The English Coinages of William I (1066-1087) and William II (1087-1100) and their Implications for our Understanding and the Public Representation of the Early Norman Period

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Dedicated to the memory of my mother,

Mrs Angela Rohde (1944-2017),

for all her support, encouragement, and love

Abstract

This multi-disciplinary project brings together the largest dataset of the surviving English coins of William the Conqueror and William Rufus yet collated. The dataset focuses on those coins which are held in public collections, thus creating a particular and specific base from which to examine not just the information held within the coins but also their contribution to museological questions. It examines these data using numismatic and statistical methods, interprets those findings from the standpoints of economic, social, and personal history, and investigates how the resulting stories can be effectively used in the UK heritage industry to engage wide audiences, and to affect the public representation of Early Norman England. The project outcomes are therefore twofold: It identifies new narratives which deepen and add nuance to our understanding of the period, and provides indisputable evidence of the value of public numismatic collections to the aims and purposes of museums in 21st century British society.

Examination of the coins reveals a picture of surprising diversity and continuation of traditional practices over the time of the Norman Conquest. This diversity manifests throughout the period of study, beyond the point at which previous numismatic research had posited the imposition of kingdom-wide conformity in the coins; the project confirms that uniformity was not achieved even by the end of William Rufus' reign. The analyses also show regional variation within the kingdom, hinting at the survival of a Danelaw identity in the coins over 100 years after England had been united through the reconquest of the Danelaw by the West Saxons.

The coinage additionally retains traces of specific historic events, notably the Northern Rebellion and the Harrying of the North in 1068-1070, and possibly also the First Crusade to the Holy Land in 1095-1099. Beyond these wider

political events, the coins also show details of the lives of individual people, in the shape of the moneyers named on the reverse of the coins, who are revealed as a group of men with a high degree of control over their working practices, their careers, and their moneying legacies.

These narratives enhance our understanding of life in England in the early years of Norman rule, and the project confirms that they can be intriguing and engaging for a wide variety of potential audiences. People from various social groups find the stories interesting and surprising, and are thereby encouraged to investigate further and discover more about the period. The coins are thus shown to be an invaluable resource for prompting curiosity and engagement in the public, and helping them to access historical research and revelation. This counters the perception that coin collections are difficult to relate to current museum aims, and can offer resistance to the trend for their marginalisation in UK museums, by confirming that far from being irrelevant to sector objectives, numismatics are vital to fulfilling museum potential in modern society.

Abbreviations and Glossary

Abbreviations

ACE – Arts Council England

BNJ – British Numismatic Journal

DCMS – The Department for Culture, Media and Sport

EHR – Economic History Review

EMC – The Corpus of Early Medieval Coin Finds

HLF – Heritage Lottery Fund

MA – Museums Association

NC – Numismatic Chronicle

OV, EH – Orderic Vitalis, *Ecclesiasticae Historiae Libri Tredecim*

PAS – The Portable Antiquities Scheme

PASE – The Prosopography of Anglo-Saxon England

SCBI – The Sylloge of Coins of the British Isles

SSN – Subject Specialist Network

WM, GR – William of Malmesbury, *Monachi de Gestis Regum Anglorum*

WP, GG – William of Poitiers, *Gesta Guillelmi Ducis Normannorum et Regis Anglorum*

YN – Yorkshire Numismatist

Definition of Terms

For the purposes of this thesis the following terms are defined thus:

- Coin Type – the numismatic classification of each distinct coin design, numbered chronologically from the first coinage of William I (Coin Type 1) to the last coinage of William II (Coin Type 13). These types have customarily been assigned names, which are also referenced within the text. They can be found in Table 1.1.
- Diameter – the largest distance across the coin from edge to edge, crossing the centre of the coin
- Die axis – the angle at which the top of the reverse coin design sits in relation to the top of the obverse coin design. The top of the obverse is defined as the top of the king's portrait, and the top of the reverse is defined as the end of the arm of the central cross which is closest to the initial cross in the inscription. Die axes at the cardinal points (0, 90, 180, or 270°) are referred to as regular die axes, while other measurements are considered irregular.
- Die linkage – two (or more) coins which have been struck using one or both of the same coining dies
- Flan – the disc of metal which is made into a coin
- Mint – a town at which coins were struck
- Moneyer – the mint official named on the reverse of the coin, having responsibility for ensuring that the coins were struck with the correct design, and to the correct weight and fineness of silver
- Mule – a coin in which one face shows the design from one Coin Type while the other face shows the design from a different Coin Type
- Obverse – the front of the coin, with the king's portrait and titles
- Overstrike – a coin which has been struck to one design, and then reused by striking a different design over the top of the old one

- Recoinage – the process which occurred at the change of Coin Types; including collecting in the old coinage, melting it down, and restriking it with the new design
- Reverse – the back of the coin, with the names of the moneyer and mint

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Chapter 1: Introduction and Research Context

1.1 General Aims

This thesis presents the results of a multi-disciplinary investigation into the English coins of William I (William the Conqueror, 1066-1087) and William II (William Rufus, 1087-1100). The investigation drew together the largest dataset of these coins yet collated, and through examination and interpretation from numismatic, archaeological, and historical standpoints has revealed new narratives of the impact of the Norman Conquest on eleventh century England. It demonstrates the continuity of practices and personnel in the monetary system of the kingdom, and therefore forces reconsideration of traditional narratives of the Conquest period. It thus highlights the vital importance of the surviving coins to the development of our understanding of the period. Further, investigation of these narratives from a museological angle showcases their vast potential for cultivating and deepening public engagement with the period. This in turn emphasises the relevance and importance of numismatics to the current aims and objectives of the UK heritage industry, at a time when coin collections are potentially under threat. The thesis therefore aims to present a synthetic overview of the research, showing both the breadth of detail that the coins can reveal about the past, and how they can be meaningfully used today.

When William of Normandy conquered England in AD 1066 he continued the practice of his Anglo-Saxon predecessors by issuing silver pennies for use throughout the kingdom, a process which persisted through the ensuing two centuries. By the time of the conquest England had a sophisticated system for the production, distribution and use of coinage, and this was an important aspect of the administration of the kingdom. The silver penny was the only denomination of coin in production and, from the coinage reform of Eadgar

c.AD 973, coins throughout the realm were all made to the same design. They were struck at mints across the kingdom: 69 towns are known to have minted coins at some time during the reigns of William I and II. Each of these towns had one or more mint officials, known as moneyers, overseeing the work. Where the metallurgy of English coins of the late 10th and 11th centuries has been measured, they are shown to have been of good quality metal, with a very high silver content. The quality of engraving of the coin dies, and of production of the coins, is also very high, resulting in neat, circular coins with legible inscriptions and images depicting and naming the king, as well as indicating the mint and moneyer.

Many thousands of these pennies have survived from the reigns of the first two Norman kings, the majority of which are currently held within coin collections. There are a number of important private collections but the bulk of the extant coins are in the public domain, housed within museum collections. These artefacts are therefore in the care of organisations with a remit to present history to the general public and as such the coins have the potential to be influential in creating and developing public understanding of the Norman Conquest and its aftermath.

The research project presented in this thesis aims to examine the surviving coins using various techniques. Numismatic and statistical analyses pinpoint patterns of similarity or difference within the corpus of coins, and investigate whether those patterns change over the course of the two reigns under examination. Drawing on the archaeological and historical context of the coins the project then aims to suggest interpretations of the numismatic analyses in terms of the social and political, as well as the economic and administrative, systems of the early Norman period. These interpretations reveal new narratives of the Conquest period which have not previously been articulated for scholarly and wider audiences, and thus contribute to improving our understanding of the course of the Conquest and its impact on

English society. Additionally, the study aims to examine the relationship between the extant coins and the institutions which hold them, investigating both how museum policy affects the preservation of the coins, and the potential for the coins to influence public representation of the Norman period. The new narratives revealed by the analysis of the coins are evaluated in order to suggest development and innovation in museum practice. This facilitates consideration of the value assigned to historic coins within current museum collections, and highlights their utility and relevance to organisational aims and priorities. This is particularly important in a time of financial constraint and scrutiny within the heritage industry, and it is hoped that work of this type may help present a robust defence against the threat of numismatic collections becoming marginalised and at risk of disposal.

1.2 Context for the Project

The background to this research project rests in the author's experiences over 15 years working in the UK museum sector. Personal interest led to a focus on numismatic collections, which supported the development of an interest in the relationship between the coins in museum collections and the policies and practices of the organisations which care for them. Specific choices are made by the institutions when acquiring and preserving particular coins, and when subsequently using them to fulfil organisational aims. It is also apparent that this is a two-way relationship, with museums influencing the coins, and the coins influencing museums: museum policy has significance for the survival of particular coins, and the composition of museum coin collections affects the way narratives of the past are presented to the public. The coins held in the public domain therefore represent a very specific research dataset, which has not previously been isolated for academic study. This project builds on the author's previous research into the status of numismatic collections in UK museums (Rohde 2010) in order to explore this relationship.

The coins which are held in the public domain are a particularly important resource for the very fact that they are accessible to the public. Numismatics is an area which has traditionally been the province of a particular sector of society; most early numismatic research was undertaken by private collectors – people with the resources to build up a collection of coins and the time to examine and investigate them. There is still today a perception that the study of coins is primarily the remit of an elite group (e.g. Harper 2008; Fenn 2015), and the author's observation of numismatic societies, conferences, and publications does suggest that within the sector there is still a large proportion of caucasian men from an affluent background, correlating with the group which has traditionally held power in Western society. For people without the resources to create their own coin collection, or from backgrounds which do not readily allow them to feel comfortable in established, academic, numismatic society, the coins held in museums are those most likely to be accessible, and may be the only available entry to the rich and fascinating historical data held within numismatic artefacts.

The coins of the late 11th century are of especial value for the insights they can provide into a time of great political change in the kingdom of England. Interest in the Norman Conquest is currently high, with the 950th anniversary of the Battle of Hastings in 2016 prompting a number of high-profile public events in both England and Normandy, such as the extensive programmes produced by English Heritage (English Heritage 2016) and the Normandy Tourist Board (Normandie Tourisme 2016). The surviving coins can enhance our understanding of the period by revealing details of the people and places involved in the administration of the kingdom, and thus the progress and embedding of the Norman regime across society after the initial military conquest. A study of the coins from different mints has the potential to reveal aspects of the local and regional picture of early Norman England, and

the moneyers who oversaw the minting process were a key group of officials whose traces in the coinage can reveal details of the lives of individuals.

A study of this type is overdue. No comprehensive corpus of surviving coins of William I and II has ever been compiled, and where parts have been published, this has been done in a piecemeal fashion over a long period of time. One of the key works on the subject is still Brooke's catalogue of the British Museum collection, which was published in 1916 (Brooke 1916). The Sylloge of Coins of the British Isles series has published many other significant collections more recently but, although this is an ongoing series, a number of the important volumes for this period appeared some decades ago; many of the key museum collections holding coins of William I and II have made significant acquisitions since their catalogues were published. These coins are brought together here for the first time.

Recent developments in technology, as well as within the heritage sector, also contribute to the pertinence of undertaking this study at this time. The rise in use of metal detectors, and the instigation of the Portable Antiquities Scheme (PAS) in 1997 to record the artefacts found by members of the public, means that the number of coins available for study is far greater than even relatively recent research projects had access to. Since Metcalf's 1998 study of English coins from the period c.973-1086 (Metcalf 1998), for instance, the PAS has recorded over 950 finds of single coins which would have qualified for inclusion in that work[1] (Portable Antiquities Scheme database 2016).

[1] Database search instigated 13/12/2016; the results totalled 954 records of single coins, broken down by reign as: Edgar's reform coinage 18; Edward the Martyr 18; Aethelred II 261; Cnut 156; Harold Harefoot 45; Harthacnut 18; Edward the Confessor 280; "Edward the Confessor – William I" 4; Harold Godwinson 17; William I 137

The conditions are therefore ideal for an investigation into the English coinages of William the Conqueror and William Rufus. The study is pertinent to a number of different, but interconnected, academic disciplines. A numismatic study of the extant coins can be usefully enhanced by study of the archaeological context of the coin finds and the places to which they are linked. Interpretation of the data revealed by the coins can shed light on various aspects of medieval history, including social, administrative, economic, and political aspects of the period. All these elements are influenced by the nature of the collections of coins in the public domain, and reciprocally the information held in the coins, and its historical interpretations, are key to the public representation of the period through the UK heritage sector.

1.3 Work to Date

1.3.1 Numismatics

Modern academic study of English medieval coins began in the Victorian period but the most influential early publication to focus on the coins of William I and II was Carlyon-Britton's article, published in parts in the *British Numismatic Journal* (Carlyon-Britton 1905 and 1906-1915). This drew together previous piecemeal work into a description of the different Coin Types, using Hawkins' classification (Hawkins 1887), with a discussion of the coin imagery, and lists of the then-known mints and moneyers, followed by descriptions of the individual mints. The next major work on the subject, and still one of the most comprehensive treatments, was Brooke's catalogue of the coins of the Norman kings in the British Museum collections (Brooke 1916).

In his introduction to the British Museum catalogue Brooke described the coinage and made reference to many of the issues which are still under discussion today. Noting the continuation of the system of frequent

recoinages inherited from the later Saxon kings, he confirmed that the designs of the coins were changed twelve times during the reigns of William I and II, giving a series with 13 different Coin Types, which he described using the names which are still in current use. In line with contemporary thought, he allocated the first eight types to the reign of William I and the later five types to William II. He highlighted entries in Domesday Book relating to the taxes and fees imposed on the minting system, and to the fact that the coin dies were created centrally in London and issued out to the various mints. However, he also noted a number of instances of mints using dies of rough workmanship, demonstrably unlike the majority of the official coin dies. He highlighted examples of overstrikes and mules, as well as coins which indicate die links between moneyers and mints, and he suggested interpretations of these in terms of minting practices. He also made some remarks about the moneyers, identifying them as likely to be men of property with Burgess rank, and he touched on issues of both the weight of the coins, and the mechanisms for control of the minting process.

Much of the numismatic work of the subsequent 100 years has focused on individual coins, new finds, or investigation of particular mints. This last occasionally included identification of the individual coin dies used within those mints (e.g. Mossop 1970; Harvey 2012) but there has been little synthesis of these die studies. There has also been continuing discussion of the issues highlighted in Brooke's catalogue. The work has been greatly aided by the ongoing publication of catalogues of key coin collections in the Sylloge of Coins of the British Isles series, of which a number of volumes include coins of the medieval period. The introductions to these volumes include useful commentary on the coins, especially for collections with a focus on coins of a particular mint (e.g. Blunt and Dolley 1973, on the Gloucester mint). In the 1980s the work of Carlyon-Britton was updated by Harris, who published lists of the mints and moneyers of the Norman kings then known (Harris 1983-1988). These have lately been further updated by Allen (2012c),

and it is a testament to the recent improvements in the finding and recording of archaeological artefacts that this work required addenda and corrigenda to be published within just four years (Allen 2016).

In 1966, on the 900th anniversary of the Battle of Hastings, Dolley published a commentary on the effect of the Norman Conquest on the English coinage, which took a rather more synthetic approach to the subject, commenting on the chronology of the coinage but also looking at the effect of the Conquest in terms of continuity of minting practice from the later Saxon period (Dolley 1966). Further important holistic work touching on the Norman kings appeared in the form of Metcalf's masterful survey of the coins of the later Saxon period (Metcalf 1998). This survey included the first eight types of the Norman series (those which, at the time, were generally considered to be the coins of William I). The work examined each Coin Type, notably including finds of single coins as well as coin hoards, and interpreted the data to suggest answers to questions of social and economic history. The importance of single coin finds to interpretation of numismatic trends has recently been further elucidated by Naismith (2013), and by Kelleher's examination of medieval coins from 1066-1544, which extends Metcalf's social and economic interpretive approach into this later period, is based on a dataset of entirely single coin finds (Kelleher 2013).

There is currently much numismatic interest in the coins of William I and II, most clearly shown by the work of Martin Allen. In addition to updating the lists of known mints and moneyers Allen has produced a cornerstone work examining the whole system and process of minting in Medieval England (Allen 2012a). He has also focused closely on the Norman kings (Allen 2012b) and even more specifically on the reigns of William I and II (Allen 2014). These latter works have included numismatic details with suggestions for interpretation, and contribute to the ongoing discussion of the issues which exercised Brooke a century ago.

One of the key queries in relation to this coin series is the dating of the coin issues. The system continued the use of the technique of 'renovatio monetae' whereby the design of the coins was periodically changed, such that when coins of the old design came back to the mints, they were replaced with those of the new style. These different designs are referred to as 'Coin Types'. As Allen notes, the mechanism for the change of coinage in circulation from the old to the new types is not definitively known, but the evidence from hoards suggests that the switch was relatively efficient and usually effectively complete (Allen 2012a, 38-39). Early work on mules and the makeup of hoards allowed the order of the 13 Coin Types of William I and II to be established with confidence by the time Brooke published his catalogue in 1916 (Brooke 1916, xv). However, the specific chronology of when the different types were issued is still a subject of debate. Carlyon-Britton postulated that in these reigns a Coin Type was usually issued for a period of exactly three years. He based this on the supposition that the tax on the English minting system introduced by William I followed the same pattern as the similar contemporary tax in place in Normandy (Carlyon-Britton 1905, 92-94). This suggestion was queried by Brooke, who noted clear differences between the two taxes, and declined to suggest a specific length of time between recoinages (Brooke 1916, lxix-lxx). The idea of a regular, triennial recoinage was supported by Dolley, however, albeit with the amendment that he suspected that it wasn't put into place until the fifth Coin Type, with the preceding types being in production for only two years each (Dolley 1966, 15-18). Eaglen's discussion of the issue also suggested a system with some three-year issues and some of two-year duration, but his suggested chronology had the first eight types in production for three years each, followed by two-year issues for the remaining five types (Eaglen 2006, 55-58). Allen broadly supported Eaglen's chronology but importantly echoed Brooke's arguments in noting that there is no clear evidence that the change of types had strict regularity. He has therefore suggested a vaguer dating

system, allocating the Coin Types to a rough period rather than specific dates (Allen 2014, 90-94) (see Table 1.1).

Coin Type	Dates	Reign
1 (Profile / Cross Fleury)	1066-c.1068	William I
2 (Bonnet)	c.1068-early 1070s	William I
3 (Canopy)	Early-mid 1070s	William I
4 (Two Sceptres)	Mid-late 1070s	William I
5 (Two Stars)	Late 1070s-early 1080s	William I
6 (Sword)	Early-mid 1080s	William I
7 (Profile / Cross & Trefoils)	Mid 1080s-c.1087	William I
8 (PAXS)	c.1087-c.1090	William II
9 (Profile)	Early 1090s	William II
10 (Cross in Quatrefoil)	Early-mid 1090s	William II
11 (Cross Voided)	Mid 1090s	William II
12 (Cross Pattee & Fleury)	Mid-late 1090s	William II
13 (Cross Fleury & Piles)	Late 1090s-1100	William II

Table 1.1: Chronology of the 13 Coin Types of William I and William II, after Allen, 2014

Consideration of the timing of the coin issues also raises the question of whether Coin Type 8, the PAXS type, was the last issue of William I or the first issue of William II. Based on his calculation of a triennial system of changes, Carlyon-Britton favoured the former (Carlyon-Britton 1905) and most subsequent research accepted this framework, although Brooke did note that there was no definitive evidence either way (Brooke 1916, lxviii). Archibald went further, positing that PAXS was actually the first type of William Rufus, and suggesting that the word 'paxs', meaning 'peace', may refer to the confirmation of the king's peace which was part of the coronation ceremony, and therefore a suitable motif for the first coinage of a reign. She noted that the first issue of Edward the Confessor and the single issue of Harold Godwinson both included versions of the word (Archibald 1984, 324-328). However, Blackburn's confirmation that the coins of Henry I which show the word 'pax' are probably the third type of the reign, rather than the first, shows that this argument is not conclusive (Blackburn 1991, 57-58). Nonetheless, Allen supports the dating of the PAXS type to the reign of William II, highlighting various coins from Welsh mints and noting the dating

of documentary evidence for Norman presence and administration in those towns (Allen 2012a, 25-26; see also Boon 1986, 67). More recently, Harvey has returned to the earlier scheme, suggesting that the large issue of PAXS coins was related to the Danish threat of 1084-5 (Harvey 2014, 140; 319-321). It is clear that there is currently no definitive argument, and little consensus, on the dating of the PAXS coinage. The author finds Allen's arguments the most convincing, and his chronology has been used throughout this thesis.

Physical aspects of the coins have also merited attention. In the 1950s Dolley commented on the die axes of the late Saxon coinage, pointing out the general regularity of these measurements, with the vast majority showing the alignment of the two faces at 0, 90, 180 or 270 degrees. He noted, however, an exception for the York mint, in whose coins "we find irregularity of die-axis almost the rule, rather than the exception" (Dolley 1952-54, 169). Both he and, later, Blackburn (2004) noted that this anomaly at York continued into the late 11th century, but neither quantified it further than that.

