An early medieval dual-currency economy: bullion and coin in the Danelaw

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Introduction

Multiple currency economies are characterised by the co-existence of two or more distinct modes of exchange. They are a recurring feature across past and present cultures, from ancient Greece, where silver bullion temporarily overlapped with coin, to contemporary Papa New Guinea, where traditional shell currency is still maintained alongside state-issued cash (Kroll 2008; Akin and Robbins 1999). Such systems reflect important aspects of their host societies, illustrating stages of monetary evolution and pointing to the existence of different regimes of wealth and value. Yet their archaeology has scarcely been explored. To what extent, and for how long, might different currencies overlap? Were different monetary media used interchangeably, or for different payments? How and why were multiple, overlapping currencies maintained?

Archaeological study of one, entirely new 'dual-currency' economy has the potential to serve as an exemplar for these core questions, while revealing fresh insights into the dynamics of one pivotal episode of cultural expansion: the Viking-Age Scandinavian diaspora. The economy is that of the Danelaw: a coin-using area of eastern England conquered and settled by 'the Vikings' in the late ninth century. Here, a quiet revolution in the availability of single find data is revealing that Scandinavian settlers continued to operate a North European metal-weight economy, despite also issuing official coins. Using this new data I demonstrate that, contrary to the established viewed that Scandinavian settlers were quick to abandon bullion in favour of coin, bullion and coin circulated concurrently for several decades in the rural Danelaw, providing genuine choice in payment media. I then propose five reasons why a bullion currency might be maintained alongside coin, suggesting that it not only provided economic versatility, but also served as an important vehicle for the expression of (Scandinavian) cultural values in a context of 'cultures in contact'.

Background: coin and bullion silver economies

The Viking-Age economy of Northern Europe was divided into two currency zones stretching either side of the River Elbe: a zone to the north and east, including Scandinavia, in which weighed silver was used as payment, and a western zone, in which locally issued coin served as the primary form of silver currency (Steuer et al. 2002; Hårdh 2007: 97). In the

eastern and northern region, the use of precious metal as payment from the ninth century is indicated by the presence of hack-silver hoards containing silver ingots, ornaments and foreign coin, deliberately cut into small pieces. Critical to the interpretation of such silver as currency is the observation that the same hoard seldom contains more than one fragment of the same object, implying that the remaining piece(s) have been dispersed (Hårdh 2007: 98). Recent settlement excavations and surveys, most notably at Kaupang (Norway) and Uppåkra (Sweden), have revealed that hack-silver is also a feature of specialised trade sites, where it correlates with substantial numbers of regulated copper-alloy weights (Hårdh 2007; Pedersen 2007).

The primary source of silver in the metal-weight economy was Islamic coin: dirhams, imported into Northern Europe in massive quantities from the early-to-mid ninth century. Significantly, the North European distribution of both regulated weights and dirhams corresponds sharply with the metal-weight economy zone (Steuer et al. 2002: 134, Figs. 1, 4). Despite the availability of silver within Scandinavia, domestic Scandinavian coinages were struck only on a very limited scale until the introduction of the first regal coinages in c. 1000 AD. In the ninth century, coin production was confined to southwest Scandinavia, and coin circulation limited to the two Danish trade centres of Ribe and Hedeby, and their environs (Williams 2007).

By contrast, in Western Europe locally issued coins served as the primary form of silver payment. In southern and eastern England silver coins had served as (relatively high-value) currency since the late seventh century. While the economy was by no means fully monetized, the sheer number of extant coins from pre-Viking England suggests that coinage was in common use: over 2,500 coins issued c. 740-880 are recorded as single finds, just a tiny fraction of the number originally produced (Naismith 2013: 202, Fig. 1). Critically, ninth-century coinage was well regulated, with foreign coin and uncoined silver effectively excluded from circulation. Notwithstanding regional and chronological fluctuations in the silver content and circulation of coinage (Naismith 2013: 203; Metcalf & Northover 1985), it is clear that Anglo-Saxon society was home to a vibrant, controlled coin economy. Within such a system it is unlikely that weighed metal bullion was a commonly accepted form of payment (Kruse 2007).

