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The Monetary Economy of
the Netherlands, c. 690 – c. 760
and the Trade with England:
A Study of the ‘Porcupine’ Sceattas
of Series E

Michael Metcalf
and
Wybrand Op den Velde

Volume I

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FOREWORD

Encouraged by the completion of our monograph on the sceattas of Series D, which was published as *JMP* 90, for 2003, we resolved to renew our collaboration by undertaking a similar study of Series E, the 'porcupines'. This turned out to be a more complex and a more challenging project. In scale alone, the die-corpus on which the analysis is based records more than 3,500 specimens – a minute fraction of the millions of porcupines that once existed, but an impressively large sample nevertheless, and one that is rich in informative die-links. Whereas Series D was minted only in the primary phase (say, a twenty-five to thirty-year period within the years c. 690 - 715/720), Series E began at much the same date, but continued throughout the secondary and tertiary phases, to the middle or even the end of the eighth century. It comprises a wide range of formal varieties. The secondary phase, in particular, shows endless minor variations and combinations in the porcupines' designs, making it difficult to devise a scheme of classification that should correspond with the order in which the coins were issued. For a couple of years we wandered around the data-base in a state of confusion, unable to formulate any true perspectives. We simply did not see or imagine the conclusions that we eventually reached, namely a 'double-helix' picture.

The break-through came by studying the metrology of the secondary-phase porcupines. The more distinctive of the stylistic varieties fall into one or other of two slightly different weight-standards, reflecting a double tradition of minting. It seemed beyond what was reasonable that that could have happened in one place. But could the two minting traditions be localized, and shown to be in some sense independent of each other? What was needed was the evidence of single finds – a random sample of stray losses – to show where each tradition was located. As well as a certain number of coins from archaeological excavations, metal detectorists' finds have provided the answer. Reliable coin dealers, such as Margreet Holleman, have recorded many finds that passed through their hands, and we thank them for their valued cooperation. We are likewise deeply indebted to the fundamental work of our colleagues Arent Pol, Jan Pelsdonk, and Bauke Jan van der Veen, whose registration of single finds has gradually built up, over the years, a corpus of finds now in the NUMIS data-base which allows distribution-maps of the different varieties of porcupines to be constructed. It is a similar story in England, where numerous single finds of porcupines, among all the other types of sceattas, have been recorded since the mid-1980s in the pages of the *British Numismatic Journal*

and on the EMC web-site, thanks to Mark Blackburn, Mike Bonser, Martin Allen, and others – not forgetting all the English detectorists who have helpfully allowed their finds to be published. The large random sample of provenanced single finds (not to mention the major resource of the Domburg finds) is the key advantage, which previous scholars have not enjoyed. Previously, all sorts of hypotheses about the mint-place(s) of the porcupines could be floated, with little fear of contradiction; now, their implications in terms of regional monetary circulation can be tested. The numbers are still subject to margins of statistical variation, but the uncertainties grow less year by year, as more single finds are recorded.

There were two densely populated regions in the Netherlands where the stray losses were concentrated much more heavily than elsewhere, namely the *terpen* area of western Friesland, and secondly south of the Rhine frontier, in the Rhine mouths area (the ‘Big Rivers’ region), together with Domburg. Elsewhere in the Netherlands, the single finds tend to be few and far between. In the number of finds per hundred square kilometres, the contrast is often of the order of twenty-fold or greater. The two regions of dense coin losses are the obvious choice, where we should expect the two minting traditions to have been located. And the ratio of single finds of the two traditions inclines one way in one region, the other way in the other. That is, in practical terms, sufficient proof to locate the minting of at any rate the bulk of the porcupines somewhere within the two regions of concentration respectively: where the group of varieties is relatively more plentiful, is where it originated. There may be two or three sub-varieties or groups of related dies left over, for which a different attribution will one day be demonstrated, but the major perspectives, which dominate the statistics, are clear. In the secondary phase there were two distinctive groups of porcupines, from north and south; in the primary phase, the corresponding situation is that Series D was relatively more dominant in the north, and Series E in the south. The explanatory power of the two-mint hypothesis is considerable. One can now see how it was possible that Series D and primary E behaved so differently in the Netherlands, the early porcupines being exported to England to a relatively much greater extent because they served the trade out of the Rhine mouths, while Series D circulated in both north and south of the Netherlands. It is difficult to imagine how that could have happened if both D and E had been minted in the same region. The two-mint hypothesis also opens up a range of other lines of enquiry, for example the question of the shipping routes by which the two kinds of porcupines reached England, and their ‘behaviour’ there, in terms of their varying occurrence in regional currencies within England. Again, they created distribution-patterns that can be tested statistically.

The final idea of the study, which was quite unexpected by the authors until a late stage in its preparation, was that the replacement of Series D by porcupines in Friesland, at a date somewhere around the decade 710/720, and the minting thereafter of porcupines in both of the main regions, was essentially a political decision. It can be set into the political history of the Netherlands, specifically the Frankish conquest of Frisia. For a long time we had been hampered from reaching this insight by an erroneous comparison between the finds from Domburg and Dorestad, which had led to the suggestion that Series D belonged to Domburg and E to Dorestad. That error went back to 1984.¹ The dating of the Nice-Cimiez hoard was also a stumbling block.

We have tried to observe the scientific proprieties which we learned in our youth, first presenting the evidence in all its rich detail, and then concluding each section of the argument with a very brief summary. Throughout, we have tried to write concisely. If that has generated a rather lengthy monograph, it is because of the sheer scale, the complexity, and the difficult and delicate problems of interpretation of the porcupine sceattas. The reader to whom one porcupine looks much like the other may find it helpful to begin by reading Chapter 8.1, which summarizes the shape or framework of the argument.

After the death of Radbod, much of the territory of the Netherlands remained ethnically Frisian, even if Merovingian military and political control had been pushed northwards. The merchant-seamen – Lebecq’s *marchands-navigateurs* – who sailed out of Domburg still felt themselves to be Frisian, even if they paid their harbour dues to an official of the Merovingian government, and obtained their sceattas from a moneyer who himself paid royal taxes.² The choice of design of the sceattas had a political as well as a commercial aspect. Series D had been the coinage of Radbod; the porcupines were still sceattas, and from the commercial point of view they were still Frisian, but in a political sense, they were Frankish.

There are many ramifications of Series E, but the two-mint hypothesis, supported by the evidence of the composition of the currency in the Big Rivers region and in Friesland respectively, is at the heart of our study. England was the destination for a substantial fraction of the mint-output. That raises the obvious question whether the two mints supplied different proportions of the inflows in different regions of England. The prevalence of porcupines in the English currency led to the striking of a certain number of direct copies, of varying intrinsic value, and also to several borrowings of the distinctive ‘porcupine’ design in combination with other, English designs.

¹ Metcalf (1984) pp. 159-160.

² Lebecq (1983).

The outreach of the porcupine sceattas extended in other directions, too, although not on such a massive scale. They were carried to Jutland, where again a substantial proportion of the finds are imitative (but where they were struck is not yet clear). In the middle Rhinelands porcupines became the dominant coin type. Many of the finds from there, especially grave finds, are base-metal copies. And they occur in Belgium and France, and all the way to Provence, as a minor element in the currency of Merovingian deniers. In north-western France, the question arises whether the inflows were directly from the Netherlands, or from England.

Carlo Cipolla, long ago, characterized the Byzantine gold solidus as 'the dollar of the Middle Ages' – more exactly, of the early medieval Mediterranean world.³ One could with justice think of the porcupine sceattas as the dollars of the North Sea world in their day. They were struck in great quantities, and were the visible evidence of an exceptionally strong monetary system and, behind it, a strong economy based in the Netherlands, with export links to England and elsewhere.

³ Cipolla (1956).

1. INTRODUCTION

1.1 Earlier interpretations of Series E

The ‘porcupine’ design has proved to be a kind of early-medieval Rorschach test in which various students, since the nineteenth century, imagined that they could see ‘a galley furnished with oars, the Capitoline wolf suckling Romulus and Remus, a debased head, an insect, a crayfish, a fantastic bird’.⁴ In order to escape from such fanciful interpretations Sutherland, in 1942, first proposed the name porcupine, ‘in order to avoid controversial alternatives’.⁵ Creatures of the porcupine family, incidentally, had a European distribution, and one was even borne as the coat of arms of a lord mayor of London in 1445, well before the discovery of America.⁶ But Sutherland’s choice was a safe one: it is certain that a porcupine is not what was intended by the die-cutters. In his alphabetical scheme of series, Rigold labelled the type Series E,⁷ but Sutherland’s harmless name, occasionally shortened to ‘porkies’, has endeared itself to generations of collectors and detectorists.⁸ The truth about the source of the ‘porcupine’ design remained baffling until 1987. Some immature suggestions are still made, claiming debasement from sceatta types showing a head – of later date than the supposed imitation! It was Michel Dhénin who had the pleasure of pointing out for the first time the correct explanation, namely that the primary-phase porcupines of both the ‘plumed bird’ variety and also of Variety G, are certainly copied from Celtic bronze coins of the Carnutes.⁹



Figure 1.1. Prototypes of early porcupines, of variety G and the ‘plumed bird’ variety: Celtic bronze coins of the Carnutes (after Dhénin, figs. 8 and 10).⁹

⁴ Metcalf (1966) p. 179; Gannon (2003).

⁵ Sutherland (1942) p. 64.

⁶ Fox-Davies (1949) p. 217.

⁷ Rigold (1977).

⁸ The diminutive ‘porkies’ also has the meaning, in Cockney Londoners’ rhyming slang, of (pork pies =) lies.

⁹ Dhénin (1987) p. 311.

Presumably a hoard of these had come to light somewhere by chance, and they were shown to the die-cutters, who copied them in their own style. Why coins from the Paris basin should have been imitated in the Netherlands is a mystery; but these are by no means the only sceattas to copy much older prototypes, of distant origin, seemingly without rhyme or reason.

To us, today, it appears perfectly clear that the porcupines were minted in the Netherlands, with the possible exception of a small proportion of imitations. They are, admittedly, by far the most plentiful series of sceattas found in England, where they account for roughly 20 percent of stray losses of sceattas. But they make up an even greater proportion of the sceatta finds in the Netherlands, probably twice as great. The theory of diffusion suggests that they spread outwards from the region where they were relatively most plentiful. In the normal course of events we should assume that that region is where they were minted. The role of the porcupines as an export currency, which was produced in order to be spent abroad e.g. in England, helps to explain the erroneous ideas about their attribution which persisted for so long. They were indeed an English currency, which would normally lead one to suppose that they were minted in England. In this case the normal conclusion would be false. It is quite hard now to realize just how recently a correct understanding became clear. Throughout the nineteenth century the dominant view was indeed that the porcupines were Anglo-Saxon. As late as 1942 Sutherland judged that 'the type may be assigned in the main to England on the grounds of its conspicuous frequency, [but it] appears to have travelled abroad in good numbers'.¹⁰ P.V. (Philip) Hill in 1951 still accepted that the porcupines were English,¹¹ but by 1954 he had revised his opinion and for various reasons was prepared to say that they were Frisian. He even expressed the view, in 1958, that different varieties of porcupines were predominant in the currency of different parts of Frisia; they were localized issues, each with its 'sphere of influence'.¹² This ill-judged development of the basic idea rested on the stylistic differences between the porcupines found in the hoards of Kloster Barthe (1838), Franeker (1868), and Hallum (1866). It implied that the circulation of the varieties in question was confined, in the Netherlands, within rather small districts, a notion difficult (but not altogether impossible) to reconcile with the use of porcupines in the export trade to England. Rigold, in 1960, promptly rejected Hill's thesis of localization, pointing out sensibly that the differences between the characteristic coins in the three hoards were to be explained in

¹⁰ Sutherland (1942) p. 53.

¹¹ Hill (1949-51) p. 251; Hill (1954) p. 11; Hill (1955) p. 104.

¹² Hill (1958).

terms of chronological development: the later specimens were, he said, more degraded.¹³ He hedged his bets a little, with the very practical, very Rigoldian dictum that porcupines (from an English perspective) ‘are assumed to be foreign unless proved otherwise’. Given the very large inflows of porcupines into England, the idea that they might have been imitated locally is an obvious speculation. One of us failed, in 1966, to heed Rigold’s mentioning the word ‘proof’, stating that the porcupines ‘were mostly struck on the Continent, and to small extent in England. Varieties E and F seem to belong to Dorestad; variety D, the VOIC coins, and the “plumed bird” type (*BMC* Type 6) belong to England. One of the basic unanswered questions is whether ‘porcupines’ were struck at Quentovic, and if so (as is likely) which varieties are to be assigned to that mint. One might guess at variety B. Some of the later or derivative varieties may have been struck in East Frisia’.¹⁴ All this was exuberant hypothesizing, without a shred of quantified evidence offered in support. None of these suggestions should now be accepted without the proof of distribution-maps; they were simply speculative. As recently as 1977, when Rigold published the alphabetical scheme of ‘Series’ in standard use today, he stated that ‘D, E, and F are “Intermediate” [in date] with strong Frisian, or NE Frankish, connections.’¹⁵ (Series F is now seen to be English.) In the same article Rigold wrote of the porcupines as ‘rivalling the [English] Primary coins in weight and metal, probably originating in Frisia but *definitely not* all struck there’ (our italics).¹⁶ The other of us, in a joint study published in 1984, wrote that ‘after a study of the distribution patterns... *BMC* Type 53 emerges as Frankish, vars. D and VOIC as probably English, and B and F as Frisian.’¹⁷ Lord Stewartby, on the same occasion, began by commenting with a sound instinct that Series E, while not rare in England, had been found ‘in much greater quantities in the Netherlands’. But he then back-tracked from that position by commenting that ‘a number of the early [i.e. primary] varieties of the series have been found more frequently in England than in Frisia and the same varieties were prominent in the Aston Rowant hoard... The Frisian porcupines tend to be coarser in execution, larger, and often less fine than those found predominantly in England’.¹⁸ Over the years, almost every variety of porcupine has been moved around like pieces on a game-board, with complete

¹³ Rigold (1960-61) p. 26.

¹⁴ Metcalf (1966) p. 204.

¹⁵ Rigold (1977).

¹⁶ Rigold (1977) p. 22.

¹⁷ Op den Velde, De Boone & Pol (1984) p. 117.

¹⁸ Stewart (1984) p. 10-11: the name is now Lord Stewartby.

insouciance. *Quot homines, tot sententiae* understates the case. Some progress was made in the forty-year period that has been reviewed; but when so many shrewd and experienced numismatists failed to reach a consensus (and failed to establish that none of the substantive varieties was of English attribution), it should be clear that the problem was an intrinsically difficult one, calling for exact observation, a rigorous methodology, – and also for fresh evidence.

That fresh evidence, which has gradually accumulated over the last twenty years, comes from single finds. Coins from archaeological excavations, but above all finds reported by metal detectorists, constitute a quite different class of material from hoards, because each stray loss is a statistically separate event. If the single finds are accidental losses, they should provide a random sample of the currency from which they fell out. Handled in that way, they allow us to say what percentage of the regional currency consisted of porcupines. Lord Stewartby's observation, quoted above, already uses this argument, although without putting exact numbers to it. And to be fair to him, there are indeed relatively more single finds of primary-phase porcupines from England than from the Netherlands. One can go much farther, if the sample of single finds is large enough, and compare the occurrence of different varieties of porcupines in particular regions within England, such as Wessex or East Anglia. In 1993 the Ashmolean Museum catalogue, *Thrymsas and Sceattas*, offered an essay on the methodology required to distinguish the mint-places of Series D and E. It was anchored to the Domburg finds, a very large sample presumed (although not known with certainty) to consist essentially of stray losses.¹⁹ The strategy was to compare the proportions among the Domburg finds with those at the great river-port of Dorestad. This comparison had first been made in 1984. Built into the thesis was the assumption that Series D and E were each the distinctive currency of a major *wic*. Both series were found plentifully at both places, but judging by a kind of matrix analysis of the relative proportions it seemed that E belonged to Dorestad and D very probably to Domburg. Unfortunately this conclusion was, as we now think, flawed, for two main reasons: Series D, which was minted in Friesland, flooded into Domburg in much greater quantities than the local porcupines; and the porcupine finds from Dorestad on which the comparison between the two *wics* was based had a very different date-range from those at Domburg.²⁰ The minting of Series D was restricted to the primary phase, whereas the age-profile at Dorestad peaks later. If the date-range of the coin losses at the two *wics* had been the same, a

¹⁹ If grave-finds are also involved, they will not necessarily compromise the statistical comparison between Domburg and other sites.

²⁰ Op den Velde, Pol & De Boone (1984) p. 135 fig. 1.

better reading of the evidence would probably have been apparent. In our previous monograph on Series D, published as the *Jaarboek* for 2003, we attempted a more detailed breakdown of the regional occurrence of the ‘continental runic’ type within the Netherlands, revealing regional differences in the occurrence of successive sub-varieties, but we failed to identify the technical flaw in the broader argument, which had led to the conclusion that Series D belonged very probably to Domburg. We hope that the arguments developed below go some way to clear up the confusion. They rest on the recognition of a dual system in the secondary phase, whereby two distinct streams of porcupines were minted, one in the Rhine mouths area and/or Domburg, and the other in Friesland, each region using its own design variants, and slightly different weight-standards. This recognition carries back into the primary phase, when there was a similar duality, porcupines being minted in the Rhine mouths area, perhaps also at Domburg and Series D in Friesland. In the Franeker or tertiary phase similarly, there are three substantive varieties of porcupine, two of which replicate designs from the primary phase, and are doubtless from the Big Rivers region, while the third replicates a characteristic Friesland design of the secondary phase. We hope that, after so many erroneous hypotheses, the dual system now proposed will turn out to be definitive.

The discovery of the large Aston Rowant hoard, in Oxfordshire in 1971, had made it clear that there were exactly four distinct varieties of porcupines during the primary phase, i.e. until roughly 715. More than 60 specimens of these four varieties chart their stylistic development up to the date of the hoard’s concealment, from their origin fifteen or twenty years earlier. De Wit has recently commented that among the four oldest types, ‘Metcalf does not consider [his] sub-group 1 [reverse with ToT- /\], which to my mind however constitutes the very beginning’.²¹ Leaving aside Dhénin’s discovery,⁹ which De Wit ignores, this is to say the least an old-fashioned style of numismatic thinking. If it had been correct, some specimens with ToT- /\ would surely have survived into the Aston Rowant hoard, probably looking a little worn.²² In all the speculation about the iconography of the porcupine design, let us not overlook the accompanying reverses, which are based on a large square and are undoubtedly derived from the Roman votive banner of the English sceattas of Series A, or possibly the same design on the slightly later Series C.

²¹ Auction Sale Künker, *The De Wit Collection, Part 4*, Osnabrück, 2008, at p. 29. No sale took place. The catalogue is a document of record, as the collection was acquired *en bloc* by the Fitzwilliam Museum Cambridge.

²² There are sceatta types that were certainly in existence at the time of the hoard’s deposit which are not represented in it, e.g. the Northumbrian coins of Aldfrith, and Series W from Wessex. But De Wit is talking about the earliest porcupines.



Figure 1.2. Prototypes of the reverse design of the porcupine sceattas.

The square is filled, on the Low Countries primary sceattas, with one of four distinctive versions ('plumed bird', VICO, G and D), each paired up without exception with an equally distinctive obverse variety. In short, it is reasonably clear that the primary phase porcupines were minted in four separate establishments. (The VICO type can perhaps be subdivided into two, but that is a refinement.)

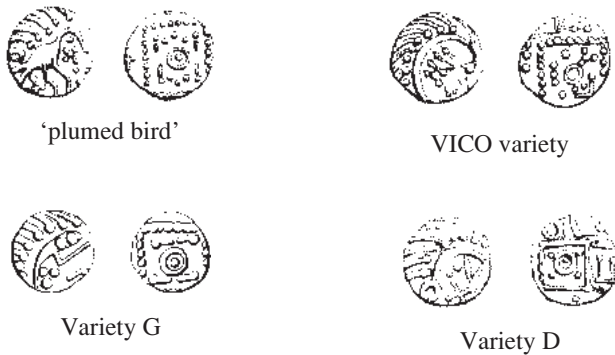


Figure 1.3. The four primary-phase porcupine varieties.

Each of the four kept strictly to its own design throughout the period of issue. Two at least of the four, as we have seen, appear to have begun at the same moment, sharing an initial impetus from two coin designs of the Carnutes (fig. 1.1, p 1). What was the administrative character of these four establishments? Were they each the workshop of a moneyer, the sort of businessman/craftsman who had put his name on Merovingian tremisses? – Whereas Merovingian moneyers are usually known from just two or three or a small handful of surviving coins, the primary porcupines exist in their hundreds. Could one moneyer with his journeymen and apprentices have produced so many? The scale of the operation is something to bear in mind when asking the next bunch of questions. Where were the workshops for each of the four varieties located? Was there any kind of political oversight or any collegiality

which connected them? Were two, three, or all four of them located in the same *wic*, e.g. Domburg, or were they spread around the Rhine mouths region, in Domburg, Katwijk, and elsewhere? Could one of them, namely the ‘plumed bird’ variety, be English, even? These are questions that might, in principle, be answered if there were differences in the relative proportions of the four varieties at the localities in question; but it is asking a lot of the evidence presently available, because, Domburg apart, single finds of the primary porcupines are rather few in the Netherlands. There are more from England, but there is no sensible expectation that two or more mint-places clustered together in the Rhine mouths area would generate significantly different distribution-patterns among the English finds. Marginally different patterns in England from coins minted in Friesland and the Rhine mouths, i.e. Series D and primary E are, perhaps, to be expected; but an empirical approach is called for – first, discover the differences; only then, try to explain them.

Before stylistic groups can be compared statistically, they have to be defined, and a list of specimens falling within each group has to be established. A composite diagram, originally published in 1966 (fig. 1.4), divided all the porcupines (and also Series D and G), into Varieties A to M. The varieties were

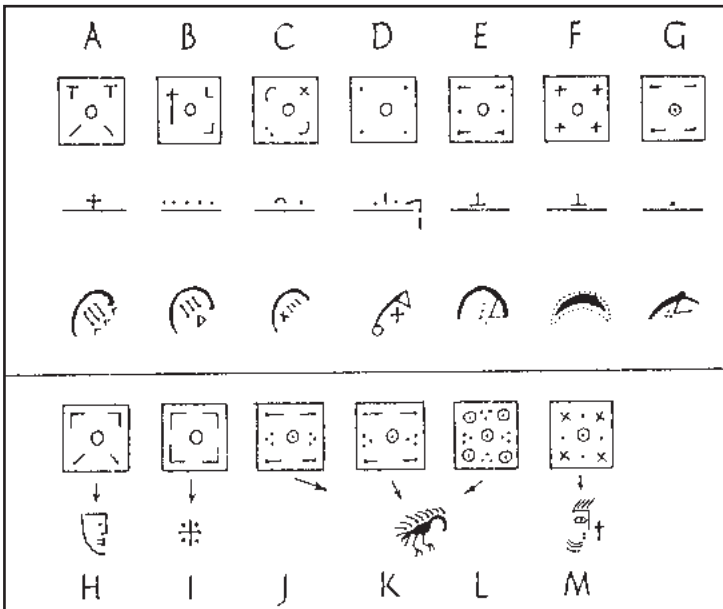


Figure 1.4. Diagram of the porcupine varieties (Metcalf 1966).

defined in terms of the pattern within the reverse standard, although it was noted that a distinctive obverse was associated with each. Sometimes the border ornaments on the reverse were also specific to the variety. The diagram jumbled up porcupines of the primary, secondary, and tertiary phases, and should not now be taken as more than a first, rough approximation. There are many secondary-phase variants not included in the diagram. It is reproduced here because the labels have stuck, and are still in use, e.g. in the corpus below, and in particular in the tertiary phase.

The scheme summarized in fig. 1.4 works well for the primary phase, and well enough for the tertiary phase, but in the secondary phase, it sometimes happens that quite different obverse designs are used with the same reverse design. The familiar ToT- / \ reverse (Variety A in the diagram), for example, is coupled with various obverses. If the ToT- / \ coins belong, as is virtually certain, to the Rhine mouths area, do they reflect a new uniformity imposed politically on the four primary-phase workshops, each of which had previously done its own thing? And if so, was there continuity of production, three or four workshops still being recognizable, each by its obverse design? That might be very difficult for the numismatist to prove, but if it is the necessary task, let us at least recognize it as such. Evidence is most likely to come from hoards. The Aston Rowant hoard was concealed at or close to the end of the primary phase; if we had another hoard from fairly early in the primary phase (and preferably from the Big Rivers region) it would be unlikely to yield any surprises (*pace* De Wit). Similarly there are various hoards from late in the secondary phase; but a substantial new hoard of ToT- / \ coins deposited early in the secondary phase would put our understanding of them on an entirely new footing. As things stand at present, the Hallum hoard is tantalizing, but leaves almost all our questions unanswered.

The basic numismatic questions about any early medieval coin are 'where' and 'when'. Almost everything that has been said so far concerns the question 'where', to which many and varied incorrect answers have been given, over the years. 'When' is by comparison more straightforward, at least as regards a relative chronology. There are three successive phases, which are well defined by the three type-hoards of Aston Rowant, Kloster Barthe, and Franeker. Traditionally, a relative chronology has been established for the whole of the sceatta series, both English and Continental, by the presence of types side by side in particular hoards, and also (in the secondary phase) by declining silver contents. This last is an argument that has its limitations, both because of variability in the alloy at any particular moment, and because debasement may have proceeded differently in different regions. A relative chronology is, nevertheless, a practical possibility. An absolute chronology is more difficult

altogether. Attempts have been made to anchor the relative chronology at one or two points, and to spread the issues out to occupy the spaces thus created. Reliance has been placed on dramatic historical events as the occasion for the concealing (or, more exactly, the nonrecovery) of particular hoards. Rigold, speaking of the Franeker, Terwispel, Kloster Barthe, and Lutje Saaksum hoards, says, ‘the crises that caused their abandonment must be later than Hallum, which must be put correspondingly farther back from the final invasion of Carolingian money and men. The context of all these hoards is the tempestuous genesis of the Carolingian empire, the mayoralty of Charles Martel... In 734 the Frisians, driven out of Gaul, were attacked by sea: this suits Hallum, the earliest and most coastal of the hoards, well enough. Cimiez was sacked in the course of the Lombard wars, in 737. I see no reason to question this long familiar dating.... It is noteworthy also that the Dutch finds become much more numerous in this phase of Primary Runic [meaning Series C] and type BII. This same second decade, or thereabouts, in spite of the troubles which drove Willibald from his see, was marked by an increased intercourse with England and by that close imitation of coinage which would betoken an assimilation of culture. Frisia... was entering a brief period of identity with the Anglian world, before passing into the Frankish orbit’.²³

The historical context sketched by Rigold, and the dating the Friesland hoards to the 730s or 740s are a good basis for discussion, but they do not amount to rigorous proof. Rigold used a similar style of argument to work out the date of the English Series A, B, and C, concluding with the peroration, ‘The “primary sceattas” themselves are the coinage of the reign of Wihtried’.²⁴ A nice idea, but it eventually proved to be a decade or so adrift: they are more probably the coinage of the reign of Hlothere (673-685). As for the Friesland hoards they are, as he himself had pointed out, not identical in their composition – because they are not tightly clustered in date.

The only anchor-point where there is anything approaching documentary confirmation of date is the Cimiez hoard, from the outskirts of Nice. And here, the long familiar dating, which Rigold saw no reason to question, has been challenged by Grierson and Blackburn, who prefer *c.* 720.²⁵ Their arguments are flatly dismissed by Lafaurie who, having previously suggested 735/740, gave as his latest opinion 741.²⁶ This serious disagreement, amounting to some 20 years, extends to the dating of a series of other French hoards. The dating is,

²³ Rigold (1960-61) pp. 26-27.

²⁴ Rigold (1960-61) p. 29.

²⁵ Grierson & Blackburn (1986) pp. 140-144; 147-149.

²⁶ Lafaurie & Pilet-Lemière (2003) p. 52 (6.88.1).

in a word, not merely disputed, but thoroughly problematic. It does not bring precision to the dating of the porcupine series; rather, any strength which the comparison may have flows in the other direction.

Another form of special pleading might be to argue that the primary-phase porcupines which are conspicuous in Nice-Cimiez reflect a brief peak of out-flows of money from the Netherlands to France. But the preponderance of the ‘plumed bird’ variety hints that these primary porcupines may have reached the Mediterranean coast via the south coasts of England (where ‘plumed bird’ specimens are relatively common) along with, for example, sceattas of the scarce primary Series W – which were imitated there and found their way into the Nice-Cimiez hoard.²⁷



Figure 1.5. A sceat of Series W.

There are several other French hoards for which it would be necessary to invoke this brief episode, e.g. the Bais hoard, which Lafaurie dates to 740, Grierson and Blackburn to *c.* 710.²⁸

The outcome of the contested evidence is that we shall feel free to construct a chronology for the porcupines based on Frankish-Frisian conflict in the Netherlands, and on the career and death of Radbod. It may even be that new evidence from France will eventually confirm the chronology.

A date for the end of the minting of porcupines in the Rhine mouths area comes with Pepin’s coinage reform, which launched the broader-flan Carolingian denarius. Pepin became king in 751. In a capitulary of 754/755 he laid down that not more than 22 solidi (i.e. 264 denarii) should be cut from a pound weight of coinage metal. That suggests a standard of *c.* 1.24 g, which corresponds well enough with the observed weight of the reformed coinage. Although porcupine sceattas could well have been referred to in the capitulary as denarii, those of the tertiary phase were considerably lighter. Again, the evidence for dating the porcupines is rather inconclusive.

²⁷ Metcalf (2005) p. 22.

²⁸ Lafaurie (1981a); Grierson & Blackburn (1986) p. 144. See also p. 133 and p. 287.

Summary

The basic numismatic questions are where and when. Throughout the 19th and the first half of the 20th century the dominant view was that the porcupine sceattas were English. Gradually it became clear that most varieties were struck in the realm of the present-day kingdom of the Netherlands, and that the large numbers of finds of porcupines in England represent coins imported from the Continent. The many porcupine varieties, once interpreted as the currency of various regions, are better understood as the issues struck during three successive phases. The dating of these phases largely depends on the meticulous study of the composition of hoards, and has changed considerably during the past fifty years.

2. PROCEDURES AND METHODS

2.1 The checking of die-identity

A corpus of sceattas of Series E was compiled. Illustrations of the coins were collected from books, journal articles, auction sale catalogues or dealer's price lists, from internet data-bases and from privately owned collections. In older works engravings of the coins are given. Although it is known that engravers sometimes 'improved' what they saw, in cases where we were able to compare the coin itself with the engraving these hand-made illustrations proved to be remarkably exact. In several instances engravings were accurate enough to establish die identity with considerable confidence.²⁹

Most published sources use photographs of the coins. These are of variable quality. The usual way of photographing coins is with oblique light from above or one side. The illuminated edges of the design are then strongly lit, while the other side contains a cast shadow. Seen from above a line or curve appears to have been shifted in the direction of the shadow. Details in the shadow are poorly visible. As a result, one and the same coin, photographed with lighting from various angles may at first glance look quite different. Therefore, in comparing photos one has to mentally correct the images.

The dies used to strike the porcupine sceattas were considerably larger than the coin flans. Many specimens are struck off-centre, so that only a part of the design is visible. Furthermore, in establishing die-identity, both the state of the dies and the conservation of the coins play an important role. Longer use and wear and tear may obscure characteristic details. As a result the establishment of die-identity is often difficult. Several series of porcupine sceattas were struck from sets of closely similar dies, apparently cut by the same person. In particular in the case of a simple design (such as the obverse of Variety G), or a nearly symmetrical design (for example the reverses of Varieties D, E, and F) it can be quite difficult to exclude die-identity. Where the conservation or the photograph of a coin was poor, they were omitted from the die study, but not from the Corpus.

To minimize the above mentioned problems, all coin illustrations were enlarged to 200 percent natural size by photocopying. In some instances the degree of enlargement had to be a guess, in particular for scans published on the internet, which usually lack an indication of the exact size. As a safeguard

²⁹ See for example fig. 5.2 on p. 131.

against unconscious bias obverses and reverses were separated and die-checked blind. The find spot or origin was indicated with a code number on the reverse of the photocopies. Further, of all coins two identical photocopies were made. These images were sorted on the basis of obvious details of the design and compared one by one. In the case of die-identity they were fixed to each other with removable tape. When there was doubt a drawing of each enlarged coin side was made on transparent paper, reckoning the direction of lighting. By superimposing the drawings it was possible to decide if they were from the same die or not. Even so, in several instances there remained a margin of uncertainty. After all pairs of the twice copied coins were finally placed near each other the die checking was considered as completed. One has to realize that, because of all the uncertainties, the verdict die-identity is in some instances nothing more than a good guess. Much care and effort were expended on achieving the best possible result, and we hope that the number of false-positive verdicts will more or less equal out the number of missed die-identities.

2.2 Estimation of the total volume

The first step in an estimation of the total volume of all porcupine sceattas – or a variety – is to establish the total number of dies used. From a consideration of the proportion of duplicates (i.e. coins struck from the same die – obverse or reverse, or both) in a sample, it is possible to derive an estimate of the original total of dies used. One can readily understand that if for example 900 sceattas of a defined variety 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 use. But for practical purposes one could say that all the dies of the variety are known. At the other end of the spectrum, a random sample of 900 of the same coins in which there were very few die-duplicates would clearly imply an original total of many thousands of dies. The truth, of course, lies somewhere in between these extremes. 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 at a *Table ronde* held in Paris in 1980.³⁰ The results were generally favourable, allowing one to choose Good's formula, which has the merits that it is easy to use, and that it is designed to cope with

³⁰ Carcassonne & Hackens (1981).

the fact that some dies were used to strike more coins than others. Good's formula states that: non-singletons : sample = known dies : x, where x = the original total output expressed in numbers of dies. The formula is applied for obverses and reverses separately, which can reveal, for example, that two reverse dies were routinely used with each obverse die.

In the next step the total volume of a variety can be gathered from the estimated number of reverse dies (subject, of course, to margins of statistical probability). When official documentary records for mint-activity begin to survive, from thirteenth-century England, they show that the average output of a reverse die (no doubt concealing wide individual variations) was in the range 15,000 to 20,000 silver pennies, and for the lower die 30,000 to 40,000.³¹ Obverse dies were routinely used to strike twice as many coins as reverse dies. What the average was in earlier centuries is, in the absence of documentary evidence, endlessly disputed. The eighth-century sceat was in high relief, but its area was only *c.* 40 percent of that of the fourteenth-century Edwardian penny. The technology for the production of porcupine sceattas was essentially the same, and there are those who argue that an assumed average of 10,000 is a reasonable or even a cautious guess. For others, 5,000 is as far as they are willing to go. We are well content to take a prudent and conservative view, and suppose that an average reverse sceat die could be used to strike a figure of close to 10,000 coins. It is, in any case, the reverse die that one should look at in order to form an impression of the outputs of the mints. An obverse (lower) die remained serviceable for a very long time, because it received much less force during the striking than the upper die.

2.3 Dating of the porcupine varieties

The ideas about the dates of issue of the porcupine sceatta varieties are based primarily on the composition of hoards and of groups of coins from graves. If other types of coins are present in a hoard alongside porcupines, they may help to establish relative or even absolute dates. For example, a rare sceat type of Northumbria bears the name of King Aldfrith (685-704).³² Some Merovingian coins can be dated within rather specific limits, because their legends indicate a ruler, the period of whose reign is well documented. Unfortunately, however, most of the known hoards with porcupine sceattas do not include other, securely dateable varieties. They can at best contribute to a relative chronology. The transition from the

³¹ Crump & Johnson (1913); Stewart (1963, 1964); Mate (1969); and Stewartby (2009).

³² Metcalf (2006).

minting of Series D to secondary-phase porcupine sceattas in Friesland probably follows the death of King Radbod in 719. We judge that the date is the *terminus post quem* for the beginning of the secondary-phase in Friesland.

Sometimes additional evidence of the date of loss, and by extension the date of production can be deduced from the archaeological context of finds. During excavations at Ribe (Denmark) sceattas were found in well-stratified layers which could be dated by dendrochronological examination of the wood-remnants.³³

2.4 The interpretation of find patterns

In general, one might expect the stray-finds of a well-defined variety to be at their most plentiful at and near the place where it was struck, declining as one goes further afield. Other aspects, such as iconography and a special economic function of the coins, have to be taken into consideration as well.

For the analysis of the English finds a more refined procedure – over-all regression analysis – was followed.³⁴ On a map all single finds of sceattas from a defined period – such as the primary phase – are indicated by a small circle. The findspots of the variety under study are represented by filled-in circles. On this map one places a transparent overlay with a circle representing 1,000 square kilometres. After selecting a suitable position on the map, one counts the number of open circles and black dots which fall within the large circle of 1,000 km², to obtain the ratio. This is a measure of how plentiful the variety was in that general locality. One repeats this procedure numerous times, moving the overlay about to give a thorough coverage of the map. One ends up with a map covered with percentages at specific points (the centre of each position of the circle), from which one can, reasonably objectively, draw lines analogous to the isobars on a weather forecast map (see for example fig. 7.2, p. 183). It is important to understand that the lines do not join points where an equal number of coins have been found, but rather where the ratio in question is equal. The resulting map helps to tell how different varieties circulated. The ratios represent the ‘competition’ between various varieties. This will give clues to the local character of monetary affairs.

In this study, the distribution patterns of the stray finds are expressed as absolute numbers and ratios per locality. Because we were interested in the global picture, only conspicuous and evident differences are taken into consideration, and no formal statistical tests of significance were employed.

³³ See p. 252.

³⁴ Metcalf (2000).

3. STYLISTIC CLASSIFICATION INTO VARIETES

3.1 The primary phase

The basic numismatic questions ‘when’ and ‘where’ of Series E have received almost as many answers as there are scholars who addressed them. A stylistic analysis of the porcupine sceattas published in 1966 was a breakthrough, and showed that there were a dozen different versions of the reverse design, each of which correlated with an equally distinctive version of the obverse.³⁵ That the versions are separate blocks of coinage in terms of their minting is confirmed by the ornaments added in the border of the reverse, outside the square of the standard – which, again, correlate well. The analysis of 1966 was far from comprehensive: many porcupines do not fit into any of the categories.

The discovery, in 1971, of the Aston Rowant hoard, was very important. This find contained at least seventy porcupines, of just four substantive varieties, in fairly equal quantities. In terms of the 1966 analysis, these were D, G, J, and another which was discussed, but not assigned a place in the alphabetical scheme: it was referred to as the ‘VOIC’ variety, because the reverse seemed to be attempting an inscription made up of those four letters. We now prefer it to read it as VICO. It is customary to refer to the four ‘Aston Rowant’ varieties as the ‘plumed bird’ variety, VICO, G, and D. Each of the four was produced from a substantial number of dies – enough to keep more than one die-cutter in employment. The Aston Rowant hoard is large enough, and varied enough, for us to be reasonably certain that at its date of concealment, *c.* 715/720, no other substantive porcupine varieties were yet in production. The early development of Series E is the story of those four varieties, and it needs to be understood in terms of their production history and of the relationships between them. A stylistic analysis of each of them quickly encounters the practical problem of distinguishing imitative pieces. Often, it is a delicate matter of judgement to decide whether a coin is official or imitative, and it will sometimes be prudent to leave the decision open.

³⁵ Metcalf (1966); fig. 1.4 on p. 7.

The 'plumed bird' varieties

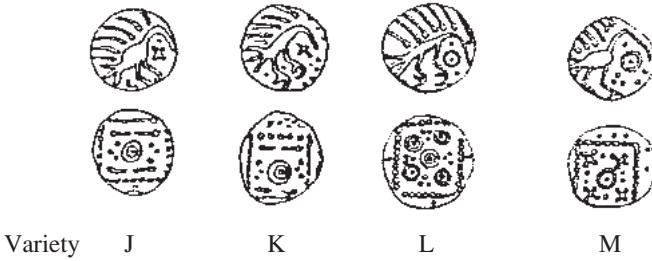
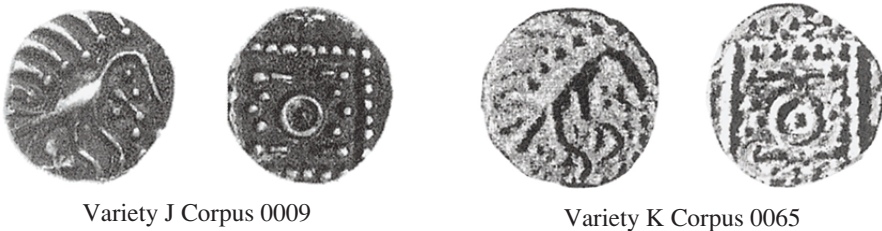


Figure 3.1. The 'plumed bird' varieties

The 'plumed bird' sceattas fall essentially into two groups, with quite different reverse types, namely J with K, and L. Variety M is an additional small group, of which only four specimens are known; it is doubtless imitative. Reverses J and K have four parallel lines and two groups of three dots in the square, while L shows five annulets each with a central pellet. The formal difference between Varieties J and K is small: the triangles of pellets are inverted. Some specimens have one of each arrangement, and others have the three dots in a straight line. It seems, therefore, that this may have been a detail of little consequence to the die-cutter. In the margins of the reverse design there is regularly a small, neat crosslet centrally on each side of the square (but variety M does not conform). As the dies are quite large in relation to the size of the flans, it is rare to be able to see more than two of the four crosslets. The details in the margin will, again, have been of little consequence to the die engravers, which makes them valuable for stylistic analysis.



There are two quite different styles of the bird on the obverse, one with a rounded, naturalistic body and curved neck, the other with a tubular body from which the neck is continued as a straight line, before making a right-angled bend. On the illustrated specimen from the Spalding productive site (Corpus 0065), the crosslet in the reverse margin is flanked by a line of pellets. These styles correlate imperfectly with the varieties: J+K coins mostly have

naturalistic birds, and L mostly tubular. As to the margins it is difficult to generalize. But there are too many exceptions in both groups, of coins which are perfectly acceptable in style. A rearrangement of the type to make the shape of the bird's body the main criterion is ruled out by the pattern of weights. The symbol under the bird's neck – a cross pommée – is associated with reverse variety J+K, and an annulet with central pellet is associated with Variety L. There may have been two or more die-cutters working side by side. Which variety came first, J+K or L? That question seems relatively easy to answer. Variety J was represented in the Aston Rowant hoard, but not, apparently, L. The less plentiful Variety L is probably absent because it is later in date than Aston Rowant. The later dating of Variety L is in any case supported by metrology (fig. 4.9 on p. 81). Variety J+K has a modal weight of *c.* 1.23 g, with a rather skew distribution, suggestive of a secondary peak at *c.* 1.13 g. Variety L is lighter and poorly controlled. The evidence of silver contents is less conclusive. Three examined specimens of Variety J contain 96, 96, and 93 percent 'silver'. Another, somewhat corroded, from Hamwic is estimated at 89 percent, and a piece present in the Föhr hoard contained 92 percent.³⁶ A specimen of Variety L is 88 percent silver, with a very small addition of tin. The change in design may even have been adopted to mark a change in intrinsic value. All in all, the stylistic variation among the 'plumed birds', and the scarcity of die-links, point to a substantial output over a considerable period of time.



Corpus 0081 Six Hills

Corpus 0085 Wharram Percy

The J+K varieties with the groups of three dots on the reverse in a straight line tend to lack the cross pommée under the bird's neck, having instead a row of three pellets, or a line terminated by pellets, or a defective cross. On the same specimens one can usually see the elongated cross in front of the bird's head, which otherwise tends to be off the flan or perhaps even omitted. If we take into account their accurate weights, we may suppose that these irregular J+K coins are early.

³⁶ All coins were analysed by EPMA, except the plumed bird sceat from the Föhr hoard (corpus 0044), which was analysed by EDXRF, a less reliable method, see table 4.5, p. 97.

Stylistic classification into varieties



Corpus 0098 Reculver



Corpus 0043



Corpus 0098, found at Reculver in the eighteenth century, mixes the formal elements of the designs of J+K and L: it has a pelletted annulet under the neck, normally associated with obverse L. Its general style is perfectly acceptable, with a very neat reverse border, and its weight is high (1.23 g). One should hesitate to think of it as transitional.

Corpus 0043, from an old English collection, is an irregular Variety J specimen, with tightly packed quills, and with an exaggeratedly large crosslet in the reverse margin. The lighter weight (0.97 g), the uneven shape of the flan, and the off-centre die-adjustment of the reverse all point to imitation.



Corpus 0060 Royston



Another irregular specimen of Variety J (Corpus 0060), found at the Royston productive site, replaces the cross pommée with a group of three pellets beneath a right-angled neck. For good measure, the same ornament is repeated between the bird's legs and again behind its legs. The naturalistic bird is plump. On the reverse the right-hand margin seems to have a pelletted line instead of a crosslet. The coin's weight is at the top of the range. Its place in the scheme is, however, uncertain.



Corpus 0011 Hamwic 4



Corpus 0012 Hamwic 5



Hamwic (Southampton) 4, 5, and 6, also formally of variety J, are stylistically very close to each other, and they are not very similar to the majority of variety J. The cross pommée under the neck is replaced by a cruciform group of four bold pellets. Although these specimens are swollen by corrosion, it seems clear that the whole style is deeply and coarsely cut, with large pellets, and the coins are struck on relatively broad flans. They were found in different sectors of the excavation. Hamwic 6 (Corpus 0059) is die-linked to two other English finds. The similarity of the Hamwic finds is intriguing. They look as if they came from the same workshop. A similar specimen comes from a collection formed in nearby Winchester in the eighteenth century. It is the only sceat in the collection, and one wonders whether it may not have been another Hamwic find, reinforcing the idea of a local connection – either because these are local imitations or, perhaps more plausibly, because they derived from a batch of coinage e.g. a sample carried to Hamwic by a merchant, and which passed into the currency of the new town at an early stage in its development.

Variety L includes pairs of coins with both ‘tubular’ and plump-bodied naturalistic birds, linked by very similar reverse dies, which strongly suggest that at that stage both styles were being produced concurrently.



Corpus 0129 Marston



Corpus 0136

Variety L apparently tails off into specimens on which the groups of pellets between the annulets on the reverse, instead of being in threes, are reduced to twos or single pellets. The Marston find (Corpus 0129), from near Oxford, is an example; chipped, it weighs only 0.74 g. No. 25 from P. Finn’s list 10 (Corpus 0136) is another example, as is Cimiez 61 (Corpus 0130), which is of full weight (1.25 g). On both these specimens the marginal crosslets are large. It is difficult to be sure where one should draw the line, however, between the (presumed) tail-end of Variety L, and imitations.



Corpus 0154 Domburg 300



Corpus 0153 Barham

Domburg 300 is not unlike the Marston find except that the bird is laterally reversed. Lateral reversal is often an indication of imitation. On the reverse, the annulets are thin, and pairs of dots are arranged radially; and the marginal crosslets have devolved into \perp , \perp . A find from Barham (K) (Corpus 0153) is another left-facing Variety L, in a looser and perhaps later style.



Corpus 0155 Royston

Over the imitative origin of Royston 15 (Corpus 0155), another rough specimen of Variety L, one need not hesitate. The bird has only one clumsy leg, and its plumes lie the wrong way. Beneath the neck is an unpeletted annulet, but also a group of three pellets. The tail feathers are untidy. The reverse has pellets in threes and singly, with strange thick lines in the outer border instead of crosslets.



Corpus 0163 Nice-Cimiez hoard

Corpus 0164 Winchester

The group of ‘plumed birds’ present in the large Nice-Cimiez hoard comprises some eccentric specimens. Cimiez 57 (Corpus 0163) is a ‘mule’ of the ‘plumed bird’ obverse with the ToT- / \ reverse of a secondary porcupine. A sceat found at Winchester (Corpus 0164) shares the same obverse die, and the reverse is another common secondary porcupine reverse. Both are patently imitative and of later date.



Corpus 0148 Nice-Cimiez hoard

Corpus 0147 Nice-Cimiez hoard

Cimiez 58 and 59 (Corpus 0148 and 0147) are of Variety M, the rare variety of which only four specimens are known, with a reverse design very similar to, and doubtless imitated from that of Series G, attributed to Quentovic (see p. 243, and the illustration on p. 35). Corpus 0148 shows a 'tubular' bird in competent style, while the bird on Corpus 0147 is clumsier but more naturalistic.



Corpus 0123 Nice-Cimiez hoard

Cimiez 62, listed as Variety L (Corpus 0123), is also clumsy, and may be by the same hand as no. 59. As Series G was not represented in the Aston Rowant hoard,³⁷ these imitations may, again, be of secondary date. The report of the Nice-Cimiez hoard by Morel-Fatio, published in 1890 by Chabouillet, includes ten 'plumed birds', the published weights of which do not match up with the six published by Le Gentilhomme in 1938. This may be through simple error rather than substitution.



Bawsey³⁸

Corpus 0168 Fincham

Among the more exotic imitations may be mentioned a Series D/'plumed bird' (var. K) 'mule' from Bawsey, and a Series E/'plumed bird' (Var. L) 'mule' from Fincham.³⁹

Nothing in the detailed evidence offers any support for the hypothesis that the 'plumed bird' sceattas perhaps are English or north French, although the Cimiez hoard may perhaps reflect some French copying, and the Hamwic finds could be of local origin. The English single finds, particularly those from the east Midlands and the north, point to imports via the North Sea trade, probably

³⁷ Except for one (intrusive?) coin of Type 36.

³⁸ The Bawsey find was published as *BMC* Type 8 mule, in *JMP* (2003), Corpus Series D 157.

³⁹ Corpus 0169 is a very similar coin found in France.

with a bias towards those regions of England that were under-supplied with currency in the years around 700. Variety L may turn out to have a distribution that reaches further inland.

The VICO Varieties

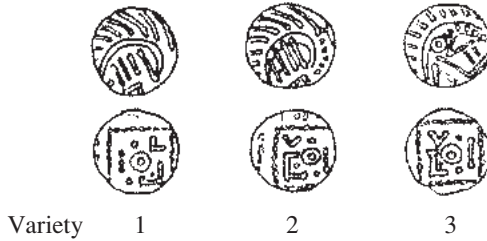


Figure 3.2. The VICO varieties.

In the VICO varieties the votive inscription in the reverse standard is replaced by an arrangement of symbols which, with the help of imagination, one may see as made up of the letters VICO, a familiar Merovingian coin legend which would be appropriate to the coinage of a *wic*. The variety is in any case conveniently labelled the VICO variety. Its reverse stands out at such an early date, from the more usual symmetrical patterns, encouraging us to think that the symbols originally had some meaning. There are essentially three sub-varieties, of which VICO 1 is the most plentiful.



On the obverse there are four parallel lines within the curve, of which the one joined to the curve is often longer, and the two furthest away are linked by a fine stroke to make an H or N. This trivial detail is again scrupulously preserved and repeated, and was evidently understood by the die-cutter as a necessary element of the design. Beneath the four parallel lines is a triangle, usually but not always inverted. The reverse reproduces every element of its design down to the last pellet with scrupulous regularity. In particular, the symbol that has

been read as a letter C is lop-sided and always has an extra pellet enclosed within its space. The letter I, so called, consists of three pellets close together in a row. Sometimes, but not always, they are joined by a line. However, the size of the symbols is variable, as is the position of the V, leaning over more or less to the right.



Corpus 0190



Corpus 0185 Keelby



The reverse border is usually off-flan, but if visible, some pseudo-letters may be seen. They have some resemblance to those on the reverse of Series D (see below). This seems to be a regular feature of VICO 1. A few VICO 1 sceattas are of otherwise good design, but with thinner lines (Corpus 0185).

The next sub-variety VICO 2 has a lateral reversal of the reverse, and can more legitimately be read as VICO. The row of three pellets is more widely spaced, and is joined more conspicuously by a line.



Corpus 0270



VICO 2



Corpus 0286 Spalding p.s.



Although the obverse of VICO 2 retains the formal elements of VICO 1, the upper part of the parallel lines within the curve are often partly superimposed on the spine. The lines under the spine are often less parallel to each other, but somewhat fan-shaped. Both the obverse and reverse dies have a different feel, and could be by another die-cutter. The reverse dies are large in relation to the size of the flans, making it difficult to observe the margins. On some specimens lines composed of three to four dots can be seen. Distinct pseudo-letters, as on VICO 1, seem to be absent, apart from two coins discussed below.

Stylistic classification into varieties



Corpus 0282 Barham

A minor variation, known from two die-identical single finds (Barham and Hitchin) introduces small groups of three pellets in the reverse. This pair of dies has the same ‘feel’ as the preceding, even if the lines on the obverse are not superimposed on the spine to the same extent.



Corpus 0268 Riby



Corpus 0267 Aston Rowant hoard



A rare VICO variety has neatly ranged, smaller and angular pseudo-letters in the reverse margin. Two die-duplicates have a regular VICO 2 obverse (Corpus 0268, 0269), combined with a Variety 1-related reverse – as does another (almost certainly ex Aston Rowant hoard) with a very similar VICO 2 obverse (Corpus 0267). Whether these three coins demonstrate an intimate connection between varieties 1 and 2 depends entirely on whether they are imitative.



Corpus 0295



VICO 3

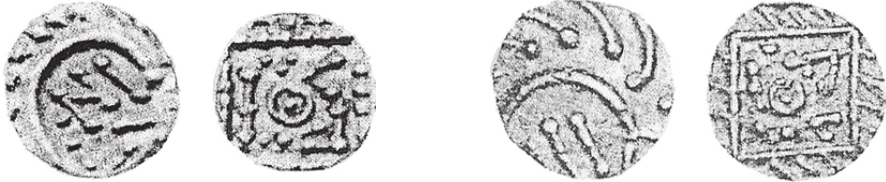


Corpus 0301 Bais hoard



VICO 3, the third sub-variety, could well be by the same hand as the second. Its reverse is the same, except that instead of the line with three pellets, there is a line with two pellets, i.e. one at each end. The obverse is quite different and approximates to Variety G, with the two pellets superimposed on the spine of the porcupine, but lacking the group of three pellets within the curve, near

the acute angle. An annulet is inserted below the middle of the curve, which is no part of Variety G, but could perhaps echo the design of Variety D. The cross at the end of the curve, present on the plumed birds and VICO 1-2, is retained. This scarce sub-variety, which is of good weight and alloy, is evidently official, and part of the substantive series.



Corpus 0327 Linton

VICO imitations

Corpus 0332

Finally, there is a substantial number of VICO imitations, of which the design deviates more and more from the main series.

The weights of the flans of VICO 1 and 2 are controlled with impressive accuracy, showing 70 percent of the coins in the central step, and a modal value of 1.23 g (fig. 4.8 on p. 80). There are too few weights for VICO 3 to generate a reliable histogram, but such as there are, they seem to fall into a similar range (fig. 4.8). The four available chemical analyses record 96, 95, 95 and 94 per cent 'silver', with no measurable tin. The large sample in the Aston Rowant hoard should give an excellent opportunity to assess the range of varieties that was available by the date of concealment, in *c.* 715, and to consider whether the English single finds have the same or a more extended range, in other words whether the issue of the VICO varieties continued after the hoard's *t.p.q.* The answer is that the stray finds include clear specimens of all three sub-varieties, in roughly the same proportions as they occur in the Aston Rowant hoard.

The best evidence for the relationship of sub-varieties 1 and 2 will lie in a correlation of the obverse and reverse styles. There is enough material to encourage one to expect positive results, but scarcely enough to give a definitive answer. Of the four lines within the curve, one (as already mentioned) is sometimes longer: this trait seems to be restricted to variety 1. It is accompanied on the reverse by large letters or pseudo-letters in the margin, including a reversed E (Corpus 0190, p. 24).

In variety 2, the wider spacing of the lines within the curve, and the bolder cross-bar of the H, are a trait that is discontinuous with variety 1. The Barham find (Corpus 0281 above) is characteristic. Because of its rarity it would be natural to see it as experimental and early. Royston 10 (Corpus 0274), with

single pellets as normal, has the same bold H. It is rarely possible to see what is in the border of the reverse of sub-variety 2. A couple of widely spaced pellets are occasionally visible.



Corpus 0274 Royston

The evidence of stylistic analysis for the VICO variety as a whole is that varieties 2 and 3 are possibly early. One might guess that variety 3 was imitative of Variety G before the new workshop settled into its own version of the design. Whether 3-2 and 1 were concurrent is not clear. Placing the more legible varieties 3-2 early has the advantage of making it more plausible that the curious, non-symmetrical design has a literal meaning. Variety 1 can then be seen as a blundered and laterally reversed copy of it.



Corpus 0264 Kings Lynn



Corpus 0290 Kings Lynn

The Kings Lynn find, which appears to be a little later in date than Aston Rowant,⁴⁰ contains one specimen each of sub-varieties 2 and 3. But the find is quite small, and the absence of sub-variety 1 could be by chance. Both specimens have a reversed N in the reverse margin; and the former has a small cross in front of the porcupine. One may choose between seeing these two coins as recent issues at the date of burial, or as two older coins represented in the find by chance. The high weight of the coin of variety 2 (Corpus 0264 1.38 g) may point to its being early, or again it may be a matter of chance.

⁴⁰ See p. 128 and p. 289.



Corpus 0315 Saint-Pierre hoard



Corpus 0223 Remmerden hoard

The specimen in the Saint-Pierre-les-Étieux hoard (Corpus 0315),⁴¹ appears to be of Variety 1, as is the other Remmerden coin (Corpus 0223). That would make a date early in the issue likely, if the above reasoning is correct.



imitative D/VICO mule:
T & S 188 Bawsey

From Bawsey there is a counterfeit double-reverse coin which combines the cross-and-pellets of Series D with a (variety 1?) VICO reverse. It is mere coincidence that the Bawsey site has yielded a D/'plumed bird' mule (illustration on p. 22).

Variety G

The ubiquitous Variety G, for which Dhénin found the prototype, was intensively studied by Blackburn and Bonser in 1987. They propose a sub-division into G1, G2, G3, and G4.



Figure 3.3. The Variety G types.

⁴¹ Known only from a line drawing, De Belfort (1890-95) No 5836.

The design of Variety G is simple, without artistic merit.



Corpus 0337 Maidstone



G1



Corpus 0353 Royston



G1 is recognizably in finer style than G2-3. The group of three pellets near the acute angle is small and neat. Two distinct pellets are superimposed on the central curve above the "nose". Beneath the spine there is a distinctive rectangular box enclosing an X, usually largely off-flan. In one margin of the reverse a distinctive reversed N is sometimes visible, possibly reminiscent of the tufa on the prototype, but here clearly treated as a letter, with pellet serifs. This is at variance with the preceding sub-varieties, but cf. the VICO coins from Kings Lynn, on p. 27. It is probably sufficient evidence to imply a different die-cutter. Other reverse ornaments are a cross pommée or some dots or lines.



Corpus 403 Spalding p.s.



G2



Corpus 0435 near Norwich



The obverse design of G2 is coarser. The rectangular box is either off the flan or has disappeared. The angle of the "nose" is less acute, and the three pellets are bolder. The bristles are more widely spaced. The reverse is virtually indistinguishable from G1.



Corpus 0482 Domburg



G3



Corpus 0512



G3 lacks the group of three pellets near the acute angle. Whether it is later than G2, or concurrent with it, is an open question. Beneath the central curve one can often see traces of a plump zig-zag line, like a stretched out Z, at the very edge of the flan. Occasionally, this zig-zag line is already seen on sub-variety G2. Again, the reverse differs hardly from G1.



Corpus 0537 Domburg



G4



Corpus 0541 Bidford



In G4 the two pellets superimposed on the curve of the porcupine are more or less transferred to the space beneath it. The bristles on the spine are more densely spaced than on G2-3; this seems to be a stylistic discontinuity. Under the spine is a distinctive legend or pseudo-legend in large, sprawling letters XAZO, the final O being prominent, diamond shaped and inserted into the bend of the Z. The reversed N of the reverse margin is a regular feature of G4, although it is sketchily drawn and unseriffed.

The flans are somewhat smaller than in G1-3 but they are neatly rounded, and the designs are well-centred. The weights are impressively exactly adjusted, and it is clear that G4 is on a lower weight standard than G1-3. Of the former, 70 percent of the weights fall in a single step, and there is a modal value of *c.* 1.23 g for coins from a mixture of sources (fig. 4.7, p. 79). The Aston Rowant hoard suggests a rather higher figure of 1.26 or 1.27 g. G4 falls to *c.* 1.16 g (fig. 4.7). The alloy is consistently *c.* 94-95 percent 'silver'. The one specimen of G4 that has been analysed showed 94 percent. The coins are tin-free, but contain the usual trifling amounts of zinc.



G5 Corpus 0555 Littlestoke

There is a small idiosyncratic sub-variety which comprises five specimens from what seems to be a G4 obverse die, in association with more complicated reverses (Corpus 0553-0557; plate 18). Four of the five are from southern

England, while the fifth is from Vechten (U). The distribution-pattern supplements that for G4. Tony Abramson proposed to label these as variety G5.⁴²



Corpus 0561



Corpus 0591

Corpus 0561 (1.23 g, 93% ‘silver’) is a unique variant in fine style, with on the reverse two groups of three pellets, creating the same formal pattern as variety J of the ‘plumed birds’. There seems to be a cross in the reverse margin, again as seen on the ‘plumed birds’. Could this coin be a genuine G1/‘plumed bird’ var. J mule? The group of three pellets are tightly clustered, and make a more or less equilateral triangle. It is perhaps an early, experimental issue, or, more likely, a carefully executed unofficial copy.

No doubt because of the simplicity of its design Variety G was copied on a large scale. It is often hard to decide whether irregular Variety G specimens are just that – or whether they are unofficial imitations. The general quality of the workmanship is a useful indication.

Thus, there are a few imitative specimens with an almost empty standard on the reverse (Corpus 0591), containing only the central annulet and pellet, maybe an accidentally unfinished die, but the obverses are also in a poor careless style.



Corpus 0499



Corpus 0595 Domburg

A sceat with a regular looking G3 obverse (Corpus 0499) shows an unusually large annulet on the reverse, and the border of the standard consists of rather widely-spaced dots on a thin line. It is difficult to say if this is a regular variety or an imitation. Corpus 0595, with a similar reverse, but laterally reversed obverse design, is without doubt an imitation.

⁴² Abramson (2008) p. 35.



The imitative nature of a rather bulky group (Corpus 0561-0636) is clearly indicated by an exaggeratedly long, acutely angled ‘beak’ on the obverse, of which the lower line touches the central spine. Often there is a group of dots within the sharp ‘nose’. The reverse border is more or less similar to variety G (Corpus 0605), or shows a rather irregular row of pellets, as on plumed bird Variety J (Corpus 0564). The absence of this distinct variant from the Aston Rowant hoard and its presence in the Kloster Barthe (Corpus 0599-0600, 0618-0619) and the De Meern hoards (Corpus 0562, 0566) supports the idea that these are imitations made later. They will belong to the secondary phase. After some decades, during the tertiary phase, a new sceat variety based on Variety G was brought into circulation. This variety E is present in the Franeker and Föhr hoards. It is very likely that in its turn variety E was also imitated. It is almost impossible to distinguish the copies of variety G from the copies of variety E, and even to draw a sharp margin between the official variety G and E specimens and imitations. We therefore decided not to list them as a separate secondary phase sub-variety, but as ‘variety G imitations’.



No. 76 in the Saint-Pierre-les-Étieux hoard, now known only from a line-drawing, is ostensibly a ‘mule’ of G3 with a denier of Provence.⁴³ Its obverse is so similar to that of No. 97 that one wonders whether two unrelated drawings have not been inadvertently paired – a suspicion confirmed by the double-reverse coin, No. 99, again known only from a line-drawing, which can be seen to include the reverse of No. 97.⁴⁴

⁴³ See pp. 244-249 for a description of this Merovingian denier.

⁴⁴ From the Saint-Pierre-les-Étieux hoard 61 coins were published in 1884 by A. Buhot de Kersers, a local antiquary; nearly thirty more are known from Barthélemy’s drawings of tin-foil impressions made for Maxe-Werly.



Corpus 0594 Caistor St. Edmund



Corpus 0588



Corpus 0596 Bais hoard



Imitations of Variety G further include a find from Caistor St. Edmund (Corpus 0594) with lateral reversal of the obverse. It has four crosslets in the reverse margin, and it is 94 percent 'silver', but weighs only 0.90 g. Another English find, of better weight, also laterally reversed, is again 94 percent fine; the four bars in the standard have been rearranged into a rotating pattern (Corpus 0588). Bais 309d (Corpus 0596) is closely similar and perhaps from the same stable. The Aston Rowant hoard contained at least two specimens of G1, at least four of G2, and at least 11 of G3, but none of G4. It provides reasonably clear evidence that the issue of G4 post-dates the hoard, and this conclusion is supported by the lower weight standard. The stylistic difference in the number of quills of the 'porcupine' could be explained in various ways, e.g. a new die-cutter. The age-structure of this group of specimens of Variety G appears to be normal (but we do not know the relative scale of issue of G1, 2, and 3). Blackburn and Bonser explore the idea that G1 might be from a different mint.⁴⁵ We have mentioned that great quantities of evidence from the Rhine mouths area would be needed to prove that the early porcupines came from more than one mint there. In this particular case, there is, apart from the difference of style which can be interpreted as early, no other reason to multiply mints.

In the Remmerden hoard there were three specimens of G3. In the treasure of Saint-Pierre-les-Étieux there were one of G2 and two of G3. In the Nohanent hoard there are two specimens apparently of G2. Bais had a G2 and a G3. In

⁴⁵ Blackburn & Bonser (1987).

both Cimiez and De Meern there was a G1. In the Kings Lynn find there was a G3. Again, the presence of Variety G3 rules out a very early date.

Variety D



Corpus 0637 Thanet



Corpus 0669 Ogbourne St. Andrews



Corpus 0648 Aston Rowant hoard



Corpus 0667 Chichester

This variety has a distinctive porcupine obverse, with a small triangle at one end of the curve, and a bold annulet at the other end – usually but not always attached to the curve. Beneath are two pellets which can be fine or coarse, and a large cross pommée. There is normally a fine pellet within the triangle. No-one could call the die-cutter a neat workman. But although the workmanship is untidy, the elements of the design show little variation. The shape of the triangle attached to the curve is variable.

The reverse is equally distinctive. The square of the standard on the reverse is relatively small and often lop-sided, and the style is again rough. The square contains the very simple pattern of a central annulet (normally pelleted) and four pellets in the corners.⁴⁶ The broad reverse margin of Variety D generally has a legend or pseudo-legend, partly off-flan, which seems to include the letters QV or OV, and sometimes an elongated square E. The letter-form Q is reminiscent of the mint-signature for Quentovic on early Carolingian coins, of Pepin and Charlemagne.⁴⁷ That slender parallel has prompted the suggestion that Variety D might be from Quentovic. The broader view will take into

⁴⁶ A little care is needed in identifying Variety D, as there are secondary porcupines with a formally similar reverse design.

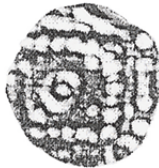
⁴⁷ See for example *MEC* No 740.

account, however, that the distribution of stray finds of Variety D is not different from that of the other primary porcupine varieties (table 7.3 on p. 191 and fig. 7.5 on p. 193).



Figure 3.4. *BMC* Type 3a.

Furthermore, there is a sceat type of somewhat later date, Series G (*BMC* Type 3a) originating not later than *c.* 720, which is a more obvious candidate for Quentovic as mint-place.⁴⁸ There is a concentration of nine finds of Type 3a in the northern French coastal region, an area otherwise not rich in sceatta finds.⁴⁹ And Type 3a is relatively scarce further north.⁵⁰ If Variety D had been produced at Quentovic a similar distribution pattern would be the expectation. The English finds of variety D have a classically east-coast distribution without any clear regional concentration, in agreement with an import coinage. The finds do not show a south-coast emphasis, such as might have been expected if the place of origin were in northern France.



Corpus 0673 Aston Rowant hoard



Corpus 0676 Aston Rowant hoard

If there is any stylistic change or development within Variety D, it is difficult to discern. Coins for which the obverse : reverse die-ratio exceeds 1 : 1, e.g. Corpus 0669-0672, might in principle be early; and the Aston Rowant hoard may perhaps include an above-average representation of earlier specimens. The earlier coins are perhaps a little neater. Conversely, specimens such as Corpus 0673-0675, with fewer quills, might be late. The Aston Rowant coin

⁴⁸ Metcalf (1993) pp. 266-274.

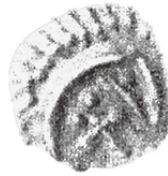
⁴⁹ Amiens, Aubigné-Racan, Corbie, De Panne, Étaples, Pommiers, Rouen, Thérouanne, Visemaretz.

⁵⁰ The northerly continental finds of Type 3a are five specimens at Domburg, one from Westenschouwen, one grave-find at Wageningen (Gld), a single find near Dodewaard (Gld), two poorly recorded stray finds from the province of Friesland, three pieces in the Hallum (Fr) hoard, and two in the Föhr hoard.

0675 has only 88 percent 'silver' (with a small trace of tin), and may well be late. But the internal chronology is at present intractable.



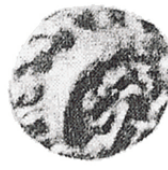
Corpus 0694



Corpus 0698



Corpus 0713 Hollingbourne



Corpus 0715 Alcester



Corpus 0658 Rouen

That adds to the difficulties of recognizing imitations. Some are fairly obvious, such as Corpus 0712-0716. On 'official' coins the square of the standard is often drawn with a solid line, on which rather widely-spaced pellets sit. All such specimens may be presumed to be official. By contrast, the Franceschi coin (Corpus 0694), is in a fatter style altogether. Likewise the Rouen find (Corpus 0658), is from a stylistically similar reverse die. And Corpus 0698 decorates the square of the standard differently – as well as having on the obverse a curved snout, and numerous quills which stand up straight.

The rough yet consistent style of both obverse and reverse design sets Variety D apart from the other primary porcupine varieties discussed above. The metrology and metal composition of variety D, however, are not inferior to the other three early varieties.

3.2 The secondary phase

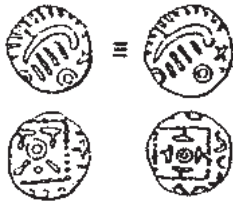
More than 1,900 porcupines dating from the secondary or Kloster Barthe phase (c. 720 - c. 740) are available for study, deriving from a wide range of sources – the Hallum hoard, the Kloster Barthe hoard itself and the De Meern hoard, several smaller hoards, site-finds (in particular well over a hundred from Domburg), and numerous stray finds from many other localities in the Netherlands, and some 400 single finds from England. Because the hoards, other than Hallum, are from late or very late in the Kloster Barthe phase, the early issues may be under-represented in our Corpus, through the normal processes of wastage. We have just the one hoard, namely Hallum, that shows us unequivocally which varieties had already been issued in the early years of the secondary phase. The single finds should serve as a corrective, because their accidental loss will have been a continuous process throughout the phase. Altogether, the sample should be large enough and varied enough to give very adequate coverage. Even though it is far from being a record of all the dies that were ever used it can, with discretion, be treated in some respects as approximating to a random sample. From it, one should be able to investigate the two basic questions that need to be answered about any sceattas: when, and where they were minted.