A topic which has engendered much more deliberation is the issue of the weight of the coins and the emergence of a national standard for a penny's weight. In the 1980s Nightingale addressed this issue from the standpoint of an historian investigating the meaning of terms used in Domesday Book (Nightingale 1983 and 1984). She assumed the notion of a nominal kingdom-wide weight standard but suggested that William I had continued the existing Saxon system and changed that standard from type to type, for expediency and profit (Nightingale 1983, 256). Metcalf went further, highlighting instances where the surviving coins suggest more than one weight standard in use within a single Coin Type. He noted the argument that the first coins of a type were struck to a heavier weight, and later coins to a lighter weight, which had been suggested by earlier work by Butler (1961, 204-208),

Petersson (1969, 148-155) and others. However, he cautioned that the actual situation is far more complex that this argument would suggest (Metcalf 1998, 56-66) and also noted that the evidence from coin hoards is contradictory on whether the heavier coins were produced before the lighter ones; although some dual-type hoards have light coins of the earlier type with heavy coins of the succeeding type, others have the opposite structure (ibid., 68). Additionally, Metcalf's work indicated that there was little kingdom-wide conformity, with different weight standards seeming to be in use at different mints. However, in the eighth Norman type, the PAXS coins, which were the latest to be included in his study, he noted a far greater level of standardisation, suggesting that a national weight standard was introduced for the first time in this Coin Type (ibid, 187). Lyon also commented on the conformity of weight of the surviving coins of the PAXS type, although he felt that "William the Conqueror had stabilised the weight of the penny some years before 1086" (Lyon 2006, 234), suggesting that the coins may have been standardised before the PAXS issue. Later, he also considered the coins of the Winchester mint, which showed great uniformity from the start of the reign, and seem to have adopted the national weight standard some issues before PAXS. He felt that the evidence from this mint suggested that the intention to standardise the penny weight was there as early as the 1070s (Lyon 2012, 21). Nightingale returned to the question in 2008. She was confident that the national standard weight was only imposed in PAXS, and indicated that this has a bearing on the question of the dating of this Coin Type: She presented the rather spurious argument that a newly-crowned king may not have felt confident enough to impose such a radical reform to the coinage system and that therefore PAXS should be seen as the last type of William I, rather than the first type of William II (Nightingale 2008, 180). Whatever the standpoint on the specific dating of the PAXS type, however, there is a general consensus in the published literature that from that point onwards the weight of the penny was standardised across the kingdom (see, for example, Allen 2012a, 138).

Metcalf had followed Petersson (1991) in suggesting that differing standards at different mints indicated that the final decision on the weight of minted coins may have been made at shire level rather than by central government (Metcalf 1998, 64). Nightingale, however, emphasised that variations between mints would have benefited the king's profits in various ways, and she felt that this was the single most important reason for these variations. She was quite certain that the decisions on the weights of coins came from the central government, not the shires, stating that "It cannot be emphasised too much that whatever was the king's policy towards the manufacture and exchange of coins, [this] was determined by him and his advisors alone..." (Nightingale 2008, 178). This question of the level and efficacy of central control over the minting system is another underlying thread in the numismatic literature. It is clear that there was some level of abuse within the system. Dies which have been altered to obscure the details of the moneyer and/or mint have been noted and linked to contemporary coin forgery, for instance by Stewart (1955) who also highlighted die links between forged coins of London and Thetford, and thus postulated a network of forgers. Elmore Jones also noted forgery and alteration of dies when discussing Norman coins of the Welsh mints (Elmore Jones 1955). In addition, there are a number of instances of the use of dies which may be considered as unofficial. Domesday Book suggests that by the end of Edward the Confessor's reign it was common for all official coin dies to be made in London (see, for instance, the entry for Worcester, translated as "…when the coinage was changed each moneyer gave 20s. at London for receiving the dies for the coinage" Domesday Book, fol.172, A Williams and Martin 1992, 474), but Brooke highlighted the use of dies of rough workmanship at certain mints in the second and fourth Coin Types of William I, suggesting that they may have been of local manufacture. He was confident that this was the case for the Welsh mints (Brooke 1916, cxxxviii-cxxxix), and this was later reinforced by Elmore Jones (1955). Metcalf too noted the presence of coins

from local dies (Metcalf, 1998). However, as Allen has noted, there has not been a systematic investigation of local-style dies in any of the early Norman coinages (Allen 2012a, 116) so the extent of the use of these rough dies is not currently clear, and its bearing on the issue of the efficacy of governmental control over the minting system has not been resolved.

Temporal context to the study of the coinage of the early Norman kings is provided by detailed work on the numismatics of previous reigns, notably Freeman's consummate survey of the reign of Edward the Confessor (Freeman 1985) and the work of Pagan on the short-lived coinage of Harold Godwinson (Pagan 1990). Gareth Williams has also recently looked at Harold's coinage, focusing on the Wilton mint and the period immediately following the Battle of Hastings (G Williams 2012), thus referencing the transitional period to the first coinage of William I. The recent discovery in Somerset of a very large hoard comprising over 2500 coins of Harold and the first type of William I (G Williams, personal email communication, 04/02 – 04/03/2019) will undoubtedly shed further light on this period. The succeeding period is also well researched, notably in Blackburn's work on the coinage of Henry I (e.g. Blackburn 1991).

Geographical context for the English coinages of William I and II is provided by Grierson's overview of the contemporary coinage of Europe (Grierson 1991). Grierson notes that Norman coinage of the mid-11th century is very much poorer than contemporary English coinage. Indeed, he has stated that "[...] the general aspect and fabric of the coins are deplorable, with low-relief, blundered inscriptions, distorted and illegible letters." (Grierson 1991, 68). Moesgaard concurs, and also highlights the low weight of ducal Norman coins (averaging c.0.75-0.85g under William the Conqueror) and the debasement of their metal to "a half-silver, half-copper alloy" (Moesgaard 2009, 92)[2]. He

[2] Translated from the French by the author; original text: "un alliage mi-argent, mi-cuivre"

notes that in both territories the circulation of foreign coins was forbidden at this time, and shows that finds of English coins in Normandy, and vice versa, are very few, suggesting that the two coinages did not circulate together in practice either (ibid, 94-97). At the time of the Norman Conquest, therefore, the coinages of the two territories represent distinct and separate monetary systems.

1.3.2 Archaeology, History and Historiography

The early development of the study of medieval archaeology is, somewhat counter-intuitively, almost entirely divorced from the development of contemporary numismatic study. Coins were collected and studied from the Renaissance onwards (Olmi 1985), but the context in which they had been used, and lost, was only rarely considered. Indeed, archaeology was generally seen only as a supplement to historical study and, as Gerrard notes, it was not until the late 19th century that it began to be recognised as a discipline in its own right, and to develop its own techniques and aims (Gerrard 2003, 54-55). Even then, interest in the archaeology of the medieval period was slow to evolve with much early work focusing on the prehistoric and Roman past. Gerrard notes that excavations of medieval sites didn't become common until after the Second World War (ibid., 95), and Schofield and Vince point out that even by the 1960s Biddle's argument for the importance of excavation of all periods of history at Winchester was unusual, since digging straight to the Roman archaeology was still "the chief objective of many excavations at the time" (Schofield and Vince 2003, 4).

This resistance to the study of the middle ages may have partly had an ideological cause, reflecting the historiography of the period. Enlightenment thought had suggested that societies should generally move in a continuous upward trajectory from barbarism towards civilisation, and in this context the English medieval period was anomalous, apparently representing a backward slide in the kingdom's trajectory after the Roman period, which was not

corrected until the Renaissance (Gerrard 2003, 10). In the 19th century this thinking was bolstered when Darwinian ideas of biological evolution were applied to human culture, and combined with growing nationalism and pride in the industry and achievements of the British Empire (Trigger 2006). The lingering influence of these modes of thought may have slowed the development of the discipline of medieval archaeology in general, and particularly the investigation of the Norman period, since the conquest by a foreign power in 1066 was seen as somewhat embarrassing, and contributed to a popular romanticism of the Saxon period, and a view of the Normans as oppressors (Chibnall 1999, 57; Brownlie 2013, 112-118). However, later developments in political, as well as archaeological, theory acted to invigorate medieval archaeology, and Marxist theories, liberal ideologies, and gender studies prompted closer examinations of previously under-researched aspects of past societies (Gerrard 2003, 128-129; 221-223).

Archaeological interest in the medieval period expanded greatly in the later 20th century. High status sites, such as castles and cathedrals, received attention, but additionally the increase in urban sites made available for excavation through city centre developments and the requirements of governmental planning policy also allowed for greater focus on the material remains of medieval towns (Schofield and Vince 2003, 10). Data from settlement sites offers evidence for the lives of people at all levels of society, rather than just the ruling elites, and investigation of urban sites is important for the archaeology of coinage, since medieval mints were all based in towns. Knowledge of medieval towns has advanced through the excavation of areas of key urban centres of the medieval kingdom. Details of the royal capital of Winchester were revealed by Biddle's excavations in the 1960s (Biddle and Keene 1976; Biddle 1990; Biddle 2012), while excavations at various waterfront sites in London in the 1970s and 1980s provided insights into the main mercantile hub of the kingdom (Steedman, Dyson and Schofield 1992). Investigations at York, including the important excavation of the Coppergate

site between 1976 and 1981 (Hall 2014), and excavations in Lincoln (Jones, Stocker and Vince 2003) have revealed fascinating details of the period in these important medieval centres of the North and East of the kingdom.

The growing abundance of data from these and other excavations has allowed for increasingly sophisticated interpretations of the development of medieval towns. In 2003 Schofield and Vince examined the influence of diverse factors including topography, castles, and trade and commerce in their overview of the progress of towns in Britain in the later medieval period (Schofield and Vince 2003). The impact of the church on urban development was investigated by Baker and Holt, using the towns of Worcester and Gloucester as case studies (Baker and Holt 2004). They utilised techniques of mapping and plot-plan analysis to support their conclusions, and similar considerations of the nature and use of spaces within a town have informed other work, such as Dean's re-examination of medieval York (Dean 2008). Loveluck highlighted the agency of various social groups, including merchants and agricultural populations as well as the governmental elite, in the creation and development of medieval towns (Loveluck 2013). All of this work now presents a nuanced picture of the complexities of relationships which combined to influence the urban sites across the kingdom, and the minting and economic activity which happened therein.

When investigating the monetary economy, archaeology has provided an invaluable complement to historical research, since the surviving textual evidence for the 11th century experience is scarce. Some tantalising clues do emerge from the documents: evidence from earlier Anglo-Saxon law codes confirms that moneyers would be working within boroughs (Allen 2012a, 1). Domesday Book includes a few mentions of the renders on profits from individual mints (Leicester, for example, paid £20 a year: Domesday Book, fol.230, A Williams and Martin 1992, 627), and rare comments which throw light on the process of minting, such as the entry for Worcester mentioned in

section 1.3.1 above, which indicates that coin dies were collected from London. Biddle and Keene have used the evidence of Domesday, together with two unique surveys of Winchester from 1110 and 1148, to identify a number of workshop buildings, lying on the same street, which were noted as properties owned by the moneyers. This thereby suggested that in Winchester at least the moneyers each had their own separate workshop, rather than working together in a single mint building (Biddle and Keene 1976, 397-407).

Archaeological work also provides evidence of the practice of minting. In recent years, for instance, a number of the dies used for striking the coins have been discovered. When Dolley investigated the die axis of late Saxon coins in the 1950s he did not have the benefit of any surviving examples of coin dies to examine. However, he suggested that the regularity of die axis measurements may indicate that most moneyers were using dies of square cross-section, with the exception of the moneyers of the York mint, where the irregularity of die axes betokened the use of circular dies (Dolley 1952-54). Subsequent finds of extant dies have supported Dolley's suggestion: the 1976-1981 Coppergate excavations at York uncovered two dies of early 10th century coins from the York mint, both of which are of circular cross-section (Blackburn 2004). Six dies of coins from other mints have also now been discovered: in 1975 a die was found during excavation at Flaxengate in Lincoln, although it wasn't identified until 1990 (Blackburn and Mann 1995); between 1989 and 1990 four dies were found by metal detector users on the Thames foreshore in London (Archibald, Lang and Milne 1995); and in 1995 a very corroded die was found during excavation at Mill Lane in Thetford (Blackburn and Davies 2004). Taken together these dies cover the period from the late 10th to the mid-12th century, having been used for coins from the reigns of Aethelred II, Cnut, William I, Henry I and Stephen. They represent the mints of Norwich, Wareham, Southwark, Northampton and, probably, Lincoln. All six dies are of square cross-section. The archaeological

contexts where these dies were discovered have additionally led to the identification of a possible die-cutter's or moneyer's workshop in Lincoln (Blackburn and Mann 1995), and to a suggestion for the location of minting activity in London (O'Hara 1993).

Investigation into the practice of minting has been taken further through the discipline of experimental archaeology, notably in the work of Sellwood who reported his experiments with medieval techniques of die production, die-cutting, and coin striking in the 1960s (Sellwood 1962). Current experimental work continues, with moneyers such as Dave Greenhalgh undertaking physical investigation to reproduce the errors and mis-strikes, as well as the perfect coins, and thus revealing the likely equipment and techniques used in the medieval workshops (D Greenhalgh, personal communication, 26/07/2016). Re-enactments of archaeologically authentic processes also play an important role in dissemination of research results to the wider public.

The archaeological contribution to our understanding of the extent and nature of coin use is also considerable. Plotting the location of coin finds has allowed identification of possible trading sites and markets, both within cities such as Lincoln (Vince 2006) and London (Stott 1991), and in the rural landscape, at so-called 'productive sites' (e.g. Bonser 1997). The distribution of finds has also been used to draw broader conclusions about the extent of monetisation in the kingdom, in different areas and at different times. Kelleher's investigation of finds of single coins, for instance, has identified changing patterns of regional coin use across the medieval period (Kelleher 2013), and Wren has used the evidence of coin finds to profile the state of the monetary economy in South Wales and the English counties of the 'Welsh Marches' in the early Norman period (Wren 2014). Bevan mapped coin finds against Domesday population densities as a case study to show how innovative mapping techniques and production of Relative Risk Surfaces can

offer a buffer against biases when using current coin distribution data to examine historic coin use (Bevan 2012).

The issue of how coins were used within society at the time of their production is an important aspect of the economic history of the medieval period. This area of historical research has a healthy pedigree, and much current interest. In 1988 Spufford concluded that in England and continental Europe coins were being used by people at all levels of society (Spufford 1988, 87). Bolton took a wider view, placing the use of money in the context of a broad examination of the whole of the economy, including non-monetary transactions, credit, and wealth held and transferred as bullion. He commented on the levels of monetisation within society, and made interesting suggestions regarding the consequences of the variation in the weight of the coinage, as noted in numismatic studies, querying how far the English coinage was used at face value and how far its intrinsic bullion value was important (Bolton 2012, 45-46). Spufford and Bolton both additionally raised the question of the potential sources of the metal for the English coinage and the possible results of falling outputs from various European silver mines.

In investigating the medieval economy Spufford also noted the importance of commerce, as well as rents and taxes, in expanding the monetisation of society (Spufford 1988, 87-90). Sawyer, however, felt that coinage was primarily produced for the purposes of governments, and that the needs of a market economy were secondary (Sawyer 2013, 27). The question of agency within the economy has also been examined by Loveluck, who charts the rise of the merchant class in medieval Europe. He notes that urban populations, of which merchants were a key part, were increasingly dynamic and socially important in this period, pointing out that when William I conquered England in the 11th century the castles which he built as symbols of his power were often on the outskirts in the key commercial towns, rather than in central

positions as elsewhere. This was much less destructive, and may represent recognition of the importance of the trade centres to the economy of the kingdom (Loveluck 2013, 236). Furthermore, Loveluck has shown that by the 11th century urban merchants were buying land, both in town and country, and could be granted estates for service in royal official roles (ibid., 302). One such role was the position of moneyer, and evidence from London provides specific examples of moneyers who also had merchant interests, notably the family of Deorman, who were later influential in the Pepperers' Guild (Nightingale 1995). Moneyers in London and elsewhere therefore seem to have been of high status, usually of Burgess rank, as confirmed, for instance, in Biddle and Keene's survey of Winchester (Biddle and Keene 1976, 421) and Symons' investigation of the Worcester moneyers (Symons 2006, 563-564).

These detailed examinations of aspects of social history are expanding knowledge of medieval society by looking at the lives of people of many different backgrounds. General histories of the period may still emphasise the actions and monuments of kings and landed nobles (e.g. Rowley 1999, or for an interesting French perspective, Neveux 2008) but, as Chibnall (1999) notes, broader research in recent years has included work on other people and levels of society, such as Stafford's research into the position of women (Stafford 1994) or Ann Williams' work on the status of Anglo-Saxon families after the Norman Conquest (A Williams 1995). This latter work indicates that while most of the members of the highest level of pre-conquest society lost their land and positions after the Conquest, there was actually a high level of retention of position at the mid-levels of society. Williams suggests that experienced officials were needed to keep the administration of the kingdom running smoothly (ibid, 77) and this would have included the moneyers of the minting system.

1.3.3 Museology

Coins, medals and tokens were among the first artefacts to be collected and exhibited in a way which is analogous to modern museums, and the history of the early use of coins in this way has been subject to interesting research. Olmi noted that in the 16th and 17th centuries members of European social elites developed a fashion for collecting 'curiosities', including natural specimens and man-made artefacts, such as coins and medals. Collectors arranged and displayed their curiosities for their friends and guests, and in so doing began to classify individual objects within their overall collections. Olmi suggests that this creation of taxonomic classifications was an attempt to impose order onto a complex world and thus gain a semblance of control over it (Olmi 1985). The idea of organising and describing aspects of the world fit well with the rationality of the 18th century Enlightenment movement; as Ferry puts it, "the systematic collection embodies Enlightenment rationality" (Ferry 2010, 40). In the following century, when public museums began to appear, they adopted this rationalist approach to pursue their aim to educate and edify the general population. In fact, as Duncan (1995) points out, early museums could be viewed as a physical manifestation of the Enlightenment ideal of the ordered, demonstrable and objective 'secular truth'.

Early museums therefore favoured objects which lend themselves to ordered categorisation. The first numismatic displays were designed to elucidate this categorisation and tended to show rows of coins, arranged in strict order in relation to each other. Coombes (1988) suggested that the popularity of this type of display may have been partly because it strengthened the idea that everything has a natural order, including human society. It was thus a subtle way of reinforcing the existing social order. Coins are ideally suited to this sort of classification, and taxonomically arranged numismatic exhibits were common well into the 20th century.

In the 1970s and 1980s a change began to occur within the museum sector. In the UK this was partly prompted by political and financial issues, as the Conservative government began to scrutinise public spending and question the role of museums within society (Cummings and Lewardowska 2000; Stoddart and Sugden 2008). This led to a sector-wide re-evaluation of the purpose of museums and the ways in which they use their collections. There was an acknowledgement that publicly-funded institutions must justify their expenditure, and the sector became increasingly aware of the importance of market forces in attracting investment. These concerns supported the growing realisation that the museum audience is key to the institution's success, and the potential audience became an increasingly important factor in museum planning. By extension, museums needed to be socially relevant and inclusive, in order to attract and maintain that audience, and this prompted a shift towards aiming to engage and entertain, as well as educate. The potential for museums to help increase social inclusion and have positive effects within society was also examined, and was expressed in a report by the Department for Culture, Media and Sport, which suggested that museums could be "Centres for Social Change" (DCMS 2000).

Subsequent research has linked the shift in the perception of the role of museums to a change in staffing within heritage organisations. Changing priorities, often combined with reduced resources, led to a reduction in roles focussed on specialised subject areas in favour of more 'generalist' curatorial posts (Stoddart and Sugden 2008). This was also noted in the MA's 2005 report 'Collections for the Future', where it was acknowledged that it was no longer practical to have all specialist knowledge available within a single organisation (Museums Association 2005). Blackburn noted that it could be clearly seen in practice in the number of UK museums which lost specialist numismatic curator positions around this time (Blackburn 2008), as well as in comparable examples from other disciplines. The shift away from subject

specialist curatorial roles was offset by an increase in positions related to learning, outreach, and improving access to museum collections. Some argued that this shift was too extreme so, for instance, the MA called for a balance to be recovered between the important work on access and social inclusion, and the more traditional roles of research, care and interpretation (Museums Association 2005). In the current climate, however, it is rare to find specialist curatorial roles outside national museum services.

Re-evaluation of the aims of museums also led to re-evaluation of the way collections were used, and the types of displays which were mounted within the galleries. Taxonomic displays of objects became less fashionable as exhibitions moved to more narrative and thematic arrangements, allowing audiences to see how the collections were relevant to their own lives and experiences. In recent years this trend has developed further, with museums realising the value of the knowledge and viewpoints of their audiences in enhancing interpretation of collections and highlighting their significance. Initiatives such as the 'Revisiting Collections' programme (MLA London and Collections Trust 2009) provided opportunities for users to become involved in areas which had traditionally been the preserve of professional curators, such as cataloguing and label-writing, and thus add their voices to the stories of the collections. The acknowledgement of the validity of ideas other than the nominally-objective 'truth' presented by the museum organisation has led to an aspiration for 21st century museums to be increasingly open, accessible, and diverse. Recent discussion, notably in the work of both Black and Simon, suggests that museums should indeed reflect the multiple viewpoints of their audiences, but that they could strive to develop this even further by allowing audiences to actively participate in the building of narratives and the interpretation of heritage. This can be achieved through providing opportunities for users to interact, respond and, importantly, affect museum displays and programmes (Black 2011; Simon 2012). The importance of working collaboratively with communities was also recognised by Arts

Council England in their Strategic Framework. One of their five goals is to provide access to the arts and museums for everyone, and they state that to help achieve this they will "Invest in long-term collaborations between local communities, arts and culture organisations, local authorities and the private sector…" (Arts Council England 2013, 48). Within the museum sector this has led to a number of experiments with co-production and co-curation of exhibits, and to an ongoing debate about the practicalities and efficacy of this approach (see, for example, the blog of Maurice Davies, previously Deputy Director of the MA; Davies 2012).

The shift in museum priorities from a focus on collections to a focus on audiences has, however, also led to a shift in the way collections may be viewed by their governing authorities. High profile cases such as the 2014 sale of the Egyptian statue of scribe Sekhema from the collections of Northampton Museums highlight a potential for museum artefacts to be viewed as financial assets of the organisations who hold them, rather than being seen as primarily cultural assets of society, as was previously the usual situation. The ethics of the Sekhema case prompted great discussion within the heritage sector, and both ACE (Kendall 2014a) and the MA (Kendall 2014b) responded with reprisals for Northampton Museums Service. However, cases of this kind are an indication of a change in the way value is assigned to historic collections. If artefacts are deemed to be extraneous to a museum's aims, they may be considered redundant and therefore at risk of being deaccessioned from the collections with the intention of realising their financial value for the museum institution.