Currency responses

Westward Viking expansion and subsequent settlement in England in the late ninth century brought Scandinavians into direct contact with a society with different means of

exchange. What happened when these two different currency systems – one based on weighed metal and the other on coin, met?

The established answer is that Viking leaders embraced the pre-existing coin economy of the Anglo-Saxons. Viking rulers in East Anglia produced their own official coins soon after settlement in c. 875 AD. From c. 895, regal Anglo-Scandinavian coinages were struck in both East Anglia and Scandinavian York (Blackburn 2001a; 2004). In their weight standard and, in many cases, Christian iconography, these coins emulated the traditions of pre-Viking Anglo-Saxon coinages, thereby stressing continuity with local minting traditions. Critically, they were well produced, regulated and voluminous. From c. 895 to c. 918, the so-called St Edmund Memorial coinage was struck by at least 70 moneyers across East Anglia and east Mercia (Williams 2014: 27-28). In sum, the Scandinavians operated a vibrant coin economy in which reliable, good quality silver coin was widely available.

Historically the fate of the Scandinavian bullion economy has been less clear. The practice of weighed metal exchange is attested during the initial stages of Viking military takeover in England by bullion-related finds from one hoard and two winter camps of the 870s (Brooks and Graham-Campbell 2000; Blackburn 2011; Williams in prep.). This evidence has encouraged speculation that bullion played a role in a developing 'dual currency' (Blackburn 2001a: 134-35; Graham-Campbell 2001a), although without significant further data extending beyond the initial settlement period, such a theory was impossible to substantiate. In the northern and central Danelaw (modern-day Yorkshire and the east/ central Midlands) a small number of silver hoards containing various combinations of local and foreign coin, ingots and hack-silver, signal the continued presence of bullion into the early tenth century (Blackburn 2001b; Graham-Campbell 2001b; Williams 2009). While these provide an important source of information for the diverse sources of bullion, material selected and deliberately deposited in hoards may not be typical of silver used in local exchange. Indeed, several hoards display strong links to the Irish-Scandinavian metal-weight economy, centred on Dublin and northwest England, and may have been deposited by travellers from that region (Graham-Campbell 2001a: 58; 2001b: 217-218; Williams 2007: 197). Moreover, no certain hoards of Scandinavian character are known from the southern Danelaw, an area of core Scandinavian settlement broadly corresponding to modern-day East Anglia and Lincolnshire. Indeed, in this area, the paucity of hoards has encouraged the view that Scandinavian settlers were quick to abandon bullion in favour of a sophisticated monetary system, in which coins passed 'as coin': by tale, rather than by weight.

New evidence for bullion exchange in the Danelaw

New data reported here provides the first tangible archaeological evidence for the operation across the Danelaw of a widespread and vibrant Scandinavian-style bullion economy. The emerging dataset is extensive and extraordinary, comprising over 180 individual finds of Viking-Age bullion silver and weights found singly in England (Table 1). It is presented here for the first time, following three years of systematic data collection utilising the records of the Portable Antiquities Scheme, museum archives, private collections and county Historic Environment Records (HERs).

The unique feature of this dataset is that it consists almost entirely of single ('isolated' or 'stray') finds, recovered during metal-detecting. The dominance of detector-finds undoubtedly introduces biases to the dataset, not least regarding the distribution of material. This will, to an extent, reflect locations of metal-detecting and finds reporting, incorporating diverse factors such as modern land-use, the presence of soil types favourable to metal preservation, distance of land from motorways and other access routes, etc. Such biases are well known and are discussed at length elsewhere (Chester-Kadwell 2009; Bevan 2012; Kershaw 2013: 13-17, 187-206). Here, it is important to stress that while apparent absences in material must be investigated and interpreted with care, the presence of finds offers a clear positive indicator of bullion use. Moreover, since the Portable Antiquities Scheme has recorded over one million individual objects, 88% of which can be located to within a 100 x 100m square or better, broad distribution patterns, as identified here, are likely to be reliable. The use of metal-detector material also enables the recording of relevant finds across the whole of England and Wales. Importantly, as single finds, the material likely represents accidental losses from areas in which bullion and weights were in frequent use (Blackburn 2007). As such, it ought to provide a strong indicator of the nature, scale, chronology and location of bullion exchange.