The alloy composition of the porcupines of the secondary phase is known from high-quality non-destructive analysis of a selection of 23 specimens, plus eight others from the Föhr hoard, analysed by a different method and seemingly more debased.⁵¹ About a third of them contain 92-95 percent ‘silver’ (silver plus gold plus lead), and another third are in the 80s, while some fall as low as 65-70 percent. One should not assume uncritically that this reflects progressive debasement during the Kloster Barthe phase, although that may be part of the story: a variable alloy may have been tolerated, and a certain number of debased specimens may be unofficial imitations. The tin: copper ratio may be informative when more analyses are available.

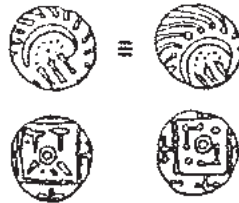
Whereas the porcupines of the primary phase, as represented in the Aston Rowant hoard (with over 60 porcupines), comprise just four distinct and separate varieties, and relatively few imitative pieces, the secondary phase material is at first glance irregular, lacking obvious boundaries between the sub-varieties, which seem to number eight or ten, rather than four. One is tempted to think of an analogy with the ninth-century stycas of the kingdom of Northumbria, where Elizabeth Pirie’s exhaustive die-studies have revealed the coupling of unrelated dies in great clusters of die-linkage – tangled skeins – from which it

⁵¹ See table 4.8, p. 101.

is difficult to envisage the underlying organization of the minting.⁵² This analogy is almost certainly misleading and unhelpful. The appearance of irregularity arises because the sub-varieties themselves are rather variable in their composition, and (even more) because they are embedded in a higher proportion of what one may for convenience call 'imitations'.



Corpus 1446, 1447



Corpus 1476, 1477

These are not, however, die-linked into the main varieties. As well as specimens where it is stylistically obvious that they are copies, the 'imitative' pieces may include, for example, 'mules' which are not true mules, because an unrelated obverse and reverse design were used as an example by an 'unofficial' die-manufacturer. One needs to look for the 'finger-print' of the die-cutter, namely any unconscious mannerisms or unimportant details, such as the ornaments in the reverse margins.

Further, we should not arbitrarily exclude the possibility that, while some mint-workshops kept carefully to their own distinctive design, others were eclectic, using a medley of designs. The sovereign evidence for this would have to come from die-links, whereby two different reverse designs were associated in use with the same obverse die (or occasionally, two different obverses linked by the same reverse die). Die-duplicate specimens, sharing both dies, are no use at all for this purpose: only die-links are indicative. In the Kloster Barthe phase, the validity of a link between two designs depends very much on the stylistic quality of the dies, because indiscriminate copying is just the sort of thing that an opportunistic counterfeiter or private minter might be expected to indulge in. By copying two familiar designs, if the user did not place confidence in one, he might trust the other. In order to gain some experience and some perspective, a systematic study of all known die-links is an obvious strategy. The majority turn out to be between very similar dies within a regular variety.

In short, a minute and painstaking examination of the material, coin by coin, is required in order to understand the organization that lay behind the production of the secondary phase. This exercise is further complicated by the possibility that

⁵² Pirie (1987; 1996).

a certain moneyer used dies made in separate die-producing centres, or even that a large die-producing workshop delivered dies to various moneyers. Within the secondary phase there will be found eight to ten sub-varieties, but whether each is from a separate workshop, and whether any of them can be further sub-divided on grounds of style (e.g. because of different ornaments in the reverse margins), and conversely whether any of the varieties can be linked up end to end as the successive issues of a single workshop, can only be decided by close study.

It is inevitable that some of our sub-varieties are contaminated by imitations with a good resemblance. Conversely, coins considered as 'imitations' might be regular issues from late in the Kloster Barthe phase, when the standards of composition of the designs had been allowed to decline. The Hallum hoard proves, however, that a wide range of different imitations was already being produced apparently early in the phase.

The number of specimens in characteristic style that can be assigned to each of the well-defined sub-varieties varies widely. Some are quite small, being known from only a handful of coins. Others are much more extensive, numbering hundreds of specimens. One thinks of the late Anglo-Saxon coinage, where fifty or more mints were extremely unequal in output. London might be known from a thousand or more specimens, while a shire town in the hinterland might be known from only five or six. If the secondary-phase porcupines were struck at various mints in the Netherlands, it is to be expected that there would have been a wide discrepancy in the volume of output of large mints and small.

The identity of a sub-variety is validated, in the first instance, by the combination of a distinctive obverse design with a distinctive reverse, the combination occurring regularly. That means that the die-cutter routinely replicated a standard design, more or less closely, on many pairs of dies. Whether the various die-cutters each attempted to make his design different from those of his commercial rivals is less obvious. Several of the varieties imitate one or both sides of one of the four primary-phase designs. Again, whether that means that there was any continuity of manufacture, or whether a design was appropriated at random, in another mint-place, is not at all clear from the evidence. In the succeeding 'Franecker' phase, characterized generally by regularity of the design and by much more elegant workmanship, the primary-phase designs are repeated again. That suggests that, although the general appearance of the coins in the two phases was so different, they may reflect a similar attitude towards administrative continuity.

The first attempt at a comprehensive stylistic analysis of the porcupine sceattas was published by one of us in 1966.⁵³ It was based primarily on the different

⁵³ Metcalf (1966) fig. 1.4 on p. 7.

versions of the reverse design. However, for the secondary porcupines, in some instances an almost identical but simple reverse design was coupled with quite different reverses.



Corpus 1762
sub-variety e



Corpus 1956
sub-variety g

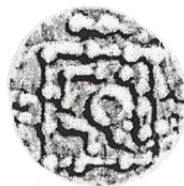


Corpus 2319
sub-variety k

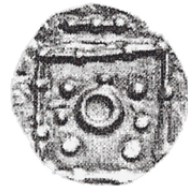
For example, in the first scheme the porcupines with just four pellets on the reverse, and the square of the standard with a double outline of the border, the outer square in high relief, and the inner one in much lower relief, were allotted to a special sub-variety. These coins showed a different parameter of weights from all the other varieties in the Kloster Barthe phase: a lower average, and a wider spread, with negative skewness. Two specimens that have been analysed are, moreover, of rather inferior alloy, around 85 percent silver. Later on, it was decided to divide them over several sub-varieties, because of characteristic elements in the obverse design.

Many decisions of this kind, partly on intuitive grounds, were taken during the process of sub-classification.

Sub-variety a. Corpus 0709 – 0745.



Corpus 0719



Corpus 0722



Corpus 0727 Sleaford

This small group includes three different reverse designs, but they are tightly linked together by their distinctive, consistent, and very neat obverse design. It is taken over directly from the primary VICO variety, with the addition within the spine of a pellet, for which a large semi-circular space has been created. The four lines within the spine are often linked by fine zig-zag lines, resulting in a fish-bone pattern, reminiscent again of the pseudo-letter H seen on the VICO coins. This detail strongly implies continuity of mint-place or workshop, although not of die-cutter.

The sequence opens with two obverse dies which were each used with four different reverse dies. The VICO reverse, Corpus 0717-0719, is no doubt early and experimental. The square C of VICO has been reduced to an L, and the square outline of the standard is linear, with superimposed pellets very widely spaced. Notice the marginal ornament of three parallel vertical lines. This detail is repeated throughout much of the sub-variety. After making just a couple of VICO-type reverse dies, the die-cutter devised his own, simpler pattern of seven pellets and a central annulet. Whether this is an echo of primary Variety D is uncertain. Two such dies, Corpus 0717-0718 and Corpus 0720-0724, are linked to the original obverse, which proves that they are early in the sequence. A further simplification reduced the design to just four pellets symmetrically around the central annulet, Corpus 0726-0753, routinely with the same marginal ornament of three vertical lines – a ‘finger-print’ of the die-cutter. Corpus 0735-0736 and 0742-0743 offer further evidence of a higher obverse : reverse die-ratio, this time 1 : 2. Corpus 0732, with yet another different reverse type (sub-variety e), should probably be disregarded. It comes from the Grantley cast-collection, and could be a mismatch of two unrelated casts.⁵⁴

⁵⁴ The diameters of the obverse and reverse side are markedly different.



Corpus 0743



Corpus 0750 East Tilbury

Some specimens in this canon abandon the characteristic ‘fingerprint’ style. That brings us to the question whether they are imitative. The obverse of corpus 0743 looks entirely acceptable, but the square of the standard lacks the wide spacing of the pellets, and the margins on two sides have a V, instead of I. A site-find from East Tilbury (Ess) (Corpus 0750) lacks the bold pellet in the semi-circular space on the obverse, and the reverse margins, ornamented with T, T, do not conform. Are these perhaps transitional coins by a different die-cutter, connecting the foregoing sequence to a new phase, or are they merely unrelated imitations?

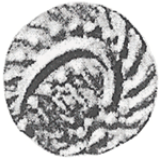
The various links outlined above seem to suggest a date at the beginning of the secondary phase, which makes the strong representation of sub-variety a in the Kloster Barthe hoard (Corpus 0717, 0718, 0720, 0721, 0725, 0728, 0729, 0735, 0742, and 0744) puzzling. The alloy is probably of primary-phase quality, or almost so. An EPMA result for Corpus 0739 shows 92 percent ‘silver’. That is unusually high for the secondary phase, and if it is at all typical, points towards an early date. The XRF results of 80-82 percent ‘silver’ for Corpus 0722 and 83 percent for Corpus 0745 are unexpectedly low, and should be treated with reserve.

Sub-variety a almost certainly represents a new start initially in the secondary phase, by a die-cutter/moneyer who very soon decided to adopt a simpler design of his own. He went on to strike only a relatively small output. He may have died or retired, or he may have been based in a place where there was not much demand for his services.

The main groups b-e and f-h

Two main groups of porcupine sceattas together account for more than half of all the coins. Of these two, by far the more plentiful has a neat, symmetrical design within the standard, ToT- /\, a replica of the reverse of English Series A and C. Between the pseudo-letters /\ there is often added a pellet, or a group of two, three, or even more pellets. One can easily think of several hypotheses to be investigated.

Stylistic classification into varieties



Corpus 0768 West Walton



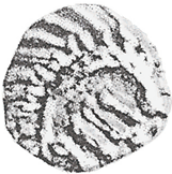
Corpus 1202 Domburg



Corpus 0950 Domburg

Are there, for example, any small differences of style, such as might suggest that three workshops, with three die-cutters, were in business side by side, distinguishing their respective outputs by no pellet, one pellet, or three pellets, as a kind of 'secret mark', in the same major *wic*? Can one negate that hypothesis through die-links between the sub-varieties? Are the same marginal ornaments used on all three sub-varieties? Alternatively, were the three sub-varieties successive? If there was a decline from 95 towards 65 percent silver content, that question, at least, should not be too difficult to answer, although at present there are far too few chemical analyses to do so. Are there any observable differences between the respective parameters of their weights? Or were these coins produced concurrently in one mint, which served wealthy merchants in return for their silver on their request with a supply of coins with a personal owner's mark? And so on. However, we have not been able to find any system in the number of pellets on the reverse. Perhaps they were simply random, or, more likely, until now their meaning has escaped our understanding.

Sub-variety b. Variety A porcupines: Corpus 0754-0982.



Corpus 0754



Corpus 0814

When large-scale minting was resumed, early in the secondary phase, the cluster of four varied designs used in the primary phase was made more uniform, and given a 'new' reverse type, ToT - /\ . This was imitated from the coinage of south-eastern England, where the design had been in use in Kent since the earliest sceattas, of Series A. It continued as Series C. Its adoption in the Netherlands was a bow to Englishness, and a recognition, no doubt, that England was to be the destination of many of the coins.

The obverse of the new coinage was formally the same as in the preceding VICO variety, namely with four parallel lines under the spine. The ToT - /\ reverse is common to sub-varieties b, c, and d. The specimens assigned to sub-variety b are, essentially, the best of them. The defining feature, for the purposes of constructing the Corpus, was the reverse margin, which should have eight crosslets – four centrally on each side of the square, and four at the corners. Between each pair of adjacent crosslets there is a pellet. This is undoubtedly the intended version of the design, to be followed exactly. Occasionally there is an added pellet between the pseudo-letters /\ , but usually not. Sub-variety c (below) is more variable as regards the reverse margin, and also in the addition of pellets between /\ . Unfortunately, distinguishing between specimens of b and c is often difficult because the ornaments at the corners of the square are off the flan.

We have gathered up 228 specimens under the rubric of sub-variety b. The relative fewness of die-duplicates implies a large output. Whether more than one die-cutter was at work is hard to say. The new design will quickly have become familiar, and may well have attracted imitation. Distinguishing 'imitations' among sub-variety b is difficult. Some specimens, for example, use squared-off serifs, whereas the majority are pommée. Some make minor modifications to the obverse, such as the addition of pellets, e.g. a triangular group of three pellets. Whether they have some organizational significance or are merely ornamental is not clear. The question is not only where one should draw the line, within varieties b plus c, between official and 'imitative' coins, but also what the distinction might imply. Were the 'imitative' coins merely the work of less skilled die-cutters, or were they opportunistic and unrecognized by government? Were they of inferior quality, and to that extent fraudulent?

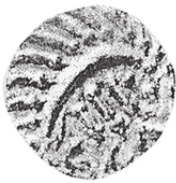
The sub-variety seems to have been, for the most part, produced with a die-ratio of 1 : 1. Two groups of specimens which appear to use a 1 : 2 ratio, namely Corpus 0813-0821 and 0887-0891, would seem to be imitative, rather than the initial issues of the sub-variety. The former group have the squared serifs, mentioned above. Also, that group links two dissimilar reverse dies.



Corpus 0834 Hamwic

In an ideal world, a large number of well-selected chemical analyses might reveal systematic differences between sub-varieties b and c. Almost everything remains to be done. Only one EPMA analysis is available, a good-looking coin from Hamwic (Corpus 0834), with 86 percent ‘silver’ and 2.7 percent tin. If this is typical, it reflects a deliberate policy of debasement from the high standard of the primary phase. To resolve that doubt is practicable, through a major programme of non-destructive analysis, and is probably the biggest gain (for monetary history) to be made by further study of sub-variety b.

Sub-variety c. Variety A related: Corpus 0983-1320.



Corpus 1035 Domburg



Corpus 1048

This very large group is broadly similar in detail to sub-variety b, except that the marginal ornaments at the corners of the square are no longer crosslets; they are varied. The quality of the die-cutting is often a little poorer than in b, and less care is exercised over consistency. The same general question arises as with sub-variety b, whether there is a line to be drawn between official and ‘imitative’ coins. An XRF analysis of Corpus 1249 measured 83 percent ‘silver’. Corpus 1228, however, has 93 percent ‘silver’. Might this coin be from very early in the secondary phase? That would imply that b and c were in production concurrently. The remarks under b about the profitability of a large programme of non-destructive analysis apply again.

Sub-variety c is noticeably better-represented at Domburg than is b. There are numerous specimens in the Kloster Barthe hoard, often die-linked. These duplicates are useful for establishing the permitted tolerance of weight: it seems to

have been quite wide, which implies that weights are in practice unlikely to be useful in establishing the internal chronology of the sub-variety.

Sub-variety d. Variety A 'imitations': Corpus 1321 – 1632.



Corpus 1501



Corpus 1577 Sleaford

Again, a very large group. It keeps to the standard ToT - / \ reverse design, but the general quality of the die-cutting shows a further small decline towards variability and untidiness. The central o in the reverse square is always present, but often one of the T T / \ symbols is turned or replaced by another symbol, some of which seem to be derivative from sub-varieties e-h.

Many of the obverse dies have a porcupine with a 'snout', reminiscent of primary Varieties D and G. These obverses would have been recognizable at a glance. Why would a coiner who hoped to pass off imitations make such an obvious change to the design? They are so different from the obverses of b and c that one's immediate thought is whether they are not from another mint-place.



Corpus 1428 Hallum hoard



Corpus 1591 Hallum hoard

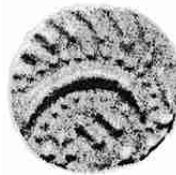
Another possibility which should be considered is that the regularity of the ToT - / \ coins deteriorated during the secondary phase, and that d is, for the most part, late. That is made doubtful by three specimens in the Hallum hoard – Corpus 1428, 1552, and 1591. One should not generalize too far from that, however, since sub-variety d is certainly an omnibus classification. There is no question, as with sub-variety a, of almost all the coins being the work of a single die-cutter. Corpus 1501 was shown by XRF analysis to contain 86-88 percent 'silver', but Corpus 1408 and 1612 gave much lower values (46 and 59 percent). Progress will be difficult.

The 'mixed grill' varieties

The next most plentiful group of sub-varieties has a reverse design composed of four assorted symbols in the standard, variously arranged around the central annulet, such as X L C ••. This has been described light-heartedly as a 'mixed grill' of symbols. At first sight the arrangement seems to be random, i.e. without any organizational significance, although die-links show that where two or more reverses are associated with the same obverse, they normally use very much the same pattern. However, in many instances the arrangement becomes symmetrical, if one rotates the standard through 45°, to become a diamond-shape, with a crosslet at the top. This perception, which has so to speak been staring us all in the face, was only recently noticed by Mr. Tony Abramson, to whom we are indebted for sharing his insight with us.⁵⁵ Once it has been noticed, this is obvious and self-evidently correct. Where it is used regularly in a sub-variety, the inference is that that is how the die-cutter saw the design, and that he was not aware that it originally represented the banner of a Roman standard (see fig. 1.2 on p. 6).

Sub-variety e. Variety C porcupines: Corpus 1633-1804.

Corpus 1668



Corpus 1703

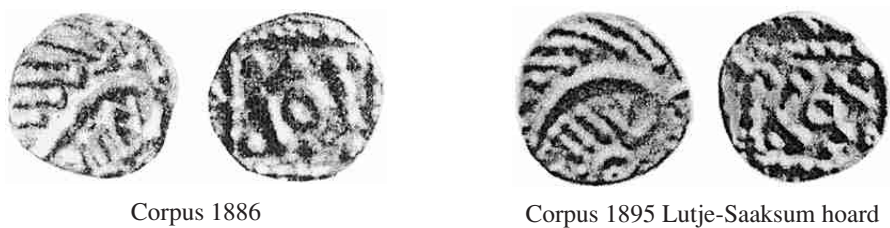
A reverse design completely different from the ToT- / \ of sub-varieties b-d has four different symbols in the corners of the square, around a central annulet. These have been perceived as, for example, C, L, X, and ••. The obverse has usually a 'Roman numeral' XIII (or XII) within the curve of the spine, which is outlined with numerous very small pellets. There is often a larger pellet superimposed on the spine, which may be banana-shaped, i.e. a shallow curve, similar at both ends. The border ornaments on the reverse seem to be miscellaneous in character. The diamond-shaped alignment of the reverse is regularly paired up with its own distinctive obverse.

⁵⁵ Already in 1756 Withy & Ryall depicted a sceat of variety C in this position, as did Conbrouse in 1839-1841 on his plate 156 No 16.

Sub-variety f. Variety C related: Corpus 1805-1896.



In sub-variety f, the style of die-cutting is very similar to sub-variety e. The porcupine has a 'snout' (cf. sub-variety d). Many, but by no means all, of the reverse dies show a diamond-shaped alignment and symmetry, and they are to that extent derivative from sub-varieties e and g. Many others, however, are definitely symmetrical on a square alignment, with a simple reverse design such as < > flanking the central annulet. A characteristic feature of f is that in many specimens the reverse die is off-centre. This allows one to see the large, straggling letters or symbols in the margin. Thus, Corpus 1805-1823, all from the same reverse die, have large letters T, T sideways in one margin, while 1824-1849, from the same obverse die, have two large annulets, O O, in one margin of the reverse. Whether the coins with < > (which also occur in long chains of duplicates, Corpus 1858-1882, 1885-1892) are from the same workshop is an open question. Other than in the Kloster Barthe hoard, sub-variety f is quite scarce.



A chain of 8 die-duplicates (Corpus 1885-1892), very similar to the skein of 25, has a very similar design, and is no doubt from the same mint, as is a triplet (Corpus 1893-1895). When merchants went to a moneyer to obtain new porcupines in exchange for old coins or scrap silver, one assumes that they would have been handed coins from the day's production, which would have been runs of die-duplicates. As the coins subsequently changed hands in a whole series of small transactions, the clusters of die-duplicates would have been broken up and dispersed. One has seen something analogous today with a consecutively-numbered run of bank-notes. These runs of duplicates in the Kloster Barthe hoard are unusual among sceatta hoards.⁵⁶ The normal pattern shows just how lively monetary exchanges were in the eighth-century Netherlands. For comparable instances of runs of duplicates one looks to Swedish Viking-Age coins in Skåne, the Malar valley, and especially at the eastern end of the Baltic. For our present purposes of classification, the interest of the duplicates is that they had very probably not long left the moneyer's hands. If so, they were among the latest coins in the hoard, and doubtless were minted late in the secondary phase.

Sub-variety g. Variety C related: Corpus 1897-1966.



Corpus 1905 Lutje-Saaksum hoard



Corpus 1935

In style, sub-variety *g* is closely similar to *e*, and is certainly from the same workshop. The formal difference is an obverse with a fat, banana-shaped central spine surrounded by narrowly spaced dotted lines, and that XIII is reduced to just three parallel lines, an O and a T or X under the central bow. But the X may be off the flan, or it may linger as a crosslet. Which came first, *e* or *g*, is an open question. In both, there are occasional signs of the use of a 1 : 2 die-ratio.

⁵⁶ The Franeker hoard, however, also contains long chains of die-linked porcupines.

Sub-variety h. Variety C related: Corpus 1967-2231.



Corpus 1980 East Tilbury

Corpus 2015



Corpus 2188

Like sub-variety f, h has a porcupine with a 'snout', and also a large, prominent annulet centrally under the spine, often touching the tip of the 'snout' (Corpus 1980). On other specimens, doubtless by the same die-cutter, the central position is taken over by a large crosslet, and the annulet is pushed to one side (Corpus 2015), or a prominent X and pellet centrally (Corpus 2188). Further developments followed, but the general style seems to be the same. These coins too seem to be inspired by the primary phase Variety D, and indeed one can sometimes see large pseudo-letters in the reverse margins, which are also reminiscent of Variety D. The number of dies involved creates the impression of an important mint-place. There is a significant amount of evidence for the occasional use of a 1 : 2 die-ratio.

The dies are rather untidy and variable, but the alloy remains of high quality, and above average for the secondary phase (Corpus 2076, 88 percent, with 1.2 percent tin, Corpus 2105, 95 percent, with 0.7 percent tin, Corpus 2129, 84 percent, and the die-duplicates Corpus 2211 and 2212, 94 and 91 percent 'silver'). The figures in the nineties are, perhaps just by chance, among the English finds.

The Kloster-Barthe hoard included also a run of 32 die-duplicates belonging to this sub-variety (Corpus 2158-2186), compare sub-variety e. It suggests that sub-variety h was in issue not too long before the concealment of that hoard. At points like this, the task of classification becomes more delicate and difficult. One has to try to work out what the relationship of the two similar kinds might be. Were they, for example, parallel issues in the same region?

Sub-variety i. Variety C related or 'imitative': Corpus 2232-2286.



Corpus 2261 Spalding



Corpus 2286 Norfolk

The designs are reminiscent of sub-varieties e-h, but the style seems somewhat different. These are possibly imitations. However, it is equally possible that some of these are early issues of the 'mixed grill' reverse group.

Sub-variety k. 'Imitations': Corpus 2288 – 2744.



Corpus 2362 Malton



Corpus 2618



Corpus 2686 East Tilbury



Corpus 2700 Skegness

This is not a sub-variety in the meaning of the regular coupling of obverse and reverse design. It comprises the large and far from homogenous residue of over 450 poorly-made porcupine sceattas. It is tempting to assume that these are predominantly imitations, possibly the output of private minting. This group shows a paucity of die-identical specimens, and also a low rate of the use of nearly similar dies, as compared to the more coherent sub-varieties. As the accidental loss-rate of stray finds was presumably similar to that of the regular varieties, the relative scarcity of die-linked or duplicate coins seems to imply that the average output of a die was lower.

3.3 The tertiary phase

Our knowledge of the final phase of the ‘porcupine’ sceattas rests to a greater extent than is desirable on one foundation, namely the large Franeker hoard, from Friesland. It contained over 300 specimens almost exclusively from the tertiary or ‘Franeker’ phase. The coins are on larger flans than the preceding issues. From the hoard, it seems that the currency of the Kloster Barthe phase had almost completely disappeared, presumably through a recoinage. It is clear that the Franeker phase comprised three main varieties, conventionally labelled B, E, and F, and a fourth, Variety AF, much less numerous in the Franeker hoard, which seems nevertheless to be a substantive issue.

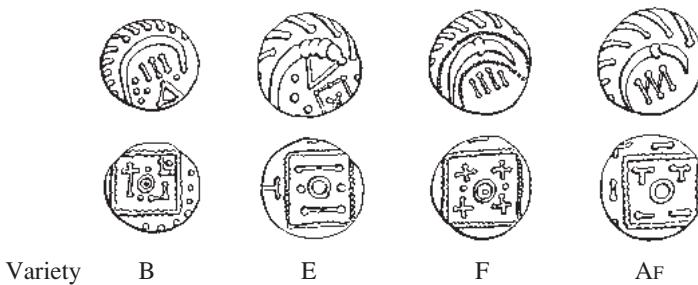


Figure 3.5. The tertiary-phase types.

In addition there are a certain number of careful copies of them. There are also a few (but not many) unofficial imitations, including several hybrid coins ‘muling’ different Franeker varieties – although whether these are true mules is open to doubt.

The publication in 2001 of the Föhr hoard made available another, independent source of information, with nearly 50 porcupines belonging to the Franeker phase. The hoard comprises mainly coins which are or which seem to be of Varieties E and B, with one specimen of AF. Variety F is absent. This strongly suggests that Variety F is later in date than E and B, and that its issue had not yet begun when the Föhr hoard was concealed. The opportunity to compare two quite different hoards is a major step forward. The circumstances in which the Föhr coins were found leaves room for some uncertainties, but they do not affect the comparisons and conclusions offered here. On close inspection of the hoard, a good proportion of the coins of Varieties E and B show details not found in the Franeker hoard.

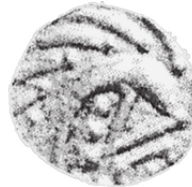
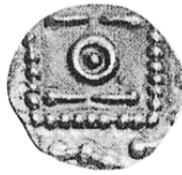
Another major source of information, made fully available only in 2004, are the site-finds from Domburg, and also from Westenschouwen, of which there

are 62 and five respectively. Some of them are not sufficiently well preserved to permit die-comparisons with the hoard material. But because the four main varieties are so distinctive in their designs, and quite different from each other, it is easy to assign all the Domburg finds to one or other variety, even if (the few) possible imitations cannot easily be distinguished from the official style. Fourthly, there are single finds from all parts of the Netherlands, in particular from Wijk-bij-Duurstede (Dorestad). Also there are a few single finds from England, France and Denmark.

Variety E. Corpus 2918-3105, 3098-3122



Corpus 0362 primary Variety G



Corpus 2967 Variety E



This is closely imitated from the dominant primary-phase variety G, but the engraving is bolder and more rounded, and the 'porcupine' has a distinctively fat curve. The 'snout' is attached to this curve on both sides, whereas in variety G the outer side is unattached.



Corpus 2963 Variety E1



Corpus 3056 Variety E2



There seem to be two 'official' sub-varieties. The first (E1) copies the symmetrical reverse of its prototype exactly, with the four symbols I in parallel. The second (E2), less neat, replaces one, two, or three of them with L. Die-links (n.b. not die-duplicates) indicate that the two sub-varieties are separate, and further that the exact mixture and arrangement of the symbols I and L tends to be the same on die-linked specimens. There should be no doubt that the sub-varieties are from the same workshop. Metrology suggests that E2, which is marginally lighter, is later.

Both E1 and E2 show a variable reverse border ornamentation. A large group has four inverted T's in the margins, and a L bracketing the corners of the square.



Corpus 3009 Variety E1



Corpus 3012 Variety E2

In another substantial batch the inverted T's are replaced by dashes.



Corpus 2950 Franeker hoard



Corpus 2951 Franeker hoard

However, on Corpus 2951-2952 – with an obverse die-linked to the series with dashes in the margin – the dashes are replaced by large pellets (compare Variety B). This indicates that the filling in of the reverse border was unimportant to the die-cutter.



Corpus 3075 Franeker hoard

There is a sizeable group of E2 specimens with a crosslet near the tip of the snout, and with marginal ornaments consisting of a simple bar at the centre of each side, and L bracketing the corners of the standard (Corpus 3065-3080). The box-shaped element at 4 to 6 o'clock on the obverse disappears, to be replaced by three or four small pellets.



Corpus 3092 Domburg

Corpus 3102 Franeker hoard

Another group has the inverted T's or dashes in the reverse margin replaced by crosses, and the L's covering the corners by two pellets (Corpus 3091-3107), but the box-shaped element at 4 to 6 o'clock on the obverse is preserved. The reverse is either E1 or E2. One cannot be sure that it carries the beginning of this group back into initial period of issue of Variety E. The batch as a whole is no doubt the work of a different die-engraver, probably although not certainly in a different workshop, and it might even be from a different place. From a numismatic point of view, at least, it deserves to be thought about as a separate issue, and it is an obvious candidate for inclusion as part of a comparative study of chemical composition. There were seven in the Föhr hoard, which proves that they are not from the tail-end of the Franeker phase. The paucity of die-identical coins in this group points to a substantive issue. We have considered the possibility that they might be coins belonging to an early, transitional phase leading into the Franeker phase (although in that case, why have no specimens survived in the Franeker hoard?). More probably they are imitative. They show a stylistic trait which reveals the hand of their die-cutter: instead of a triangle attached to the spine on the obverse, the angled element has a free end (copied directly from primary variety G) with a dot which lies close to, but is separate from, the large dot at the end of the spine. The alloy of these Föhr specimens speaks against their forming an early transitional phase.



Corpus 3105 Franeker hoard

Finally, there are three specimens with four pellets within the reverse standard (Corpus 3105-3107). Their position is uncertain.

Variety AF. Corpus 3108-3118.



Corpus 3113 Franeker hoard



Corpus 3116 Föhr hoard

The obverse of this smallish group has a distinctive zig-zag pattern within the curve. The reverse design has most in common with Variety E, including the border ornamentation. The style of die-cutting is also closely similar to Variety E. There is little doubt that they are from the same hand. This is confirmed by an AF/E2 mule (Corpus 3109 on p. 60).



Corpus 1552 Hallum hoard

The reverse design may have been inspired by some secondary phase sceattas with ToT - _ _ (Corpus 1552-1557). The ten known specimens are struck from two obverse and four reverse dies. The adjustment of the weight standard is careless, two very well preserved specimens from the Franeker hoard displaying weights as disparate as 1.14 and 0.54 g.



Corpus 3221 Föhr hoard



Corpus 3222 Föhr hoard

Föhr 79 and 80 (Corpus 3221, 3222) seem to be E/AF 'mules' (i.e. not true mules). They may possibly be unofficial, opportunistic forgeries. They are further evidence, if more were needed, that AF was already known at the date of

concealment of the Föhr hoard. No. 80 is of good workmanship, whereas No. 79 is a poor, sketchy affair. Our survey of Variety E has revealed quite a high proportion of specimens which should, in our view, be excluded from the *oeuvre* of the main workshop; but they are not miscellaneous. Nor are they necessarily sub-standard or fraudulent. Their production involved many similar dies and, in total, substantial quantities of bullion. Föhr 79-80 are perhaps the exception to this generalization. Their weights are not however on the low side.

Variety B. Corpus 3147-3219.



Corpus 0187 primary

VICO variety

Corpus 3176 Variety B

This variety, again, is certainly imitated from another primary-phase issue, the plentiful VICO variety. Variety B is quite homogenous, the only detail of note being the die-cutter's tendency to indulge in lateral reversal of the reverse design. As laterally reversed specimens occur die-linked to regular coins, one can be sure that they are not imitative (reversal is often a tell-tale sign of amateurish die-cutting). There are sometimes three strokes and sometimes four within the curve of the porcupine. This variation seems to be at whim, and without chronological significance.



Corpus 3208 Franeker hoard

Corpus 3213 Domburg

There are just a couple of coins in the Franeker hoard which attract a degree of mild suspicion as perhaps being imitative, because the triangle on the obverse is replaced by a box-shaped element (copied from Variety E?) (Corpus 3208). In addition, Domburg 395 and 396 (Corpus 3213) could well be imitative.

Variety F. Corpus 3350-3436.



Corpus 1923 secondary-phase sub-var. g

Corpus 3241 Variety F1

A distinctive design normally with four crosslets on the reverse, and with the banana-shaped curve of the 'porcupine' outlined with tiny pellets. The obverse is imitated from a group of 'porcupine' sceattas from the secondary Kloster Barthe phase. Variety F consistently has inverted letters T in the margins of the reverse (like Variety E) and also letters L bracketing the corners.



Corpus 3314 Variety F2

Corpus 3358 Variety F3

The standard contains four crosslets with or without additional pellets (usually two, sometimes four). It is possible, but not certain, that the coins with pellets are slightly lighter. The average weight of the very well preserved Variety F sceattas in the Franeker hoard is:

Var F1, reverse without pellets	1.165 g
Var F2, reverse with two pellets	1.152 g
Var F3, reverse with four pellets	1.153 g

The reverse design is then modified, so that the standard contains three crosslets and an L (Variety F4).



Corpus 3378 Variety F4

Corpus 3391

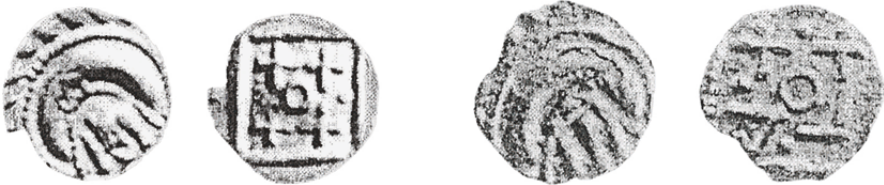
Die-linkage suggests that the two designs are chronologically separate, the three-crosslets-and-L version being a little lighter in weight (Franeker hoard: 1.136 g).



Corpus 3396 Katwijk

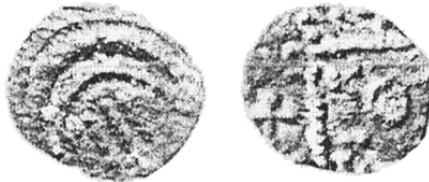
Corpus 3397 Franeker hoard

A small group of specimens with the marginal ornament of pellets (Corpus 3395-3404) may be imitative.



Corpus 3404

Corpus 3420 Ribe



Corpus 3432 Domburg

Other specimens with a rather untidy design may also well be imitations. Or are they issued beyond the date of concealment of the Franeker hoard and do they represent the final phase of the production of Variety F?

Tertiary-phase 'mules'. Corpus 3108-3109, 3220-3435.



Corpus 3220 E2/B 'mule'

Corpus 3225 B/E1 'mule'



Corpus 3109 AF/E ‘mule’

Two E/AF ‘mules’ are discussed above on p. 56. At first sight the E/B and B/E ‘mules’ suggest that both Varieties E and B are from the same workshop. However, because we have not found die-links of these ‘mules’ with the Varieties E and B, it is possible that they are imitations, although in particular Corpus 3220 is in ‘good’ style. However, the group of four dots on the obverse is not easily matched among the regular Variety E coins, nor is the elongated L on the reverse. Corpus 3225 has crosslets in the margin, compare Corpus 3092 and 3104 above. We have not found any ‘mules’ of Variety F with E, B, or AF.

These ‘mules’ make clear that also during the Franeker phase imitation took place. The presence of several ‘mules’ in the Föhr hoard indicates that they were issued concurrently with the main series and that they are not from the tail-end of the tertiary phase.

3.4 Problems of copying and imitation

The evidence of style for copying and imitation

The design of the porcupines made them a forger’s charter, especially in the secondary phase. The genuine coins showed such a variety of simple linear types, that even a half-way competent imitation was unlikely to be challenged by the recipient, provided that its weight and alloy seemed adequate. In constructing a corpus arranged by varieties, obvious imitations have been listed separately, but it is probable that we have from time to time included an unofficial specimen among those that it copies. Does it matter? – Probably not, in the sense that it is highly unlikely that the overlooked copies affect our main conclusions.

Rigold, in his definition of a series, specifically included unofficial or ‘imitative’ mints,⁵⁷ and he also noted the wide spectrum of copying and imitation,

⁵⁷ Rigold (1977) p. 22.

from the downright fraudulent (such as forgeries plated on a base-metal core), through coins that do not pass the test of internal stylistic coherence (but which might, as our knowledge increases, come to be seen as genuine), to the open borrowing of designs, where ‘imitation is the sincerest form of flattery’. He speaks of ‘the unintelligible “Porcupine”’, and remarks that ‘they are thoroughly barbarous in design and presumably in intent, and the case for any royal control is generally weak, but still not negligible’.⁵⁸ His argument jumps directly from the design of the coins, to the organization behind their production. We hesitate to follow him, preferring to travel that road more cautiously, and to bring in as many strands of evidence as possible. Whatever the relationship between the various mint workshops (of which there seem to have been e.g. four in the primary phase, possibly belonging to four independent moneyers) and royal authority, it is certain that each workshop produced very large numbers, even millions, of coins, over a period of fifteen or twenty years. The existence of these workshops must have been a matter of public knowledge. They were much too large-scale and active for any ambiguity. It seems to us, taking a simple view, that there is a clear dividing-line: a porcupine either was, or it was not, produced in one of the large workshops. Sometimes we may not feel confident of the answer, but we are reluctant to envisage a free-for-all, in which anyone who chose could mint porcupines, as a kind of victimless crime. We have asked ourselves whether there might have been such unregulated activity on a large scale, in the secondary phase, and if so how one might recognize it from the evidence of the coins themselves. One could not expect to prove anything from distributional evidence, because the unofficial, private minters would presumably have been based in the same towns as the official moneyers. The stylistic regularity of the dies (obtained from whom?), and the consistent weight and alloy of the sceattas might be helpful criteria. The volume of coinage that unofficial moneyers produced would surely mean that their activity was a matter of public knowledge: customers had to visit them, carrying the silver which they wished to have coined. If the ruler levied a tax on the coins produced by the ‘official’ moneyers, e.g. 5 percent, as was normal practice in the middle ages, he would undoubtedly have viewed freelance minting as an encroachment on his revenues, and would have acted accordingly. Merovingian control of the Big Rivers region was probably firmer than it was in Friesland. If there was any unofficial minting, it is more likely to have been in the north, or even in districts beyond Merovingian control. It might be expected to show up, for example, in Jutland. That is as close as we feel able to come to a clear answer, in general terms.

⁵⁸ Rigold (1977) p. 23.

Judging the scale of copying and imitation

Die-estimation allows us to form an impression of the survival-rate of porcupines and, in so far as imitations were good enough to gain acceptance, and to pass from hand to hand, their loss-rate will have been much the same as that of official coins. That implies that they, too, were produced on a considerable scale. The idea that forgeries were detected, and then thrown away as worthless, giving them a much higher survival-rate today, is special pleading, and we are not disposed to give it any credence. Another implication of scale is that if there were small-time rogues who went to the trouble of producing relatively speaking a mere handful of porcupines (and one must set no limits to the trouble to which the warped minds of the socially alienated will go)⁵⁹ few if any of them will appear in our corpus, for purely statistical reasons: they are underneath our radar.

The distinctive problems of copying and imitation are different for each of the three phases.



Corpus 0333 Aston Rowant hoard



Corpus 2689 Aston Rowant hoard

The primary phase looks to be moderately free of fraudulent copies. True, the corpus includes a lot of primary phase varieties labelled as ‘imitations’. See for example a G/VICO ‘mule’ found at De Panne (fig. 9.1 on p. 293). It is however uncertain whether they were struck during the primary or secondary phase. Exceptions which prove the rule are two coins from the Aston Rowant hoard (dateable, therefore), one which imitates the VICO variety (Corpus 0333), the other perhaps Variety D or G (Corpus 2689). Lateral reversal of the porcupine is a classic sign of copying. The VICO coin (Corpus 0333) has been chemically analysed, and is very obviously sub-standard - only 72 percent ‘silver’, with a significant addition of tin (1.76 percent) (table 4.4, p. 97. The metal content of Corpus 2689 is unknown.

⁵⁹ A prosecution in late eighteenth century England has preserved evidence of two characters who made counterfeit halfpence. Each evening, after they had eaten their meal, they used the frying pan to ‘cook’ a panful of forgeries, in order to give them a greasy, used appearance. The next day they passed them off on the unsuspecting.

During the work on our corpus the idea was that the secondary phase sub-variety b is regular/official, sub-variety c includes some imitations, sub-variety d is mainly imitative. The sub-varieties e-g seem to be official, h and i are doubtful. And the huge sub-variety k is a mixed bag of all kinds of imitations. If this is true, the number of privately minted porcupines approaches 50 percent (table 4.18, p. 105), with a lower survival rate of sub-variety k. The tertiary phase is altogether tidier in its designs, and is reminiscent in that and other ways of the primary phase. It includes, however, some mules between varieties, a feature hardly noticed in the primary phase.⁶⁰ Are they mules or 'mules'? In the former case, some collaboration between workshops seems to be implied, or at least some blurring of the boundaries between each workshop's 'own' design. In the latter case, the coins might be merely opportunistic copies, although one would have to say, very good copies. Enough has been said to alert the reader to the possibility that the arrangement of specimens in the corpus under the heading of formal varieties is a working arrangement, which does not imply that the list for each variety excludes imitations – although they have been listed separately as far as possible. Future students will no doubt gradually achieve greater clarity.

Summary

The simple design of the porcupine sceattas was very easy to copy. Stylistic irregularity of the dies, such as lateral reversal or a general untidiness, inferior alloy, and lower weight point to imitation. The arrangement of specimens in the corpus under the heading of formal varieties and sub-varieties is a working arrangement. The list of each category may include a certain number of imitations or even a few forgeries. However, it is unlikely that the overlooked copies affect the main conclusions.

The primary and tertiary phases were moderately free of imitations, but the secondary phase includes a sizeable number of unofficial copies. There are no indications that these imitative porcupines are of inferior alloy. They seem to have circulated freely at par with the regular issues.

⁶⁰ See p. 62.

3.5 Summary: types and varieties

The long-lived porcupine type falls into three distinct chronological phases, namely primary, secondary, and tertiary. In older publications the secondary and tertiary phases have often been referred to as the 'Kloster Barthe' and 'Franeker' phases, from the names of the type hoards. In general, porcupines of the three phases can be distinguished at a glance. The first and third are very regular in their types and varieties, doubtless reflecting an underlying regularity of organization for their minting, in separate workshops. The second phase is very large in volume and is utterly different, comprising or including two broad groupings of types, sometimes referred to as the ToT- / \ and 'mixed grill' groupings, each with many, many varieties. But also there is a large 'grey area' of what seem to be copies and imitations, of every description. It is hard even to match them up into little groups from related dies, and it is neither possible nor appropriate to list these as though they were the output of regular mints. Many could be from the Netherlands, both north and south, but others were in all probability minted elsewhere, in England, northern France, Belgium, Germany, or Scandinavia. Some are of obviously inferior quality, but most are well struck from well-cut dies, and seem to be of respectable weight and alloy. The task of bringing this very large body of intractable data into sharper focus will have to proceed piece-meal, and it will doubtless occupy numismatists for decades to come, as new material is brought to light by metal detectorists and archaeologists.

In the primary phase there are four main types ('plumed bird', VICO, G and D), which would seem to have been concurrent issues. The first three each comprise several minor varieties of the basic design, which can to some extent be arranged into chronological order, on the basis of hoards, metrology, chemical analyses, etc.

In the secondary phase, it is now clear that porcupine sceattas were minted both in the Big Rivers region and in Friesland, with different types (and with many seemingly random variations). There seems to have been a short early secondary phase, perhaps when minting was resumed after a hiatus, when copies echoing the designs of the primary varieties were made. Establishing an internal chronology for the secondary phase is very difficult, because the known hoards seem to be mostly from late in the phase, and because of the big problem of copies and imitations.

In the tertiary phase, a much more orderly pattern is resumed, with four distinct types (E, B, AF, and F, of which F seems to begin later than the others). Types E and B deliberately recall the primary-phase designs, which must have been dropped a couple of decades previously. Type F, however, recalls a

locally-minted secondary-phase design belonging to Friesland (presumably because the primary-phase porcupines had not been minted in that province). Hoards allow us to propose an internal chronology for Type E, dividing it into E1 and E2. The tertiary-phase sceattas are on rather broader flans than the preceding types, and are of neat workmanship with a deeply-cut and well-rounded 'spine' of the porcupine, and often with fewer 'quills'. The border ornaments outside the square standard on the reverse are a useful criterion for classification. There are occasional mules between the types, which could, however, be merely imitative.

4. TECHNICAL ANALYSIS OF THE COINS AND ITS IMPLICATIONS

4.1 Metrology

Metrology has much to tell the general historian about the porcupines that could not be learned in any other way. In combination with the evidence of provenance, it opens a path into the difficult arguments for mint-attribution. The weight-standards of the porcupines were determined in advance, and the moneyers adhered to them. Differences or changes in the standard were deliberate, and call for historical explanation. First and foremost, the same or very similar standards were used both in Frankish and in Frisian-controlled territory, for Series D as well as for the primary-phase porcupines. If that was a political virtue, it arose from necessity: sceattas were no respecters of frontiers. What really mattered in manufacturing a coin for international use was, in one sense, not its weight but its intrinsic value, of which weight was one component, and the purity of the silver alloy was the other. The evidence on metrology set out below needs to be considered, therefore, together with the evidence on metal contents discussed in the next section. It would probably be anachronistic to think of porcupines as having a face value greater than their intrinsic value, by more than a little; and that is all the more true because they were predominantly an inter-regional trade currency which would lose any over-valuation as soon as they left the territory of the issuing authority. Their alloy was even more closely controlled than the individual weights of the sceattas, which routinely varied by ten or fifteen percent, and sometimes even more. If payments of large sums were made by weight, as was probably the normal practice, weight-variation would not matter (but the reliability of the alloy would). But then why bother with weight-standards? Probably there were various prescribed payments, such as tolls and taxes, for the purposes of which a sceatta was a sceatta. And ordinary people, who perhaps did not have a lot of money through their hands, may have had neither the opportunity nor the incentive to sift through their sceattas, and pay with the lightest piece that was acceptable. Merchants certainly did: it would be to their advantage to make lump sum payments abroad using the heaviest coins that they could accumulate. They could thereby make a few extra percentage points of profit, with no extra risk. As time went by, and specifically from *c.* 720, with the secondary-phase porcupines, the use of coinage locally in the Netherlands grew in relative importance, and the dual function of the sceattas, with its

metrological implications, becomes a little easier to understand. But careful weight-standards were a feature of the porcupines from the very beginning, in *c.* 690. They were a few points lighter than English sceattas of Series A and BI, but were perhaps notionally the same.

The sceattas in existence and known to us today are a sample which is no longer of exactly the same weight as when the coins left the moneyers' hands. That is not only demonstrable but also measurable. There are various reasons for the changes that the coins have suffered, and it is a technical task for the numismatist to sort them out.

Metrological differences between the various classes of material

The six histograms of weights in fig. 4.1 show a dramatic contrast between the classic, bell-shaped curve for the Kloster Barthe hoard, and the much lower, straggling distribution, without any single clear peak, for the De Meern hoard, and similarly for the single finds from the Netherlands and from England respectively. These are coins from the same workshops. Indeed, there are quite often die-links between Kloster Barthe specimens and other groupings. How did such a contrast arise? The De Meern coins look corroded and/or worn in comparison with those in Kloster Barthe, and it is tempting to see that as a sufficient explanation for the difference. No doubt it is a factor. But five theoretical possibilities to explain fig. 4.1 come to mind, namely, (I) that the single finds have suffered much more, and variously, from the effects of corrosion and leaching; (II) that the weight-standard at which the porcupines were issued was successively reduced during the period in which they were struck; (III) that porcupines were minted concurrently on more than one weight-standard (as certainly happened in late Anglo-Saxon England); (IV) that the owner of the Kloster Barthe hoard carefully selected and retained the heaviest coins passing through his hands, in order to use them for a payment by weight, rather than by tale; (V) modern cleaning may reduce the weight of a sceat by as much as two or three milligrammes.

The five theoretical possibilities are not mutually exclusive. The end-result could arise from the operation of two or more of them. Thus, (I): corrosion and leaching (which can leave the surface of a silver coin looking undamaged) is the obvious and very possibly a major cause. In an extreme form we see its effects at Domburg (the sixth histogram in fig. 4.1), where some of the coins have suffered the greatest weight-loss of all. But as an explanation it still leaves some of the evidence unaccounted for. The De Meern hoard, for example (the second histogram) is quite unlike that for Kloster Barthe, and corresponds much more closely with the single finds. The latter will have suffered

variously; but the De Meern coins have all had essentially the same history since burial. Ought they not, therefore, to show a similar bell-shaped curve to Kloster Barthe, perhaps somewhat flattened, and with a lower central value? That is what normally happens, for example with Byzantine gold coins, hoarded after a couple of decades of use: the bell-shaped curve is still clearly visible. The argument applies all the more strongly (as regards De Meern) to sub-varieties e-h which, in Kloster Barthe, have a sharply defined and steeper central peak than b-d. The Woodham Walter hoard coins generate a similar

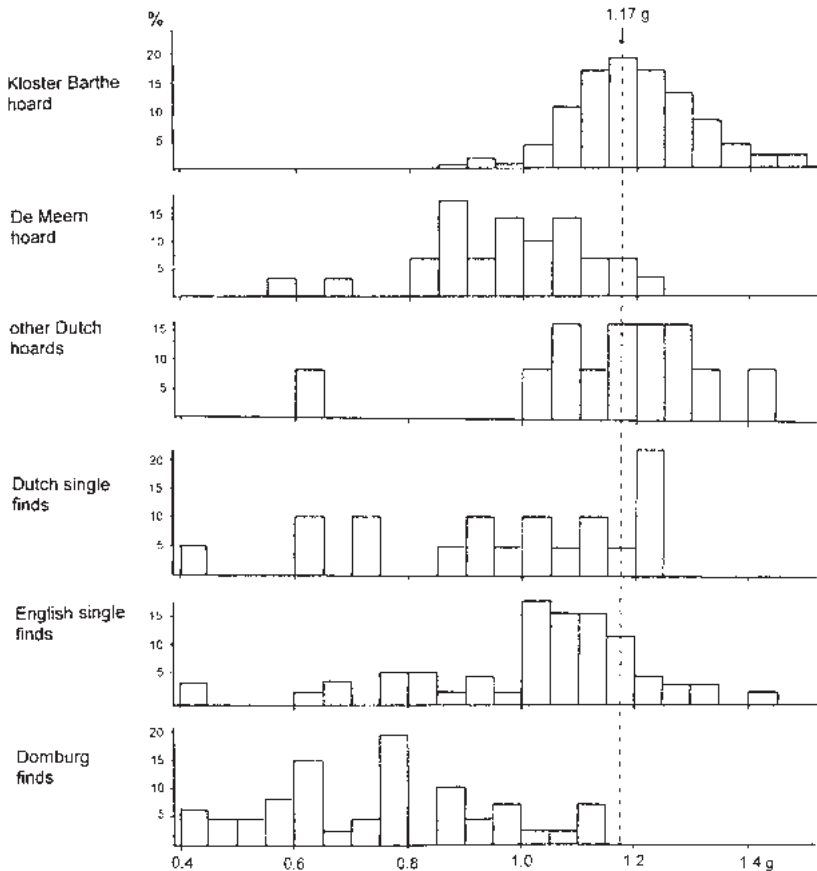


Figure 4.1. Six histograms generated by different categories of material in the secondary sub-variety c. The numbers are reduced to percentages, in order to make the area under each histogram the same. The peak value of 1.17 g in the Kloster Barthe hoard is projected through the diagram, by a broken line.

histogram to De Meern, except that they show a small separate higher peak. We can hardly argue that these hoards were put together from coins that had already suffered in the ground.

(II) It is not plausible to argue that the weight-standard was progressively reduced (which would mean that virtually all the single finds were later issues), because all the subvarieties, graphed separately, show essentially the same pattern. There are small differences, which could reflect a decline over time, but which do not approach 10 milligrammes. And in any case there are numerous die-links and die-similarities between heavy and light coins. In order to sustain the hypothesis, one would have to add the assumption that each variety continued in production concurrently, throughout.

(III) Might the customers have been given a choice, as regards the average weight of the coins they received? The original owner of the Kloster Barthe hoard might then have opted for (fewer) heavy coins, while other merchants, for example the owners of the Lutje Saaksum, Hallum, and Franceschi hoards, chose various later standards. This idea is wholly implausible. If the English single finds showed a different weight-range from those from the Netherlands, the idea might be worth looking at. But there are no significant differences in the pattern of weights of the single finds from England, the Big Rivers region, or Friesland. And within England, there are no significant differences regionally, e.g. south of the Thames. What does emerge is that, in spite of their supposed history of heavy weight-loss, the single finds from the various regions separately all tend to preserve the systematic difference in average weight between sub-varieties b-d and e-h (discussed below). The coins of sub-varieties e-h tend to be clustered at the upper end of each regional histogram. Even at Domburg, e-h are significantly heavier, with a median value of *c.* 0.85 g against *c.* 0.68 g for b-d.

(IV) We are left with the possibility that the Kloster Barthe coins have been deliberately selected because they are heavy. If that were the case, the evidence of the modal values of the hoard for the original or intended weight-standards would be somewhat misleading. The peak of a histogram, for example, may not coincide with the median value. It would then be rather unexpected that that selection should result in a bell-shaped curve, for sub-variety c. That too may be misleading: other varieties are less regular. One could enquire whether the hoard showed an excess of coins from sub-varieties e-h, because they were heavier in the first place.

It should be clear from what has been said above that the metrological analysis of a corpus of coins is not a neutral exercise, for which the presentation of the results follows a pattern determined before one even begins. The coinage has a monetary context (which metrology may help to elucidate), and histograms are designed and constructed in order to address general problems. Metrology

is not an optional extra for the historian. It should also become clear that simple averages of weights dispense with much that is useful in the evidence: the parameters of a histogram of weights preserve more information.

The very large number of porcupines registered in our Corpus makes a sophisticated level of analysis possible. The weight-patterns of the three phases of the porcupines (primary, secondary, and tertiary) are better studied separately in the first instance, because of the varied character of the hoard material that dominates each phase. Rather than to begin at the beginning, it will be convenient first to examine the secondary or Kloster Barthe phase, the general conclusions from which will influence our understanding of the first and third phases. When we turn to the primary porcupines, we see some uncanny metrological resemblances to the other large series of sceattas minted in the Netherlands in the same period, namely Series D. In order to make the results directly comparable, we have used the same step-interval and the same positioning (1.00-1.04 g, 1.05-1.09 g) as in our previously published monograph.⁶¹

Historians and other non-numismatists may find it better to go directly to the discussion of the results (p. 87), but ‘the devil is in the detail’, and it needs to be set out as fully and carefully as possible, making clear how secure each conclusion seems to us to be.

The secondary phase

The porcupines of the Kloster Barthe phase, numbering in all some 2,184 catalogued specimens, and comprising both hoards and single finds, offer an unusually fine opportunity for metrological analysis. One could of course make a single massive histogram, but it would not be very informative. We have enough weights to look at sub-varieties a to k separately, and to compare them. If the coins have been correctly grouped, that might be expected to show whether weight-standards and tolerances were maintained uniformly throughout the period of issue of the secondary porcupines. As regards the chronological ordering of the groups, a quick glance at the material is sufficient to show a broad division into two, in terms of the reverse design of the coins. There are the neat, literate, symmetrical designs with ToT- / \, and then there are the others, on which the symbols in the four corners of the square are varied – the so-called ‘mixed grill’ designs, some of which have a diamond-shaped alignment of the reverse. The natural expectation might well be that the ToT- / \ varieties were earlier. A small but unanswerable objection to that idea is that,

⁶¹ Op den Velde & Metcalf (2003).

in two English hoards composed essentially of primary-phase coins, there is in each case just one secondary porcupine which, unless these hoards are unusually deceptive, will surely belong very early in the secondary phase. In each case it is of the 'mixed grill' category (Corpus 1697 and 2239, see p. 129). Next, one must accept the observation that, in the Kloster Barthe hoard itself, sub-varieties g and h are relatively heavily die-linked, and sub-variety f is even more heavily die-linked. This would normally suggest that f was the most recent variety present in the hoard, and g and h the next-most recent sub-varieties. These likewise belong with the 'mixed grill' category. When the Kloster Barthe hoard was concealed, it seems that sub-varieties f, and to a greater extent g and h had not had time to become dispersed. Sub-variety e, which shares the same general reverse design with f, g and h, the so-called 'mixed grill' design, will necessarily have been some years earlier. As well as being less heavily die-linked, it also shows other differences.

One cannot (counter-intuitively) place the ToT- / \ varieties last (although some specimens, from accomplished dies but of much reduced fineness, may be late issues). In support of that, one may mention that in the De Meern hoard, varieties e-h are more heavily die-linked than varieties b-d. It is difficult to escape the conclusion that the two basic designs were in production concurrently. How this is reflected in their metrology, we shall next consider.

If we were to construct a set of eight further diagrams like fig. 4.1, one for each of the sub-varieties b and d to k, and each diagram including *all* the specimens of that sub-variety (except those from Domburg that are off the bottom of the scale), the general effect of the diagram would be very similar for each of the eight. Note that the histograms in fig. 4.1 have been converted from numbers of coins into percentages, so that the area of each is the same, even if it represents many fewer specimens. Sub-variety a is too scarce to generate a useful histogram. The diagram for sub-variety c has been chosen as a good representative example here. The eight histograms, which include Kloster Barthe hoard coins, De Meern coins, other Netherlands hoards, Dutch single finds, English single finds, and finally Domburg coins all create much the same pattern, for each sub-variety, of weight-loss. Very similar relativities, that is to say, are visible throughout varieties b to h. The Kloster Barthe coins are the heaviest, and their histograms presented separately would all show a well-developed peak, or median value. The coins from the De Meern hoard are not only significantly lighter (in spite of the fact that the hoard was concealed at a slightly earlier date), but their distribution has largely lost the characteristic bell shape, and is much more spread. The contrast is pronounced – and they certainly are not two or three decades apart in date. Other hoards from the Netherlands (Lutje Saaksum and Hallum) are unfortunately too small to generate

usefully accurate histograms. They are in roughly the same weight-range as Kloster Barthe, but even so the peaks of their distribution are somewhat flattened. The Franceschi parcel, doubtless from another hoard, is slightly larger, and it is the one that corresponds most nearly, so far as one can judge, with Kloster Barthe. De Meern looks like the ‘odd man out’ in its metrology. Single finds show the same flattening effect. Some will have fallen into ground where the soil conditions were more adverse than others. There are, over all, no obvious differences in the parameters between the Dutch and the English single finds, such as might have suggested for example that the English finds were originally lighter. The Domburg finds include much the highest proportion of severely reduced specimens. The corrosive effects of salt water may have had their effect. The Westenschouwen finds have also suffered severe weight loss – and the finds from Wijk-bij-Duurstede are not much better.

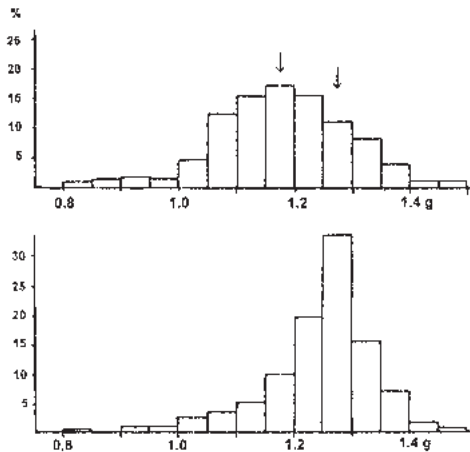


Figure 4.2. Differing peak values and parameters for the Kloster Barthe sub-varieties b-d (above) and e-h (below) help to show that there were two main centres of minting, using different weight-standards. b-d, N = 317, e-h, N = 327.

The histograms of weights for the Kloster Barthe hoard-coins, b-d and e-h respectively, are shown together in fig. 4.2. The parameters give a visual indication of the spread of weights. The most valuable (and unexpected) conclusion from this study of metrology is that the ‘mixed grill’ sub-varieties e, f, g, and h are distinctly and definitely heavier than sub-varieties b, c, and d (ToT- / \). Their peak or median value lies at *c.* 1.27 g, instead of *c.* 1.17 g. Also, the flans of the ‘mixed grill’ sub-varieties are more carefully weight-adjusted, i.e.

the peak is steeper. This is a clearly significant difference, as the reader may judge from the diagram fig. 4.2.

The concurrent use of porcupines on two distinct weight-standards is such a key observation that it deserves to be described as closely as possible, in order to rule out any chance that the over-all histograms (fig. 4.2) are misleading in some way that has not been envisaged. If one breaks down the data into smaller units by looking at four individual hoards separately, the weight-difference between b-d and e-h is repeated unequivocally in each of them – even if the numbers of specimens for varieties e-h are very small in two of the four. The difference is of the order of 8 to 12 percent. (The material in the Corpus is necessarily dominated by the Kloster Barthe hoard). The mean average (n.b. not median) weights are as follows:

Table 4.1. The mean weights and the number of non-singletons of the secondary phase porcupine varieties in hoards.

		sub- var.	sub-var.	weight of (b-d) / (e-h)
		b - d	e - h	%
De Meern	N	55	43	90
	mean weight	0.98	1.09	
	non-singletons	10	11	
Woodham Walter	N	12	3	88
	mean weight	1.02	1.16	
	non-singletons	0	0	
Lutje Saaksum	N	11	3	94
	mean weight	1.11	1.18	
	non-singletons	2	0	
Franceschi parcel	N	14	11	89
	mean weight	1.13	1.27	
	non-singletons	0	2	

The relationship between sub-varieties b, c, and d is far from clear. One can at least narrow the possibilities by examining their metrology, for each sub-variety separately. Fig. 4.3 shows that sub-variety b is the most exactly adjusted of the three, with 18 percent of the values in the central step – still less careful than in sub-varieties e-h. There is a hint of a lower peak, at *c*. 1.07 g. Sub-varieties c and d show a decline, again with hints of more than one weight standard, e.g. at *c*. 1.13 g with a second peak at *c*. 1.23 g. If the sequence b-d have been arranged correctly in order, for example if d is later than b and c, it suggests a decline in average weight during the years of issue of the secondary porcupines.

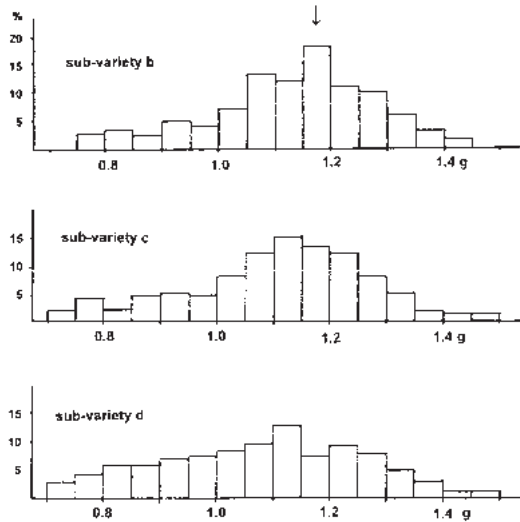


Figure 4.3. Histograms of weights for sub-varieties b, c, and d compared (values of 0.7 g and upwards). Step-intervals 1.00-1.04 g, 1.05-1.09 g, etc. For b, N = 193, c, N = 263, d, N = 224.

However, in case b, c, and d are contemporary, but d contains mainly imitative specimens, it implies that the imitations are on a less well maintained and somewhat lower weight standard. In each case the priority of b within b-d is assured. Within the group of ‘mixed grill’ sub-varieties (e-h), and also a, and part at least of i-k, there is a very distinctive die-cutting tradition which sees the square of the standard aligned as a diamond shape. We need to enquire whether there are any significant metrological differences between sub-varieties e plus g (with diamond-shaped reverse design) and f plus h. Fortunately, the sample size is large enough to permit the drawing of histograms based only on Kloster

Technical analysis of the coins

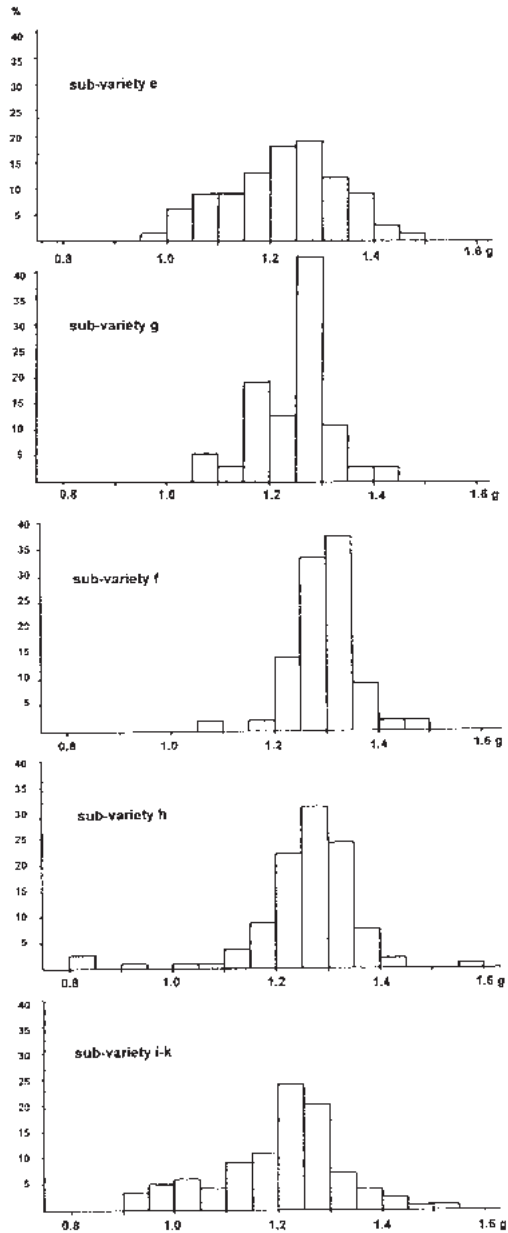


Figure 4.4. Histograms of weights for sub-varieties e-k in the Kloster Barthe hoard (values of 0.7 g and upwards). Step-intervals 1.00-1.04 g, 1.05-1.09 g, etc. For e, N = 68, g, N = 37, f, N = 57, h, N = 142, and for i-k, N = 120.

Barthe specimens, i.e. coins which have all had the same history (fig. 4.4). These will be, in effect, a cluster of histograms which we have already seen amalgamated in the lower diagram of fig. 4.2. They might show differences in the peak or modal values, and/or in the parameters or spread of weights.

In fact, all the 'mixed grill' sub-varieties are, individually, on the heavy weight-standard, of around 1.27 g. The modal values of the diamond-shape varieties (e and g) are, as nearly as one can judge, at 1.25 g and 1.27 g respectively. As well as being a shade heavier, g is definitely more tightly adjusted. The parameter is more compact. One might interpret that as suggesting that g was earlier than e. Sub-varieties f and h are a little heavier, at *c.* 1.30 g and 1.27 g respectively, but with a slightly flattened peak. That need mean no more than that the flans were cut slightly less carefully.

The heavily die-linked varieties f and g, which are presumably among the latest coins in the Kloster Barthe hoard, show no decline. Indeed, this conclusion would be secure enough even if the chronological ordering were incorrect, since no sub-group falls noticeably below the general level.

The coins that have been judged to be imitative (sub-varieties i and k), and which are no doubt a mixture from different sources, were nevertheless hoarded in Kloster Barthe in substantial numbers. Their histogram (fig. 4.4), which will reflect their mixed origins, is more spread, with significantly more negative skewness, but nevertheless shows a strong peak at *c.* 1.23 g.

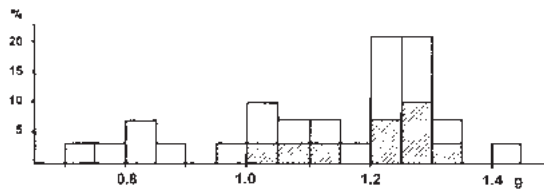


Figure 4.5. Histogram of the weights of sub-variety a. N = 29.
Coins from hoards are shaded.

Sub-variety a has been left aside in the discussion, because the sample size is small. It has a distinctive reverse design, which may derive from primary Variety D, but the style of die-cutting differs from Variety D, and is much more similar to primary Variety VICO. There is, however, no doubt whatsoever that its modal or peak value is somewhere around 1.23 g. It is, in short, on the heavier weight standard. For what it is worth, the histogram of weights (fig. 4.5) matches that for the sub-varieties e-h much more closely than it matches b-d.

The four primary varieties

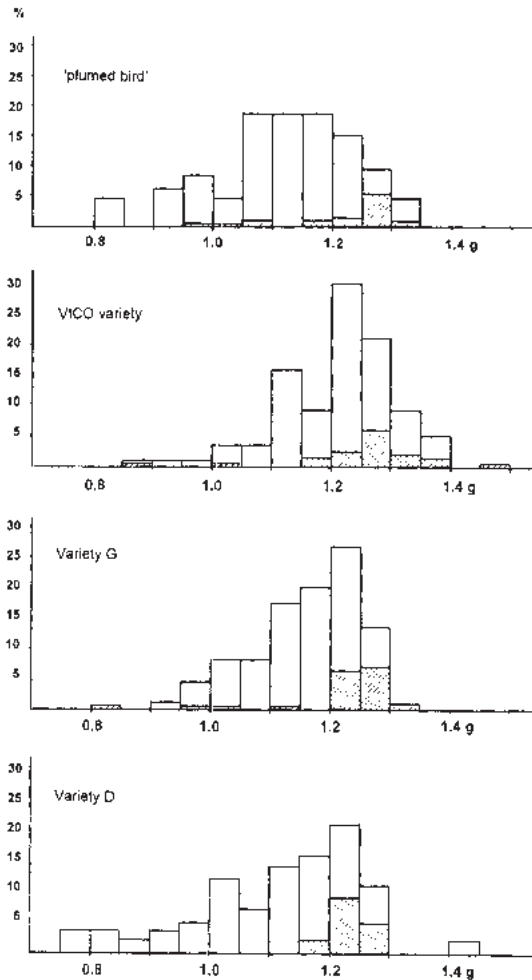


Figure 4.6. The weight histograms of the four primary-phase porcupine varieties 'plumed bird' (N = 108), VICO (N = 96), G (N = 150), and D (N = 54). Coins from hoards are shaded, Domburg finds are omitted.

The four varieties – plumed bird, VICO, G, and D – generate histograms which offer some unexpected and puzzling evidence. It is clear that the primary-phase coins are susceptible to the same sort of distortion as is illustrated

in fig. 4.1, hoard coins being the heaviest and Domburg finds the lightest. Each histogram is therefore liable to be an amalgam of several weight-ranges, namely of hoard-coins, single finds, and so on. All four varieties, cumulatively, show evidence for a weight standard of *c.* 1.23 g. As it is, the composite histograms (i.e. of coins from all sources) show some curious features such as double peaks, e.g. at *c.* 1.23 g and *c.* 1.13 g. It will be prudent to remember (in light of the experience garnered from the Kloster Barthe phase) the possibility of different weight-standards. Were they in any sense a precedent for what happened in the secondary phase?