In terms of numismatics, Orna-Ornstein highlighted the fact that the move away from traditional museum disciplines to more engaging and inclusive practices presented a problem for the use of coins in museums, as succinctly expressed in his comment that "The truth of the matter is that many people find displays of coins inaccessible and boring" (Orna-Ornstein 2001a, 96). The

taxonomic displays of categorised coins started to disappear, and curators were left with the problem of how to use coins in broader, thematic displays in such a way as to make them accessible and interesting. The problem is compounded by the fact that coins are notoriously difficult to display, being small, double-sided, intricate, and often seemingly in need of detailed explanation (cf. Feria 1995 and Orna-Ornstein 2001a). It can be difficult to identify the relevance of coins to current museum aims, and to see their potential for use, especially in museum services without a subject specialist curator. Specialist coin displays have been removed or greatly reduced in many museums, and even large international organisations have been affected: the Smithsonian Institute in Washington DC closed their numismatic gallery in the early 2000s, for example (Doty 2004). Often the coins have been removed to storage, thus reducing their visibility within the overall museum collections. Where the responsibility for numismatic collections rests with generalist staff with no specialist knowledge, and a large collection to curate, they may be passed over for use in favour of artefacts which are deemed to be easier to fit to organisational aims. The author's previous work has suggested that in many cases numismatics risk becoming a 'marginalised' collection (Rohde 2010), and this decreases their perceived value as cultural assets, thus making the threat of deaccessioning to realise their financial value increasingly acute, especially as there continues to be a healthy market for historic coins in the private sector.

In the context of the current work the situation is aggravated by issues related to the museology of the Norman period. The problems noted by Gerrard, Chibnall and Brownlie regarding the disparaging of medieval culture in Enlightenment and colonial-era thought (see section 1.3.2 above) had an influence on both the acquisition of artefacts for early museum collections and the readiness to display them in exhibition galleries. The legacy of these attitudes may persist in the traditions of current museum practice, with displays of late 11th century artefacts, and discussion of the Norman period of

English history, being relatively uncommon, as explored in Chapter 6 below. However, Brownlie's fascinating work on the survival of cultural memories of the Norman Conquest in the current British population indicates that the majority of UK residents know of the Conquest and consider it to be an important event in British history (Brownlie 2013, 24), suggesting that there is great potential for public engagement with the subject.

1.4 Specific Objectives and Scope of the Project

1.4.1 Research Questions, Outputs and Outcomes

Building on the rich background of existing work highlighted above the thesis addresses the general aim of presenting a synthetic, multi-disciplinary examination of the coins of William I and II by considering the following primary research questions:

- How was the fiscal aspect of early Norman England administered at a local and regional level?
- How is the social and economic history of English society in the aftermath of the Norman Conquest revealed through the coinage?
- How can the surviving coins be effectively used to represent the period to our peers and wider audiences?

These primary research queries are nuanced and developed by the following detailed research questions:

- How close was central control over the minting of coinage and did the level of control vary in different regions?
- Did the system of minting vary in different regions?
- What level of decision-making authority did the individual moneyers have over their minting practice?
- What was the role and position of the moneyers within society?
- Did the situation change over the course of the reigns of William I and II?

- How engaging are the historical narratives revealed by the coins for a modern audience?
- How could those narratives be presented in a UK museum setting?

This thesis summarises the findings of the project and addresses these research questions. It therefore represents the main output of the study. The project database of information and measurements of the surviving pennies of William I and II is the largest collation of details of these coins yet created and is another important project output. Additionally, the recommendations for improved use of museum coin collections in the representation of the early Norman period constitute a further important output of the project.

Beyond these direct research outputs, the project also has indirect outputs, as the details recorded from coins in museum collections will be forwarded to the museums for inclusion in their institutional documentation. These data will thus lead to improved knowledge of the collections and improved accessibility for their future use. The ongoing dissemination of research findings through publication, presentation at academic conferences, and delivery of public engagement events also constitutes an important output of the project.

A major outcome of the research is an increased understanding of the period after the Norman Conquest. This includes the social dynamism and complexity of English society in the later 11th century, the administrative and governmental systems of the early Norman state, regional diversity within the kingdom, and the nature of the embedding of Norman rule across the country. A further outcome is an increased appreciation of the influence of museums on the composition of the accessible corpus of extant coins, as well as further recognition of the potential for numismatic artefacts to affect public understanding of the history of the period. This provides an important indication of the value of the coins to the fulfilment of current museum aims.

1.4.2 Scope

The project focuses on the coinages of William I and II, thereby looking specifically at the period 1066-1100. Politically this is a particularly important period in English history, running from the military conquest of the country in 1066 to the point where the new rulers were confirmed as a dynasty, with the accession of the third Norman king, Henry I, in 1100. In effect these 34 years represent the establishment and embedding of the Norman regime in England. Numismatically too this is a logical period to study, with the coin issues forming a natural grouping. 13 different types of coin were issued by the first two Norman kings, all following a similar style. As there was no tradition of differentiation between the names of the kings on their coins at this period, for instance by the use of regnal numbers, all 13 types are simply issued for 'King William'. This has contributed to an ongoing uncertainty about which coins were issued by William I and which by William II (see section 1.3.1 above), and strengthens the feeling that the 13 Coin Types naturally constitute a single series and can be sensibly studied together. The number of extant coins of these two reigns can also be seen to be a significant, yet manageable, sample for a research project of this length.

Further, the project focuses solely on the coins issued by William I and II in their English territories; the contemporary coinage of Normandy is not closely examined within the thesis. Previous work has indicated that the coins of the two territories were markedly different and that there was only limited cross-channel movement of money (Moesgaard 2009). Although the relationship between the two coinage systems has the potential to be very revealing, and has been little studied to date, investigation of this subject must regrettably fall outside the remit of the current project, due to constraints of time and resources.

The scope of the analysis of the coins is broad but is also limited by the resources available for the project. In particular it has not been viable to examine the metallurgical content of the coins. For almost all coins held in museum collections this aspect of their physical properties has not previously been measured and, as such, is not available for investigation. It has not been feasible with the time and equipment available for the current project to take these measurements and thus generate the data. Similarly, for most coins, no measure of thickness has previously been recorded, and in undertaking data gathering for the project no simple way of obtaining an accurate measure of thickness was found. The thickness of the coins varies repeatedly across their surface, thanks to the nature of their manufacture and the results of wear, and in practicality any method of quickly measuring the thickness of the coins is not sensitive enough to record meaningful differences between individual artefacts. The project analyses of the physical properties of the coins are therefore confined to the weights, diameter measurements, and die axes.

Interpretation of the coin analyses has allowed the construction of socio-economic narratives of the early Norman period. A number of these narratives have been selected for evaluation, to investigate their potential to engage broad audiences and fulfil the current objectives of the UK museums sector. Within the scope of the current project this evaluation has been targeted to specific audience groups in order to provide initial proof of concept for consideration of the potential of museum numismatic collections to develop public representation of the period. This aspect of the project constitutes a pioneering study of the use of public coin collections, and thereby sets the groundwork for future enhanced and expanded investigation.

1.5 Structure of the Thesis

Following the initial reference section, this chapter has outlined the context of the research presented in the thesis, and explained the aims, objectives and scope of the project. The following chapter outlines the factors which have influenced the methodology of the study. It provides an account of the rationale behind certain important methodological choices, and gives a detailed explanation of the specific tools and approaches used in the research.

The thesis then presents the findings of the investigation in four linked chapters which form a chain of reasoning. Chapters 3 and 4 focus on showing the results of the examination of the surviving coins. These are presented with numismatic and statistical analysis, thus forming an evidence base for the interpretation of the data they reveal. Chapter 5 offers this interpretive analysis, investigating the historical implications of the coin data. The narratives suggested by the coins are expounded in this chapter. Chapter 6 presents the results of evaluation of those narratives. They are examined in a museological context which allows for inferences on the potential of the coins to contribute to public understanding of the early Norman period.

The final chapter of the thesis draws together the details from the preceding work into a set of final conclusions, and provides recommendations for development of the project for future work, with acknowledgement of the challenges facing this process.

Chapter 2: Approaches and Methodology

The preceding chapter summarised the research context for this project, indicating where the current investigation will contribute to the broad and active body of previous work. The specific aims and objectives of the study have been discussed, highlighting the key research questions to be addressed in the thesis. This chapter proceeds to consider the particular methods which have been adopted in order to examine the research questions.

2.1 Approaches Influencing Methodology

The interrogation of large sets of numismatic data is most usefully approached using statistical methods. The tools of quantitative analysis have been applied to medieval coins by a number of earlier researchers. Notable examples include Petersson's work on the weights of late Anglo-Saxon coins (Petersson 1990) and the more recent work of Kelleher on the numbers and distribution of coins of the later medieval period (Kelleher 2013). Both these studies use mathematical graphic illustrations to plot and interpret their data, as well as statistical tests to comment on the significance of their findings. This approach acknowledges the methods of processual archaeology; the theoretical framework developed in the 1970s and '80s which emphasised systematic scientific approaches to archaeological investigation. Using the quantitative approach different sets of data (for instance the weights of coins of contemporary manufacture from different mints) can be mathematically compared. Additionally, the biases in the data, such as sample size, can be quantified and accounted for in interpretation.

When looking to separate the dataset into smaller sets for analysis and comparison a number of different approaches are possible. Temporal groupings are an obvious option, and the data lend themselves well to this,

thanks to the process of periodic recoinage in the early medieval period, which led to successive different coin designs and thus present a natural categorisation. Much past research has utilised this approach, to examine changes over time and pinpoint the inception of historical developments, such as the start of minting in a particular town (e.g. Allen 2003) or the imposition of a national weight standard (see section 1.2.1 in the previous chapter). Another option is to split the dataset geographically. Work investigating the coins produced at individual mints has a long pedigree (e.g. Henfrey 1880; Carson 1949; Mossop 1970) and Metcalf utilised a similar, though more sophisticated, approach in his analysis of earlier medieval coins of the whole kingdom, where he grouped the mints into regions for examination and comparison (Metcalf 1998). The approach allowed for useful conclusions about local variation, which highlight the complexity of the medieval monetary system.

Various approaches are also possible in the interpretation of the results of analysis of numismatic data. As the name suggests, the theories of processual archaeology advocate examination of the processes of history. This would support consideration of the legal and administrative systems in which the coins were created, as well as the influence of the wider medieval economy. Economic historians such as Spufford (1998) and Bolton (2012) have used this approach to good advantage in providing a general assessment of the role of money in medieval society. The utility of the approach can also be seen in the contribution of examination of variance in the coinage to ongoing debates on the effectiveness of administrative control over the moneying system. By extension this addresses the interplay of royal, governmental and local power. Brooke (1916) alluded to this and it has been further discussed by researchers including Nightingale (2008) and Allen (2012a).

A different approach can be seen in work which focuses on investigation of the moneyers named on the coins. A prime example of this approach is

Nightingale's superlative investigation of the London Grocers' Company which identifies and elucidates the status and influence of moneyer Deorman and his family (Nightingale 1995). Loveluck too examines the role of individuals and communities in directing the course of trade links and urban development (Loveluck 2013). These social historical interpretations of material data can be seen to fall within the tradition of post-processual archaeological theory, which developed as a reaction to the clinical tendency of processual interpretive methods. It emphasises the agency and identity of past people and examines their actions and motivations. Post-processual interpretation also encourages examination of traditionally under-represented societal groups, such as the peasantry, or women. This approach allows for the production of narratives of specific people and places, which may be particularly useful for engaging museum audiences and disseminating research to the wider public (Grey, Gardom and Booth 2006).

A further dimension of the investigation of medieval coinage can be opened up through examination of the impact of the coins in current society. This approach looks at the nature of the artefacts' survival and current use, for instance by setting individual artefacts within the context of public or private collections. The approach could be described as both historiographical and museological, investigating the perception and meaning of historical events and material culture, and the interplay of that meaning with their public representation. The study of changing attitudes to the Norman Conquest has been summarised by Chibnall (1999), and the expression of current communal and societal memories of the event has been the subject of detailed investigation by Brownlie (2011; 2013). Both these works provide useful results which are of direct relevance to the study of the use of Norman coins in a museum context. At a time when the value of a museum collection is judged in terms of its ability to engage the museum's audience (e.g. Orna-Ornstein 2001a; Taylor 2007), research into the impact of medieval coins in the public domain is pertinent. This approach allows for specific, targeted

recommendations for the improved use of the coins in their present situation, and their increased impact within their real-world setting.

2.2 Sources of Evidence

The most important source of evidence for this study is clearly the surviving English coins of William I and II. There are many published data for these coins. One of the key published sources is the Sylloge of Coins of the British Isles series, which is the output of an ongoing project of the British Academy to "publish detailed and fully illustrated catalogues of the coins of the British Isles in British and foreign collections" (Fitzwilliam Museum 2007a). 25 of these publications include information on coins of William I and II (Pirie 1964; Blunt and Dolley 1969; Metcalf 1969; Blunt, Elmore-Jones and Mack 1971; Gunstone 1971; Galster 1972; Grinsell, Blunt and Dolley 1972; Mack 1973; Pirie 1975; Gunstone 1977; Talvio 1978; Clough 1980; Gunstone 1981; Warhurst 1982; Brady 1982; Kluge 1987; Mikolajczyk 1987; Gunstone 1992; Berga 1996; Booth 1997; Leimus and Molvõgin 2001; Lindberger 2006; Bateson 2001; Mucha 2003; Pagan 2012).

Beyond the SCBI series, a number of other published catalogues are also available. The most important of these is Brooke's catalogue of the coins in the collection of the British Museum (Brooke, 1916), since this is currently the largest single collection of coins of William I and II. Additionally, the coins of two particular mints, Winchester and Lincoln, have been separately collated (Harvey 2012; Mossop 1970), and both these catalogues include information on extra coins in addition to those included in the SCBI or British Museum catalogues.

Further published coin data can be found in two online digital resources: the databases of the Corpus of Early Medieval Coin Finds (EMC) and the Portable Antiquities Scheme (PAS). The EMC is a "project to gather together into a

single database all of the single finds of coins minted 410-1180 found in the British Isles" (Fitzwilliam Museum 2007b). The project provides access to digitised data from the first 51 volumes of SCBI, and also allows people to submit data on individual coin finds via email, for upload to the database. The PAS database has a similar function, although a much broader remit, aiming to "encourage the voluntary recording of archaeological objects found by members of the public in England and Wales" (Portable Antiquities Scheme 2000). The scheme employs a network of Finds Liaison Officers (FLOs) across England and Wales who meet with members of the public and record details of archaeological objects which they have found. The FLOs then enter the details into the PAS database. Both these databases therefore include details of coins of William I and II which have been discovered as chance finds and reported by their finders. Unlike the published catalogues, the data in these schemes usually includes details of the location where the coins were found.

Beyond the published data there are naturally additional surviving coins which have not been included in catalogues or the current databases. An important group is those coins which have been acquired by museums since their catalogues were published. Some details of these coins are recorded in the institutions' internal documentation but in many cases the full data are only available by physical examination of the coins. Similarly, some details have not been systematically recorded in the published catalogues, but can be accessed by a personal investigation of the coins. The guiding principles of most museum organisations are such that providing access to the objects in their collections is part of their core function, so details of the coins can be acquired through research visits to the museums.

These publications and institutions therefore constitute the main sources of data on the surviving coins used for this project. However, it is clear that the dataset built up from these sources is still only a sample of the extant coins. As noted in section 1.4.2 above, the majority of coins investigated are

currently held within the public collections of museums and heritage organisations; coins held in private collections have only been included in the project where their data are published and readily available in the public domain. This distinction opens up the possibility of biases in the dataset, related to the retention bias of museums when gathering and developing their collections. Limited resources mean that museums are unable, as well as often unconcerned, to acquire every artefact which passes before them, so some selection must be made, often based on the particular institution's primary purpose and collecting policy. In broad terms too, museums generally acquire objects with the hope of displaying them to the public, so they will tend to go for coins showing the clearest design and the least wear. Coins with minting errors or imperfections may be rejected in favour of coins in better condition. Additionally, many museums aim to only have one example of a particular coin in their collection, so duplicates, or those of very similar type, may be passed over. (The structure of museum coin collections is examined further in Chapter 6 below.) The majority of the dataset of coins investigated for this project may therefore be more accurately described as the surviving coins of William I and II which have fulfilled the criteria for acquisition into a museum collection. The additional coins in the dataset are those whose data have been recorded and made readily accessible in the public domain, through publication in print or online. (The composition of the project dataset is detailed in section 2.5.1 below.)

Additionally, within the project dataset the data on individual coins is not comprehensive. The full dataset of coins investigated numbers 5498 items, but only 59% of those (3271 coins) were personally measured by the author, with the details of the other 41% coming solely from published information. The accuracy of the published data is estimated to be very high; where both measured data and published data are available for the same coins, they

show virtually no variance[3]. However, in some cases the published data do not include particular measurements which are of interest to this study: the diameter of the coins is often not included in published catalogues, and the die axis measurement is also sometimes missing. Where the die axis has been recorded it is sometimes given at a lower level of accuracy, using the 'o'clock' method to record which of the 12 points on the circumference of a clockface it relates to, rather than using the actual angle in degrees. The coins which have not been personally examined as part of the study therefore represent an acknowledged inconsistency in the evidence base for the research. Furthermore, for many of the surviving coins some data are simply not available. The precise findspot of coins is only rarely recorded in museum documentation, for instance, especially for coins acquired before the later 20th century. Accurate grid references are mostly the domain of individual coin finds recorded on the EMC and PAS databases.

Further evidence for the investigation of the key research questions of the project can be found in contemporary documents. A detailed examination of the written sources for the period is beyond the scope, and aims, of the current project but some primary sources can be usefully consulted. The key text is Domesday Book, which records fiscal data gathered from across the kingdom around the year 1086 (A Williams and Martin 1992). Additionally, some relevant evidence for interpretation of the coin data can be gleaned from the near-contemporary histories and chronicles of the period, including the texts of the Anglo-Saxon Chronicle, compiled in various forms at monasteries across England between the 9th and 12th centuries (Savage 1984), and histories such as William of Poitier's Gesta Guillelmi, written by one of William the Conqueror's chaplains, probably around 1071-1077 (Davis and Chibnall 1998), or the Gesta Normannorum Ducum, originally created by the monk William of Jumièges in the 1060s and 1070s, then later reworked

[3] Of the 552 coins with weights published in SCBI which were also weighed by the author, for instance, not a single one showed a variation of greater than 0.01g.

and extended by Orderic Vitalis, and again by Robert of Torigni, both in the 12th century (Van Houts 1995).

It is noted that only the most well-known texts have been studied as part of the current research and the evidence from these texts is by no means comprehensive, having all been written by members of a small, distinct social group, and representing the particular aims and prejudices of the authors and their patrons. Furthermore, for this project the texts have only been studied in translation so the nuances of their meaning are additionally filtered through the thinking of the translators. The texts should therefore not be considered a primary source of evidence for the current project.

The key source of evidence for the role, status and utility of coins in UK museums is the organisations themselves. Details of the aims and policies of museums, together with their acquisition processes, and the nature and structure of their coin collections, are held within internal institutional documentation, while present practice can be revealed by current displays and events. Some theoretical evidence for the potential of museum collections to engage the public and to represent the past to wide audiences is available through the results of past evaluations and published discussions. However, no discussion of the specific potential for coin collections to be used to engage visitors with the early medieval period has been undertaken to date. Therefore, by necessity, to investigate this particular aspect of the research only primary sources of evidence are available, in the form of potential museum audiences themselves.

2.3 Rationale for Choice of Case Study Regions

With the resources available for the project it is not feasible to make in-depth analyses of all the coins in the dataset. It is therefore necessary to filter the dataset and perform detailed analysis on a sample of the coins, while still

allowing for more general examinations of the broader group. The method for creation of this sample was the selection of a number of geographical regions of England, focused on particular mints, to act as case studies. This approach follows Metcalf's method for examination of English coins of the Saxon period (Metcalf 1998). However, Metcalf split the mints into regional groups for analysis, and it was felt that this grouping represented an assumption of homogeneity within a region, and thus presented a danger of obscuring any subtleties of variance between individual mints. The current project therefore focused on comparing and contrasting particular mint towns.

A key rationale for the selection of the case study mints was to choose areas which provided a broad geographical spread and a cross-section of different settlement types, thereby offering the best potential to address the complexity of the project research questions. As the project aimed to uncover variations in the coinage, both regional and temporal, the criteria for selection of case studies included consideration of the history of the different mint towns, in order to assess which might show the most marked differences in the workings of the mints, the roles of the moneyers and the use and circulation of the coinage. Additionally, consideration was given to the availability of supplementary sources of information about the towns, in terms of archaeological excavation, historical sources and modern research. A further key consideration was the number of surviving coins from the mint, since the larger the dataset the more likely it is to show statistically significant variations and allow meaningful conclusions to be drawn. Using these criteria, the following areas were selected to be the foci for the detailed coin analyses:

- London, with Southwark
- Winchester
- York
- Lincoln, with Stamford

- Thetford and Norwich
- Gloucester, Worcester and Hereford

2.3.1 London, with Southwark

London was one of the most important towns in England in the Early Medieval period, and by the mid-eleventh century it was firmly established as a major trading port. Finds from excavations at its docks of Queenhithe and Billingsgate indicate the international nature of its trading network, showing influences from Scandinavia and North-Western Europe (C. Thomas 2002, 12). The evidence indicates that the population was growing and the town was becoming increasingly wealthy, a process which burgeoned in the later eleventh and twelfth centuries (ibid, 20), to the point where it could be considered the pre-eminent urban centre of the kingdom.