Bullion assemblages from Viking-period contexts within Scandinavia comprise four main elements: ingots, ornaments, foreign coin (notably dirhams) and standardized weights. All of these are prominent as single finds from the Danelaw. In the case of single finds, without archaeological context, there is always room for ambiguity concerning their function. Silver ingots could be used as raw material for jewellery, for instance, while complete ornaments could constitute mediums for display in contexts of gift giving and hospitality. Yet the case for the monetary use of these items is strong. Crucially, we will see that the items presented here have close parallels in Scandinavian bullion hoards and/or bullion material retrieved from specialised trade sites across Scandinavia and the Baltic, including Kaupang

(Norway), Birka (Sweden), Hedeby (Schleswig) and Truso (Poland). In addition, all items show positive indications of active use as bullion either in being deliberately cut and thus in a form consistent with 'hack-silver', and/or in bearing characteristic Viking-period test marks, indicating that they have been interrogated for their metal content. In what follows, I discuss each artefact group in turn, highlighting their role in the Scandinavian bullion economy and citing evidence for their extensive use in the Danelaw.

<Table 1>

Ingots

Silver ingots are 'worked metal stored for whatever eventual purpose in a form without function as an ornament' (Kruse 1988: 288). Within the Scandinavian bullion economy ingots were a convenient means of storing and trading wealth. Viking-Age examples are typically cigar-shaped, with parallel sides, rounded ends and consistent oval, circular or sub-rectangular cross-sections. They are common finds in both Scandinavian bullion hoards and at specialist trade and market sites (Wiechmann 1996: 65-7, Karte 76; Hårdh 2007).

In England, 44 ingots have been identified as having a monetary use due either to deliberate fragmentation (being chisel-cut at one or both ends) and/ or the presence of small, crescent-shaped knife cuts known as 'nicks': characteristic Viking-Age testing marks designed to expose plated forgeries and/ or to assess silver fineness by means of a resistance test (Supplementary Table 1) (Figure 1). Since a craftsperson is unlikely to test an ingot s/he had recently cast, test marks are a reliable indicator of exchange. They were seemingly successful: of 13 ingots that have been subject to surface XRF analysis, 11 (85%) have a silver content exceeding 90%. Silver content in excess of 90% is also characteristic of ingots and hack-silver contained in Viking-Age hoards from Britain, Ireland and Scandinavia, a pattern that suggests that debased silver was routinely removed from circulation (Kruse & Tate 1992; Arrhenius, Linder Welin & Tapper 1972-73; Ilisch et al. 2003: 138-49).

<Figure 1>

Ornament-derived hack-silver

A smaller, but visually distinctive, element among the single finds of silver bullion is ornamental metalwork, derived from Scandinavian types of ring and brooch. When complete,

such items served as prestige jewellery, and could be worn to enhance personal status. They were also a convenient means of storing and carrying bullion, and could be cut up as necessary to generate payment.

14 items on record from the Danelaw represent hack-ornament derived from diagnostically Scandinavian silver objects (Supplementary Table 2). The fit to the Scandinavian bullion economy is again very clear. The finds include artefact types commonly represented in Viking-period silver hoards from Scandinavia, including a cut piece from a plaited-rod neck-ring and fragments from two so-called 'Permian' arm-rings (Figure 2). Other finds, including a fragment of a plain rod ring known as 'ring-money' and cut pieces from two 'Hiberno-Scandinavian broad-band arm-rings' reflect connections to the Scandinavian bullion economy of the Irish Sea region (Graham-Campbell 2011b; Sheehan 2009).