There is, unfortunately, insufficient hoard-material from the primary phase to establish the parameters of the best coins in the way that was possible using Kloster Barthe for the secondary phase. There are only a few primary-phase coins surviving into the later hoards, to serve as a matching reference-point. The shaded columns (hoard coins) in fig. 4.6, however, indicate an average weight of *c.* 1.25 g for all four primary varieties, with a single peak. This suggests that the primary-phase porcupines had all been on a single weight-standard.

Three of the four varieties can be sub-divided, and the sub-varieties arranged uncontroversally into chronological order. This exercise makes clear that there was a decline in weight-standards late in the primary phase. Initially the moneymakers worked carefully, as may be judged from a sharp peak in the histograms of the earliest issues. Later, they were less exact, and even worked to a slightly lower average weight.

The easiest and best place to begin is with Variety G. Its internal chronology is not in doubt, and the available sample is large enough. The histograms generated by varieties G1, G2, G3, and G4/5 (fig. 4.7) are fully as regular as one might expect, given the mixed character of the sample. The classical bell-shaped curve is modified by negative skewness, in a familiar way. There is a strong peak at *c.* 1.23 g in varieties G1, G2, and G3, while G4/5 (not present in Aston Rowant, but possibly an English imitative variety, with a very different obverse: reverse die-ratio from G1 to G3) is also regular, but with the peak at *c.* 1.15 g. There seems to be a lower secondary peak in G2, at *c.* 1.12 g, which deserves investigation. Before theorizing about it, one should recollect that it would require the inclusion of only two or three imitative specimens, for example, to create the appearance of the secondary peak.

Hoard coins (shaded in fig. 4.7) are at the top end of the range in the histograms for G1, G2, and G3, and suggest that the peaks of the histograms are pulled down-scale by the miscellaneous character of the sample. The peaks are sufficiently sharp that we are inclined to accept that they reflect accurately enough the modal weight at which the coins were issued – namely, *c.* 1.23 g.

Surprisingly, it seems that Variety G was made from silver from a different source from the other three varieties of primary porcupines, containing smaller traces of gold (table 4.6, p 99).

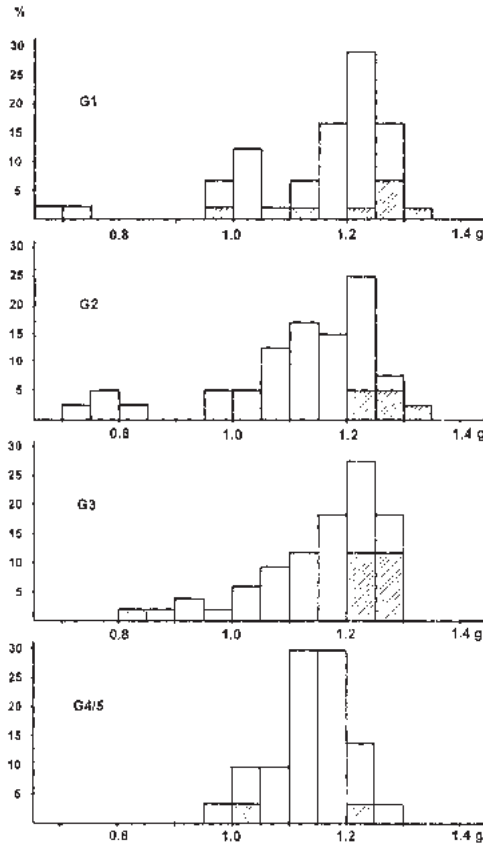


Figure 4.7. Histograms of weights for the successive varieties G1, G2, G3, and G4 + G5. N = 41, 40, 51, and 30 respectively. Hoard coins are shaded.

So much for Variety G. When we look at VICO variety 1 (fig. 4.8), we see a prominent peak at that same value, *c.* 1.23 g, defined by 19 specimens, and then only four specimens in the next step down, from 1.15 to 1.19 g, and a tall and quite isolated secondary peak at *c.* 1.13 g, based on 12 specimens. The double peak looks altogether too clear-cut to have arisen from the miscellaneous character of the sample (hoard-coins, single finds, etc.). If a miscellaneous sample had had this effect, one would expect to see it also in Variety G – where

Technical analysis of the coins

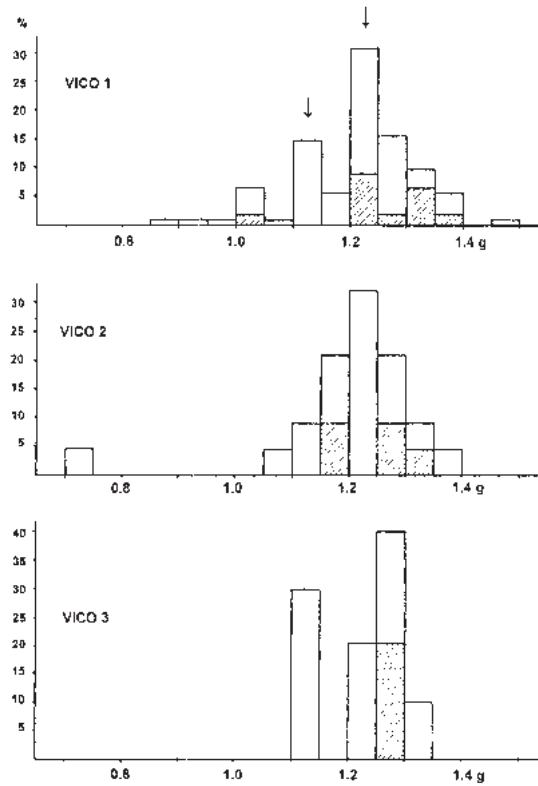


Figure 4.8. Histogram of weights for VICO varieties. VICO 1 N = 63, VICO 2 N = 23, and VICO 3 N = 10. Hoard specimens (shaded) are, as usual, concentrated at the top end of the weight-range. Domburg finds are omitted.

G1, G3, and G4 look as much like single distributions as one could hope to see. G2, as already mentioned, has what now, in the light of the VICO evidence, seems a convincing secondary peak, again at *c.* 1.13 g. The histogram of VICO 3, although based on very few specimens, shows also two peaks. VICO variety 2, which may or may not be by the same die-cutter as VICO 1, looks to have a single distribution with its peak again at *c.* 1.23 g. Our scheme of classification of the VICO type, into varieties 1, 2, and 3, is much simpler than that originally proposed,⁶² and is better supported by the evidence of

⁶² Metcalf (1993) pp. 211-216.

metrology. Probably VICO 2 represents the first issues, and VICO 1 and 3 are later, and they reflect a decline of the weight standard during their period of production.

A similar story is repeated for the ‘plumed bird’ porcupines, of sub-varieties J, K, and L. Their histograms (fig. 4.9) do not approximate at all closely to the bell-shaped curve seen (above) in Variety G. In sub-variety J, although there are not two clearly separated peaks as in VICO 1, there is a pronounced shoulder on the lower side of the main peak. The final shape of the histogram no doubt reflects the conflation of two separate but overlapping peaks, at *c.* 1.23 g and, probably, *c.* 1.13 g, as before. Sub-variety K seems to show some falling-away from the original high standard. One might possibly interpret it as reflecting two overlapping peaks at *c.* 1.17 g and *c.* 1.00 g. These two sub-varieties are defined in terms of trivial differences in the arrangement of groups of dots on the reverse.

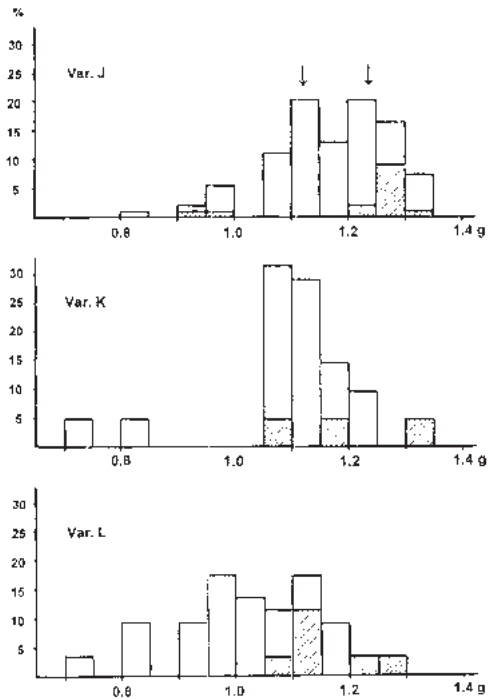


Figure 4.9. Weight-patterns of the primary-phase ‘plumed bird’ porcupines, Varieties J (N = 54), K (N = 21), and L (N = 34). Hoard coins are shaded. In J there seem to be two overlapping peaks, at *c.* 1.23 g and *c.* 1.13 g (arrowed).

A better criterion might be the shape of the bird – round-bodied or tubular – which is surely likely to have been part of the settled habit of the die-cutter. Nevertheless the metrological evidence confirms the priority of J. Sub-variety L, which tends to have a tubular bird, and which is absent from Aston Rowant, shows a sad decline. It is lighter, much less tidy, and also of inferior alloy. Note its occurrence in the secondary-phase Woodham Walter and Cimiez hoards.

A couple of die-linked ‘plumed bird’ Variety J sceattas in the Kloster Barthe hoard are right at the top of the weight-range (1.27 and 1.32 g), and add to the impression of a merchant who had a lot of money passing through his hands selecting the heaviest specimens for a payment by weight.

Variety D, which stylistically is the ‘odd man out’ of the four primary varieties, shows a very clear peak at *c.* 1.23 g (fig. 4.6), and also a clear secondary peak at the unexpectedly low value of 1.03 g. The internal chronology of Variety D is not apparent from the style of the coins; could the light standard belong late in the primary phase? The moneymen might, of course, have changed the weight-standard without any deliberate change in the design, and this would not have mattered if merchants normally paid large sums by weight.

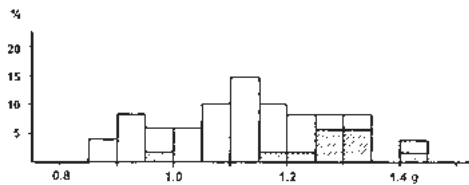


Figure 4.10. Weight histogram of the Variety G imitations. N = 48.
Coins from hoards are shaded, Domburg coins are omitted.

The Corpus includes a number of apparent imitations of the four primary varieties. It is uncertain if these coins were struck during the primary or secondary phase, or even later. Only the group of sceattas listed as variety G imitations is large enough to draw a useful histogram. This weight histogram shows a flattened curve, with a peak of *c.* 1.13 g, definitely lower than for the regular variety G1-3 issues (*c.* 1.23 g). We found what seems to be a lower secondary peak in G2, at *c.* 1.12 g (fig. 4.10), and this could perhaps reflect copies, erroneously included in the official variety G2. This is far from improbable, because the simple design of Variety G was not at all difficult to copy.

The tertiary phase

The weights in the Franeker or tertiary phase follow the by now familiar pattern, of hoard coins of the highest weight-range, single finds appreciably lower in weight, and the Domburg finds in aggregate much the lowest. The material is dominated by the Franeker hoard, which is large enough to provide several useful histograms of weights. Varieties E, B, and F are each so clearly defined in their designs, and with distinctive border ornaments, that one can be very confident of the integrity of the sample for purposes of metrology. That turns out to be important, because the shape of the histograms is unexpected. They bear little relation to bell-shaped curves. The best of them (for varieties E1 and B) display what can only be called positive skewness (fig. 4.11). It is radically improbable that such a deviation from the normal bell-shaped curve would be present when the coins left the moneyer's hands, and one is obliged to consider, therefore, that the owner of the hoard has sifted out light specimens and

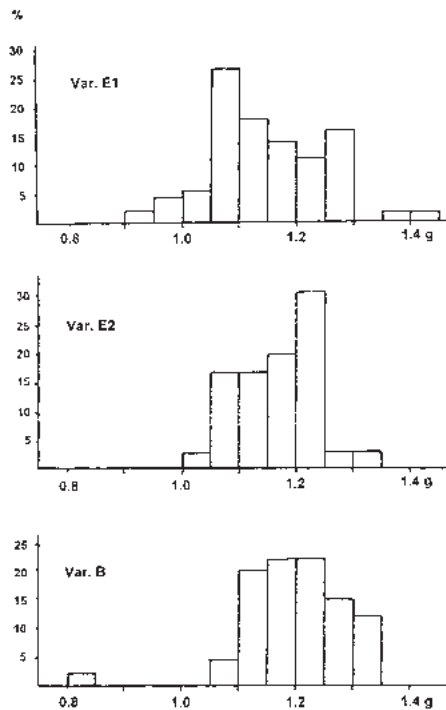


Figure 4.11. Franeker hoard coins of (from top to bottom) varieties E1 (N = 59), E2 (N = 52, excluding E2 with crosslet), and B (N = 45).

retained heavy ones. It is possible to make comparisons, in Varieties E1 and B, with the Föhr hoard. Although it is not a large enough hoard to be really useful for the purpose, it is clear that the lighter-than average coins are more plentiful in Föhr than they are in Franeker, and that the heaviest specimens are not over-represented to the same extent (fig. 4.12).

There is only limited die-linkage between Franeker and Föhr. If the Föhr coins really are all or nearly all from the same workshops as the Franeker coins, a process of sorting by weight has been at work.

The selective character of the Franeker hoard is further demonstrated by die-linkage. In Variety E1, for example, the coins in the heaviest step of our histogram (1.25-1.29 g) are die-linked to lighter coins. A specimen weighing 1.26 g is linked with two others, 1.15 and 1.06 g; coins weighing 1.29 and 1.26 g are linked with others weighing 1.15 and 1.13 g; 1.27 with 1.08 g; and even 1.44 and 1.28 g with 1.10 g. All these are Franeker hoard coins, which have had the same secondary history since their burial. Essentially the same phenomenon of die-linkage between heavy and light coins is repeated for Varieties E2, B, and F. This is the strongest evidence that we have – stronger than the parameters of the histograms – that the moneys worked within a rather wide tolerance. There is accordingly very little reason to imagine that the positive skewness visible in the histograms arose at the point of issue of the coins, i.e. because more than one standard was employed at different times or on different occasions.

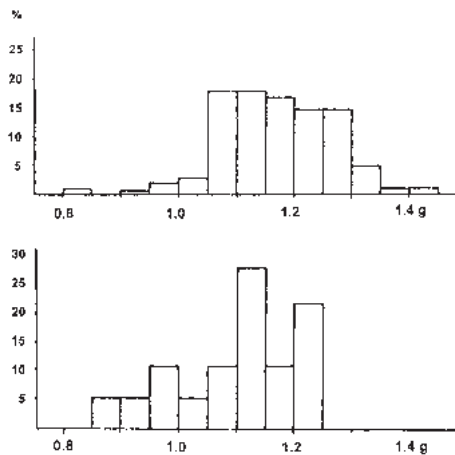


Figure 4.12. Contrasting histograms of the porcupine sceattas in the Franeker hoard (above) and the Föhr hoard (below) which suggest that lighter coins were largely excluded from the Franeker hoard, by deliberate selection.

If that is the correct interpretation of the Franeker hoard histograms, it affects our judgement of the intended weight-standard, which will presumably lie closer to the lower end of the main block of weights. Variety E1 has a clearly-defined peak at *c.* 1.09 g, and a less pronounced peak at *c.* 1.27 g, Variety E2 is less clear-cut (fig. 4.11). Taking into account the common sense view that the weight-standard is unlikely to have been changed between E1 and E2, we would judge that there is a 'shoulder' on the histogram at *c.* 1.08 or 1.09 g. A higher peak, at *c.* 1.23 g, is quite pronounced in E2. This phenomenon corresponds with what is seen in Variety E1. The *c.* 1.23 g peak is, we suggest, to be discounted, that is to say, it results from secondary selection of heavy coins for hoarding. The relative chronology of E1 and E2 is indicated not just by devolution in the reverse design, but also by the Föhr hoard, which terminates with E1. Variety E2 with crosslets on the obverse is less carefully manufactured, but was probably on the same standard as E1 and E2.

Encouraged by this reading of the evidence of Variety E, we would interpret Variety B similarly (fig. 4.11), as regards the distortion of its histogram by positive skewness, as resulting from selective hoarding. The original intended standard surely cannot have been the same as for Variety E. Inspection of the histogram makes clear that it cannot have been as low as 1.08 g. It must have been at least 1.13 g, and may well have been at *c.* 1.18 g, a by now familiar differential. The false peak in the histogram for Variety B lies somewhere about 1.28 g.

The scarce variety AF contributes only ten specimens to the Franeker hoard. They seem to be on an intermediate standard of *c.* 1.12 g, but that can only be a provisional conclusion, from such a small sample.

Variety F, which is unrepresented in the Föhr hoard, and present in the Franeker hoard in long chains of die-identical specimens, is apparently the latest variety. Again it generates a histogram with a 'shoulder' which we would interpret as reflecting the original or intended weight-standard. Of the two peaks in the Franeker hoard material, the lower is at *c.* 1.08 g, and the higher at *c.* 1.18 g (fig. 4.13). Given the evidence of die-linkage, we would again interpret it in terms of the hoarding of heavy specimens. This reading of the metrology of Variety F matches that of Variety E rather closely, and any thought that its weight standard was revised upwards runs counter to common sense.

To try to make more reasonable sense out of the tertiary phase, fig. 4.14 looks at the single finds (wherever they are from), since they at least should be free from the effects of hoarding heavy specimens. The upper diagram, of mainly Frisian and English finds, is very extended, reflecting weight-loss. Only the upper range of the histogram is likely to be of help. There is a small peak at

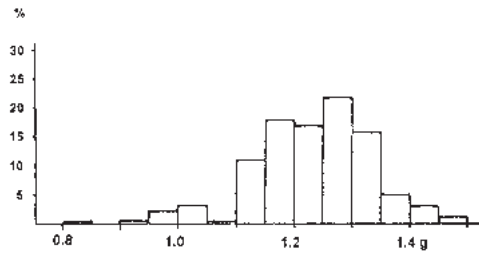


Figure 4.13. Franecker hoard coins of Variety F (N = 153), again showing the preferential hoarding of heavier coins.

c. 1.13 g. The lower diagram is of finds from Domburg and from Wijk-bij-Duurstede. At both these sites the coins are even more severely affected by corrosive weight-loss, and the complete histogram would continue below 0.6 g. It does, however, show a small peak again at c. 1.13 g. But there is virtually nothing above that weight.

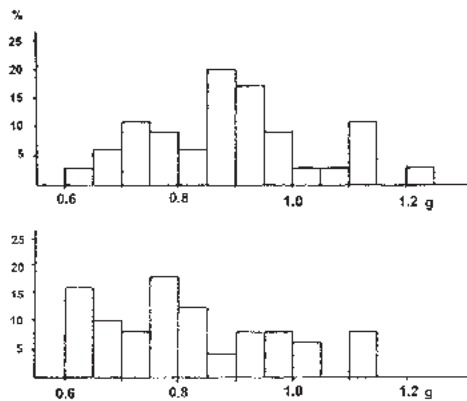


Figure 4.14. Single finds of tertiary-phase porcupines (above 0.6 g in weight). Above generally, other than below; below = Domburg and Wijk-bij-Duurstede. N = 35 and 50 respectively.

The Franecker phase seems to have introduced a reduction in weight-standards. At least in Variety E, where the sub-varieties are surely successive, the new, lower standard was carefully maintained. It was a deliberate reduction, not downwards drift. The alloy standard of the coins appears to have been reduced from what is seen in the secondary phase at its best, but we do not know

sufficient about that phase to say whether the Franeker coins mark a further reduction of silver contents from what was current at the end of the secondary phase. Moreover, the analytical evidence of the Föhr hoard (discussed in the next chapter) is problematic.

Discussion of the results

The average weight of the main groups of porcupines when they left the moneyers' hands was carefully regulated, whether by law or custom. The porcupine sceattas were struck *al marco* and not *al pezzo*. The regulation was doubtless expressed in terms of a certain number of coins to a pound (but what pound? – perhaps a special moneyer's pound). For purposes of numismatic study, however, it is advantageous to study the modal rather than the mean average, i.e. to look at the peak values of the histograms. We know from a capitulary of 754/755 that the weight of Pepin's reformed denarii was royally regulated: not more than 22 solidi (i.e. 264 coins) were to be struck from a pound by weight.⁶³ That gives a theoretical (mean) weight of *c.* 1.3 g; but 24 coins of Pepin making up the Hoogstraat I hoard from Dorestad have a median weight of only 1.05 g.⁶⁴ Either there was a moneyer's pound which was lighter (something that is known from later in Anglo-Saxon England) or the Hoogstraat coins do not conform to what is prescribed by the capitulary. The median of *c.* 1.05 g is very close to the peak weight of the Franeker porcupines of Varieties E and F, although Pepin's coins were perhaps of better silver. The moneyers of the porcupines (and of Pepin's deniers) were permitted a certain measure of variation on either side of the average. The craftsmanship of preparing and cutting the flans as accurately as was practicable when tens of thousands of coins were being made generated a characteristically bell-shaped or normal or Gaussian curve in a histogram of individual weights. The peak value of the curve today may not be exactly what it was when the same coins left the moneyers' hands, and discretion is called for in assessing the original value.

Now and then sceattas with an unusually light weight are found. That gives rise to the speculation that sceattas on half the usual standard have circulated. Some coin dealers offer light-weight porcupines as a special issue for an exaggerated price, under the label 'rare half sceat'. The histograms of the porcupine varieties, however, do not support in any way a double weight standard. A reduced weight is commonly the result of corrosion.

⁶³ Grierson & Blackburn (1986) p. 204.

⁶⁴ Van Gelder (1980).

The primary porcupines, variety by variety, yield an average weight of *c.* 1.23 g with a secondary modal value of *c.* 1.13 g (or sometimes lower). This figure of 1.13 g, almost exactly, is seen in the earliest runic sceattas of Series D, initially at *c.* 1.14 g. They circulated concurrently with the primary porcupines. The moneyers of both designs were evidently working to the same prescribed weight-standard. The alloy of the two designs, and therefore the intrinsic value of the coins, were also on average the same. Obviously the two types would have been interchangeable at par. The historical context in which these two distinct Series D and E were minted concurrently in the Netherlands is discussed in chapter 7.1. It is virtually certain that in Series D the average weight was increased after the issue of sub-variety 1a. For sub-varieties 1b, 2a, and 2b the average is 1.21-1.22 g. Perhaps, therefore, the heavier of the primary porcupines similarly are a practical adjustment upwards, rather than the opening phase. Was it deemed necessary for Series D and E thus to keep in step with each other? How could that be reconciled with the two weight standards seen, for example, in the porcupines of Variety G2? Perhaps it would be necessary to argue that the porcupine series began before Series D? But that still leaves G1, which ought, by analogy with Series D, to be on the lighter standard, but which certainly is not. Did its minting begin at a later date? The hypothesis that the weight standard of the primary porcupines was adjusted upwards at some intermediate date during their years of issue, in parallel with Series D, seems after all to fail.

Although the moneyers evidently went to a lot of trouble to achieve the desired average, at the same time the permitted tolerance in weight meant that one coin might well have an intrinsic value of ten or 15 percent greater than the next. That might seem to negate the purpose of the exercise. To anyone, such as a merchant, through whose hands a lot of money passed, that seems like an open invitation to make an extra profit of up to five or six percent on his turnover. And yet the monetary system worked.

Until a substantial hoard comes to light from early in the secondary phase, much of this is still speculative. We need more evidence which allows us to be sure that the moneyers were adhering to fixed standards.

The intense minting activity of the secondary phase eventually came to an end, perhaps in the early 740s, and gave way to distinctive new variations of the porcupine design, the tertiary or Franeker phase. These coins, of elegant workmanship and on slightly larger flans, are strongly reminiscent of the designs of the primary porcupines, so much so that one must think of deliberate recall. Sentiment, however, was unable to provide a flow of silver bullion to the moneyers; the tertiary-phase porcupines were struck in only modest quantities. Although one should be cautious of historical conclusions based merely on

iconography, it seems that the tertiary-phase porcupines may signal or celebrate a recovery of Frankish control of Dorestad. For the first time, porcupines become plentiful as single finds at Dorestad itself.

There are three distinct tertiary-phase varieties, referred to as E, B, and F, and a fourth, far less plentiful variety, AF. There are also some confusing 'mules'. The inverted commas imply the judgement that they are careful imitations, rather than combinations arising because dies were transferred between one workshop and another (i.e. true mules). The original or intended weight-standards are made more difficult to judge by very lax tolerance (evidenced by die-links between coins of very different weight) and by the selection of heavy specimens for hoarding, by the owner of the Franeker hoard. In Varieties E1, E2, and F the heavy coins generate what are best understood as false peaks in the histograms, at various values from *c.* 1.18 g upwards. The original standard was perhaps *c.* 1.08 g. Variety B was originally heavier, at *c.* 1.13 g or higher. The silver contents of the earlier Franeker coins (Varieties E1, B, and AF, but not E2 or F) have been measured in the Föhr hoard (table 4.9, p. 109). In detail the analytical results are very problematic, but it is almost certainly the case that most specimens were quite debased when they left the moneyer's hands. That would make sense when the tertiary-phase porcupines are set alongside the contemporary English sceattas.

Pepin's reformed deniers, which finally swept away the porcupines, show a median value of *c.* 1.05 g, i.e. marginally lower than the Franeker Varieties E and F, in a hoard from Hoogstraat, at Dorestad. Such of Pepin's coins as have been analysed are of good-quality silver, as are the contemporary reformed pennies of the English King Offa.

Summary

Metrological analysis indicates that the porcupine sceattas were struck on well-defined weight-standards. The comparison of the weight of pairs of die-identical specimens make clear that a variation of 10 to 15 percent was tolerated.

The four primary-phase porcupine varieties were manufactured on a weight-standard of *c.* 1.23 g. There is evidence of decline in weight at the end of the primary phase.

Surprisingly, the secondary porcupines have two different weight-standards (fig. 4.2). The weight-peak of the group with the ToT- / \ reverse design is *c.* 1.17 g, that of the sub-varieties with a 'mixed-grill' reverse design lies roughly 8 percent higher, at *c.* 1.27 g. The available evidence from the composition of hoards rules out the possibility that the ToT- / \ and 'mixed grill' issues were

successive. There are no indications of a declining weight standard during the secondary phase. The stray-find distribution of these samples in the Netherlands reveals a clear regional contrast. It is very plausible that during the secondary phase two major production centres of porcupine sceattas operated in the Netherlands.

The moneyers of the porcupines of the tertiary phase worked to a rather wide and lax weight-tolerance. That renders the original or intended weight-standards more difficult to judge. The peak of the weight for varieties E and also F may well have been *c.* 1.08 g, and somewhat heavier for Variety B at *c.* 1.13 g. The majority of the porcupines from this phase in the Corpus are from the Franeker hoard. The histograms yield evidence that particularly heavy coins were selected and hoarded by the owner of this hoard, causing false peaks in the histograms.

4.2 The metal contents of the porcupine sceattas

Introduction

The first chemical analyses of porcupine sceattas were published in the nineteenth century by Rethaan Macaré and De Man.⁶⁵

Table 4.2. Chemical analyses from the 19th century.

	silver	gold	copper	tin
R-Macaré	90.00	0.80	9.20	
R-Macaré	53.78	0.60	45.43	trace
De Man	92.50		7.50	

Unfortunately we lack an illustration or a cast of these coins, which were presumably destroyed in the process. In a letter from 1868 with a description of the Franeker hoard, a drawing of a Variety F sceat has the addition “*silver 400/1000*”, and the drawing of a silver object “*600/1000*”.⁶⁶ Perhaps the results of examination by a local jeweller with a touchstone? The next analysis of the composition of a porcupine was performed nearly one hundred and thirty years later.

⁶⁵ Rethaan Macaré (1856); De Man (1899).

⁶⁶ Op den Velde (2001) p. 39.

The production of silver for coinage

Silver (Ag), usually with a small percentage of gold (Au) and other metals, such as copper (Cu), is present in several kinds of ores. In ancient and medieval times the silver was extracted from the ore by cupellation. This process is based on the principle that precious metals (Au and Ag) do not oxidize, unlike base metals. Crushed silver-containing ore, or stock silver to be refined, is mixed with an abundant quantity of lead and heated in a furnace under a constant flow of air. The lead is transformed into lead oxide, which melts at a relatively low temperature, and which captures the oxides of the base metals. Silver plus gold remain floating on top of the molten lead oxide and can be removed. This chemical reaction is $(\text{Ag} + \text{Cu}) + \text{Pb} + \text{O}_2 \rightarrow \text{Ag} + (\text{PbO} + \text{CuO})$. The gold-silver alloy thus extracted is separated by salt cementation. Thin sheets of the alloy are mixed with salt and heated in a sealed pot. This process is repeated several times. The silver reacts with salt to form silver chloride, leaving purified gold behind $(\text{Au} + \text{Ag}) + \text{NaCl} \rightarrow \text{Au} + \text{AgCl} + \text{Na}$. The sodium evaporates, and silver can be recovered from the debris by smelting. When the last of the old tremisses, containing between ten and 20 percent gold, were replaced by silver sceattas in the late seventh century, this was how the gold was recovered. Following salt cementation, traces of gold will always remain in the purified silver, e.g. one percent, which are too small to be worth recovering. Thereafter, if the silver was recycled into porcupines of other varieties, the gold : silver ratio will remain virtually unchanged.

Silver sceattas invariably contain traces of gold, which entered the alloy along with the silver. The heating of the precious metal with lead during the process of cupellation always leaves *c.* 0.5 – 2.0 percent of lead. In most sceattas with a high silver content, tin (Sn) is absent or below the level of detection. It is, however, regularly present in more debased specimens. This is no doubt the result of the addition of bronze (a copper-tin alloy) to the coin metal. It is corroborated by the more or less direct proportion of tin to the copper contents.⁶⁷

Sceattas almost always contain traces of zinc. As metallic zinc could not be isolated in the middle ages, it will necessarily have entered the composition of the coins as part of a copper-based alloy (brass), and it is therefore sensible to examine its distribution in terms of the zinc : copper ratio, which is characteristically anything from *c.* 2 to 5 percent zinc – far less than in good-quality brass.

⁶⁷ Metcalf (1994) fig. 23 on p. 654.

Methods of non-destructive metal analysis

The development at Oxford by Professor E.T. Hall, head of the Research Laboratory for Archaeology and the History of Art, of a computerized system suitable for the non-destructive analysis of coins by X-ray fluorescence (XRF) opened the way for programmes of analysis planned jointly with the Institute of Archaeology, the Ashmolean Museum, and a few other collections. Professor Hall's 'Milliprobe', which was designed to produce results quickly and therefore cheaply, used a curved-crystal spectrometer in order to focus onto a smaller area than is normally possible with XRF. That proved to be a big advantage so far as coins were concerned. Measurements were derived from a circular area of about 1 mm diameter. It was necessary to find a place on the edge of each coin where it was at least 1 mm in thickness – not too difficult with sceattas, the flans of which are sometimes slightly wedge-shaped. A section of the edge was cleaned using 600 grade emery grit, to present a smooth surface to the X-ray beam, and to cut through surface enrichment. The idea was to abrade a few tens of microns, take measurements, and then repeat the process until stable readings were obtained. The analyses were carried out by Mrs Julia Merrick, and later by her colleague Miss Lynette Hamblin. The coins were all illustrated, and the analyses were given a running number and a prefix, e.g. O for Oxford, or M for Metcalf. The first 'Milliprobe' analysis of a porcupine (O.20) was published in 1966, in the journal *Archaeometry*,⁶⁸ and others were published in the *Numismatic Chronicle* for 1967⁶⁹ (O.38), and in a 'Minerva' handbook published in Newcastle in 1968⁷⁰ (O.41-4, Ca.4, and Sc.3).

These included a 'stepped cross' porcupine (Type 53) and two '*Ethiliræd*' porcupines. In the same year, a programme of analysis specifically of Low Countries sceattas was undertaken, and the results published in the *Jaarboek*.⁷¹ They included 22 porcupines (O.127-142, M.1-6). Eleven of these were specimens selected from the Franceschi parcel. The 'Milliprobe' did not operate in a vacuum, and the limits of detection were therefore not as low as one might have wished, especially for tin. In 1973, a new and improved XRF instrument, named the 'Isoprobe', was built by Professor Hall. It was used *inter alia* for a programme of analysis of Merovingian silver coins, along with which one porcupine, of the secondary sub-variety k was analysed (Corpus 2311). Thus, altogether, 30 analyses of porcupines were acquired. For each coin,

⁶⁸ Hawkes, Merrick & Metcalf (1966).

⁶⁹ Metcalf & Merrick (1967).

⁷⁰ Metcalf, Merrick & Hamblin (1968).

⁷¹ Metcalf & Hamblin (1968).

Table 4.3. Results of the measurement of four metals in the period 1966-1968 by X-ray fluorescence (XRF).

Corpus		T&S	variety	Au	Ag	Cu	Pb	'silver'
0001	O.41	192	plumed bird	2	96	2	tr	c. 98
0079	Sc.3	-	"	<1	96	3	tr	c. 97
0270	O.20	-	VICO	2	95	3	[]	c. 97
0282	O.38	194	"	<1	c. 98	<1	[]	c. 98
0483	O.127	204	Variety G	1.5	92	5	1.3	94.7
0514	O.128	203	"	1	91.5	6	1.5	94
0561	O.129	200	"	1.5	89-90	7-8	1.3	c. 92
0722	O.137	220	sub-variety a	1.3	80-82	16-18	1	c. 83
0745	O.135	235	" "	0.3	79-81	16-18	2	c. 83
0793	M.1	-	sub-variety b	1.5	80-82	15-17	1.5	c. 84
1249	O.139	238	sub-variety c	1	72.5-74.5	23-25	1.5	76
1374	O.134	236	sub-variety d	0.3	92-93	4-5	2	c. 95
1501	O.138	237	" "	1.5	83-85	12-14	1.3	c. 87
1779	M.5	244	sub-variety e	1	77.5	20	1.5	80
1794	Ca.4	218	" "	1.5	93.5	4	1	96
1795	O.136	217	" "	1	82.5-85.5	12-15	1	c. 86
1960	O.133	222	sub-variety g	1	88	11	tr	89
2076	M.3	242	sub-variety h	1.5	82	15	1.5	85
2212	O.131	215	" "	1.3	92-93	4-5	1.5	c. 95
2311	MEC663		sub-variety k	0.6	87	9	0.9	88
2347	M.2	-	" "	1.5	78-82	15-19	1.5	c. 83
2412	O.132	234	" "	1.5	83.5-85.5	21-14	1	c. 87
2492	O.141	240	" "	1	88-90	8-10	1.3	c. 91
2512	O.140	239	" "	1	81.5-83.5	14-16	1.5	c. 85
2513	O.142	241	" "	1.5	72-73	24-25	1.5	c. 75
2619	M.4	243	" "	1.5	88.5	9	1	91
2635	M.6	251	" "	1.3	65.5-58.5	37-39	1.3	c. 60
3522	O.44	258	'stepped cross	1.3	94	5	tr	95.3
3566	O.42	134	<i>Æthiliræd</i>	1.5	96	3	tr	97.5
3571	O.43	135	"	1.5	92-96	3-7	tr	c. 95

measurements were calculated for silver, copper, gold, and lead, and for any minor constituents of the alloy that were detectable as traces, e.g. tin, zinc, iron, and antimony. It may be convenient to tabulate the percentage values for the four main constituents of the coins in Corpus order, together with the analysis running number (table 4.3).

In discussing the results, below, the silver contents of the coins as they would have been perceived by craftsmen at the time, i.e. including the small amounts of gold in the silver, and also the minor amounts of lead left over from the cupellation process, will be referred to as 'silver', in inverted commas. This figure is generally something like two percent higher than for silver (Ag) alone. The 'silver' contents of the analysed coins are mentioned in the Corpus. In 1993-1994 the historical metallurgist Dr J.P. Northover, of the Department of Metallurgy (later Department of Materials), Oxford, analysed 53 porcupine sceattas, plus 5 of the 'stepped cross' type and 3 of the '*Æthiliræds*', using the vastly superior facility of a scanning electron microscope and electron microprobe analysis to measure the concentration of 11 elements on a polished section of the edge of the sceattas. The section was first examined microscopically in order to choose an area that was free from corrosion, and measurements were then taken by rostrating within a 50-micron square (a mere four-hundredth of the area measured by XRF). The specimens for analysis were mainly from the Oxford collection, and from the Hamwic (Southampton) excavations, with a few from the National Museum of Wales, Cardiff. Three of the Hamwic coins were severely corroded, and half a dozen others betrayed some inhomogeneity affecting particular chemical elements. Otherwise the sample comprises well-preserved specimens.

The results are all tabulated in *Thrymsas and Sceattas*, vol. 3.⁷² There was a deliberate overlap with the earlier XRF analyses, allowing us to compare the two sets of figures for 'silver' and, in effect, to judge the reliability of the XRF results (table 4.4). The XRF results are nearly always higher, and there need be very little doubt that that is because Mrs Merrick and Miss Hamblin abraded the edges more gently than Dr Northover. The 'Milliprobe' was calibrated (daily) using a good set of silver-copper standards including 25, 50, 75, 90, and 97 percent: the measurements are to be relied upon. This goes to show that corrosion and leaching are a severe practical problem for the scientist – an unpalatable message, so far as the XRF results are concerned. Half the results differ by less than four percent, but some differ by over ten percent. The trouble is that the degree of difference is unpredictable.

⁷² Metcalf (1994) pp. 660-679.

Table 4.4. The differences between the ‘silver’ content measured by X-ray fluorescence (XRF) and the more reliable electron probe micro analysis method (EPMA).

Corpus	T&S	XRF	EPMA	difference
0001	192	98	96.24	+ 1.8
0282	194	99	95.36	+ 3.6
0483	204	94.75	94.67	+ 0.1
0561	200	92.25	92.75	- 0.5
1794	218	96	84.37	+11.7
2076	242	85	88.18	- 3.2
2212	215	95.25	91.45	+ 3.8
2412	234	87	84.51	+ 2.5
2492	240	92.25	81.05	+10.2
2513	241	75.5	67.27	+ 8.2
2619	243	91	88.58	+ 2.2
2635	251	60	46.13	+13.9
3566	134	97.5	85.81	+11.7
3571	135	95.5	87.78	+ 7.7

A further 53 porcupine sceattas from the Föhr hoard, of which all but half a dozen are of the Franeker or tertiary phase, were analysed and published by Prof. Ernst Pernicka, of the Institute for Archaeometry at Freiberg, and formerly of the Max-Planck Institut für Kernphysik at Heidelberg, using energy-dispersive X-ray fluorescence analysis.⁷³ This technique (like the simpler XRF) gathers data only from the surface layers of the coin, to a depth of between 10 and 50 microns. Both sides of each coin were analysed separately by Prof. Pernicka, thus 106 analyses, for nine chemical elements. The results reveal all too clearly that the surface layers were not a fair reflection of the original composition of the coins. The results from the two sides of the same coin varied, often by as much as five percent (absolute) for the silver contents and sometimes more. To give a glaring but not unique example, coin no. 37 was found to have silver contents of 76 or 61 percent, gold of 0.55 or 0.85 percent, tin of 1.9 or 13.9 percent (*sic*), and zinc of 3.20 or 1.36 percent. One can only suppose that the measurements were made on unabraded surfaces. No

⁷³ Hatz (2001).

doubt they measure the surface composition very accurately, and there is a presumption that because of surface enrichment of silver, the true silver contents will be lower still – but by how much, it is impossible to tell. Prof. Pernicka offers a ‘best’ result for each coin, which is usually based on the lower silver value, or sometimes on an average. The tertiary porcupines became significantly debased, even in the first half of the phase, but sadly, one can hardly hope to use figures as uncertain as these to analyse the numismatic history and minting arrangements of the tertiary phase. Unless the edge of the coin is abraded, the most sophisticated analysis is but labour and resources lost.

There are several other techniques for the non-destructive analysis of metal objects. These include activation with thermic neutrons or radioactive particles. Both methods give excellent and reliable results, but they are very expensive because a cyclotron is needed. The latter method also renders the coins radioactive for a considerable period of time.

The primary phase

The 23 primary-phase porcupines analysed by EPMA were mostly around 92 to 93 percent ‘silver’, thus closely comparable with the runic sceattas of Series D.⁷⁴ The broad picture of very good silver contents in the primary phase (in line with other primary types, e.g. in England) is complicated by a minority of specimens which fall below, sometimes well below, the broad standard. The question is whether these coins are part of the official series, or contemporary copies. With some specimens the verdict is obvious (stylistic blunders, lateral reversal, etc.), whereas with others judgement is difficult. The alloy of the primary-phase porcupines, of all four varieties, routinely included very small amounts of zinc (the distinctive constituent of brass), but usually no measurable amount of tin (which turns copper into bronze). Out of 22 results, 15 had no tin, and one other, with just 0.02 percent, had virtually none. There is a significant contrast in this respect with the contemporary runic coins of Series D, where EPMA measurements of coins with 80 to 90 percent ‘silver’ sometimes show *c.* 1.0 percent tin.

⁷⁴ Op den Velde & Metcalf (2003) pp. 55-58.

Table 4.5. Metal analyses results of the primary-phase porcupines (EPMA). (ED)XRF values in italics.

Variety	Corpus	Ag	Au	Pb	Cu	Sn	Zn	Au:Ag
Pl bird	0001	93.7	1.2	1.1	3.6	-	0.1	1.29
	0009	93.1	1.6	1.4	3.7	tr	0.1	1.72
	0011	84.9	1.4	1.8	11.4	0.2	0.2	1.64
	0043	90.5	1.3	1.3	5.5	1.7	0.1	1.39
	0044	92	<i>1.1</i>	<i>0.5</i>	<i>6</i>	<i>0.2</i>	<i>0.3</i>	<i>1.19</i>
	0079	<i>96</i>	<i><1</i>		<i>3</i>			
	0102	<i>90-95</i>						
imitation	0165	85.7	1.4	0.8	10.4	1.3	0.1	1.69
VICO	0176	92.1	1.2	0.9	5.4	-	0.2	1.32
	0241	<i>62</i>	<i>0.9</i>	<i>0.6</i>	<i>33</i>	<i>2.7</i>	<i>0.3</i>	<i>1.45</i>
	0270	93.3	1.4	0.5	4.4	-	0.2	1.53
	0282	92.5	1.8	1.1	4.4	-	0.2	1.91
	0295	93.5	1.0	1.0	4.2	-	0.2	1.10
	imitation	0333	69.8	0.7	1.4	26.0	1.8	0.2
G2	0428	93.2	1.2	1.2	4.2	-	0.1	1.29
	0435	93.0	0.8	1.2	4.7	-	0.2	0.91
G3	0483	91.9	1.0	1.7	5.1	-	0.2	1.12
	0514	<i>91.5</i>	<i>1</i>	<i>1.5</i>	<i>6</i>			
G4	0552	92.3	0.8	1.0	5.7	-	0.1	0.93
G imitation	0561	90.6	1.1	1.1	6.7	-	0.5	1.24
	0567	<i>53</i>	<i>0.8</i>	<i>1.0</i>	<i>43</i>	<i>2.1</i>	<i>0.4</i>	<i>1.51</i>
	0572	<i>69</i>	<i>1.4</i>	<i>1.1</i>	<i>26</i>	<i>2.1</i>	<i>0.6</i>	<i>2.02</i>
	0573	<i>52</i>	<i>0.7</i>	<i>1.3</i>	<i>41</i>	<i>4.8</i>	<i>0.7</i>	<i>1.35</i>
	0588	92.4	1.1	0.9	5.2	-	0.1	1.15
	0594	92.4	1.1	0.9	4.9	-	0.8	1.15
D	0649	93.5	1.2	0.9	4.1	-	0.2	1.24
	0676	85.8	1.0	1.0	11.6	0.3	0.3	1.12
	0681	91.9	1.8	0.9	5.3	tr.	0.1	1.82
VERNVS	3455	92.3	0.6	1.1	5.4	0.1	0.4	0.62
	3474	93.1	0.8	1.1	4.6	-	0.3	0.87



Corpus 0043



Corpus 0333 Aston Rowant hoard

Where tin was present in a primary-phase porcupine in amounts of e.g. between 1.0 and 2.0 percent (Corpus 0043, 0332), it offers a strong hint that the coin was imitative. Smaller amounts can occur, however, in coins struck very late in the primary phase, e.g. 0.18 percent in a ‘plumed bird’ coin of Variety L.⁷⁵ Another specimen, of Variety D (Corpus 0676), with 0.29 percent tin, is probably also late.

The same remarks apply, alas, to EDXRF analyses of 11 porcupines from the Flixborough (L) excavations, made by Ian Panter using Link XR 200 system in the University of Durham.⁷⁶ He warns, scrupulously, that his figures are doubtless inexact because of surface enrichment (this could mean that the quoted silver contents are probably too high, by varying amounts). The three primary-phase VICO specimens are 96, 95, and 91 percent ‘silver’, the second and third of these with 5 percent and 3 percent gold respectively (surely too high?). Among the secondary-phase porcupines, four have 80-86 percent ‘silver’. Significant amounts of tin were measured, interestingly, in nos 3223 (which has low silver) and 3220 (one percent).⁷⁷



Corpus 0676 Aston Rowant hoard

Zinc is always present in the alloy of the primary porcupines, usually in amounts ranging between 0.1 and 0.25 percent. The moneyers may well have added a proportion of scrap brass, along with scrap copper, to the crucible. It seems clear that they did not do so in a completely haphazard fashion, which is puzzling. Not

⁷⁵ Metcalf (1994) pp. 664-665.

⁷⁶ Evans & Loveluck (2009), and p. 297.

⁷⁷ See the illustrations of these coins on p. 296.

only are the zinc : copper figures clustered quite closely, but the figures strongly suggest that there are systematic differences among the four primary varieties. On the evidence of the available analyses, excluding imitations, the zinc contents are lower in the D and ‘plumed bird’ varieties (table 4.6).

Table 4.6. The zinc : copper ratio of the primary porcupines (mean averages, imitations – not included in the averages – in parentheses).

								average
‘plumed bird’	1.94	1.90	2.39	2.17	(1.34)			2.10
VICO	4.40	5.44	5.98	(0.84)				5.27
G	4.60	4.90	3.70	2.29	(7.81)	(2.36)	(14.94)	3.87
D	2.06	2.41	1.50					
VERNVS	8.06	7.36						7.71

Table 4.7. The gold : silver ratio of the primary porcupines (imitations – not included in the averages – in parentheses).

								average
‘plumed bird’	1.39	1.29	1.72	1.64	1.23			1.45
VICO	1.91	1.53	1.10	1.32				1.47
G	1.24	1.29	0.91	1.12	0.93	(1.15)	(1.22)	1.10
D	1.82	1.12	1.24	1.54				1.43
VERNVS	0.62	0.87						0.75

Much more puzzling are similar discrepancies in the gold : silver ratio (table 4.7), because gold was a minor constituent that was in the silver naturally, and of which the workmen were unaware. The lower ratio of the two VERNVS sceattas may be explained by their English origin. Although double the number of analyses would be welcome, the available evidence shows a substantial difference between Variety G and the other Low Countries porcupine varieties – which tends to show that that workshop was obtaining its major silver supply from a different, lower gold containing source. It will be recalled that Variety G is on its own weight-standard, of *c.* 1.18 g. It is very difficult to understand how the lower ratio for Variety G can have arisen within the confines of the Netherlands; but we would be most reluctant to envisage that Variety G was, for example, English. The runic Series D has a gold : silver ratio, comparably calculated, of 1.36 percent (23 analyses).

All told, the interest in the alloy of the primary phase for the numismatist (and for the monetary historian) lies with the minor constituents, especially zinc and gold. The four primary varieties were produced, it seems from these differences, in separate workshops or from different stocks of silver, and the plumed bird workshop at least, if not also the others, had its own accustomed metallurgical practices. The hypothesis that Variety L of the ‘plumed bird’ coins (with a different die-ratio) is from another workshop remains to be explored metallurgically. More analyses of EPMA quality are needed to confirm the differences that seem to be present between the varieties – ideally including a carefully-chosen batch of specimens from a single hoard.

The secondary phase

The available analyses show ‘silver’ contents ranging between 92 percent and 65 percent, with a couple of outliers at 44 and even 27 percent. But almost half the specimens gave values over 85 percent (table 4.8 and fig. 4.15).

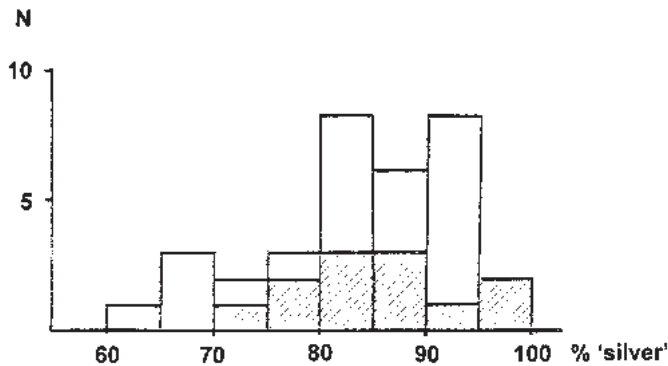


Figure 4.15. The ‘silver’ content of secondary-phase porcupine sceattas. The diagram combines XRF (shaded) and EPMA results. Step positioning 81-85, 86-90 %, etc. Where the same coin has been analysed by both methods, only the EPMA result is entered in the diagram. Two specimens, with 46% and 30% ‘silver’ are omitted from the diagram. N = 33 (+2).

At first glance one might conclude that the alloy of the porcupines at the beginning of the secondary phase was as good or almost as good as it had been previously (and still without any addition of tin, discussed below) and that the coinage then suffered a small debasement through the 80s and eventually down to about 70 percent ‘silver’.

Table 4.8. Metal analysis results of the ‘official’ secondary-phase porcupines. XRF values in italics. (The ‘stepped cross’ coins may be late primary.)

Sub-var./Type	Corpus	Ag	Au	Pb	Cu	Sn	Zn	Au:Ag
a	0721	<i>81</i>	<i>1.2</i>	<i>1</i>	<i>17</i>			
	0739	89.6	1.2	1.3	6.3	1.3	0.1	1.33
	0745	<i>80</i>	<i>0.7</i>	<i>1.2</i>	<i>17</i>			
b	0793	<i>81</i>	<i>1.5</i>	<i>1.5</i>	<i>16</i>			
	0834	84.3	0.8	0.8	11.1	2.7	0.2	0.97
c	1145	27.4	0.4	1.7	62.3	4.4	3.4	1.42
	1228	90.7	1.2	1.2	6.5	-	0.2	1.37
	1249	<i>73.5</i>	<i>1</i>	<i>1.5</i>	<i>24</i>			
e	1647	70.9	1.0	1.5	24.7	1.8	0.2	1.35
	1779	<i>77.5</i>	<i>1</i>	<i>1.5</i>	<i>20</i>			
	1787	92.1	1.3	1.2	4.2	0.6	0.1	1.42
	1794	80.4	1.3	2.6	9.1	4.4	0.2	1.65
	1850	62.3	1.0	0.9	31.5	3.5	0.6	1.62
g	1960	<i>88</i>	<i>1</i>	<i>tr</i>	<i>11</i>			
	1962	83.7	1.1	2.2	12.6	0.2	0.1	1.36
h	2076	85.8	1.2	1.2	10.5	1.1	0.1	1.36
	2106	91.5	2.5	0.8	4.2	0.7	0.1	2.73
	2127	81.5	1.5	0.7	16.1	-	0.1	1.83
	2157	<i>48</i>	<i>0.8</i>	<i>0.6</i>	<i>47</i>	<i>3.3</i>	<i>0.2</i>	<i>1.66</i>
	2211	91.8	1.4	0.9	5.6	-	0.2	1.54
	2212	89.1	1.3	1.1	8.0	0.2	0.3	1.48
	‘Stepped cross’	3491	91.6	1.3	0.8	5.0	tr	1.2
	3493	91.8	0.9	1.2	6.0	-	0.4	0.94
	3514	91.5	1.3	1.1	9.8	-	0.2	1.40
imitation	3522	73.0	0.8	1.8	21.6	1.7	0.5	-
”	3526	88.2	0.6	1.6	9.0	tr	0.4	0.71
<i>Æthiliræd</i>	3546	93.1	2.7	0.9	1.9	1.1	0.1	2.86
	3566	83.6	1.1	1.1	13.2	0.6	0.4	1.29
	3571	84.6	1.6	1.6	11.0	0.9	0.2	1.86

That may well be the broad picture, but it could be an over-simplification, which deserves to be tested first, by the analysis of die-duplicate specimens.⁷⁸ It is in any case very clear that the porcupines fared better than the contemporary English sceattas. A few of these (but very few) are 90 percent or better, but they quickly fall to around 60 percent, and many are only 50 percent 'silver' or less. There is the possibility that the values at the bottom of the scale in fig. 4.15 belong to imitative coins – in which case it would be even more true that the secondary porcupines maintained their quality much better than the secondary-phase English sceattas.

We are now able to go further than that, using the proposed new classification into sub-varieties. The hoard evidence from Kings Lynn and Lambeth, which takes priority, suggests that two separate streams, namely the 'mixed grill' and the ToT- / \ designs, may have coexisted from very early in the secondary phase. But the pattern will thereafter have grown in complexity, and the chronology of the development is not made clear by the larger hoards, because most of them were concealed late in the secondary phase.

We will examine whether there are any systematic differences between sub-varieties b-c on the one hand (with ToT- / \ reverses) and on the other hand sub-varieties e-h (with reverses consisting of, or derived from, or linked with, a 'mixed grill' of symbols).



Corpus 1145 Remenham

This exercise is not as straightforward as it sounds, because it depends quite heavily on the validity of the classification, in particular on our ability to distinguish between official coins and copies. The Remenham find could well be an English, fraudulent imitation. That is, however, a small, isolated problem. When we tabulate the EPMA analyses of the sub-varieties, it quickly becomes obvious that many uncertainties will remain if there are just one or two specimens for a given sub-variety; and as we have seen, it would be hazardous to treat the earlier XRF analyses as directly comparable with EPMA analyses, in order to

⁷⁸ Coins of Marseille of the same type and sometimes struck by the same dies had silver contents as disparate as 93 and 65%, and 82 and 54% (Grierson & Blackburn 1986, p. 110). But whether the porcupines showed an equally wide tolerance needs to be established empirically.

fatten out the series. Unfortunately, we lack an adequate representation of regular ToT- / \ specimens. From sub-varieties b+c there are only two valid EMPA analyses, which give an average 'silver' value of 89.5. Nine specimens of the regular 'mixed grill' reverse varieties (sub-varieties e-h), yield an average 'silver' content of 87.2 percent. This does not support the hypothesis that the two main mints of secondary porcupines maintained separate silver standards.

Before we can speak about a course of debasement, we need to have secure, independent evidence of the internal chronology of the secondary phase, and of the degree of variability that was tolerated at any particular time. In particular the sub-varieties f and h are very probably from late in the secondary phase, as we may judge from their heavy representation and die-linkage in the Kloster Barthe hoard. Another useful point of reference is that the Franceschi parcel, containing a range of sub-varieties and doubtless fairly late, contained many coins with 'silver' contents of *c.* 80 percent or better. Thus it appears that the alloy standard was still high in coins minted quite late in the phase. The available analyses thus offer no support for a process of debasement during the secondary phase.

Back to the wider problems of copying and imitation. The whole of sub-variety d appears to be in some sense imitative of sub-varieties b and c, copying the distinctive reverse design but with an assortment of different obverse designs. It is a feeble response to suggest that anything one does not understand is an imitation; but when and where were the coins of sub-variety d struck? Do they represent some sort of underhand commercial competition, at one or more other mint-places (a question which should surely be answerable through metal analyses) – or was there more than one mint-place or more than one workshop producing 'official' coins characterized by the shared ToT- / \ design, but with different obverse designs?

The selection of specimens for which EPMA analyses are available was made in the past, and to some extent biased towards 'unusual' reverse designs, many of them now grouped in sub-variety k. A good many of these 'unusual' designs are probably from late in the secondary phase, but that is by no means a proven fact.

The average 'silver' contents of the 'imitative' sub-varieties d and k are with 63.5 and 67.2 percent respectively significantly lower than the regular secondary-phase porcupines. These sub-varieties show relatively few die-identical or die-linked specimens. They are possibly the outcome of more or less illegal minting, of various smaller stores of silver, with weakness in quality-control. The position of the 'stepped cross' type (*BMC* Type 53) is perhaps in between the primary and secondary phases. In two specimens in regular style with

‘silver’ contents well over 90 percent, there is no tin or virtually none. One ‘stepped cross’ coin shows a high zinc : copper ratio (Corpus 3491), but otherwise is in line with the primary porcupines, in particular with Variety G. The gold : silver ratio of the ‘stepped cross’ type also seems to match Variety G. The alloy of two irregular specimens is indistinguishable from secondary porcupines (table 4.8).



Corpus 3491

Corpus 3546

Almost the same can be said about the *Æthiliræd* porcupines (*BMC* Type 105). Corpus 3546 has a high silver content, and a high gold : silver ratio. Two others show a ‘silver’ content of 85.8 and 87.8 percent (table 4.8).

To sum up, the main point established by the analyses is that the official secondary-phase porcupines seem to have been largely immune to the downward pressures of debasement or depreciation. The porcupines were a strong currency compared with the English sceattas (and this would doubtless have been understood in England). Many of the English finds are certainly coins minted in the Netherlands; whether there was also a flourishing manufacture of imitative porcupines (which one might search for particularly within sub-variety k) remains to be seen. Also of much general historical interest, the Big Rivers region and Friesland were commercially integrated, and there is (as yet) no reason to suppose that porcupines of significantly different fineness were struck in north and south.

As regards the minor constituents of the alloy of the secondary porcupines, the existing analytical data will grow in value when the numismatic context of the coins in question is understood in more detail. Comparison of the minor constituents in die-duplicate specimens will give a more secure scientific basis for conclusions. The output of a single pair of dies is the equivalent of many crucibles-full of metal, and one should not expect die-duplicates to be closely identical, unless they happen to be from the same batch of alloy. Even then, the pouring out may have resulted in some variation.

Table 4.9. Metal analyses results of the ‘imitative’ secondary-phase porcupines. XRF values in italics.

Sub-var.	Corpus	Ag	Au	Pb	Cu	Sn	Zn	Au:Ag
d	1374	92.5	<i>0.3</i>	<i>1.3</i>	<i>4.5</i>			
	1385	68.1	0.9	0.9	27.7	2.1	0.3	1.28
	1408	43.8	0.8	1.3	23.5	4.6	0.2	corr
	1500	66.9	0.8	1.4	28.4	1.7	0.6	1.24
	1501	<i>84</i>	<i>1.5</i>	<i>1.3</i>	<i>13</i>			
	1545	74.2	1.4	1.8	3.9	4.3	0.1	corr
	1612	<i>58</i>	<i>0.8</i>	<i>1.1</i>	<i>33</i>	<i>5.7</i>	<i>0.2</i>	<i>1.40</i>
k	2297	88.6	1.1	0.8	9.3	-	0.2	1.23
	2311	92	<i>1</i>	<i>1</i>	<i>6</i>			
	2327	56	0.8	0.8	40	1.7	-	1.43
	2338	66	1.0	0.8	30	1.9	0.4	1.51
	2345	67	1.3	0.4	28	3.3	-	1.94
	2347	80	1.5	1.5	17			
	2359	55	0.9	1.5	35	5.8	0.2	1.64
	2366	53	0.8	0.9	41	4.8	-	1.51
	2412	81.9	1.2	1.4	14.0	1.1	0.2	1.48
	2427	90.4	0.9	0.9	7.3	-	0.3	1.02
	2492	79.7	0.6	0.7	17.6	1.2	0.1	0.75
	2508	73	1.0	0.8	23	1.9	0.5	1.37
	2513	65.3	0.8	1.2	30.3	1.8	0.5	1.21
	2529	86.5	1.1	0.8	11.3	0.1	0.1	1.23
	2580	58	0.9	0.9	34	5.5	0.1	1.55
	2619	86.8	1.3	0.4	10.1	1.0	0.2	1.51
	2635	44.6	0.6	1.0	47.7	4.7	1.4	1.26
2685	76	1.4	0.8	19	2.2	0.1	1.84	
2688	58	0.4	1.4	36	4.2	-	0.69	
2847	76	0.6	2.4	15	1.9	3.2	0.79	



Corpus 2211 and 2212 are die-duplicates, and agree as closely in their minor constituents as is to be expected. The gold : silver ratios of the secondary porcupines are unremarkable, varying within much the same range as those of the primary porcupines and of Series D. Primary Variety G, it will be remembered, has lower gold contents than the other three varieties, and it is an obvious question, whether any identifiable part of the secondary-phase issues is the successor to Variety G. There are hints – no more than hints – that some or all of the ToT- / \ coins might fit the bill. That could be something to bear in mind in a future programme of analyses. From what one can see at present, there is no reason to suspect any new silver source, with characteristic gold contents, in the secondary phase.

Tin, which is rarely measurable in the primary porcupines (but which was used in Series D), was routinely added to the secondary-phase porcupines, but not to all of them. The limit of detection using EPMA was 0.02 percent (whereas with XRF it was, unfortunately, very much higher). Because of its position in the periodic table, tin presents the analyst with severe problems: coins that have suffered corrosion often show exaggeratedly high tin : copper ratios, apparently because of redeposition of tin in the surface layers of the coin. One hopes that the EPMA procedure as outlined at the beginning of this chapter, with careful preliminary examination of the polished area by scanning electron microscope, more or less overcomes the problem. A comparison of the coins analysed both by XRF and by EPMA is salutary (table 4.4). If one plots the tin : copper ratios against the ‘silver’ contents, using only the EPMA results tabulated above (and excluding, for example, a coin with an implausible tin : copper ratio of 48), the graph suggests, on a cautious reading, that tin was virtually absent in coins with more than *c.* 90 percent ‘silver’, while the ratio is *c.* 5 to 10 percent in coins with lower ‘silver’ values. A high-tin bronze would contain more than 10 percent tin; nevertheless, 5 to 10 percent is certainly a deliberate addition. Perhaps it was added to improve the workability of the alloy, i.e. to ensure that the coins took a sharp impression when struck. In more debased porcupines, with e.g. *c.* 70 percent ‘silver’, the tin : copper ratio is not raised further to compensate. What is historically interesting is that it

was added so regularly. It may be that greater amounts of tin were added in the ToT- / \ series than in the 'mixed grill' series, but there are not enough analyses of sub-varieties b-d to establish the contrast.



Corpus 2311

Corpus 2311 (sub-variety k), analysed by the 'Isoprobe', was found to contain 3.30 percent tin. English secondary-phase sceattas routinely contain tin, and show a higher tin : copper ratio than the contemporary porcupines.



Corpus 1228

Corpus 1962

Porcupines with contents of over 90 percent 'silver' and with very little or no tin include a ToT- / \ reverse (Corpus 1228) and also a 'mixed grill' reverse (Corpus 1962, with 87 percent 'silver'). That would make sense in terms of the 'two-minting regions hypothesis'.



Corpus 2427

Against the hypothesis, there is a coin of sub-variety k that one would have imagined was late in date (Corpus 2427), but which lacks tin. It is not extravagant to imagine, however, that the mint-workers had run out of scrap bronze on that day. A pair of specimens similarly which look imitative, could perhaps be English (Corpus 2211 and 2212): the absence of tin could here be a clue to unofficial copying.



Corpus 0739

Corpus 2106

Coins which seem to offer contrary evidence, namely those with high 'silver' contents but containing significant amounts of tin, were noted by Dr. Northover as being corroded (Corpus 0739 and 2106).

In conclusion, because the secondary phase is large and complex, perspectives on its alloy are difficult to reach, even before one tries to take imitative specimens into separate account. It is the coins which exceed *c.* 90 percent 'silver' that are the most difficult to put into a context. Some of them are to all appearances from very late in the secondary phase. What would advance our understanding greatly, from many points of view, would be a hoard concealed right at the beginning of the secondary phase. We probably need to think in terms of a well-designed programme of as many as a hundred new analyses, which certainly need to be of EPMA quality, before we can hope to reach a settled view. As well as filling gaps, the programme should include enough pairs of die-duplicates, preferably from both minting regions and including sub-variety *k* to give a working idea of consistency of alloy normally achieved at any particular time.

The tertiary phase

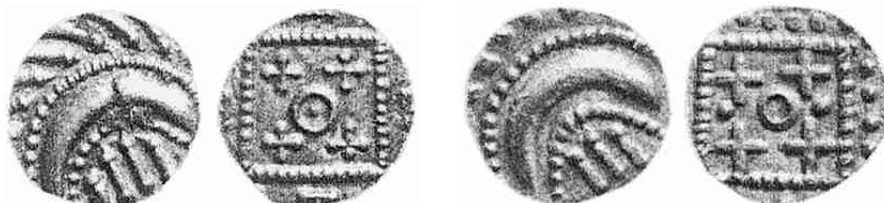
What is one to make of the Föhr hoard analyses? It is a great pity that the unabraded surfaces of the sometimes corroded coins were examined. In many instances the figures for the obverse and reverse side were markedly divergent. Hatz and Pernica further reported that all porcupines from the Föhr hoard contained traces of mercury, a metal not detected in any other study of the alloy composition of sceattas. The possibility that the colour of these coins was improved by washing with a silver-mercury amalgam is not to be excluded, although the modern cleaning of coins is another possible source. Normally one would expect uncleaned surfaces to show 'enrichment' of silver, due to depletion of copper (table 4.4). And if the exterior of the Föhr hoard coins was indeed treated with silver dissolved in mercury, a further 'enrichment' is to be

Table 4.9. Metal analyses results of the tertiary-phase porcupines. EDXRF values in italics.

Variety	Corpus	Ag	Au	Pb	Cu	Sn	Zn	Au:Ag	
E1	2958	58	<i>0.8</i>	<i>0.7</i>	<i>36</i>	<i>3.1</i>	<i>0.3</i>	<i>1.38</i>	
	2964	64	<i>0.9</i>	<i>0.9</i>	<i>31</i>	<i>2.4</i>	<i>0.4</i>	<i>1.41</i>	
	2970	44	<i>0.6</i>	<i>1.4</i>	<i>48</i>	<i>5.5</i>	<i>0.2</i>	<i>1.36</i>	
	2971	45	<i>0.4</i>	<i>3.8</i>	<i>45</i>	<i>5.0</i>	<i>0.6</i>	<i>0.89</i>	
	2983	40	<i>0.6</i>	<i>4.7</i>	<i>47</i>	<i>6.6</i>	<i>0.5</i>	<i>1.50</i>	
	2996	53	<i>0.7</i>	<i>1.8</i>	<i>40</i>	<i>4.2</i>	<i>0.7</i>	<i>1.32</i>	
	2997	58	<i>0.8</i>	<i>1.1</i>	<i>37</i>	<i>7.9</i>	<i>0.6</i>	<i>1.37</i>	
	3001	67	<i>1.0</i>	<i>1.1</i>	<i>27</i>	<i>2.4</i>	<i>0.4</i>	<i>1.49</i>	
	3002	38	<i>0.6</i>	<i>3.1</i>	<i>52</i>	<i>5.5</i>	<i>0.8</i>	<i>1.58</i>	
	3007	27	<i>0.6</i>	<i>2.1</i>	<i>69</i>	<i>1.4</i>	<i>0.1</i>	<i>2.22</i>	
	3008	59	<i>0.9</i>	<i>1.2</i>	<i>37</i>	<i>1.6</i>	<i>0.6</i>	<i>1.52</i>	
E2	3051	78	<i>1.2</i>	<i>0.5</i>	<i>18</i>	<i>2.7</i>	<i>0.4</i>	<i>1.54</i>	
	3079	51	<i>0.8</i>	<i>1.5</i>	<i>41</i>	<i>4.7</i>	<i>0.7</i>	<i>1.57</i>	
	3080	43	<i>0.6</i>	<i>1.9</i>	<i>49</i>	<i>4.6</i>	<i>0.1</i>	<i>1.39</i>	
	3091	59	<i>1.1</i>	<i>1.6</i>	<i>37</i>	<i>0.8</i>	-	<i>1.86</i>	
	3093	45	<i>1.1</i>	<i>2.5</i>	<i>50</i>	<i>1.0</i>	<i>0.1</i>	<i>2.44</i>	
	3094	74	<i>1.2</i>	<i>0.9</i>	<i>21</i>	<i>2.9</i>	<i>0.2</i>	<i>1.62</i>	
	3095	41	<i>1.2</i>	<i>1.5</i>	<i>50</i>	<i>5.7</i>	-	<i>2.92</i>	
	3096	46	<i>0.2</i>	<i>2.0</i>	<i>48</i>	<i>3.2</i>	-	<i>0.43</i>	
	3097	37	<i>0.6</i>	<i>0.9</i>	<i>58</i>	<i>1.8</i>	-	<i>1.62</i>	
	3103	56	<i>0.8</i>	<i>0.9</i>	<i>40</i>	<i>2.2</i>	<i>0.5</i>	<i>1.43</i>	
	3116	50	<i>0.5</i>	<i>1.0</i>	<i>44</i>	<i>3.5</i>	<i>0.7</i>	<i>1.00</i>	
B	3155	72	<i>1.0</i>	<i>0.6</i>	<i>24</i>	<i>2.0</i>	-	<i>1.39</i>	
	3189	56	<i>0.8</i>	<i>1.1</i>	<i>39</i>	<i>3.1</i>	<i>0.5</i>	<i>1.43</i>	
	3190	48	<i>0.6</i>	<i>1.8</i>	<i>46</i>	<i>2.8</i>	<i>1.1</i>	<i>1.25</i>	
	3191	65	<i>1.3</i>	<i>1.6</i>	<i>28</i>	<i>3.1</i>	<i>0.2</i>	<i>2.00</i>	
	3196	81	<i>1.4</i>	<i>0.6</i>	<i>15</i>	<i>2.1</i>	<i>0.2</i>	<i>1.73</i>	
	3204	41	<i>0.5</i>	<i>2.4</i>	<i>50</i>	<i>5.1</i>	<i>0.6</i>	<i>1.22</i>	
	3210	60	<i>0.9</i>	<i>1.4</i>	<i>33</i>	<i>4.0</i>	<i>0.2</i>	<i>1.50</i>	
	3215	44	<i>0.7</i>	<i>0.7</i>	<i>51</i>	<i>2.4</i>	<i>0.2</i>	<i>1.59</i>	
	B/E 'mules'	3221	46	<i>0.6</i>	<i>1.1</i>	<i>49</i>	<i>3.5</i>	<i>0.2</i>	<i>1.30</i>
		3222	53	<i>0.7</i>	<i>1.3</i>	<i>41</i>	<i>4.2</i>	<i>0.1</i>	<i>1.32</i>
3223		42	<i>0.5</i>	<i>1.7</i>	<i>50</i>	<i>4.7</i>	<i>0.5</i>	<i>1.19</i>	
3227		42	<i>0.7</i>	<i>1.8</i>	<i>50</i>	<i>4.9</i>	<i>0.6</i>	<i>1.66</i>	
F	3246	80.0	1.0	1.0	17.3	0.4	0.2	1.22	
	3416	40.0	0.6	1.6	52.8	3.1	0.7	1.42	

expected. That would mean that the true 'silver' values were even lower than the published figures.