The important citizens of London were already a powerful and influential group, with a reputation for independent action: in 1052, for instance, the support of the London citizenry for the disfavoured Earl Godwin was instrumental in forcing a reconciliation from the king, Edward the Confessor (Stott 1991, 298), and William of Poitiers refers to them at the time of the conquest as 'inconstant' and 'hostile' (*WP,* GG ii.34, in Davis and Chibnall 1998, 160-161). The wealthy social group which made up the important citizenry of the town included at least some of the moneyers of the London mint, as Nightingale's work on the family of Deorman the moneyer indicates (Nightingale 1982; Nightingale 1995). It may be postulated that the London moneyers felt more secure in their power and social position than in towns more firmly under royal control, and indeed the most well-known contemporary forgeries of coins of the reign of William I seem to have originated in London (Brooke 1916, cxlix; Stewart 1955, 190). London therefore has the potential to provide an interesting indication of the relative level of autonomy of moneyers in the post-Conquest period.

It is clear from the surviving coins that the mint of London was the most prolific in the kingdom in this period: Allen notes that London is the most commonly represented mint in the coins from 1066-1100 that are recorded in the EMC database, with nearly 20% of that group originating from the London mint (Allen 2014, 99). A further indication of the importance of the mint may be seen from the number of moneyers working there during the issue of the PAXS Coin Type at the start of William II's reign. This particular type is the most numerous in terms of surviving coins, and examination indicates that at least eight moneyers were working in London during this issue. London is the only mint with this number of moneyers in PAXS, the next highest being the seven moneyers at Norwich, and the six at each of Canterbury, Thetford and Winchester. All other mints are represented by four or fewer moneyers (Allen 2014, 99).

While there has been no detailed survey of the coins of the Medieval London mint, there is a wealth of archaeological evidence, including important excavations at the sites of the docks (e.g. Ayre and Wroe-Brown 2015 for Queenhithe; Steedman, Dyson and Schofield 1992 for Billingsgate) and finds from the Thames foreshore. Pennies of the London mint are also the most numerous within the project dataset, representing around 13% of the coins with a mint attribution.

Any consideration of the Early Medieval mint at London will benefit from also considering the nearby mint at Southwark. Southwark was a settlement which grew up around the Southern bridgehead of London Bridge, and represents an interesting contrast with London, since it was close to the city but outside its jurisdiction, being instead part of the diocese of Winchester. Although much smaller than the London mint, it is clear that there were links between the two, with evidence of shared use of coin dies, and of moneyers having responsibility at both mints (Allen 2012a, 4-5). In his history of the London mint Craig went so far as to suggest that the Southwark mint "had

been regarded as an outwork of the main establishment" (Craig 1953, 19). Consideration of the two mints as one case study will allow for a broader examination of the minting situation in the London area in the early Norman period.

As the most prolific mint in the kingdom in the Early Medieval period, London makes an important case study for this project. Additionally, the existence of a powerful merchant population in the city, which included at least some of the moneyers, suggests the potential for greater involvement in the minting process at a sub-royal level. Studying the coins and the minting practices in London could reveal important insights into the relative level of autonomy of the moneyers.

2.3.2 Winchester

While London can be seen as the commercial centre of the kingdom Winchester remained the administrative centre. Winchester had been a royal centre for the kings of the Saxon kingdom of Wessex and continued to be a seat of royal power throughout the Early Medieval period. Rumble describes this as a period "in which royal power was very strong in Winchester" (Rumble 2002, 31). In the 11th and 12th centuries Winchester was the site of the principal royal treasury and William I used Winchester as a royal residence, replacing the earlier Saxon palace in the city with a large, new palace and hall. It was also one of the three locations for the annual crown-wearing ceremonies of the early Norman kings, who would enact the ritual at Winchester for Easter, at Westminster for Whitsun and at Gloucester for Christmas (Biddle and Keene 1976a, 291-296). Winchester seems to have been firmly under royal control in the late 11th century.

By the time of the conquest "the leading men of the community were a recognised body" (Biddle and Keene 1976b, 480), and this body probably included some of the town's moneyers. However, the citizenry of Winchester

does not seem to have had the same reputation for independence as their counterpart in London, so detailed study of the workings of the Winchester mint offers the chance for an interesting comparison with the latter town to investigate the issue of the extent of royal control over the minting process.

Coins with a Winchester mint signature are known from the time of King Alfred onwards, and there is evidence that until at least the reign of Aethelred II the design for new Coin Types emanated from Winchester (Lyon 2012, 10-11). It was still an important mint in the early Norman period, as suggested by the contingent of six moneyers active there during the PAXS coinage (Allen 2014, 99). Additionally, the Winchester mint's representation within the corpus of extant coins is high, partly due to its disproportionate representation in the huge hoard of coins found at Beauworth in 1833, a circumstance probably attributable to the fact that Winchester was the closest mint to the point of deposition of the hoard. Coins of the Winchester mint make up 9% of mint-attributed coins in the project dataset, allowing for detailed and meaningful analysis.

Furthermore, much important numismatic and archaeological work has previously been done on Early Medieval Winchester, notably collated in the Winchester Studies series. Prominent amongst this series is volume 8, focusing on the Winchester mint and providing a catalogue and discussion of the surviving coins from the town (Biddle 2012). Modern evaluations also benefit from a comparative wealth of historical documentary evidence, including the so-called 'Winton Domesday', which records surveys of the town from c. 1110 and 1148, and which somewhat compensates for Winchester's omission from the national Domesday survey of 1086 (Barlow et al 1976).

Winchester therefore provides an interesting case study of a town of key administrative importance and a secure centre of royal power. In this

circumstance it represents a potential comparator to London which was a centre of increasing commercial power within the kingdom and was less firmly under royal control.

2.3.3 York

In the late 9th and early 10th centuries York was the capital of the Viking Kingdom of York, part of the 'Danelaw'; the area of England under Scandinavian influence. Finds of goods from Norway, Germany and Western Europe discovered in excavated 11th century contexts indicate that this prosperous city maintained international trade links throughout the period (Ottaway and Rogers 2002, 2999). The major urban centre in the North of the kingdom at the time of the Norman Conquest, York was of key strategic importance in gaining and maintaining authority over that part of the country. However, York was one of the centres of the rebellions against Norman rule in the late 1060s and was subject to heavy reprisals during William's counter-campaign in 1069-70, the so-called 'harrying of the North' (e.g. Rowley 1997, 59).

In the mid-11th century York had the only mint north of Lincoln, until minting was commenced at Durham in the late 1080s (Allen 2003, 3). The York mint was quite prolific, having eleven moneyers in the early part of William's reign, although it had reduced in size to probably four moneyers during the PAXS coinage (Allen 2014, 99). Coins with a York mint signature still make up 5% of the attributed dataset.

The medieval town of York is also well known from excavations, most notably those at Coppergate which discovered, amongst other things, the probable site of a 10th century moneyer's workshop (Pirie 1986, 18-22 and 33-45; Hall 2014). Additionally, there has been some investigation of the coins of the York mint (e.g. Pirie 1975), although it is unfortunate that the unpublished

die study undertaken by William Lean cannot now be located for the reigns of Harold II or later (A Woods, personal communication, 17/02/2015).

York has the potential to be a particularly informative case study. Its geographical distance from the royal strongholds in the South of England and its Scandinavian traditions hint that York may reveal a strong regional character in the nature of economic and administrative organisation, and the processes of minting. Additionally, one might postulate that the results of the Harrying of the North may have included a change in the level of royal control of the minting process, or a shift in the workings of the moneyers, which may be revealed through a study of the coinage.

2.3.4 Lincoln, with Stamford

Lincoln was a major urban centre in the Early Medieval period, and a key site of pottery production from the late 9th to the early 11th centuries (Vince 2006, 533). Being part of the Viking influenced area of England, Lincoln developed close links with other Danelaw towns, such as York. The town, and its population, expanded during the 10th and 11th centuries, and this growth seems to have continued after the Norman Conquest, although the pottery industry was in decline by this time (ibid, 543).

In the late 10th and early 11th centuries Lincoln was an important mint, and one of a number of places which seem to have been centres for the cutting of dies for striking coins. A distinctive local style is clearly noticeable in the coins of Cnut's Quatrefoil type, for instance (Lyon 1970, 12). The minting of coins in Lincoln seems to have declined over the course of the reign of William I, with nine moneyers known in his first issue but only two by the time of the PAXS coinage (Allen 2014, 99). Over the reign of William II, however, the number of moneyers increased again. Coins of the Lincoln mint survive in relative profusion, with 6% of mint attributed coins in the project dataset being from this mint.

Study of the coins is also greatly aided by previous work, especially that of Mossop who published a corpus of Lincoln coins in 1970 (Mossop 1970). There have also been a number of important archaeological investigations in the city, notably the city centre excavations of the 1970s and 1980s (e.g. Perring 1981; Steane et al 2006).

During the Saxon period there seem to have been links between the mints of Lincoln and Stamford, including occasions when moneyers may have had responsibility at both mints (tables in North 1994, 125-127, 136-138 and 145-146 highlight coincidences of moneyer names at Stamford and Lincoln in the period from Aethelred II to Harold II). Stamford was a particularly important mint in the period up to Aethelred II's reign (Stott 1991, 295), although it seems to have declined in importance during the 11th century. In the reigns of William I and II it was not particularly prolific, with three moneyers currently known for Stamford in the PAXS issue (Allen 2014, 99). The number of surviving coins from Stamford is considerably lower than those of Lincoln, making up less than 1.5% of the project dataset, but they may provide interesting corroborative or comparative information for the practices at the larger mint.

A case study of the Lincoln mint, therefore, has the potential to clarify whether the close links of the Danelaw period, with Stamford or York for example, still existed in the 11th century, and whether any regional variation in minting practice can be identified therein.

2.3.5 Thetford and Norwich

The 11th century was a particularly important period in the histories of the Norfolk towns of Thetford and Norwich, as regional power seems to have shifted from the former to the latter around this time. In the preceding century Thetford had been the major urban centre in Viking East Anglia, and

an important production site for pottery (Rowley 1997, 83-84). It was the administrative centre for the region, and in 1070, under the new Norman Bishop Herfast, the see of East Anglia was moved to Thetford from the small town of Eltham. However, during the same period the neighbouring town of Norwich was growing in importance. Norwich was a trading port on the River Wensum, and finds of imported pottery on many sites in the town indicate its international commercial links, and compare favourably to the relative paucity of similar continental pottery from sites in Thetford and nearby Ipswich (Carter 1978, 203). In the early Norman period Norwich expanded, possibly by as much as 30% in the 25 years after the conquest (Ayers 2004, 13). Norwich also had the only royal castle in East Anglia until the mid-12th century (Carter 1978, 196). Additionally, in 1095 the seat of the Bishop of East Anglia was moved again, from Thetford to Norwich.

This shifting balance of power is reflected in the coinage. The Thetford mint seems to have been particularly prolific in the early 11th century but to have declined noticeably by the reign of William II (Carson 1949, 199-205). However, both mints were still important in the early Norman period, with Thetford having six moneyers in the PAXS type, and Norwich seven (Allen 2014, 99). Of the coins in the project dataset with clear mint attributions, around 4% are from Thetford and 3% from Norwich.

Investigation of the Thetford coins is complemented by an early study of the mint by Carson (1949) and, as discussed in section 1.3.1 above, links have been noted between contemporary forged coins of William I from the London and Thetford mints (Stewart 1955, 191). Although there has been no detailed examination of minting in Norwich, much important work has been done on the medieval town and its social and economic position (e.g. Rawcliffe and Wilson 2004).

Thetford and Norwich can be seen as examples of towns which were not of such national importance in the 11th century as, for instance, London, Winchester or York, but were still major urban centres of regional significance. Taking them as a case study will allow investigation of minting practices away from the main centres of administrative power. Additionally, the coinage has the potential to provide insights into the interplay between the two towns in this period of shifting regional dynamics.

2.3.6 Gloucester, Worcester and Hereford

Gloucester was an important administrative centre in the Saxon kingdom of the Hwicce, and later when that kingdom was subsumed into Mercia. In the 10th and 11th centuries it was still the site of a royal palace (Baker and Holt 2004, 19), and its importance in the early Norman period can be judged by the fact that it was one of the three sites of the annual crown-wearing ceremonies, as noted in section 2.3.2 above. In contrast, the nearby town of Worcester seems to have had a much stronger tradition of ecclesiastical, rather than royal, authority, with the Bishop of Worcester acting as lord of the local area in the 8th and 9th centuries, and subsequently sharing power with the king (ibid, 128). The third important urban centre in the area was Hereford, and there is evidence that these three shire towns shared trading links in the 10th century (ibid, 23). Throughout the Early Medieval period Hereford, as a border town, was a focus for the often strained relations between the English and the Welsh, and one of the few pre-conquest castles in the country was constructed there, in the years prior to 1052 (Thomas and Boucher 2002, 4). All three towns had active mints in the early Norman period.

The productivity of the mints of Gloucester, Worcester and Hereford seems to have been around the mid-level in the reigns of William I and II. Gloucester seems to have only had two moneyers active in the PAXS issue but both Worcester and Hereford had four (Allen 2014, 99). The surviving coin

evidence from these towns is relatively small, however, with Gloucester and Hereford coins making up just 1.6% of the mint attributed project dataset each, and Worcester accounting for only 1.3%. However, the moneyers of the Worcester mint have been subject to an excellent survey by Symons, who has shown that they were of the property-owning classes, and has provided evidence suggesting that some moneyer positions in the town were hereditary. Interestingly he also notes the lack of evidence for Worcester moneyers being active at other mints (Symons 2006). Blunt and Dolley indicate a similar circumstance for the Gloucester mint but note a die link between Hereford and Gloucester during the reign of Edward the Confessor (Blunt and Dolley 1973, 111). In addition to these numismatic examinations there are a number of useful surveys of the archaeological and ecclesiastical histories of the three towns (e.g. Baker and Holt 2004; Baker et al 1992; Shoesmith 1980, 1982 and 1985; Thomas and Boucher 2002).

As a case study the three shire towns of the West Country provide interesting comparisons with each other. Additionally, they are towns which were not within the Danelaw, and therefore developed under West Saxon traditions, which has the potential to show regional variation when compared with those mints in areas which were under Scandinavian influence in earlier centuries. The towns were also somewhat more rural than some of the other case study areas, which again may provide evidence of variant practices in minting.

2.3.7 Critical Assessment of Case Study Choices

The six geographical areas chosen for study have, to a certain extent, been dictated by practicality: in order to undertake meaningful assessment, especially using statistical techniques, it has been necessary to choose mints from which the corpus of surviving coins is of sufficient size to extrapolate wider patterns, and to draw significant conclusions. This has inevitably led to a focus on the mints which can be supposed to have been larger, both in

terms of the number of moneyers employed therein, and of their estimated output. This in turn represents an inherent bias in the data used for detailed analysis, and may mask patterns of contemporary variance in the working, structure, and objectives of the mints: the analyses undertaken for this project effectively exclude the majority of small mints, and by extension the majority of mints outside the major urban centres of the kingdom. Thus, if those mints were working in different ways to the larger institutions, it will not be revealed by the current work. It is difficult to suggest a methodology which would mitigate this lack of extant coins from the smaller mints, and it would therefore be problematic to investigate this lacuna with the current corpus of surviving coins.

While acknowledging these limitations in the data, however, it can still be seen that the six case study areas which have been chosen represent a varied sample of the English mints in the late eleventh century. They are geographically diverse, being distributed across the kingdom, including the northern and western regions as well as the royal heartlands in the south and east. The selection includes trading ports, and settlements with administrative importance, in addition to more rural towns, and the political significance of the towns in the early Norman period is mixed. The sample therefore has excellent potential to reveal patterns of diversity in the workings of the mints.

2.4 Rationale for Museological Formative Evaluation

One of the key research aims of the project is to examine how the surviving coins of William I and II can be effectively used to represent the period to a wide audience, through the formulation and dissemination of new museum narratives. As explored in section 1.3.3 above, the perceived purpose of museums in society has shifted in recent decades, from being focused on the objects in the collections to being focused on the audiences who use the

museums' services. As Benton and Watson note, since the 1980s UK museums have been "required to demonstrate their effectiveness in satisfying the visiting public" (Benton and Watson 2010, 129), and this has led to a change in the way value is assigned to museum collection artefacts. Benton and Watson describe the increasing importance of the 'political value' of objects - measured in terms of how they fulfil aims of increasing visitor numbers, or of contributing to the particular political standpoints of the organisation's governing body (ibid, 132) – over cultural and historical value, from which it follows that objects which are not perceived as contributing to these aims are seen to have lesser value, and are thus more at risk of being identified as extraneous to the purpose of the museum collection. It is therefore important to highlight the great potential of historic coin collections to contribute to current museum aims and help satisfy the needs of museum visitors.

Within the heritage sector as a whole, the need to be more 'user-focused' has led to a move away from traditional, didactic presentation of the past, with the curator as the giver of knowledge and the arbiter of what stories are told. The vital importance of engaging with audiences on a meaningful level has been acknowledged, and highlighted as key to the continuing survival of museums as a purposeful institution in current society (Black 2011, 7-10). Changes in the way museums present information to visitors are a tangible response to this imperative. In order to show the relevance of museum collections to the multifarious potential audiences, the range of narratives represented has broadened. Examples such as the stately Blenheim Palace's new focus on stories of women and servants as well as national leaders (West and McKellar 2010) highlight how widespread this shift has become. Professional guidance within the sector also routinely emphasises the importance of presenting different 'voices' within the interpretation of collections (e.g. Grey, Gardom and Booth 2006, 32-33), and projects to investigate the meaning of historic objects for a variety of different users

have a strong pedigree in the 21st century (e.g. MLA London and Collections Trust 2009). These initiatives aim to align museum practice more closely with the requirements of museum users, but this is still relatively new territory within the sector. In order to assess how to successfully translate the theory into practice, there is a clear need to evaluate potential representations of the past with their potential audiences.

As with any historic object, the coins of the early Norman period contain information which can be used to reveal historic narratives. Examination of the details held within the coins, and how they can be interpreted as evidence for the stories of people, places and events in 11th century England, was a major part of the current research project. The narratives thus revealed constitute clear evidence that the coins can be a rich source for our knowledge and understanding of the period. Therefore, the particular challenge when considering the museology of the coins is to show that they can be used to effectively disseminate that knowledge to museum audiences, and to encourage the development of discovery, investigation, and greater understanding. Specifically, in order to fulfil the project research aims it is important to establish how interesting and engaging the narratives revealed by the coins of William I and II can be for potential museum audiences.

As noted above, evaluation of museum presentation of historic information can take a number of forms. These are usually split into three categories: front-end evaluation generally occurs before a new display is initiated, and aims to identify who the target audience is and what the key message of the display will be. Formative evaluation is an interim process, occurring during development of the display, and aiming to test initial presentation ideas with a view to amending and enhancing them based on audience feedback. Summative evaluation examines the finished product to establish how successful it is, and to tease out suggestions for improvements to future presentations.

Traditionally, summative reviews have been the most commonly practised form of evaluation in UK museums, with Davies and Heath noting that they are often a requirement of grant funding (Davies and Heath 2013, 3). However, the same report notes with disappointment how infrequently the findings of these evaluative surveys are translated into tangible changes to existing displays, or even to the planning of future presentations (ibid). The importance of improving this situation has long been acknowledged, for example by Schlereth (1989; 1994), Lindauer (2006), and Davies and Heath (2013), but this professional best practice is unfortunately rare. Additionally, in considering the methodology of the current project, it is apparent that a summative form of evaluation would not be appropriate for the specific aspects which are of interest: a summative model would require preparation of a complete museum display, or at least completed elements of a display, presenting the history of the early Norman period through the surviving coins. Aside from the time and resources required to realise this, any review of the resulting display would necessarily be evaluating the effectiveness of the author's display techniques as well as the interest of the underlying narratives. There would be a substantial risk that evaluation of the physical aspects of the display would overshadow any deeper response to the content. Alternative display techniques would also be excluded from the evaluation, such that the narrative(s) may be reviewed as unsuccessful even if the failure was in actuality the result of an inappropriate choice of presentation, rather than an inherent lack of engagement with the story.

In the current context, therefore, evaluation of a front-end or formative type is more fitting. As the presentation of the historical information in this case is a theoretical exercise, in order to prepare suggestions for a hypothetical, rather than an actual, display, the research query will benefit from the opinions of a number of different potential audience groups. In this way the work has aspects of front-end evaluation. However, in order to be a

practicable survey, the specific narratives for evaluation were selected by the author in advance of the review, and crafted into a form where they could be accessed and considered by the research participants. This suggests aspects of formative evaluation.

Both the front-end and formative evaluative models have the additional benefit that they are proactive, rather than reactive, and can thus affect the development of museum presentation of the past. This is in keeping with the move towards more user-focused museum practice. Recent work, notably by both Black and Simon, has championed the idea of involving audiences in all aspects of museum practice, moving beyond being just inclusive, or even interactive, to developing fully participatory relationships (Black 2011; Simon 2012). The ideal is to encourage meaningful engagement by providing opportunities for users to actively affect the way museums use their collections, including commenting on, changing, adding to and developing displays and representations of history. A number of heritage organisations are translating this ideal into practice through collaboration and co-production projects. Seeking the responses and involvement of audience members at all stages of the development and evaluation of a project is a key part of this, as can be seen from Derby Museums' 'Human-Centred Design' model (Derby Museums Trust 2014a, 8-9).