<Figure 2>

Foreign coin

The primary source of silver fuelling the Scandinavian bullion economy was Arabic silver dirhams, acquired by Scandinavians in Russia through the sale of slaves and furs. Dirhams were brought back to Northern Europe in tremendous quantities from the early-to-mid ninth century. Numbers recorded from the Scandinavian countries, predominantly belonging to a core 100-year period of c. 840-940, total in excess of 170,000 (Gullbekk 2014: 334-35). Metal analysis indicates that far more were melted down on arrival into ingots and ornaments (Arrhenius, Linder Welin & Tapper 1972-73). From Scandinavia, a smaller number of dirhams travelled further west to Britain and Ireland, where around 350 are recorded from Viking-period silver hoards (Naismith 2005).

To these can now be added 65 new single finds from England (Supplementary Table 3). Those with legible inscriptions, allowing broad dating, fall into two main groups: just under half are issues minted in the eighth and ninth centuries, predominantly by Abbasid rulers, while the remainder belong to a chronologically later group dominated by late ninth- and tenth-century Samanid mints. The dirhams from England provide important chronological information for the circulation of bullion in the Danelaw, the details and implications of which are discussed below. Deliberately cut dirhams are common, comprising 29 of 64 dirhams whose state of preservation is recorded (Figure 3). They have an average

weight of just 0.57g: less than a quarter of a complete coin (weighing c. 3g), and below half the weight of a contemporary Danelaw coin (weighing c. 1.35g).

<Figure 3>

Imported weights and weight systems

One of the hallmarks of a metal-weight system is the presence of standardised weights made to specific units. Within Scandinavia and the Baltic, two weight types are attested from the 860/70s and 870/80s respectively: small copper-alloy cubo-octahedral (dice-shaped) weights, with 1, 2, 3, 4 or 6 punched dots on each of their six square sides marking their weight unit, and larger, heavier oblate-spheroid weights, with an iron core and brass casing (Steuer et al. 2002). In both their form and, less certainly, their shared underlying weight unit (of c. 4g), the weights reflect Islamic origins, although there is also evidence for their production within Scandinavia (Pedersen 2007: 121). That they were used for weighing silver is indicated by their concentration, alongside dirhams and hack-silver, at central and market place sites, as well as their occurrence in a small number of late Viking-Age hacksilver hoards (for instance, Bogucki 2007: 100 and Fig. 13; Gustin 2004: 89-96; Pedersen 2007: 123-26, Table 6.4; Kilger 2011: 264-65).

In England, 34 oblate-spheroid and 26 cubo-octahedral weights are now recorded as single finds, a number that suggests that small bullion weights were in common use (Supplemental Table 4) (Figures 4 and 5). Whereas cubo-octahedral weights, weighing between c. 0.75 and 4.5g, were well suited for weighing very light sums of silver (e.g. a dirham fragment), oblate spheroids indicate the use of bullion to make medium to large payments: the 32 examples from England whose mass is documented cluster within the 10-40g range (Figure 6). Since an individual weight represents the minimum sum of silver that could possibly be weighed, this evidence suggests that transactions involving at least this weight of silver were being carried out. Clearly, if multiple weights were used together in a single transaction, their weighing capacity would increase.

<Figures 4, 5, 6>

Bullion distributed across the rural Danelaw

Beyond presenting evidence that bullion was being used in the Danelaw in a clearly Scandinavian fashion, two more challenges remain for establishing the rudiments of a dual

economy: co-use in space and time. For bullion and coin to have constituted part of a true dual-currency economy, it has to be demonstrated that they were both in widespread use, and not confined to a small number of locations. This is indeed the case: the distribution of single finds of both coin and bullion reveals geographically extensive use across the area of documented Scandinavian settlement (Figures 7 and 8).