How much lower is impossible to say. Note the figure of 40 percent mentioned at the beginning of the chapter.



Corpus 3246

Corpus 3416

The samples analysed at Oxford included only two porcupines of the tertiary phase: the Föhr hoard analyses would have complemented them perfectly. The two available EPMA analyses of Variety F, however, show highly divergent silver contents (Corpus 3246 has 82%, and Corpus 3416 has only 42 %). Could Corpus 3246 be from very early in the issue of Variety F?

The 34 reported EDXRF examinations of tertiary-phase porcupines range between 27 and 81 percent silver, with an average of *c.* 50 percent. As discussed before, it is not to be excluded that these figures are, as a result of surface enrichment and/or silver washing, even higher than the intrinsic silver content. The general conclusion is that the tertiary-phase porcupines are more debased than the secondary-phase issues.

Reckoning with the limitations of the employed EDXRF technique, no systematic differences are apparent between Varieties B and E (Variety F is unrepresented in the Föhr hoard). The four examined B/E 'mules' seem to have a somewhat lower silver content, and are perhaps unofficial issues. A programme of reliable analyses of coins from the Franeker hoard is an obvious requirement for the future.

Summary

The intrinsic silver values of the sceattas are referred to as 'silver' in inverted commas, as representing how the contents would have been perceived at the time, i.e. including the small amounts of gold in the silver, and the minor amounts of lead left over from the cupellation process. Although the number

of reliable metal analyses of porcupine sceattas is limited, a general pattern of the metal alloy composition begins to become recognisable.

The porcupine varieties of the primary phase have, just like the English primary-phase sceatta types, a 'silver' content between 90-95 percent, a gold : silver ratio of *c.* 1.5, and tin is absent or only a minor constituent. The VERNVS group is presumably characterised by a comparably high 'silver' content, but a much lower gold : silver ratio of *c.* 0.7, which may be explained by the English origin of the alloy. Given differences in the gold : silver and zinc : copper ratios, the four primary porcupine varieties were produced from different stocks of silver, thus possibly in different workshops. The 'silver' content of the primary porcupines is also quite similar to the contemporary runic sceattas of Series D. However, a significant contrast is the tin content. This metal is absent in most primary porcupines, while Series D sceattas contain *c.* 1 percent.

The metal composition of the 'official' porcupine sceattas from the secondary phase is less strictly maintained. A few specimens are, considering their alloy, indistinguishable from primary-phase issues, but in most of the groups of regular issues the 'silver' percentage varies between 80 and 90. There is no clear difference discernable between the issues with a ToT- / \ reverse, and those with a 'mixed grill' reverse. The alloy standard was still high in coins minted quite late in the secondary phase, which speaks against a course of debasement. Secondary porcupines with designs in a less regular or untidy style, and therefore labelled as 'imitative', show a broader spread of 'silver' values, with an average between 60 and 70 percent. In comparison with the contemporary English sceatta types the secondary porcupines have a higher intrinsic value.

There are indications of a further decline of the silver content during the tertiary phase. The reported values from the XRF analyses range between 27 and 81 percent silver, with an average of *c.* 50 percent. They do not suggest that there are gross differences between the three major tertiary varieties, or the earlier and later issues. One has to realise that we have to do with XRF analyses results from the surface of the uncleaned coins, which may be considerably different from the interior composition, due to corrosion and surface enrichment.

A programme of reliable analyses of a careful selection of porcupine sceattas – at least including a series of specimens from the Franeker hoard – is an obvious requirement for the future.

4.3 Die-estimation and what it can contribute

Introduction

Statistical estimation of the number of dies originally used to strike the porcupine sceattas depends on the proportion of die-duplicates in a random sample. The inclusion of material from hoards may distort that sample, because of a tendency to include small groups of duplicates that have, in all probability, stayed together since they left the moneyer's hands. We encounter the same phenomenon today when we receive bank-notes with consecutive numbers. The moneyer would, of course, strike many hundreds or even thousands of sceattas from the same pair of dies before they wore out (or before the upper die wore out), and it is a testimony to the velocity of circulation in the eighth century that die-linked groups are not even more plentiful than we see them. Statistical estimation based on a single hoard is liable to yield a much depressed estimate of the scale of the currency, which is of little historical value in itself, except as evidence for the character of the hoard. Hoards may vary in this respect from one to another, and also across their age-structure, the older coins being more thoroughly mixed.

No sizeable hoard is known which consists of a single batch of coins all from the same dies. Rather, they reflect an intermediate stage in the dispersal of the coins. If die-duplication in threes and fours is prevalent in the porcupine hoards – as it is – it suggests not merely that merchants had obtained new coins directly from a moneyer, but that the money supply had then gone through a stage when the merchants were buying and selling among themselves. The hoards were not put together simply by gathering up sceattas in ones and twos from the currency at large. These remarks apply especially to the Kloster Barthe and Franeker hoards, in which there are often long runs of duplicates. The practical answer to the problem seems obvious enough. We should exclude the hoard material from consideration, and make our die-estimates of the scale of mint-output using single finds, plus unprovenanced specimens which may or may not be single finds. That has the unfortunate effect of reducing the sample size, with a corresponding increase in the relative size of the margins of statistical variation. Because the sample is smaller, the statistical uncertainties are greater. That is a price that has to be paid. If we make estimates separately for the twenty or so sub-varieties of porcupines, common sense tells us that, wide though the margins of statistical uncertainty may be, they are very unlikely to be all in one direction. Statisticians may frown at this simple-minded approach, but the sub-varieties are not unrelated to each other. They may vary, but they should add up, more or less, to the same total as a single,

global estimate. Given the splendidly large sample, including plentiful die-duplication, the global estimate is certainly exact enough for historians to accept it without reservation.

With some 3,400 porcupines, of which 3,054 have been checked for die-identity (plus an additional smaller sample of VERNUS, 'stepped cross' and *Æthiliræd* porcupines), this is by far the largest exercise of die-estimation for any sceatta type. It falls into two parts, in the sense that roughly half the 3,054 specimens are coins from hoards, which require separate study. An example will illustrate the procedures. We will choose the secondary sub-variety f (Corpus nos. 1805-1896), because of the conspicuous long runs of duplicates which it contains. Most of the material is from the Kloster Barthe hoard (59 specimens), leaving only 33 specimens from various other sources. It is clear from a glance at the Corpus that the long runs of Kloster Barthe coins would depress and vitiate the general result. No fewer than 35 specimens are from a single obverse die, which is used with two reverses (13 and 22 specimens). There are a further 19 specimens from another pair of dies. What is not so clear from a glance is that the 33 single finds, etc. are also surprisingly heavily die-linked, and yield quite a low estimate (die-links between Kloster Barthe and the single finds, which also occur, are ignored altogether in this procedure). An inspection of the Corpus shows that the 33 miscellaneous coins include three from the De Meern hoard from the same pair of dies, which obviously should be excluded, and another duplicate pair from the Stephanik collection, perhaps from an unrecorded hoard, and better excluded. That leaves 28 which are as near as we can get to an undistorted random sample. Their die-linkage is summarized diagrammatically below, in Corpus order (fig. 4.16).

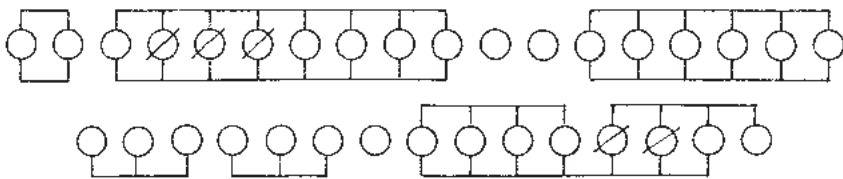


Figure 4.16. Chains of die-linked sceattas of sub-variety f. Kloster Barthe hoard coins are excluded, and coins from the De Meern hoard and the Stephanik collection (possibly also from a hoard) are crossed out.

We apply Good's formula (see p. 14), which states that:
 non-singletons : sample = known dies : x
 where x = the original total output expressed in numbers of dies.

The formula is applied for obverses and reverses separately. For the obverses, we have $24 : 28 = 10 : x$, therefore $x = 11.7$, For the reverses, $19 : 28 = 9 : x$, therefore $x = 13.3$. The accuracy of the results is dependent on the reliability of the die-checking which, as explained in Chapter 2.2, is probably not perfect. Any errors will not affect the historical usefulness of the final answers, which are good enough for all practical purposes. Thus, for example, it was evidently normal in sub-variety f to use just one reverse die with each obverse. The ratio was *c.* 1 : 1.

For the 59 Kloster Barthe specimens, we follow exactly the same method (although without needing to exclude any). Good's formula shows that for the obverses, $56 : 59 = 4 : x$, and for the reverses, $56 : 59 = 5 : x$. That means that using only the hoard material, x is depressed to approximately 4 or 5, or less than half the values using a random sample.

Primary-phase porcupines

There is a substantial sample, which includes enough duplication to give a reasonably accurate set of estimates. They indicate that the primary porcupines were minted using something of the order of 760 reverse dies. Imitations, particularly of Variety G, would push the total up to between 800 and 900. Duplicates within the Aston Rowant hoard are very few, and are not a problem in processing the data. The primary porcupines circulated concurrently with the runic sceattas of Series D. On the basis of a sample of 1,068 specimens of Series D we have published an estimate of 2,846 reverse dies – between three and four times as many as the primary porcupines. The obverse : reverse die ratio in Series D varies from one variety to another, but it is often 1 : 2 or even higher. If, hypothetically, Series D and E were both used in the same way, one would expect that the single finds of Series D would be between three and four times as numerous. That suggests the possibility of a regional analysis comparing the occurrence of the two series, both in the Netherlands and in England.

The samples used were:

Plumed bird J, Corpus 0001-0062 (62 specimens); K, Corpus 0063-0086 (24 sp.); L, Corpus 0099-0136 (38 sp.). Total, 124 coins.

VICO 1, Corpus 0171-0254 (84 specimens); 2, Corpus 0255-0289 (35 sp.); 3, Corpus 0290-0302 (13 sp.). Total, 131 coins. Imitations, Corpus 0317-0335 (19 sp.).

Variety G, 1, Corpus 0336-0384 (49 specimens); 2, Corpus 0394-0440 (47 sp.); 3, Corpus 0452-0518 (67 sp.); 4, Corpus 0525-0552 (28 sp.). Total, 191 coins. Imitations, Corpus 0561-0627 (67 sp.).

Variety D, Corpus 0637-0707 (71 sp.).

The coins classified as imitations have been left aside from the calculations, as one cannot be sure where or when they were made.

The 'plumed bird' variety includes a reverse link between two Kloster Barthe coins, and an obverse link between two Aston Rowant coins. These have not been excluded from the estimation process. The die-ratio is 1.35 in Variety J, but *c.* 1.0 in Varieties K and L. That could be interpreted by saying that a 1 : 2 ratio was used in the early stages of the issue (as seems to have happened with some English sceatta types). Examples of two reverse dies used with one obverse are: Corpus nos. 0008-0010, 0018-0020, 0021-0024, and 0032-0034. If the theory is correct, it may be thought to confirm the priority of Variety J. The VICO variety is more interesting. The Aston Rowant hoard contributes a group of three duplicates, a pair, and a reverse pair. Leaving these aside reduces the sample from 83 to 76. It is clear that in VICO variety 1 (estimates, 90 obverse and 172 reverse dies), the die ratio was 1 : 2. The moneyer will have made or obtained his dies in sets of three. Whether VICO varieties 2 and 3 (which show lateral reversal of the reverse design, sometimes a sign of copying) were from the same source as VICO 1 is doubtful. VICO 2 routinely has H I I within the spine of the porcupine, i.e. the two strokes on the left are linked. This feature is seen only occasionally on the coins that have been assigned to VICO 1. The die-ratio is *c.* 1 : 1. VICO 3, on which the porcupine has a snout and an added annulet, is a small stylistic group, possibly imitative, with a die-ratio of *c.* 1 : 2. We are still a long way from being able to demonstrate where the VICO coins were minted. One hypothesis might be that three moneyers worked (not necessarily concurrently) in the same place – possibly a *vicus* or *wic*.

Variety G supports the theory of an initial flurry of activity: G1 has a die-ratio of *c.* 1 : 1.5, whereas G2 and G3 are both close to parity. The big surprise is G4, with a die-ratio of *c.* 1 : 3. An inspection of the Corpus reveals no quirks that might have distorted the calculation. These are the coins that appear to read AZO. Their absence from the Aston Rowant hoard has always been assumed to be simply because they fell late in the primary phase, after the hoard was concealed. It can now be seen that that involves a degree of assumption. The geographical distribution of the variety appears to be no different from the rest of Variety G. It has been found (occasionally) in the Netherlands, even if mostly from England.

Variety D cannot yet be divided into a chronological sequence. The die-ratio, of *c.* 1 : 1.3, looks familiar from 'plumed bird' variety J, and also G1. Examples of the use of two reverses with one obverse are to be seen at Corpus 0638-0642, 0646-0647, 0670-0673, and 0693-0694.

Were all four primary-phase varieties minted in the same place, or even in the same region? Was more than one moneyer involved in producing the VICO

variety? Is Variety G4 an imitative series, possibly English (cf. G5)? We are not in a position to do more than guess. The initial surge of activity, in more than one variety, perhaps shows that they were all launched at the same date.

Table 4.11. Die-estimation of the primary-phase porcupines.

Variety	N	non-singletons		dies		estimates		die	survival
		obv.	rev.	obv.	rev.	obv.	rev.	ratio	rate
plumed bird J	62	36	30	40	45	69	93	1 : 1.35	0.67
K	24	16	15	14	15	21	24	c. 1 : 1	1.00
L	38	15	16	30	29	76	69	c. 1 : 1	0.55
Total	124	67	61	84	89	166	186		0.66
VICO 1	76	43	27	51	61	90	172	c. 1 : 2	0.44
2	35	25	25	19	20	27	28	c. 1 : 1	1.25
3	12	11	9	5	8	6	12	c. 1 : 2?	1.00
Total	124	79	61	75	89	123	212		0.58
Variety G1	49	37	32	24	31	32	47	c. 1 : 1.5	1.04
G2	47	29	30	28	28	45	44	c. 1 : 1	1.07
G3	67	30	29	48	50	107	116	c. 1 : 1	0.58
G4	28	21	10	15	22	20	62	c. 1 : 3	0.45
Total	191	117	101	115	131	204	269		0.71
Variety D	71	41	38	46	50	80	93	c. 1 : 1.3	0.76

Imitations of primary-phase porcupines

The Corpus includes some 116 specimens of primary-phase types which appear to be imitative. Some are very obviously sub-standard, others show lateral reversal, or inappropriate design elements. Some are clearly of secondary date, and others may be. What is noteworthy is that, Variety G apart, there are very few instances of die-linkage or die-duplication. If we make estimates of the original total numbers of dies, using the standard formula, the figures are very large – in aggregate, larger even than the total for the regular coins (table 4.12).

Table 4.12. Die-estimation of the imitative primary-phase porcupines.

Variety	N	non-singletons		dies		estimates		die	sur-
		obv.	rev.	obv.	rev.	obv.	rev.	ratio	vival
									rate
plumed bird imit.	25	2	2	24	24	300	300	<i>c.</i> 1 : 1	0.08
VICO imit.	19	2	2	18	18	171	171	<i>c.</i> 1 : 1	0.11
Variety G imit.	67	22	19	55	57	168	201	<i>c.</i> 1 : 1.2	0.33
Variety D imit.	5	0	0	5	5	>25	>25	<i>c.</i> 1 : 1?	0.20

That is puzzling, and one's first instinct is to think that there is something wrong with one's observation of the facts. If we look at the survival-rate or representation-rate of the imitations, i.e. the number of specimens divided by the estimated number of reverse dies, the survival rate is several times less, e.g. anything from a third to a tenth of that of the regular coins (see table 4.11). The statistical uncertainty embedded in the die-estimate will carry over into the figure for the survival-rate, but the results are so consistently in one direction that they may be accepted as working figures. Yet the chances of a coin in circulation being accidentally lost were presumably the same whether it was regular or imitative. Imitations were hoarded, and as they contained silver, they would not have been discarded or thrown away. If imitations were to any extent discriminated against in hoards, that would have lowered their survival-rate slightly, but there is little sign that that happened, and it would not be enough to explain the facts. The ratio of imitations to regular coins (116 to *c.* 600) is surely the better evidence of their original quantities (and statistics limited to single finds would in principle be better still). If that indicates that the imitations are far fewer than die-estimation suggests, it is in all probability because the average output of an imitative die was far lower. The imitative dies were less fully used, or perhaps they were technically inferior. We unhesitatingly prefer the evidence of survival-rates. Even so, imitations are excessively plentiful in the record.

For the monetary historian it is remarkable that the die-estimates for imitations should be so high. Possibly a few of the specimens that we have catalogued as imitative came, after all, from the regular workshops. An example might be the coins of Variety G which lack the dots within the standard. Possibly a substantial proportion of the imitations were made in the early secondary phase (they are rare in the Aston Rowant hoard). Their geographical distribution is not significantly different from that for the regular coins, in a way that

might affect their survival. They are, perhaps, rather more plentiful as single finds in the Netherlands – which would be more understandable if they were of early secondary date.

In England there are major changes in typology between the primary and the secondary phases, amounting to a sea-change. Although it is very difficult to demonstrate, it seems probable that there was some sort of discontinuity, a severe monetary downturn. With the porcupines too, there is a typological discontinuity between the primary and the secondary phase. Might the four regular workshops have closed down, leaving an unsatisfied need for minting, which was met unofficially? That is mere speculation, but it might help to explain some at least of the imitative coins under review here. The introduction of the distinctive new reverse designs might have been made at a date some little time after the economic recovery began.

The imitations of Variety G differ somewhat from the other three types, in that they include distinctly more duplicates and die-links. That gives them a higher survival-rate (see table 4.12). There is, apparently, a gradient from variety G1 to G4, which might be because the earlier issues were in circulation for longer, and had had more chances of being accidentally lost. We are, however, well into the realms of speculation in making that suggestion. A definite interpretation will have to await the discovery of one or more early hoards.

Secondary-phase porcupines

Any differences between sub-varieties b-d and e-h will be of interest, and also any indications of a chronological progression within either sequence. The major perspective made clear by the calculations is that mint-output in b-d (from the Big Rivers region) is far weightier than in e-h (from Friesland) – perhaps as much as three times as great. We could not have learned that without going through the procedures of die-estimation. The result will influence our understanding of the composition of the hoards, especially those from Friesland. Uncertainty over the mint-place(s) of sub-varieties i and k may (or may not) shift the perspective a little, but it is most unlikely to overturn it.

There is ample evidence, throughout the secondary varieties, that estimates derived from the Kloster Barthe hoard are severely depressed, compared with the ‘correct’ values. They are usually only half as large, or even less. Estimates have therefore been made from the non-Kloster Barthe coins. The De Meern and Lutje Saaksum hoards also seem to include little ‘clusters’ of die-linked coins. For most varieties there are not enough of them significantly to affect the results, and for the sake of simplicity they have been left as part of the

non-Kloster Barthe samples – which perhaps ought, therefore, to give marginally higher estimates.

Sub-variety a (Corpus 0717-0753, 37 specimens), which metrology has identified as matching the weight-patterns of e-h, is an ‘odd man out’ in terms of its obverse : reverse die-ratio. Whereas nearly all the secondary phase porcupines use, on average, either one, or between one and two reverse dies with each obverse, sub-variety a uses three. The sample, when Kloster Barthe coins are excluded, is only 21. It suggests that there were originally 21 obverse and 60 reverse dies. The Kloster Barthe coins yield an estimate of reverse dies of only 26. Runs of four and five coins from the same obverse die suggest that sub-variety a had not had long to become dispersed, when the secondary issues came to an end.

Sub-variety b (Corpus 0754-0973, 219 specimens), includes 108 coins from Kloster Barthe, and also 17 De Meern coins, which have not been excluded from the non-KB sample of 111 coins. These give estimates of 390 obverse and 590 reverse dies, a die-ratio of *c.* 1 : 1.5. That result is perhaps unduly influenced by Corpus nos. 0927-0934, where one obverse is used with four reverses; three of these are De Meern coins. Kloster Barthe on its own indicates a 1 : 1 die-ratio, with 261 reverse dies, a result depressed to only 44 percent of that from the more random sample.

In sub-variety c (Corpus 0983-1302, 320 specimens), we exclude 121 Kloster Barthe coins, but allow 26 from De Meern to remain. The working sample of 199 specimens gives estimates of 720 obverse and 647 reverse dies. It is perhaps just a quirk of the sample that there should be more obverse than reverse dies. The die-ratio, which is 1 : 0.9, would seem to have been, in effect, 1 : 1. The Kloster Barthe coins, dominated by pairs, with just a few triplets, indicate 343 and 356 obverse and reverse dies, a ratio close enough to 1 : 1, and a total of reverse dies depressed to close to half the correct result.

Sub-variety d (Corpus 1321-1619, 294 specimens) includes 87 Kloster Barthe coins. The remaining 207 again include a great many pairs but few triplets, suggestive of a currency that had become thoroughly mingled after leaving the moneyer’s hands. They yield estimates of 639 obverses and 765 reverses, and thus a die-ratio of 1 : 1.2. The Kloster Barthe coins are also dominated by pairs rather than higher multiples, yield estimates of 136 and 176 dies, a comparable ratio of 1 : 1.3. The Kloster Barthe totals are depressed to 23 percent.

All three of the ToT- / \ or southerly varieties were issued on a substantial scale. Each of them approached the size of the entire primary-phase output.

Of the ‘mixed grill’ or Friesland-connected varieties, sub-variety e (Corpus 1633-1795, 163 specimens) was quite a big issue, but the others were minted less

prolifically. Leaving aside 67 Kloster Barthe coins and 19 from the De Meern hoard, the sample of 77 produces estimates of 235 and 403 dies, a die-ratio of 1 : 1.71. The Kloster Barthe coins on their own indicate 118 reverse dies, an estimate depressed to 28 percent, and the De Meern coins give an even lower figure. The heavily die-linked sub-variety f has already been discussed, in the introduction. It seems that it was produced from only about 13 reverse dies, but has a high survival-rate.

Table 4.13. Die-estimation of the secondary-phase porcupines.

Sub-variety	N	non-singletons		dies		dieestimate		die	survival
		obv.	rev.	obv.	rev.	obv.	rev.	ratio	rate
a	21	12	6	12	12	21	60	c. 1 : 3	0.35
ToT-/\ b	111	27	19	95	101	391	590	1 : 1.5	0.19
c	199	47	52	170	169	720	647	c. 1 : 1?	0.31
d	207	57	49	176	81	639	765	1 : 1.2	0.27
Total	517	131	120	441	51	1750	2002		
Mixed grill e	77	21	13	64	68	235	403	1 : 1.7	0.19
f	28	24	19	10	9	11	13	1 : 1.2	2.15
g	27	9	7	22	24	66	93	1 : 1.4	0.29
h	122	76	53	70	88	112	206	1 : 1.7	0.59
Total	254	130	92	166	189	424	715		
i-k	481	132	130	406	407	1479	1505	1 : 1	0.33

Sub-variety g (Corpus 1897-1966, 70 specimens) was struck from an estimated 66 obverse and 93 reverse dies, a ratio of 1 : 1.41. The Kloster Barthe estimates (37 specimens) are of only half as many dies, and De Meern even fewer. Sub-variety h (Corpus 1967-2229, 263 specimens) is second only to f in including long chains of die-duplicates. It can be broken down into 141 coins from Kloster Barthe (including a run of no fewer than 29 duplicates), and 122 others. The 122 look quite different from most of the sub-varieties, as they include plenty of groups of three or four, and even up to eight. They give estimates of 112 and 206 dies, a die-ratio of 1 : 1.69.

Sub-varieties i and k (Corpus 2232-2713, 481 specimens), comprising ‘imitative’ coins of various categories and origins, include 130 reverse non-singletons: they generate a huge estimate of 1,505 reverse dies. For some time we hesitated to

accept that figure, without being able to offer any clear reasons to doubt it. But the relationship between the sample size (357 coins, leaving aside 124 Kloster Barthe specimens) and the number of specimens, 1,465, is not far from what we see in sub-varieties a-h (792 specimens, generating an estimate of 2,777 reverse dies, see table 4.12). It is challenging to find a methodology which can be usefully applied to sub-varieties i and k.

Tertiary-phase porcupines

The Corpus is dominated by specimens from the Franeker hoard, which is very heavily die-linked, and which on its own yields misleading estimates of the original totals of dies, in exactly the same way as the Kloster Barthe hoard in the secondary phase. The Föhr hoard also includes a number of duplicates, but so do the residue of specimens, and it seems that Föhr does not seriously distort the results. Calculations based on the non-Franeker sample are, for the present, the best compromise, although far from ideal.

Variety E1 + E2 (Corpus 2918-3090, 173 specimens) comprises 113 Franeker and 60 non-Franeker coins. The latter yield estimates of 214 and 206 obverse and reverse dies, clearly struck on a 1 : 1 ratio. The Franeker hoard estimates are 79 and 120, influenced by the long die-chain, Corpus 2922-2935, in which one obverse die is associated with three reverses. The tiny Variety AF was struck from a mere half-dozen pairs of dies.

Variety B (Corpus 3147-3216, 70 specimens) includes only 25 non-Franeker coins, a rather small sample for practical purposes. It yields estimates of 92 and 144 obverse and reverse dies, a die-ratio of 1 : 1.6. This rests on very few pairs of duplicates, but it is confirmed by the evidence of the Franeker coins, which include a great many more die-links, and which generate estimates of 21 obverse and 30 reverse dies, a ratio of 1 : 1.4. It seems that there was a different technical tradition at the workshops of Varieties E and B respectively.

Table 4.13. Die-estimation of the tertiary-phase porcupines, coins from the Franeker hoard are omitted.

Variety	N	non-singletons		dies		die-estimate		die ratio	survival rate
		obv.	rev.	obv.	rev.	obv.	rev.		
E	65	17	17	56	54	214	206	1 : 1	0.32
B	25	6	4	22	23	92	144	1 : 1.4	0.17
F	42	19	25	31	28	68	47	1 : 1	0.89
Total							397		

Variety F (Corpus 3228-3394, 195 specimens) comprises 153 Franeker and 42 non-Franeker specimens. The 42 produce an eccentric result, with more obverse than reverse dies (68 and 47). The larger Franeker sample, however, with 29 and 32 dies, is clearly close to a 1 : 1 ratio. The correct original number of reverse dies will doubtless be somewhere in the range 50-70.

In total, the tertiary-phase porcupines seem to have been struck from a figure quite close to 400 reverse dies, a severe decline from the hey-day of the secondary phase.

Discussion

It is beyond question that the porcupine sceattas were struck from many hundreds of dies, over their sixty-year lifetime – upwards of 800 in the primary phase, upwards of 2,800 in the secondary phase (or nearer to 4,200, including sub-varieties i and k) and roughly 400 in the tertiary phase. At an average figure of 10,000 coins per reverse die, a hundred dies produced a million sceattas (see p 14). As in thirteenth-century England, the work of the moneyers was so intensive, and they used up so many dies every year, that arguments invoking the under-use of dies in the official mints, in defence of a lower average, seem hollow. Moreover, not only did such great quantities of porcupines exist, they circulated both locally and between regions (as shown by single finds and hoards), and as the mingling of the issues of different minting regions in the secondary phase demonstrates. And so whether the die-estimates imply that in aggregate some 50 million porcupines were produced, or (assuming a lower average output per die) only half that number, the repercussions for the general historian are much the same. The numbers are so large that they represent a kind of ‘over-kill’. The trade of the Netherlands generated a monetary economy, which grew very rapidly in the first half of the eighth century, and which must control our ideas of the region’s history.

For the practical purposes of numismatics and monetary history, much of the interest of die-estimation lies at the next level of detail, in comparisons between one variety of porcupine and another. It is convenient to express these comparisons in terms of dies, leaving the well-rehearsed arguments about the average output of a die on one side. While these comparisons involve hundreds of dies – for example, as between the primary, secondary, and tertiary phases – the margins of statistical uncertainty are not a practical problem. Comparisons between smaller sub-groups, however, require to be handled with discretion. It is theoretically possible that the average output of dies varied from one minting region to another, or from decade to decade. The best check on regional

variation lies with numbers of single finds, on the grounds that the chances of a particular coin being accidentally lost were unrelated to the output of its pair of dies. All told, we believe that die-estimation is capable, if treated carefully, of yielding historical evidence which is thoroughly secure.

Summary

The number of dies originally used to strike the porcupine sceattas has been estimated by statistical sampling. The obverse : reverse die-ratio of the porcupine varieties and sub-varieties ranges between *c.* 1 : 1 and 1 : 1.7. It makes clear that the design with a central spine and bristles was on the lower or anvil die, and the standard design on the upper or trussel die. The die-ratios suggest that dies were supplied in groups of either two, or three, one obverse die plus two reverse dies.

The total volume of a variety can be gathered from the number of reverse dies. If we accept that – on average – one reverse die can be used to strike 10,000

Table 4.14. Estimate of the total volume of porcupine sceattas, based on the number of dies.

	reverse dies	number
Primary porc. 'plumed bird'	186	1.86 million
VICO variety	212	2.12 "
Variety G	269	2.69 "
Variety D	93	0.93 "
Imitations*		1.72 "
Secondary porcupines		
'southern' sub-varieties b-d	2,002	20.02 "
'northern' sub-varieties e-h	715	7.15 "
other sub-varieties a, i-k	1,505	15.05 "
Tertiary porcupines		
Var. E	206	2.06 "
Var. B	92	0.92 "
Var. F	42	0.42 "
Total		54.94 million

* The estimate of the volume of primary varieties imitations is based on the survival rate, and not on the number of reverse dies (see pp. 114-116). Probably many of these imitations were struck in the secondary phase.

coins, which is perhaps even a rather conservative estimate, the total number of porcupine sceattas is impressive.

Thus, in the primary phase, the scale of issue of the porcupines was roughly of the order of 9 or 10 million, concurrently with some 20 million sceattas of Series D. This assumes that average die-output was much the same for both types, which is admittedly conjectural. In the secondary phase, porcupines have been produced over a period of some twenty-five or thirty years. The jump in the rate of production in the secondary phase is less dramatic if one takes Series D into account. About the decline in output in the tertiary phase, there need be little doubt.

5. DATING OF THE PORCUPINE VARIETIES

5.1 The importance of hoard evidence

Introduction

Hoards and grave-finds normally reflect the age-structure of the currency from which they were withdrawn (something that single finds cannot do). A chronologically arranged list of hoards can provide a series of snapshots of a developing and changing currency (see table 5.1 at p. 134). Such a check-list is an essential *instrument de travail* for that and for several other purposes. It can establish the sequence in which new varieties were struck, and successively entered the currency. The proportions of each of the varieties can be compared between hoards, in a simple form of matrix analysis. That may show that the composition of the currency varied between regions, e.g. between the Netherlands and England, or between Friesland and the Big Rivers region. Single finds, however, may prove that more certainly, because not every hoard was concealed in the region where it was put together. The inner character of a hoard may be revealed by aspects of its composition. For example, a hoard that is richer than usual in die-duplication may reflect sums of money only recently obtained from the moneyer; or unusually heavy coins may demonstrate careful selection by the owner, for purposes of hoarding. But before any such questions can be asked of a hoard, it is necessary to assess its integrity, from an account of the circumstances of its discovery.

The known hoards which include porcupine sceattas are, unfortunately for historical purposes, not distributed evenly through the period of their currency, nor through the various regions in which they were in use: they tend to be clustered, perhaps reflecting moments of political crisis, or skirmishes, or epidemic disease, – or perhaps just by chance. In the Netherlands, where the porcupines were struck, hoards may consist exclusively or very largely of that one type. In England they may make up only perhaps a quarter of the contents of a hoard, in line with their prevalence in the English currency. In France, there may be just two or three percent of porcupines in a hoard of Merovingian deniers. Dating the French hoards must depend primarily on the local coins. There are half-a-dozen major hoards of porcupines, on which much of the effort to establish a relative chronology depends, simply because the sample size is large enough to be statistically reliable, or at least usable. The coins themselves have, of course, other evidence to contribute, concerning die-linkage,

metrology, and so on, but that is more appropriately handled in the context of the corpus of specimens. In chronological order the major hoards are: Remmerden (only 5 porcupines), Aston Rowant (at least 63 porcupines), Hallum (13), De Meern (119), Woodham Walter (32), 'Franceschi parcel' (? = Duffel, near Antwerp) (35 published out of a probably larger total), Lutje Saaksum (27), Kloster Barthe (800+), Föhr (52), and Franeker (320). There are in addition various smaller hoards, which will be mentioned below.

The primary phase

First, some well-documented negative evidence: a well-studied series of English grave-finds from east Kent and the Thames estuary, normally containing either 8 or 20 coins,⁷⁹ can be arranged into a chronological sequence, at first comprising Series A and BI, later BII and C. No porcupines are present, presumably because their issue began later, although they could, theoretically, have been deliberately excluded. This is to some extent confirmed by the absence, similarly, of Series D. D-2c is in any case later than the introduction of Series C, which it imitates. The negative evidence of the grave-finds seems to push the beginnings of the primary porcupines on to *c.* 690-695. If there was an embargo on the use of foreign coins as grave-goods (which seems implausible), it was breached by the Kings Lynn find (below, p. 128).

The **Remmerden** (Gld) hoard of 1988, *t.p.q. c.* 710/715 is our first major source of information (see also p 291). Of the sceattas, 156 were of Series D, and just seven were porcupines or porcupine-related. The emphasis on Series D is puzzling: were porcupines deliberately not hoarded, or were they not available in circulation? Had the owner of the hoard just arrived from Friesland (home of Series D)? The coins of Type 2c run up as far as sub-variety 3f, but the hoard lacks any of the reduced weight specimens which occur quite plentifully in the Aston Rowant hoard. It seems that the hoard was concealed before the issue of Series D was complete. But the porcupines are by no means the earliest issues of their type. They comprise a VICO, variety 1, VICO, variety 3, two VERNVS coins (arguably of English origin), two die-linked specimens of G3 (Corpus 0456-0457), and a G4.

This last is surely late in the sequence of primary porcupines. G4 was not found in the Aston Rowant hoard (below), although that hoard already includes the latest (reduced weight) issues of Series D.⁸⁰ One cannot help wondering, however, whether any of the porcupines is intrusive.

⁷⁹ Rigold (1960-1961; 1966).

⁸⁰ Op den Velde & Metcalf (2003).

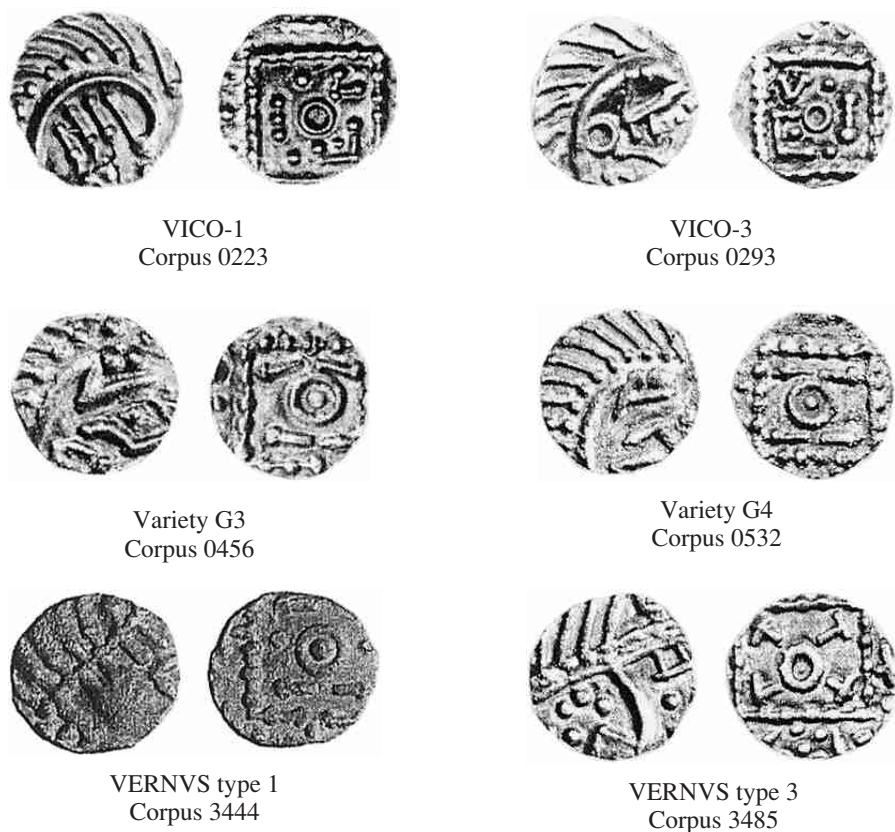


Figure 5.1. Six of the seven porcupines in the Remmerden hoard (Corpus 0457 is a die-duplicate of 0456).

The **Aston Rowant** (O) hoard (see also p. 286) of 1971 contained at least 380 sceattas, traditionally dated to *c.* 710, although *c.* 715 or even some years later is more likely. The total included 70 primary-phase porcupines,⁸¹ and 197 coins of Series D. It seems to have been concealed before the issue of primary porcupines was complete. The ‘plumed bird’ coins do not include any of reverse variety L, nor even, so far as we know, of K. VICO varieties 1, 2, and 3 are all present, but Variety G4 is absent. There is an apparent conflict of evidence with Remmerden, which is (on the clear evidence of Series D)

⁸¹ One porcupine sceat, Corpus 2689 (illustrated on p. 62), is included in the secondary phase sub-variety k. It was auctioned only in 1985, and the forensic trail is sketchy. It could be intrusive, but if correctly provenanced, would have to be an early imitation.

earlier, but which already includes G4. It may be that the boundary between G3 and G4 needs to be reconsidered, on stylistic criteria. The internal chronology of Variety D is unclear. If we compare this assessment with ideas about the coins of Series D, Type 2c included in the hoard, we see that it already contains issues on a reduced weight-standard (which are not yet found in the Remmerden hoard), and that there are no specimens of subgroup 2c (in so far as the classification is sound). Although these are absent from Aston Rowant, they are present among the English single finds, where they could post-date the hoard.⁸² Because Aston Rowant was concealed quite late in the period of issue of the primary porcupines, it cannot, on its own, tell us much about the relative chronology of the four varieties. Did all four begin at the same moment, or are one or two of them later in origin? To answer that, it would be necessary to have a hoard concealed early in the primary phase. None has yet come to light.

The Rodings (Ess) hoard, *t.p.q. c.* 710, is the only other hoard in which the porcupines consisted wholly of primary-phase coins (see also p. 292). The date is clearly very late in the English primary phase. The porcupines are of VICO varieties 2 and 3, and G, varieties 1 and 3.

The secondary phase

There are several substantial hoards from the secondary phase, but they are with one exception from the end or almost the end of the phase. Rigold was disposed to associate their non-recovery with the Frankish assault on Frisia in 734;⁸³ that traditional dating has been questioned by Grierson and Blackburn,⁸⁴ in the context of a wholesale reconsideration of the dates of hoards from the first half of the eighth century, deriving from arguments about the correct dating of the hoard of Nice-Cimiez (see below, pp. 133-139).

Kings Lynn (Nf) (see also p. 289). Hoards demonstrate that primary-phase porcupines remained in circulation in quantity into the early years of the secondary phase, certainly in England, and almost certainly (as we shall see in a moment) in the Netherlands. The Kings Lynn find is of particular interest, because while three of the porcupines are of primary date (VICO, two, and G3), the fourth is a secondary-phase coin with a 'mixed grill' reverse design (Corpus 2239). Its obverse lacks the characteristic dotted outlining of the spine, seen in sub-varieties e and g, and it has accordingly been classified as sub-variety i. Note the marginal ornaments.

⁸² Op den Velde & Metcalf (2003) p. 72.

⁸³ Rigold (1960-61), p. 26.

⁸⁴ Grierson & Blackburn (1986) p. 184-185.



Kings Lynn grave-find, Corpus 2239 (drawing by DMM)

Nevertheless this coin offers important proof that the diamond-shape alignment was introduced very early in the secondary phase, and does not date from after the issue of the ToT- / \ varieties, as might have been imagined. A *t.p.q.* of *c.* 720/725 for Kings Lynn may be suggested.

Four porcupine sceattas were found together at **Lambeth** (Sr). It is apparently a small hoard, with primary-phase porcupines surviving (see also p. 290).



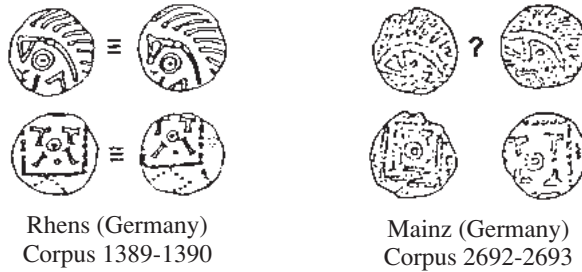
Lambeth hoard, Corpus 1697 (sub-variety e)

Two primary and two secondary porcupines, if that is the total of what was lost, suggests a date early in the secondary phase. It is gratifying that the secondary-phase coin now in Oxford should be of a very similar 'mixed grill' variety as the singleton in the Kings Lynn find. It confirms the early date at which sub-varieties e and g began.

A third tiny hoard tells the same story. The **Fingringhoe** (Ess) hoard comprises just three porcupines which were stuck together when found. One was of primary Variety D, and one (Corpus 2070) was a derivative of the secondary sub-varieties with a diamond-shaped alignment (see p. 288).

All the larger secondary-phase hoards, except Hallum, fall late in the phase. The secondary-phase coins have been classified into ten sub-varieties, a to k, and all except sub-variety g tend to be represented in all these late hoards. Analogously with the hoards of late primary-phase porcupines, it follows that they can do very little to demonstrate the sequence of the sub-varieties. Sub-variety f, which occurs principally in the great Kloster Barthe hoard, would seem to be the latest. Sub-variety k is an omnibus grouping of coins that appear to be copies of one sort or another - some, possibly, minted in England,

but many occurring at Domburg and in the hoards from the Netherlands. One hopes that each of sub-varieties a-h reflects a discrete phase of production, but that could be an over-simplification. If some specimens have accidentally been included under the wrong heading, then an analysis of the hoards conducted in short-hand terms – so many specimens of sub-variety c, so many of sub-variety d – could lead to blurred or even misleading conclusions. It has been argued initially on the basis of metrological differences that there are two distinct sequences which reflect the work of two separate mint-places, apparently in the Big Rivers region and in Friesland respectively.⁸⁵ These comprise sub-varieties b-d, with ToT- / \ on the reverse, and e-h, with a variety of symbols, including the ‘mixed grill’ design mentioned above; their reverse designs can be told apart at a glance. A comparison of the relative proportions of the two groupings, hoard by hoard, should help to show where each hoard was put together. But bearing in mind what has been said above about the validity of the groups, one should remember that the ToT- / \ design, for example, was perfectly easy to imitate.



Before examining the large hoards, one may mention two mini-hoards from Germany, consisting of just two coins each. From **Rhens**, there are two die-duplicate specimens, of sub-variety d.⁸⁶ One imagines that the owner had obtained, at first- or second-hand, a group of coins direct from the moneyer, all struck from the same dies, and that these two had stayed together from the moment of their issue, to their concealment. A similar pair of die-linked coins, of sub-variety i, is recorded from **Mainz**.⁸⁷ Both pairs are perhaps imitative. The **Hallum** (Fr) hoard of 1866, found 15 km north of Leeuwarden and published promptly, was concealed in a pot (see also p. 289). The composition of the hoard is so much at variance with the general currency of Friesland, as to suggest that it may be a sum of money awaiting re-minting. The porcupine sceattas in the Hallum hoard are present in an unusual ratio, namely two plumed birds, seven

⁸⁵ See pp. 70-75.

⁸⁶ Corpus 1389 and 1390. The discovery *c.* 2005 was kindly communicated by Prof. J. Heinrichs.

⁸⁷ Corpus 2692 and 2693. Stoess (1994).

coins of sub-varieties b-d, just one of sub-varieties e-g (Corpus 1914), and three from sub-variety k, and no tertiary porcupines. Although concealed in Friesland, the porcupines would seem to have been carried there from the region where the ToT- / \ coins were minted, which seems from the regional proportions of single finds of the two categories to have been the Big Rivers region. Our understanding of the internal chronology of sub-varieties b-d and e-h respectively is purely empirical, depending on their presence or absence in the late-secondary hoards – and complicated by the hypothesis of two mints, and by difficult judgements on whether individual coins are imitative.

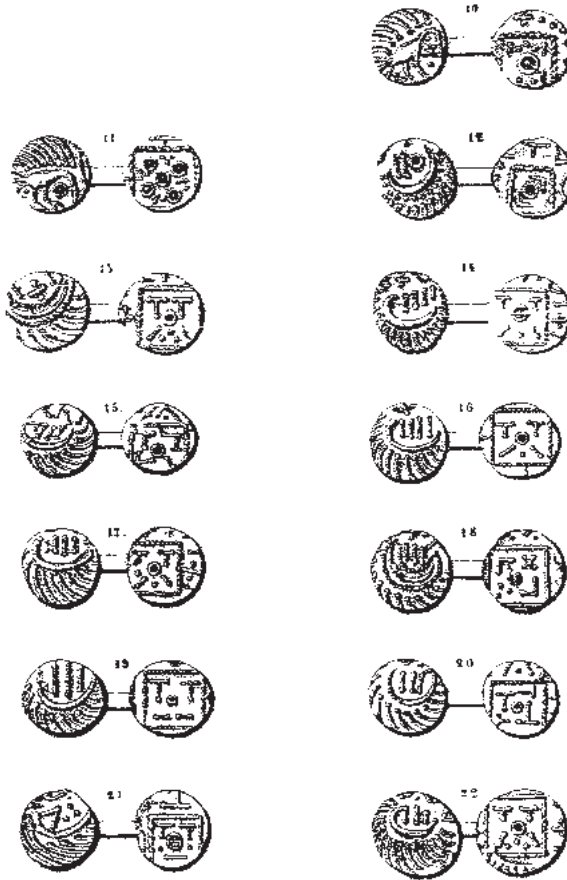


Figure 5.2. Porcupine sceattas from the Hallum hoard, engravings by J. van Calsbeek. The hoard consisted mainly of Wodan/monster sceattas, but also included 13 porcupines, ‘hexagram’ coins, and a variety of Merovingian deniers and English sceatta types.⁸⁸

⁸⁸ De Haan (1866); Dirks (1870).

The **Franceschi parcel** of 35 porcupines may date from late in the secondary phase (see p. 287). The parcel comprises two primary-phase porcupines, 14 of b-d, five of e or g, six of h, and eight of i or k. If it is, after all, a random selection, the hoard will have been formed at a date when the primary-phase coins had almost disappeared from circulation. From the secondary phase, sub-varieties b-d are well represented, compared with e/h, but not well enough to imply that the hoard as a whole had its origin in the Big Rivers region. The absence of sub-variety f is not significant statistically, but if taken at face value it would show that the eight specimens of i/k were minted concurrently with the 'official' sub-varieties.

The **De Meern (U)** hoard offers scientifically much better evidence, because the forensic trail from discovery to publication is unbroken, and the hoard is essentially complete (see p. 287). As a sample, it is thus known to be undistorted by modern selection. Eight of the 119 porcupines were primary-phase porcupines, a similar proportion to that seen in the Franceschi parcel. The secondary-phase coins included examples of all the sub-varieties, but their proportions are intriguing. They suggest a slightly earlier date than is indicated for most of the hoards, *c.* 730. The local sub-varieties, b-d, number 45, while sub-varieties e-g account for 25, f-h, 15, and i, 8. Within b-d, sub-variety b is conspicuously better represented (18 specimens) than is usual in the hoards. Sub-variety c dominates; and there are only ten specimens of the normally plentiful d. The Friesland varieties total 48. Sub-variety e greatly outweighs g (19 against 6), and the specimens of g are closely die-linked – suggesting, perhaps, a *t.p.q.* soon after the introduction of g. Sub-varieties h and f (12 against 3) follow the same pattern, the three specimens of f being die-duplicates. That suggests that e+g and h+f were produced concurrently, at different mint-places, rather than successively. The normally abundant sub-variety k is represented by only eight specimens in the De Meern hoard.

The **Lutje-Saaksum (Gr)** hoard was found in a terp near Baflo, in 1917 (see p. 290). It was entirely composed of porcupine sceattas. The proportions of b-c-d are quite different from De Meern: 1, 5, and 9 respectively, including a motley selection of reverse designs. The Friesland varieties are also assorted. Whether the hoard is relatively late in the secondary phase, or merely contains more imitative coins, it is difficult to say.

An English hoard of much the same date as the Frisian group was found at **Woodham Walter (Ess)**, (see also p. 292). The hoard, of 108 sceattas, included many different English types, and also 32 porcupine sceattas. As such it is in principle important for the relative chronology of the Dutch and English issues.

The last of the late-secondary group of hoards from Friesland and beyond is the great **Kloster Barthe** hoard of 1838 from north-western Germany. It contained over 850 sceattas, all porcupines, and is the *locus classicus* for the secondary phase. They include the full range of sub-varieties, including e and g (104 and 37 specimens respectively), f and h (59 and 141). Sub-varieties h, and in particular f, which predominate, cf. De Meern, are very heavily die-linked with long runs of duplicates. There is no reason to doubt that these are the latest additions to the hoard, and that groups of duplicates had no time to become broken up and dispersed in the course of circulation. The number of imitations is high (see p. 290).

5.2 Critical assessment of the French hoards

There remain to be mentioned various French hoards composed mainly of Merovingian coins, but which included just a few porcupines. By analogy with the Hallum hoard, discussed above, in which a few older English coins survive, in France it is the porcupines which are the foreign coins, and which seem characteristically to have a longer age-profile than they would on their home territory. A large hoard from 40 km south-east of Rennes, at **Bais** (Ille-et-Vilaine) included, among some 400 deniers, 18 sceattas of Series D and seven or possibly nine porcupine sceattas (varieties G2 and G3 (2), VICO var. 3 and a couple of imitative pieces), together with three English sceattas of Series A and B. Lafaurie has proposed a date of concealment of *c.* 735/740,⁸⁹ by which time the primary-phase sceattas were thirty to forty years old. Grierson and Blackburn, however, propose *c.* 710 – at which time the primary porcupines would be much more recent, or even still current.⁹⁰ We consider a *t.p.q.* *c.* 730 more likely (see p. 287).



Bais hoard?
Ex Durocher collection
Corpus 1106



Bais hoard?
Ex Durocher collection
Corpus 2584

⁸⁹ Lafaurie (1981a).

⁹⁰ Blackburn (1984) p. 167.

The forensic history of the hoard since its discovery in 1904 leaves room for uncertainty; two secondary-phase porcupines in the Durocher collection could very well have been added before *c.* 735/740, but are impossible on the Grierson-Blackburn chronology. Why are there none in the main body of the hoard? The conflicting views on chronology affect similarly one's understanding of the Hallum hoard (above).

The famous hoard of **Nice-Cimiez** (Alpes-Maritimes), discovered in 1850, contained over 2,000 deniers, among which were 29 porcupines. The traditionally assigned date of deposit, or more exactly of the loss, of the hoard of Nice-Cimiez was 737. This judgement was influenced by the idea that the loss was associated with the campaign of the Lombards in Provence in that year. It was supported by a claim that Cimiez (a suburb of Nice), specifically, was sacked and destroyed at that date. Modern scholarship, however, considers that to be a fiction. In their magisterial survey of early medieval coinage, Grierson and Blackburn argued at length that the hoard dates from *c.* 715/720. Using that as their anchor-point, they tabulate the sceatta hoards as follows:

Table 5.1. Dating of the sceatta hoards by Grierson and Blackburn (1986).

Saint-Pierre-les-Étieux	<i>c.</i> 700/705
Plassac	<i>c.</i> 700/705
Nohanent	<i>c.</i> 710
Aston Rowant	<i>c.</i> 710
Bais	<i>c.</i> 710
Escharen	<i>c.</i> 710
Nice-Cimiez	<i>c.</i> 715/720
Hallum	<i>c.</i> 720
Föhr	<i>c.</i> 720/725
Savonnières	<i>c.</i> 720/755

All these hoards except Plassac and Savonnières include porcupines. Grierson and Blackburn argue their case from the great quantities of coins in the Nice-Cimiez deposit, their rather variable weights and finenesses, and the degree of die-duplication of successive issues of the patricians of Provence: 6 deniers of Antenor, 67+ of Ansedert, 1,189+ of Nemfidius, who was patrician in the later years of Pepin of Herstal, say around 700/710, and 102+ of his successor, another Antenor, who is known to have been patrician at the time of the death of Pepin, in 714. Then there is an anonymous group (153+) with a large M as

its obverse type, and a reverse reading OCAC. Thus the hoard consisted overwhelmingly of coins minted between *c.* 700 and *c.* 715, with many die-duplicates. There is a good deal of supplementary evidence, involving e.g. the coins of the bishops of Clermont-Ferrand.

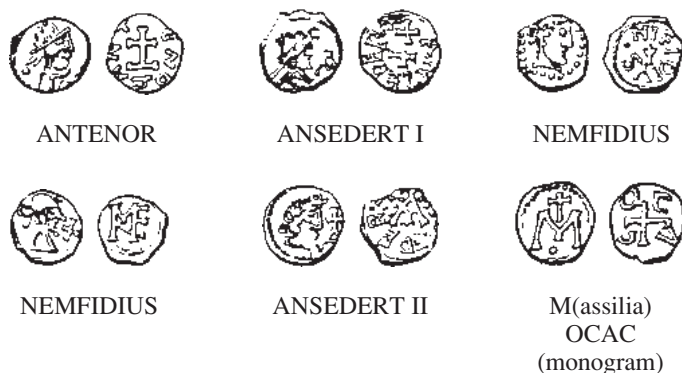


Figure 5.3. Deniers of the patricians of Marseille from the Nice-Cimiez hoard.

The only general weakness of the argument is that it plays down the possibility that mint-output at Marseille declined dramatically after *c.* 715, so that the coins of Nemfidius continued to dominate the stock of currency for many years after his death.

Lafaurie flatly disagreed with this chronology, describing it bluntly as false, and in his inventory of French finds, published in 2003,⁹¹ the dates he proposes are:

Table 5.2. Dating of the French hoards by Lafaurie (2003).

Saint-Pierre-les-Étieux (Cher)	<i>c.</i> 730/735
Plassac (Gironde)	<i>c.</i> 732
Nohanent (Puy-de-Dôme)	740
Bais (Ille-et-Vilaine)	40
Nice-Cimiez (Alpes-Maritimes)	741
Savonnières (Indre-et-Loire)	745

The two lists reflect a substantial difference of opinion, of up to 30 years, with radical consequences for the chronology of the English sceattas, and also for

⁹¹ Lafaurie & Pilet-Lemiere (2003).

the porcupines. It would be difficult to exaggerate the importance of resolving the discrepancy. If it is incorrect to push Nice-Cimiez back to *c.* 720, it is no longer necessary, for example, to push Aston Rowant back to *c.* 710. We have, elsewhere in the text, sought to anchor the chronology of the porcupines to political events in the Netherlands, specifically to the progressive Frankish conquest of the territories held by the Frisian ruler Radbod. There is, moreover, the evidence of dendrochronology from Ribe (see below p. 139). In particular, the change-over from minting Series D to Series E in Friesland following the death of Radbod is an insight we would be reluctant to surrender. It is tempting to think that it is, in the end, the stronger argument. The evidence for the respective chronologies must be confronted.

Table 5.3. The pontificates of the bishops of Paris (Lafaurie 1989).

33	Sigofredus ... 690-692 ...	Plassac	Lafaurie 3-4
34	Turnoaldus (693-717) -, style of	Bais 88 Bais 230-236; Plassac 54	Lafaurie 7 Lafaurie 8
35	Adulfdus	Cimiez 222 (1 specimen)	Lafaurie 9
36	Berneharius (<i>c.</i> 720-730)	Cimiez 220-222, 224, 227 (6)	Lafaurie 10-15
37	Hugo (after 723)	Cimiez 216 (2)	Lafaurie 16-19
38	Merfridus	Plassac 36-38, 40; St-Pierre 20-21 Cimiez 213, 235, 237	Lafaurie 20-31
39	Fredolinus		
40	Ratbertus (730-744)	Cimiez 217, 225-226, 231-232, 4 204, 233, 215 (10); Bais 86	Lafaurie 32-45
41	Ragnecapdus (<i>c.</i> 744-750?)		
42	Madalbertus?		
43	Deodefridus (...756 ...)		

The case made out by Grierson and Blackburn has been summarized above. Lafaurie, with an understandable sense of satisfaction, felt that he had trumped it in 1989 from a quite unexpected direction, when he identified and described the series of deniers attributable to the bishops of Paris, from the 32nd bishop, Agilbertus, onwards.⁹² The bishops whose pontificates have a bearing on the dates of the French hoards in which they are found are given in table 5.3.

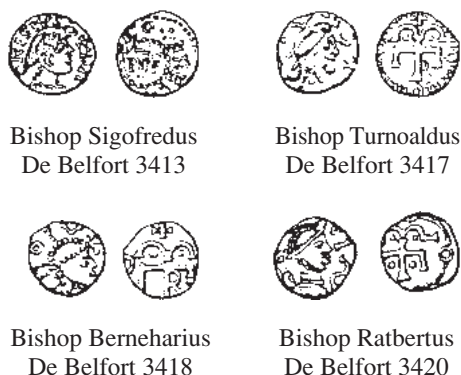


Figure 5.4. Deniers of the bishops of Paris.

Lafaurie's first step was to recognize the name SIGOFREDO PAP, written out in full, as that of the 33rd bishop of Paris (690-692). *Papa* was the well-attested episcopal title. One specimen occurred in the Plassac hoard.⁹³ He went on to identify a series of types present in the Nice-Cimiez hoard, with the initials of subsequent bishops, and (usually) wearing an episcopal head-dress. The initials are either attached to or incorporated into the Neustrian *croix ancrée*, which was adopted as the logo of Paris in *c.* 675. The coins of Sigofredus are of very good silver; the only analysed specimen of Turnoaldus (693-717) is 83 percent fine; those of Berneharius (*c.* 720-730), marked B, and of later bishops up to Ratbertus are debased, sinking into the 50s or high 40s. The Nice-Cimiez hoard contains debased deniers of five bishops with different initials, subsequent to Turnoaldus, up to and including Ratbertus, who flourished somewhere between 730 and 744. Ragnecapdus shares the initial R with his predecessor. So much the worse for Grierson and Blackburn's dating of the hoard to *c.* 720.

⁹² Lafaurie (1989).

⁹³ Lafaurie (1998) pp. 65-66 and cat. Nos. 3-4.

Lafaurie could have rested his case at that point. He adds, however, that Charles Martel, after his reconquest of Lyon (c. 736), suppressed the striking of deniers by the patricians of Provence, and also (almost) the issue of episcopal deniers. Both the patrician and the episcopal coins, which are known especially from the Nice-Cimiez hoard, disappear from circulation throughout Gaul (Lafaurie asserts) at that date. His suggestion is that the obsolete money was stock-piled in the hoard, probably with the intention that the silver should be reminted into the early Carolingian deniers of Pepin.

Whether or not one accepts this addendum to the analysis, it is beyond reasonable doubt that five if not six successors of bishop Turnoaldus struck deniers at Paris, which were present in the Nice-Cimiez hoard. A date of deposit in the 730s, at least, is necessary. The bulk of the hoard goes back, it seems, to the time of the patrician Nemfidius (700 – 710): it was old money. The primary-phase porcupines, and the sceattas of Series W, albeit imitative, were likewise old money. A few more recent coins were included, in particular secondary-phase porcupines, and English sceattas also of the secondary phase. Lafaurie's researches on the deniers of the bishops of Paris have disposed of the suggested *t.p.q.* of c. 720 for Nice-Cimiez, and there is therefore now no pressure to push Aston Rowant far enough back to allow room for the secondary-phase coins in Cimiez (including the secondary-phase porcupines). In the English series of sceattas, the end of the primary and the beginning of the secondary phase amount to such a dramatic change in minting arrangements and coin-types that one is inclined to wonder whether there was some sort of catastrophe which brought the primary phase to an end – for example, a severe visitation of the plague. No dated documentary evidence can be offered to account for the gap. The best that can be said is that the sceattas on which we read the name of King Aldfrith of Northumbria (685-704) are very securely dated. There is one specimen excavated at Hamwic, with a dendrochronological date of c. 710 for the planks lining a nearby well.

For Rigold, writing in 1960, the transition from the primary to the secondary phase occurred at a date around 730. This has turned out to be clearly mistaken. He was influenced by the idea that the English primary sceattas in the south-east were the coinage of King Wihtræd of Kent (686-725), remembered as '*rex gloriosus Cantiae*'. It now seems that an attribution to King Hlothere of Kent (673-685) would be more plausible. Rigold, still subscribing to the old chronology, went on to speak, rather grandiloquently, of the 'tempestuous genesis of the Carolingian Empire... in 734 the Frisians, driven out of Gaul, were attacked by sea'; this suits Hallum, the earliest and most coastal of the hoards well enough'. One can rarely know the circumstances in which a hoard was lost, and it is better not to build a chronology so dependent on direct links with

battles or brief historical events. The date of the Hallum hoard should be moved back to *c.* 720, as suggested by Grierson and Blackburn; the English early secondary sceatta types in the hoard offer their support. At the end of the day, it really does seem that the end of Series D and the stylistic transition between primary and secondary porcupines may be the strongest evidence for chronology at our disposal.

Similar general problems arise concerning the few porcupines in the hoards of **Nohanent** (Puy-de-Dôme), 1877, and **Saint-Pierre-les-Étieux** (Cher), 1882. Where hoard evidence is ambiguous, evidence of the date of production can sometimes be deduced from the archaeological context of finds.

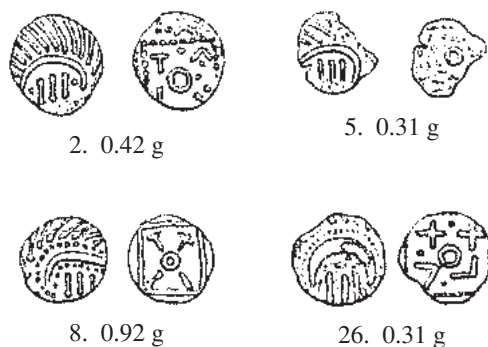


Figure 5.5. Porcupine sceattas excavated at Ribe (Denmark) in well-stratified layers dateable by dendrochronological examination (Feveile 2006); 2, 5 and 8 were found in layer B (705-725), 26 (Variety F) in layer D (760-780).

During excavations at Ribe (Denmark) several Wodan/monster sceattas were found in well-stratified layers which could be dated by dendrochronological examination of wood remnants.⁹⁴

Three Kloster Barthe type porcupines have been found there in layers dated 705-725. This is in agreement with the dating based on the analysis of the hoards (fig. 5.5). There is strong stratigraphic evidence that the Wodan/monster sceattas, minted in Denmark, were in use there until *c.* 800/820.⁹⁵

The comparison of the hoards discussed in this section leads to the conclusion that the production of secondary porcupines started a few years prior to 720. The absence of tertiary phase porcupines in these hoards indicates that they were assembled and hidden before *c.* 750. The date of concealment must lie somewhere between these two dates, probably 730/740.

⁹⁴ Feveile (2001); Feveile (2006).

⁹⁵ Feveile (2008).

5.3 Uncertainties concerning the dating of the tertiary-phase porcupines

The type-hoard from the tertiary phase was found in Friesland in 1868, at **Franeker** (see p 288-289). During the levelling of a terp, around 412 coins were found, of which 320 are porcupines. They are of three main types, B, E, and F, together with a smaller group (AF) and a certain number of specimens which seem to be imitations or 'mules'. They are recognizable from their rather broader flans, and the bold style of die-cutting. The designs of these three varieties are inspired by earlier types. For example, variety E is a crude copy of primary variety G, struck between 695-715. Because of their complete absence in the hoards of the secondary phase, they are assigned to a final tertiary phase. Although tertiary-phase porcupines are uncommon as single finds, it seems that the whole or almost the whole range of known varieties is represented in the Franeker hoard, which will have been concealed when their issue was complete. This is the only hoard containing Variety F, and the sceattas of this variety in the Franeker hoard look almost uncirculated, and are present in long die-linked chains. They are obviously the last additions to the treasure, and there was no time for them to become dispersed into the currency after leaving the mint. Their obverse design copies the secondary-phase sub-varieties e and g, which are from Friesland. So, presumably, is Variety F.



A porcupine Variety F sceat from the Franeker hoard.

Just one other substantial hoard of tertiary-phase porcupines is known, from the North Frisian island of **Föhr** (see p 288). A total of 87 sceattas and Merovingian coins were picked up, where they had fallen out of the cliffs. Five sceattas of Series G and J, which one would be inclined to date to the beginning of the secondary phase, raise the question whether there were some stray losses as well as a hoard, or whether these English types were old coins that had 'silted up' in the currency of North Sea trade. Certainly, most of the coins are from a hoard. Among the total of 87 there are 52 porcupines, mostly of the tertiary varieties B and E1, together with AF. The hoard will presumably have been concealed mid-way during the issue of the tertiary porcupines. The owner of this sum of money was most probably in transit, to or from Jutland, but had buried it on the island.



Figure 5.6. The Merovingian or early Carolingian MILO-coin in the Föhr hoard.

The Föhr hoard included a Merovingian or very early Carolingian penny of a certain Milo, which has been seen as crucial for the dating of the hoard (fig. 5.6). Possible attributions have been discussed at length by Hatz.⁹⁶ The Milo best known in numismatic circles is a Viscount of Narbonne (fl. 782-791). His coins have *rev.* NRBO. Could the Föhr hoard be so late? – surely not. The Föhr coin uses a reverse that has been read (incompletely?) as TRE, doubtfully attributed to Caunes (*Trencianum*), in the south of France. Both coin-types use a lozenge- or diamond-shaped O, and both bear non-royal names. Milo was, however, not such an unusual name that a second individual is out of the question, and the fabric of the Föhr coin would be decidedly small for a date in Charlemagne’s reign. Hatz has pointed to a bishop Milo of Trier (722/3 – 761/2), and suggests that the reverse of the coin in fact reads PTRE for *Petrus*. St. Peter was the patron of the cathedral of Trier. TRE could also be read as *Treveri*. The question is when during bishop Milo’s long pontificate this coin was struck. Hatz believes that it must have been after the capitulary of Vernon (754/755)⁹⁷ because of the coin’s weight of 1.23 g. However, the difficulty is that this would be the only coin of Pepin’s reign which does not use his name or monogram (RP, RF). More certainty will have to await the discovery of other specimens, or of an obviously related variety, hopefully from somewhere closer to Trier, but meanwhile Hatz’s is by far the most sensible conjecture. If the attribution to the bishop of Trier is correct, then it is unlikely that this coin was issued after 761/2. This seems to indicate that around or shortly after 755 still a new sceatta type, namely Variety F, was introduced. We have to realize that this dating is rather flimsy, because it is based on one single coin with a somewhat controversial attribution from the Föhr deposit, and the possibility that this crucial coin did not belong to the original hoard is also not excluded. However, at present it is the best possible conclusion. The find of a Variety F specimen at Ribe, in a layer dated between 760 and 780 (fig. 5.5, p. 139), offers additional evidence.

⁹⁶ Hatz (2001) pp. 41-43.

⁹⁷ The capitulary of Vernon-sur-Seine regulated the disordered Merovingian coinage system, and ordered a denarial weight of 1.24 g.

Table 5.4. The presence of porcupine varieties and sub-varieties in hoards. The *t.p.q.** indicates the supposed date of concealment.

Period		primary				secondary										tertiary		
Variety		PI	VI	G	D	A					C					B	E	F
Sub-variety	<i>t.p.q.</i>					a	b	c	d	e	f	g	h	i	k			
St. Pierre-les-Étieux	710		x	x														
The Rodings	710		x	x														
Remmerden	710/715		x	x														
Nohanent	710/715	x	x	x														
Aston Rowant	715/720	x	x	x	x										x**			
Kings Lynn	720/725	x											x					
Lambeth	c. 720	x	x								x							x
Hallum	c. 725	x					x	x	x			x						x
Bais c.	730		x	x					x									x
Woodham Walterc.	730	x	x	x		x	x	x	x		x	x	x					x
<i>Franceschi parcel</i>	c. 730		x		x	x	x	x	x		x	x						x
De Meern	c. 730	x		x	x	x	x	x	x	x	x	x	x					x
Lutje Saaksum	c. 730			x		x	x	x	x	x	x			x				
Kloster Barthe	c. 730	x	x	x	x	x	x	x	x	x	x	x	x	x				x
Nice-Cimiez	741	x		x			x	x	x		x	x						x
Föhr	c. 755	x	x	x				x					x				x	x
Franecker	> 755		x	x	x					x							x	x

* *t.p.q.* (*terminus post quem*) is the date of issue of the most recent coin in a hoard.

** Corpus 2689. It is uncertain whether this is a secondary-phase coin, or a primary-phase imitation, see p. 62, and footnote 81.

The prevailing opinion was that the production of sceattas would have come to an end after the Frankish conquest of Friesland by Charles Martel in around 730, and that they were superseded by the new Carolingian pennies. Yet it seems possible that sceattas continued to circulate for a considerable period after the Frankish conquest of the northern parts of the Netherlands. For how long they remained current, and the region where they stayed in use, is uncertain, but at Ribe it could well be until the end of the late eighth century, or even later, for no coins of Pepin have been excavated there.

5.4 Summary of the dating evidence

The dating of the numerous porcupine varieties largely depends on the comparison of hoards. The archaeological context of a few single finds offers additional information. The four early varieties, ‘plumed bird’, G, VICO, and D are represented in the Aston Rowant hoard (as we have argued above), concealed around 715. Their issue did not start before *c.* 695. Other hoards seem to imply that the succeeding secondary phase porcupines were already in circulation around *c.* 725. But they are absent in the Aston Rowant hoard. Because the major hoards containing secondary-phase porcupines are from the end of the phase, it is difficult to establish the chronological order of the sub-varieties. It is, however, arguable that the groups, b-d, e-g, and also the imitations, were struck concurrently.

The secondary phase was followed by a tertiary phase, as illustrated by the Franeker and Föhr hoards. This final phase is characterized by far fewer varieties than the preceding (Varieties E, Af, B, and F). There are indications that one of the tertiary porcupine types, Variety F, was introduced only after *c.* 755. And that they circulated for a much longer period than was previously supposed.

Primary porcupines	<i>c.</i> 695 - <i>c.</i> 715/720
Secondary porcupines	<i>c.</i> 720 - <i>c.</i> 740
Tertiary porcupines	<i>c.</i> 740 - <i>c.</i> 800?