In seeking to establish how the coins of William I and II can be effectively used to represent the early Norman period to a wide audience, the current project therefore utilises elements of both front-end and formative evaluative techniques. These have been used to indicate how various potential audiences engage with the narratives of the period revealed by the coins, and how they would envisage those narratives being presented in a museum context. The findings of the evaluation have also formed the basis of recommendations for the improved use of coin collections, in a way which can be clearly shown to fulfil the current aims of the heritage sector to be

user-focused, and to engage audiences in a holistic way. This in turn showcases the potential value of museum coin collections, in political terms as well as cultural and historical terms.

2.5 Detailed Description of Methods

2.5.1 Data Gathering and Organisation

The first phase of data gathering was a desk-based exercise to collate the published details of coins of William I and II. A download of the records for all coins of these reigns from the EMC database was provided by Martin Allen of the Fitzwilliam Museum. This included coins published in the SCBI series as well as individual finds of coins reported to the EMC project. The downloaded spreadsheet constituted the basis of the project dataset. Its layout was adjusted to more closely reflect the particular data required for the project, and each individual coin record was allocated a unique project reference number. The numbers were formatted with the prefix 'EMC' to indicate the source of the data, followed by a running digit. Details of relevant coins from the PAS database were downloaded and added to the EMC data, with reference numbers using the prefix 'PAS'. As the EMC database only includes details of volumes 1 – 51 of the SCBI, the data on coins published in later volumes were added to the spreadsheet manually. Similarly, the coins enumerated in the British Museum catalogue (Brooke 1916), Blackburn's article on the Fitzwilliam Museum collection (Blackburn 1987), and the syntheses of coins of the Winchester (Harvey 2012) and Lincoln (Mossop 1970) mints were also copied into the spreadsheet. The coin records thus created were given project numbers with a prefix reflecting the source of the data.

Having collated the published data into the project spreadsheet, the next phase of data gathering involved research visits to key museum collections. The collections were chosen based on a cost-benefit analysis of the number

of relevant coins held (with those emanating from the case study mints given priority), against the cost of travel and accommodation for visiting to examine them. Unfortunately, the necessity of this selection process resulted in a number of the coins not being personally examined by the author. Many of these were held in institutions with only a handful of relevant coins in their collection, and thus the expense of visiting was not justified. This also meant that collections outside the UK had to be discounted due to the cost of making foreign research visits, and these included a number of large and important collections. Most notable amongst these are the collections of the Royal Coin Cabinet in Stockholm, which contains at least 255 coins of William I or II, that of the Hermitage Museum in St Petersburg, which contains over 90 relevant coins, and that of the Royal Coin Cabinet in Copenhagen, which contains at least 80 coins. The data on the coins in these collections have therefore been gathered from publications only, and it is acknowledged that they may thus not be comprehensive.

In light of the considerations of cost and project benefit, research visits were made to the following 15 museum collections:

- The British Museum, London (1785 coins examined)
- The Fitzwilliam Museum, Cambridge (354 coins examined)
- The Ashmolean Museum, Oxford (232 coins examined)
- The Yorkshire Museum, York (215 coins examined)
- The Hunterian Museum, Glasgow (182 coins examined)
- The Collection, Lincoln (135 coins examined)
- National Museums Cardiff (125 coins examined)
- Birmingham Museums and Galleries (63 coins examined)
- Norwich Castle Museum (53 coins examined)
- National Museums Liverpool (52 coins examined)
- Gloucester City Museum (29 coins examined)
- Leicester City Museums (18 coins examined)
- Nottingham City Museums and Galleries (15 coins examined)

- Hereford City Museum and Art Gallery (10 coins examined)
- Derby Museums Trust (3 coins examined)

The visits therefore resulted in personal examination of 3271 coins.

During the course of the visits each coin was weighed, to an accuracy of 0.01g, and the largest measurement across the coin (for convention referred to hereafter as 'the diameter') was measured to an accuracy of 0.1mm. Additionally the die axis of the coins was measured, by eye, to the nearest 5 degrees (see section 4.2.1). In almost all cases the same set of equipment was used for taking these measurements. The main exception to this was at the Ashmolean Museum where an automated system has been devised to photograph, weigh, measure and calculate the die axis of the coins as part of a single process. Pictures of the obverse and reverse of each coin were thus provided for the Ashmolean items. Images were also gathered during each of the other visits. Where the host organisation had high quality photographic equipment these were utilised, but where they were not available a set-up using the author's own camera, desk lights, and tripod was used. The Yorkshire Museum has an automated system in place for photographing coins, but in most other cases the photographs were each set up and taken manually. An exception was the British Museum, where the quantity of coins requiring imaging necessitated a more time efficient system. In this case the coins were scanned on a flatbed scanner, in batches of 24 at a time, and the pictures were then cropped to separate each coin image. The resulting images are not as high quality as photographs, but are of sufficient clarity to allow examination and analysis.

The data thus gathered were recorded within the project spreadsheet, with their associated metadata of sources for the information and photographic references. Where data on a particular coin had already been recorded from published sources, the information from the examination was appended to the existing spreadsheet entry. Coins which had not been included in the

published dataset were given new spreadsheet records, and allocated unique project reference numbers with a prefix reflecting the source of the data. The composition of the final dataset, in terms of the initial source of the data, can be seen at table 2.1. Having thus gathered details of the full dataset of coins, the spreadsheet was converted to a relational database format for ease of querying and analysis. The photographs of coins were processed for maximum clarity and stored as digital files in jpg format, labelled with the project database number of the particular coin shown.

Data Source		Number of Coin Records
EMC database		2518
PAS database		147
Published data not included in EMC		2083
	(Sylloge of Coins of the British Isles: 334 records)	
	(British Museum Catalogue: 1437 records)	
	(Article on Fitzwilliam Museum collection: 183 records)	
	(Mossop's catalogue of Lincoln coins: 41 records)	
	(Harvey's catalogue of Winchester coins: 88 records)	
Personal observation only		750
TOTAL:		**4598**

Table 2.1: Sources of Data for Project Dataset

2.5.2 Analysis and interpretation of Coin Data

The numerical measurements gathered from the surviving coins were analysed using a number of statistical methods. The distributions of the values for weights and diameters were plotted, and their mean, mode and median averages, quartiles, and standard deviations calculated. The dataset was then split into various subsets, by both temporal and geographical divisions. These subsets were subjected to similar analyses, and the resulting figures were then compared to give mathematical pictures of the subsets of coins and how they vary from each other. The die axis measurements were allocated to one of two groups, designated as either 'regular' (die axes at the four cardinal points of 0, 90, 180 or 270 degrees), or 'irregular' (die axes at any other point). The temporal and geographical subsets were then

examined to establish the proportions of each die axis group, and these proportions were compared.

The coins were further analysed by means of a partial die study. This involved close examination and comparison of the photographs of the coins in order to identify which specific dies were used to strike each coin. The dies thus identified were each allocated a code, and the codes of the obverse and reverse die used for each coin were recorded in the project database. It was then possible to compare the codes and find instances where separate coins were struck using one or more of the same dies, thus providing evidence of links between moneyers and mints, as well as some indication of the practical working within the mints. Instances of the use of unofficial, possibly locally-cut coin dies were also identified during this process. The task of completing a die study requires a great deal of time, so within the resources available for the project a full die study of all coins in the dataset was unfortunately not possible. Two coin issues were therefore chosen as case studies for this form of examination; Coin Types 3 (issued early-mid 1070s) and 9 (issued early 1090s). These two issues have comparable numbers of surviving coins, and represent an issue from early in each of the kings' reigns, so make useful comparators.

Additional analyses were performed by collation of the instances of individual moneyer names appearing on the coins of particular types and from particular mints. These examinations thus allowed patterns to be identified relating to moneyer careers, changes of personnel within the mints over time, and links between different locations.

The results of these analyses of the coin data were then considered from a number of perspectives in order to make interpretations. A numismatic viewpoint attempted to draw conclusions relating to the striking of the coins and the economic systems of the kingdom in the late 11th century. Historical

considerations expanded on this to consider the role and control of the central authority, and the implications for regional political and administrative dynamics, while a more social historical angle allowed for inferences about individual people and the impact of national events on local society.

2.5.3 Evaluation of Coin Potential for Public Representation of the Norman Conquest

In addition to gathering data on the surviving coins, the research visits to museums detailed in section 2.5.1 above were an opportunity to gather observational data on the use of coins in museums and how the stories of the Norman period are currently presented. Wherever possible, museums' permanent galleries and temporary exhibitions were examined, taking methodological guidance from Lindauer's suggestions for critiquing the museum experience (Lindauer 2006). The issues of using numismatic collections in representations of the past were also informally discussed with museum staff. In addition, this approach was extended to a few key museums whose coin collections were not subject to a research visit, notably the coin galleries at the Manchester Museum and the Barber Institute of Fine Arts in Birmingham, as well as Colchester Castle Museum, Hastings Museum, and Battle Abbey, which are key Norman sites. Observations and notes from these visits and conversations were kept as a diary. Where pertinent details from informal discussions have been used in the following analysis and interpretation, the speaker was contacted to confirm the veracity of the author's record of the discussion.

Interpretation of the findings of the analyses of coin data revealed historical details which were drawn together to suggest new, and newly nuanced, narratives of the early period of Norman rule in England. These narratives have the potential to be engaging for a broad audience and could thus enhance heritage organisations' use of their coin collections, as well as their

presentation of the Norman period to the wider public. Five of the narratives were selected as samples for formative evaluation of their potential utility in museum displays. They were presented in the form of a visual display document for research participants to examine (see Appendix 5), and a questionnaire recorded their responses to the narratives, as well as their thoughts on possible presentation of the stories in a museum setting (see Appendix 6.1).

Participants for the evaluation were recruited electronically, via advertising through email distribution lists, social media, and the websites, blogs and newsletters of a variety of organisations. The target audience was broad, limited only to people over the age of 16, but the opinions of specific groups were of particular interest so advertising was focused on organisations and societies associated with those groups. The groups included numismatists, historians, museum visitors, teachers, parents, and the staff and volunteers of heritage organisations. Research participants received the narratives document by email, and once they had read the stories, the document directed them to the questionnaire, hosted online on the Bristol Online Surveys website. The survey was active for four months, between January and April 2017, and attracted 91 responses. Once the survey period had closed, the responses of the research participants were analysed using the statistical tools available through the BOS website, to make inferences about how engaging the narratives are for various audiences, and how they would envisage those narratives being told in a museum setting.

The findings of the evaluative survey were considered in light of the observational data gathered from museum visits. This consideration aimed to create a picture of current best practice within the UK heritage industry, and how this differs from general practice in actuality, and from the needs and opinions of potential audiences, as expressed through the survey responses. These elements were then used to highlight the potential for coins to affect

public perception of the Norman period, and suggest a series of practical recommendations for the improved use of numismatic collections in UK museums.

Chapter 3: Metrical Analysis of Surviving Coins

The preceding chapters provide the background and framework for the study and interpretation of the surviving English coins of William I and II whose data are currently available in the public domain. This chapter and its successor present the results of the numismatic analyses of those coins. The current chapter examines measurements of the physical properties of the coins. The following chapter considers the moneyers and mints named on the coins, and the evidence of the dies used to strike them. These analyses provide the foundation for the socio-historical interpretation of the coins, and the investigation of their relationship to public representation of the early Norman period, which are presented in chapters 5 and 6.

In this chapter the metrical examination of the coins is presented, firstly through investigation of the weights of the surviving coins, and then through their diameters. Analysis of the patterns which emerge from the weight data is provided after those data have been described, and likewise for the diameter data. A correlative analysis of the weight and diameter data follows at the end of the chapter.

A summary of the metrical data can be found at Appendix 1. This details the averages, the standard deviations, and a measure of the skew of the distribution histograms, presented for each Coin Type, and given for the whole dataset as well as for the subsets of each of the case study mints identified in section 2.3 above.

3.1 Coin Weights

One of the most revealing aspects of the coins of the first Norman kings is their weights. As outlined in section 1.3.1 above this is an issue which has

prompted great debate amongst numismatists, particularly in relation to the homogeneity of coins issued across the kingdom and within individual Coin Types, and to the emergence of a national standard weight for the penny. For the current project, close examination of the weights of surviving coins has provided data which can contribute to these ongoing discussions, as well as having implications for other considerations of life in early Norman England.

The analysis presented here begins with an overview of the weights of all complete coins in the project dataset. This group is then divided temporally by creating separate data subsets, each comprising the coins of a particular Coin Type. A geographical variable is subsequently introduced, by examining the weights of coins from particular individual mints. An analysis of the trends suggested by the coin weight data concludes this section.

3.1.1 Weights of the Full Dataset

To analyse and compare the weights of the coins it was necessary to filter the dataset to include only whole coins. Therefore, deliberately cut fractions (halfpennies and farthings) were omitted, as were coins recorded as being chipped or incomplete, and coins recorded as being reconstructed from fragments, glue and filler. This left a total of 4599 complete coins with weights accurate to two decimal places (hundredths of a gram). Of these, 3106 were personally seen and weighed by the author; the weights of the remaining 1493 coins have been taken from published catalogues.

The weights range from a minimum of 0.71g to a maximum of 2.29g. However, as may be expected, these outliers are few in number, and the majority of coins fall within the range 1.10g – 1.46g. (4387 coins have weights in this range, equating to just over 95% of the complete coins.) The distribution of coin weights has a clear negative skewness (Pearson's 2nd Coefficient of Skew for these data is -0.78) indicating that there are many more coins of lower than mean average weight than coins weighing higher

than average, and that the numbers of coins of higher weights drop off quickly, while there is a long, shallowly curving 'tail' of coins of lighter weights. The histogram at figure 3.1 gives an indication of this distribution curve.

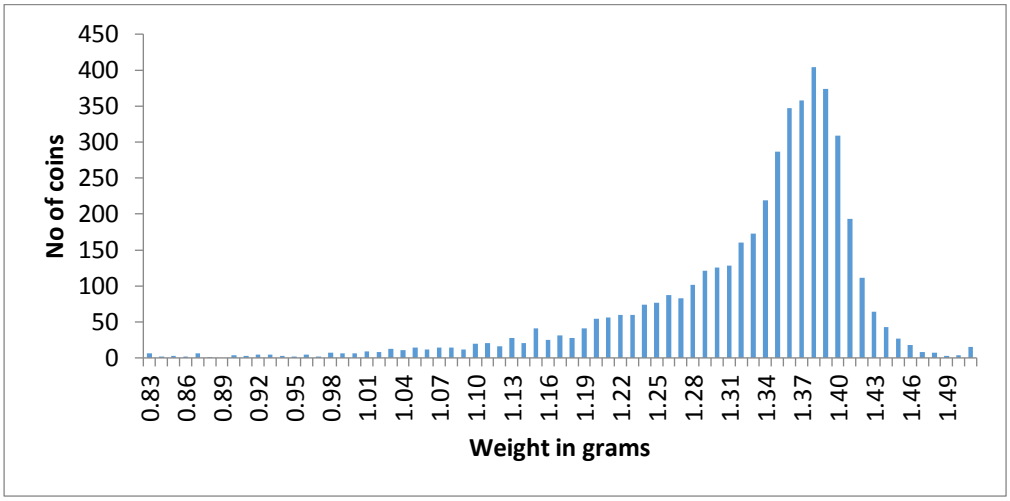


Figure 3.1: Weights of all complete coins in the dataset

The mean average of these weights is 1.32g with the median at 1.35g. The modal average is 1.38g, with 404 coins (about 9%) having that weight. Lyon suggested that at the time of the Domesday survey in 1086 the average weight of coins in circulation was 1.37g (Lyon 2006, 234), and the weights of complete coins in this dataset do broadly align with that suggestion, albeit with a great deal of variation.

However, Lyon was focusing on 1086, which is just one particular point within the period covered by these coins. It should be noted that the different sub-periods within the span 1066-1100, as represented by the 13 different Coin Types, are not equally represented within the project dataset, as shown in table 3.1: some Coin Types are represented by fewer than 100 coins, while some have over 400 surviving specimens. Coin Type 8 is a distinct exception; thanks to the particularly large Beauworth hoard, there are over 1850 examples of this type, making them more than four times more numerous than the next largest group. The overall distribution of coin weights may therefore be unevenly biased by any unusual properties of coins of Type 8.

Similarly, if any particular mints are disproportionately represented in the surviving coins, they may also unduly bias the distribution. In other words, a simple plot of the overall distribution of weights of all the complete coins in the project dataset may disguise both temporal and geographical variations in the coins. It is therefore important to break the dataset down into sub-sets for more detailed analysis.

Coin Type	Dates	Number of complete coins in the dataset
Type 1	1066-c.1068	245 coins
Type 2	c.1068-early 1070s	432 coins (419 standard plus 13 mules)
Type 3	Early-mid 1070s	141 coins (140 standard plus 1 mule)
Type 4	Mid-late 1070s	260 coins (258 standard plus 2 mules)
Type 5	Late 1070s-early 1080s	440 coins (434 standard plus 6 mules)
Type 6	Early-mid 1080s	177 coins
Type 7	Mid 1080s-c.1087	149 coins
Type 8	c.1087-c.1090	1856 coins (1839 standard plus 17 mules)
Type 9	Early 1090s	172 coins
Type 10	Early-mid 1090s	325 coins (319 standard plus 6 mules)
Type 11	Mid 1090s	237 coins
Type 12	Mid-late 1090s	84 coins (83 standard plus 1 mule)
Type 13	Late 1090s-1100	78 coins (77 standard plus 1 mule)

Table 3.1: Number of complete coins of each Coin Type in the dataset

3.1.2 Weights by Coin Type

The difference in the sample sizes between the different Coin Types means that trends indicated by each subset must be considered in light of the number of coins measured. The perceived trends will be more statistically significant, and therefore more reliable, for the Coin Types with the larger numbers of surviving coins. Types 3, 6, 7, 9, 12, and 13 are each represented by fewer than 200 complete coins so conclusions drawn about those types are presented in the knowledge that they are less firm than conclusions drawn about the other Coin Types. When analysing trends, therefore, greater emphasis is placed on data derived from the Coin Types represented by higher numbers of surviving artefacts.

When separating the dataset into subsets by type, mules have been included with the coins of the later of the two types represented in their production, as they must necessarily date from at least the time of that latter type.

3.1.2.1 Weights of Coin Type 1

The complete coins of Type 1 range in weight from 0.96g to 1.46g, with two significantly heavier outliers. The mean average weight of this set is 1.27g, and both the median and mode are 1.28g. This average weight is interesting when compared with the weights of the last coins of Edward the Confessor and the single Coin Type of Harold Godwinson. Metcalf notes a potential weight standard of 1.27g for both Edward's 'Pyramid' type (Metcalf 1993, 173) and Harold's 'PAX' type (ibid., 176), suggesting that William's first Coin Type shows a significant continuation from the earlier coins of 1065-6. However, in the cases of both the Pyramid and PAX coins, Metcalf suggests that 1.27g is just one of two or more standards in use in various parts of the country. This suggestion of regional variation will be explored in section 3.1.3 below, where the dataset of weights of the early Norman coins is split geographically.

As shown in figure 3.2, the weights of Coin Type 1 produce a curve unusually close to a standard symmetrical distribution, with a Pearson's Coefficient of Skew of only -0.19; indeed, there are almost as many overweight as underweight coins.

The level of uniformity of data within a set can be represented by investigating the standard deviation of the data. This specifically measures how much the overall set varies from the mean, represented as a figure in the range from 0 to 1. A high standard deviation indicates great variety within the set of data. A lower standard deviation indicates more uniformity within the set. The standard deviation of this subset is 0.088, indicating a relatively

tight distribution of weights and thus a low level of variance from the average.

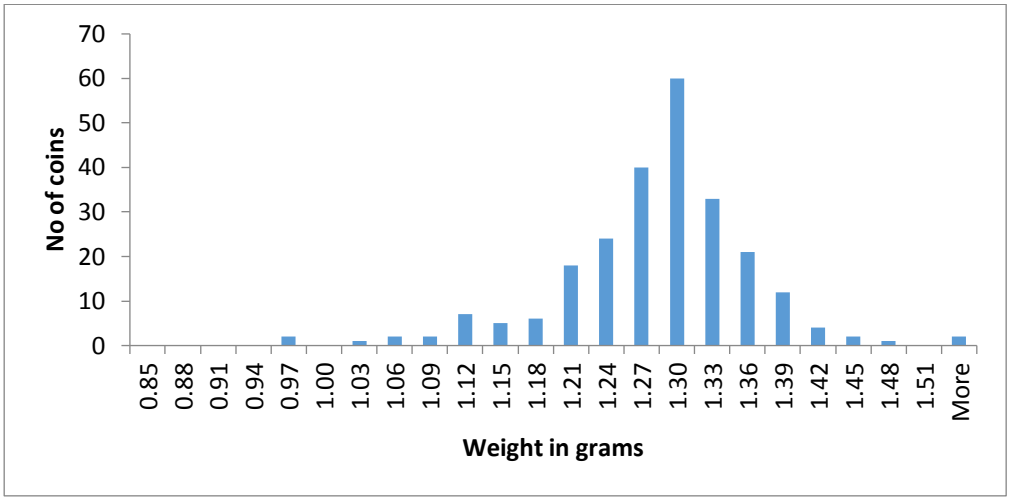


Figure 3.2: Weights of complete coins of Coin Type 1

3.1.2.2 Weights of Coin Type 2

The weights of coins of Type 2 show much greater variation than those of the preceding type. They range from 0.83g to 1.51g, and the three averages are very disparate. While the modal average is still 1.28g, the median is 1.23g and the mean average weight is only 1.21g. In addition, as shown in figure 3.3, the distribution curve of this subset is very far from a standard distribution, with its main peak not sharply defined, and a great many coins of lower than average weights. The standard deviation is also much higher than in the previous Coin Type, standing at 0.129, indicating that the variance from average within this subset is high; a fact borne out by the histogram.