<Figures 7, 8>

The single finds span the entire Danelaw region, and correlate well with its extent. Bullion and weights are densest on the Yorkshire Wolds, and in north Lincolnshire and northern East Anglia (Figure 8). While all areas are foci for metal-detecting, the comparatively low number of finds reported from adjacent regions with similarly high levels of detector activity (e.g. southern Suffolk, Essex) suggests that this pattern is genuine. The concentration of finds in northern East Anglia is striking, since this region is often considered external to the core area of Scandinavian settlement (but note Kershaw 2009: 302). Significantly, bullion finds are scarce in the central Midlands. This region, centred on a group of Scandinavian-occupied urban strongholds known as the 'Five Boroughs' (Leicester, Lincoln, Stamford, Derby, Nottingham), is traditionally considered a prime area of Scandinavian settlement. It is rich in Scandinavian place-names and is actively metal-detected: the lack of bullion thus represents a real, and puzzling, absence. Notably, a similar gap has been observed for Scandinavian female jewellery (Kershaw 2013: 196-99). However, coins are also rare here, despite the fact that they were minted locally (Figure 7) (Blackburn 2001a). It is possible that the early introduction of stable nucleated settlements in the region (by c. 850 AD) means that Viking-Age sites are concealed by modern urban development (Kershaw 2013: 198-99).

There is one further setting in which bullion finds are notably absent: towns. Despite the fact that the Danelaw towns of Norwich, Thetford, York and Lincoln have seen extensive excavation, they have produced very little in the way of bullion silver or standardised weights. No silver bullion finds or weights are recorded from Thetford, Norwich or Lincoln, for instance, while excavations in York, have yielded just a handful of potentially relevant finds (Mainman and Rogers 2000: 2478, Figs. 1199-1200 and 2559-64, Figs. 1257-60). This pattern is at odds with that observed within Scandinavia, where commercial bullion exchange appears to have been predominantly focused on urban centres (Skre 2007).

Conversely, Figure 7 reveals that coins were in frequent use in urban centres. Notably, and unlike in Scandinavia, towns in the Danelaw were often the location of mints. The scarcity of bullion finds from these settings may reflect the enforcement of coin use within towns. In contrast to the lack of bullion finds in York, single coins and coin-hoards are widely documented, with the nature of these suggesting that they were drawn from a managed currency, within which foreign coin was excluded (Blackburn 2004). It is possible that within such a controlled system, bullion use was actively suppressed, with any items of non-minted silver being channelled into coin production.

Bullion and coin: co-existence in time

Rather than representing a temporary pulse of bullion use before coinage was (re-) established, the single finds of silver and weights span an extended time period. It can be demonstrated that they overlapped chronologically with coinage, providing Danelaw inhabitants with a genuine choice of monetary media. In the absence of finds from datable archaeological contexts, and given the lack of precision in typological dating, the chronological structure for the single finds rests on datable dirhams. In England, the date of production can be given for 44 of 65 single finds of dirhams, in 35 cases to within ten years (Supplemental Table 3). The histogram in Figure 9 shows the distribution of dirhams by decade, according to their mint date (Figure 9). It was built by allocating a fraction of the coin to each year of the date bracket to which it is assigned and adding those totals together to arrive at the number of finds per decade (for this method, see Blackburn 2007: 47).

The results indicate a wide mint-date range, including coins minted in the eighth century. This reflects the fact that within the Caliphate, and thus in subsequent exports, old coins circulated alongside new ones. Regarding the longevity of bullion use, the key finding is that dirhams minted in the first three decades of the tenth century are well represented among the single finds from England. Indeed, the mint date of 14 dirhams can be confidently located in the period 900-930 (Supplemental Table 3). Allowing for a travelling and circulation time for such dirhams from their source, via Scandinavia, to England of between c. 10 and 15 years (Williams 2011: 66) we may conclude that fresh supplies of newly minted dirhams continued to reach England as late as the late 930s/940s, and perhaps beyond.

This long date range fits with the available typological dating of the oblate-spheroid weights (introduced to Scandinavia in the 870/80s) as well as the diagnostic hack-ornament (Supplementary Table 2), and is consonant with evidence yielded by the only two single find items from the Danelaw to derive from a stratified archaeological context: two oblate-

spheroid weights from York, excavated from Period 3 levels dated from the mid-to-late ninth to the early tenth century (Mainman and Rogers 2000: 2456, Table 223, and 2564). In sum, bullion and coin appear to have co-existed for some seventy or eighty years, from c. 865 to the c. 930/40s, and possibly beyond.