6. THE MINT-PLACES OF THE PORCUPINE SCEATTAS

6.1 Where were the four primary varieties minted?

There is a huge contrast between the Netherlands and England, in the numbers of single finds of primary porcupines. From England there are more than 360, from Friesland just 10, and from the Big Rivers region, seven. In the Netherlands it is only at Domburg that they are well represented, with 59 finds among the thousand from the site. Normally, one's first thought would be that the primary porcupines were English. If that were so, one would then have to go on to say that the design migrated to the Netherlands only in the secondary phase – somewhat in the way that the English Series C was copied by the continental Series D. It has been argued, however, that there is no region in England where the minting of the primary porcupines could be accommodated. The English regions had each their own distinctive issues, and the distribution-pattern of the porcupines in England shows no signs of regional localization. They are found everywhere, from Yorkshire to Wessex. We must accept, therefore, that they were minted in the Netherlands, like the secondary-phase porcupines which succeeded them, and that they were primarily an export coinage, destined for trade with England. Much of this trade flowed through Domburg. In this respect, they resemble Series D Type 8, but there is a contrast with Series D Type 2c, which has yielded many single finds in the Netherlands, as well as many in England. It is difficult to offer any statistical proof of the Dutch origin of the early porcupines, simply because the single finds are so few that a regional analysis within the Netherlands is impossible. In the Dutch hoards, similarly, primary porcupines occur only in ones and twos.

As a crumb of evidence one may mention that the tertiary-phase porcupines deliberately hark back to the distinctive designs of the primary varieties, which would not make sense if the primary coins were English.

The next question, then, is whereabouts in the Netherlands they originated. In our monograph on Series D we argued that that type and also the porcupines were minted in the Big Rivers region. We now wish to retract that conclusion, which was based on an inappropriate comparison between the site-finds from Domburg and Dorestad – inappropriate because the date-range and balance of the finds (as between primary and later phases) was not the same at both places. A greater emphasis on the political context, which

sees Series D as the coinage of Radbod, and minted in Friesland, now seems preferable. That leaves the origins of the primary porcupines, uncontroversially, in the south. Within that southerly, Frankish-controlled area, any locations are theoretically still possible: the porcupines do not have to share them with Series D.

They could be from the Big rivers region, e.g. Dorestad, and/or from Domburg. This ambiguity deserves some explanation. In the period of the ‘moneyers tremisses’, i.e. up to c. 690, Dorestad is by far the most plentiful mint-place represented at Domburg, whereas few if any specimens are on record from Dorestad itself. That may be partly a modern phenomenon, namely a function of modern recovery-rates; but it is clear, even so, that Domburg (which did not mint tremisses, so far as we know) was the outlet to the sea for Dorestad. Could something very similar be true for the primary porcupines, which follow on directly from c. 690? Or did mint-activity migrate, at that moment of transition from gold to silver, to the coast? Coastal *wics* were certainly mint-places elsewhere around the North Sea, although they tended to flourish more in the secondary phase of sceattas. The primary phase is absent among the more than 30 porcupines from Wijk-bij-Duurstede. It is a large and complex site, and one should not exclude the possibility that a part of it which functioned in the primary phase has not contributed to the assemblage of modern finds. That caveat aside, Dorestad, having been an active mint for gold tremisses, seems to fall in abeyance, coming to life again very clearly and unequivocally only in the tertiary phase of the porcupines, and during the following Carolingian rule. Whether or not primary porcupines were minted at Dorestad – as tremisses had been – it seems that they did not circulate there to any extent. Even that does not, however, fully resolve the issue: their apparent absence could well be because they were primarily an export coinage.

Was the mint-place of the primary porcupines Domburg or Dorestad? This difficult but quite important question cannot yet be answered. We can imagine that, in the future, when many more single finds have been published from the Big Rivers region, it might be resolved indirectly from the evidence of differing distribution-patterns for one or more of the four varieties of primary porcupines. For the present, we retain the ambiguous phrase, ‘Domburg and/or the Big Rivers region’, as the mint attribution of the primary porcupines.

After all, we do not know that all four varieties were minted in the same place. In more detail, we are faced with the intriguing numismatic choice, whether they were minted by moneyers or in workshops operating independently, but all in one place, probably Domburg, or whether they are from four different places, including e.g. Dorestad⁹⁸ and Katwijk. But there are no primary-phase

porcupines recorded from Dorestad. Because single finds are so few in the Big Rivers region, there is no possibility of exploring the question through contrasting distribution-patterns there.

Table 6.1. Single finds of primary porcupines in the Netherlands and England.

	'plumed bird'	VICO	G	D
Friesland	3	2	4	1
Big Rivers region	1	0	6	0
Domburg	9 15%	16 27%	28 47%	6 10%
England	96 27%	82 23%	151 42%	32 9%

The only curious anomaly is that Variety G is dominant in the Big Rivers region (6 out of 7) – a dominance seen also in the middle Rhinelands. In any case, the four varieties doubtless mingled in circulation, with each other and with Series D, in the Big Rivers region. The only hope, therefore, of demonstrating that the four varieties originated in different places would be if they generated different distribution-patterns in England. The regional statistics from England are examined in a later chapter.⁹⁹ They give little encouragement, probably because for the most part the four varieties left the Netherlands already mixed. (The same is true of the secondary-phase porcupines, where one might have imagined that the sub-varieties minted in the Big Rivers region and in Friesland respectively would have entered England through different ports, and would have generated regional patterns that were to some extent different. That was not the case, and it seems likely that the monetary outflows went largely through Domburg.)

Because of the deficiencies of the evidence, the only statistical comparison that is numerically worth making is between Domburg and England (table 6.1). It shows that the shares taken by the four varieties are much the same, except that the 'plumed bird' variety is distinctly more plentiful in England, and perhaps especially so in Wessex (fig. 7.5, p. 193). That pattern (which is not repeated in the Aston Rowant hoard) tempts us to reconsider whether the 'plumed bird' variety, at least, could be English, in whole or in part. Attention will focus on sub-variety L. But if the whole of the 'plumed bird' variety were

⁹⁸ Dorestad was the dominant port of the Rhine distributaries by the third quarter of the eighth century. How dominant it was at the end of the seventh century is less certain. Dendrochronological evidence from the harbour excavations hardly goes earlier than 700, but we should remember the Madelinus tremisses, struck at Dorestad in great quantities.

⁹⁹ Chapter 7.2, p. 181ff.

English one would expect that the return flows, counter to the flows generated by the over-all balance of payments, would have resulted in even fewer finds from Domburg than we see. And Dhénin's identification of Celtic prototypes for both the 'plumed bird' design and for Variety G among coins of the Carnutes favours a continental origin.¹⁰⁰

The relationship of the four varieties therefore remains puzzling, and our only course of action, for the present, is to test the nul hypothesis in as many ways as we can, on the chance of finding interesting differences between them. Thus, clues to the relationship of the varieties might lie in the weight patterns and alloy standards. In fact, all four conform closely with each other. They are all heavy, with modal values in the region of 1.20-1.30 g. There is some falling-away from the best levels, probably late in the issue, but some at least of the lighter specimens are imitative pieces, which are irrelevant to the argument. All four varieties were also initially of excellent silver, commonly 94 to 96 percent 'silver', with occasional falling away. Any metrological differences, in short, are so slight that large and carefully controlled samples (from hoards?) would be needed to demonstrate meaningful variation. Their gold contents show an intriguing contrast. The 'plumed bird', VICO, and D varieties average 1.4 – 1.5 percent, whereas Variety G averages only 1.1 percent (table 4.7, p. 99). They are almost all tin-free.

Comparisons between hoards and site-finds are another possible line of enquiry. Thus, the English single finds differ in their over-all composition from the Aston Rowant hoard. The former will have been lost gradually over an extended period of time, whereas the hoard may well reflect the somewhat tighter age-structure of the porcupine population at the date of the hoard's concealment, and may even reflect money recently imported into England. The Domburg finds, on the other hand, should afford a straight comparison with the English single finds, as both will have been lost piece-meal in much the same way.

If another large hoard were to come to light, from a decade or so earlier than Aston Rowant, and standing close to the date of origin of the porcupine series, the comparisons would almost certainly be very illuminating, both for the chronological relationships of the four varieties, and for the stylistic development within each. Such a discovery would not, however, contribute to localizing the mint-place or places of the four varieties. That remains an impasse.

¹⁰⁰ See fig. 1.1 on p. 1.

Summary

Although the English : Netherlands single finds ratio of the primary porcupines suggests an English origin, this attribution is certainly not tenable. There is no region in England where the minting of the primary porcupines could be accommodated. Like Series D Type 8, they were struck in the Netherlands, as an export coinage for the trade with England. The relationship of the four varieties ('plumed bird', VICO, G, and D), which mingled freely into the circulation with each other and the sceattas of Series D, remains puzzling. Are they from different mints, located in one or more regions? The only well substantiated conclusion is that they were not produced in Friesland. Good candidates for the place of production are the Big Rivers region (Dorestad) and Domburg. The flimsy find distribution patterns point in the direction of Domburg.

6.2 Evidence of two minting regions for the secondary phase

The intriguing conclusion from the study of metrology is that the sub-varieties e, f, g, and h (with a 'mixed grill' reverse) are distinctly heavier than sub-varieties b, c, and d (ToT- / \). Their peak or median value lies at *c.* 1.27 g, instead of *c.* 1.17 g. Also, the flans are more carefully weight-adjusted, i.e. the peak is steeper. This is a clearly significant difference, as the reader may judge from fig. 4.2 (p. 72). If the two sequences, b-d and e-h, have been correctly arranged in order, for example if d is later than b and c, we can say that there was no significant decline in average weight during the years of issue of the secondary porcupines. It is indeed the case that d is not significantly lighter than b or c. The heavily die-linked varieties f and g, which are presumably among the latest coins in the Kloster Barthe hoard, show no decline in weight. Indeed, this conclusion would be secure enough even if the chronological ordering were incorrect, since no sub-group falls noticeably below the general level.

Implications for the minting arrangements

What the two weight-standards might imply in terms of the arrangements for minting requires careful consideration. Coins that were weight-adjusted with different degrees of care could have been struck by separate establishments in the same place. At this stage we have to say, simply, that the place might have been the *wic* of Domburg, or it could have been in the vicinity of Wijnaldum on the coast of Friesland, or the great river-port of Dorestad. But could porcupines on two distinct weight-standards have been minted in one locality concurrently? If

they were readily distinguishable to their users by their designs (as sub-varieties b-d and e-g were), any difference in their intrinsic value would soon have become known to the merchant community. Alternatively, one could imagine a commercial situation in which it was known that both kinds were intrinsically equal, containing the same weight of silver, but the heavier kind contained more copper. In fact that hypothesis is plainly untenable, because the heavier, 'mixed grill' varieties are often of the maximum practicable fineness, i.e. 93-95 percent 'silver'. It would be impossible for the (lighter) ToT- / \ varieties to achieve intrinsic parity. Another question, then: could there have been a reduction in weight at some date? – That, too, seems implausible, because even sub-varieties f and g are still firmly on the heavier standard.

The differences in median weight, of about ten milligrams or roughly eight percent, are strong encouragement to explore the idea that the secondary porcupines were minted in two regions. There is a natural expectation that one of these would have been in the Big Rivers region, and the other somewhere in Friesland. Against this hypothesis is the fact that the hoards are thoroughly mixed, the only obvious exception being the Hallum hoard, which has a preponderance of the ToT- / \ sub-varieties (b-d). If the main monetary function of the porcupines was still to facilitate inter-regional and long-distance trade, this thorough mixture is possibly no more than what is to be expected. Hoards may be a misleading guide to the region of origin of each of the sub-varieties, because some of them may very well have been put together in one place, but concealed in another. That possibility arises naturally from their main function. It suggests that we should rely more on the single finds, which should approximate to a random sample of the currency of the district where they were accidentally lost. The coins will surely have had a local function as well, in the region where they were minted, for the long-distance trade will have generated considerable local commercial activity. Nowhere will that have been more true than in Dorestad itself; but one's general impression is that the Big Rivers region was commercially altogether weightier than Friesland – with more populous settlements, which were more monetized. It seems that there was also a lot of money in Friesland, which grew rich through its trading contacts with the regions further north and east; but the social fabric was simpler. The strategy that comes to mind, therefore, is to begin by looking at the single finds from the Big Rivers region and from Friesland respectively, to see whether there is any residual localization of the two categories of secondary porcupines in one region and the other (in spite of the mixing effects of long-distance trade). It may be worthwhile to list the single finds, in case their detailed topography offers further clues. They are grouped as 'Big Rivers', 'Friesland', and 'Domburg' (For details see the appendix "Notes on collections, hoards and productive sites").

Table 6.2. The stray-finds distribution of the secondary porcupines of the ToT- / \ (b-d) and the ‘mixed grill’ (e-h) sub-varieties in three regions. Absolute numbers (b-k) and percentages pro rata (b-h = 100%).

	b-d		e-h		i-k
	N	%	N	%	N
Friesland (north)	25	57	19	43	12
Big Rivers region (south)	31	84	6	16	21
Domburg	97	77	29	23	86

There is a clear-cut north-south contrast: 57 : 43 in the north, 84 : 16 in the south. A difference of this magnitude should be safe against any marginal defects in the scheme of classification. Domburg, which may have been frequented by merchants from many regions, and may have been fed from both Friesland and the region of the big rivers, has a characteristically southern distribution. Cautiously, one may say that there is a strong *prima-facie* case for two mints and that it is supported by the sharp differences in the designs of the two groups, and by the metrological difference. There is a risk that the statistics are blurred by the inclusion of contemporary copies, but if such copies were made in their home region, they do not greatly affect the argument, and if they were made outside it, omitting them would strengthen the contrast.

The ToT- / \ reverse sub-varieties b-d and its attribution

The relationship between sub-varieties b, c, and d is far from clear. The histogram of weights for sub-varieties b-d is more spread, and one wonders whether it might be a composite parameter, conflating differences between (or even within) b, c, and d. The reverse design would, after all, be very easy to copy. One can at least narrow the possibilities by examining their metrology, for each category separately. Sub-variety b is the most exactly adjusted of the three, with 18 percent of the values in the central step – still far less careful than in sub-varieties e-h (fig. 4.3, p. 74). There is a hint of a lower peak, at *c.* 1.07 g. Sub-varieties c and d show a decline, again with hints of more than one weight-standard, e.g. at *c.* 1.13 g with a second peak at *c.* 1.23 g. The priority of b within b-d is assured, and the regional occurrence of single finds (discussed above) locates all three varieties in the south. Sub-variety c shows the weakest bias towards the Big Rivers region (north : south = 8 : 9), and it is especially numerous at Domburg. But it is still essentially southern in its characteristics.

The block as a whole certainly belongs to the south, to the Frankish-controlled Big Rivers region – which had previously been the home (no doubt) of at least three of the primary varieties. At a date very early in the secondary phase the four primary designs were abolished, and a single design (ToT- / \) took their place in the Big Rivers region. This has the appearance of a politically driven reform, imposing a kind of uniformity where previously there had been three or four separate strands. The reform may have involved the fixing of a new and slightly lower weight-standard of *c.* 1.17 g (whereas Friesland clung to a higher standard of *c.* 1.27 g). The four workshops of the primary phase could have been amalgamated, or more probably they could have continued their separate existence, all adopting the new official reverse design, but retaining some freedom over the obverse or ‘porcupine’ design. If, for the sake of argument, we suppose that there continued to be four workshops in the south, the moneymen might have seen fit to distinguish their individual products in some way. A possibility that comes to mind is the addition of one or more dots between the / \ of ToT- / \ design. That is not a correct guess, as may be seen by studying die-linked reverses, which are by no means always consistent in that respect.

Our scheme of classification may not correspond exactly with the minting arrangements, but there is no reason to suppose that the ToT- / \ design was imitated on the higher, Friesland weight-standard of *c.* 1.27 g. It is a feature of sub-variety *c*, in particular, and to a lesser extent of *d*, that specimens in the Hallum and Lutje Saaksum hoards are often die-linked to Kloster Barthe specimens. But that may merely reflect the accumulation of southern money in Friesland, and implies that coins on the lower weight standard were accepted there.

The ‘mixed grill’ reverse, sub-varieties e-h

The big question, obviously, is whether there were two ‘official’ mint-places in the Friesland minting region, namely one producing sub-varieties *e* and *g*, while the other struck (concurrently?) sub-varieties *f* and *h*. About *i-k*, it is more or less pointless to speculate. A detailed mapping of the single finds from Friesland and adjoining provinces suggests that *e-g* and *f-h* circulated over the same region: the distribution-patterns overlap completely, so far as one can judge from a limited number of finds. There is little or no reason to suspect, for example, that *f+h* originated further east in Friesland.

What we can do is to reconstruct table 6.2 (above) so as to compare, in a simple matrix analysis, the extent to which *e+g* and *f+h* reached the Big Rivers region, and also Domburg (table 6.3).

Table 6.3. Regional distribution of single finds of secondary-phase porcupines. Quantities (b-k) and percentages (b-h).

	b-d		e, g		f, h		i-k
	N	%	N	%	N	%	N
Friesland, etc.	25	57	10	23	9	20	12
Big Rivers, etc.	31	84	1	3	5	13	21
Domburg, etc.	97	77	14	11	15	12	86

The diamond-shape sub-varieties reached the Big Rivers region hardly at all (3 percent, against 84 percent of the local sub-varieties b-d), but they reached Domburg rather more (11 percent), presumably by coastal shipping, and because Domburg was the major emporium. Sub-varieties f and h made up 13 percent in the Big Rivers region – still a minority of the currency there, but they were carried south significantly more. Yet that was not reflected at Domburg (12 percent). The sample size is large enough, and the contrasts are large enough, for it to be a statistically secure conclusion, that both belong to Friesland. We must hope that the faithful and non-selective recording of single finds will gradually add to the data-base, and perhaps allow the focus to be sharpened. Meanwhile, there is the evidence of the English single finds, which is considered in another chapter, pp. 195-197 below.

Sub-variety a

The small sub-variety a has a distinctive reverse design, which may directly derive from the primary-phase porcupines. Although the sample is too small to generate a reliable histogram, there is little doubt that its modal or peak value is somewhat around 1.23 g. It is on the heavier weight standard, and therefore it matches the sub-varieties e-h much more closely than it matches b-d. It is perhaps an early Frisian porcupine issue, struck during the interval between the end of the production of Series D sceattas and the beginning of the ‘mixed grill’ sub-varieties.

Sub-variety k

This large residue-group of untidy and irregular looking specimens, and therefore probably imitations, is discussed in section 6.4

The representation of the two minting regions in hoards

If the De Meern and Kloster Barthe hoards had been put together shortly before their concealment, one might expect their contents to show a gradient

from a recent batch of coinage from the local mint, towards a more thoroughly mixed currency, of coins issued ten or twenty years previously. Table 6.4 shows the comparison of Kloster Barthe with De Meern, as regards the quantities of ‘northern’ and ‘southern’ coins. The southern : northern ratios are 51 : 49% and 57% : 43%. There is no dramatic difference in composition between the two hoards. Kloster Barthe seems to be somewhat more northerly in its make-up, at least in its more recent material (and one recalls the heavy die-linkage in sub-varieties f and g).

If we attempt a comparison with the single finds (listed above in table 6.3), the southern : northern ratio in the north is 57 : 43, and in the south 82: 18, the hoards thus appear to be northerly in complexion.

Table 6.4. The quantities of ‘northern’ and ‘southern’ secondary phase porcupine sub-varieties in the Kloster Barthe and the De Meern hoards.

		Kloster Barthe	De Meern
‘southern’	b	109	18
	c	120	27
	d	88	10
		} 317	} 55
‘northern’	e	68	20
	f	59	3
	g	37	6
	h	141	13
		} 305	} 42
	totals	622	97

As regards the characterization of the smaller hoards as tending to the ‘northerly’ or ‘southerly’ in their composition, the Hallum hoard has already been mentioned as being strongly southerly – even though its find-spot was in Friesland. But Hallum does not reflect the currency of either north or south: it consists predominantly of Wodan/monster sceattas. The English hoard of Woodham Walter, Essex is equally heavily weighted with sub-varieties b-d – or, to speak more exactly, c and d, for b is absent. There are 13 specimens, compared with just four of e-h. And the die-linkage to Kloster Barthe is much less. There were also one specimen of sub-variety a and seven of k. It seems clear that the porcupine component of the Woodham Walter hoard had been carried to south-eastern England direct from the region where sub-varieties b-d were minted. Likewise the Lutje Saaksum hoard, from Groningen province, is distinctly southerly in its composition, but with a significant amount of die-linkage to Kloster Barthe. Its southern : northern ratio is 68% : 32%. Within b-d it shows a preponderance of sub-variety d, which was perhaps in issue when it was put together. The Franceschi parcel looks different from Lutje Saaksum,

and northerly (southern : northern ratio of 52% : 48%). Unlike Lutje Saaksum, it contains a good number (eight) of specimens of sub-variety k. It is difficult to judge whether the die-links between the smaller Friesland/Groningen province hoards and Kloster Barthe imply that they were to a significant extent withdrawn from the currency of Friesland, but it is something to bear in mind. In any case, it seems clear that the hoards illustrate a diaspora northwards of porcupines from the Big Rivers region (and likewise, a diaspora into southern and eastern England).

Monetary implications of the results

If we accept the conclusion that there were two main mints, one in the Big Rivers region and/or Domburg comprising essentially varieties b-d and the other in Friesland, with varieties e-h, in order to follow through its implications for monetary circulation, the main point is that despite their difference in average weight porcupines from both north and south mingled freely in both regions. The chances of a coin's being accidentally lost were in direct relation to the proportion in the local currencies respectively of the issues of north and south. That should certainly mean that our statistics understate the case for two major mints, because they will reflect merely the residual localization of the two varieties. The process of mingling will have proceeded steadily for as long as the secondary porcupines remained in circulation. If the tertiary Franeker phase involved a recoinage (as the Franeker hoard tends to imply), one can envisage two consequences: fewer stray losses of the latest sub-varieties (in relation to the numbers of dies employed) should be expected; and secondly, the degree of mingling should become greater, over all, with the passage of time.

What happened in the Netherlands (and also in England) at a date around 715-720 to cause a break in the minting of sceattas, and the introduction of a new, uniform design in the Big Rivers region (ToT- / \), is a matter for conjecture. Certainly, the issue of runic Series D in Friesland came to an end by that sort of date; and the four parallel varieties of primary porcupines also came to an end (G4 and D possibly a year or two later than the rest?), to be replaced, in due course, by other porcupines of similar but new designs, the secondary or so-called Kloster Barthe phase. The historical background is one of Frankish political and military pressure against the Frisian ruler, Radbod. In 711 the marriage of Radbod's daughter to Grimoald, the son of Pepin, mayor of Neustria signalled a peaceful accommodation between the warring parties. Unfortunately the balance of power was upset in 714 by the deaths of both Grimoald and Pepin. Radbod exploited the Frankish weakness by reconquering

Utrecht and Dorestad. Commerce will have been disrupted by the uncertainty, and for a time it may be that the moneyers' services were not much required. If Dorestad was already a mint-place, cause and effect would seem obvious; but we do not know that it was. A major river-port though it was, no primary porcupines have been found there.

The secondary porcupines, like their predecessors, were still a coinage with a dual function, used for export but they also took over the role (previously played by Series D) of providing the local currency of the Netherlands. As such, they generated considerably more stray losses within the Netherlands than the primary porcupines had done. These single finds, in combination with a stylistic analysis of their designs, allow us to recognize that they were minted both in Domburg and/or the Big Rivers region, and also in Friesland – on slightly different weight standards. Sub-varieties b-d (with ToT- / \ as their reverse design) are on a standard of *c.* 1.17 g, whereas sub-varieties e-h are on a standard of *c.* 1.27 g. Single finds indicate that the lighter group are from the south, and the heavier group are from Friesland. In spite of enmity between Franks and Frisians, and in spite of the discrepancy of about 8 percent in the intrinsic value of the two groups, they evidently mingled freely in the currency of both regions. Both groups were exported, and we can sometimes detect the southerly or northerly origin of the porcupines in a distant hoard, such as the Woodham Walter hoard from Essex, or the Kloster Barthe hoard itself, from Germany.

In England, sceattas of entirely new designs, e.g. Series H, K, W, and V were introduced at the beginning of the secondary phase, everywhere except in East Anglia. The English secondary-phase sceattas quickly came under pressure and began to be debased. It is not clear whether the downward pressure was commercial or fiscal in origin. What is clear is that in the medium term the porcupines fared better than the English issues: they were a strong currency (and that is doubtless a reason why the basic design was maintained for so long). They were minted in enormous quantities. The weight standards of the secondary porcupines were well maintained throughout the phase. What happened to the silver contents during the same period is a complex and under-documented problem (see chapter 4.2). A great many specimens were of good silver, and certainly the general level was better than in England.

Summary

Surprisingly, the secondary porcupines have two different weight-standards. The weight-peak of the group with the ToT- / \ reverse design is *c.* 1.17 g, that of the sub-varieties which include a 'mixed-grill' reverse design lies roughly

8 percent higher, at *c.* 1.27 g. The available evidence from the composition of hoards rules out the possibility that the ToT- / \ and 'mixed grill' issues were successive. The stray-find distribution of these samples in the Netherlands reveals a clear north-south contrast. It is very plausible that during the secondary phase two major production centres of porcupine sceattas operated in the Netherlands, the largest in the south, the Big Rivers region and/or Domburg, and a smaller one in Friesland.

6.3 The mint-places of the tertiary-phase porcupines

In the tertiary phase, the over-all volume of porcupines fell away dramatically, from something of the order of 4,000 reverse dies for the preceding secondary phase, to a mere 400 or so. Die-estimation offers figures of *c.* 350 reverse dies for the varieties E, AF, and B, and *c.* 50-70 dies for Variety F. It is therefore not a surprise that the numbers of stray finds are small. Consequently the interpretation of the patterns is a delicate matter.

The evidence discussed in the chapter on dating led to the conclusion that the tertiary varieties E, AF, and B are followed by F, which began later. Therefore we will first direct our attention to the earlier tertiary varieties.

What now seems perfectly clear, from having established a die-corpus, is that Varieties E/AF and B are from dies produced by different die-cutters. There are characteristic stylistic differences between the two varieties. In Variety E the 'quills' of the porcupine are quite widely spaced, and typically only four or five are visible. In Variety B, with its long, deep curve, there may be traces of as many as 15 'quills'.

It is an open question if these stylistic mannerisms indicate also separate workshops. We simply do not know whether each workshop manufactured its own dies, or whether a mint ordered its dies from different independently operating die-cutters. Where were these mints? They could have been in different regions, or they could have been located very close to each other. It is the story of the four primary-phase varieties all over again: distinctive designs, yet apparently from the same region of the Netherlands.

It is also clear, from the evidence of the stray finds, that the varieties E/AF and B circulated both in Friesland and in the Big Rivers region. The Franeker hoard itself is from Friesland, and it may very well have been put together there, but that is not certain. The Föhr hoard points to outflows beyond Friesland to Jutland (where one or two specimens have also been found). The most reliable approach to the problem is to compare the ratio of Varieties E and B in Friesland and the Big Rivers region, in order to see whether there is any

residual localization. Domburg may be a special case, through being accessible to coastwise trade, but Dorestad will be of special interest, not only as lying well within the Big Rivers region, but as a potential mint-place.

Table 6.5. Possible evidence that Varieties E and B were differently localized.

		E	B	ratio
Hoards:	Franeker	176	68	2.6
	Föhr	27	9	3.0
Single finds:	Friesland	12	3	4.0
	Big rivers	17	3	5.7
	Dorestad only	13	4	3.2
	Domburg/Westensch.	19	7	2.7
	England	8	5	1.6

The numbers are mostly too small to be statistically reliable, but such as they are they give no reason whatsoever to suppose that one of the varieties was minted in Friesland and the other in the Big Rivers region. As a working hypothesis, we can only conclude that E and B are from the same region. They could still be from different places, if those places were not far apart, but it would seem to be almost impossible to establish that, one way or the other, from distributional evidence.

Table 6.6. Numbers and proportions of single finds of the main tertiary varieties from different regions.

	E	%	AF	%	B	%	F	%
Friesland	12	75			3	19	1	6
Big Rivers region	17	53			3	9	12	38
Domburg/ Westenschouwen	34	51	1	2	7	11	24	36
England	8	35			5	22	10	43
Total	71		1		18		47	

A first logical step is to see if the distribution of stray finds confirms the two-mint regions pattern of the secondary phase also for the tertiary phase. The statistics should be handled with discretion, both because some of the numbers are small, and because they may include imitative pieces, probably originating elsewhere than the official mint, which could blur or distort the patterns.

Because single finds of the main varieties survive in different totals, the statistics are also presented as percentages for each variety, for the Netherlands. The English finds are treated *pro rata*. The tabulated ratio for E+AF+B: F is shown in table 6.7. There are no striking differences between the varieties E/AF and B, but F (the latest variety) is significantly at variance, with a much lower proportion of the finds coming from Friesland and a slightly higher proportion from England. The relative numbers of single finds of F is surprisingly large, if the die-estimates are to be believed: a mere 50-70 reverse dies of F.

Table 6.7. The varieties E+AF+B: F ratio for different regions.

	E+AF+B	:	F
Friesland	94	:	6
Big Rivers	62	:	38
Domburg/Westenshouwen	63	:	37
England	57	:	43

Variety F is absent in the Föhr hoard, and present in long die-linked chains in the Franeker hoard. We have interpreted this as a strong indication that Variety F was introduced as a new variety after the concealment of the Föhr hoard. Based on the inclusion of a coin of MILO, in early Carolingian style the date of deposit of the Föhr hoard has been estimated to be not earlier than 750.¹⁰¹ That remains somewhat controversial. From 754 onwards new, broader Carolingian pennies were brought into circulation. Such early Carolingian coins from Pepin the Short and Charles the Great struck at Dorestad were found there in hoards and as single finds. It is highly unlikely that in the Big Rivers region after 754 the production of sceattas was allowed to continue. They will have been swept away by the new Carolingian issues. It is thus inconceivable that Variety F was struck in the Big Rivers region. The only plausible conclusion left is that Variety F was produced in Friesland, as the design already suggested.

A minor, but nevertheless important stylistic detail is that the reverse border ornamentation of most of the coins of varieties E and F is strikingly similar, as is the general bold style of die-cutting. Could not only Variety F, but all tertiary-phase porcupines be Frisian? It is better to reserve judgment.

At Domburg and on the North Sea coast, meanwhile, Variety F remains plentiful, but it is curiously absent in Friesland, its homeland. The predominant use of Variety F must have been as an export coinage. That is curious, since it is

¹⁰¹ See p. 141.

clear that the outflows of porcupines to England markedly decreased at about the end of the Kloster Barthe phase.



Figure 6.1. Two early Carolingian deniers struck at Dorestad and found at Wijk-bij-Duurstede. The first one is from King Pepin the Short, minted between 754-768. The second one is issued in the name of Charles the Great (Charlemagne) between 768-793. Both coins show a battle-axe, the Carolingian *logo* of Dorestad (Van Gelder 1978).

In all likelihood the tertiary porcupines stayed in use in Friesland, and were allowed to circulate in the Big Rivers region at par with the newly introduced Carolingian pennies, at least for some time. Following the references in the capitularies to the requirements of purity, the silver content of the early Carolingian deniers seems to have been good.¹⁰²

If all this is true, it implies that Frankish/Carolingian influence was not yet strong enough in Friesland to prevent the continuation of the production of porcupines there. The Frankish conquest of *Frisia* is poorly documented. The annals mention that Frisian troops were defeated by a raid in 734. But we cannot be certain that that was a definitive conquest of the *terpen* region. The murder of Boniface at Dokkum (Fr) in 754 could have been followed by a gradual further annexation.¹⁰³

Summary

This final phase comprises the issue of the distinct varieties E, AF, and B, followed after *c.* 750 by Variety F. This last variety was very probably minted in Friesland, although the distribution of single finds does not support this attribution. The figures for the varieties E and B are mostly too small to be reliable, but they give no reason whatsoever to suppose that one of the varieties was minted in Friesland and the other in the Big Rivers region. We can only conclude that E and B are from the same region, but they could still be from different places, if those places were not far apart.

¹⁰² For pre-reform coins of Pepin and Charlemagne, see Metcalf & Merrick (1967), analyses O.39, 40, and 40bis, and Metcalf, Merrick & Hamblin (1968), analysis O.107bis.

¹⁰³ Mostert (2009).

6.4 Where were the imitative porcupines issued?

The mint-places of the primary-phase imitations

Porcupines and Series D are the most plentiful sceatta types in England, because they were exported from the Netherlands in payment for goods; and England ran a substantial balance-of-payments deficit with its trading partner. But once the sceattas of Series D and E accumulated and became plentiful, might it not have been the case that they were also imitated, locally, in England? What could be more natural? It is a question that should, in principle, be answerable on the basis of a detailed scheme of classification. Having established, say, twenty varieties, the percentages that each of the twenty makes up among the single finds create a profile for the Netherlands, and another for England. If there were a couple of glaring anomalies, where a variety is far more plentiful in England than in the Netherlands, that, surely, would be a candidate to be considered an English copy. Using that same argument apropos Series D, we concluded that the continental runic type sub-varieties 3c, 3h, and perhaps 4c seemed to be English, and that English imitations might amount to as much as *c.* 10 percent of Type 2c.¹⁰⁴ Of course one runs into the statistical limitations of small numbers, and it is prudent to take account of the full range of evidence – lateral reversal, inferior alloy, and so on. For general historical purposes, nevertheless, it is the figure of *c.* 10 percent that is of consequence. Can anything along the same lines be said about the porcupines?

There are a couple of ‘plumed bird’ coins in the Nice-Cimiez hoard (from very different dies) of variety M which pair the bird with the reverse type of Series G (Corpus 0147-0148). Could these Series E/G ‘mules’, which show distributional similarities with Series W, have originated in Hampshire? Note that they are necessarily of secondary date. Before jumping to the idea that they are local copies, made in the south of France, one should note that there is at least one other similar piece with a presumed English provenance (Corpus 0143). That leads into more wide-ranging considerations about the over-representation of Variety L in Nice-Cimiez (they make up 12.5 percent of the porcupine sceattas in this hoard) – and also in the Isle of Wight, from which there are three plumed bird finds of Variety L (Corpus 0140-0142). (Note also the Nice-Cimiez/ Winchester die-linked imitations, Corpus 0163-0164, plate 5).

¹⁰⁴ Op den Velde & Metcalf (2003) p. 88.



A Series G sceat



Corpus 0146



Corpus 0147 Nice-Cimiez hoard



Corpus 0148 Nice-Cimiez hoard

The ‘plumed bird’ type as a whole is more prominent within the total of primary porcupines in England than it is in the Netherlands, especially so south of the Thames (the Aston Rowant hoard, however, conforms more closely with the Dutch statistics). Ought one to examine the distributional evidence for an English attribution? After all, the bird is typologically the ‘odd man out’, and has no successor in the tertiary phase. The arguments are not straightforward, but we judge that there are too many Netherlands provenances for the idea to be taken seriously. And the prototype, a coin of the Carnutes, has been noted above (fig. 1.1, p. 1). Monetary flows across the Channel and across the North Sea were to a large extent in one direction: the single finds in the Netherlands of primary-phase sceattas that are definitely of English origin are very few. Domburg seems to be the most likely destination of counter-flows. The ‘plumed bird’ finds from there (5 specimens), and Maurik, and in Friesland from Wijnaldum (2 specimens) and Bolsward would already be enough to be anomalous, if they were English.

Add into the equation three or four die-duplicate specimens of the ‘plumed bird’ variety J, two of which are provenanced coming from Germany, from Aschaffenburg and from Wenigumstadt (both well into the valley of the Main) (Corpus 0049, 0051).¹⁰⁵ Were they local copies, or did they arrive in Germany together? The workmanship is very acceptable. We have included

¹⁰⁵ It is possible that the reports from the finds near Wenigumstadt and Aschaffenburg indicate the same coin.

this die-linked group as regular coins, but they could perhaps be imitative. Even if regular, they tell against the hypothesis of an English origin – as does another find, from Münzach (near Basel in Switzerland) of Variety L (Corpus 0102).



One of four die-duplicate 'plumed bird' coins Corpus 0048 – 0051

A sceat of Variety G4, Corpus 0541

Another big question, in the primary phase, is whether the 'AZO' Variety G4 (not present in Aston Rowant) is merely late in the phase, or whether it could be an issue, produced on a substantial scale, at what Rigold called an 'imitative' mint, and either late primary or very early secondary in date. The obverse : reverse die ratio (discussed in chapter 4.3) is highly unusual at *c.* 1 : 3, and this is almost certainly enough to preclude an attribution to the same workshop as G1-3. Also the weight standard is lower than that of G1-3. It is tempting to think that G4 is English, perhaps from East or Middle Anglia. There are, however, two finds, one from Remmerden and the other from Limmen (NH) (Corpus 0532 and 0538), and one more from the Big Rivers region of the related G5 (Corpus 0553). These make an attribution to Suffolk or Essex problematic.

The mint-places of the secondary-phase imitations

The many hundreds of single finds of secondary-phase porcupines from England are evidence of very substantial monetary inflows from the Netherlands, in effect a balance-of-trade deficit with England. One should ask oneself, however, whether this evidence, apparently so clear, might not overstate the case, if some of those finds were imitations manufactured in England. The answer is, that it cannot be a major problem. The Corpus shows that in the English find-material, there are so many die-links with coins found in the Netherlands that, taken together with other specimens which are stylistically similar although not die-linked, most of the imitations (which are numerous) are in fact imports from the Continent. English imitations are very unlikely to have made up more than a small fraction of the total of imitations found in England.

The secondary phase includes so many formal sub-varieties that the scope for questioning how many workshops were active is considerable. There is, for example, a sizeable group of imitations of primary Variety G (corpus 0591-0613) with a long, narrow snout,¹⁰⁶ of which the provenances are so heavily English that one cannot escape the question, again, whether they might not be from an English 'imitative' mint.



Corpus 0607

That would not be a strong argument if the coins were of primary date, but the variety is not represented in the Aston Rowant hoard.

Our scheme of classification, it should be understood, is into formal varieties. It leaves open questions concerning their sequence and their relationship to each other. The sub-varieties b, c, and d are a case in point. They would best be explored from their occurrence in hoards. A hoard from early in the secondary phase might, in principle, remove many uncertainties. The available hoards are mostly late, and the only exception, namely Hallum, does not contain enough porcupines to be very helpful.



sub-variety b
Corpus 0785



sub-variety c
Corpus 1067



sub-variety d
Corpus 1374

¹⁰⁶ See p. 32.

Those that there are, raise more questions than they answer. Even with as much evidence as is now arranged in the corpus, the problems are still delicate. As for the sub-varieties e, f, g, and h, where so many of the reverse dies are symmetrical if viewed as a diamond shape,¹⁰⁷ may that symmetry hold clues to the 'official' status or otherwise of the coins?



sub-variety e
Corpus 1692



sub-variety g
Corpus 1905



sub-variety h
Corpus 2047

Sub-variety i-k, with 457 specimens, is by far the largest repository of copies and imitations. Individual coins have been assigned to the sub-variety because of their simplified, untidy, or irregular and clumsily garbled designs. The hypothesis that they are imitative, that is to say not struck at any of the 'official' mints, is based simply on the inferior workmanship of their dies. It is a reasonable hypothesis, probably largely true, but it may not be completely true: inferior dies may sometimes have been used at the 'official' mints, e.g. late in the secondary phase. Sub-variety k is an omnibus classification, and as such it is subject to revision in the future. It may, for all we can say, contain both early and late coins within the secondary phase, and likewise coins minted both in the Netherlands and in England, and even in France, Germany or Scandinavia. It will probably be a fertile field for detailed numismatic research for many years to come, based on the recognition of small groups of stylistically related specimens. Meanwhile, statistical comparisons with other sub-varieties, such as b-d or e-h, will be so inexact as to be of limited use, because average figures for sub-variety k as a whole are liable to blur any distinctions which

¹⁰⁷ See p. 47.

might be apparent from smaller groups of specimens. One can think of several aspects of the material included in sub-variety k which would tend to demonstrate that it was or was not imitative, and which may well be worth exploring. High on the list would be information about the silver contents and minor constituents of the alloy of the coins. Since one could not generalize from the data in the same way as one can for the regular sub-groups, a large number of individual analyses would be needed, and that is something which we do not command. Secondly, and much more accessible, the weights of the coins might reveal that they were sub-standard and to that extent fraudulent – especially if a smaller group of stylistically related coins were consistently light in weight. The over-all position may be studied by comparing fig. 4.3, a and b (p. 74) with fig. 4.2, a and b (p. 72). The Kloster Barthe coins of sub-variety k include distinctly more specimens weighing less than 1.0 g than do the other sub-varieties in Kloster Barthe; and the non-Kloster Barthe coins of sub-variety k (excluding Domburg) are even lighter still. Part of the difference could be because the non-Kloster Barthe coins have suffered more from corrosion and leaching in the soil, but we do not think that that is the whole explanation (cf. fig. 4.1, for sub-variety c). Thirdly the extent of die-duplication in sub-variety k may be informative. If the survival-rate per reverse die (i.e. based on the estimated original total of reverse dies) is significantly lower than it is for sub-varieties b-d and e-h, that would strongly suggest that the average output per die was lower in k – a hint of unofficial production. Fourthly, the same exercise of statistical estimation, applied separately to obverses and reverses, might reveal a significant difference in the obverse : reverse die-ratio, namely 1 : 1, compared with a higher figure, approaching 1 : 2, at the ‘official’ mints – again, a hint of unofficial production. Fifthly, any regional concentrations of sub-variety k, or of parts of k, would be of interest. Finally, the occurrence of specimens of sub-variety k in the known hoards may be useful evidence, especially in a relatively early hoard, such as Hallum, or in any hoards with a clear regional origin. If merchants obtained batches of new coins direct from the (‘official’) moneyers, as long runs of duplicated specimens sometimes suggest, one might be on the look-out for a lower ratio in sub-variety k between hoard-coins and single finds. In fact, there are no fewer than 94 specimens of k in Kloster Barthe.

The lower average weight distribution of sub-varieties i-k, might suggest that some of these imitations were minted in the south. Conversely, many of the reverse designs look as though they might be derivative from sub-varieties e-h, and it would be easy to imagine that the coins originated in the north. The single finds tabulated in table 6.2 (p. 150), however, show very clearly that sub-varieties i-k, for whatever reason, is relatively more plentiful at Domburg than

elsewhere (86 out of 119, or 75%, compared with 29 out of 54, or 54%, in Friesland). Many of these coins could, of course, have reached Domburg from Friesland.

The frequency of sub-variety k (457 specimens, out of 2,021 secondary-phase coins, or *c.* 23 percent) is high. If a large proportion of these coins are indeed imitative, as their style suggests, it would seem that copying was a major aspect of the monetary history of the secondary phase porcupines (in quite sharp contrast with the primary and tertiary phases). How far the copying happened within territory under Merovingian control, and how far it was concentrated beyond the frontiers, is obviously a crucial question. It would be natural to guess that copying of the (foreign) porcupine design would have escaped punishment in England much more easily than in the Netherlands. The question lends itself well to statistical exploration. On the basis that the flow was very largely from the Netherlands to England, and not vice versa, the ratio of single finds b-d, e-h : k in England and in the Netherlands respectively is clearly an important statistic for monetary history. Figures based only on stray losses suggest that sub-variety k made up more than *c.* 23 percent of the currency as a whole; the over-all figures from the corpus are dominated by hoard material, in which k is less plentiful. The ratios are: for Friesland, 100 : 18, for the Big Rivers region, 100 : 48, for Domburg, 100 : 68, and for England, 100 : 48. These are just raw figures, but they imply that all the imitations found in England could have arrived already mixed with 'official' coins, from the Big Rivers region. The finger points clearly, if unexpectedly, to Domburg as the source of many imitations. But the distinctly higher ratio at Domburg allows us to say that the relatively large number of English single finds of sub-varieties k does not necessarily suggest that the imitative category includes numerous copies minted in England: so far as the statistics are concerned, they may be simply what was imported from Domburg. In order to confirm that perspective, one would need to compare the Domburg and the English assemblages in much more detail. That exercise might well reveal small stylistic groups not represented at Domburg, which could be English, but we very much doubt whether they would change the over-all picture significantly. The date-range of k may be rather wider than that of a-h.

Contradictory evidence will be mentioned below (p. 197), namely that the imitative sub-varieties i-k are unexpectedly more numerous in the north of England, compared with the distribution of sub-varieties b-h. And England, as the major foreign destination of porcupines, is surely the most likely place to expect to find copying. But candidates for local minting, in the form of little groups of stylistically related coins, have not until now been recognized among the single finds from northern England. The basic test of Englishness is

a distributional contrast, namely that neither the same dies, nor very similar dies, are represented among finds from the Netherlands. The picture will become clearer as the data-base grows, permitting new comparisons and detailed numismatic research. But to judge from the evidence currently available, we very much doubt whether local imitations, i.e. secondary porcupines minted in England, amounted to more than five percent of the single finds from England. Even so, any that can be securely identified are of potential interest as markers, revealing the extent to which the porcupines were carried between regions in England (and also further afield); and for numismatists they are intriguing in themselves.

The recognition of English imitations

How can one recognize an imitation as English? As explained above, if a minor variety is found almost exclusively in England, and not in the Netherlands, there will be a *prima-facie* case that it is of English origin. Some English coins may have been carried back to the Netherlands, but that will have been very much against the flow. This argument (which does not apply in the same way to primary-phase porcupines, because so many of them were exported) is statistical in character: its probability depends on having a sufficient number of provenanced specimens, and a cut-and-dried contrast. In a small group, it only takes the addition of two or three finds from France, or from Scandinavia, to cast serious doubt on an English attribution. While the numbers remain very small, the chances of the patterns being misleading are, as we shall see, high. If the variety is scarce, the statistical level of confidence will, unfortunately, remain ambivalent. But the argument depends also on considerations of style: one has to identify a group of unusual specimens arguably by the same hand, and preferably showing other signs of imitation, before one can apply a statistical test. If the style is eccentric enough to be easily recognized (by us, if not at the time), and its boundaries drawn, so much the better. Metrology will then be another supporting argument (the imitations may well be on the light side) and, in an ideal world, the same would be true of chemical analyses of the fineness and minor constituents of the alloy. The practical problem usually lies in drawing the boundaries of the group, although there will be a presumption against 'imitations of imitations': the chances of an opportunistic forger choosing a very scarce variety to copy will surely have been small.

Although one must normally base one's whole argument on contrasting patterns of provenance (e.g. a stylistic group is found in England but not in the Netherlands), very occasionally a specimen will announce itself as an English imitation. A completely unexpected and historically fascinating coin found at

Twyford, Hampshire (Corpus 1499) incorporates a miniature copy of the Hamwic bird, as seen on Series H, Type 39, into the sigla in the reverse margin.



Corpus 1499, The Twyford find, with a miniature Hamwic bird in the margin.

The die-cutter has gone to a lot of trouble to create the tiny bird. It is almost certainly produced from a single punch. We have given careful thought to the possibility that the bird could have been added to an existing porcupine, as a counter-mark. But there is no technical evidence that that it is so, e.g. flattening on the other side of the flan, or depression of the background around the bird, below the general level of the surface. The bird occupies its own space in the reverse design; it is not superimposed on any other element. Moreover, style supports the view that the bird is integral: the various elements within the standard are erratically positioned, and the other sigla in the margin are non-standard. In other words, the coin looks like an imitation. Nevertheless, the technical quality of the die-cutting is assured. On the obverse, within the curve, there is a line at right angles, which is unusual; and below or to the left of that, we see a crosslet, aligned differently from the line. Below, and partly off the flan, are (?) XII and a large annulet. All these details allow us to recognize other coins by the same die-cutter.

The Twyford porcupine was not a one-off. It is virtually certain that the same moneyer used other dies too (without the bird), and produced tens of thousands of coins. We can recognize his hand. The bird may of course merely be invisible – off the flan, as is so often the case. Corpus 1500, unprovenanced but from an old English collection (Ashmolean 226, 69% ‘silver’) has an obverse which is from the same die.



Corpus 1500, from an old English collection

It is a useful link, because its reverse has a different pattern within the standard. Two coins from England and none from the Netherlands is by no means large enough a sample to be statistically significant, but the little bird in the margin is compelling.

What was the significance of the Hamwic bird on the Twyford find? Taking into account the care and trouble taken in the production of the coin, it seems most unlikely that it was struck in the Netherlands. Series H was not familiar there. We would be reluctant, also, to envisage that it was struck actually in Hamwic concurrently with Series H, but it may well have been produced somewhere close by, such as at the mouth of the River Hamble (from where travellers are known to have taken ship for the Continent), or, closer still, at Bitterne, the Roman shore-fort of Clausentum, on the opposite bank of the River Itchen, and facing the waterfront of Hamwic. The fact that the coin was found a mere 15 km from Southampton, on the outskirts of Winchester, goes a long way to strengthen the hypothesis of a local origin. Series W, too, belongs somewhere not very far from Hamwic but not from the *wic* itself.

A group of porcupine imitations from northern France?

It is highly unusual for the English origin of a secondary porcupine to be so clear-cut, on the basis of iconographical indications, plus provenances. Another nice example, which relies on a very unusual style, plus provenances, but not iconography, is much less secure, and it can serve as a warning. That the coins are imitative is not in question: the weight-distribution of this group of specimens is compact, and distinctly on the low side. The accuracy of the published silver contents, which are also low, is unfortunately open to some doubt. At one stage, when six out of ten specimens had firm English provenances, the little stylistic group seemed to be a strong candidate for a north-of-England attribution. But now, with more than 20 specimens on record (Corpus 2354-2374, 2378-2379), the finds are widely dispersed, and the arguments have swung around. The source of the coins still appears to lie outside the Netherlands, but the most likely attribution now seems to be northern France. The coins have very distinctive patterns within the standard on the reverse. That is a good argument that the coins are imitative, but it does not make them English. The obverse, too, is characteristic: one can imagine that the ‘snout’ of the porcupine, with a dot in the middle of the space, is a cartoon-like animal’s mask. All these details can be seen clearly on an old find from Rouen (Corpus 2361), and also from one of the finds from Yorkshire (Corpus 2362). Notice, to the lower left of the snout, an unseriffed or lightly dotted line at a slight angle; also, the large number of quills (about 20?).



Corpus 2361 Rouen (France)



Corpus 2362 Malton (NRY)

On the reverse, the two halves of the pattern in the standard match each other, but not as a simple mirror-image (like ToT- / \). One half is rotated through 180 degrees, and then placed back-to-back with the other half. Notice that the square of the standard is outlined by unusually numerous, tightly-packed dots. There need be no doubt that the various specimens are by the same die-cutter, who felt free to vary the formal details of the reverse design at whim. Because the list includes no instances of die-duplication, we must assume that there were originally a good many more pairs of dies, and that there was, in effect, a small workshop and exchange somewhere, striking these (to our eyes) instantly recognizable porcupines. If the moneyer produced over a hundred thousand coins, his business was certainly public knowledge. Where was he based? Two finds from Yorkshire (Corpus 2358 and 2362) and another from Bawsey (Nf) (Corpus 2363) are quite tightly clustered, and might tempt one to think of north-eastern England.



Corpus 2358 Sledmere (ERY)



Corpus 2363 Bawsey (Nf)



Corpus 2370 Namur (Belgium)

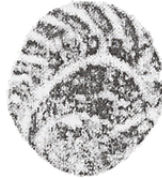
That may, however, be misleading. Two finds from France, Rouen (Corpus 2361, above) and Cambrai (Corpus 2360, below), are two against three, but

one should accord them heavier weighting, because there are so few secondary porcupines from northern France or Belgium. The two make up a significantly higher proportion of the total. One can imagine merchants travelling from there to the productive site on the Yorkshire Wolds, possibly to buy wool; the converse makes no obvious sense. Add another find from Namur (Corpus 2370, of similar design, but apparently by a different hand) and one from London (Corpus 2355, below), and a French attribution becomes more persuasive. Perhaps the coins were struck for use in trade with regions where porcupines were very familiar.

Drawing a line round the die-cutter's *oeuvre* is very difficult, because he obviously felt free to use quite different designs – copying, for example, the Friesland obverse of sub-varieties e/h. The tightly dotted outline of the standard remains the most useful diagnostic detail, and we would be inclined to exclude coins which very obviously do not conform in that detail, e.g. the Namur find (Corpus 2370), Domburg 591 (Corpus 2368) and a related Lockett coin (Corpus 2367), and a die-duplicate pair, from the Hallum hoard and from Friesland (Corpus 2373 and 2374).



Corpus 2368, Domburg



Corpus 2367, old English collection



Corpus 2373, Hallum hoard



Corpus 2369, English

Arranging the coins into a possible chronological order is speculative, but if Corpus 2369, with a regular ToT- / \ reverse, belongs in the group, it should doubtless stand at the beginning, before the die-cutter began to be more idiosyncratic. The obverses of Corpus 2369, 2363, and 2362 illustrate the early development of his work.



Corpus 2360, Cambrai (France)

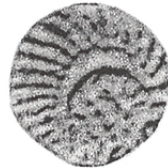


Corpus 2359, Föhr hoard

Corpus 2363 stands closer to the prototype, with normally-shaped letters T. Coins with three dots in the snout, instead of just one, are recorded from Cambrai and from the Föhr hoard. There should be no doubt that these two coins are from the same hand as each other. The Sledmere coin (Corpus 2358, p. 170) is, at worst, a close copy. Likewise, the London find (Corpus 2355) and Domburg 581 (Corpus 2357) are from similar pairs of dies; and Corpus 2354 adds to the observed variability. They lack the snout on the obverse, but have most of the other characteristic features, including the tightly-dotted square. Could these be 'imitations of imitations'? One should hesitate to multiply workshops without good reason.



Corpus 2354, English find?



Corpus 2355, London excavations



Corpus 2357, Domburg



Corpus 2366, Föhr hoard

Finally, Corpus 2366 (Föhr hoard 83) has affinities with this variety, but one hesitates over whether to include it in the group. Like Corpus 2359 it seems to have relatively high tin contents.

Many ambiguities remain. Even when more than twenty related specimens are available for consideration, conclusions remain open to debate, especially because the coins were carried far and wide. Recognizing imitative coins by

the unconscious mannerisms of the die-cutter, and constructing little groups, could occupy numismatists for many years to come. This kind of research is not mere antiquarianism, because imitations clearly made up a significant proportion of all the secondary porcupines, and the implications for monetary history add much more than a footnote. Even the possibility of expatriate minting, by colonies of Frisian merchants dwelling overseas, and wishing, for whatever reason, to have bullion converted into their national coin type, cannot be entirely excluded.

Summary

In a previous study we concluded that Series D sub-varieties 3c, 3h, and perhaps 4c seemed to be English, and that English imitations might amount to as much as *c.* 10 percent of Type 2c.¹⁰⁸ Anything along the same lines is difficult to say about the porcupines.

The large group of imitative porcupine sub-varieties is intermediate in the weight statistics. Most of them were probably minted in the region of the main mints. England, as the major foreign destination of the porcupines, is the most likely place to expect copying. Distributional evidence suggests that local imitations of secondary phase porcupines are more numerous in the north of England. However, English imitations are unlikely to have made up more than five percent of the secondary porcupine series.

In this chapter two minor varieties are discussed which are possibly imitations struck outside the Netherlands. For one the iconography points to England. Given the distribution of finds the other group could have been issued in northern France.

¹⁰⁸ Op den Velde & Metcalf (2003) p. 88.

7. REGIONAL CIRCULATION AND THE MONETARY CONTEXT OF SERIES E

7.1 Regional circulation within the Netherlands: the interplay of primary-phase porcupines and Series D

Introduction

The runic sceattas of Series D and the four primary-phase varieties of porcupines were contemporary issues. Both were minted within the years *c.* 690 - *c.* 715. They circulated alongside each other, doubtless at par, throughout the Netherlands, and also throughout England, and in smaller quantities elsewhere. Both series were minted in the Netherlands – but where in the Netherlands? The two problems are interconnected. Among the secondary phase porcupines it is possible to distinguish two groups and to demonstrate, from the residual localization of single finds, that one group is northern in origin and the other southern (chapter 6.2). For that exercise, hoards were judged not to be suitable source-material, and the same is true in the primary phase. Can we use a similar argument to demonstrate that in the primary phase, Series D and E originated in different regions of the Netherlands? That is a difficult task, because there are relatively few single finds of primary-phase porcupines in the Netherlands, except at Domburg. The sample size is too small to support a detailed regional analysis. Moreover, the D : E ratio is, we think, deceptive for that analysis. Series D far outnumbers primary E at Domburg. That fact contributed to the previously published idea that D was minted at Domburg, which we would now wish to repudiate. The inter-regional balance of payments was what determined the composition of the currency at Domburg – and in Friesland, and in England. If Series D is dominant over primary E at Domburg (79 : 21) it is even more so in Friesland, where the primary porcupines are very few (95 : 5).

The geographical distribution of single finds of Series D and primary Series E

There are 481 provenanced single finds of Series D and primary E from the Netherlands, catalogued in this study and in our previous monograph.¹⁰⁹ Of these 408, or 85 percent, are of Series D, and only 73 (15 percent) are of the four early

¹⁰⁹ Op den Velde & Metcalf (2003). The total excludes a certain number of finds stated to have been found in ‘the Netherlands’, but not assigned to a province. Obviously they cannot contribute to this particular discussion of Friesland versus the Big Rivers region.

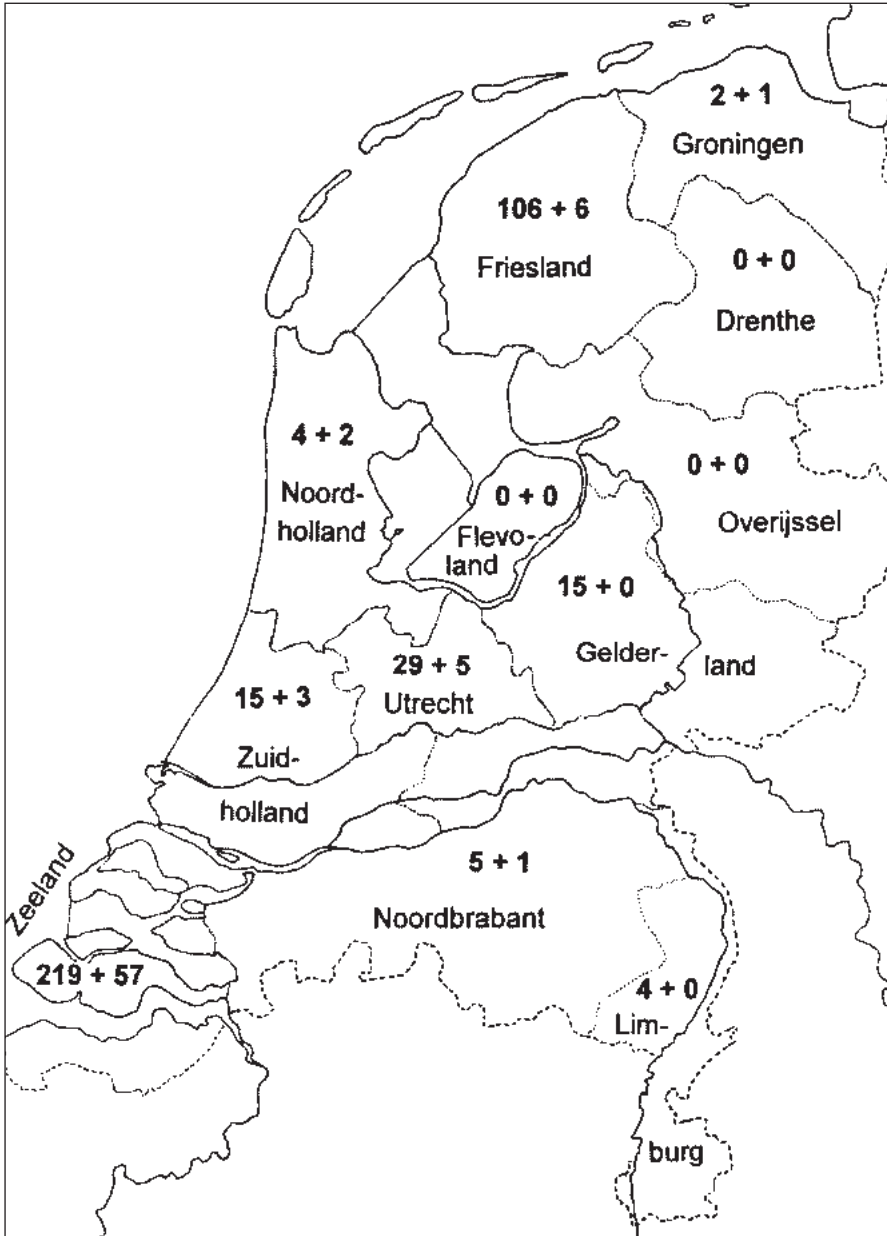


Figure 7.1. Numbers of single finds of Series D and primary-phase Series E reported from the various provinces of the Netherlands.

Sources: the Corpus, and for Series D similarly in *JMP* 90 (2003).

types of Series E. The 481 single finds are very unevenly distributed across the Netherlands. A glance at the map (fig. 7.1) with totals (D plus primary E) for each modern province shows how strongly the early stages of the sceatta currency were concentrated along the North Sea coast.

No fewer than 276 are from Domburg and 112 from the *terpen* region of western Friesland. From Katwijk a/d Rijn there are 22 (but there are only two from Westenschouwen, where the losses begin later). From the Big Rivers region there are approximately 50 finds, mostly from the course of the Rhine, or nearby. But from the rest of the Netherlands, each province has yielded only a tiny number of finds of D and primary-phase E. Groningen, Drenthe, Overijssel, and Flevoland are empty regions, and there is a clear zone of separation between Friesland and the Big Rivers region.

The locations of the mints

The only plausible locations for mints are in regions where single finds are plentiful, namely Domburg, western Friesland, perhaps the Big Rivers region, e.g. Dorestad or Utrecht, and just possibly Katwijk. The numbers of single finds of D and primary E in Friesland are 106 to 6. That in itself is enough effectively to rule out any likelihood that the primary porcupines were minted in the *terpen* region. In Zeeland (i.e. Domburg) the numbers are 219 to 57: Series D still accounts for 79 percent of the two competing series (compared with 95 percent in Friesland). If the porcupines were minted at Domburg, should one not expect them to provide distinctly more than 21 percent of the local currency? At the *wic* of Hamwic (Southampton), for example, the locally-minted Series H accounts for half the finds. Another hypothesis might be that Series D was minted both in the *terpen* region and also at Domburg or in the Big Rivers region. This is at odds with the ‘political’ hypothesis, which sees the two designs as Frisian and Frankish respectively. The best that one could do by way of reconciliation would be to say that, when the river Rhine was the political frontier, there might have been a mint-place on the left bank striking porcupines, and another on the north bank or a little way further north striking runic sceattas. In fact the Zanderij site at Katwijk, dominated by Series D, is on the left bank. Devising a complicated hypothesis in the face of difficulty is not scientifically recommended, but if Series D had been minted both in Friesland and in the south, it would certainly be distinguishable by little details of their style.¹¹⁰ In our

¹¹⁰ In late Anglo-Saxon England, dies were supplied by die-cutting centers, each of which sent dies (of identical style) out to a number of mints. We surely do not need to envisage anything like that in the seventh-century Netherlands.

monograph on Series D we suggested, on the basis of residual localization (and style), that sub-variety 4a, and also much of sub-variety 2c, might belong to the Big Rivers region.¹¹¹ We now wish to reconsider that conclusion, although this may not be the place to do so in detail. It is not difficult to test (and to falsify) the proposition that different varieties of Series D were minted in north and south respectively. All one has to do is to draw histograms showing the percentages of all the sub-varieties, among the 106 finds from Friesland and the 219 from Domburg. All the same sub-varieties are represented in each histogram, and there are no obvious or dramatic differences in the heights of the columns, beyond what might be expected from sampling variation.¹¹² No common variety of Series D is plentiful at Domburg, but scarce in Friesland. It is prudent to remember that some of the sub-varieties, e.g. 3a, are not very coherent. There may be within them some scarce groups, certainly by other die-cutters, which should really have been separated out.¹¹³ But the operative word is scarce. These few coins do not control the pattern. Although the scheme of classification of Series D may not be perfect, it is quite good enough to sustain this argument. We have to believe that the great bulk of the Domburg finds of Series D originated in Friesland. Even if the *wic* had its own moneyers, striking substantial quantities of early porcupines, the currency at Domburg was dominated by the even greater volume of sceattas of Series D.

This unexpected balance-of-payments situation was to be diametrically reversed in the secondary phase, when the porcupines minted in Domburg/the Big Rivers region greatly outnumbered those minted in Friesland, and came to dominate the currency in the *terpen* region (see below). The evidence for that follows exactly the same lines: die-estimation, and the residual localization of single finds. It seems that Frankish political control was followed by a transfer of commercial activity from Friesland to the Rhine and southwards.

We can in principle use the same comparative method to explore the possibility that one or more of the four primary varieties of porcupines were struck elsewhere than in the south, i.e. at Domburg or in the Big Rivers region. Domburg is necessarily our yardstick, because of the large sample that is available: we see ‘plumed bird’ coins (9), VICO (16), G (25), and D (6) (these sub-totals include specimens that have been catalogued as imitative). In the *terpen* region, and in other provinces of the Netherlands, the numbers are unfortunately too small to be statistically worth-while. At least they offer no

¹¹¹ Op den Velde & Metcalf (2003) p. 96.

¹¹² Op den Velde & Metcalf (2003) at p. 85 and p. 89.

¹¹³ Examine in Op den Velde & Metcalf (2003) the shape of the head, and also the unusual runes on pl. 38, 408-409, and 39, 410. Likewise, the neat, square seriffing on pl. 39, 427-429 and pl. 37, 337.

hints that any of the four varieties was relatively more plentiful in the north. Statistically useful corroboration comes from the English single finds: ‘plumed bird’ (83), VICO (74), G (147), and D (35). (See the next section.) The relatively large total for the ‘plumed bird’ variety raises the question whether there was some particular context in which it was carried to England, or whether it could even, conceivably, be English – a forerunner, perhaps, of English sceatta types showing birds, such as Series H, Type 49 (several ‘plumed bird’ porcupines have been found at Hamwic). If that were so, one might reasonably expect that the earliest sub-variety, J, would be particularly plentiful in England: it is not.

The Aston Rowant hoard underlines the anomaly: ‘plumed bird’ (5), VICO (22), G (19), D (11). The ratio of D : primary E in the hoard, incidentally, is 197 : 63. Thus Series E makes up 24 percent, which is close enough to the 21 percent at Domburg to encourage the idea that the owner of the hoard, or at least the original owner of the coins of Series D and E, was a merchant who had set out from there. It is a long way short of the 53 percent seen among the English single finds. Note, however, that the Aston Rowant hoard reflects the composition of the currency at a particular moment, whereas the 53 percent is an average over time.

Any idea that the ‘plumed bird’ coins might be English is made additionally difficult by their occurrence in the Netherlands and also elsewhere on the Continent. It would be necessary to identify a region in England where they were minted (and where, probably, they were more plentiful). It would also be necessary to postulate a counter-flow of the variety, from England to Domburg (but not to Friesland!), against the trend of the very substantial flows of primary-phase porcupines northwards across the North Sea. The most that one could contemplate is that sub-variety L, with annulets on the reverse (absent from Aston Rowant, and almost certainly late) is an English imitative variety. But that has little to commend it.

The ‘plumed bird’ porcupines remain puzzling. If a merchant set out from Domburg with a purseful of die-duplicates of them, and made a large purchase in some particular region of England, it might be the case that the coins he spent tended to remain in that region. There is just a hint, in the form of the frequency of die-linked single finds from not too far apart, that that may have happened.¹¹⁴ It is difficult to quantify, but it is something to bear in mind.

¹¹⁴ In favour of this hypothesis, Corpus nos. 0053-0054, 0058-0059, 0064-0065, 0069-0070, 0076-0078, 0084 and 0086; against, 0025 and 0027.

The next point to observe is that the D : primary E ratio in Utrecht province is 29 : 5. The finds are mostly from the south of the province, not too far from the Rhine. The numbers are small, but such as they are, they indicate that the porcupines, at 15 percent, are relatively less plentiful than at Domburg. That suggests that the composition of the currency at Domburg is unlikely to have arisen simply as a result of inflows of coins minted in the Big Rivers region. Moreover, the 29 single finds of Series D from Utrecht province are dominated by finds from Wijk-bij-Duurstede (13) and De Meern (6), whereas none of the five porcupines is from either of those sites. Four of the five primary porcupines are of Variety G, as is also the one from Noordbrabant (Corpus 0511).

The really big anomaly in the statistics that we are considering is that Type 8 (p. 275) contributes no fewer than 91 specimens to the total of 300 English single finds of Series D. There are a good many die-links between English and Dutch single finds, and we saw no sign of an 'English' style among the coins of Type 8, such as might suggest copying in England as the explanation for the total of 91. There would probably need to be some regional localization of Type 8 in England, coupled with a distinctive style, for an English attribution to stand up. If there is a tendency for Type 8 to be from northerly regions of England, that might be because it originated in Friesland. Type 8 is very probably the earliest part of Series D, and we have to believe that an unusually high proportion of the issue was carried to England in the course of the North Sea trade, as compared with the rest of Series D. The type remained in circulation until the end of the primary phase (as the Aston Rowant hoard shows), and the 91 specimens will not all have been lost at an early stage, or even necessarily carried to England at an early stage. But the statistics make it likely that many, or even most of them were.

Having said that, the distribution-pattern of Type 8 in the Netherlands is very tight. From Friesland there are seven specimens, of which three are from Wijnaldum, one is from near-by Midlum, another from Arum (again, not far away) and two are vaguely from 'Friesland'. At Domburg there are 16 specimens, but that should be understood as a function of the large total of finds from the *wic*. Elsewhere there is just one single find from Remmerden, and one from Hoek van Holland. The contrast with the wide scatter of finds from England could hardly be sharper. The coins of Type 8 were minted in order to be exported. From the *terpen* area they were carried either to Domburg, or perhaps directly to England. Moreover there is a contrast with the distribution of Type 2c in Friesland, which is more widely scattered there than Type 8 is. Surely all this suggests that the mint-place of Type 8 was Wijnaldum? – and,

once established, it may have continued as the mint-place for Type 2c, and subsequently of many of the secondary porcupines.

The political context during the primary phase

In the primary phase, the sceattas of Series D and E are both found throughout the Netherlands, but they are by no means evenly scattered. Finds are far more numerous in the *wics* of the North Sea coastlands.

The residual localization of single finds shows that the primary-phase porcupines were relatively most plentiful at Domburg, by a good margin. That was, very possibly, where they were minted, while Series D was minted in Friesland, possibly at Wijnaldum. From a commercial point of view each series was the distinctive design belonging to a *wic* participating in the North Sea trade. At the same time, the porcupines were a Frankish coinage, while the runic sceattas were politically Frisian. The representation of primary-phase Series E at Domburg may seem not very high if that was its mint-place (only 21 percent of D plus E), but no alternative explanation stands up to analysis. The ratio of D : E in the Aston Rowant hoard matches that at Domburg quite closely, whereas the English single finds show a more evenly balanced representation of porcupines against Series D.

Given that there are some small but interesting differences among the four primary varieties of porcupines as regards their metrology and alloy composition, one should not altogether yet rule out the possibility that one or two of them could have been minted somewhere along the course of the lower Rhine – where however the D : E ratio is lower, at only 12-15 percent. The finds are too few to permit reliable statistical comparisons. But in any case the primary porcupines were minted in the south of the Netherlands, definitely not in Friesland.

Series D certainly came to an end with the end of the primary phase, and thereafter the secondary porcupines were minted in both Friesland and the south. That probably reflects the Frankish conquest of Frisia: the porcupine design had political connotations for its users.