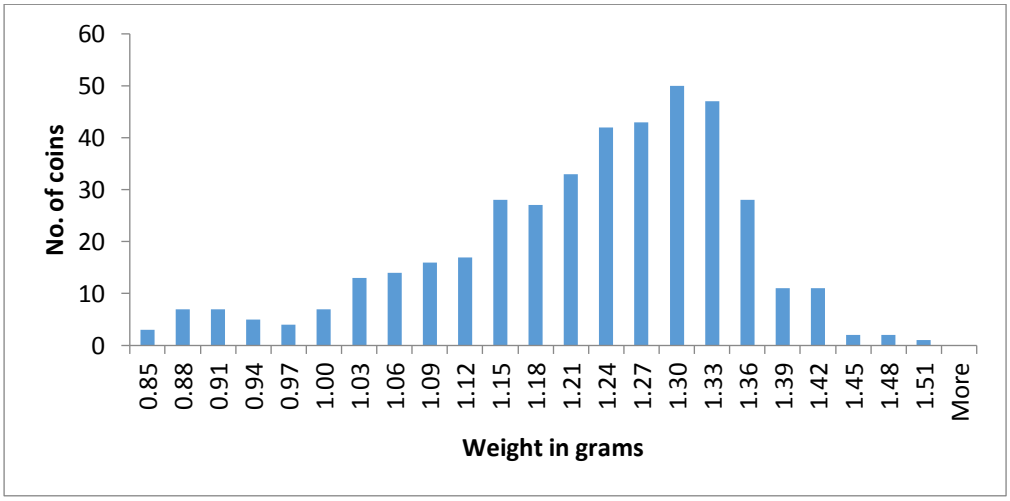


Figure 3.3: Weights of complete coins of Coin Type 2

3.1.2.3 Weights of Coin Type 3

Coin Type 3 is one of the types represented by only a small number of surviving coins. The weights mostly range from 1.00g to 1.43g, with a single low weight outlier. The average weights are slightly higher than in the previous Coin Type, with a mean of 1.25g, median of 1.26g, and mode of 1.30g. The standard deviation is 0.094, between the high level of Coin Type 2 and the low level of Coin Type 1. The histogram, shown as figure 3.4, shows a clear primary peak at the modal average of 1.30g.

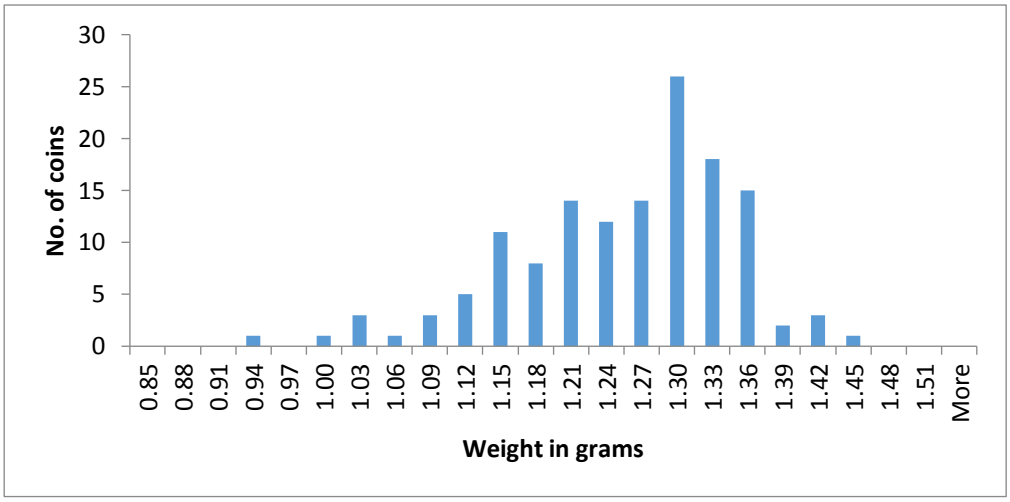


Figure 3.4: Weights of complete coins of Coin Type 3

3.1.2.4 Weights of Coin Type 4

The coins of Type 4 have weights in the range 0.92g to 1.54g, although the main bulk of the coins weigh between 1.06g and 1.48g. The average weights are somewhat higher than those of the preceding three Coin Types, falling between 1.30g and 1.35g. The standard deviation in this group is 0.092, indicating a similar level of variation within this Coin Type to that shown in the preceding type.

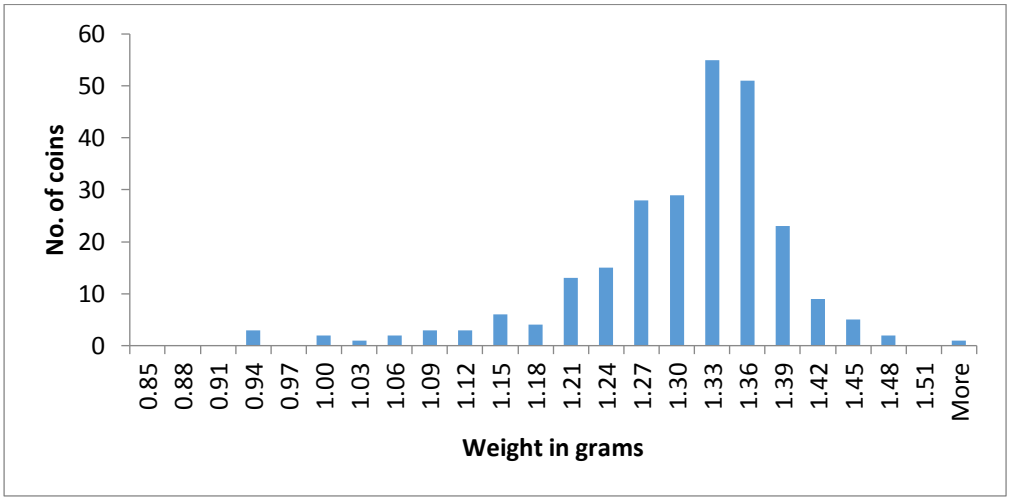


Figure 3.5: Weights of complete coins of Coin Type 4

3.1.2.5 Weights of Coin Type 5

The distribution pattern of weights of Coin Type 5 is broadly similar to those of Coin Type 4. The coins range from 0.96g to 1.45g with a single lightweight outlier and two outliers of heavier weight. The average weights of this group are slightly lower than those for Coin Type 4, at 1.29g mean, 1.31g median, and 1.33g mode, but still higher than the averages of the early Coin Types. The standard deviation is relatively high, at 0.098, although this is still lower than the very high level of variation seen in Coin Type 2.

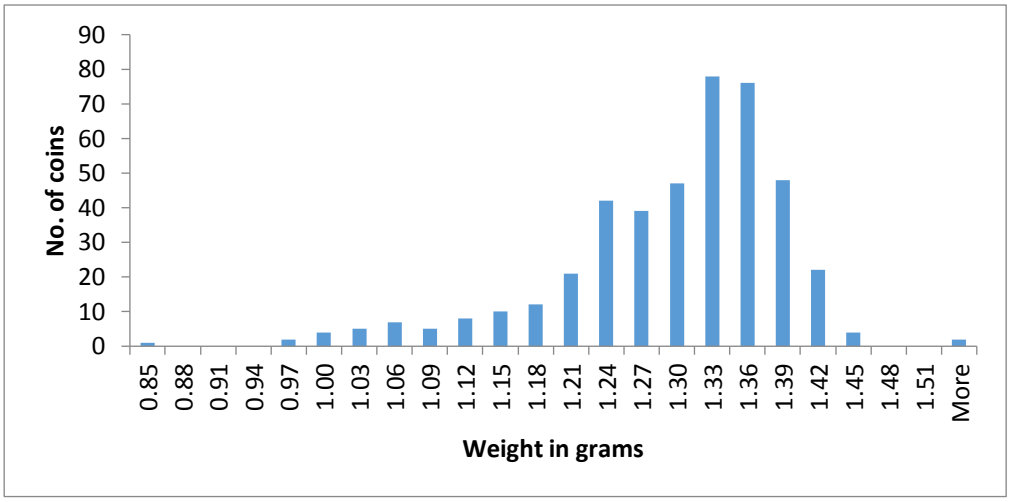


Figure 3.6: Weights of complete coins of Coin Type 5

3.1.2.6 Weights of Coin Type 6

Coin Type 6 is another type which is represented by relatively few surviving coins. The general range of weights is from 1.03g to 1.46g, with two outliers of low weight. The mean and median weights are similar to the preceding type, at 1.28g and 1.30g respectively. However, the modal average is much higher than previously seen, at 1.37g. When plotted on a histogram, as at figure 3.7, the shape of this distribution is very interesting, seeming to have three peaks, which could suggest the use of a number of different weight standards, one around 1.13-1.15g, a second at 1.25-1.27g, and the other at 1.37-1.39g. The three peaks could relate to the outputs of different mints, and this will be investigated in section 3.1.3 below. The standard deviation is high, at 0.100, indicating the high level of variation within the coins of this Type, which is clear from the histogram.

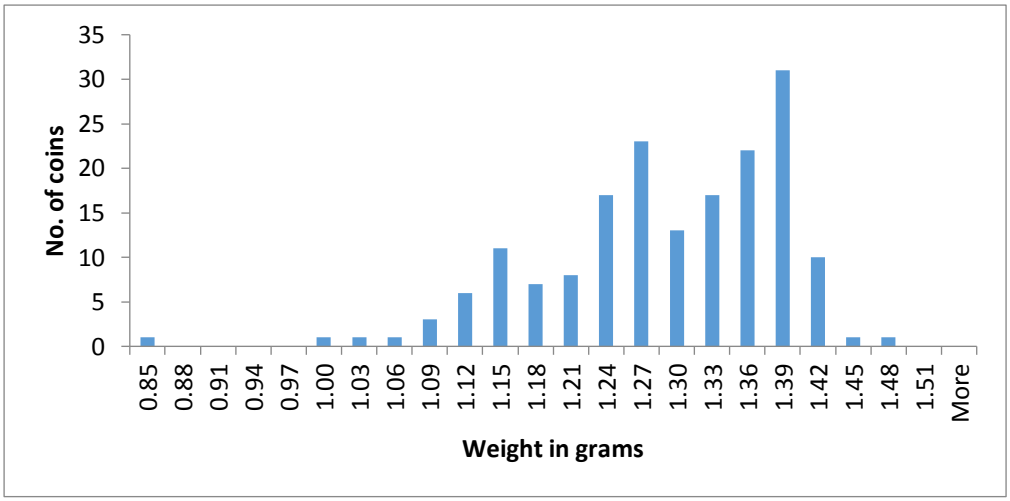


Figure 3.7: Weights of complete coins of Coin Type 6

3.1.2.7 Weights of Coin Type 7

The number of coins representing Type 7 in the dataset is also small, but the distribution of their weights shows some similarities to those of Coin Type 6. Again, there may be more than one peak in the distribution, in this case two peaks at around 1.19g-1.21g and 1.34g-1.36g. The peaks are, however, less clearly defined than in the earlier type, as can be seen in figure 3.8. The range of weights is generally between 1.03g and 1.41g, but there are a number of lighter, and one heavier, outliers. The average weights for this group are fairly disparate, with the mean at 1.26g, and the mode up at 1.34g. The standard deviation is again high, at 0.122.

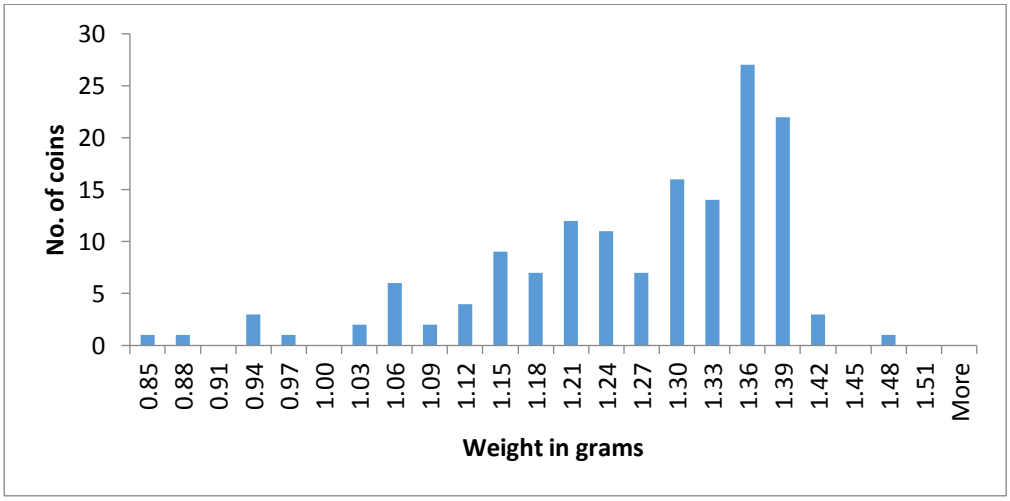


Figure 3.8: Weights of complete coins of Coin Type 7

3.1.2.8 Weights of Coin Type 8

Coin Type 8 is by far the largest subset within the data, being represented by 1856 complete coins. The patterns in its distribution of weights also seem to be very different to those of the preceding Coin Types. The range of weights is from 1.13g-1.53g, with 6 outliers of lower weight, and 4 outliers of higher weight. However, the vast majority of the coins fall within the range 1.33g-1.41g, with 1512 coins, or over 81% of the total, having those weights. The three averages are very close, with the mean at 1.37g, the median at 1.38g, and the mode at 1.39g. The standard deviation is also very low, at just 0.053. Both these facts suggest that there is a low level of variance in the weights of these coins, and this is borne out by the histogram at figure 3.9, which shows a tight distribution of weights, with a single, clear peak and tails which fall away very quickly and do not extend very far.

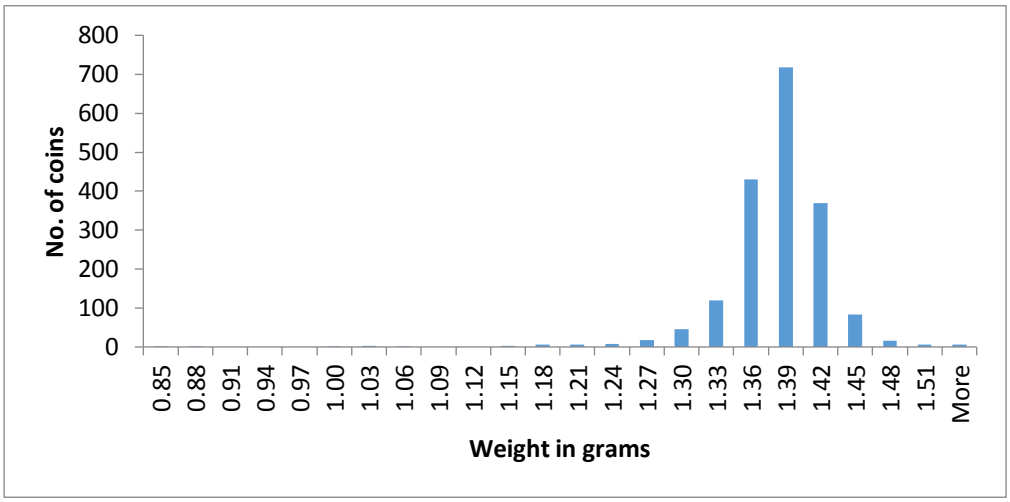


Figure 3.9: Weights of complete coins of Coin Type 8

3.1.2.9 Weights of Coin Type 9

The shape of the distribution of weights of Coin Type 9, as shown in figure 3.10, is similar to that of Coin Type 8, but on a very different scale: by contrast with the very large dataset of the preceding type, Coin Type 9 is one of those represented by fewer than 200 surviving coins. However, the histogram has a similar single, clear peak, with low numbers of under- and over-weight coins. The median and modal averages are also similar, both being 1.38g, although the mean average is lower, at 1.35g. Additionally, the standard deviation is noticeably higher than for Coin Type 8, being 0.096, and thus suggests rather more variation than in the preceding type.

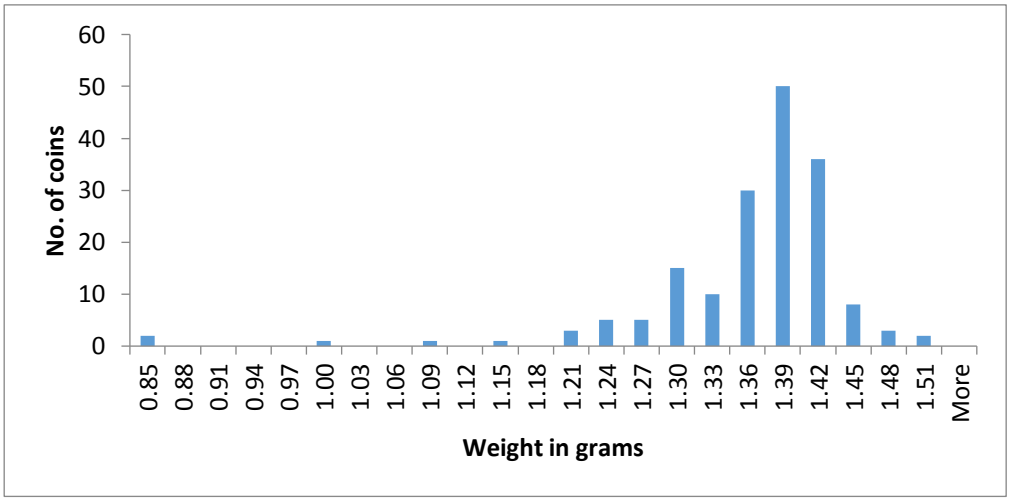


Figure 3.10: Weights of complete coins of Coin Type 9

3.1.2.10 Weights of Coin Type 10

The weights of Coin Type 10 show a much less standardised distribution than the preceding two types. The range of weights is from 1.05g to 1.49g, with two low weight outliers. The mean and median are somewhat lower than previously, at 1.35g and 1.36g respectively, but the modal average weight is higher, at 1.40g. The shape of the histogram, as shown in figure 3.11, reflects this range of averages, with a very broad peak to the distribution, spreading across a range of weights. The standard deviation is also relatively high, at 0.085.

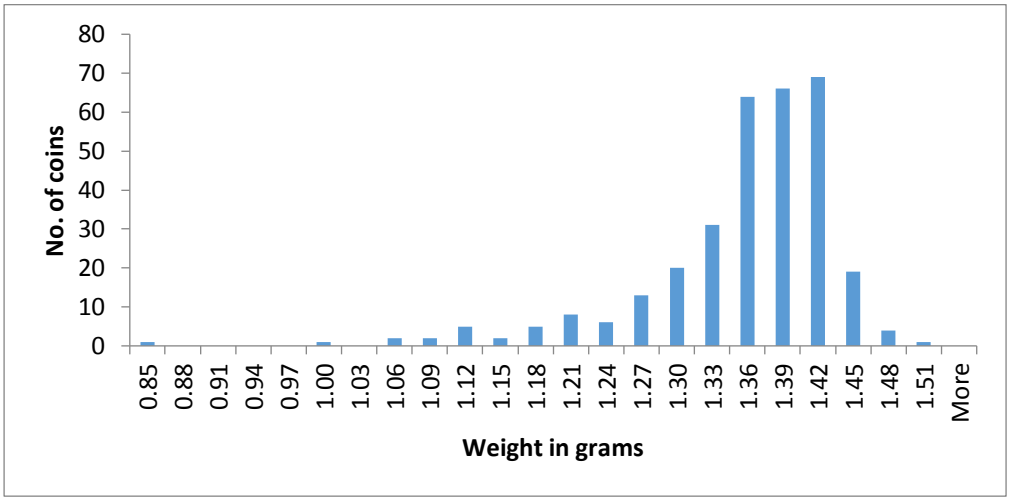


Figure 3.11: Weights of complete coins of Coin Type 10

3.1.2.11 Weights of Coin Type 11

Coin Type 11 has a very similar distribution pattern to types 8 and 9, with a clear, narrow peak and relatively few under- or over-weight coins. The averages are also less disparate than in Coin Type 10 being, in fact, exactly the same as those seen in Coin Type 8. Similarly, the standard deviation of this set is very low, at 0.050. The overall range of weights is tighter and heavier than previously, running from 1.20g to 1.46g, with two outliers of higher weight.

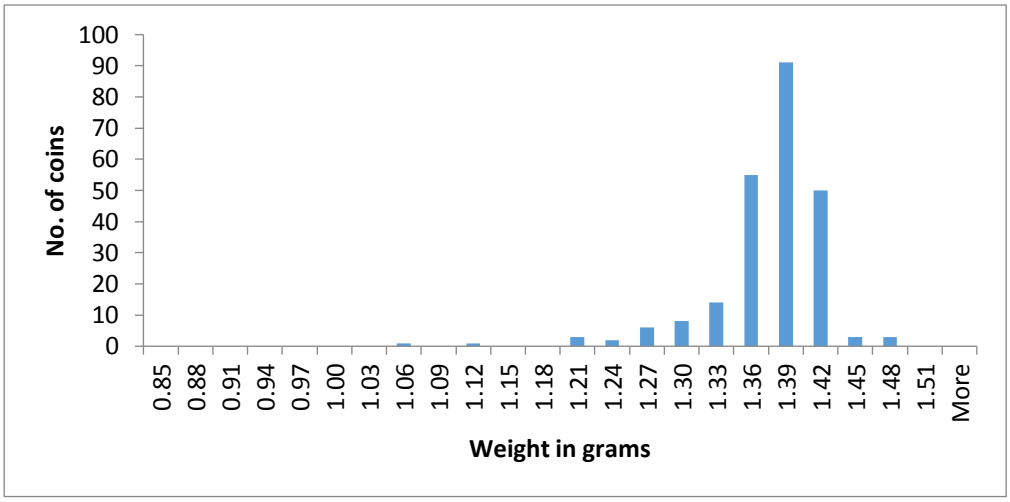


Figure 3.12: Weights of complete coins of Coin Type 11

3.1.2.12 Weights of Coin Type 12

Consideration of the pattern of distribution of weights of the last Coin Types of William Rufus must take account of the fact that Coin Types 12 and 13 are the rarest survivals in the series and thus the sample sizes for these subsets are very small. However, some general points can be made about their weights. The range of weights in Coin Type 12 is quite broad, running from 1.13g to 1.44g, with a couple of lighter outliers. The averages are broadly in line with the preceding types 8 to 11 but show somewhat greater variation, with a mean of 1.33g, median of 1.36g, and mode of 1.37g. The histogram shows a single peak, but the standard deviation of the group is high, at 0.090.