<Figure 9>

Discussion

The evidence presented above demonstrates the existence of a true dual currency in Scandinavian-occupied England in both space and time. How and why was a multicurrency maintained?

Regarding its operation, two possibilities present themselves. The first is that the Scandinavian settlers made exclusive use of bullion as currency, rejecting coin (and perhaps its frequent Christian iconography) as a means of exchange altogether. This would imply segregated Scandinavian and Anglo-Saxon trading communities, and limits to Anglo-Scandinavian integration. The second is that Scandinavian settlers used coin 'as coin' in addition to maintaining a bullion economy, perhaps using different media for different monetary purposes. Given that local coins are only occasionally tested in the Danelaw, and are never deliberately cut, this scenario is more likely. Indeed, the apparently successful exclusion of bullion from seemingly regulated urban markets suggests that coinage was required in some exchange environments (Bornholdt-Collins 2010). It is thus reasonable to surmise that the purse of a Scandinavian trader contained bullion as well as local coin, the duality of payment media ensuring that s/he was prepared for all exchange eventualities.

Apart from in towns, there was likely to have been a choice in silver currency. Why was bullion maintained alongside a sound silver coinage? From a neo-classical economic perspective, bullion exchange entailed high 'transaction costs' and might thus be viewed as 'inconvenient' (Frier and Kehoe 2007: 117-19). But convenience is a relative concept and the advantages of bullion were many. The relatively well-contextualised historical framework of the Danelaw makes it possible to suggest five reasons for maintaining bullion. Although arising from the study considered here, they are sufficiently broad in scope that they may apply to future archaeological study of comparable systems.

Large value transactions. Bullion was sufficiently versatile to accommodate both large and small-scale payments, using both complete ingots and fragmented dirhams respectively. It was, however, particularly well-suited to high-value exchange. The weight

range of both the ingots and oblate-spheroid weights suggests that medium-to-high-value transactions were a regular feature of bullion exchange (Supplementary Tables 1 and 4; Figure 6). A recurring trait of recent historical multicurrency economies is that choice of payment media is determined by the value of the commodity being purchased (Kuroda 2008). The persistent use of bullion may, then, indicate that exchange requiring high-value currency was fundamental to Scandinavian economic life in the Danelaw. The objects of such exchange are elusive, but may include bulk supplies of foodstuffs, livestock and land, in addition to social payments such as bridewealth.

An international medium of exchange. A second advantage of bullion over coin was its ability to cross trade frontiers. Whereas coins were intended for circulation primarily within their area of jurisdiction, silver was an international medium of exchange. Bullion was likely preferred for trading with parallel bullion-using Scandinavian communities in Ireland, Scotland and the Scandinavian homelands. The penetration of bullion into the Danelaw countryside nonetheless suggests that its use in international trade was relative to its role in local exchange. A multiplicity of payment options thus provided economic flexibility. The multiple currencies were complementary: together, they provided a function that a single currency could not (Kuroda 2008).

Easy to test, retains its value. For those with the required knowledge, bullion silver was also easy to test, and thus a reliable way of guarding against fraud. Moreover, silver bullion retained its value over time, whereas coins could go through periods of severe debasement during which their acceptability may have been challenged. Viking armies would have witnessed such a phenomenon during their raids in southern England in the third quarter of the ninth century, when a period of severe debasement saw the silver content of local coins drop to a low of 18% (Metcalf and Northover 1985).

Tax evasion. Critically, silver bullion could not be taxed. Whereas coins were effectively taxed through recoinages, often following periods of debasement, silver in bullion form could bypass the moneyer. As an 'illicit' currency, it remained outside the law. Given that royally issued coinage was regulated in part so that issuing authorities could extract revenue from it, this implies genuine limitations to the extent of Scandinavian royal authority beyond towns.