Another hypothesis, focussing more on the commercial context, might refer to the very heavy concentration of single finds, of both Series D and E, at the coastal *wics* of Domburg, Katwijk, and Wijnaldum. In England similarly it became normal for minting to be concentrated in coastal *wics*, and the design of a particular English sceatta type can often be seen as the ‘logo’ of the *wic*. The design belonged to the *wic*, and maintaining it contributed to commercial confidence. The statistics of the Domburg finds do not reveal, however, that primary porcupines dominated the currency there, in the same way that the English Series H, for example, was the most plentiful type at Hamwic.

It seems clear that the commercial outreach of the various *wics* around the North Sea and Channel coasts created a complicated pattern of sceatta finds, which could be reconciled with the location of minting in various ways. It is necessary to consider whether, even in the relatively uncomplicated primary phase, porcupines were struck in more than one place. That calls for a more detailed comparative analysis of the statistics, focussing down as far as sample size permits, in order to see for example whether one or other of the four primary varieties of porcupines might be relatively more plentiful in Friesland than at Domburg or in the Big Rivers region. Unfortunately, the numbers of stray finds of them from the Netherlands are much too small to allow such an analysis at present. The same question arises in relation to the English finds.

Summary

Series D belongs essentially to the *terpen* region of western Friesland, while the primary Series E appears to belong to the *wic* of Domburg, with strong links into the hinterland of the Big Rivers region, and further up the Rhine. This claim so far is purely empirical or theory-free, based merely on the geographical pattern created by the mapping of single finds of Series D and E, and on the statistics from the twelve provinces of the Netherlands.¹¹⁵

Our hypothesis is that the completely different designs of Series D and E were used because they were minted in regions under different political control. Series D was Frisian, E was Frankish. When Frankish power was victorious in Frisia, with the subduing of Radbod and then his death, Series D was suppressed, and the ‘territory’ of the porcupine design was extended, in the secondary phase, to include the north. Where runic sceattas had been minted, the work of the moneyers continued, but they now struck porcupines. The historical sources scarcely allow us to say whether Frankish political control remained solid in the north, but the change of coin type was permanent.

7.2 Porcupines in England: the regional occurrence of coins from the two minting regions

Porcupines were accepted and circulated freely throughout England, alongside Series D and alongside the many other series of sceattas minted in England. Porcupines were indeed the single most plentiful sceatta series in the English

¹¹⁵ The twelfth province, Flevoland, was created in the 1960s by reclaiming parts of the IJsselmeer (the former Zuiderzee).

currency – but that does not make their origin English. They were used to balance a trading deficit with England. The Netherlands was a net importer of English goods, on some considerable scale. Regression analysis has been used to show that, if English single finds are mapped as a percentage of all the sceatta types found locally, it is clear that porcupines were carried by merchants to certain districts of England – e.g. the middle Thames valley, or the Warwickshire Avon valley – to a significantly greater extent than elsewhere. No doubt the merchants were buying a range of goods, but the landscapes where porcupines are concentrated most heavily suggest that wool may have headed the list. Fig. 7.2 shows the percentages for the primary phase.

This foreign trade is the background for a dominant tendency in the distribution of the porcupines, but their use in England, like the uses of other sceatta types, was multifarious. It is well established that, in the primary phase especially, English sceattas were carried about over long distances, from mint-places even as far apart as Wessex and Northumbria, but particularly from mints in the south-east, becoming widely dispersed and mixed as to type. Once the porcupines arriving in England had been spent, they no doubt entered this rapid monetary circulation without distinction.

Even so, one should be on the look-out for any little hints, perhaps especially on the fringes of the monetized regions of England, that coins had remained in use locally. The pattern of single finds which we see may still preserve residually some interesting local details, even if it reflects (as it doubtless does) the geographical end-result of the rapid circulation and of the use of coins for various purposes, before they were accidentally lost. It follows that, if porcupines arrived in England in the hands of merchants with a particular destination in view, the original degree of localization of their spending will by now be blurred. It will originally have been more pronounced than what we see, for example, in fig. 7.2. The broad picture should be our starting-point.

Of the various questions about monetary circulation which now arise, potentially the most illuminating, and also the most comprehensive in relation to the evidence as a whole, is this: are there any statistical indications that the porcupines minted in the Big Rivers region, and those minted in Friesland, are concentrated differently in the various English regions? Did two separate streams of money enter England? The broad answer is no. Quite apart from the blurring effects of circulation within England, any such tendency will probably be slight, because the coins of the two minting regions were in any case already mixed before they left the Netherlands. Money carried to England by ships sailing out of Domburg, for example, would already include issues from Friesland. The over-all statistics reveal the broad picture; there could of course also have been lesser tendencies, which are submerged by the main trend.

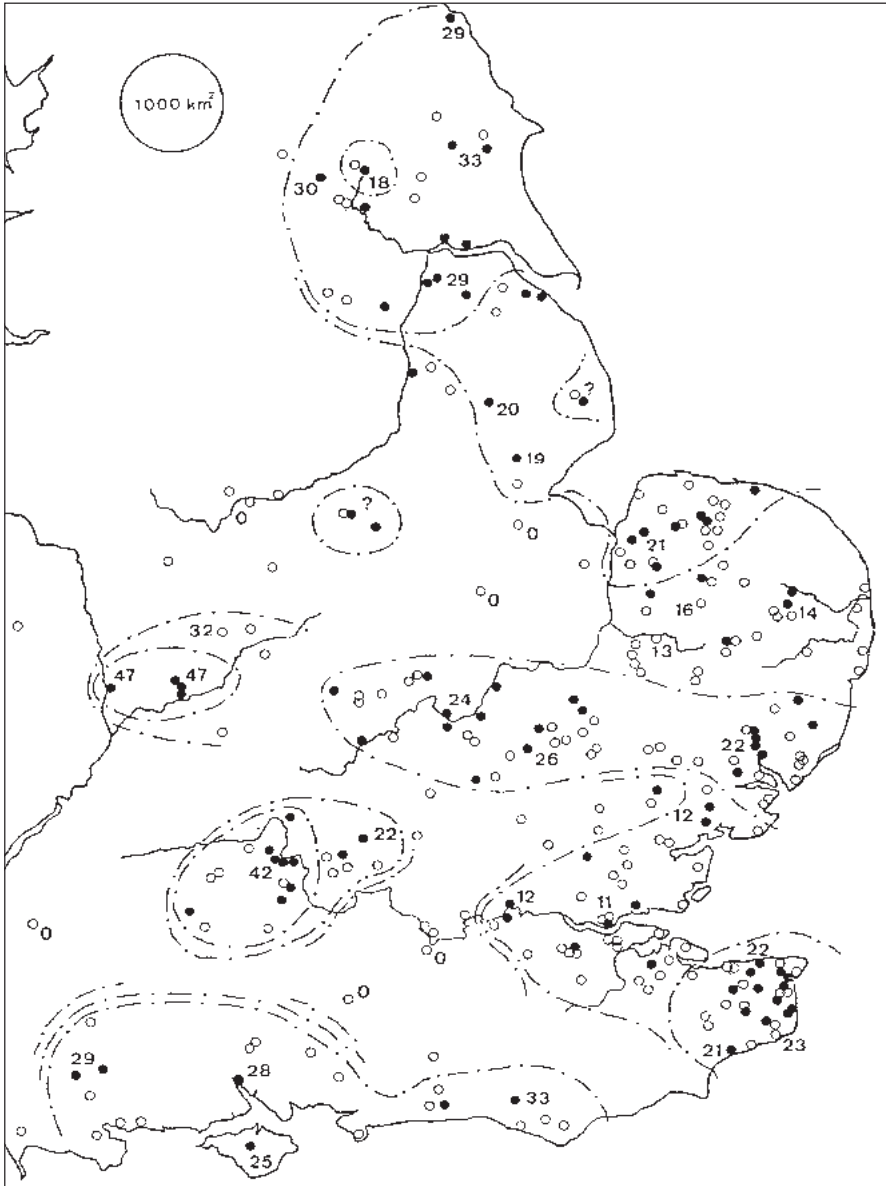


Figure 7.2. Regression analysis of single finds of primary porcupine sceattas, as a proportion of all primary sceattas. The contours define regions within which the proportion was in a given range. Thus, in the Thames estuary and at London, the percentage is c. 11-12, whereas in east-Kent it is higher, at just over 20 percent. The size of the gathering circle is shown in the upper left corner of the map.

In the secondary and tertiary phases, monetary circulation in England became more regionally restricted, and that will presumably have included the circulation of porcupines. It will be best, therefore, to discuss the phases separately.

The primary phase

For the primary phase, Series D was minted in Friesland (as we have argued in the preceding section), and Series E in Domburg and/or the Big Rivers region. The expected norm of single finds of D and E might lie somewhere between 95 : 5, which is what the single finds from Friesland show, and 86 : 14, a corresponding figure from the Big Rivers region (Utrecht and Gelderland provinces), or even 79 : 21, which is the well-attested ratio for Domburg. Not so, the ratio in England is 47 : 53.

The 547 provenanced single finds of Series D and primary Series E¹¹⁶ are rather evenly distributed over the various English regions (table 7.1 + fig. 7.4). The primary-phase porcupines and the continental runic sceattas of Types 2c and 8 together made up roughly half of the English currency in the primary phase.

The difference is very clear-cut, and there should be not the slightest doubt that it is statistically significant. How can such a dramatic difference have arisen? Could the minting (and export) of porcupines have begun significantly later than that of Series D? The ratio in England might then be a composite figure, an average for two phases. Otherwise one would have to say that porcupines were imported preferentially, and even in the Big Rivers region, merchants planning a visit must have sorted out porcupines to carry with them, very often. It raises difficult questions for the monetary historian, about how the porcupines were used, also in the Netherlands, and these questions are close to the heart of the problem of understanding the character and scale of the trade between the two countries, in the period *c.* 690 to *c.* 715.

There was, obviously, a very substantial balance-of-trade outflow of money from the Netherlands to England, in which porcupines played a much greater-than-expected part *vis-à-vis* Series D. If porcupines made up only *c.* 5 percent of the currency in Friesland, that surely tells us that the bulk of the trade was out of the Rhine mouths area. Porcupines simply were not available in Friesland

¹¹⁶ If we include English finds without a detailed provenance the total rises from 547 to 639, but the D : E ratio stays the same, at 47 to 53. The larger total includes the unprovenanced detectorists' finds from recent years in England, sold by e.g. Finn, Gillis, and Vosper, but omits coins in older British collections, which may date from before the rise of metal detection to such a popular hobby. These could be English finds, or they could have been bought from the Continent.

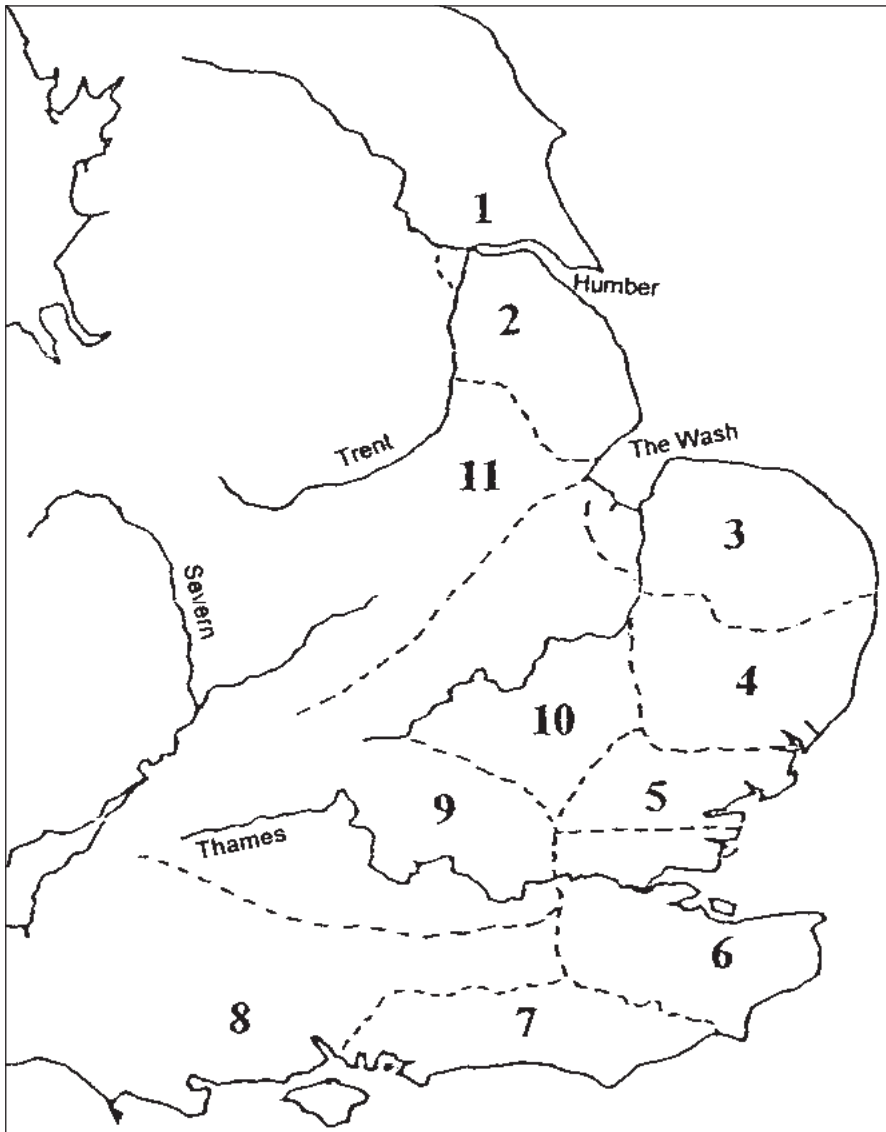


Figure 7.3. The boundaries of the eleven English standard regions as used in Metcalf (2004; 2007). In tables 7.1 and 7.3, below, region 11 has been divided into its northern and southern parts 11a + 11b. For legends see tables 7.1 and 7.3.

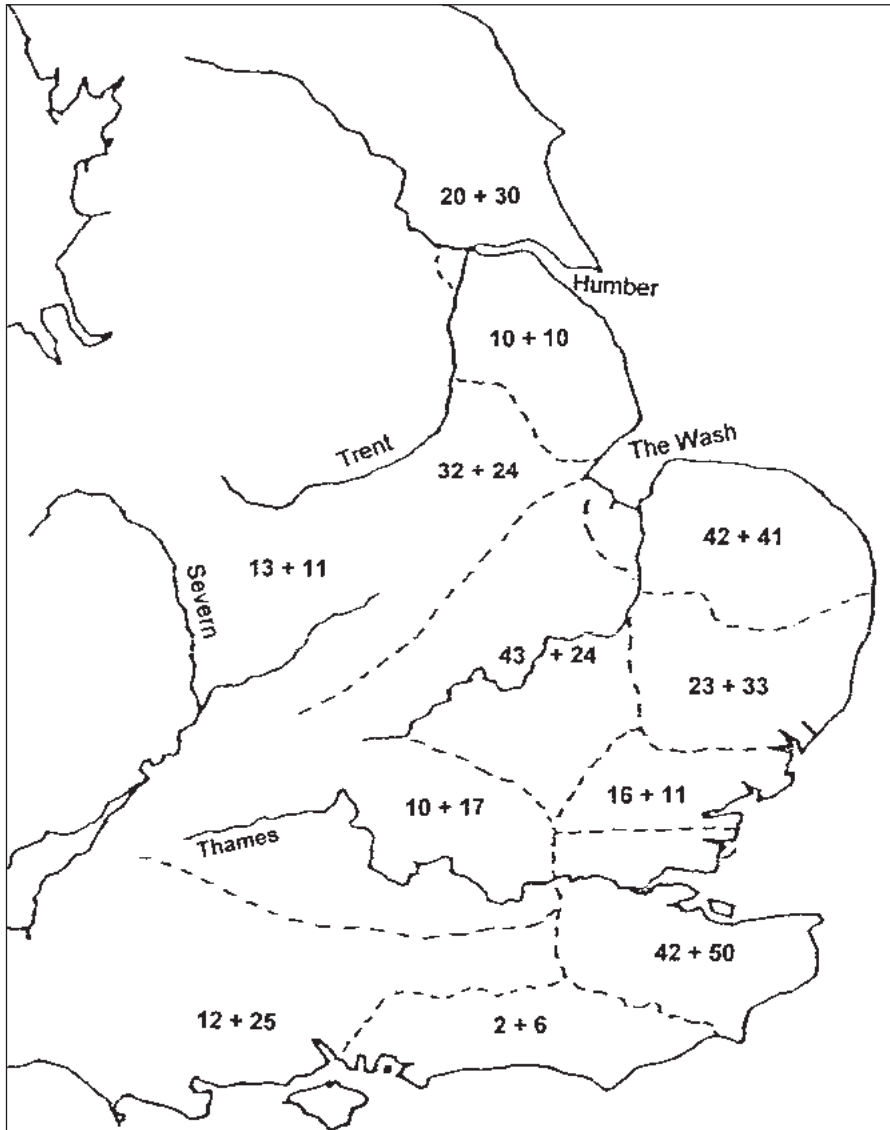


Figure 7.4. Numbers of single finds (Series D plus primary Series E) in the various English regions. Source: table 7.1, p. 188.

in the quantities needed to generate a 47 : 53 ratio in England.¹¹⁷ To that extent, the English evidence is supportive of the two-mint hypothesis. But even in Domburg and the Big Rivers region, primary phase porcupines made up only *c.* 20 and 14 percent respectively. Merchants trading with England evidently took with them porcupines preferentially. It seems clear that that was not from necessity: Series D was of the same intrinsic value and was equally acceptable in England, so far as one can judge from its plentiful and widespread distribution. That is confirmed by the Aston Rowant hoard, the 'exception which proves the rule'. In it there were 197 sceattas of Series D mingled with 70 porcupines.¹¹⁸ The ratio, 74 : 26, corresponds closely with that at Domburg, and proves, as clearly as one can ever prove anything about hoards, that the Netherlands component in the Aston Rowant hoard, or most of it, had recently been brought from Domburg or the Rhine mouths, rather than put together from what was in circulation in England, in the Thames valley. But if merchants did take about half their money to England in porcupines, how did they acquire or accumulate them? They did not use just what came into their hands locally. While at home in the Netherlands, did they sift through their money, retaining a stock of porcupines for their next voyage? Or did they, perhaps, obtain new coins, direct from the moneyers? If the latter were true, one would expect the English finds to be more heavily die-linked than the material as a whole, unless the velocity of circulation in England was spectacular. There is absolutely no encouragement to think that there is an excess of die-links. Productive sites in the north of England, which tended to be set in a landscape with few stray finds, would be where die-links ought to show up, if anywhere; there are none, for example, at the site near Spalding (L).¹¹⁹ And the English single finds of porcupines, taken as a whole, are if anything less heavily die-linked than the over-all figures derived from the corpus (that tends to show that a high proportion of the output of primary porcupines ended up in England). We are at a loss to explain the discrepancy in ratios, which is large. Common sense is a necessary ingredient of any hypothesis. Could the currency in the great river-port of Dorestad, for example, have been significantly different in composition (as regards the D/E ratio) from that in the surrounding districts? More plausibly, could there have been a community or class of well-to-do merchants, who were major holders of currency, and who traded among themselves? That might explain how it happened that the porcupines were already

¹¹⁷ In the secondary phase, hoards were carried to Friesland from further south, containing considerably more than 5 percent of sub-varieties b-d. In so far as those coins were absorbed into the local currency, which was so much larger than any hoard, they 'disappeared'.

¹¹⁸ In the Aston Rowant hoard were 19 sceattas of Type 8, and 178 of Type 2c.

¹¹⁹ Formerly referred to as the 'south Lincolnshire productive site'.

well mixed, as regards the fewness of die-duplicates, when they reached England – again, cf. Aston Rowant (there is good evidence that something very like this happened in England in the later Anglo-Saxon period, when some hoards include more coins from the local mint than the proportion found locally as single finds).¹²⁰

Would merchants setting out from Friesland sometimes have sailed directly across the open seas to England, – or would they routinely have hugged the coast as far as Domburg before making the crossing? One can see immediately that any significant differences in the D/E ratio between the north of England and the regions of the south coast could be of interest as empirical evidence for the ways in which money from the Netherlands reached England. The ratios, and the numbers of single finds from which they are derived, are set out in table 7.1. The numbers are worth scanning, just as a reminder that some of them are too small to escape serious risk of being misleading through statistical variability.

Table 7.1. Single finds of Series D and of primary-phase E from the 12 English regions, expressed as a) numbers, and b) ratios. Source: for D, the corpus in *JMP* 2003, and for E, the corpus below.

	Series D	Series E	Ratio
1 North of Humber	20	30	40 : 60
2 Lindsey	10	10	50 : 50
3 Norfolk	42	41	51 : 49
4 Suffolk	23	33	41 : 59
5 Essex (north)	16	11	59 : 41
6 South-East	42	50	46 : 54
7 Sussex	2	6	25 : 75
8 Wessex	12	25	32 : 68
9 Upper/middle Thames	10	17	37 : 63
10 Middle Anglia	43	24	64 : 36
11a Trent	32	24	57 : 43
11b Severn	13	11	54 : 46
Total	265	282	48 : 52

¹²⁰ Metcalf (1998) p. 90f and 93f, where the related question of above-average duplication is also discussed.

Indeed, most of the variations of ratios between the English regions are on the edge of statistical significance. Accordingly, one should show restraint not to over-interpret them. Series D appears to be under-represented against the English average in regions south of the Thames, namely Sussex and Wessex (with which one may group Kent south of the Weald). The numbers are too small for comfort, especially for Sussex, but they might make some sort of geographical sense if one imagined that, for merchants from Frisian, the Channel coasts were further from home than for merchants from the Rhine mouths. But that would be to ignore what has been said above about Friesland merchants sailing via Domburg.

The regions where Series D is noticeably above the English average are Middle Anglia (64 percent) and Trent (57 percent). For both these regions the numbers of stray finds are large enough to be taken seriously. A possible link is that both were accessed from rivers flowing into the Wash. The only common-sense explanation that comes to mind is that not all the Frisian merchants sailed to England via Domburg. Some could have established traditional trading partners, returning to the same places year by year, – or perhaps merely the discrepancy is chronological.

It is also true that an above-average proportion of the primary single finds (of all series) from these two regions come from productive sites, namely the ‘South Lincolnshire’ site near Spalding (L), the site near Royston (Hrt), and the site in the Biddenham loop of the River Great Ouse, near Bedford (Bd). (The first two are major sites which have been very faithfully and reliably recorded.) Foreign merchants would no doubt have found it convenient to trade at these regional meeting-places, rather than going from village to village. But so did everyone else: the prominence of the productive sites in the monetary landscape is just that, a topographical phenomenon. In general there is little reason to imagine that Series D and E made up a higher proportion of all the primary-phase finds at the productive site than in the surrounding region. A possible exception to that observation is the productive site near Sledmere (ERY), in the Yorkshire Wolds, where (curiously) it seems that there are ten primary-phase porcupines, against only three specimens of series D, Type 2c. The reporting of the early finds may have been less than candid, and we have wondered whether a small hoard has distorted the statistics. If not, was there rivalry, or even ill-feeling, against the Frieslanders? Here, the coins from the Netherlands are virtually the only primary-phase sceattas; foreign trade was evidently the initial impetus to monetization in the Wolds.¹²¹ Series D, meanwhile, occurs at a smaller productive site not too far away, at North

¹²¹ Bonser (in press).

Ferriby (ERY) on the north bank of the Humber estuary, from where primary-phase porcupines have not been reported.

If we turn next to Series E, and break down the totals given in table 7.1 between the four primary varieties, we can compare the corresponding sub-totals for Friesland, the Big Rivers region, and Domburg. For convenience of analysis, (the few) single finds from Noordholland have been amalgamated with those from Friesland, and those from Zuidholland with the Big Rivers region, simply as a matter of geographical proximity. The small number of single finds of primary porcupines from the Netherlands, except at Domburg, is indeed remarkable, and makes it all the more difficult to envisage that the coins left the Netherlands already well mixed as a result of regional circulation. The small number of geographical locations also means that one cannot easily judge, from the Dutch evidence, whether all four varieties were minted at the same place. The Netherlands evidence, such as it is, is that the primary porcupines are overwhelmingly from Domburg, with so few from the Big Rivers region that the straightforward view must be that they were minted at Domburg. It was from Domburg that the primary porcupines reached England, where they have been found in far greater quantities than at Domburg itself: they were first and last an export coinage, and especially so in the early days of the minting of sceattas. The ratios between the four varieties are quite closely similar in England and in the Netherlands, which seems to rule out any idea that one or more of them might be English in origin (table 7.2). The ‘plumed bird’ variety is rather more plentiful in England, but there could be second-order reasons for that, e.g. chronological. Or could it, possibly, be partly English – specifically, could reverse variety L (with annulets) be English? There are three imitations of Variety L from Domburg (Corpus 0154, 0159-0160), and one further specimen which we have given the benefit of the doubt (Corpus 0128). The only other Netherlands find that might be relevant is from Wijnaldum (Corpus 0112).

Table 7.2. Regional occurrence of single finds of the four primary varieties of porcupines in England and in the Netherlands. Source: table 6.1.

	‘plumed bird’	VICO	G	D
England	96 27 %	82 23 %	151 42 %	32 9 %
The Netherlands	13 17 %	18 24 %	38 50 %	9 9 %

(Although the numbers are too small to be statistically reliable – even smaller than for the D/E comparison, they will serve to give a general impression). Porcupines were accidentally lost in every part of the country, but that may be

Table 7.3. Occurrence of the four primary varieties of porcupines in the twelve English regions, a) as numbers, and b) as percentages for the region.

	'plumed bird'	VICO	G	D	total	all primary	propor- tion %
a) numbers							
1 North of Humber	6	7	13	4	30	42	71
2 Lindsey	3	4	1	2	10	45	22
3 Norfolk	11	11	15	4	41	104	39
4 Suffolk	3	6	22	2	33	112	29
5 Essex, north	3	3	5	0	11	35	31
6 South-East	14	11	21	4	50	190	26
7 Sussex	1	1	2	2	6	11	54
8 Wessex	13	3	5	4	25	41	61
9 Upper/mid Thames	3	5	6	3	17	45	38
10 Middle Anglia	5	7	11	1	24	91	26
11a Trent	6	8	9	1	24	} 77	45
11b Severn	1	0	9	1	11		
Total	69	66	119	28	282	793	36 %
b) percentages (each region = 100 percent)							
1 North of Humber	20	23	43	13			
2 Lindsey	30	40	10	20			
3 Norfolk	27	27	37	10			
4 Suffolk	9	18	67	6			
5 Essex, north	27	27	45	0			
6 South-East	28	22	42	8			
7 Sussex	17	17	33	33			
8 Wessex	52	12	20	16			
9 Upper/mid Thames	18	29	35	18			
10 Middle Anglia	21	29	46	4			
11a Trent	25	33	38	4			
11b Severn	9	0	82	9			

The numbers for all primary sceattas are somewhat out of date (source: *BNJ* 2004, p. 10), and therefore too low in relation to the numbers of porcupines, but the relativities between regions should be reliable – perhaps even more so than with up-to-date statistics.

partly because they circulated freely after they were first spent. As we have seen, regression analysis (fig 7.2, p. 183) suggests that in many cases they were initially carried to districts where the merchants expected to be able to buy the commodities they sought. Even after their subsequent circulation, they still tended to be more plentiful there. The primary porcupines made up a nominal 36 percent of the currency (see the caption to table 7.3), but the true figure was lower; very roughly, a quarter to a third of all the primary sceattas in circulation. That proportion was below-average (26 percent) in the south-east, probably because it was the main region of minting for English sceattas, where the incoming porcupines merged into a larger regional currency than in some other regions. Conversely the average was exceeded north of Humber (71 percent), where relatively few sceattas were minted, and similarly in Wessex (61 percent).

The next step is to look at the occurrence of the four varieties in the different regions of England. One looks for percentages which deviate markedly from the average, in adjacent geographical regions: none is obvious. Some of the numbers are, as already mentioned, small and possibly erratic, e.g. for the Severn basin. The percentages printed in bold type in table 7.3b, namely 67 and 52, are the only ones which raise doubts. For Suffolk, there is the possibility that the single finds accidentally include a small hoard; for Wessex, no good explanation is to hand.

From the Netherlands, as already mentioned, there are so few single finds of the four varieties outside of Domburg, that one would hesitate to be categorical that all four were minted in that *wic*.

Any idea that the primary porcupines were, all four, English (as has, indeed, been proposed within living memory)¹²² would raise very great difficulties in discovering their region or regions of minting, within England. Moreover, reversing the flow would create a monetary model that was implausible, in which porcupines circulated everywhere in England, but were virtually confined to Domburg and Wijnaldum when they arrived in the Netherlands – where, meanwhile, a widespread monetary circulation throughout the country was supported by the sceattas of Series D.

In the fulness of time it may well be possible to say more about primary porcupines in England, as single finds continue to accumulate. A newly-discovered hoard, with a *t.p.q.* definitely before the end of the primary phase, might throw some very welcome light on the chronology. As things stand, the grave-finds from south-eastern England comprise only the English series A, B, and C. At the dates when those containing Types BII and C (rather than A and BI) were

¹²² See chapter 6.

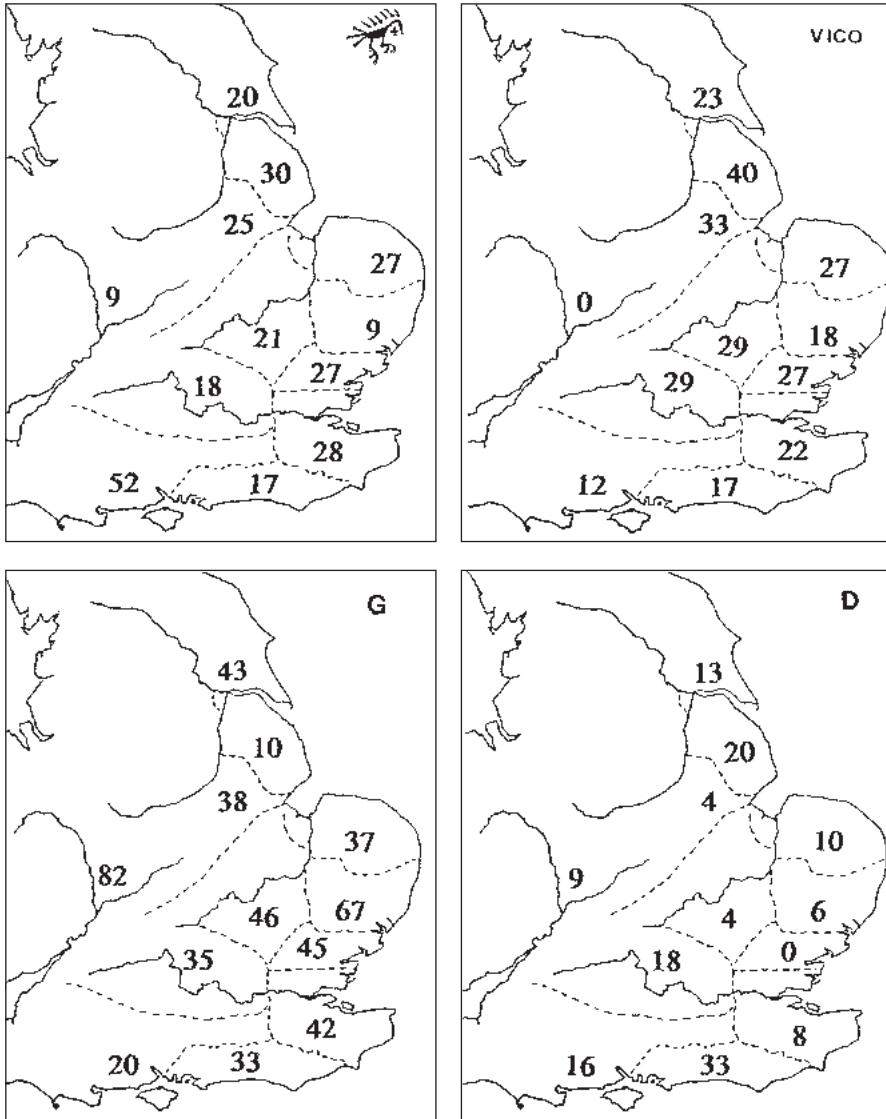


Figure 7.5. The regional occurrence of single finds of primary-phase porcupines in England. For each region, the four percentages total 100. The purpose of comparing the maps is to consider whether there is any significant localization of a variety within England (e.g. the ‘plumed bird’ variety at 52% in Wessex). Any such local concentration might be either because the variety had reached England to some extent separately, from a different region of origin, or because it was, in whole or in part, minted in England. The original patterns will have been blurred by subsequent wide circulation of the coins. Based on table 7.3. For the regions see fig. 7.3.

buried, i.e. the later grave-finds in the chronological sequence, porcupines were surely already in existence; and they existed, so far as one can judge, primarily in order to be exported to England. Yet they are absent from the grave-finds. Were they deliberately excluded from them, e.g. for ethnic reasons (which sounds very improbable), or was there a delay in their penetrating the South-East region, while the Frisian merchants were intent on trading elsewhere? These puzzling questions apply also to the absence of Series D – of which Type 2c copies the obverse of Series C, and therefore necessarily post-dates the beginning of that series. Series D Type 8 may, in principle, have begun earlier than the introduction of Series C, but the English statistics make even that problematic. Did Series D reach England almost all via Domburg, or could it in part have been carried direct from Friesland? The problems of the circulation of Series D and E in the primary phase are intertwined.

On purely numismatic grounds Type 8 seems to stand at the beginning of Series D. But it is relatively so much more plentiful in England than in the Netherlands (see table 7.4, below) that one ought perhaps to consider whether it could be English – or whether, for example, it was copied in England on a substantial scale. If it were English, the logic behind table 7.1 would be at fault, and it would be desirable to re-draft it, excluding Type 8. But the arguments against reversing the monetary flows are an exact re-run of those just rehearsed for the porcupines: Type 8 is found widely in England, while in the Netherlands it does not penetrate the hinterland, stopping abruptly (like the primary porcupines, and unlike Type 2c) at Domburg and Wijnaldum.

Table 7.4. Comparison of the numbers of single finds of Type 8 with Type 2c, varieties 1-2b, and the corresponding ratios. Source, the Corpus in *JMP* 2003.

	Numbers		Ratios
	Type 8	2c/1-2b	
England	89	14	86 : 14
Friesland, plus Noordholland	4	19	17 : 83
Domburg	14	23	38 : 62
Big Rivers region, plus			
Zuidholland (excl. Domburg)	0	15	0 : 100
Aston Rowant hoard	16	7	70 : 30

(Its being confined to those two wics amounts to the best argument that it is earlier than Type 2c. In the beginning, Type 8 was predominantly an export coinage.) In either case, our argument about inflows from the two minting regions of the Netherlands in the early stages of the primary phase might be affected. A stylistic study of the type gives no reason to suppose that it might originate in more than one place. If Type 8 were simply early in Series D, one might expect to see some continuity of behaviour between it and the earliest varieties of Type 2c, say varieties 1-2b. That is conspicuously not the case in England, as may be seen from table 7.4. In fact, there is a major statistical discontinuity in the evidence, as may be judged from the table. Also, the ratio for the Aston Rowant hoard is anomalous. These puzzling figures should impose a degree of caution on our interpretation of Type 8.

The secondary phase

In the secondary phase there was a major shift in the volume of minting of sceattas in the Netherlands, from Friesland (previously dominant) to the south – either the Big Rivers region (Dorestad?) or Domburg or both. We have suggested that the reason for the shift was political in the first instance, rather than economic or monetary. Stylistic analysis has identified two broad categories of secondary porcupines, designated in the corpus as varieties b-d (from the south) and e-h (from Friesland). The regional attributions are amply confirmed by the ratios of single finds – 57 : 9 in the Big Rivers region, i.e. very strongly coloured by b-d, against 48 : 33 in Friesland (table 7.5).

Table 7.5. Single finds of secondary porcupines, of the main groups of varieties, by region. a) numbers and b) percentages. Source: the corpus, below.

	Friesland		Big Rivers		Domburg		England	
	N	%	N	%	N	%	N	%
a			1	2	4	2	7	2
b-d	20	48	25	57	93	46	159	45
e-h	14	33	4	9	27	13	68	19
i-k	8	19	14	32	83	41	127	34
Total	42	100	44	100	207	100	361	100

Since both regions were now minting the porcupine design, in sceattas which were very similar in intrinsic value, and since both regions were under Frankish control or influence, so far as we know, the northwards ‘drift’ of money (i.e. even

in Friesland varieties b-d are the most plentiful at 20 out of 42) presumably reflects mainly the commercial and economic context. The corresponding ratio at Domburg is 46 : 13, and among the English single finds it is 45 : 19. Converted into percentage terms for b-d and e-h only, the figures are: Big Rivers, 86 : 14 in favour of the south; Domburg, 78 : 22; England, 70 : 30; Friesland, 59 : 41. The figures for England are intermediate between those for the south and for Friesland (the primary-phase anomaly has disappeared). Note that varieties b-d are distinctly more dominant in the Big Rivers region than at Domburg.

It seems that the secondary porcupines reached England primarily via Domburg, as they had done in the primary phase, but again it is worth looking at the ratios for the English regions, to see whether there are any anomalies (table 7.6). The numbers on which the percentages are based vary from small to very small, and should be treated with discretion. They approximate to the over-all figures of 70 : 30, with few exceptions. Varieties b-d are above average in the north, and (curiously) in Suffolk (7 single finds). Varieties e-h are above average in the South-East and in the Thames corridor – which was accessed via the South-East. In general there is nothing in the figures to show that money arrived separately from Friesland.

Table 7.6. English single finds of secondary porcupines, of varieties b-d and e-h, by regions (percentages). Source: the Corpus, below. Note that table 7.5 shows 227 single finds of b-d, e-h, but a few of these cannot be assigned to a region.

	b-d	e-h
North of Humber	88	12
Lindsey	78	22
Norfolk	68	32
Suffolk	100	0
Essex (north)	67	33
South-East	50	50
Sussex	67	33
Wessex	68	32
Thames	50	50
Middle Anglia	72	28
Trent	71	29
Severn	67	33

Productive sites seem to show a similar ratio, within the limits of statistical variation, to the region in which they lie. East Tilbury (Ess) is a possible exception. One should not, therefore, expect to find any regional differences in the occurrence of sub-varieties e-g as against f-h. That expectation is borne out by the statistics (even if the numbers are still too small to be conclusive).

Table 7.7. The regional occurrence of secondary-phase sub-varieties in England. The North comprises regions 1, 2, 3, and 11a, and the South, 4-10 and 11b on fig. 7.3.

	b-c	d	e-h	i-k
North	35	26	20	55
South	41	23	38	45

There is, however, an intriguing statistical difference between sub-varieties e-h and the imitative coins catalogued as sub-varieties i-k. The imitations are relatively more plentiful among single finds from the north of England (table 7.7). If sub-variety i-k was in conformity with e-h, a figure of *c.* 25 rather than 55 would be expected. If both the regular sub-varieties b-c and e-h had arrived in England together with the 'imitative' sub-varieties d and i-k, it is difficult to understand how they could have been lost selectively. One wonders, therefore whether the north of England total includes a certain number of local copies. A stylistic search has revealed only one little group (discussed above, pp. 167-169), but this makes hardly any inroads into the potential total of about thirty specimens. The statistical phenomenon remains largely unexplained.

The tertiary phase

Stray losses of porcupines of the tertiary phase are very few in England. Only a dozen are on record, compared with 361 of the secondary phase (table 7.8 below). The estimated total volume of secondary porcupines is in excess of 30 million, perhaps even over 40 million, whereas that of the tertiary porcupines is only between three and four million. It seems that the trend in English stray losses follows the mint-output figures, but it may be even more extreme.

Whether that is because inflows from the Netherlands virtually ceased, or is partly because porcupines were compulsorily reminted in some English regions in the interests of establishing a controlled English currency is a question to be considered. Whether the dramatic change in the survival rate was abrupt, coinciding with the introduction of the new-style porcupines in the Netherlands, or was more gradual, with a decline in inflows beginning towards the end of the secondary phase, is difficult to determine, because the chronology is vague at

almost every point. What is clear is that the recorded single finds are not distributed across England at random: half of them are from the modern county of Lincolnshire – our regions of Lindsey and Trent.

There are in addition nine unprovenanced specimens, either sold in England recently, and presumed to be detectorists' finds,¹²³ or in old collections formed in England – for which an English provenance is less than certain. Many of the finds are distinctly light in weight, compared to Dutch finds, a phenomenon that seems to require explanation.¹²⁴

The date at which the new-style tertiary phase porcupines were introduced in the Netherlands is not known, and this unfortunately affects the interpretation of the English single finds. To allow room for the copious and varied secondary porcupines, a date not earlier than the mid-730s or even the 740s seems to be necessary. The end-date of the tertiary phase is controversial. In Dorestad and Domburg, and in the Frankish controlled south generally, it is virtually

Table 7.8. Provenanced stray-losses of tertiary porcupines in England.

	Corpus		
Variety B	3199	Market Rasen (L)	0.88 g
	3202	Stamford (L)	1.09 g
	3217	Bere Regis (Do)	n.r.
	3218	London	n.r.
	3219	Spalding (L) p.s.	n.r.
Variety E	3101	Spalding (L) p.s.	n.r.
	3138	Southampton (Ha)	0.52 g
	3139	Spalding (L) p.s.	1.12 g
	3140	Stanton St John (O)	n.r.
	3141	Wetheringsett (Sf)	0.97 g
	-	Flixborough (L) ¹²⁵	1.08 g
Variety F	3255	Reculver (K)	0.70 g
	3410	Spalding (L) p.s.	n.r.
	3415	Bidford-on-Avon (Wa)	0.86 g

¹²³ E.g. Corpus 3384 1.14 g, and 3421, weight not recorded.

¹²⁴ E.g. Corpus 3024, 0.87 g, 3025, 0.85 g, 3233, 0.97 g, 3248, 0.99 g, 3416, 0.98 g, and 3418, 0.61 g.

¹²⁵ This find came to our attention only after the Corpus was finalized, see p. 294 and pp. 296-297.

certain that Pepin's coinage reform, referred to in the capitulary of Vernon, 754/755, brought the issue of sceattas to an end.

The Hoogstraat I hoard, from Dorestad, is composed exclusively of Pepin's denarii.¹²⁶ Its *t.p.q.* will, no doubt, be some years later than the capitulary, which creates some leeway. But sceattas certainly remained in use for much longer at Ribe,¹²⁷ which of course lay beyond the frontier of Carolingian control. From Friesland there is no clear evidence for the terminal date. One's judgement will rest on one's reading of the political context, i.e. the effectiveness of Carolingian control. The Föhr hoard, which was concealed half-way through the tertiary issues, contains what seems to be an early Carolingian coin in the name of Milo.¹²⁸ If it postdates Pepin's reform, the issue of tertiary porcupines will have continued (where?) for several or even many years after 755. If, on the other hand, the coin of Milo is judged to be a late Merovingian denier, lacking the royal monogram of Pepin, 754 could be the end-date.

How might these dates tie in with the evidence from England, where the chronology is equally uncertain? Were tertiary porcupines recoined, except in Lincolnshire? They could, in theory, have been banned in Northumbria, and reminted into the royal sceattas of Eadberht (737-759), which were struck in some quantities in the 740s. South of the Humber, in Æthelbald's, and then Offa's kingdom of Greater Mercia, it is more difficult to envisage reminting on any scale in the 740s or 750s, because minting was in abeyance. Middle England had sunk into a deep recession, from which it did not fully recover until the 780s. Only in the independent kingdom of East Anglia (Norfolk plus Suffolk) was a money economy able to survive through these decades. Beonna became king probably in 749, but Miss Archibald's opinion is that his coins belong probably to a short period on either side of 760.¹²⁹ In a word, there is no positive evidence for compulsory reminting, and the very small number of single finds of tertiary porcupines is therefore probably a fair reflection of the trickle to which the inflows were reduced. They are not all early in the tertiary phase: there is at least one post-Föhr example of Variety E2, and three of the latest Variety F. The porcupines fed into a much diminished, indeed an almost vanished, currency in middle England. It is intriguing that they tend to be very light in weight (although there is no reason to think of them as English imitations).¹³⁰

¹²⁶ Van Gelder (1978).

¹²⁷ See chapter 7.7.

¹²⁸ See p. 141.

¹²⁹ Archibald (1974).

¹³⁰ E.g. a find from Bidford-on-Avon, Corpus 3415, and the die-linked 3416, which are, however, die-linked also to specimens from Westenschouwen and Wijk-bij-Duurstede (Plate 90). Could these be post-Franeker?

Summary

During the primary phase, *c.* 695 – *c.* 715/720, large quantities of sceattas of both Series D (*BMC* Types 8 and 2c, the continental runic type) produced in Friesland, and the four early porcupine varieties (belonging to Series E) produced in the southern Netherlands, probably at Domburg, were used to pay for goods in England, where they mingled freely in circulation with sceattas minted in England. The ratio of single finds of Series D and primary Series E in the Netherlands is *c.* 85 : 15, but in England *c.* 47 : 53. It seems that the primary porcupines were exported selectively. In England the ratio of D : E is much the same in all regions, except Middle Anglia and the lower Trent basin. The modest number of die-duplicates indicates that the primary porcupines were already well mixed when they reached England. This clear-cut ratio difference is perhaps caused by a community of wealthy Dutch merchants, major holders of currency, trading amongst themselves. The available evidence suggests that these merchants did not sail directly from Friesland to England, but that the crossing of the North Sea started mainly from Domburg. The areas in England where the primary porcupines are concentrated most heavily suggest that wool may have been an important commodity.

In the secondary phase, *c.* 720 - *c.* 740, there was a major shift in the volume of minting of sceattas in the Netherlands, from Friesland to the Big Rivers region. Sceattas of Series D were no longer manufactured. The porcupine sub-varieties e-h (with a ‘mixed grill’ reverse) were produced in Friesland, and the sub-varieties b-d (with a ToT - / \ reverse design) in the region of the big rivers. Both groups of porcupines were similar in intrinsic value. The reason for this shift was political, rather than economic or monetary, and the result of the increased Frankish dominance of the north of the Netherlands. The single finds ratio for the two groups of porcupine sub-varieties are *c.* 60 : 40 in Friesland, and *c.* 80 : 20 in the south. The ratio for England is in-between, *c.* 70 : 30. There are no indications that the Frisian and Big Rivers groups of porcupines arrived separately in England. As they did in the preceding phase, it seems that the secondary porcupines reached England mainly via Domburg.

The date of the beginning of the final, tertiary phase is difficult to establish exactly, perhaps around *c.* 740? The end date of this phase is even more obscure. Stray losses of tertiary porcupines (Varieties E, B and F) are very few in England. Whether this dramatic change in survival-rate was abrupt or gradual is uncertain. It seems that trade with the Netherlands virtually ceased, although the possibility of reminting is not to be excluded entirely. The few recorded finds of tertiary porcupines in England are concentrated in Lincolnshire.

7.3 Associated ‘porcupine’ types as control groups: English sceatta types which copy the ‘porcupine’ obverse design

If we compare the distribution-pattern in England of single finds of imported porcupines, with the patterns created by other sceatta types which originated in England, it may provide some worth-while insights into the ways in which porcupines were used in England. For example they were, as we have seen, initially carried into the upper Thames valley and even as far as the River Severn, beyond Bidford-on-Avon. English primary types also enjoyed a wide circulation, but they were not carried so far west in such quantities. Some of these English types copied the ‘porcupine’ design closely, for reasons that are not obvious, beyond the fact that it was a very familiar and trusted coin type. The copying seems not to have begun until late in the primary phase. Among the earliest of the imitative types is the VERNVS group. The map of finds (below) shows a more easterly pattern, and that is a reason for judging that these coins did not arrive in England mingled with the porcupines, which they resemble. They serve as a control-group. Their scarcity in the Netherlands suggests that they were not minted there, although one has to admit that primary-phase porcupines are also quite scarce as single finds in the Netherlands. The obstacle is that there are two specimens in the Remmerden hoard.

Similarly, the ‘stepped cross’ type is represented by no fewer than 36 single finds from England; but the relative importance of finds of this type from the Meuse basin points west and suggests that its origin may lie in those regions, a hypothesis supported by a more thorough analysis of the finds from Yorkshire. Because of its complexity, the ‘stepped cross’ type is discussed in a separate section, 7.4 below.

There are several other types which are undoubtedly English, and which openly use the ‘porcupine’ obverse design (usually transferred to the reverse), in combination with a characteristically English design. They are mostly from the secondary phase, when monetary circulation in England was regionally more restricted. The secondary porcupines are found everywhere, in all regions of England; the copies, less so. This must be because the copies were initially put into circulation in a different commercial context. The *Æthilraed* runic type is the earliest of the types in question. It still behaves more like a primary-phase issue. Finds of these English types in the Netherlands are of special interest as unambiguous evidence of counter-flows of money out of England. There are very few specimens, even of porcupine related types, and even at Domburg. That is a useful observation, because it probably implies that counter-flows of secondary-phase porcupines were also few (unless merchants carefully repatriated them selectively). It would follow that, if a porcupine

variety is found at all widely in the Netherlands as well as in England, its origin is very unlikely to be English. Three of these derivative types are included in our corpus, because of their early date and their general affinity with the regular porcupines. They are:

1. Some of the VERNVS types (*BMC* Types 3b and 91).
2. The ‘stepped cross’ type (*BMC* Type 53).
3. The *Æthiliræd* runic type (*BMC* Type 105).

VERNVS, which has been classified into varieties 1 to 3, occurs already in the Remmerden hoard,¹³¹ in which the presence of all varieties implies that its issue was substantially complete well before the end of the primary phase. There are five specimens from the Aston Rowant hoard.

The *Æthiliræd* type is of less pure silver (*c.* 85 percent), and may be of late-primary or, more probably, early secondary date.

The ‘stepped cross’ type (*BMC* Type 53) is discussed separately below (Chapter 7.4). In spite of the many single finds from England it has been judged to be continental in origin.



BMC Type 10, Long Wittenham



Variety G4, Corpus 545



We may also mention here *BMC* Type 10, with a porcupine-derived reverse, which seems to be imitating Variety G4 (and if so, is relatively late in the primary phase). It is die-linked, however, to an early looking variety of Series D.¹³² The Remmerden and, especially, the Escharen hoard point to a place of origin in the Big Rivers region (where porcupines of Variety G are found, but not often). If Type 10 really is derivative from G4, the implications for chronology need to be faced squarely. For G4 to be available as the model, it seems that the issue of all four varieties, G1-4, would have to have been virtually complete, at an early stage in the issue of Series D, Type 2c. The minting of porcupines, that is to say, began substantially earlier than the beginning of Series D. Inescapable as that is, we are reluctant to accept it without

¹³¹ Variety 1, one specimen, variety 3, one specimen, see fig. 5.1, p. 127.

¹³² Op den Velde & Metcalf (2003), Nos 312-321.

corroboration. There are contrary indications. The Aston Rowant hoard, which includes what are arguably the latest issues of Series D, on a much reduced weight-standard, lacks G4. That is the problem; and it would not help much to say that the prototype was really G3. Could the absence of G4 be merely by chance? As Aston Rowant includes Series D, varieties 3 and 4 plentifully, it would probably be necessary to say that variety 2c, and also Type 10, to which it is die-linked, are in fact significantly later in date than varieties 2b, 2d, etc. But variety 2c and Type 10 are still on the original weight-standard. The Remmerden hoard (which includes G4) runs up to variety 3f of Type 2c: it includes three die-linked specimens of variety 2c, linked to Type 10 (and slightly earlier?), but no specimens of Type 10. Escharen runs up to variety 3a, and includes four specimens of Type 10, but none of variety 2c. That suggests that Remmerden is marginally earlier than Escharen, and it implies, *prima facie*, that Type 10 dates from about the time of variety 3f. The little mint where it was struck began by copying a variety of Series D that was already a few years old. But we admitted, in our previous monograph, that the presence of light-weight specimens of Series D in Aston Rowant, but not in Remmerden, hinted that our scheme of classification did not correspond perfectly with the chronology of the series. We can only hope that future hoards will clarify this thorny problem. One or more of the assumptions has to be false. The Dutch finds and the occurrence of four specimens in the Escharen hoard are sufficient evidence that its mint-place was in the Netherlands.

Other types which are more obviously English are:

4. Series T, bust/porcupine reverse (*BMC* Type 9).
- 5 a. MONITASCORVM around obverse bust/porcupine reverse (*BMC* Type 9 var.).¹³³
 - b. DE LUNDONIA around bust, reverse with SCORVM below porcupine.
 - c. Blundered copy of 5b. (*BMC* Type 12/5).
6. AESE/porcupine (*BMC/Hill* Type 89) and related varieties.
7. An E/N mule (*BMC/Hill* Type 88).

Specimens of all these derivative types (excluding *BMC* Type 10) are found mostly or even exclusively in England. They are relatively small-scale issues. It might seem obvious that they are English in origin. If we consider, however, how heavily the primary-phase porcupines are concentrated in England, compared with the single finds from the Netherlands – because they were produced primarily as an export coinage – the argument becomes less straightforward. Might not some, at least, of the porcupine derivatives, of primary date, have

¹³³ Metcalf (1994) p. 435.

been minted in the Netherlands, and carried to England mingled with the regular issues? The interpretation of the find-statistics would then become more delicate: given that most of the provenances are English, how many finds from the Netherlands are needed before they make it advisable to consider the possibility of a continental origin?

The (scarce) regional occurrence of a derivative type in the Netherlands may have a bearing on our understanding of it. The *Æthiliræd* runic type, for example, is overwhelmingly English in provenance, and doubtless English in origin, but there are just two or three specimens from Domburg. Traffic between Domburg and English ports was evidently so heavy, with merchants sailing to and fro, that Domburg is probably the most expected Dutch provenance, statistically, for English sceatta types. There is, after all, the analogy of a few specimens from Domburg of other, unambiguously English types, from Series A onwards. If one can accept that the *Æthiliræd* type is English, one can run through the argument a second time, and conclude that it serves as a test-case, which shows us how we might expect English types to behave, as regards their being carried to the Netherlands, against the flow. And if some type of uncertain attribution were found predominantly in England with just a few specimens from the Big Rivers region, but none from Domburg, should one be more disposed to consider a Netherlands attribution? Probably one should, unless the regional pattern is a mere statistical quirk of small numbers. The argument would be distinctly stronger if it were the case that there were just a few specimens from Friesland, but none from Domburg or the Big Rivers region.

Another ambiguity might arise if the few Netherlands-provenanced specimens were imitative. There are, in fact, a few *Æthiliræd* coins of aberrant style (see below), which are probably imitative; but the finds are not from the Netherlands. If they had been, it would, of course, have strengthened the case for an English attribution of the type in question.

In the secondary phase, when single finds of porcupines become very plentiful in the Netherlands as well as in England, the caveat does not apply: if any of nos. 4-7 above were of continental origin, one would expect them to turn up freely in the Netherlands. The deceptive nature of the primary-phase evidence no longer applies. In fact, the absence or virtual absence of nos. 4-7 in the Netherlands evidence helps to confirm that they are indeed English.

If we decide, from a more detailed consideration of the evidence, that types 1 and 3-7 are indeed English, it raises the question whereabouts in England their mint-places were. In general, the expectation is that each *wic* had its distinctive sceatta type or group of conceptually related types. If that expectation is correct, nos. 1 and 3-7 above add significantly to the canon of English mints, and

may shift the perspectives of English monetary history. That is, however, a subject which lies outside our remit.

1. *The VERNVS group*

The rather heterogeneous VERNVS group (*BMC* Type 9) takes its name from three specimens on which the inscription is read as VERNVS. Fragments of this legend, no longer recognized as letters, survive in other specimens. The obverse with a bust (sometimes very degraded) with spiky hair and a reverse side showing a standard with a circle in the middle link them to Series E.

The first three letters of the inscription, VER, are beyond doubt. It is possible that the letters NVS, at least part, are intended to represent the neck of the bust. Thus the legend should perhaps be read as VER or VERA. Blackburn & Bonser speculate that this word might be the Old English *wer* meaning wergild or the legal money equivalent of a man's life.¹³⁴ However, they prefer a more usual interpretation of a personal name. One might expect a moneyer's name, by analogy with *Pada* or *Epa*, or a place-name.

The beginning of the VERNVS group is far from clear. The coin type(s) that served as the example or the inspiration of the die-cutter(s) of the VERNVS coins, and the development of the varieties are not easy to identify.



Perhaps a sceat with a bust with radiate crown and reading VAIQOIBE, an enigmatic legend, came to hand and was chosen as the model for a small local series. Its obverse has several elements, such as the sharp angle between the line between the crown and the nose, and the way the nose and ear are indicated, that are also seen on the VERNVS coins. However, its style is not quite the same.



There are some very crude 'plumed bird' imitations on which the obverse flan is bisected by a straight line with a cross with three large pellets at the end. The bird's body is blundered to a triangular lump depending from the straight

¹³⁴ Blackburn & Bonser (1984a).

line. The reverse follows the plumed bird varieties J/K more closely, but the groups of three pellets are reduced to one, as on porcupine variety G. It is possible that these plumed bird derivatives are a forerunner of the VERNVS sceattas, by mutation of the plumed bird into a profile head. One would prefer a better designed prototype, and not a simple untidy copy that changes into a more elaborate type.

In particular the chronological sequence of the various but related designs has been the subject of different ideas. The theories, formulated in the last quarter of the 20th century, were based on a very limited number of VERNVS coins known at that time. Since then, the number of these sceattas has increased to 42.

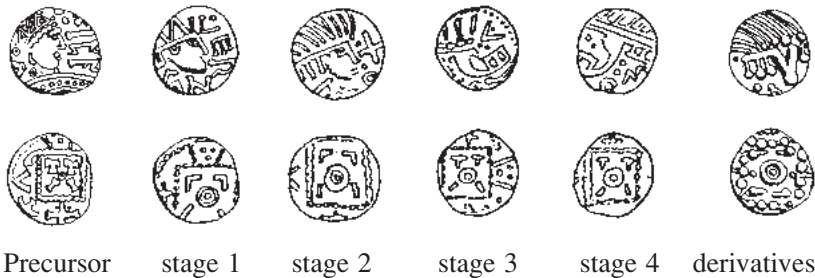


Figure 7.6. The theory of Blackburn and Bonser about the chronological development of the VERNVS type, based on the limited number of coins known in 1984.

In 1984, Blackburn and Bonser hypothesized a beginning with the sceat inscribed VERNVS as a copy of Series C. In their stage 2 the radiate crown was replaced by spiky hair, and the legend became blundered. In stage 3 the bust is degenerated, with a long protruding chin, fused with the letter E. Stage 4 has a laterally reversed obverse of the previous stage. At the end of these consecutive stages they place the crude derivative specimens.

In an analysis published in 1993, an almost reversed order of development was suggested (fig. 7.7).¹³⁵ In this hypothesis, the series begins by imitating the 'plumed bird' version (a-b). The bird's body is changed into a triangular lump depending from the straight line. The quills are reduced to five or six straight lines with large pellets. The reverse follows the model quite closely, except that the group of three pellets is reduced to one. The degraded plumed bird then mutates into an angular profile head (c), and it is supported by an almost identical reverse. The cross in front of the bust is seriffed. Two vertical lines depend

¹³⁵ Metcalf (1993) p. 140-146.

behind the head. The ear is indicated by a semicircular loop, also depending from the axis, but the eye is omitted. The next change concerns the reverse (d). The standard is replaced by a copy of the reverse of the earliest coins of Series R.

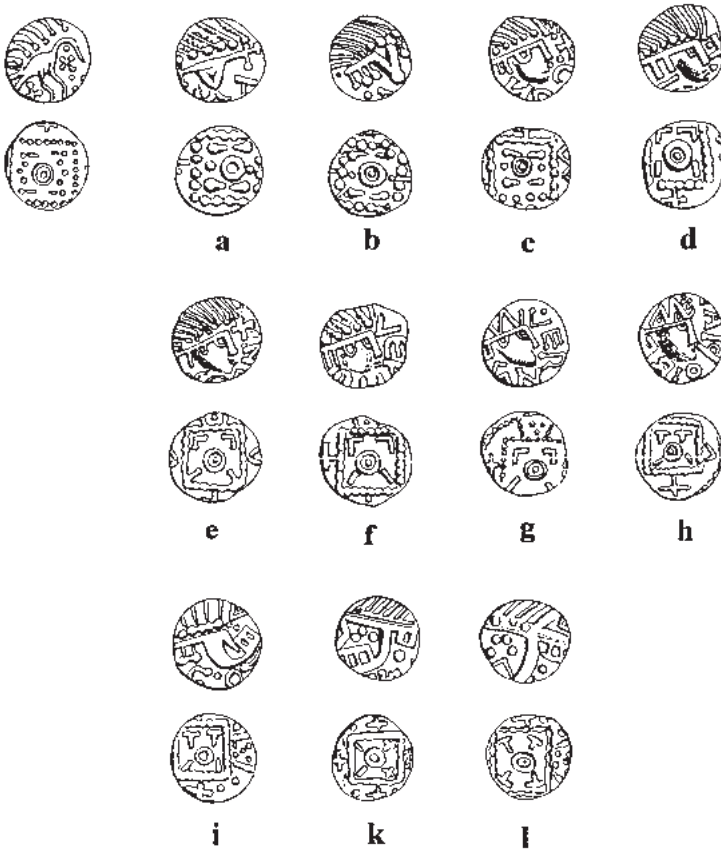
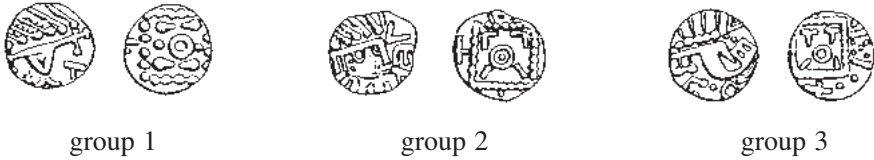


Figure 7.7. The possible chronological development of the VERNVS group hypothesized by D.M. Metcalf in 1993. Group 1 = a-b; Group 2 = c-h, Group 3 = i-l.

Whether a tufa is present is uncertain, it could be off the flan. On the obverse a thin line marks the eye-socket. Then follows the sceat, still with spiky hair, and the inscription VERNVS (e, f). The next step is the replacement of the quills by a radiate crown (g, h). In this analysis, sceat type (h) is understood as closely based on (f). The internal order of the second group (i, k, l) is more obvious. Coin (i) is copied from (f), although one would have difficulty to recognize a bust without knowing the forerunner.

Although the varieties brought together under the heading “VERNVS group” have some stylistic similarities, it is not at all certain that they are the output of the same mint. There is no doubt that they are early, because of their presence in both the Aston Rowant and Remmerden hoard. That renders it unlikely that they post-date stage 4, as suggested in the first discussed hypothesis. It is not to be excluded that the varieties a + b, and c to l are not successive, but parallel.

The sequence c to g has the advantage that the development of the reverse standard design is logically arranged. However, the changes in the obverse design, from a crude copy into a more elaborate design, first with an eyeless head, that is changed into a bust with an eye, a radiate crown, and a legend, is not very likely. The next step, the degradation of the radiate bust into a more abstract version, is more convincing.



Groups 1 and 2-3 are at first glance so different that one is tempted to wonder, even, whether they are from the same mint-place: the general style of die-cutting is quite different, and so, it seems, is the survival-rate. Indeed, we have even asked ourselves whether group 1 could be from a mint-place in the Netherlands, while groups 2-3 are English.

Basic to our understanding of the VERNVS coins are: (a) that they are represented already in the Remmerden and Aston Rowant hoards, and are therefore early, and (b) that groups 2 and 3 are heavily die-linked, indicating a small volume of output and a high survival-rate.



VERNVS group 1, Corpus 3438

Group 1, of which the obverse is a rather crude copy of the ‘plumed bird’ porcupines, while the reverse copies Variety G of the primary porcupines, is known from just eight specimens, all from different reverse dies. There may originally have been six or eight obverse dies used. The average weight is higher than for groups 2-3 (fig. 7.8); no analyses of metal contents are available. One

specimen of group 1 is from Houten (U), and one from the Remmerden hoard: none is recorded from Domburg. There were two specimens in the Aston Rowant hoard, leaving at best four (?) English single finds, of which only one (from the Royston site) is certainly English. The numbers of single finds from the Netherlands and England respectively, one against four, are much too small for confidence, but they would not contradict the hypothesis that the variety was Dutch, and that it reached England in the same way as the primary porcupines. It would probably have passed without notice among them, and that would account well enough for its occurrence in the Aston Rowant hoard.



VERNVS group 2, Aston Rowant
hoard Corpus 3446



VERNVS group 2, Potterspurly
Corpus 3451

A careful analysis of the content of the designs, however, leads to the opposite conclusion, namely that groups 1 and 2-3 are consecutive issues at the same mint-place. Group 2 (27 specimens) is from an estimated 10 or 11 obverse and 23 reverse dies. Doubtless two reverse dies were used with each obverse, a sign of regular production. There is continuity of design and style between group 1 and group 2. The same reverse type, copied from porcupines of Variety G, is used on some specimens of group 2. These are undoubtedly the earliest, transitional dies of group 2. Only two or three dies were involved, and one might even think of them as group 1/2 mules. The devolved bird of group 1 becomes, in group 2, a profile head, built around the same strong diagonal line with pendent loop (the bird's body, which now becomes the eye-socket) and two or three pendent lines at right angles (wreath-ties?). A sharply right-angled line represents the nose. These early coins of group 2 still have porcupine's quills as hair, and they also still have a crosslet in front of the face. They do not at first include a legend, merely a couple of annulets where VERNVS will later appear. Is the head imitated from some better-known type?

The coins are so early in date that few models were available, other than Series A (or just possibly Series C); but a profile head is a very obvious sort of design, and one would not wish to insist on the derivation. The reverse is more intriguing: the standard now is ornamented 'o' - / \ rather than ToT - / \.

Regional circulation and the monetary context

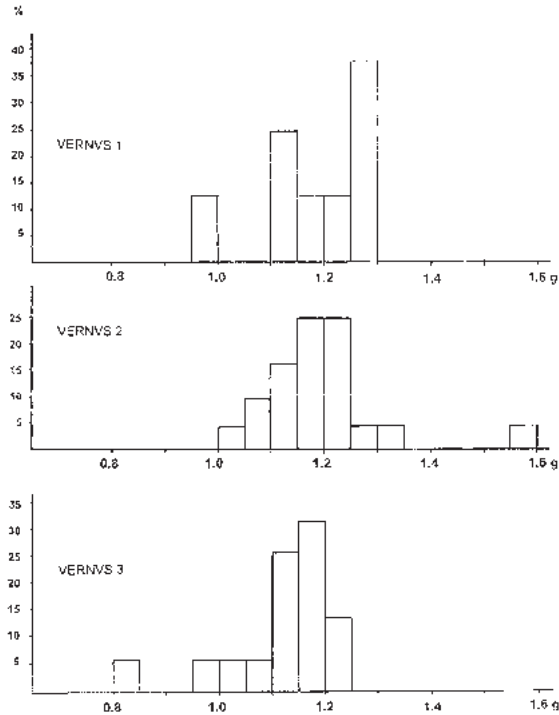


Figure 7.8. Weight histograms of the VERNVS groups 1, 2, and 3.

From where was this derived? The pattern is not found in the English series earlier than the East Anglian type R3 (720 – 730), which is much too late. It seems very probable that the design was imitated from Series D, Type 8 (Corpus 3449 onwards).



VERNVS group 2, Middlesex
Corpus 3465



VERNVS group 2
Corpus 3464

The crosslet is omitted, leaving room for the letters VER to appear in front of the face. At first, the E is lunate. Next, the porcupine's quills used to represent

hair are replaced by the radiate crown which is proper to Series A and C. VERNVS is now clearly legible (Corpus 3463-3465).



Legend VAIQOIBE, Ashdon
Corpus 3466



Legend VENOVS
Corpus 3470

Finally, there are coins with reverse ToT- / \, and with a quite different obverse legend, VAIQOIBE or similar (Corpus 3466-3468) or VENOVS (Corpus 3469-3471). If, as has been suggested, Vernvs was the name of a moneyer, perhaps these coins are the work of another moneyer – or two? Although they make no obvious sense, Vaipoibe at least seems too deliberate to be a meaningless blunder. Perhaps the ¶ is meant to be a thorn, and the reading is Vaithoibe? Another specimen from the same obverse die as the Ashdon find, and from a similar reverse die, was part of a group of five coins found in *c.* 1992 on the banks of the River Bulbourne, at Berkhamsted (Hrt). The association of the coins may be presumed, as they are all of much the same date. The other four were of Type BII (cf. BII,8?), BIIIA (cf. BIIIA,2), a crude imitation of A3, and an unpublished variety resembling Series D, Type 2c. A closely similar specimen of this last was found at Fingringhoe (Ess);¹³⁶ they are perhaps local. The Berkhamsted hoard is dated by the BIIIA specimen, and will be of late primary or very early secondary date.¹³⁷



Figure 7.9. Die-linkage between VERNVS groups 2 and 3.

¹³⁶ Coin Register *BNJ* (1996) 96.

¹³⁷ Another specimen, also from the same obverse die as the Ashdon find, was recently found near Alne (NRY) (Abramson collection A400). The coins from Berkhamsted and Alne came to our attention after the Corpus was finalized. They are, however, included in the drawings on plate 92, and in fig. 7.10.

It is fortunate that there is a die-link between VERNVS groups 2 and 3, otherwise one might hesitate to attribute the coins to the same mint. The profile head devolves into an abstract design, while the reverse continues with ToT- / \ in the same style as the last coins of group 2, eventually tailing off into four Ts (Corpus 3484-3486).



Corpus 3475



Corpus 3485 Remmerden hoard

This final version occurs in the Remmerden hoard which, subject only to the hoard's integrity, suggests that the whole sequence of VERNVS was completed by the time Remmerden was concealed, thus a couple of years earlier than Aston Rowant, and definitely before the end of the primary phase.

Table 7.9. The number of dies and non-singletons of the VERNVS groups.

	group 1	group 2	group 3
Total	8	27	15
Obverse dies	6	10	8
Reverse dies	8	16	11
Obverse non-singletons	3	27	11
Reverse non-singletons	0	19	7

Group 2 has an obverse : reverse die-rate of 1 : 1.6. Group 3 is from an estimated 8 obverse and 11 reverse dies, which suggests that the use of a 1 : 2 die-ratio was eventually abandoned, late in the sequence.

Out of 39 single finds of groups 2 and 3, there is just one from Domburg, and one in a Dutch private collection. The rest are English finds, either certainly (the big majority) or probably. As the VERNVS types are overwhelmingly English in provenance, the obvious attribution is probably the correct one, although as we have seen the Remmerden hoard demonstrates their presence in the Big Rivers region at an early date. Where were the VERNVS coins minted? The distribution-map (fig. 7.10) strongly suggests East Anglia, and probably Suffolk rather than Norfolk. The Ipswich area is an almost 'empty quarter' for minting during most of the primary phase, all the more so if Types



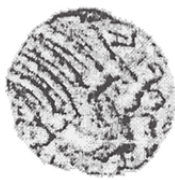
Figure 7.10. Single finds of VERNVS group 2 (dots) and group 3 (triangles) sceattas.