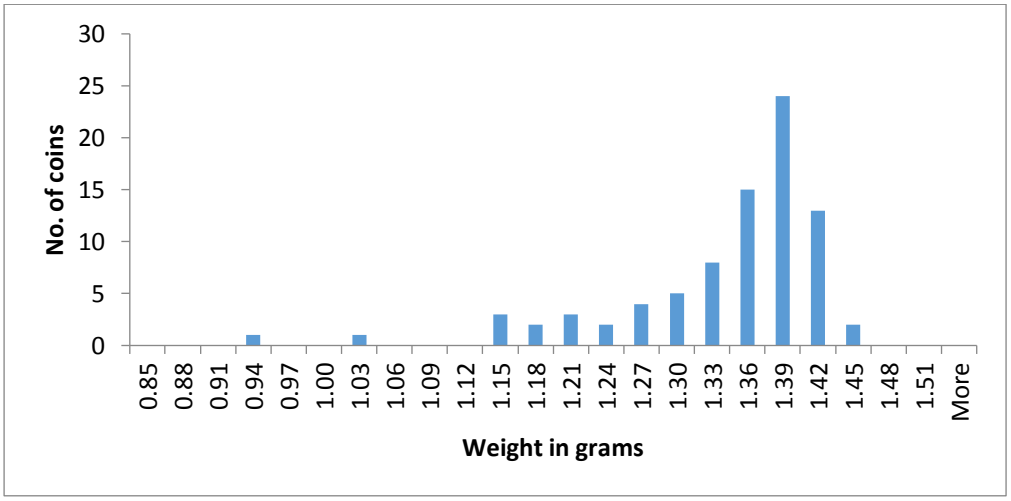


Figure 3.13: Weights of complete coins of Coin Type 12

3.1.2.13 Weights of Coin Type 13

As with the preceding type, Coin Type 13 has a very small sample size. The distribution of coin weights is similar to those of Type 12, with the range running from 1.20g to 1.45g. The average weights also broadly follow the pattern seen in the preceding five types, being 1.35g mean, 1.37g median, and 1.38g mode. The histogram has a single, clear peak, and a relatively low standard deviation, at 0.072.

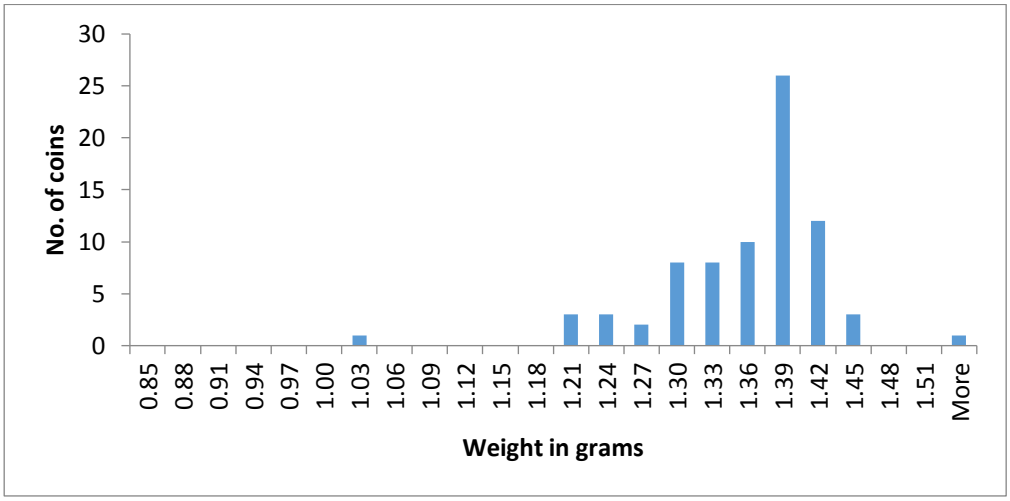


Figure 3.14: Weights of complete coins of Coin Type 13

3.1.2.14 Analysis of Weights by Coin Type

The data presented above show that each different Coin Type presents a unique distribution of weights. However, investigation of the data across the series suggests some interesting trends.

Plotting the average weights of the coins of each type can give an indication of the most common weights in use across the period, and thus present a picture of how the weights of the coins in circulation changed over the course of the first 34 years of Norman rule in England. Figure 3.15 shows the mean, median and modal average weights for each of the 13 Coin Types.

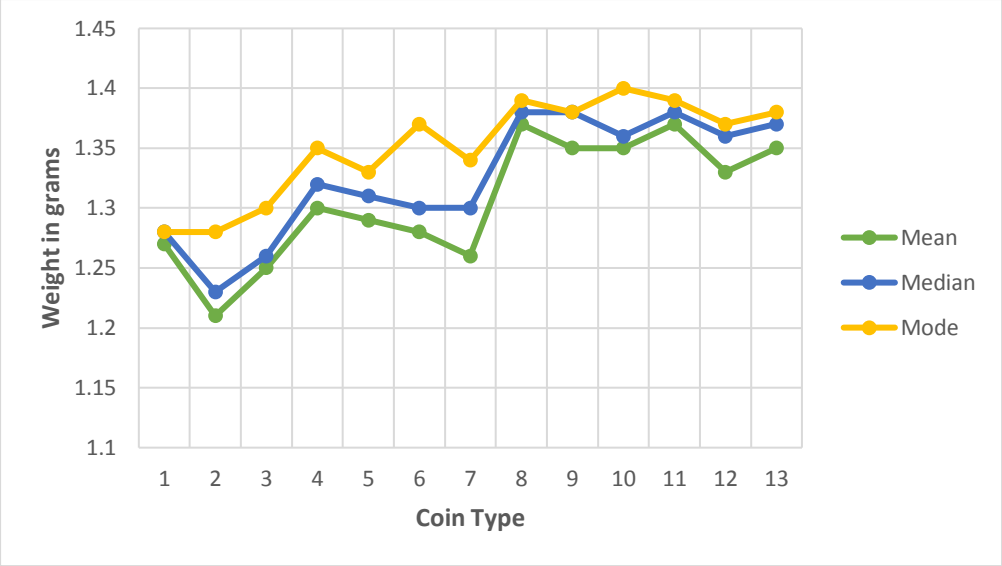


Figure 3.15: Average weights of coins of each Coin Type

It is clear that the trend is for coin weights to increase as the period progresses, and this trend is even clearer when the data are smoothed to focus on the Coin Types for which we have the most remaining coins. Coin Types 1, 2, 4, 5, 8, 10, and 11 are all represented in the dataset by more than 200 surviving complete coins, while the other Coin Types have fewer. Data presented by larger subsets are more statistically significant than those derived from smaller sets. They are therefore more likely to be representative of the original datasets of coins in circulation. Focusing on these larger sets can provide a higher level of confidence in the trends suggested by the data. Figure 3.16 shows the same data as figure 3.15 but the trend lines have been adjusted so they only follow the datapoints provided by the subsets with the larger sample sizes.

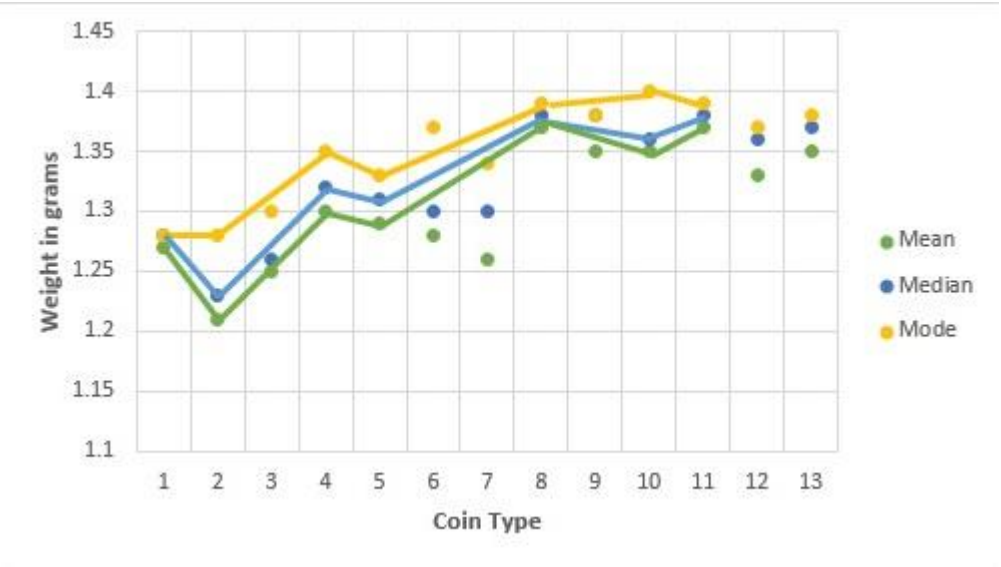


Figure 3.16: Average weights of coins of each Coin Type, with data smoothed

The first two coinages of William the Conqueror have weights broadly in line with those of his immediate predecessors, with averages between 1.21g and 1.28g. The third Coin Type has few surviving examples. Coin Types 4 and 5 show a higher weight, with averages between 1.29g and 1.35g. The next two Coin Types have only small numbers of coins in the dataset. By the reign of William Rufus, the coins are of a higher weight again, with Coin Types 8, 10 and 11 having averages between 1.35g and 1.40g. Coin Type 9, and the last two coinage issues of the period, are all represented by only very small numbers of surviving coins. The weight of 1.37g, which Lyon suggested as the average weight of circulating coins at the time of Domesday (Lyon 2006, 234), therefore does seem to have been usual from Coin Type 8 onwards.

Just a glance at figures 3.15 and 3.16 shows immediately that there is a fluctuation between the different averages of the coin weights. The modal values (shown in green on the charts) are consistently the highest of the three values, which reflects the persistent negative skew to the distributions; in all cases there are more coins of lower than average weight than there are coins of higher than average weight. This means that the modal average (the individual weight for which there is the highest number of corresponding coins) is towards the heavier end of the distribution. The median average

(the 'middle' number in the range of weights) is always equal to or lower than the mode. The mean average (the total weight of all coins divided by the number of coins) is lower still, having been brought down by the large number of underweight coins.

For some Coin Types, such as Coin Type 1, Coin Type 8, and Coin Type 11, the difference between the three averages is small, while for some other types, such as Coin Type 2, and Coin Type 10, the difference is much larger. This could be seen as a reflection of the distribution of the weights of the different subsets; if the pattern of weights is close to a standard distribution the three averages will be very similar. If, however, the distribution is very skewed, has multiple peaks, or is in some other way patchy or inconsistent, the three averages will be much more disparate.

Examination of the standard deviation of the sets gives an indication of the level of uniformity of coins of each type. This is plotted as figure 3.17. The trend line shows that there is a general move towards lower standard deviations over the period, although the actual figures are rather erratic.

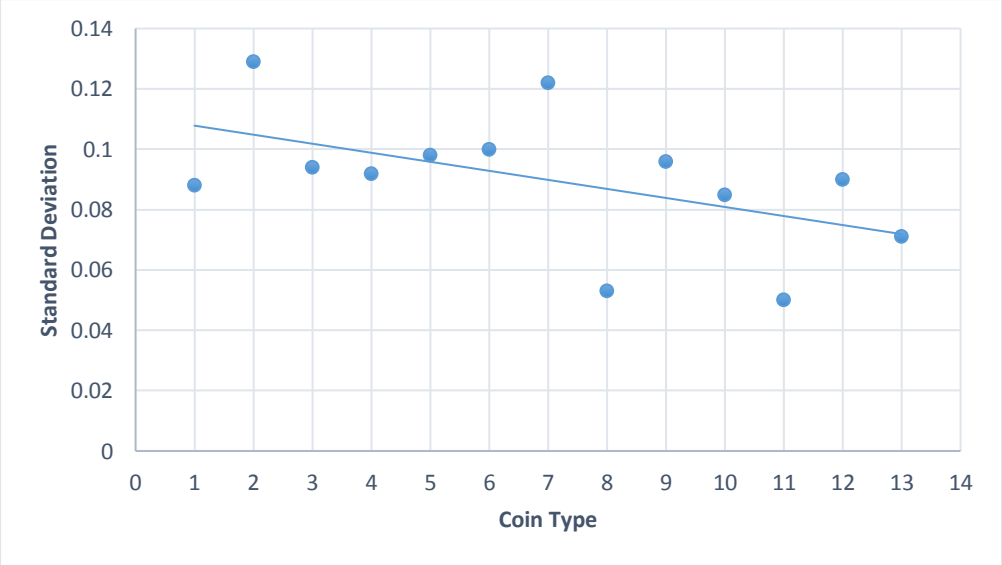


Figure 3.17: Standard deviation of weights by Coin Type

The chart indicates that for most of the Coin Types, the standard deviation is fairly similar, falling between 0.085 and 0.100. There are two Coin Types with

a much higher standard deviation, thus representing high variation between the coin weights: Coin Type 2 at 0.129 and Coin Type 7 at 0.122. (It should be noted, however, that Coin Type 7 is one for which the sample size is small.) Three Coin Types show a noticeably lower standard deviation than the norm, thus representing greater standardisation of coin weights: Coin Type 8 at 0.053, Coin Type 11 at 0.050, and Coin Type 13 at 0.071. (Again, however, it should be noted that Coin Type 13 is represented by a very small sample.) These anomalies also broadly follow the overall trend towards increasing uniformity in the samples, in that the Coin Types with particularly high levels of variation are in the earlier part of the period, while those with particularly low levels of variation are towards the end of the period.

3.1.3 Weights by Mint

The examination of data from across the kingdom reveals a picture of great variety, which offers little evidence for standardisation of weight for the English penny in this period. However, Metcalf postulated that different weight standards may have been in use concurrently in different mints (Metcalf, 1993), and the national data explored above may indeed mask differing mint practices in different parts of the kingdom. This section therefore breaks down the data subsets by geographical criteria, looking at the weights of coins which emanated from individual mints.

In all 72 different mints are known on the coins of William I and/or II so a full examination of all individual mints was not feasible for the current project. Additionally, many of the smaller mints are represented by very few surviving coins so meaningful statistical analysis of their data is not currently possible. The investigation has therefore focused on the case study mints identified in Section 2.3 of the preceding chapter. Even within this selection, however, there is a notable disparity in the number of surviving coins from the individual mints, as shown in Table 3.2; there are 559 extant complete coins of the London mint, but Stamford, Gloucester, Worcester and Hereford are

each represented by fewer than 100 coins. This variety of sample size must always be borne in mind when considering the reliability of trends suggested by the data from the different mints, and the intimations and conclusions which follow are offered in light of this consideration.

Mint	Number of complete coins in the dataset
London	559 coins
Southwark	120 coins
Winchester	397 coins
York	220 coins
Lincoln	244 coins
Stamford	59 coins
Thetford	175 coins
Norwich	134 coins
Gloucester	74 coins
Worcester	64 coins
Hereford	73 coins

Table 3.2: Number of complete coins of individual case study mints in the dataset

The investigation of coins from the whole kingdom examined in Section 3.2 above suggests that the average weights of coins varied between different Coin Types, with the later types being made to heavier weights than those early in the period. It would therefore be of limited value to focus on the full distribution of weights of all coins from any given mint (although these figures are included at Appendix 1). This is especially the case for mints which are over-represented for particular Coin Types, for instance the York mint whose dataset includes a large number of examples of Coin Type 2 stemming from 4 substantial hoards with deposition dates in that type found within the city of York, or the Winchester mint whose dataset includes a disproportionate number of examples of Coin Type 8 from the Beauworth hoard. The data presented here therefore focus on the weights of coins of individual Coin Types from the different mints, thus adding a temporal element to the geographical criterion and allowing consideration not just of regional differences in the coinage but also of how those may have changed over time.

3.1.3.1 Weights of Coins of the London and Southwark Mints

The average weights of coins of each Coin Type from the London mint are shown in Figure 3.18. The chart gives the mean average (as circles) and the modal average (as squares). For comparison, the modal average weights of coins of all mints is shown as a line. With the exception of Coin Type 1, the coins of the London mint are generally lighter than the national average in the early part of the period. In the reign of William Rufus, however, the average weights from the London mint become closer to the national average, although the earlier light weight profile does reappear occasionally, notably in Coin Type 10.

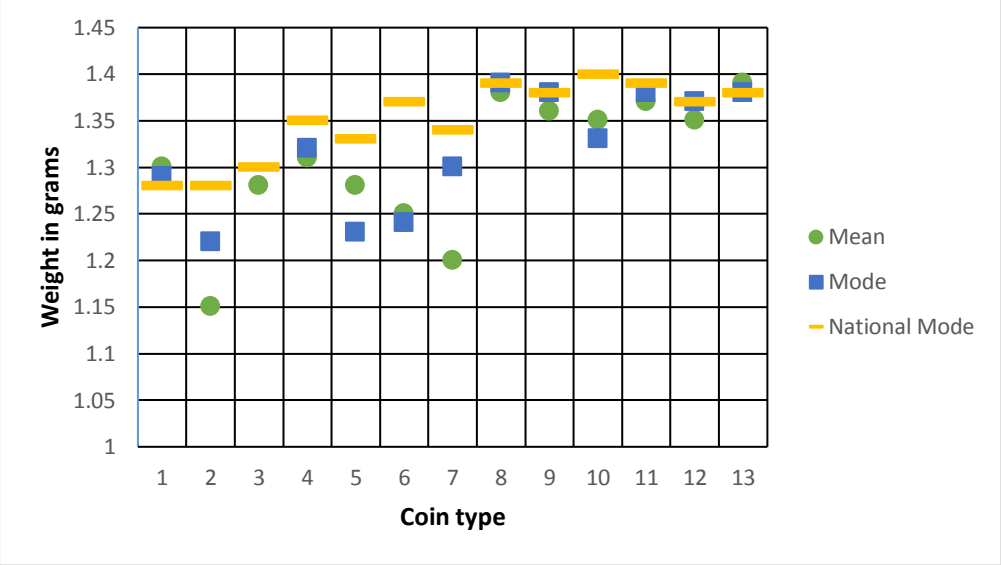


Figure 3.18: Average weights of coins of each Coin Type from the London mint

The chart shows a great deal of variety within the London mint across the period. In some Coin Types, such as 4 and 8, the mean and mode are very close but in others, such as 2 and 5, they are widely disparate. Additionally, in 5 of the Coin Types the mean average is higher than the modal average, which suggests that in those types there are a large number of coins of higher than average weight.

A closer examination of the weight distribution in the individual Coin Types can offer some hints about these unusual results. In some of the early types

there is a suggestion from the histograms that the London mint may have been working to more than one weight standard within an individual type, as suggested by Metcalf (1993). The clearest example of this is in Coin Type 2, as shown in figure 3.19. The average weights for this Coin Type from London are between 1.15g and 1.22g. However, the histogram seems to have three peaks, hinting that there may have been an intention to make coins at three different weights – one around 1.07g-1.09g, one around 1.22g-1.24g, and a third around 1.31g-1.33g. An alternative explanation, however, could be that the idea of a 'standard coin weight' was not common, or not closely adhered to, in this mint at this time. This idea is explored further in Chapter 5.

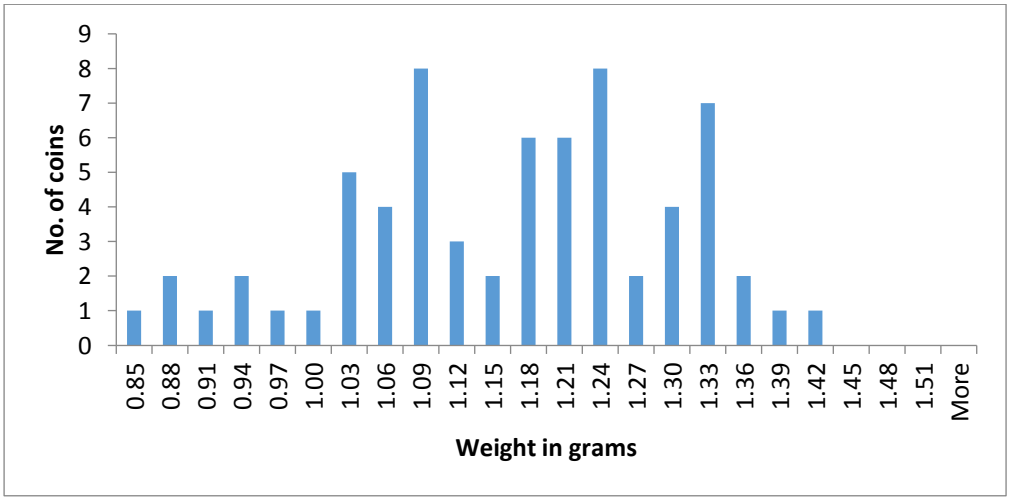


Figure 3.19: Weights of coins of Coin Type 2 from the London mint

Histograms with multiple peaks are something of a feature of the coin weights of the London mint in the early part of the period: with the exception of Coin Type 1, the charts for all the coinages of William I have no clear single peak. From Coin Type 8 onwards the charts show a more standard distribution, with a single peak, but the histogram for Coin Type 10, shown at figure 3.20, seems to return to the earlier pattern, with the suggestion of more than one peak in the distribution.