Cultural marker. It is also possible that bullion proved resilient not because of market need, but because it signalled an important aspect of collective identity. The multiple stages involved in bullion transactions: cutting silver to accurate amounts; calibrating silver to known weight units; applying test marks and interpreting the results, required specialist

knowledge as well as privileged access to sources of silver and weights gained via Scandinavian-controlled trade networks. Bullion exchange was thus a cultural, as well as economic practice: the extent to which it permeated Anglo-Saxon trading circles must be open to question, not least because bullion is rare outside of Scandinavian-settled regions. Indeed, the protracted nature of bullion exchange may have served as a mechanism through which traders of Scandinavian background confirmed their common affiliation, and marked their separateness from exclusively coin-using groups. The mutual acceptance of weighed silver may have thus served to build relationships between traders: a valuable function in the context of the newly settled Scandinavian communities of the Danelaw. The ability of bullion owners to literally wear their stored wealth, in the form of elaborate silver rings and brooches, may have further enhanced the prominence of bullion as a symbol of Scandinavian cultural values.

Conclusions

Viking leaders in the Danelaw may have aligned themselves with Anglo-Saxon minting practices, but robust support for a bullion economy continued for some two generations. Put simply, many people must have understood the principles of bullion exchange: they would have been able to weigh, divide, and test silver and to calibrate measurements to known weight units. Bullion appears to have served an important role as high-value currency, but in non-urban settings it likely also rivalled coinage as a trusted means of exchange for smaller purchases. Its maintenance as currency may have also served as a conscious act of cultural preservation, reinforcing cultural separateness in a multi-ethnic society. Evidence for bullion exchange in the Danelaw not only provides tangible evidence for the continued existence of Scandinavian traditions in a context of ‘cultures in contact’, it also serves as an excellent, historically contextualised exemplar of the reasons behind the emergence of dual-currency economies.

Acknowledgements

This research was conducted during a British Academy Post-doctoral Research Fellowship. Thank you to Nicholas Jones, James Graham-Campbell and the two anonymous reviewers for their constructive comments.

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Figure Captions

Figure 1 A cut and ‘nicked’ silver ingot, Roxby-cum-Risby, Lincolnshire. PAS ‘Find-ID’ NLM-683755.

Figure 2 Cut and ‘nicked’ fragment of a ‘Permian ring’, Spofforth, Yorkshire. PAS ‘Find-ID’ SWYOR-55BBB2.

Figure 3 Cut dirham quarter with multiple cut marks, Hooton Levitt, Yorkshire. PAS ‘Find-ID’ FAKL-984168.

Figure 4 A cubo-octahedral weight, South Newbald, Yorkshire.

Figure 5 An oblate-spheroid weight, near Stamford Bridge, Yorkshire. PAS ‘Find-ID’ YORYM-01C134.

Figure 6 The weight distribution of oblate-spheroid weights (total: 32 weights).

Figure 7 Single finds of coins minted in the Danelaw, recorded by the Portable Antiquities Scheme and Early Medieval Corpus.

Figure 8 Single finds of bullion silver and weights. Finds provenanced at county level only are not shown.

Figure 9 The distribution of single dirham finds from England (per cent.) by date of production (total: 44 coins)

Table 1

Artefact Type	*Number*
Ingots	
Cut at one end	19
Cut at both ends	6
Complete, with 'nicks'	17
Broken at one end, with 'nicks'	2
Total	***44***
Ornament-derived hack-silver	
Permian ring	2
Hiberno-Scandinavian broad-band arm-ring	2
Ring-money	1
Brooch	1
Neck-ring	1
Twisted rod arm-ring	1
Finger-ring	6
Total	***14***
Dirhams	
Umayyad	3
Aghlabid	1
Abbasid	26
Samanid	22
Khazar	1
Volga Bulgar	6
Unknown dynasty	6
Total	***65***
Regulated Weights	
Oblate-spheroid	34
Cubo-octahedral	26
Total	***60***
Total	**183**