R1-2 are reattributed elsewhere. The only English provenance for group 1 is the Royston (Hrt) productive site. There is no great difference between the dispersion of groups 2 and 3. One notes two separate finds (of groups 2 and 3 respectively) from Barham (Sf), which lies 7 km north-west of Ipswich; but there are none from Coddendam (Sf), from where they might have been expected if they were local, nor from Ipswich itself, in spite of extensive excavation. More curiously, there are two (again of groups 2 and 3) from Watton (Nf). These hint at a merchant spending money in or near Watton, which he had obtained from the VERNVS mint.

VERNVS coins could enter inter-regional trade, as we see from the Remmerden hoard; and their presence in Aston Rowant shows that the currency of East Anglia could make a contribution. Less weight should be given to these hoard-coins than to the single finds, in attempting to locate the issue. The best guess we can make is Suffolk, but not Ipswich.

The alloy of groups 2 and 3 is of perfectly respectable quality (EPMA results of 94 and 95 percent 'silver'),¹³⁸ but the weight-standard tends to decline at the end (fig. 7.8 p. 210). The gold : silver ratio of the two examined specimens is substantially lower than in the four main groups of primary porcupines, suggestive of the use of a different stock of silver. The zinc contents of the two analysed specimens are higher than is normal in the primary phase, indicative of the use of some scrap brass.

The estimated number of reverse dies used to strike the groups 2 + 3 is: $26 : 42 = 27 : x$, $x = 44$. This brings the total volume of groups 2 and 3 on c. 440,000 coins.



Corpus 3439



Corpus 3489



The VERNVS coins seem not to have been a popular subject to opportunistic copying, probably because they were not sufficiently plentiful or well-known. Corpus No. 3439 attracts suspicion, and 3489 is certainly a poor, light-weight object (0.91 g), with a defective reverse design.

¹³⁸ Table 4.4 on p. 97.

3. The *Æthiliræd porcupines*

Corpus 3550



Corpus 3561

A scarce variety of porcupine, *BMC* Type 105, combines the distinctive obverse with a reverse reading in runes in two lines, surrounded by a triple pelleted border. The two halves of the inscription *Æthili - ræd* share a baseline, the second half being upside down in relation to the first. This has since the time of Marie de Man been described as '*en boustrophedon*'.¹³⁹

On most of the regular coins the curved 'spine' of the obverse is attached to the first of the parallel lines within the curve. Another striking element is a zig-zag line beneath. Outside that again, one sometimes sees an incomplete row of small pellets, as though part of an outer border.

The corpus includes 31 *Æthiliræd* types in a good and very consistent style. On the obverse die most coins have four parallel lines under the central curve, but seven pieces have only three lines. One pair struck from identical reverse dies joins an obverse with three and one with four lines. The reverse with the runic inscription is also very consistent. On some of the first group, the runes incline forward, on others they are erect, or they lean back. Eleven specimens show features associated with unofficial copying, such as lateral reversal, or general incompetence.



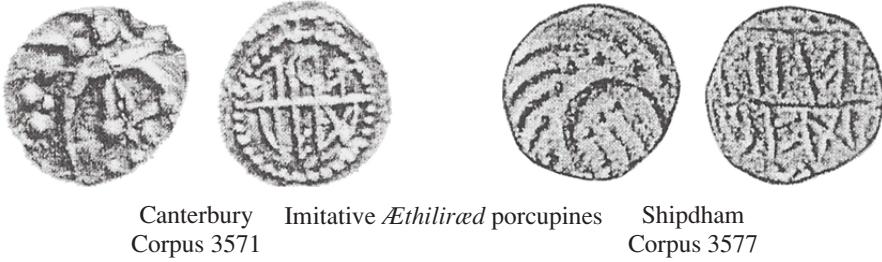
Corpus 3576, Kent

Five die-linked imitations have a sharp 'snout' on the spine, and lack the parallel lines within the curve. The runic legend is in mirror image, often a sign of imitation.

¹³⁹ De Man (1899).



Figure 7.11. Finds of *Aethiliraed* porcupines in England.



The finds of the standard style as well as the imitative *Æthiliræd* type are heavily concentrated in England (fig. 7.11). There are only two or three continental finds, all from Domburg.¹⁴⁰ The English/continental ratio is 11.6 : 1. So there is little doubt that they are English. The seven finds from Kent point to a Kentish origin, as Blackburn already suggested.¹⁴¹ An attribution to east Kent remains problematic, however, because that region is the home of Series A and C.¹⁴²

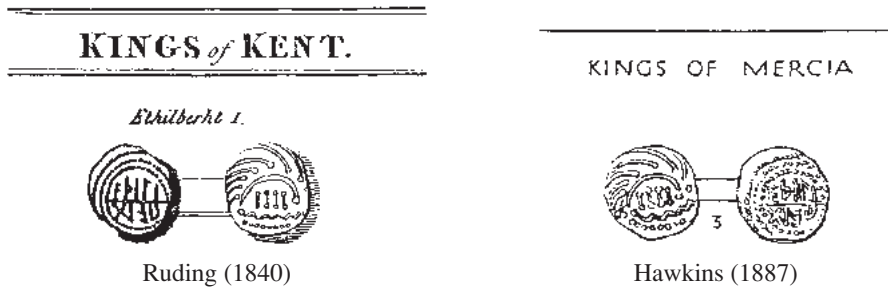


Figure 7.12. Older, now obsolete attributions of the *Æthiliræd* porcupines.

The name was first misread as *Ethilbert*, and erroneously linked to King Ethilberht I of Kent, who reigned from 568 to 615.¹⁴³ This led to a far too early dating of the sceatta issues in the first half of the 19th century. Haigh attributed the type to King Æthelred of Mercia (674-704), and they were so listed in Hawkins' book, and in *BMC*.¹⁴⁴ The fact that they are not found in Mercia is not an obstacle. But Rigold's chronology for the two primary series of sceattas

¹⁴⁰ The possibility that two specimens described by De Man in 1895 and 1899 are one and the same coin is not excluded.

¹⁴¹ Blackburn (1991).

¹⁴² Metcalf (2001) pp. 44-45.

¹⁴³ Ruding (1840); Hawkins (1841).

¹⁴⁴ Haigh (1839-40); Hawkins (1887); Keary (1887).

made it seem virtually impossible, if Series A and B were introduced only in 694.¹⁴⁵ Blackburn's revised chronology has now pushed that date nearer to 680, thus allowing the origin of the porcupine design to antedate the end of Æthelræd's reign, and bringing the Mercian attribution back at least within the realm of the possible.¹⁴⁶ Because most recorded finds occurred outside of Mercia, Grierson and Blackburn prefer to regard the name as that of a moneyer, analogous with *Pada*.¹⁴⁷ The *Æthiliræd* type must obviously post-date the porcupine variety that it copies, and cannot therefore be earlier than *c.* 695. Although in theory the opposite derivation, namely that the *Æthiliræd* type is the forerunner of the porcupine series, is also conceivable, yet it is very unlikely. The type was absent from Aston Rowant, which, given its size and the range of types represented in that hoard, is an argument against an early date – unless it is merely because the hoard was put together outside England, as its D : E ratio suggests.



Corpus 3546 Southampton

The few metal analyses that have been performed speak against an early date. One specimen in good style (Corpus 3546) was 97 percent 'silver', another (Corpus 3566) was 86 percent. The Canterbury find (Corpus 3571), with a snout, is very similar (88 percent 'silver') but if imitative is unsafe evidence for chronology.¹⁴⁸ The Hamwic find (Corpus 3546), is doubtless from early in the sequence. It is from exceptionally careful and elegant dies, the face of the dies being very smooth. In addition it showed 97 percent 'silver', plus 1.06 percent tin. Tin is a minor constituent rarely seen in the primary phase, certainly not in the early primary phase. The alloy also includes an unusually large trace of gold (2.67 percent).¹⁴⁹ Minting began ambitiously, but soon, it seems, the standard of the alloy faltered.

¹⁴⁵ Rigold (1960-61).

¹⁴⁶ Blackburn (1984).

¹⁴⁷ Grierson & Blackburn (1986) p. 176.

¹⁴⁸ Metcalf (1994) cat. no. 135.

¹⁴⁹ Metcalf (1988a) p. 39; Metcalf (1994) p. 662. 'Silver' in EPMA analyses is actually the amount of silver + gold + lead.

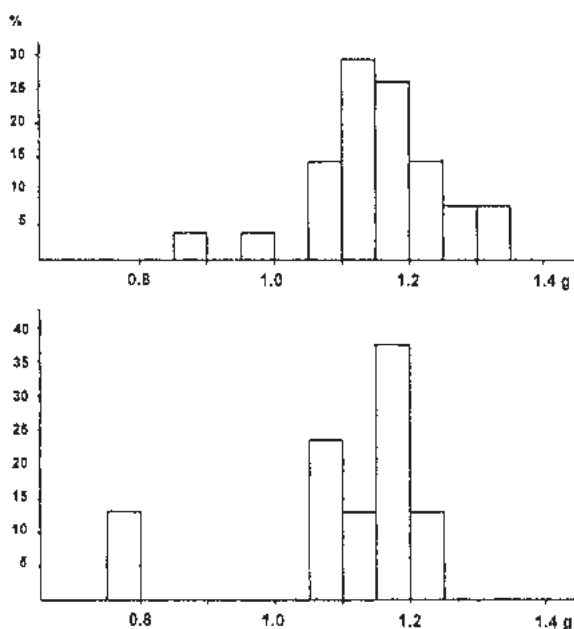
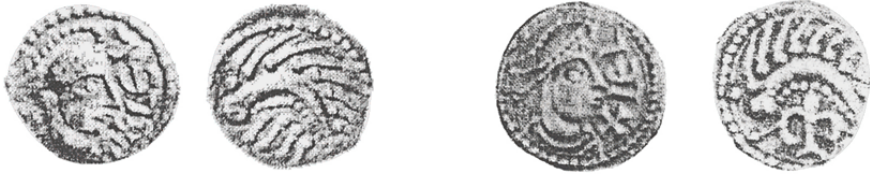


Figure 7.13. Weight histograms of the regular (N = 27) and imitative *Æthiliræd* porcupines (N = 8).

The average weight of the coins in good style is 1.14 g, which would be low for an early primary date, that of the imitations 1.09 g (fig. 7.13).

The 31 regular *Æthiliræd* porcupines (Corpus 3539-3569) are struck from 18 porcupine, and 15 *Æthiliræd* dies; there are 21 ‘porcupine’ non-singletons, and 24 *Æthiliræd* non-singletons, which implies, using Good’s formula (p. 14), original totals of 27 ‘porcupine’ and 19 ‘*Æthiliræd*’ dies. A line-by-line reading of the Corpus suggests the routine use of upper (‘porcupine’) to lower dies in a 2 : 1 ratio, except for Corpus 3546-3552, which are the other way round. We suspect that there was a change of practice: Corpus 3546-3552 are carefully made early dies, in which the porcupine design was on the lower die. If that is correct, the type was struck from an estimated 33 upper and 16 lower dies – a total volume of coinage of the order of a third of a million.¹⁵⁰

¹⁵⁰ See the comment on the implications of the obverse : reverse die ratio on the estimate of the total volume in the chapter “The stepped cross porcupine type”, p. 227.

4. *Series T (BMC Type 9) and associated varieties*

Clavering (Ess)

Series T, which uses the (obverse) porcupine design as its reverse, is an English secondary-phase type, from a mint-place apparently on the northern shores of the Thames estuary. The obverse has a London-based bust with an outward-facing legend +LEL or +LELNS. Six or seven specimens have been found at the East Tilbury productive site, and there are three from London.¹⁵¹ The mean weight appears to be *c.* 1.03 – 1.04 g, and its silver contents are in the 40–45 percent range.¹⁵² It was carried to the Netherlands only very occasionally; there is one old find from Domburg, with the legend TANVM+.¹⁵³

The reverse has a laterally reversed 'porcupine' design. On a unique specimen, the four bars under the spine of the porcupine are replaced by what in later centuries would be described as a fleur-de lis.¹⁵⁴ This is perhaps an initial issue? The reason why the porcupine design should have been adopted in south-east England is probably irrecoverable. It may have been for no better motive than that it was familiar in England, and commanded commercial confidence; or could it have been because the moneyer of Series T was serving a merchant community with strong Frisian links. There is plenty more to be said about Series T, but it belongs to English monetary history, and is hardly relevant to the subject of this monograph.

5a. *MONITASCORVM around obverse bust/porcupine reverse*

¹⁵¹ Metcalf (1994) at p. 545, considers an East Midlands attribution, but goes on (p 548) to argue the case for London or Essex. Various additional Essex finds have since come to light.

¹⁵² Metcalf (1994) p. 545.

¹⁵³ Op den Velde & Klaassen (2003) 63 = Rethaan Macaré (1856) pl I-24. A similar coin was present in the Lockett collection.

¹⁵⁴ EMC 2003.0063, Clavering (Ess) 0.9 g.

This is a rare variety closely modelled on Series T, and again probably from the northern shores of the Thames estuary, but reading *MONITASCORVM* (*BMC* Type 9var.).¹⁵⁵ This intriguing legend has tentatively been expanded *moneta sanctorum*.¹⁵⁶ The porcupine design, laterally reversed, bears a strong resemblance to the version seen on Series T. Fortunately, the hand of the die-cutter of Series T is so distinctive that one can state categorically that the *MONITASCORVM* coins are not also by him. Rare as it is among English single finds, a specimen is recorded from Domburg.¹⁵⁷ A zig-zag outer border appears clearly on what may be a slightly later issue.¹⁵⁸

5b. DE LVNDONIA around bust, reverse with SCORVM below porcupine



Kent

Woodham Mortimer (Ess)

Another derivative (as it seems) of Series T, which is equally scarce, copies the (early?) helmeted version of the Series T bust, and is technically remarkable for the neat setting out of its legend, *DE LVNDONIA* between two circles which must have been scribed onto the die with compasses. The reverse has *SCORVM* below the porcupine with the *S* sometimes reversed (*Z*). Another beautiful specimen, which may or may not be the work of the same die cutter, came from Woodham Mortimer (Ess).¹⁵⁹ As regards its mint-place, that seems clear enough. Where it fits in with the numerous other types that have been definitely or tentatively attributed to London is less clear: can more than one series have been in production simultaneously? Perhaps it is unduly sceptical to remark that the legend might be making a looser claim, that the coins are of the London standard or quality, or are in some way associated with London.

¹⁵⁵ Metcalf (1994) pp. 435-436; also De Wit S337 (ex Finn 1995), probably by the same die-cutter as the Eastcote specimen. Also *BNJ CR* (2005) 127 Hornchurch (Ess).

¹⁵⁶ Metcalf (1994) p. 435.

¹⁵⁷ Op den Velde & Klaassen (2003) 64. The coin has suffered badly, but one can just make out the obverse legend, *MONITASCORVM*.

¹⁵⁸ De Wit collection S338; Subjack collection 84; Abramson collection T200.

¹⁵⁹ Portable Antiquities Scheme ESS-F6FC74, and *BNJ CR* (2005) 128. Other finds are from Oxborough (Nf), Tiptree (Ess), Firle (Sx), and East Anglia.

5c. *Blundered DE LVNDONIA around bust, reverse porcupine*

On this coin, the head and face are of very inferior workmanship, and the legend is slightly garbled, reading ELVNDONIM, with a cursive final M (*BMC* Type 12/5). Six specimens are known, all die-duplicates.¹⁶⁰ Among them there are two Dutch finds, from the Hallum hoard and from Rotterdam. The variety would seem to be English, but confirmation would be welcome. The specimen in the Ashmolean collection is only *c.* 25 per cent ‘silver’,¹⁶¹ compared with *c.* 50 percent for Series T. Its poor alloy probably shaped P.V. Hill’s judgement that it was an intruder in the Hallum hoard.¹⁶² If that is correct, the same presumably applies to the E/N mule, no. 6 below.

The variability of legends found in Series T, together with its consistency of style, helps to show that it is the product of a smallish mint over a period of time. The MONITASCORVM variant is part of a wider-reaching episode involving other series too. The meaning of the legend is uncertain. Series T is probably from Essex, rather than London; the connection of the related variants with London remains to be established.

6. *AESE/porcupine (BMC/Hill Type 89) and associated varieties*

The very scarce coins with four letters clockwise around a central cross have previously been read as SEDE,¹⁶³ but an eighth-century letter D would surely not have been written with such exaggerated serifs.¹⁶⁴ The significance of (?)AESE is altogether unclear. The four letters are separated by symbols.

¹⁶⁰ Only one has a cast-iron English provenance.

¹⁶¹ Metcalf (1994) pp. 668-669. Note the tin contents of 5.6 %, and zinc 2.2 %, intended no doubt to improve the appearance of the alloy.

¹⁶² Hill (1954).

¹⁶³ Metcalf (1993) p. 246, referring to P.V. Hill (1953) p. 107 and pl VI-27. The coin was then apparently unique.

¹⁶⁴ Stewart (1984) p. 24 read (?)EGFR, but that suggestion can now safely be dismissed, in light of the increased number of specimens with clear readings.



East Marden (Sx)



Oxford collection, T&S 263

Two associated reverse designs are known. A specimen found at East Marden (Sx)¹⁶⁵ is, straightforwardly, a porcupine. Another has a laterally reversed porcupine, crudely imitated probably from primary Variety G.¹⁶⁶ The obverse found with this variety has annulets with central pellet as the symbols separating the four letters. Outside the dotted border it has either a legend of pseudo-letters,¹⁶⁷ or a cable border.¹⁶⁸ That progression is, of course, strongly reminiscent of Series O, and the specimens with pseudo-legend, in both Series O and AESE, are of good silver, suggestive of a date early in the secondary phase. The two AESE versions (pseudo-legend and cable border) share a porcupine die – a reminder, perhaps, of the very limited scale of the issue, but the details are puzzling.¹⁶⁹



The other associated reverse design is composed of a (?)snake coiled around a central crosslet, completely surrounded by what look like porcupine's quills. There is an outer zigzag border.¹⁷⁰ The obverse found with this variety has crosses instead of annulets separating the four letters.

¹⁶⁵ EMC 2007.0330 = CR (2008) 127.

¹⁶⁶ Metcalf (1993) No 263, 91% 'silver; De Wit collection S344, ex Spink.

¹⁶⁷ Metcalf (1993) No 263.

¹⁶⁸ Metcalf (1993) p. 246.

¹⁶⁹ De Wit (2008), erroneously describes them as die-duplicates. The central design of the two obverses is puzzlingly similar, making one wonder, almost, whether the border has been recut. But why would anyone have done that?

¹⁷⁰ Seven specimens of this variety are known.



'Celtic cross' group

Series O *BMC* Type 38

There is an eclectic coin of the 'Celtic cross' group, with the same coiled (?) snake around a central crosslet, completely surrounded by porcupine's quills.¹⁷¹ De Wit describes this coin as "the precursor of the great porcupine series".¹⁷² This is wildly unlikely, because the coin evidently post-dates the introduction of the primary porcupines. The knob-headed snake is again reminiscent of Series O. And the same basic design, 'improved', is seen on coins of another eclectic group, the C ARIP group. The creature's body is much more like the spine of the original porcupine, but at its front there is a delicately engraved monster's head.¹⁷³

None of these varieties was carried to the Netherlands. There are too few provenances, and too little information generally, for it to be clear, as yet, where in England Series O was minted (perhaps south of Thames?), nor whether the AESE type is subordinate to Series O in a similar way administratively to the nexus between Series T and its related varieties. Less weight should be given to the use of the porcupine design on the AESE variety, since it is not also used in Series O.

7. An E/N mule



E/N 'mule' from the Hallum hoard

Series N sceat

¹⁷¹ De Wit collection S270; Abramson collection Ccg1; Subjack collection 54. *BNJ CR* (2007) 191 Shoreham (W. Sx); 192 Maidstone (K); 193 Ely (C).

¹⁷² De Wit (2008) p. 71.

¹⁷³ Metcalf (1994) pp. 416-417.

This unique coin, from the Hallum hoard, is obviously imitative, and unless any of its fellows should turn up in the future, there is nothing that can be said about its place of origin. The reverse shows two standing figures holding a cross, reminiscent of Series N. Therefore, in date, it must be later than the introduction of Series N (c. 725). The letters HV within the curve of the porcupine's spine are reminiscent of the primary phase, but the quills are swept the wrong way.¹⁷⁴

Summary

Already during the primary phase a smallish English mint, possibly located in Suffolk (East Anglia), produced a sequence of coins with designs reminiscent of the 'plumed bird' porcupines and Series D Type 8. This so-called VERNVS group shows much variation and specimens differ considerably in design. The weight and alloy of these sceattas are in agreement with the larger series struck during the primary phase. The estimated total volume was approaching half a million coins.

Another scarce English sceatta type combines the runic legend *Æthiliræd* with on the other side a 'porcupine' design. *Æthiliræd* is possibly the name of a moneyer, rather than of a king of Mercia. The find distribution indicates a Kentish origin. The total number struck is estimated to be roughly a quarter of a million. Alloy and absence in hoards concealed during the primary phase make clear that they were been produced during the early secondary phase. Around a quarter are apparently imitations, in a garbled, incompetent style.

Series T comprises sceattas with a bust, and on the reverse a 'porcupine'. The legends around the bust read LEL, or MONITASCORVM, or DE LVNDONIA, and variants. Why these scarce variants use the same, laterally reversed 'porcupine' design is not known, but it indicates that they were all part of a somehow close-knit group. The finds are concentrated around the northern shores of the Thames estuary. The variability of the legends, together with its consistency in style, helps to show that these sceattas are the output of smallish mints over a considerable period of time. The debased alloy indicates production during the second half of the secondary phase.

Finally, there is a very scarce English type with four letters, separated by annulets or crosses, clockwise around a central cross, and associated with a straightforward 'porcupine' design, or a snake coiled around a crosslet, surrounded by porcupine-like quills.

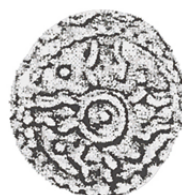
¹⁷⁴ Metcalf (1994) p. 462.

The reason why the porcupine design should have been adopted in south-east England is probably that it was familiar there, and commanded commercial confidence. Frisian merchants doubtless brought large quantities of continental porcupines to England, and received a small amount of English sceattas in return during the settlement of purchase transactions. The Dutch finds illustrate this very modest counter-flow of the English types from the Thames estuary to the Netherlands.

7.4 The porcupine/stepped cross type, a coinage from the upper Meuse basin or northern France?



Corpus 3496



Corpus 3511

The 'stepped cross' type (*BMC* Type 53) combines a porcupine obverse with a distinctive cruciform pattern on the reverse. To judge by the purity of its alloy, normally 90-94 percent 'silver', it is of primary date (table 4.7, p. 101). As it does not occur in the large Aston Rowant hoard, its issue probably began shortly before or even after that hoard was put together, late in the primary phase. But if it were minted elsewhere than in the Netherlands, that argument might be less secure: it might be a little earlier in date. The porcupine design is carefully copied from the primary variety G: the acute angle of the 'nose', only one limb of which is attached to the spine; the pellets (usually three) superimposed on the spine; and a rectangular box-like arrangement beneath the porcupine, sometimes enclosing a large X, when visible on the flan. There is also a large, neat annulet within the spine (and sometimes touching it). It is this unusually large annulet, as much as anything, which makes the design distinctive. It is copied most probably from the primary VICO variety 3, although in the 'stepped cross' version there is often a pellet at the centre of the annulet.

The reverse design has a similarly large annulet, again pelleted, from which eight zig-zag lines radiate, making up the four baluster-like arms of an open cross. The zig-zag arms of the cross touch an inner dotted border, beyond which there is an unusual zig-zag outer ornamental band. Usually it is mostly off the flan, because the dies were larger than the flans. So far as

one can estimate, there would be 25 to 30 small Vs in the zig-zag border. A similar border occurs very rarely on an English secondary-phase sceatta type,¹⁷⁵ but on the ‘stepped cross’ coins it seems to have been completely original.



Corpus 3514



Corpus 3518

Single pellets are often added ornamentally, either four, within the four arms, or four, between them, or eight (both), or haphazardly. Die-linked reverses usually, although not always, show the same pattern of pellets as each other. One would expect this trivial ornamental detail to be useful in arranging the coins into a sequence. Indeed, a run of four die-linked specimens (Corpus 3492-3495) helps to suggest that the variety with no pellets is the first. Occasionally there are groups of three pellets, and on one die, even, a crosslet. These are perhaps imitative (or later struck) specimens, on which the zig-zag border is replaced by dots. Because of its reverse design, Type 53 is easily recognizable today even by a non-expert. The proportions in which it is recorded in hoards and in statistics of single finds, e.g. compared with regular porcupine sceattas, should therefore be very reliable.

The weight distribution and the number of dies

The average weight of the regular style ‘stepped cross’ porcupines is 1.16 g, that of the imitations 0.94 g. Specimens with a sharp ‘snout’ fall within the same parameters as regular specimens.

The 35 regular ‘stepped cross’ porcupines are struck from 21 obverse, and 26 reverse dies; there are 24 obverse non-singletons, and 15 reverse non-singletons. According to Good’s formula, $15 : 35 = 26 : x$, $x = 61$. This is the original number of upper dies; the estimate for lower dies is 31. Clearly two reverses were used with each obverse. Accepting the conventional (and conservative) estimate of an average of 10,000 coins per reverse die, the scale of the issue was *c.* 600,000.

¹⁷⁵ See the MONITASCORVM and AESE types, p. 221 and 222-224.

Regional circulation and the monetary context

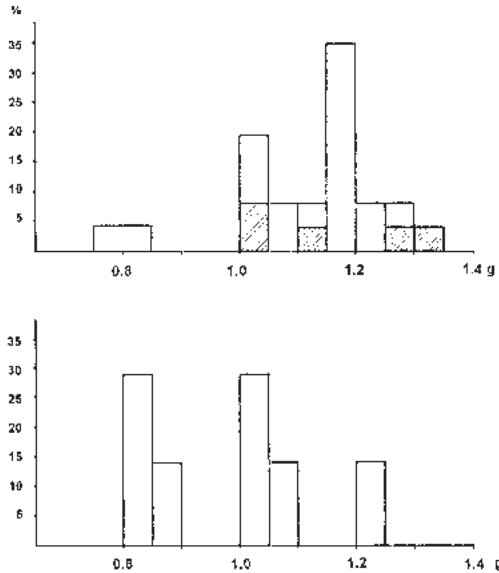


Figure 7.14. Histogram of the weights of the regular 'stepped cross' porcupines, above (N = 26), and the imitations below (N = 7). The six specimens with a sharp 'snout' are shaded. Step intervals 0.80-0.84, 0.85-0.89, etc. The specimens from Domburg are omitted.

The problem of mint-attribution

The corpus of specimens of the 'stepped cross' type, which stood at a total of just eight when it was first systematically studied, in 1985,¹⁷⁶ has now grown to 49. These include 36 single finds certainly or very probably from England, three from Domburg, three more from the Netherlands, and six from France. The question whether the type is English or continental is a difficult one. In comparison with the certainly English VERNVS coins, discussed in chapter 7.3, the proportion of continental finds is somewhat higher, and in particular there are finds from France, including one from Artois (Corpus 3516). In spite of the predominance of English single finds, it is not straightforward to conclude that the type is English, given that it is of primary-phase date. Its absence from the Aston Rowant hoard hints at a late primary date. Blackburn and Bonser in 1985 took the common-sense view that 'differences of detail and

¹⁷⁶ Blackburn & Bonser (1985).

style suggest that the dies of Type 53 were cut by several different hands and/or over a longish period'. That observation remains valid, if 'longish' means e.g. five or six years, but we would prefer to think in terms of official coins and imitations.

Histograms of the weights for coins in the regular style and for imitative coins (fig. 7.14) show that the former were well-maintained, with a median value of c. 1.16 g. The imitative coins tend to be lighter, and die-links are absent among them, perhaps because the average output of an imitative die was low. If the type were English, it might be difficult to find room for it after Aston Rowant and before the end of the primary phase.

Before looking for a mint-place, however, the argument deserves to be made that, unlike *BMC* Type 10¹⁷⁷, the 'stepped cross' type is indeed from a separate mint, and that it is not linked into the main porcupine series. Fortunately, the neat workmanship, as well as the distinctive porcupine dies with their large annulet, are without parallel in the main series. Where, then, was Type 53 minted? If the 'stepped cross' type were Continental, one would have to add the qualification that it, too, functioned as an export currency. That would have some bearing on identifying its home region. Moreover, although it is a scarce type, it was well enough known and esteemed to attract imitation.

The widespread distribution-pattern of the 'stepped cross' type, a more northerly pattern than *VERNVS* (fig. 7.10 on p. 213) is reminiscent of Series J, Types 85 and 37,¹⁷⁸ and Series G,¹⁷⁹ which are at most a few years later in date. It is not at all obvious that it is relatively more plentiful in any particular region of England (this point will be clarified below).

Its relative concentration, when measured against the primary porcupines, could however be slightly misleading if the imitations (which certainly exist) could have a different distribution within England from the regular or official issues. Exactly the same stylistic problem of drawing the line between copies and regular coins bedevils the study of Series J and G. Thirty-six specimens may sound like a usefully large sample from which to tackle the difficulty, but some of the finds were reported only verbally, without photographs. And then there is a small grey area, where it is not yet possible to judge whether a coin is official or imitative. Thus, for one reason and another, it is still not altogether clear whether the official 'stepped cross' coins have an essentially north-of-Thames distribution, as seems to be the case – unlike the primary porcupines, which are found both north and south of the Thames.

¹⁷⁷ Op den Velde & Metcalf (2003) p. 89.

¹⁷⁸ Metcalf (1994b) p. 360.

¹⁷⁹ Metcalf (1993) p. 267.



Figure 7.15. Single finds of 'stepped cross' porcupines in England. Coins in acceptable style are shown by dots, unverified coins are indicated by open circles, specimens that are certainly or probably imitative are shown by triangles. One find in Yorkshire is omitted, because the exact find spot is unrecorded.

If Type 53 is absent from a region, one must consider carefully whether that may not be merely for statistical reasons. The 49 specimens in the Corpus are matched by some 750 primary-phase porcupines. In so far as both types circulated together (which seems to be broadly true in England), only one 'stepped cross' coin is to be expected in any local or regional assemblage for every 15 primary porcupines. That is a rough and ready argument, but it is rather easily misjudged unless one does the arithmetic. For example, a glance at the map of single finds from England (fig. 7.15) suggests that there is a concentration in East Anglia and the adjoining county of Cambridgeshire. Could that be where the type originates? No, it is simply that East Anglia is very rich in single finds of sceattas. The ratio of Type 53 to primary porcupines, namely 7 to 76, or 1 : 11, would not pass any test of statistical difference from 1 : 15. Likewise the ratio among the Domburg finds, of 3 to 54, or 1 : 18, is as near to normal as one could expect, if the two types were exported from the Netherlands already mixed. From Hamwic there is just one specimen to set against seven primary porcupines (and none from the productive site on the Isle of Wight).



Corpus 3531, Spalding

At the major South Lincolnshire productive site, near Spalding, there are no regular specimens of Type 53, but there is a unique imitative coin with the stepped cross enclosed in a square standard (rather than in a circular border). To judge from the style of the porcupine die, specifically the smooth, high-relief modelling of the spine, it may be early tertiary in date, and in any case would have little bearing on the whereabouts of the official mint. And there are only a dozen primary porcupines from the Spalding site. The case where Type 53 is absent altogether from a productive site is statistically not much better than if there were one specimen. One needs a great many primary porcupines to achieve significance. The Rhineland, for example, have not yielded enough.

Because such a large sample is required to demonstrate the *under*-representation of the 'stepped cross' type at a site or in a region, arithmetically it is easier to argue from *over*representation. The only example that one could point to is the productive site near Sledmere, on the Yorkshire Wolds. It seems, however,

to be a special case, as will be explained below, and it should not be seen as encouraging the idea of a mint-attribution to the north of England.

Altogether, the ‘stepped cross’ type is found widely in England, both in East Anglia and the east Midlands, and along the south coast. There is no region in England with an obvious (relative) concentration of the type.

Finds in the Netherlands



Corpus 3491, Stephanik coll.



Corpus 3494, Cothen

We turn next to the single finds from the Netherlands. Of the 49 coins in the Corpus, only half a dozen have Netherlands provenances, and even that statement gives a slightly exaggerated impression. As already mentioned, there are three finds from Domburg, and it is unlikely to be coincidence that two of them are die-duplicates. They will have arrived at the site together. We can rule out Domburg as the mint-place. Then there are two finds from the Big Rivers region, from Maurik, and from Cothen, both from Gelderland. A coin from the Stephanik collection is presumed to be a Friesland find (Corpus 3491), but whether it is a single find or comes from a hoard is unknown. That leaves only a single find from the Kloster Barthe hoard (Corpus 3518), not necessarily minted in the north, concealed a couple of decades later, and in any case imitative. Can we say that all this points us, very tentatively, towards the Big Rivers region? There is an apparent contrast with the primary porcupines, which are widely scattered, with a good share from Friesland and the coasts. But the other half of that argument, concerning Type 53, rests on only a couple of coins. The evidence is flimsy.

Finds in Belgium and France

We come then to the daring question. Could the ‘stepped cross’ type possibly belong somewhere a little further to the south-west of the Big Rivers region, in Belgium or the north of France? Four crumbs of evidence, none of which is conclusive, at least encourage us to ask the question.

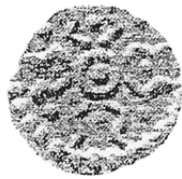
(1) Porcupines were dominant throughout the Big Rivers region and also Friesland, and we would expect a small mint within either the Frankish or the Frisian zone to conform, by striking close copies of the regular porcupine

design. Politically, we would expect the ‘stepped cross’ type to be from a region influenced by the porcupines, and able to participate in the North Sea trade into England’s eastern coastlands (note the Sledmere finds, discussed below), but politically separate and a little to one side. Let us say, somewhere that was not ethnically Frisian.

(2) The scarcity of finds from Belgium and northern France is not at this stage an obstacle, since reported sceatta finds of whatever type are few. That could be partly because of a lack of monetary activity, but also because diligence in reporting single finds to the authorities has been poor.¹⁸⁰ And in fact we have an old find of a ‘stepped cross’ porcupine from Artois, and another (die-duplicate) coin from the d’Amécourt collection, a third specimen in the Brussels cabinet, and a fourth in the Bibliothèque nationale de France. The matching tally of primary porcupines from Belgium and northern France is very small – just five specific provenances, namely Furfooz in Belgium, Ardres (Pas-de-Calais), Château-Porcien (Ardennes), and (further away) Rouen (Seine-Maritime) in France. Even though the numbers are so small, the ratio is really quite encouraging. There are half-a-dozen unprovenanced specimens from France, but they need not have come from the North. The possibility that the ‘stepped cross’ type was struck in an unexplored coastal *wic*, or alternatively in the upper Meuse basin, is plausible enough.



Corpus 3499, Nice-Cimiez hoard



Corpus 3532, near Montpellier



(3) There are two finds of ‘stepped cross’ sceattas from the south of France, from the Mediterranean coastlands. They strongly suggest that the type was available to be carried south by westerly routes through Gaul (i.e. not along the Rhine). One, in the Cimiez hoard, is of perfectly respectable style, and is die-linked to a find from Yorkshire (Corpus 3498-3499). The number of primary porcupines in Cimiez seems to have been seven. The other, from near Montpellier, is on a small flan and certainly imitative, but its value as evidence is in some ways greater than that of the hoard-coin (the same general problem arises with sceattas from the south coast of England, Series W, which were

¹⁸⁰ Theuvs (2007).

imitated and are found in the Cimiez hoard:¹⁸¹ either way, they were known in the far south).

(4) A remarkable Merovingian coin found on the South Lincolnshire productive site near Spalding in the autumn of 2004 copies the ‘stepped cross’ porcupine, with its distinctive large annulet.



Spalding p.s.



Corpus 2713, Narborough

The design is laterally reversed, a familiar symptom of copying. The reverse, in neat, unassuming lettering, reads +RCARNOTI (or +ECARNOTI?) around a bold annulet with central pellet.¹⁸² This refers, no doubt, to Chartres (where early Carolingian coins have a similar circular legend, CARNOTIS.¹⁸³ Taken on its own, the evidence of this unique coin might be considered ambivalent, since designs from far away could be copied quite without rhyme or reason (as, indeed, the ‘plumed bird’ design is copied from a Celtic bronze coin of the Carnutes,¹⁸⁴ perhaps just a coincidence). In the context of the three preceding arguments, however, one is perhaps entitled to think that the ‘stepped cross’ design was not unknown in the Paris region. Conversely there is no sign of it in Scandinavia.

Yorkshire finds

Three ‘stepped cross’ coins were reported on three separate occasions, in February 1993, October 1993, and April 1995, from a productive site in the north of England, by detectorists who sold their finds but kept the whereabouts of the site strictly secret, for reasons of competition and personal greed. Fifteen years later it became known, for certain, that the location of the site is near the village of Sledmere, in the rather isolated Yorkshire Wolds. The tally of finds from the site, shown to a serious student in threes and fours between 1992 and 2007, by that time included also ten primary porcupines (mostly reported by

¹⁸¹ Metcalf (2005) pp. 13-15.

¹⁸² The coin was acquired by the Ashmolean Museum as a favour from the finder, with whom DMM had a long relationship.

¹⁸³ Völckers (1965) plate B (four examples).

¹⁸⁴ Dhénin (1987) pp. 311-313. Dhénin’s figs. 8 and 10 are reproduced on p. 1.

1995).¹⁸⁵ These porcupines were the earliest sceattas to reach the Wolds region, where little or no coinage had previously been in use. It seems clear that Frisian merchants arrived in the region, possibly via the local east-coast port of Bridlington, with the purpose of buying wool and hides, from the flocks of sheep which grazed the chalk uplands of the Wolds. The merchants thereby kick-started the region's commercial development, which was geared to this foreign trade. The Sledmere site was at first the sole market-place. That does not fully explain the unusually high proportion of 'stepped cross' to primary porcupines, but at least it provides a geographical context, and allows us to dismiss any idea that the 'stepped cross' coins were minted locally (and were traded throughout eastern England!).

When the whereabouts of the productive site was still unknown, it was suspected to be at Flixborough in north Lincolnshire, a site known to have been plundered by detectorists; and because of the heavy concentration of Series J and G, and early porcupines, among the finds (unlike the mix of sceatta types found in the controlled excavations also at Flixborough) it was suspected that an undeclared hoard was involved, which the finders fed onto the market gradually. That now seems less likely, although still possible. Even if it were so, the evidence of the Sledmere site for the interpretation of the 'stepped cross' type would be much the same, namely that the coins arrived in the hands of merchants sailing out the Rhine mouths region, where the staple currency was porcupines. These merchants could conceivably have been men from the Meuse basin, trying to infiltrate the trade dominated by the Frisians; but the facts hardly warrant such a hypothesis. Unfortunately only one of the three 'stepped cross' coins was photographed by the middleman before being sold on: it is from the same dies (of good quality) as three other southern English single finds. The Sledmere site continues to be explored and to yield a fair crop of sceattas, and future finds may therefore bring some clarification.

Frisian merchants also arrived in Yorkshire via the Humber estuary, and sceattas of primary date have been found at various sites on both the north and the south banks of the estuary. These include one 'stepped cross' coin, from the Lincolnshire side.¹⁸⁶ Its style is discussed below, on p. 237. The Frisians also sailed up the River Ouse as far as York, where it seems that they established a colony in the southern suburbium of the city, at Fishergate. There is a passing reference to the colony in the *Life of St Liudger*.¹⁸⁷ The sceattas excavated

¹⁸⁵ Bonser (in press).

¹⁸⁶ Corpus 3523. Its Portable Antiquities Scheme code is HNL, for Humberside/North Lincolnshire.

¹⁸⁷ Tweddle, Moulden & Logan (1999) pp. 115, 129, 138-139.

there suggest a slightly later start-date; Type 53 is not represented – but there is only one primary porcupine.

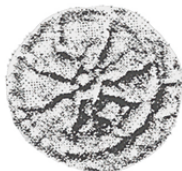
There is one other single find of the ‘stepped cross’ type, reported merely as coming from Yorkshire. It is in good style, and has been mentioned above, as being die-linked with a coin in the Cimiez hoard.

To sum up: the Yorkshire (Corpus 3498) finds of the ‘stepped cross’ type are of much interest for their commercial context, which seems to have been the same as that of the primary sceattas. Their style is regular; there is nothing to suggest that they were local imitations. Greater clarity may come with future discoveries. But in no way do they tilt the balance away from a continental mint-attribution. They seem to imply that the mint-place lay in a region close enough to the Big Rivers region, and which shared its appetite for imports of primary produce, especially (one supposes) wool.

A derivative style: the variety with two annulets



Corpus 3525



Corpus 3527



Several of the ‘stepped cross’ coins that one suspects to be imitative are struck from dies of poor quality, and may even show a lack of understanding of the reverse design, e.g. by modifying the zig-zag balusters into a clockwise whorl (Corpus 3527).



Corpus 3521

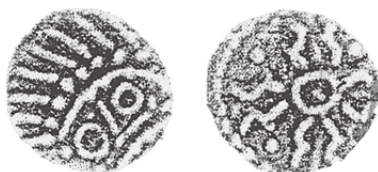


Corpus 3522



There is one shining exception, currently known from three obverse dies, of sophisticated workmanship (Corpus 3521-3524). The dot within the ‘nose’ of the porcupine is replaced by a second, matching annulet. In place of three dots superimposed on the spine there is a tight row of seven or eight dots, filling the right-hand end of the spine. This feature implies that the die-cutter was familiar

with the three-dot version, which must therefore be earlier; it is copied from the primary porcupine variety G. The porcupine has a large number of quills, tightly packed. All this may be an example of Blackburn and Bonser's comment that 'the dies were cut by several hands'. On the reverse the four zig-zag baluster shapes are much more carefully and symmetrically laid out than is usual in Type 53.



Corpus 3523, South Humberside

This die-cutter had a good eye, and neat, even elegant habits. The outer zig-zag band of ornament on the reverse is visible on Corpus 3521, which has largish pellets added in all the spaces, either singly or in threes. The intriguing technical novelty is that the 'balusters' on Corpus 3522 have an added central line, seriffed at its outer end. If it were not for the serifs, one might think that the lines were merely working guidelines. They appear again, as a distinct part of the design, on the coin of much rougher style from Humberside (Corpus 3523). Is this coin from the same workshop as the two beautiful prototypes, or is it imitative? – a grey area indeed, where judgement is better suspended. But the dies are perhaps not from the hand of the craftsman who originated the variety.

There is, regrettably, some confusion about the alloy of Corpus 3522 with added central lines.¹⁸⁸ It was analysed by XRF in 1968, and found to contain 96.25 percent 'silver'. It was re-analysed by EPMA, and is stated in the catalogue to be 96 percent silver, but in the tabulation of the full analytical results¹⁸⁹ the silver contents are given as 73.04 percent, copper 21.65 percent, and in the column for 'silver' is noted 'error?'. Does the analysis refer to some other coin? A repeat analysis is desirable, and – if it should show reduced silver contents – some others to confirm the finding.

Identifying imitations

One should resist as far as possible the tendency or inclination to interpret specimens as imitative, unless it is very clear that they are interlopers in an

¹⁸⁸ Metcalf, Merrick & Hamblin (1968) pp. 22 and 58 (O.44).

¹⁸⁹ Metalf (1994) pp. 668-669.

official series with a consistent style. Our knowledge of the ‘stepped cross’ type has not yet reached that point, even with 49 specimens. Imitations were made for a variety of reasons, both commercial and political. After all, the ‘stepped cross’ type openly imitates the primary porcupines, presumably in order to benefit from their commercial prestige. Deception was not involved, since the coins could be distinguished in a moment. The early sceattas offer plenty of other examples of the same kind of copying – the Frisian Series D copies one side of the English Series C; Types BII and BIII copy Series B; the East Anglian Series R copies Series C; and so on. The copies were minted in large numbers, and their production was public knowledge.

Fraudulent imitation was another matter altogether. It was done in private, it was small-scale and opportunistic, and it was worth-while to the counterfeiter because the intrinsic value of the coins was less than that of the official coins. Even if the silver contents were only five or ten percent less than they should have been, there was a modest profit to be made. The profit was increased by making the coins a shade lighter than they should have been. Sometimes the counterfeits were silver-plated on a base-metal core.



Silver-plated copper sceat, Corpus 3528

There is a modern forgery of the ‘stepped cross’ type which (at least in a photograph) is good enough to deceive.¹⁹⁰

Summary

The ‘stepped cross’ type is a distinctive porcupine variety. Most specimens show a consistent, regular style, but around 25 percent are imitations, given the garbled design and more variable weight standard. The high silver content indicates production during the final stage of the primary phase. The mint-attribution turns out to be a matter of conjecture. In spite of the predominance of English finds, there is no English region with an obvious concentration of the type, pointing to a mint on the Continent. The few finds from the Netherlands could be consistent with a mint in the region of the big rivers, but

¹⁹⁰ Abramson (2006) p. 154, No 152.

the evidence is flimsy and the co-existence of two designs in the region would be problematic. Given several finds of ‘stepped cross’ porcupines in France, where finds of primary porcupines are very limited, it is also possible that they have been minted in the upper Meuse basin or in northern France. From there, a few might well have been carried to the Big Rivers region.

7.5 Porcupines in France and Belgium

In the eighth century Anglo-Saxon and Frisian traders visited the market of the abbey of Saint Denis near Paris.¹⁹¹ The balance of trade in the first half of the eighth century between Merovingian Gaul and the Netherlands was entirely different from that between England and the Netherlands, in which there were very large outflows of sceattas to England, but little in the other direction. Substantial numbers of Merovingian deniers occur among the Domburg finds, where they make up 7 percent (67 out of 927) of the coins of that period. For Wijk-bij-Duurstede it is also 7 percent, for all other single finds in the Netherlands 6.7 percent. From France, conversely, there are 17 single finds of porcupines, or thereabouts, plus two sceattas of the ‘stepped cross’ type (possibly minted in the upper Meuse valley or France),¹⁹² one of Series D, and one Wodan/monster, among nearly 250 single finds of deniers inventoried by Lafaurie and Pilet-Lemière.¹⁹³ It is not possible to treat the numbers precisely, because they include some coins reported only in vague terms. Moreover, we cannot exclude the possibility that three or four of the porcupines might have reached France via the currency of England; that possibility is corroborated in that the total of roughly 250 includes between 20 and 25 sceattas struck by English mints. Again, however, several of these could be imitations minted in France. The over-all figure to set against the *c.* 7 percent in the Netherlands, is about *c.* 7 percent of porcupines in France. We do not know the relative sizes of the currencies in Gaul, England, and the Netherlands, which means that we are comparing 7 percent of *x* with 7 percent of *y*. Furthermore, the use of metal detectors is legally very restricted in France, unlike in England and the Netherlands. Nevertheless, the contrast between the Netherlands-French and the Netherlands-English balance-of-trade is perfectly secure.

There are various French hoards of Merovingian deniers, which also include a few porcupines.¹⁹⁴ In the Bais hoard, for example, there were seven or nine

¹⁹¹ Boeles (1954) p. 241.

¹⁹² See 7.4, p. 226 ff.

¹⁹³ Lafaurie & Pilet-Lemière (2003).

¹⁹⁴ See pp. 287-293.

porcupines, among 407 deniers. They were so few that there is no need to invoke any special explanation for them; they could probably have been hoarded from what was available locally. What is of interest is that they should be mostly (or all?) of the primary phase.

The provenanced single finds of porcupines listed by Lafaurie and Pilet-Lemière, with a few additions, are:

Table 7.10. Finds of porcupines in France and Belgium.

	L. & P.L.	Corpus	Variety
1. Rouen (Seine-Maritime)	76.540.12	0097	'plumed bird'
2. Dépt. Gard	-	0157	'plumed bird'
3. Dépt. Loir-et-Cher	-	0169	'plumed bird' der.
4. Furfooz (Belgium)	-	0312	VICO?
5. De Panne (Belgium)	-	-	Var. G3 ¹⁹⁵
6. Château-Porcien (Ardennes)	8.107	0460	Var. G3
7. Achères (Yvelines)	78.5.1.	0638	Var. D
8. Rouen (Seine-Maritime)	76.540.9.3	0658	Var. D
9. Ardres, Saint-Omer (Pas-de-Calais)	62.38.1	0670	Var. D
10. De Panne (Belgium)	-	-	G/VICO ¹⁹⁵ 'mule'
11. Amiens (Somme)	-	0944	sub-var. b
12. Bourogne (Territoire de Belfort)	90.17.1a	0974	sub-var. b-d
13. Dépt. Marne	51.000.2	1327	sub-var. d
14. Bourogne (Territoire de Belfort)	90.17.1b	2287	sub-var. e-h
15. Cambrai (Nord)	59.122.1.2	2360	sub-var. k
16. Rouen (Seine-Maritime)	76.540.10	2361	sub-var. k
17. Namur (Belgium)	-	2370	sub-var. k
18. Metz (near?) (Moselle)	-	2398	sub-var. k
19. Namur (Belgium)	-	2592	sub-var. k

¹⁹⁵ See p. 293. By mistake the porcupines found at De Panne were not included in the Corpus.

20. Nantes (Loire-Atlantique)	44.109.11	2859	sub-var. k
21. De Panne (Belgium)	-	-	sub-var. k ¹⁹⁵
22. Sens (Yonne)	89.387.3	3134	Var. E
23. De Panne (Belgium)	-	-	Var. E
24. Artois region (Nord/Pas-de Calais)	-	3516	'stepped cross'
25. Saint-Bauzille-de-Montmel (Hérault)	34.242.4	3532	'stepped cross' imitation
26. Palaiseau (Essonne)	91.477.1	2862	unknown
27. Saint-Saulve, Valenciennes (Nord)	59.544.1	2868	unknown
28. Saint-Rémy-de-Provence (Bouches du Rhone)	13.100.1.65	2878	unknown
29. Troyes region (Aube)	10.387.5	2882	unknown

The list is not long enough to subdivide or classify in any elaborate way. One can nevertheless see that the finds fall into some distinct topographical groupings, separated by large regions where deniers have been found but which are almost empty of porcupines (fig. 7.16). That means that the over-all figure of 7 percent, mentioned above, was exceeded in the focal regions, which one might label: (I). the Channel coastlands, 1, 5, 8, 9, 10, 16, 21, 23, and 24. At first sight one might suppose that these coins reached France from the Rhine mouth area by coastal shipping; (II). The finds from the north-east might have reached Belgium and France via the Sambre-Meuse valley, 3, 6, 7, 13, 17, 19, 26, or the Scheldt valley, 15. (III) The eastern finds 12, 14, and 18, might have been carried by the Rhine/Moselle. (IV). The finds 22, 26, and 27 are located on the borders of the Seine. (V). The Mediterranean coastlands (where Marseille was an important monetary centre) yield three single finds, 2, 25, 28, some of which may have been carried there by Englishmen en route to Rome. They complement the evidence of the Nice-Cimiez hoard, to the effect that quite skilled copies were made locally, of English (and Dutch) sceatta types, e.g. Series W,¹⁹⁶ and also half-a-dozen varied imitations of the 'plumed bird' issues. Both the 'plumed bird' porcupine from the hinterland of Montpellier (2) and the 'stepped cross' from Saint-Bauzille (25) are certainly imitative.

¹⁹⁶ Metcalf (2005), see also p. 10.

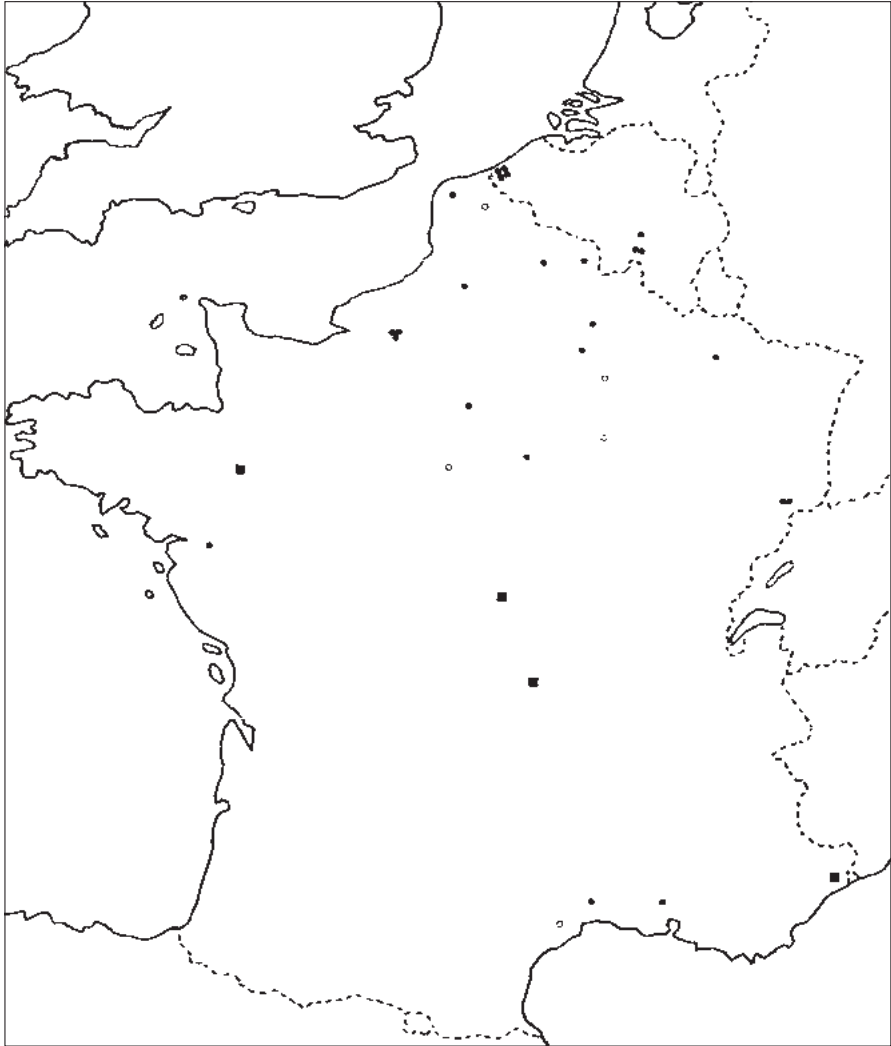


Figure 7.16. Finds of porcupine sceattas in France and Belgium. Squares indicate hoards containing porcupines, filled-in circles are single finds, open circles are single finds for which only the département is recorded.

Belgium was, more generally, the territory of the ‘interlace’ type, a regional pattern shown very clearly by map 21 in Lafaurie and Pilet-Lemière. The distribution extends just into France, with a find from Cambrai, and two more thought to be from the region of Auxerre.

From the département of Pas-de-Calais, where Quentovic lay, there are several finds of Series G and J, and others of Series G from Amiens (Nord). Further west along the coast, at Rouen, however, G and J are replaced by porcupines, which seem to reflect a cross-Channel link with England. Two of the three finds from Rouen are primary varieties. The third is a secondary-phase imitative coin, for which a French origin has been suggested, above.¹⁹⁷



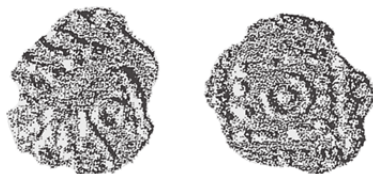
Corpus 2360 Cambrai



Corpus 2361 Rouen



The same is true of the porcupine from Cambrai, No 17, which is stylistically closely related to the Rouen find.



Corpus 0097 Rouen

The Rouen porcupine of the ‘plumed bird’ variety K is apparently a copy, as it has groups of only two, not three dots on the reverse. One would not wish to rule out the possibility that it has been carried back from Provence by a returning traveller, since ‘plumed bird’ imitations are rare in England. Direct cross-Channel links, e.g., between the mouth of the Seine and the Solent, are evidenced by other single finds, e.g. two sceattas from Saint-Wandrille-Rançon, Rouen, one of them minted in Hamwic,¹⁹⁸ and a coin of Saint-Ouen-de-Rouen from southern England.¹⁹⁹

¹⁹⁷ See p. 170.

¹⁹⁸ Lafaurie & Pilet-Lemière (2003) 76.659.1.1-2.

¹⁹⁹ In the collection of DMM.

A division of the French single finds into primary and secondary phase porcupines shows, at least, that the inflows began in the primary phase (cf. the Bais hoard). Among seven primary-phase coins in the above list, it is intriguing that three should be of Variety D, whereas in the Nice-Cimiez hoard, 'plumed bird' imitations predominate.

Summary

The balance of trade in the first half of the eighth century between Merovingian Gaul and the Netherlands was entirely different from that between the Netherlands and England, in which there were large outflows of sceattas to England, but little in the opposite direction. Merovingian deniers make up *c.* 7 percent of the coins finds in the Netherlands of that period. There are 29 reported single finds of porcupine sceattas in Belgium and France. Some of these are perhaps local imitations. The inflows began already in the primary phase. The single finds fall into distinct topographical groupings, separated by large regions almost empty of porcupines. These are:

- (I) The Channel coastlands;
- (II) Finds which might have reached the north-east via de Sambre-Meuse valley;
- (III) Finds carried to the east of France by the Rhine/Moselle;
- (IV) Finds on the border of the Seine;
- (V) The Mediterranean coastlands.

7.6 A French porcupine-related series possibly from central France

The Nice-Cimiez hoard included at least 21 specimens of a type with distinctive designs,²⁰⁰ namely a crude, narrow bust with crosslet in front. The reverse has V / I I in the lower angles of a cross, with a titulus above. De Belfort catalogues the full range of varieties, known to him principally from Nice-Cimiez.²⁰¹

The spiky hair of the bust (its 'chevelure hirsute') devolves into quills reminiscent of the 'porcupine' design around the cross. The possibility that the porcupine's quills of Variety G have inspired the die-cutter to become the spiky hair of the deniers has also been considered.²⁰²

²⁰⁰ Chabouillet (1890).

²⁰¹ De Belfort (1892-95) Nos 3037-3059.

²⁰² Lafaurie (1969).



De Belfort 3056

An old acquisition of the Cabinet de France in Paris with a degraded left-facing bust and a lozenge-like hair or head-covering is probably the prototype.²⁰³ This gives way, on Morel-Fatio 104, to spiky hair reminiscent of the porcupines. The bust soon degenerates into a design in which the human features become unrecognizable. The numeral V / II is familiar from tremisses minted in Mainz,²⁰⁴ Burgundy or Provence, e.g. at Mâcon or Saint-Maurice-d'Agaune, on which it stands for seven siliquae (cf. the 8-siliqua weight of Byzantine tremisses). On deniers, it is probably meaningless. It does not, certainly, indicate an alloy-standard of 7/8ths (c. 82-85 percent 'silver'). That is made clear by chemical analyses of three specimens in the Fitzwilliam Museum.²⁰⁵ XRF measurements of eight elements by 'Isoprobe' in the Oxford laboratory showed that a coin from the Nohanent hoard (see below), closely resembling Morel-Fatio's plate 6, 104 was 94 percent 'silver', and another resembling 107 was only 72 percent 'silver', plus 2.45 percent tin.



Föhr hoard no. 2

A specimen in the Föhr hoard (no. 2) again resembles Morel-Fatio 111, but the quills terminate in very distinctive and carefully executed bud-shaped pellets, something not seen in the main series. We are inclined to consider this coin as imitative or derivative. Its 'silver' content (by EDXRF) was 65/61 percent. The regional attribution of this small series (which made up one percent of the Nice-Cimiez hoard) has attracted speculation ranging widely. Because of the M on the reverse of De Belfort 3056 (illustrated above) Fillon attributed it to Mainz, and De Belfort listed it, with understandable doubt, as such.²⁰⁶ We now

²⁰³ Le Gentilhomme (1938) Plate IV-76 = De Belfort (1892-95) No 3056, 1.20 g.

²⁰⁴ De Belfort (1892-95) Nos 3004-3011, 3015.

²⁰⁵ Metcalf (1983) pp. 120-121, Nos 44-46.

²⁰⁶ Fillon (1853) p. 91. De Belfort (1892-95) Vol III p. 385: deniers anonymes de Mayence ... jusqu'à la proposition d'une meilleure attribution.

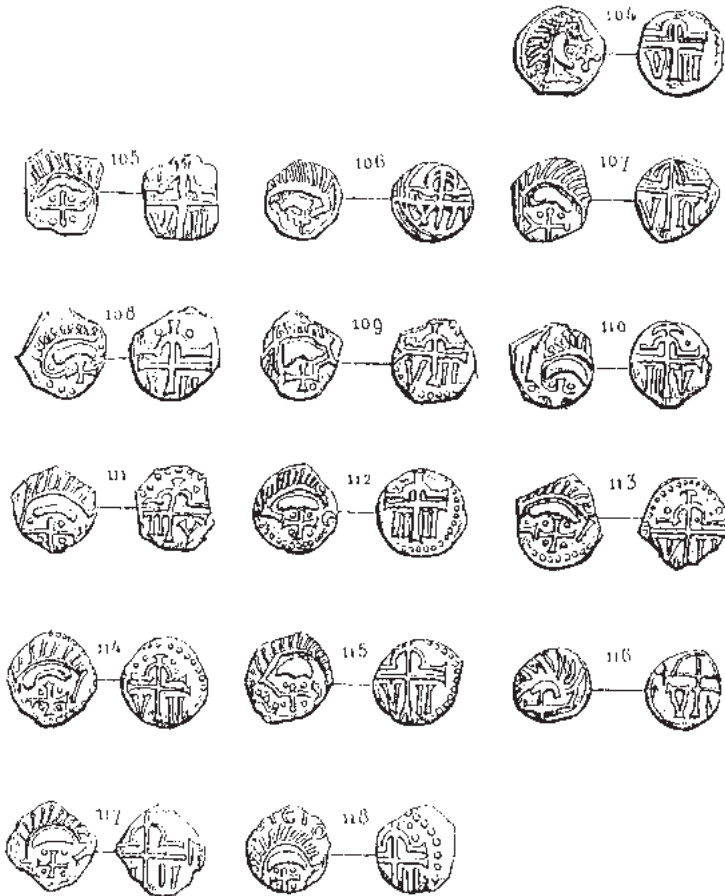


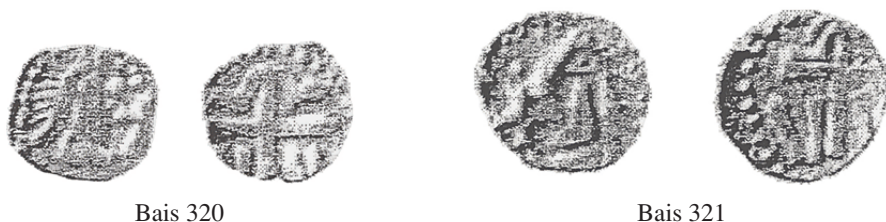
Figure 7.17. Silver deniers from the Nice-Cimiez hoard, line-drawings by Morel-Fatio.²⁰⁷

have a sufficient number of single finds of porcupine sceattas, etc., from Mainz to be able to say that the series does not occur there. Morel-Fatio saw in the numeral V / I I a degenerate version of MA, and in the titulus two letters S. This ingenious suggestion gives the name MASS(ilia) (upside-down) as seen on pre-reform coins of Charlemagne. For him, that tied in with the near-by provenance of Nice-Cimiez. The suggestion now seems far from persuasive. Prou and Le Gentilhomme were even inclined to exclude them from the Merovingian series and listed them as sceattas. However, Morel-Fatio's

²⁰⁷ Prou (1986); Le Gentilhomme (1938) p. 48.

suggestion that they were Provençal has been adopted by Lafaurie.²⁰⁸ Lafaurie observed that a number of hoards in the southern and central parts of Gaul allow us to locate their mint-place in the south of France. ‘Ces deniers mérovingiens’ he concludes, ‘s’ils ne sont pas de Marseille sont d’une origine très voisine’ [if they are not of Marseille, they are from very nearby].

Later, Lafaurie expressed another opinion. In re-editing two specimens in the hoard from Bais (Ille-et-Vilaine), (almost as far from Marseille as it was possible to go), he commented that ‘the analogy was so great between these deniers with a devolved head and the porcupine type, that one could hardly not see them as Anglo-Saxon sceattas’.



The two deniers in Bais, he concluded, may have served as models for the Anglo-Saxon sceattas [meaning porcupines], but were nevertheless minted in Gaul. Although theoretically possible, that idea commands no confidence, and is better forgotten.

In the search for the regional origin of the series, almost all options are still open. Single finds would be the best evidence. Site-finds from Saint-Rémy-de-Provence, the Roman *Glanum*, include 25 deniers from Marseille, but none of our little series.²⁰⁹ That is statistically no difference from the Nice-Cimiez hoard: zero in 25 could well be the same as one percent. At least the site-finds have the merit of reflecting the local currency, whereas with hoards one can never be completely certain how or where they were put together.

There were a couple of specimens in the hoard of Saint-Pierre-les-Étieux (nos. 74-75), and the two from Bais (nos. 320-321) illustrated above. A third specimen which is apparently a mule, from Saint-Pierre-les-Étieux (no. 76), is illustrated by Lafaurie from Belfort’s line drawing (3052). It has a straight-forward porcupine obverse, of primary variety G, coupled with a reverse of the type under discussion. Lafaurie prudently adds the cautionary remark, ‘original non revu’ [‘actual coin not seen’].

²⁰⁸ Lafaurie (1969) p. 175.

²⁰⁹ Lafaurie & Pilet-Lemière (2003) 13.100.1.24-65.



St. Pierre 76
De Belfort 3052



St. Pierre 75



St. Pierre 97



St. Pierre 99
De Belfort 5817

If the coin existed it would be, clearly, the prototype and beginning of the series, the design being almost immediately modified into a profile bust of similar shape to Variety G. The line-drawing of the reverse of no. 76 is, however, so unconsciously similar to the reverse of no. 75, that we suspect confusion. Moreover, the drawing of the obverse could very well be the same coin as no. 97. No 99 is a line-drawing of an also very unlikely ‘double reverse mule’ of Variety G. One of the sides of No 99 is very similar to No 97. De Belfort or his draftsman have accidentally created two hybrids. Lafaurie’s prudence was surely justified.



Nohanent 11



Nohanent 14



Confirmation that Saint-Pierre-les-Étieux no. 76 is indeed a ‘ghost coin’ comes from the Nohanent hoard, nos. 11-14, on which the hair is longer, thus closer in style to the porcupine’s quills. The Nohanent coins are probably from a slightly earlier phase of the series than those in Nice-Cimiez. If that is correct, it is an added reason to reject the ‘mule’.

The hoard in which our porcupine-related series makes up easily the highest proportion is Nohanent (very near to Clermont-Ferrand), with 4 specimens among only about 20 Merovingian deniers, or 20 percent. Nohanent had two deniers of Clermont, and 5 of Marseille. The ratio of coins of our series to those of Marseille, at 4 : 5, is as different as could be from the ratio in Nice-Cimiez, for example.

We can say categorically that the type is not found in England. It is rare in the Netherlands. There are two finds from Domburg,²¹⁰ one from Wijk-bij-Duurstede,²¹¹ and there is one specimen in the collection Van Rede, possibly a Dutch find.²¹²



Domburg 867

Wijk-bij-Duurstede

The evidence so far rehearsed for the location of the mint is in our view still rather inconclusive. The absence of the series among English single finds, and its virtual absence at Domburg point to a central or southerly French origin. The type is proportionally most plentiful in the Clermont-Ferrand region. On the more devolved specimens, seen mainly in the Nice-Cimiez hoard, the design is no longer recognizable as a profile bust (see fig. 7.17 above). Given Lafaurie's (secure) late dating for Nice-Cimiez to 741,²¹³ the devolved specimens could well be of late secondary-phase date. A similar date would, of course, be possible for the single finds from Domburg and Dorestad.

Summary

A series of Merovingian deniers with the bold numeral VII in the lower angles of the cross reproduces, on the obverse, the quills of the porcupine design. Their place of origin has attracted several hypotheses. Of these, we can now rule out Mainz. The type has been found so widely in France, that the few specimens in the Nice-Cimiez hoard do not (as has been suggested) constitute definite proof of a Provençal origin. The Nohanent hoard, from near Clermont-Ferrand, has the highest percentage of the VII series.

An apparent mule with a normal porcupine obverse, which seemed to be strong evidence tying the beginnings of the series into the regular porcupine series, has introduced confusion into the stylistic analysis of the V / I I coins, because it is a modern error, a false association of an unrelated obverse and reverse die.

²¹⁰ Domburg 867, 0.60 g = De Belfort (1892-95) No 3037 =? De Man (1926) Plate I-16. Domburg 868, 0.68 g = De Man (1905) No 260.

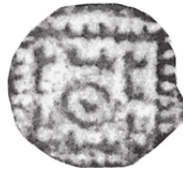
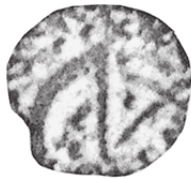
²¹¹ Van der Chijs (1866) plate III-7, ex collection Balfoort.

²¹² Now in the collection of the Geldmuseum, Utrecht.

²¹³ See p. 135-137

7.7 Porcupines in Scandinavia

Money from the Netherlands was already reaching the coasts of Jutland, doubtless carried by trading vessels, even before silver coins replaced the debased gold tremisses minted up until *c.* 675. A *Madelinus* tremissis was found in a grave-mound, Hastehoj, in the fields of Gadegaard, near the sea on the Limfjord, in 1856. Another *Madelinus* tremissis, pierced, was found by metal detection recently at Jelling. On a manor site at Dankirke, just 10 km south of Ribe, 13 coins from the 7-8th centuries have been found. They included two further *Madelinus* coins, in silver, which were minted perhaps five or ten years later than the tremissis; it is of interest that they are die-duplicates. Then there are two sceattas from late in Series D, *c.* 710,²¹⁴ one tertiary-phase porcupine of Variety El (Corpus 3020) and five Wodan/monster sceattas which will have come originally from nearby Ribe, but which had evidently circulated outside their mint-place, the *wic* (see below).²¹⁵ Again it is of interest that the porcupine should be very close in style to a specimen found at Helgö (Sweden) in 1974.²¹⁶



Corpus 3020 Dankirke



Corpus 3088 Helgö

From Norway, only one sceat is reported, apparently a Northumbrian issue of Series Y, from Ervik (Sogn og Fjordane).²¹⁷ Otherwise, there are a few Northumbrian stycas from Norway, evidence of direct contact across the North Sea. Essentially, Norway in the early eighth century lay beyond the orbit of trade out of the Rhine mouths.

Lödöse, the precursor of Göteborg (Sweden), is a Viking-Age trading place, founded too late for any finds of sceattas to be expected. The only early discovery is an iron axe from the fifth or sixth century.²¹⁸ Sceattas are similarly absent at Uppåkra in Skåne, at Lejre on Seeland, and elsewhere. Three Wodan/

²¹⁴ Op den Velde & Metcalf (2003). They are of varieties 3h and 4b, Corpus nos. 905 and 983. Variety 3h is absent from the Remmerden hoard.

²¹⁵ All the coins are admirably catalogued by Bendixen (1981) cat. nos 39-51.

²¹⁶ Malmer (1986). Corpus 3088.

²¹⁷ Skaare (1976) p. 158.

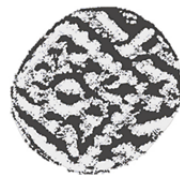
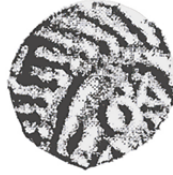
²¹⁸ Ekre, Hylander & Sundberg (1994) p. 8.

monster sceattas were found at Åhus in south Sweden.²¹⁹ The find of a porcupine sceat at Helgö (in the vicinity of Stockholm) has already been mentioned.

The tertiary-phase porcupine from Dankirke (Corpus 3020) is significantly later in date than the beginnings of the Wodan/monster issues at Ribe, and is to be set in connection with the Föhr hoard, which likewise terminates with Variety El. The Dankirke site yielded various other artefacts indicative of long-distance trade.



Corpus 1984 Gudme



Corpus 1986 North Moreton

The coasts of Jutland are almost the eastern limit of the penetration of sceattas. Apart from the porcupine from Helgö, in eastern Sweden, there is just one from Gudme, on the Danish island of Fyn (Corpus 1984). It is from the same obverse die as a Kloster Barthe coin (Corpus 1983), and from extremely similar dies to two English finds, *BMC* 56 (Corpus 1991), and a coin found at North Moreton (O) in 1976 (Corpus 1986). That raises the question whether the Gudme find might possibly have reached Scandinavia via England. Like Dankirke, Gudme was a high-status site in the iron-age (Roman) period, and has also yielded a continental runic sceat,²²⁰ and tenth-century coins.

The Ribe excavations of 1970-1976, on the Post Office site, revealed a wonderfully detailed stratigraphy and yielded 32 sceattas.²²¹ The numerous layers were grouped, and interpreted as chronological phases. The sceattas came from Phases 1 to 4, apart from some that were residual ('reembedded'). They are mostly Wodan/monsters, but there were two secondary-phase porcupines, *c.* 715 - *c.* 730, both from Phase 3, and from the sector named Kunstmuseets Have.



Corpus 1598

Ribe, Kunstmuseets Have



Corpus 1599

²¹⁹ Callmer (1983).

²²⁰ Pedersen (1997).

²²¹ Bendixen (1973).

They were found some distance apart from each other.²²² Although they are not die-duplicates, they are close in style, and the reverse design, including one sideways letter T, is so unusual in our Corpus, that the probability is great that either they arrived in Ribe together or else they are local imitations. Consider: if a merchant arrived at Ribe with a purse of say 40 or 50 coins of this unusual variety, which he spent, and the coins passed into circulation in the *wic*: if the local currency was of any size (which it surely was), the chances of two of these 40 or 50 occurring among 32 stray losses would be very small. The problem is intriguing. One other find from 1970-1976²²³ might possibly be a porcupine, but it is too damaged for its type to be certain.

Subsequent campaigns of excavation at Ribe have been at Sct. Nicolajgade, in 1985-1986, and elsewhere in the market-place area in 1990, 1993, and 2000. There are now altogether about 210 sceattas from the various Ribe excavations, and the Post Office site coins mentioned above have been dated to Phases B (705-725), D (760-780), and E (780-790).²²⁴ From Phase B there are seven other sceattas plus two Wodan/monsters, from Phase D, two other sceattas plus five Wodan/monsters, and from Phase E, one plus seven. Those figures can be interpreted as a trend, whereby Wodan/monsters become increasingly dominant; but the other sceattas have their story to tell. The stratigraphy of most of the other excavated sites is, alas, not so clear-cut as that at the original Post Office site. The Wodan/monster coins, about which there has been considerable controversy, dominate the Ribe finds, and the porcupines, etc., other than those just described, have been relatively neglected. Without entering into the discussion about the mint-place of the Wodan/monsters,²²⁵ we would simply say that the attribution of secondary porcupines to two minting regions, and the political significance in the adoption of the porcupine design in Friesland means that there is no empty space in the Netherlands where a home could be found for the Wodan/monsters. They belong without doubt to Ribe. They are, it is true, more plentiful as single finds in Friesland than in the Big Rivers region, but that is simply a matter of regional proximity.

Scientific prospecting by metal detector in and around Hedeby (Haithabu), on the isthmus of Jutland, has resulted in the recovery of a good haul of coins, including one Wodan/monster sceat,²²⁶ and has strongly suggested that the

²²² Bendixen (1973) Cat. no 22 = D12686, and 24 = D12793.

²²³ Bendixen (1973) Cat. no 13.

²²⁴ For a summary, see Feveile (2008) pp. 53-68.

²²⁵ Metcalf (2002) p. 109, no 2.

²²⁶ Hatz (1989); Feveile (2008).

place did not develop its commercial importance until the ninth century.²²⁷ Hedeby was not a mint-place for Wodan/monsters, nor for porcupines. There is one recent stray find of a porcupine from Schuby (Corpus 2396), a few kilometres away. It is of a distinctive reverse design, doubtless imitative.



Corpus 2396, Schuby



Corpus 1956, Krinkberg

In a grave-field near Krinkberg, south-west of Hedeby, three Wodan/monster sceattas and a porcupine (Corpus 1956) were excavated.²²⁸ Various sites at Ribe, on the north side of the river, have yielded 22 porcupines, of which some 15 are legible, alongside a considerably greater quantity of Wodan/monsters. Eighteen are listed in table 7.12 at the end of the chapter. With only one exception they appear to belong to the secondary phase, as may be seen from fig. 7.18. That means that they arrived in Ribe and were lost there at a time when Wodan/monsters were already the town's dominant currency. We do not know the source of the bullion from which Wodan/monster coins were struck, but it is a reasonable assumption that it reached the town from the Netherlands and England, in the form of other sceattas, including no doubt porcupines.

It would seem that merchants arriving at Ribe were required to visit a moneyer, to convert their silver into the official Wodan/monster currency. How, then, did the 15 excavated porcupines (a tiny sample of what was above-ground) escape? We do not know, but the situation is not so surprising: at Hamwic, for example, Series H amounts to only about half the currency.

There is a very significant difference between the Ribe material and the Föhr hoard, which contained half-a-dozen secondary-phase porcupines (fig. 7.19). Four of these bore cuts, where they had been chopped with a knife, to test the quality of their alloy and to make sure that they were not plated copies. The cut-marks, on those parts of the design in high relief, usually the spine of the porcupine, are analogous to the pecking, which is a routine secondary characteristic of later Anglo-Saxon and German coins in the Northern Lands. Coins

²²⁷ Von Carnap-Bornheim & Hilberg (2007) pp. 199-218. 'The systematic prospection with metal detectors which has been in operation since 2003 and which is still in progress has brought a wealth of new small finds of the Viking Age to light but no new eighth-century metal finds, not even from the southern settlement site'.

²²⁸ Hatz (1989).

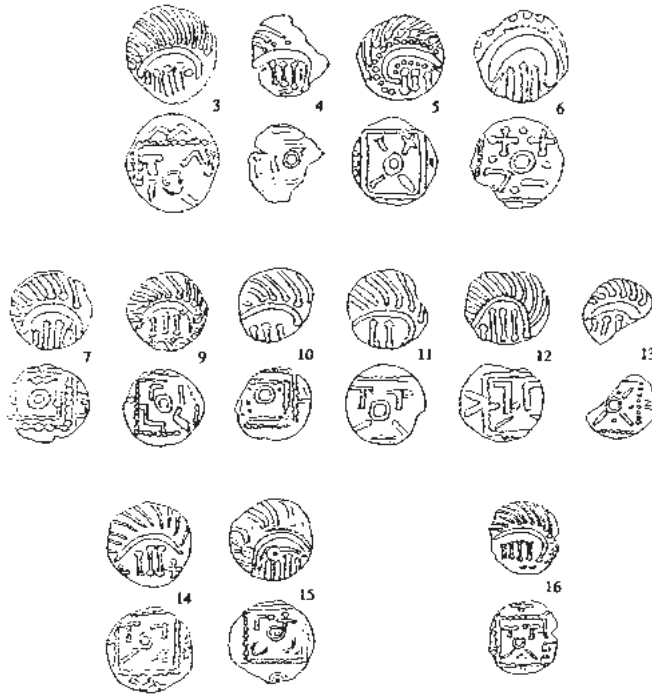


Figure 7.18. Porcupines from Ribe, from sites north of the river.
For site and Corpus numbers, see table 7.12, p. 256.



Figure 7.19. Secondary-phase porcupines from the Föhr hoard,
Hatz nos. 82-87.

from Dankirke are cut-marked,²²⁹ but the porcupines found in Ribe are not, so far as one can tell. The soil of Ribe has not been kind to them, but the marks should have been visible at least sometimes, if they were ever there. Their absence probably implies that they had not been circulating in the same pool

²²⁹ Personal communication by Claus Feveile, to whom we are indebted for discussing this with us. He has suggested that the Dankirke coins are a little hoard, because they are distinctive in this way.

of currency as supplied the Föhr hoard. We have never noticed porcupines with cut-marks anywhere else: if the odd one turned up in the Netherlands or England one would assume that it had once been in Scandinavia, and had been carried back from there. (Cf. Corpus 3246 on p. 110.)

The cut-marks seen on so many of the coins in the Föhr hoard offer the clearest evidence that they had circulated, either on the island or inland in Scandinavia, but in any case beyond their home region. The Föhr hoard was not simply a sum of money in transit, newly arrived off the coast of Scandinavia. A great many of the tertiary-phase porcupines in it bear test-marks, as do the Merovingian deniers and the coins of the English Series G and J. All these sceattas had changed hands in Scandinavia before they were hoarded.

Primary-phase porcupines are lacking at Ribe, and there was just one – a ‘plumed bird’ with test-mark – in the Föhr hoard. It could still have been in circulation in the Netherlands or in England in the secondary phase.

The secondary-phase coins are, as may be judged from the diagram, stylistically a very mixed bunch, with more than their share of specimens that one would relegate as being in one sense or another derivative or imitative. It seems not to have been the case that merchants, whether they were setting out from the Big Rivers region or from Friesland or even from England, arrived carrying sums of money that were characteristic in their composition of the currency of their home region. Would such merchants have chosen deliberately to bring with them a riff-raff of inferior coins? – We doubt it. Half-a-dozen of the Ribe finds have been included in the Corpus under sub-variety d (and five others as sub-variety k), but when they are viewed from the standpoint of Ribe, we would hesitate to assert that these specimens assigned to sub-variety d in our Corpus were minted in the Big Rivers region. Even those specimens that are formally in order, such as nos. 8 and 11-13 (fig. 7.18), include small irregularities of workmanship or design, which give pause. On no. 13, for example, the four lines within the curve of the porcupine terminate with small crescents rather than pellets. If it is the case that these coins are not quite what they seem, it poses some problems of numismatic interpretation: where were they minted? The two coins from the Post Office site, with which we began, are an illustration of the difficulty. They are of decent style and workmanship, but the reverse pattern with three letters T is extremely unusual. The two-mint hypothesis throws light on the majority of porcupines from the Netherlands, but it is not intended to claim that all porcupines originated in those two minting regions. It may well be necessary to think also of small-scale copying at other mint-places.

The extremely miscellaneous character of the assemblage of porcupines from Ribe makes any monetary analysis difficult. We draw attention to no. 8, with

an unusual zigzag or step pattern in one quarter of the standard seen again on Föhr 85, certainly by the same die-cutter, but cut-marked. And Föhr 84 belongs to a distinctive small group of imitations which has been discussed, above. Its region of origin is uncertain, possibly northern France,²³⁰ but this specimen could well have reached Föhr via northern England.

The secondary-phase porcupines from Föhr are, in general, a better class of money than those from Ribe. Whereas no. 87 shows the characteristic diamond-oriented symmetry of Friesland porcupines, on nos. 82 and 83 one half of the reverse design is rotated through 180 degrees, and placed back to back. The same geometry applies to no. 84. Ribe no. 6 is evidently of tertiary date, but it also appears to be imitative.

That is about as far as one can go in interpreting the Scandinavian material at present. More points of interest will very probably emerge if the data-base is enlarged by future discoveries. Meanwhile, we can say that although Ribe stood alone (not yet rivalled by Hedeby), its currency is not simply an outpost of the currencies of the Netherlands or England. Its monetary history is not to be seen in isolation.

Table 7.12. Porcupines from Ribe

Phase			Variety		Source
Kunstmuseets Have (2 porcupines, among 32 sceattas)					Bendixen (1973)
1			sub-variety d	1598	No. 22 = D 12686
2			sub-variety d	1599	No. 24 = D 12793
ASR Posthuset (4 porcupines, among 54 sceattas)					Feveile (2006)
3	3	Phase B	sub-variety d	1614	p. 289
4	5	Phase B	?	2863	p. 289
5	8	Phase B	sub-variety k	2658	p. 290
6	26	Phase D	Variety F	3420	p. 292
ASR 951 Riberhus (7 porcupines, among 25 sceattas)					
7	3		sub-variety k	2551	p. 301
8	4		?	2864	p. 301
9	5		sub-variety d	1572	p. 301
10	12		?	2385	p. 302
11	13		sub-variety d	1542	p. 302

²³⁰ Corpus 2359, see pp. 169-173.

12	22		sub-variety k	2681	p. 303
13	25		sub-variety k	2633	p. 304
ASR 1085 Gasværksgrunden (2 porcupines, among 9 sceattas)					
14	1		sub-variety d	1596	p. 305
15	4		sub-variety i	2274	p. 306
ASR 1357 Giørtzvej (one or two porcupines among 7 sceattas)					
16	4		sub-variety b	0920	p. 307
17	7		?	2865	p. 307
ASR 7 Excavation of 1985-1986					
18	35		?	1786	NNÅ 1994

Summary

Maritime trade brought porcupines to the coast of Jutland, where they have been found at Dankirke and, especially, the *wic* of Ribe. Porcupines are absent at Hedeby (as is now well established by controlled metal-detecting), but there is one find of a porcupine from Schuby, nearby (and one from the Krinkberg, near Pöschendorf). Monetary penetration further to the east than Ribe was severely limited, but there is one porcupine from Gudme, and even a tertiary-phase specimen from Helgö in Sweden. The dozen specimens from Ribe are stylistically varied. It seems that many of them are imitative.

There is a contrast, which is important for the monetary historian, with the Goting Kliff hoard from the north Frisian island of Föhr, in which four of the six porcupines (as well as other types) had been chopped with a knife, to test the quality of their silver. A couple of chop-marked coins are on record from Dankirke, but they do not occur at Ribe.

7.8 Porcupines in the middle Rhinelands

Building work for a Hilton hotel on the Löhrrstrasse in Mainz involved a good deal of digging and earth-moving, and gave the opportunity to local metal detectorists to recover early-medieval coins from what turned out to be a remarkably productive site, and one which has yielded novel information of much interest for the early history of the city. The detectorists sold many of their finds to a local coin dealer, and it was possible for Christian Stoess to keep a record of material which passed through his hands in this

way.²³¹ A total of 143 early medieval coins were published in 1994. The earliest are a Germanic imitation of a Roman antoninianus, and then a gold tremissis of Mainz and a Madelinus tremissis. There follow 20 sceattas, and five pre-reform deniers of Pepin (2) and Charlemagne (3). There are a further 33 Carolingian coins, some of them minted at Mainz itself (MOGONTIACUS), and others at Dorestad. Both the coins of Pepin have also been attributed to Mainz.²³²

Whatever monetary interpretation one places on the moneyers' gold tremisses struck at Mainz, it is now clear that the city where Archbishop Boniface eventually had his see was an important trading place, reached from the Netherlands by river traffic, in the first half of the eighth century if not sooner. Already before 794 this trade route extended up the Rhine as far as Basel and across the Alps to northern Italy, as single finds and coin-hoards demonstrate. Of the 20 sceattas, just one is of Series D, while all the rest are porcupines. Three or four are of the primary Variety G, and the rest are from the secondary phase, mostly imitative. 'Interlace' sceattas are conspicuous by their absence, as are Merovingian deniers (except for Stoess no. 5), and also tertiary-phase porcupines. It seems that sceattas were reaching Mainz chiefly from the Big Rivers region, and not from farther west, and apparently not directly from Friesland. Of the four primary varieties, there was an affinity with Variety G – which is probably another small clue to the localization of its mint-place. It may have been imitated in the middle Rhineland: note that Stoess no. 20 is of very poor silver, while nos. 21-25 are all described as copper. Their alloy is sufficient proof that they are imitations, although it does not tell us where they were made. Given the less-than-ideal circumstances in which all the Hilton finds were rescued for science, one cannot rule out the possibility that some or all of them were grave-finds. In spite of the uncertainties, it seems safe to say that there was a monetary upturn which reached the middle Rhineland between c. 690 and c. 740, whereas the reign of Pepin witnessed something approaching a recession.

Mainz in the first half of the eighth century was not an isolated pocket of monetary circulation. The city seems to have been the motor driving monetary use in the surrounding region (table 7.13 and fig. 7.19).

²³¹ Stoess (1994).

²³² They read DMAG.C.S, a mint-signature which is common enough under Charlemagne, but extremely scarce for Pepin. Stoess (1994, p. 178) takes these two coins as evidence for an attribution to Mainz, *contra* Metcalf (1964-65), where a Netherlands attribution is tentatively argued. Stoess may be right, but the Mainz attribution does not follow automatically from these two provenanced specimens, any more than one would automatically attribute the (numerous) porcupine finds to Mainz. M remains unrepentant, noting that there is no letter D in Mogontiacus, and that Völckers (1965) catalogues *inter alia* three DMAG.C.S specimens in the Jelsum hoard and from the Krinkberg.

Table 7.13. Finds of sceattas in the Mainz region. Some of these are early finds, of which the types were not described. They may or may not have been porcupines, but most of them undoubtedly are.

Bad Münster am Stein	Maschen
Bonn	Meckenheim
Dietersheim	Nassau
Eltville	Remagen
Erbenheim	Rheinbach
Euskirchen	Rhens
Galgenberg	Schwabsburg
Gernheim	Trier
Griesheim	Weisenau (Mainz)
Kaltenengers	Wiesbaden
Kornwestheim	Zülpich
Kreuznach	

Of special interest are two die-identical ‘plumed bird’ specimens found at Aschaffenburg and Wenigumstadt (Corpus 0049, 0051).²³³ Another ‘plumed bird’ porcupine was excavated in Liestal-Münzach (Corpus 0102), in Switzerland.

Further north, at Rhens (c. 10 km south of Koblenz) in a grave two die-duplicate porcupines were found (Corpus 1389-1390).²³⁴ They are certainly imitative, and again might be of local manufacture. Further afield, there is a sceatta find from another urban centre, namely Trier. All along the Rhine from Gernsheim to Kalkar, mainly at left-bank sites, sceattas have been found.²³⁵

Five from Xanten are of special value, as coming from controlled excavations, at the cathedral. Only one is certainly a grave-find, but the others are probably also. They are two of Series D, a secondary-phase porcupine, an ‘interlace’ type, and a Wodan/monster.

There is another ‘interlace’ type (minted in the Meuse basin?) from Krefeld-Gellep, from the vicinity of the castle. And from Köln or thereabouts there is a Series D, bought there in 1912. The mix of types found farther north offers

²³³ It is possible that the reports from the finds near Wenigumstadt and Aschaffenburg indicate the same coin.

²³⁴ Illustrated on p. 291.

²³⁵ Heinrichs (forthcoming), and personal communications.

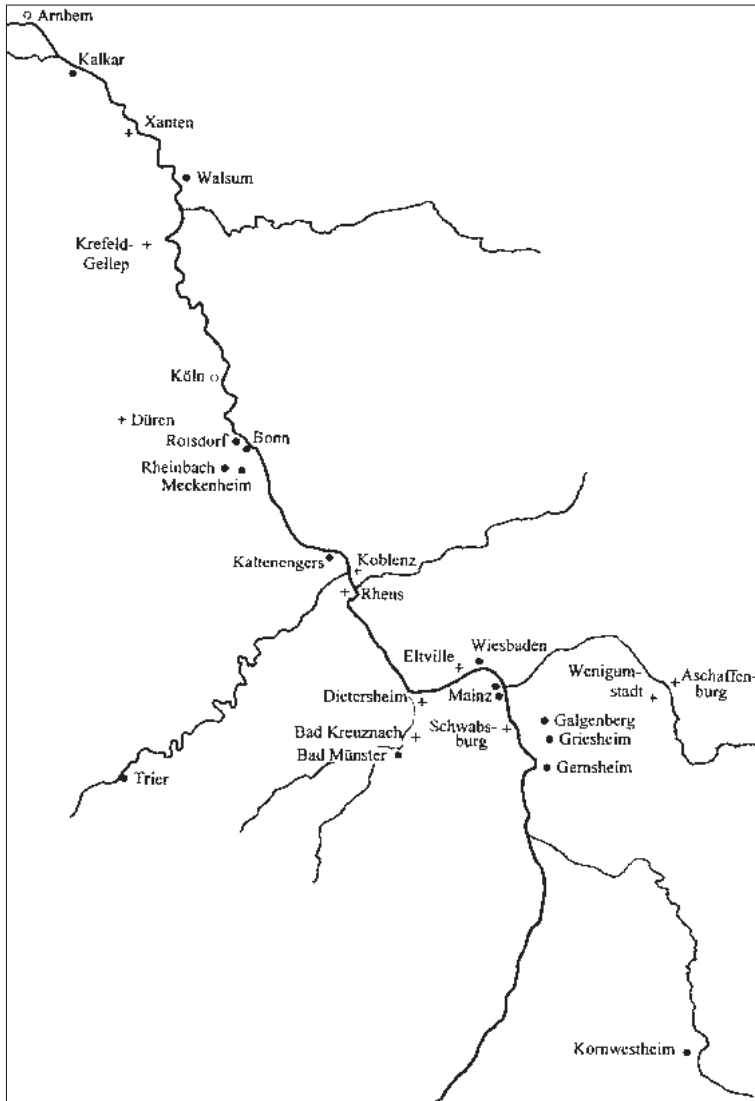


Figure 7.20. Finds of porcupine sceattas in the middle Rhinelands. Based on the study in progress by Prof. J. Heinrichs, who kindly shared his forthcoming publication with us. Grave finds are indicated by a cross. No porcupine sceattas were found at Arnhem and Köln, these cities are indicated for orientation. There are two sites with porcupine finds in Mainz. It is possible that the reports from the finds near Wenigumstadt and Aschaffenburg indicate the same coin. Several finds are not listed in the Corpus, because an illustration was not available, and the variety is unknown. The most southerly find of a porcupine sceat (a ‘plumed bird’ variety) in the course of the Rhine, from Munzach-Liestal in Switzerland, near Basel, falls outside the frame of the map.

a contrast with Mainz, and helps to create the impression that the porcupines at Mainz reflect direct, long-distance river travel originating in the Big Rivers region.

The concentration on porcupines, however, seems to be over and above what might be expected if a random handful of sceattas from the currency of either Domburg or the Big Rivers region had been carried south. That is true especially of the primary phase, when Series D was so plentiful in the southern Netherlands. It is perhaps another reason to think in terms of imitation as well as export.

From Bonn comes a Series D, and a secondary phase porcupine (Corpus 1885). The porcupine is again from a grave-find, but it is from dies represented in the De Meern hoard and elsewhere. Two porcupines from near-by Roisdorf were found in a mineral spring, the so-called Trajanus-Quelle. They are both copies, in a low-tin bronze alloy.²³⁶

Excavations at St Anne's church, Düren (south-west of Köln), produced a porcupine, again a grave-find (Corpus 2124), and from the same dies as an English single find from Foulsham (Nf).

One's general impression is that the balance of payments was against the middle Rhineland in the first half of the eighth century: the region did not accumulate a stock of coinage silver.

Summary

Porcupines have been found at numerous sites along the Rhine, with a concentration at Mainz and its region. Many are imitations, of inferior alloy or even just copper. That perhaps suggests that they were made locally. In the primary phase, everywhere south of Xanten there is a conspicuous scarcity of Series D, and a concentration on porcupines of Variety G (although the numbers are small), which would be unlikely to have arisen, if the Rhineland finds were a random sample, carried south, of what was then in use in the Big Rivers region.

²³⁶ Zedelius (1980) 3 and 4, p. 141 and note 13.

8. DISCUSSION OF THE RESULTS

8.1 The shape of the argument

Introduction

The reader has been presented with a dauntingly large amount of detailed information about the porcupine sceattas, deriving from a Corpus of over 3,500 specimens. The material has been submitted to various separate statistical analyses, with two distinct purposes, namely to identify differences in the way they were made, and differences in the ways they were used. The same basic information is often reprocessed to support separate arguments. The first task is to create perspectives of a purely numismatic character, by devising a scheme of classification of the porcupines corresponding (we hope) with the order in which they were issued. Only when one can refer to groups of related coins is it possible to make generalizations about their average weight, their alloy, and the estimated number of dies from which each group was struck. Secondly, one may then be in a position to build on those numismatic attributions, using them in the construction of distribution patterns, from which to describe the trends of regional monetary history, as seen in the ways in which the coins circulated. The picture that is created serves to draw attention to the intensive commercial activity which the coins imply, especially the trade between the Netherlands and England. The final stage of the argument is to set these monetary affairs into their political context in the history of the Netherlands (see the next section 8.2).

We hope that students in other disciplines, who may not be familiar with the methodologies that numismatists and monetary historians of the early middle ages routinely employ, will have the patience to get to the bottom of our arguments and to understand them thoroughly. To help them, we offer this brief recapitulation of the key arguments and the way in which they fit together – the shape of our survey.

Classification

Classifying the porcupines, which is the very first step, relies on the style and content of their designs. Historians and archaeologists should not make the mistake of dismissing classification as an arcane exercise, of merely antiquarian interest. All subsequent arguments are built on the resulting groups of specimens. One cannot discover the average weight of a variety without first

having determined the group of coins from which the average is measured. It is an empirical exercise, which has the practical benefit that handling the material is made more manageable, by breaking it down into separate smaller blocks.

The volume of the porcupine sceattas

The study of obverse and reverse die-links helps to validate the scheme, and it is also a necessary preliminary to statistical estimation of the numbers of dies which were employed to strike the porcupines. Using the conventional estimate of 10,000 coins as the average output of an upper or reverse die, it becomes very clear that the porcupines were minted in enormous quantities. Over the full date-range of the type, many millions, even tens of millions, were struck, at a time when the purchasing power of one gramme of silver was closer to that of one gramme of gold in the modern age. Broadly speaking, and even allowing for margins of uncertainty, the evidence is that the economy of the Netherlands was intensively monetized in the first third of the eighth century. In more detail, estimation of the numbers of dies used for each numismatic variety in the scheme permits comparisons which lead reliably (subject only to margins of statistical uncertainty) to general historical conclusions.

Thus, in the primary phase, the scale of issue of porcupines, minted in the Big Rivers region or at Domburg, was roughly of the order of 9 or 10 million, concurrently with some 20 million sceattas of Series D from Friesland. This assumes that the average die-output was much the same for both types, which is admittedly conjectural. In the secondary phase, when porcupines were the coin type of both regions, the dominant share was transferred to the south, with probably 30 million coins from the Big Rivers region/Domburg (the exact allocation of sub-varieties i-k is uncertain), against only 7 million from Friesland. The over-all rate of production is dependent on the respective duration of the primary and secondary phases, but appears to have been similar. In the tertiary phase, the sample size is inadequate, but it seems that the over-all output was much reduced, down to between 3 and 4 million porcupines, certainly a dramatic decline. Some secondary-phase coins may have remained in circulation, but the hoards suggest that that was not a major factor.

The chronology and dating of the porcupine varieties

The iconography of the porcupines offers hardly any clues either to their date of manufacture, or to their mint-place. A *terminus ante quem* for the minting

of a coin can occasionally be determined from dendrochronological dating of an archaeological context, as for example at Ribe in Jutland. But the date of the coin's manufacture may be significantly earlier than the date of loss. With single coins, one can rarely know at all exactly how old they were when they were accidentally lost. Dating can best be established empirically from hoards in which porcupines occur alongside more readily dateable coin types, issued by Anglo-Saxon or Merovingian rulers. There are few enough of these, and many hoards contain no varieties that are independently dateable. Even if a particular hoard appears promising, the variety in question will usually provide at best a *t.p.q.*, because its issue will not necessarily be close to the date of the hoard's concealment: it may be an older coin. Thus, even the most helpful hoards may suffer from a degree of uncertainty, at least if one hopes to do better than date the porcupines to the nearest decade. It turns out that some of the key evidence comes from far away, from coins of the bishops of Paris, in a hoard found on the outskirts of Nice, on the French Riviera. Closer to home, we judge that much of the hoard chronology is otherwise still debateable, and that the Frankish conquest of Frisia and the death of the Frisian ruler Radbod offer the best anchor-point for the porcupines.

If a scheme of absolute chronology can be constructed only very patchily, the relative chronology of the porcupines is, by contrast, perfectly straightforward. They fall into three phases, with clear-cut boundaries, namely primary (*c.* 695 - *c.* 715/720), secondary or Kloster Barthe (the type-ward) (*c.* 720 - *c.* 740), and tertiary or Franeker (from *c.* 740 onwards). They were an unusually long-lasting and stable coin type, persisting until they were swept aside in the Big Rivers region by Pepin's coinage reform (assumed to have been begun in 754), which introduced broader, thinner denarii.

The primary phase (c. 695 – c. 715/720)

The discovery of the Aston Rowant hoard in Oxfordshire in 1971 showed which varieties were already in existence by the date of that hoard's concealment, late in the primary phase, and which (broadly speaking) were not. There was a gratifyingly clear pattern: four distinct varieties (the 'plumed bird', VICO, G, and D varieties) had been minted doubtless in parallel with each other, and constitute virtually all porcupines of the primary phase. There were no links (such as 'mules') between them. The impression created was thus of four separate workshops.

The provenanced finds in the Netherlands are too few to permit detailed reliable statistical comparisons. But in any case the primary-phase porcupines were

not minted in Friesland. The residual localization of single finds shows that the primary porcupines were relatively most plentiful at Domburg by a good margin. That was, in all probability, where most of them were minted, while Series D was minted in Friesland, apparently at Wijnaldum. Given that there are some small but interesting differences among the four primary varieties of porcupines as regards their metrology and alloy composition, one should not altogether yet rule out the possibility that one or two could have been minted along the course of the Rhine.

The “vast trackless wastes” of the secondary phase (c. 720 – c. 740)

There was an abundant middle phase, which seemed to be altogether lacking in any similar outward signs of administrative tidiness. An apparently endless profusion of design variations morphed into each other. In so far as distinct sub-varieties could be identified, they were freely ‘muled’ with each other, seemingly indiscriminately. As recently as in 1993, one of us referred despairingly to ‘the vast trackless wastes of the later porcupines’.²³⁷ It is the most dramatic claim of this monograph, to have discovered an over-all pattern within all that confusion, by dividing the bulk of the secondary-phase porcupines between two minting regions in the Netherlands, in Friesland and in the south.

The strong evidence that the secondary-phase porcupines are to be divided between two minting regions comes from a combination of their different designs, metrology, and their regional occurrence. The Corpus lists them under the heading of eight sub-varieties. Three of these (sub-varieties b-d) have a neat, symmetrical reverse with ToT- / \. Five (sub-varieties a, e-h) have a reverse with a ‘mixed grill’ of symbols. The contrast in the designs is very obvious, even if there may be some blurring at the edges, through the inclusion of imitations. The difference in design is matched by a difference in weight of roughly 8 percent. The ‘mixed grill’ coins were heavier, and also the weights of the flans are more accurately controlled. The contrast in metrology can be seen from the Corpus overall, and also from hoard after hoard, taken separately. The five sub-varieties a, e-h are on a significantly heavier and better-controlled weight-standard than b-d. A tabulation of the ratios of single finds shows the clear contrast in the currencies of Friesland and the region of the big rivers.

²³⁷ Metcalf (1993) p. 222.

Table 8.1. The ratio of single finds of the secondary-phase sub-varieties in various regions

	b-d	:	a, e-h
Friesland	59	:	41
Big Rivers	83	:	17
Domburg	75	:	25
England	68	:	32

Sub-varieties b-d dominate the currency of their minting-region of origin, the Big Rivers region and, to a slightly lesser extent, that of Domburg (which was perhaps more open to money from Friesland). The great majority of the single finds are in any case of southern origin. Thus, the volume of the respective minting is a major factor in explaining the pattern. Sub-varieties b-d were struck from an estimated 2,002 dies, a and e-h from 775 (sub-varieties i and k are numerous enough to distort this conclusion, but we do not think that they change the course of the argument, because their proportion in the currency is highest at Domburg, and lowest in Friesland). Perhaps the Frankish conquest of Frisia had somehow diverted the flow of silver into the hands of moneyers in the southern minting region ('to the victors belong the spoils'). The ratio for England is less eccentric than in the primary phase.

The numismatic task of constructing from the perceived chaos a scheme of classification which should reflect the order or pattern in which the second-phase porcupines were minted was, to put it mildly, a headache. Some specimens were, no doubt, opportunistic imitations struck elsewhere than in the main mint or mints, and if so, one had to recognize for practical purposes that they were confusing the data and making analysis more difficult. But the weights and the general quality of even the more imitative-looking of the secondary porcupines were, on the whole, good. Resorting to the idea of imitation in order to offer an explanation for the undisciplined designs was not much more than an admission of defeat. It is permissible to think of a fringe of counterfeits, etc., but the chaos of the secondary phase is on a vast scale, and is intrinsic to it. Could one begin to introduce some order into it by examining the progressive occurrence of sub-varieties in a chronological sequence of hoards? There are several hoards from Friesland composed of secondary-phase porcupines, plus the odd surviving primary-phase coin, but most of them seem to include a full range of secondary varieties – doubtless because they were concealed at dates close to the end of the secondary phase, which had lasted for perhaps twenty or twenty-five years, from *c.* 720. It is plausible that some of them were concealed and not recovered because of the Frankish

assault on Friesland in 734. These hoards, each containing anything from 30 to 100 porcupines, are too small to demonstrate the absence of a particular minor variety from the currency at their date of concealment, for purely statistical reasons. If the secondary phase had been tidy, they would have done the job, but because it is so complicated and irregular, much of their potential remains locked up. For the time being, one should not try to 'read' them in other than broad terms. An internal chronology for the secondary phase, which would be a big step forward, even if it was only a relative chronology, remains dependent on future discoveries of hoards, and preferably sizeable hoards, from earlier or mid-way through the phase. An early hoard would immediately show which varieties launched the secondary phase (and to what extent primary-phase coins remained in circulation). Four small hoards from England, namely Fingringhoe, Flixborough, Kings Lynn and Lambeth, provide crucial evidence in that respect, even though they contained only one secondary-phase porcupine each, in association with primary-phase coins (see below pp. 288-290 and 296).

We have taken care to speak of minting regions rather than mints, i.e. of designs and weight-standards which can be localized to a region, although not to a specific mint-place. The four primary-phase varieties could have been all in one place, e.g. Domburg, or (more probably) one or more of them could have been elsewhere in the Big Rivers region. The same arrangements could well have been continued into the secondary phase, where the categories, within sub-varieties b-d, are more difficult to discern. In Friesland, it seems probable that there were two separate minting traditions, represented by sub-varieties e and g, and f and h respectively. Evidence for that idea lies with the De Meern hoard (p. 287), in which sub-varieties f and g are under-represented.

The tertiary phase (c. 740 – c. 800?)

The discovery as long ago as 1868, of the large Franeker hoard, from the *terpen* district of Friesland, had indicated that there was a final phase of the porcupines, this time with just three substantive and perfectly distinct varieties, and one substantially smaller variety. Primary and secondary-phase porcupines survive in the Franeker hoard in minimal numbers, but essentially the earlier porcupines had quite disappeared. If the hoard is characteristic of its region of discovery, they had disappeared likewise from the currency of Friesland. Two of the three new varieties, designated E and B, deliberately echo the designs of two of the four varieties from the primary phase, after a gap of thirty years or thereabouts. The design of Variety F deliberately echoes a secondary-phase sub-variety which can be securely localized to Friesland. A secondary-phase

prototype had to be used, because no primary-phase porcupine variety was minted in Friesland, which during the primary phase was producing Series D. It looks, therefore, as if the tertiary-phase porcupines were minted mostly in the Big Rivers region (or Domburg), but partly in Friesland. The rather isolated evidence of the Franeker hoard was reinforced by the discovery in 1976 at Föhr, in the North Frisian islands, of a similar hoard, concealed a few years earlier. The date at which the tertiary phase began was quite late in relation to the English secondary phase, as may be judged from the absence of the Franeker varieties among 32 porcupines in the Woodham Walter hoard.

In the tertiary phase, the over-all volume of porcupines minted fell away dramatically, from something of the order of 4,000 reverse dies for the secondary phase, to a mere 400 or so. Die-estimation offers figures of *c.* 350 reverse dies for E, AF, and B, and *c.* 50-70 dies for Variety F. Perhaps the estimate of *c.* 50-70 will need to be adjusted upwards.

There is a matching decline in the monetary economy in most regions of England. The ratios listed in table 8.2 are based on much smaller numbers of single finds, and will be subject to wider margins of statistical variation. The regional contrasts, however, are large enough for that not to be a practical problem.

Table 8.2. The ratios of single finds of tertiary-phase porcupines in different regions.

	E, AF, B	:	F
Friesland	94	:	6
Big Rivers	59	:	41
Domburg	64	:	36
England	80	:	20

The tabulation seems to suggest that Varieties E, AF, and B belong to Friesland, and F to the Big Rivers region. This is the exact opposite of what the choice of prototypes suggest. One local fact emerges very clearly and uncontroversially: in the Big Rivers region, the single finds show a new emphasis on Dorestad (where single finds of primary and secondary porcupines are relatively few). Out of 34 tertiary single finds in all, from the Big Rivers region, 24 are from Wijk-bij-Duurstede, namely E, 14, B, 3, and F, 7. There is a contrast with the residue of single finds from the region. In place of the E+AF+B : F ratio of 59 : 41 for the region as a whole, Wijk-bij-Duurstede gives 71 : 29.

The secondary-phase sub-varieties e and g, which F echoes, are without any doubt from Friesland. Our instinct is to trust the iconographical evidence, and not the find distribution discussed above. Furthermore, Variety F begins later

than E and B, as shown by its absence from the Föhr hoard (*t.p.q. c. 755*). But it entered the region of the big rivers plentifully.

It is almost certain that at the time of the introduction of Variety F the issuing of porcupine sceattas in the Big Rivers region was already completely swept away by the broader Carolingian pennies. Apparently the Frankish/Carolingian control was not yet strong enough in Friesland to prevent the continuation of the production of porcupines there. In all likelihood the tertiary porcupines stayed in use in Friesland, and were allowed to circulate in the Big Rivers region at par with the new Carolingian coins, at least for some time. Meanwhile, the tertiary-phase porcupines reached England only in small numbers. It is unclear whether they arrived there directly from Friesland, or by the Dorestad-Domburg route (as the 20 specimens of Variety F from Domburg and the 4 found at Westenschouwen suggest). They perhaps even reached France, given the three specimens in the Paris collection.

Beyond the fringes of the porcupines' official circulation area, at Ribe in Jutland, archaeological stratigraphy shows that the secondary-phase porcupines remained in circulation there until more or less the end of the eighth century, or even later. It is uncertain if the currency at Ribe was replenished with tertiary porcupines. There is only one stratified find of a Variety F sceat in a ground-layer from *c. 760-780*. Perhaps the specimens of Variety F were recycled on arrival into Danish Wodan/monster sceattas, otherwise there must have been a cessation of Frisian trade with Denmark.

Altogether our understanding of the tertiary phase is still limited, with many open questions, such as the exact end-date of the porcupine sceattas.

Where and how were the porcupine sceattas used?

Porcupines (plus Series D in the primary phase) made up the bulk of the currency in the Netherlands, e.g. around 80 to 90 percent, and a quarter to a third of the currency in England. Although these sceattas were also carried into more distant regions, the commercial partnership of the two countries and the circulation-area of the coins essentially coincide.

The porcupines of all three phases were minted primarily as an export coinage, but the secondary-phase coins especially were also widely used in their home regions. Those from the northern and southern minting regions mingled freely with each other. The primary-phase coins were, however, destined first and foremost to be spent overseas, primarily in England. Thus they were a way of exporting silver bullion *via* the North Sea trade, in return no doubt for imports of commodities into the Low Countries. Where all the silver came from, to supply sixty years of large-scale minting, is a mystery which the porcupines

themselves cannot, in principle, resolve. (Unless, perhaps, lead-isotope analysis of their alloy could prove that newly-mined silver was used. But that is a pipe-dream.) It is also a mystery whether the imported goods were absorbed locally, or were exported further (being paid for in silver). Wool, for example, might have been imported from England, woven into cloth, and then exported. The regional balance-of-payments situation can only be conjectured. If silver coinage from the middle Rhinelands or from Merovingian Gaul entered the Low Countries in payment, it might have been promptly recycled into porcupines, leaving little trace among the local coin finds. But substantial numbers of Merovingian denarii have been found at Domburg and the other coastal *wics*. In so far as they are relatively less plentiful at inland sites, that seems to hint at the maritime routes by which they reached the Netherlands. At Domburg we see 67 Merovingian deniers, against 429 porcupines – a substantial secondary component. English sceattas on the other hand make up only a minor fraction of the currency. In England on the other hand (where there was no attempt to impose a controlled currency by recycling foreign coins, until the 740s or thereabouts), porcupines accumulated in great quantities, and came to make up something like a quarter of the entire currency. Thus it is reasonably clear that the balance of payments with England was heavily in one direction.

England, then, was the major destination for the porcupines. Merchants from the Netherlands will probably have made landfall at one or another of the coastal *wics* which characterize the trade of the period. As well as these proto-towns, and of equal or greater monetary importance, there were throughout the English regions upwards of twenty ‘productive sites’, typically two or three fields in the open countryside, where numerous sceattas have been found. They were well-known meeting-places for trade, and porcupines are sometimes among the earliest sceattas found there. Single finds of porcupines are so numerous in England, both at productive sites and as isolated losses, that they have even misled some students to suppose that, e.g., the primary varieties were of English origin. That is a theory which does not stand up to examination.

Beyond the frontiers there is a very sharp drop in the quantities of porcupines that were in use. It is not merely that the legal attitude towards metal detectors is hostile in Germany, France and Belgium, resulting in far fewer single finds being reported; the proportion of porcupines among all types of sceattas and Merovingian deniers falls abruptly, from c. 80-90 percent in the Netherlands (and the Rhine valley), c. 25-30 percent in England, and very roughly 15 percent in Belgium, to c. 1 or 2 percent elsewhere. Essentially, the commercial partnership between the Netherlands and England was ring-fenced by a monetary discontinuity.

A partial exception to that perspective is that significant numbers of porcupines were carried beyond Friesland towards Saxony and Jutland, as testified by the hoards from Kloster Barthe (near Oldenburg, Germany) and Föhr (a North Frisian island, and by the excavation coins from Dankirke and Ribe, in western Jutland. Ribe functioned as a *wic* comparable with those of eastern England, and porcupines were in a minority of *c.* 20-30 percent among the local issues of Wodan/monster sceattas. The recorded material is of secondary and tertiary date of loss, except at Dankirke, where the finds begin earlier. Most of the secondary porcupines from Ribe have been assigned to the imitative sub-varieties d or i-k in the Corpus. One should hesitate to deduce that those of sub-variety d reflect money arriving from the Big Rivers region rather than from near-by Friesland. In constructing the Corpus, coins which looked like sub-variety d were included under that heading (as the only practical way to proceed), but the possibility that the particular specimens from Ribe are imitative cannot yet be excluded.

Porcupines of primary date occur, in very small proportions, in various French hoards composed principally of Merovingian deniers. It seems that those hoards are late enough to have included secondary-phase porcupines, if they had entered the French currency in sufficient numbers. As they did not, the inflow of primary porcupines would seem to have been an episode of limited duration. The exception to this pattern is the large Cimiez hoard, from the outskirts of Nice, which included primary but also a full chronological range of secondary porcupines (making up, however, no more than 1.5 percent of the hoard). English pilgrims and travellers to Rome journeyed through France, and there is evidence from the Cimiez hoard that sceattas minted in Wessex, namely Series W, were known and copied there (and there is a Series H find from Ostia, near Rome). Similarly, there are finds from Rouen which suggest cross-Channel traffic between there and the Solent estuary (and/or Hamwic). Porcupines may sometimes have reached France via England, by that route, rather than directly overland, or by coastal shipping.

In French hoards, which are of miscellaneous composition, they are found in trifling proportions, although there is no reason to suspect that they were discriminated against, or melted down. Single finds occur even more rarely, and then mostly in a few districts, e.g. the lower Seine basin. There is some reason to think that porcupines were rather more plentiful in the near-by Sambre-Meuse basin, perhaps to the tune of about 15 percent of the currency.

Outflows of porcupines of primary and secondary date were carried south, up the Rhine, to a limited extent, and have been found at Xanten, Bonn and its vicinity, Mainz (from where the evidence is abundant), and as far as Münzach at the Swiss border, doubtless by river traffic. Porcupines are completely

dominant over other types of deniers or sceattas. The frequency of grave-finds and of coppery imitations among them suggests, however, that a money economy had not yet taken firm hold in the middle and upper Rhine regions.

Belgium remains a virtual blank on the distribution-map of porcupines, with the exception of one site, namely De Panne, on the coast near the frontier with France, at the site of a Roman camp. Here, excavations in the dunes have yielded over the years 13 sceattas, of which six are of Series D and four are porcupines.²³⁸ It seems obvious that they were carried by coastwise shipping. Otherwise, from inland sites, some 20 sceattas or Merovingian deniers are on record, of which only three (15 percent) are porcupines. More data would be welcome.

The Sambre-Meuse basin is extensive enough to have supported important commercial activity, which one might expect to see reflected in the local currency. It had several towns which, in the Merovingian tradition, may each have had their own distinctive coinage. The 'hexagram' type is a candidate for a local attribution: it has been found, for example, at and around Nijmegen, at Namur, and at unspecified sites 'in the Meuse valley', as well as in significant numbers at Wijk-bij-Duurstede – but hardly at all at Domburg. It was not exported to England in any significant quantities, but (curiously) is found so often in Friesland as to have suggested an attribution to that province.²³⁹ The 'interlace' type also seems to belong to the lower Meuse basin. Its distinctive design was continued into the early Carolingian coinage.

The network of arguments and considerations by which the porcupines are attributed focusses, necessarily, on the evidence from the Netherlands, since that is where they were minted. Regional differences within the Netherlands are the key to our understanding. The English finds, which make up a substantial part of the data-base, can contribute on an equal footing to the analysis of metrology, fineness, and die-linkage, and even chronology. But they are extraneous to questions of mint-attribution. The millions of porcupines imported into England, in the course of innumerable trading voyages, could have left the shores of the Netherlands from Domburg, from Wijnaldum, or from a variety of other ports. The only glimpse we catch of all this money in transit is the little Lambeth hoard, consisting exclusively of porcupines, from the south bank of the River Thames at London. There are also some crumbs of evidence for porcupines in the cross-Channel trade reaching Hamwic or the Solent estuary. We asked ourselves whether the English single finds might, in principle, reinforce the arguments for two minting regions, if it were the case that the

²³⁸ See p. 298.

²³⁹ Op den Velde & Metcalf (forthcoming).

ratio of Big Rivers/Domburg to Friesland varieties showed significant differences in the various English regions. In practice, we have not discovered any such differences. That could be either because a lively inter-regional circulation within England (which there certainly was, especially in the primary phase) obliterated any original localization, arising from where the porcupines were first spent; or it could be because the northern and southern varieties arrived already freely mingled.

We can use ratios to compare the English hoards with the evidence of the single finds. That reveals, for example, that the late-primary Aston Rowant hoard is much closer in its composition to the D: E ratio seen at Domburg, than to the over-all ratio in England – which suggests that the hoard contained a sum of money put together outside England, and imported, perhaps shortly before its burial. In the secondary phase the English ratio is similar to that for Domburg, a pattern to which the Woodham Walter hoard conforms, within statistical limits.

Foreign imitation of porcupine sceattas

The subtler question naturally arises whether some, or even many, of the English finds could have been copies minted in England, of an imported type which had become very widespread and familiar. Could the porcupines have had a dual origin, produced primarily in the Netherlands, but also in England, where they had become very familiar through foreign trade? No: the hundreds of single finds from England, which constitute an excellent random sample of the currency, are often die-duplicates of, or die-linked to, specimens found in the Netherlands. More generally, stylistically very similar coins which certainly originated at one and the same mint-place, are found in both countries. Given that they were minted in one region, they could in theory have travelled in either direction but it is unlikely that that could be explained by saying that there were large flows of English-minted porcupines to the Netherlands, 'against the tide'. The imitation of porcupines on a large scale in England can be dismissed as an idea (although there will of course certainly have been some smaller-scale manufacture of imitations).

Proving an English origin for a small group is a delicate matter. The last of the primary porcupines of Variety G, namely G4, uses a very different obverse : reverse die-ratio from G1 to G3, and is probably an imitative issue from another workshop. But that workshop might, in principle, also have been in the Netherlands. In the primary phase, when England is the source of such a large proportion of the finds, a largely English distribution pattern of G4 is not a compelling argument for an English origin. The occurrence of even one or two

single finds from the Netherlands is a strong counter-argument, but it runs into the realm of statistical uncertainty, which bedevils the handling of small groups. The absence of G4 from the Aston Rowant hoard could be either because it is later than the hoard's formation, or because it is from a different mint place.

Similarly the last of the 'plumed bird' porcupines, Variety L, has a distinctive reverse design, and only one specimen has been found at Domburg. Again, the variety is absent from Aston Rowant. They are not noticeably localized in England, except that they show a tendency for two or three to be found at a site. There were a couple in the Nice-Cimiez hoard, and three from the Isle of Wight.

Local imitation may also have occurred elsewhere on the fringes of the region where porcupines became plentiful. When we see two die-duplicate specimens found at Rhens, in the middle Rhineland, for example, the question comes to mind whether they have been carried up the Rhine by a merchant who obtained them from a moneyer in the Netherlands, or whether they represent local enterprise.

In the primary phase, it seems possible that the 'stepped cross' type (Corpus 3490-3538) belonged to a region not too far from the Netherlands. It copies the 'porcupine' obverse design, coupled with a distinctive reverse, unrelated to Series E. Single finds of the 'stepped cross' coins occur predominantly in eastern England, which might seem to imply an English origin – until one remembers that the same is true of the primary-phase porcupines. Like them, the 'stepped cross' coins were certainly an export currency, destined for the English trade. But they are by no means plentiful at Domburg. A couple have been reported from Gelderland, and there was just one in the Kloster Barthe hoard, and one in the Stephanik collection, from Friesland; they certainly did not mingle in any quantity with porcupines in the currency of the Netherlands. Presumably their region of origin, and the Big Rivers region, were not commercially complementary. The dispersion of 'stepped cross' coins to England is in sharp contrast with that of the 'hexagram' type, and the ratio of 'stepped cross' to primary porcupines, e.g. in Yorkshire, is an intriguing index-figure.

Two other types which imitate the 'porcupine' design at an early date are uncontroversially English, namely the *Æthiliræd* runic porcupines, and the VERNVS group. Their virtual absence among the Dutch finds underlines the one-way direction of the monetary transfers across the North Sea.

One other type, on which we see the spiky 'quills' of the porcupine imitated, is a Merovingian coinage minted perhaps in the region of Clermont-Ferrand. There is no reason to suppose that there was a commercial context for this copying. Porcupines reached Marseilles, certainly, and the distinctive design

may have been copied in central France simply because the local die-cutter saw such a piece, and was intrigued enough to take it as his model.

Finally, there are various English secondary types of sceattas, such as Series T and related varieties, which copy the obverse design of the porcupines closely. They are of relevance to the monetary historian in so far as they are very rarely found in the Netherlands. As in the primary phase (see above) the monetary transfers, reflecting the balance-of-payments situation, were very heavily in one direction.

Series D and primary-phase Series E



In the primary phase, not only were great quantities of porcupines minted in the Netherlands, for export, but concurrently, equally great quantities of sceattas of Series D were also minted there – and they behaved differently. They were exported copiously to England, like the primary porcupines, but unlike the latter they also circulated freely throughout the Netherlands, where they are far more frequent as single finds than are the primary porcupines. That is true both in the Big Rivers region and in Friesland. The intrinsic value of the two kinds was essentially the same, and one would expect them to have been interchangeable at par. In England, certainly, they were hoarded together.

The evidence of single finds is much to be preferred to that of hoards, because a hoard may well have been put together in one region, but then carried, presumably by a merchant, and concealed in another region.

There are all together 481 provenanced single finds of Series D and primary Series E in the Netherlands. They are very unevenly distributed across the country. A glance at the map (fig. 7.1 on p. 175) with totals of Series D + primary E for each modern province shows how strongly the early stages of the sceatta currency were concentrated along the North Sea coast. No fewer than 276 are from Domburg, but there are only two from the nearby Westenschouwen, where the losses begin later. From the *terpen* region of western Friesland there are 112. Katwijk, where the old river Rhine discharged into the North Sea, yielded 18. From the region of the big rivers there are approximately 50 finds, mostly from

the shores of the Rhine, or nearby. But from the rest of the Netherlands, each province yielded only a tiny number of finds of Series D and primary-phase Series E. Groningen, Drenthe, and Overijssel are empty regions, and there is a clear zone of separation between Friesland and the Big Rivers region.

The plausible locations for mints are in regions where single finds are plentiful – Domburg, western Friesland, the Big Rivers region, e.g. Dorestad or Utrecht, and just possibly Katwijk aan de Rijn. The ratio D to E in Friesland is 106 : 6, that is in itself enough to rule out any likelihood that the primary porcupines were minted in the *terpen* region. In Zeeland (i.e. Domburg) it is 219 : 57; Series D there still accounts for 79 percent of the two competing series (compared with 95 percent in Friesland).

The tabulation of the percentual ratios supports conclusions which are very close to the heart of all the various overlapping arguments about the porcupines (table 8.3). There is no reason to suspect any systematic distortion of the figures through the selective recording in modern times of Series D or E respectively. Both are common enough, and they were doubtless accepted at par. In the primary phase, Series D completely dominates the currency of Friesland, and to a slightly lesser extent that of the Big Rivers region.

Table 8.3. The ratios of single finds of sceattas from the primary phase in different regions.

	D	:	prim. E
Friesland	95	:	5
Big Rivers	86	:	14
Domburg	79	:	21
England	47	:	53

The detailed stylistic classification of Series D, together with the evidence of die-links, allows us to be confident that these single finds of Series D from the Big Rivers region originated in Friesland: they are not local copies. Die-estimation suggests (subject to margins of statistical error) that Series D was struck from 2,846 reverse dies, and primary-phase E (the porcupines) from 853, a ratio of 77 : 23. Friesland evidently had a very plentiful supply of silver at that time, with which it could run a trade deficit, importing more goods from the Big Rivers region than it exported there. An awareness of the high proportion (86 percent) contributed to leading us astray in an earlier study, into thinking that Series D was minted at Domburg: not so.²⁴⁰ At Domburg, the ratio is slightly lower again than in the Big

²⁴⁰ Metcalf (1993) p. 182.

Rivers region, or conversely the figure for Series E is higher (21 percent, cf. 14 percent), which perhaps suggests that the primary porcupines were minted there, rather than inland at a river-port (or at more than one place) in the Big Rivers region. The big surprise of the tabulation is the English ratio. There seems to be no way that it can reflect sums of money drawn at random from the currency of any of the Dutch regions. Nor can it be explained through English imitations of the primary porcupine designs. Could the explanation be chronological? – could there have been a period before Series D flooded into the Big Rivers region in such overwhelming quantities, when the locally-minted primary porcupines were dominant there? There could, theoretically, have been a delay, with Series D already in existence in Friesland, or possibly the minting of porcupines could have begun some years earlier than Series D. The little group of die-linked coins of Series D type 2c var. 2c, linked with Type 10 (which imitates the porcupine variety G4) could be interpreted as late. The introduction of Type 2c, admittedly, must post-date that of the English Series C (although Series D Type 8 may be earlier), while the earliest porcupines could, hypothetically, be contemporary with Series A and B. The combined evidence of the Remmerden and Aston Rowant hoards seems to demonstrate that Series D and E were issued concurrently, the latest varieties of D (on a reduced weight-standard) being absent from Remmerden. The end-dates of the two series is a separate question.

The alternative idea which comes to mind is that merchants from Domburg or from the Big Rivers region carrying money to England, to some extent used porcupines preferentially. The single finds which account for the 47 percent of Series D in England may also have arrived via Domburg, as there is little or no evidence of regional variation within England, such as might suggest that there were direct monetary outflows from Friesland to e.g. eastern or north-eastern England. The Aston Rowant hoard illustrates the arrival in England of Series D and E already mixed.

Table 8.4. The numbers of single finds of primary phase sceattas from Series D Type 8 and Series E in different regions.

	D type 8	prim. E
Friesland	6	10
Big Rivers	0	7
Domburg	14	59
England	74	361

Within the perspectives established by the tabulation, the regional occurrence of Series D Type 8 is anomalous.

Like the primary porcupines, and to a greater extent than Series D Types 2c, Type 8 was predominantly an export coinage. The 14 specimens from Domburg hint that it was carried to England (its major destination) via Domburg. The few finds from Friesland itself are focussed at or near Wijnaldum. That was possibly their mint-place. From there they were carried to Domburg but hardly into the Big Rivers hinterland, and occasionally they found their way to Belgium and France; but far more than elsewhere, their destination was England (74 specimens), where they have been found everywhere from Yorkshire and Lindsey, to Essex, Kent, and Wessex. Again, any theory that Series D Type 8 was English in origin will not stand up: why would they have been carried back, from all the English regions, only to Wijnaldum? It would be like a cinematographic film run backwards, of the broken pieces of a plate or cup jumping up from the floor and re-assembling themselves into an unbroken object.

The tabulation of D : E ratios regionally brings into the foreground several clues to the directions of trade in the primary phase, which should be of central interest for monetary historians. It is possible to construct a closely comparable table for the secondary phase, once it has been established that, after the minting of Series D in Friesland had ended, porcupines were minted in their place, that is to say, in Friesland as well as in the south.

Closing remarks

A Corpus of 3,500 specimens may seem to be a magnificently large data-base, and indeed it is. It is already large enough to have permitted many useful conclusions, built around the discovery that the secondary-phase porcupines can be divided between two minting regions. As more porcupines are brought to light year by year, it should gradually become possible to reconsider the many lines of argument that have been worked out, on the basis of even richer evidence. And future students may succeed in noticing new and more detailed patterns and contrasts, which will feed into the over-all historical view of the porcupines as primarily a trade coinage, and will bring the regional perspectives into sharper focus. The broad shape of the argument is, we hope, now securely drawn, but new discoveries may still turn out to be of wide-ranging interest.

Summary

How were the porcupines made, and how were they used? Our answer to these two general questions make use of the same data-base, and even although the arguments interact, the methodologies are quite different.

First, stylistic analysis is used, to define groups of coins which are formally similar in their design. Each group represents, hopefully, a phase of the output of a particular workshop. It may, however, also include imitations. In order to determine when each group was struck, we can take into account the composition and relative chronology of hoards, and the metrology and alloy of the individual coins.

As to where the coins were struck and where they circulated, single finds (presumed to be accidental losses) are superior as evidence to hoards. In order to analyse them, they too need to be grouped, but this time into monetary regions, normally of about the size of two or three provinces. Statistical comparisons (which are subject to significant margins of statistical error where the numbers are small) are best made between these regional assemblages. The regional differences point, first, to the regions where particular stylistic groups were minted, and, secondly, to the directions in which monetary transfers took place.

Die-estimation shows that, over all, many millions of porcupines were minted. England was a major destination for them. That reflects very substantial exports, over many decades, from England to the Netherlands, and a balance-of-trade deficit which was counter-balanced by the transfer of silver to England.

8.2 Attaching political significance to the ‘porcupine’ design: the date of the transition from Series D to Series E in Friesland

Who controlled the minting of the porcupine sceattas?

Was the minting of porcupine sceattas in any sense under the control of the Frankish rulers of Austrasia? Or were they produced quite independently by the merchant community? Although their designs are anonymous, were the porcupines nevertheless in any sense a royal coinage? Specifically, did the kings, or the mayors of the palace, or the local counts or lords, collect a tax on the profits of being a moneyer? Or was the production of coinage a matter of private initiative, managed for the convenience of the merchant class, and untrammelled by royal intervention, until Pepin’s reform of *c.* 754, after which the coin designs make very clear that they are royal? Or, is an either/or response too simple? Were porcupines both public and private, in the sense that alongside the regular stylistic varieties which we have identified and described, there was a ‘black economy’ of imitations? The secondary-phase sub-varieties i-k, which were struck in very large quantities, raise this possibility acutely. These are large questions, which it

is very difficult to study empirically, in the way that monetary circulation can be studied, through within-sample variation and contrasts in the distribution-patterns. If taxes were levied on the work of the moneyers (and thus indirectly on the profits of the merchant class) they have left no written record. That is, alas, perfectly possible. The capitulary of *c.* 754 is our only evidence, and it does not clarify questions of taxation. For that, there is (in Anglo-Saxon England) the Domesday Survey, but that it from three hundred years later.

The best that one can do is to consider various common-sense arguments. The conclusions to which they point turn out sometimes to be debateable, sometimes (as both sides would agree) inconclusive. For example, the weight- and alloy-standards of the porcupines may reflect royal control, or they may merely have been what was customary, and what it was in the interest of all concerned to adhere to. If that was so, it becomes difficult to draw a line between regular porcupines, and private, ‘unofficial’ copies (which presumably escaped taxation). Metrology helps: sub-varieties i-k (an omnibus classification) are often slightly substandard. Common sense says that the enormous scale of monetary output, especially in the secondary phase, was such that the work of minting was inevitably a matter of public knowledge. Common sense says that the four primary-phase varieties were so regular in their designs, and on such a scale, that it is difficult to see them as other than official. Moreover, the rulers cannot have been unaware of the intense minting activity of porcupines (an argument which Stahl put forward, *a propos* the Merovingian tremisses of the region of Metz),²⁴¹ nor of the trade which it serviced. Across the North Sea, customs duties are well attested, and various of the small Anglo-Saxon kingdoms demonstrably had their own distinctive designs of coinage. In some cases royal names appear on the English sceattas, at dates contemporary with the porcupines. Of special relevance, as being early, are the sceattas of King Aldfrith (685-704).

Our analysis of the single finds of sceattas in the Netherlands has thrown up a new, freestanding argument, which encourages a ‘royal’ interpretation. It is set out fully below, but it can be summarized in two sentences. It says that Series D was the coinage of the Frisian king Radbod, while the distinctive porcupine design, traditionally thought of as Frisian, in fact reflects Frankish political control. The key moment, on which the proof turns, was the replacement, in Friesland, of the minting of Series D by porcupines. This was a political act, asserting the subjugation of the Frisian kingdom.

²⁴¹ Stahl (1982), pp. 131ff.

The date of the transition from Series D to Series E in Friesland

In the primary phase, Series D was the currency of the *terpen* region of Friesland. Very few primary porcupines (at most 5 percent of the finds) penetrated the region: therefore they cannot possibly have been minted there. Already by the beginning of the secondary phase the minting of Series D had ceased, and thereafter porcupines became the currency of Friesland. Throughout the secondary phase they were minted there (varieties a, e-h), while others of a somewhat different design and on a lower weight-standard were minted in the south. The very visible change in design, by the moneyers in Friesland, from Series D to E, seems to have coincided to within a few years with the death of Radbod and the subjection of the Frisians by the Frankish or Merovingian rulers whose power-base lay south of the Rhine. *Post hoc, propter hoc?* Was the traditional design, Series D Type 2c, replaced as a very visible sign of changed political overlordship? There is no documentary evidence describing the intentions of the new rulers, nor should we expect any. Was the change necessarily made promptly after the death of Radbod in 719, or might there have been a delay of a couple of years? If the date of the change of design coincides closely with the change of political control, we may feel entitled to presume motive. But the coins are, of course, undated, and working out their exact date of issue depends on a network of numismatic arguments. It is unlikely ever to yield results to within a couple of years. However, all is not lost.

The early eighth century witnessed a proliferation of distinctive sceatta designs in England. Each *wic* or each region normally had its own design, and minted that design only. The pecking bird of Hamwic is a well-known example as is, further afield, the Wodan/monster type at Ribe. The kingdom of East Anglia had two coastal minting places (at or near Ipswich, and in the north at Burgh Castle), which used the same design, with small differences which numismatists can detect, and which are localized differently within East Anglia. It could be merely that the smaller mint-place copied the type of its southern neighbour; or it could be that the kings of East Anglia, who valued the *wics* within their borders, so decreed. In Friesland, King Aldgisl and his successor King Radbod had a mint-place, doubtless located in a *wic*, where the distinctive design of the sceattas was that of Series D. The concentration of single finds of (the early) Series D Type 8 at or near Wijnaldum is a good reason to think that that was where the monetary activity was originally focussed, and it very probably stayed there.

We know a certain amount about Radbod's reign from written sources of the period. His power extended as far as the Rhine, but Pepin of Herstal, whose aim it was to subdue the Frisians, defeated him at the fortress of Dorestad in *c.*

692. Radbod lost control of Dorestad and Utrecht, and had to agree to pay a tribute. The settlement was fragile: it seems that, a few years later, Dorestad was again in Frisian hands. Pepin continued his warfare against Radbod, with the strategic objective of securing the line of Roman fortifications along the lower Rhine, to create a defensible frontier. By 711, a political stand-off was signalled by the marriage of Radbod's daughter with Pepin's eldest son Grimoald. That might have had the eventual outcome of the peaceful annexation of Frisia. It is theoretically possible that Radbod agreed at that point to adopt the porcupine design. But in 714 Grimoald was murdered, and Pepin died in the same year. Radbod took the opportunity of Frankish weakness to reconquer Utrecht and Dorestad. If porcupines had been minted in Friesland from 711 to 714, followed by a gap, there might well be some stylistic discontinuity in the series of coins, i.e. a visible break between the porcupine issues of 711-714, and the main series. There are in fact a small number of what seem to be secondary-phase coins which imitate primary porcupines, before the die-cutting settled down into a regular pattern. What is needed is a hoard from Friesland concealed in 718; such a hoard would, with a minimum of luck, settle the question. Charles Martel eventually succeeded Pepin, and in that year he defeated the Frisians and occupied a considerable part of the region north of the Rhine. Radbod died in 719.

Another Frankish assault on Frisia took place in 734. Rigold jumped to the conclusion that those turbulent times were the context in which the late-secondary hoards were concealed or lost. That is plausible, but hoard-evidence has a way of being more varied than a general theory might suggest.

From this brief résumé, deriving from detail chronicled in the *Liber Historiae Francorum*, and the Metz Annals, it is sufficiently clear that neither Pepin nor Charles Martel could have imposed the distinctive Frankish sceatta design, the porcupine type, on the moneys in Friesland, while Radbod was still in power. Whether Radbod might have minted sceattas of Series D also at Dorestad or Utrecht intermittently in the years around 700 is another question, which might be answerable from differences in the distribution of single finds or excavation-coins of the relevant varieties of Series D Type 2c. What we are concerned with at present is whether secondary-phase porcupines could have been minted in Friesland (as they certainly were in the 720s and 730s) earlier than 718. It seems very unlikely. Why would Radbod have tolerated the use of a new design, which distinguished the coinage of his mortal foes?

Grierson and Blackburn suggest a date of c. 710 for the Aston Rowant hoard.²⁴² That hoard included a group of sceattas of Series D Type 2c on a reduced

²⁴² Grierson & Blackburn (1986) p. 185.

weight-standard, apparently the latest issues of the type. Can there have been a gap of five to ten years between the end of minting of Series D, and the beginning of the secondary porcupines in Friesland? (Note that secondary-phase minting in the Big Rivers/Domburg region could in principle have begun a few years earlier than in Friesland.) Taking into account the very large volume of mint output, in both the primary and secondary phases, a hiatus is not impossible but it is an unwelcome hypothesis. It turns out that the date for Aston Rowant has been judged, not by any specific historical information, but simply by the need to allow room between Aston Rowant and the Cimiez hoard for the (English) secondary types which Cimiez includes. Grierson and Blackburn dismiss the traditional dating of Cimiez to 737, and propose *c.* 720. For that reason (and that reason alone) it was necessary for Aston Rowant to be about a decade earlier. As explained in a preceding chapter, Lafaurie has now demonstrated very convincingly that Cimiez is distinctly later in date. There is in consequence no need for the deposit of Aston Rowant to be much earlier than *c.* 720, if other evidence requires it (note that if primary-phase porcupines were still in production at that date, what has been said above about the years 711-714 falls down). So far as the porcupines are concerned, the change of political régime in Frisia is much the firmest, indeed the only firm date in these years.

Dendrochronological evidence from the excavations at Ribe, on the other hand, seems to make this the latest date that could be contemplated. Three secondary-phase porcupines (illustrated above on p. 139) were excavated, separately, in layer B, which was dated to 705 -725. One of the three is a poor imitation of a Friesland sub-variety, with the spine of the porcupine outlined with small dots, as on varieties e and g. The end-date of phase B, namely 725, could possibly be moved on by a year or two; and seven or eight years in fact allows plenty of time for sub-variety e-g to be imitated. But *prima facie*, Ribe favours a somewhat earlier date than *c.* 725 for the beginning of the secondary phase in Friesland.

When all the detailed numismatic arguments have been reviewed, one has to admit that the starting-date of the secondary porcupines in Friesland cannot be proved to better than within five to ten years. The hypothesis of a political context for the change of design, from D to E, has to stand largely on its own merits, not an ideal situation. A date after 718/719 is not contradicted by other hoard-evidence, because the dating of those hoards is, at the required level of detail, insecure. It is supported by what we know about the use of distinctive designs at other *wics*, in England and Jutland. In East Anglia, where two *wics* within the kingdom used the same design, the political dimension is demonstrable. In conclusion, we are inclined to think that in Friesland similarly the

change of design was politically motivated, and that it followed soon after Charles Martel's conquests in 718 and the death of Radbod in 719. Future coin finds will perhaps one day settle the question conclusively.

Summary

Key to our understanding of the porcupines is the switch which occurred between the primary and secondary phases. In the primary phase, porcupines were minted in the Big Rivers region and/or at Domburg, whereas in Friesland, Series D was the sole type. Few primary-phase porcupines arrived there. In the secondary phase, Series D had ceased to be minted, and porcupines became the currency of the north too. The numismatic evidence that they were minted in both north and south is very clear. There should be no doubt that this change of design reflects the Frankish conquest of Frisia. The monetary reform happened probably soon after the death of King Radbod in 719.

Whereas the relative chronology of the porcupines is perfectly clear, the absolute chronology to within a decade or so is vague, involving as it does a sequence of fixed points for other sceatta types. In previous scholarship, much has rested on the date of concealment of the Nice-Cimiez hoard. Grierson and Blackburn have argued, most recently, for *c.* 720. But Lafaurie has now identified a dateable series of deniers of the bishops of Paris (see Chapter 5.2). Coins which he attributes to Bishop Ratbertus (730-744) occur plentifully in Nice-Cimiez, which must have been buried several years after 730. That means that the end of the primary phase (traditionally judged to be *c.* 710), which was constrained by the date of *c.* 720 for Nice-Cimiez, can in principle be moved a decade or so later, to fit in with the death of Radbod. That still leaves plenty of space, chronologically, for the secondary-phase sceattas present in Nice-Cimiez.

Thus it now appears that the distinct difference of design between the primary porcupines and Series D was politically iconic.