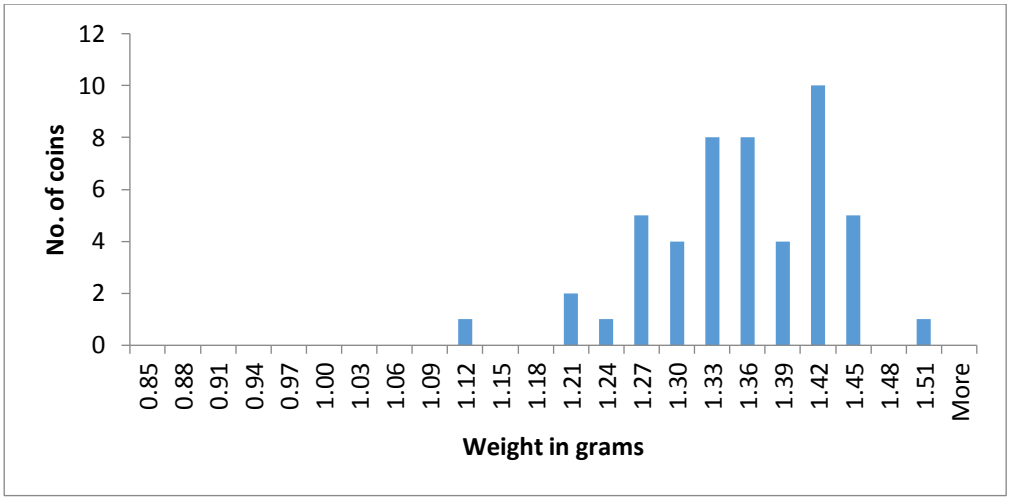


Figure 3.20: Weights of coins of Coin Type 10 from the London mint

The histograms clearly show distributions with a great deal of variation in the weights of coins of a particular Coin Type. There seems to be little standardisation in the coin weights of the London mint in the early part of the period, and this is borne out by examination of the standard deviations, as shown in figure 3.21. In general, the standard deviation is high for the first seven Coin Types, in some cases much higher than the standard deviation of the overall kingdom-wide data shown in figure 3.17 above. However, from Coin Type 8 onwards the standard deviations from the London mint become much lower. Interestingly, for some of these Coin Types, such as types 8, 11, and 12, the figure for London is considerably lower than for the kingdom-wide data. The trend within this mint is clearly for a decrease in the standard deviation of coin weights, representing noticeably increasing uniformity of coin weights as the period progresses.

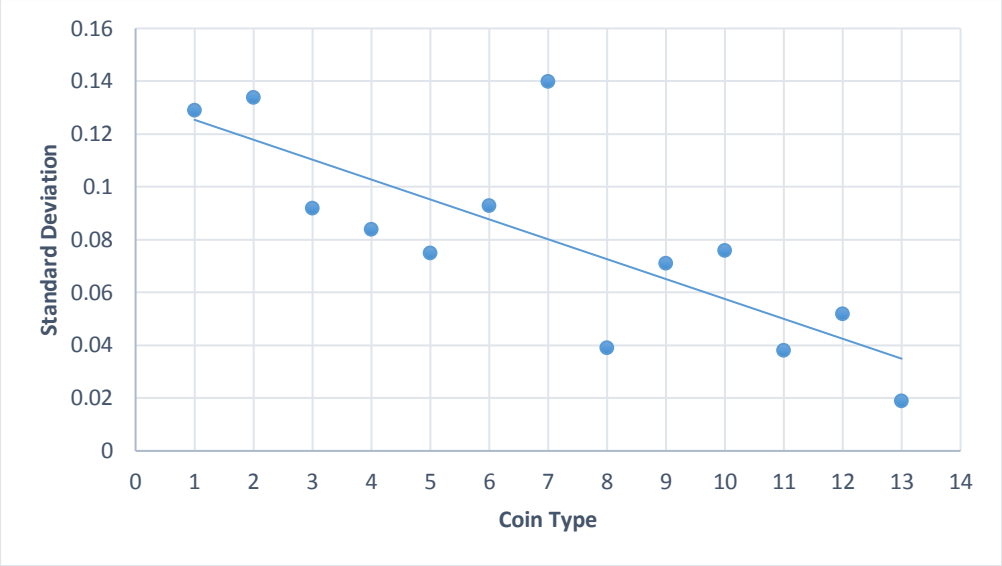


Figure 3.21: Standard deviation of weights of coins of the London mint

The Southwark mint has historically had very close links with the mint in the city of London, so the two are considered together here. The sample of surviving coins from Southwark is very small, with no coins at all of types 1-4 or Type 7. From the reign of William Rufus, however, the number of survivals increases, although the sample sizes for each individual Coin Type remain very low.

For the Coin Types with sufficient examples to provide figures, the average weights of coins of the Southwark mint are broadly similar to those of the London mint. There are exceptions in Coin Types 10 and 12, where the average weights of Southwark coins are somewhat lighter than those from London. In Coin Type 10, for instance, the average weights of Southwark coins are 0.05g lighter than contemporary coins of London. There is no indication of multiple concurrent weight standards in use at the Southwark mint.

3.1.3.2 Weights of Coins of the Winchester Mint

The pattern of coin weights from the mint at Winchester is in clear contrast to the patterns from the London mint. The chart at figure 3.22 shows that for

the majority of Coin Types the average weights of Winchester coins are very close to the national average and, in a number of cases, the Winchester coins are somewhat heavier. Additionally, the heavier weight standard of around 1.37g-1.39g, which becomes common across the kingdom from Coin Type 8 onwards, can be seen to appear at Winchester in Coin Type 6, maybe five years earlier than in most mints.

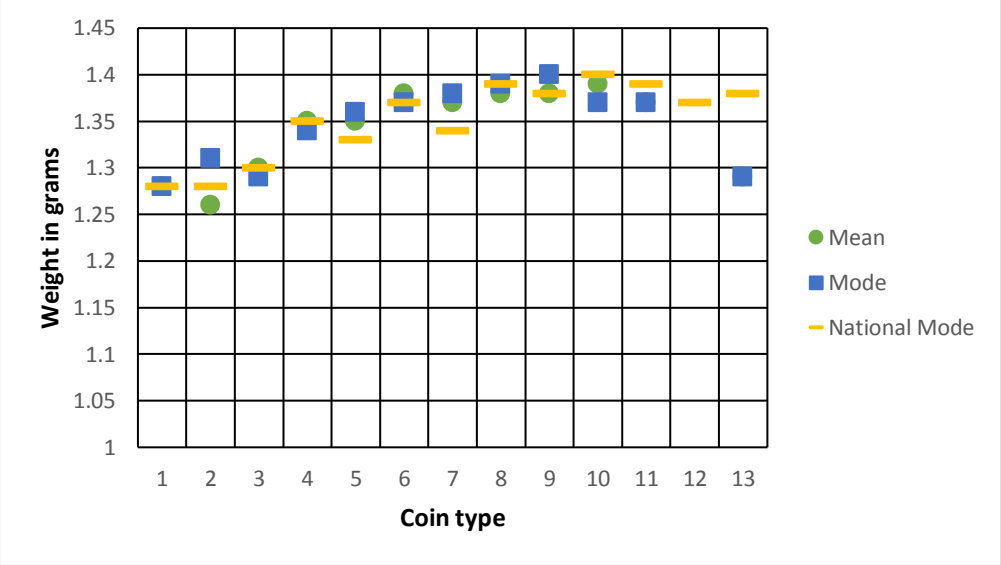


Figure 3.22: Average weights of coins of each Coin Type from the Winchester mint

With the exception of Coin Type 2 the mean and modal averages from the Winchester mint are very close, suggesting a high degree of uniformity in the distribution of coin weights. This suggestion is borne out by the distribution histograms for the individual Coin Types. The chart for Coin Type 5, shown at figure 3.23, is typical. There is a single, clear peak in the data and the majority of results are clustered closely around the peak. There is no long 'tail' of over- or under-weight coins and no suggestion of multiple peaks in the data. The charts for all Coin Types indicate that the Winchester mint was working to a single weight standard, and that the surviving coins adhere closely to that standard.

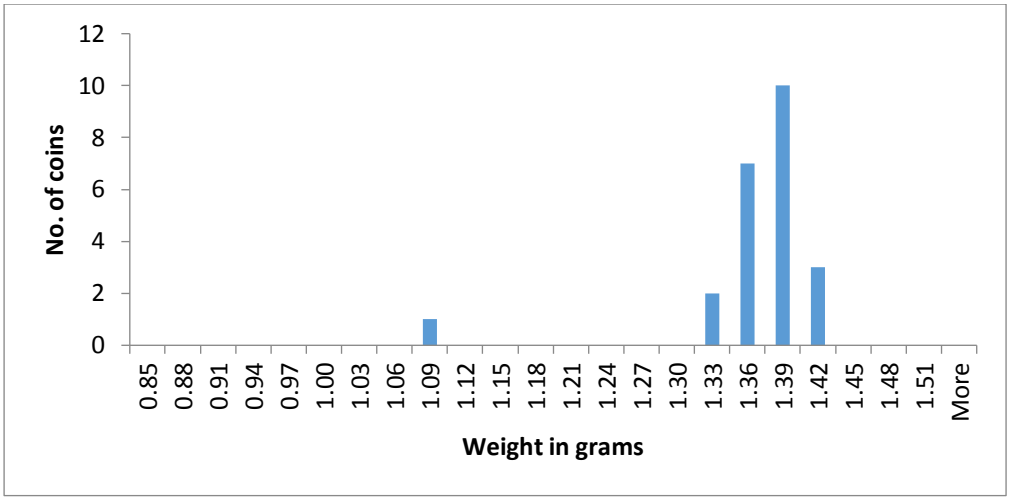


Figure 3.23: Weights of coins of Coin Type 5 from the Winchester mint

The same story is revealed by the standard deviations of the coin weights of each Coin Type. For the Winchester mint these are uniformly low, with the lowest (for Coin Type 6) being 0.017, indicating almost no variation within the group. The highest standard deviation (for Coin Type 8) is only 0.067. This is particularly note-worthy when plotted against the standard deviations for the London mint, as shown in figure 3.24; even the highest standard deviation within a Coin Type at Winchester is lower than all but 4 of the standard deviations for the London mint. Additionally, while the trend at London is clearly for increasing standardisation across the period, the level of uniformity at Winchester remains essentially stable. The chart does show a slight trend towards higher standard deviations towards the end of the period, but the increase is small, and may be related to the smaller sample sizes of the later Coin Types of William II.

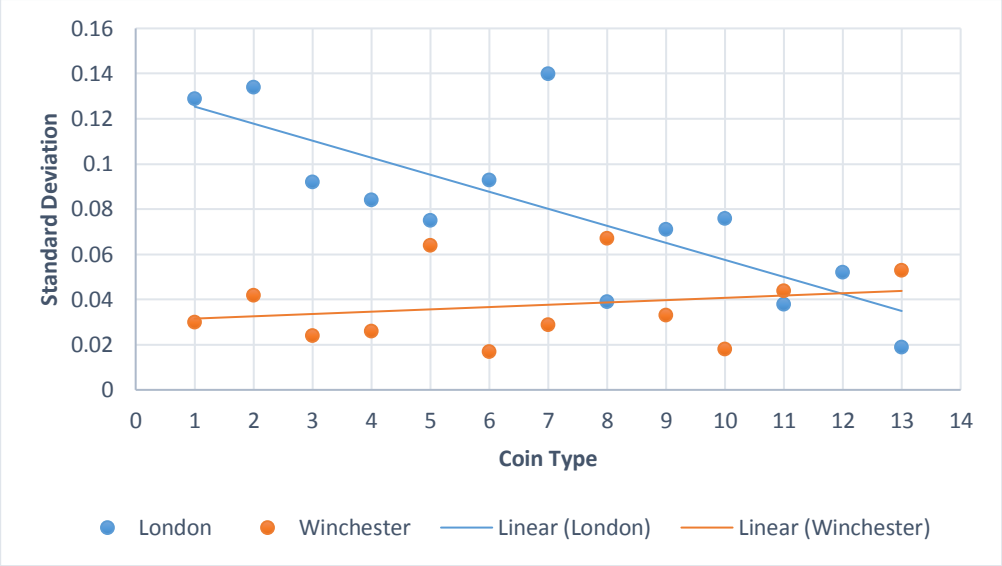


Figure 3.24: Standard deviation of weights of coins of the London and Winchester mints

3.1.3.3 Weights of Coins of the York Mint

The weights of coins emanating from the mint at York present an interesting picture, as they hint at a change of practice early in the period. The average weights are shown in figure 3.25. For the first two Coin Types the York mint seems to be striking coins at higher than the national average weight. There is then a gap in the chart for Coin Type 3, for which there are only 2 coins in the project dataset. From Coin Type 4 onwards, the average weights of coins of York are uniformly lower than the national average, in contrast to the two Coin Types at the start of the period. It should also be noted that after Coin Type 8 the number of surviving coins of the York mint becomes very low indeed, with no coins at all from types 9 and 13, and fewer than ten coins each of types 10 to 12. This possible change of practice may be related to political events in the early part of William the Conqueror's reign, and is discussed further in Section 5.2 in Chapter 5 below.

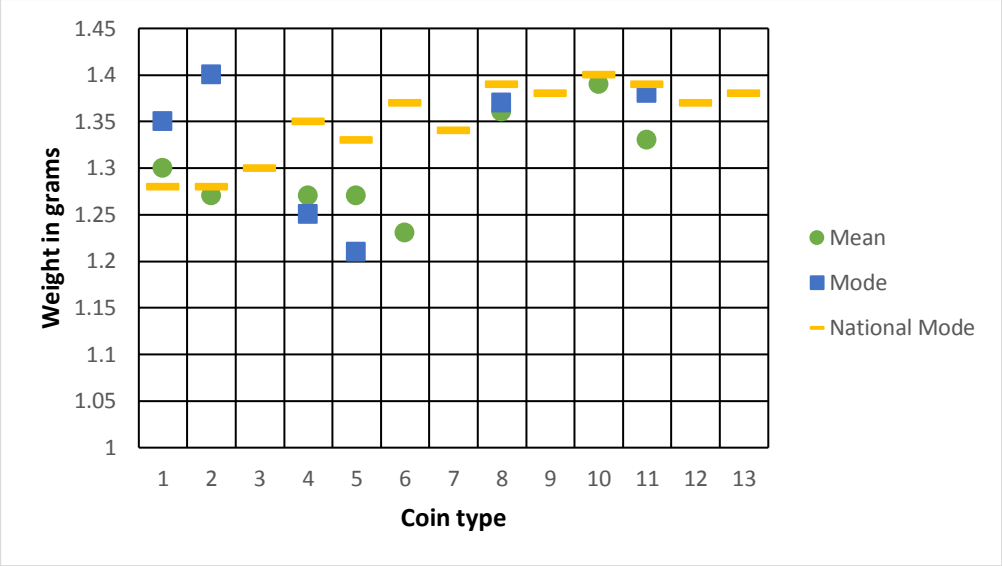


Figure 3.25: Average weights of coins of each Coin Type from the York mint

The individual distribution histograms for the York mint present a picture similar in some ways to those of the mint at London. The chart for Coin Type 2 is presented as figure 3.26. It shows a great deal of variation in the weights of individual coins, and also has a possible suggestion of multiple peaks. This broad variation in the coin weights continues after the hiatus of Coin Type 3, and even in Coin Type 8, which across the kingdom often has the tightest distribution curve, there is variety, as shown in figure 3.27.

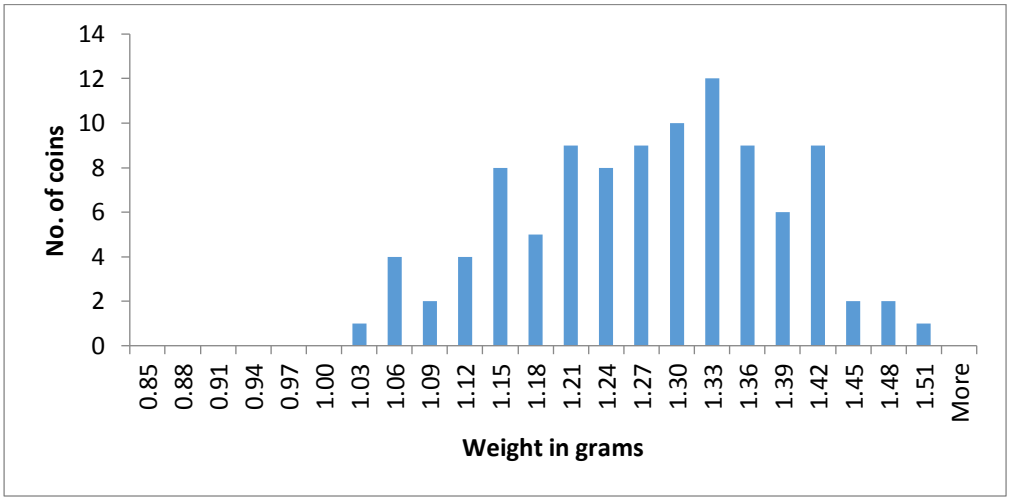


Figure 3.26: Weights of coins of Coin Type 2 from the York mint

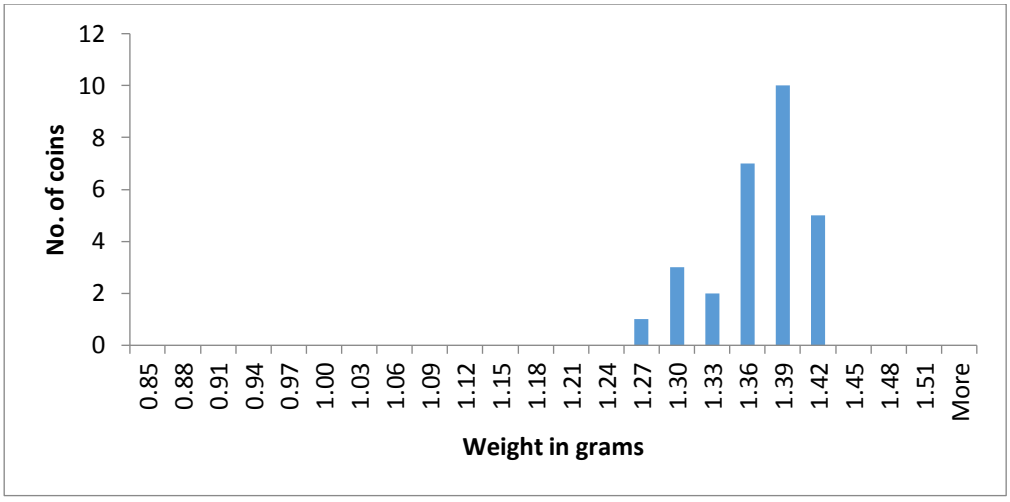


Figure 3.27: Weights of coins of Coin Type 8 from the York mint

The standard deviations of the data for each Coin Type from the York mint seem to show a clear and definite trend towards greater standardisation as the period progresses. However, the figures are only available for some of the Coin Types and, as noted above, those at the end of the period are based on very small sample sizes, so the picture may not be as certain as the graph at figure 3.28 suggests.

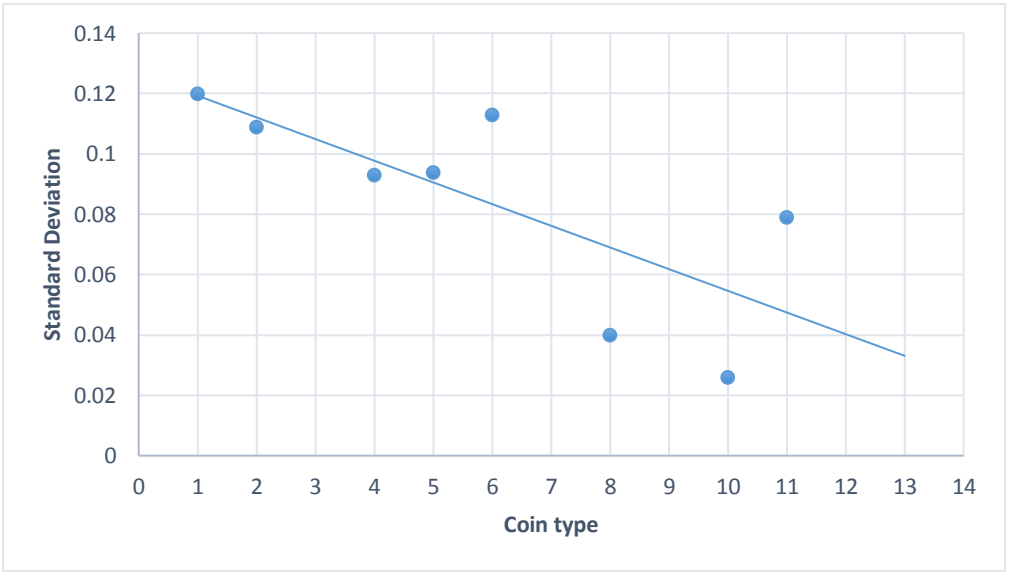


Figure 3.28: Standard deviation of weights of coins of the York mint

3.1.3.4 Weights of Coins of the Lincoln and Stamford Mints

The average weights of coins of the Lincoln mint show quite a degree of variation from the national average, with no clear pattern to mark them out:

in many of the Coin Types the average weights of Lincoln coins are somewhat lighter than the national average, but in some types they are about the same and in others they are rather heavy. In Coin Type 1 the Lincoln coins have a heavy profile, similar to that at York, but in Coin Type 2 the average weight from Lincoln is notably much lighter than the national average. From Coin Type 3 onwards the Lincoln weights are closer to the national averages, but still with great variation from type to type.

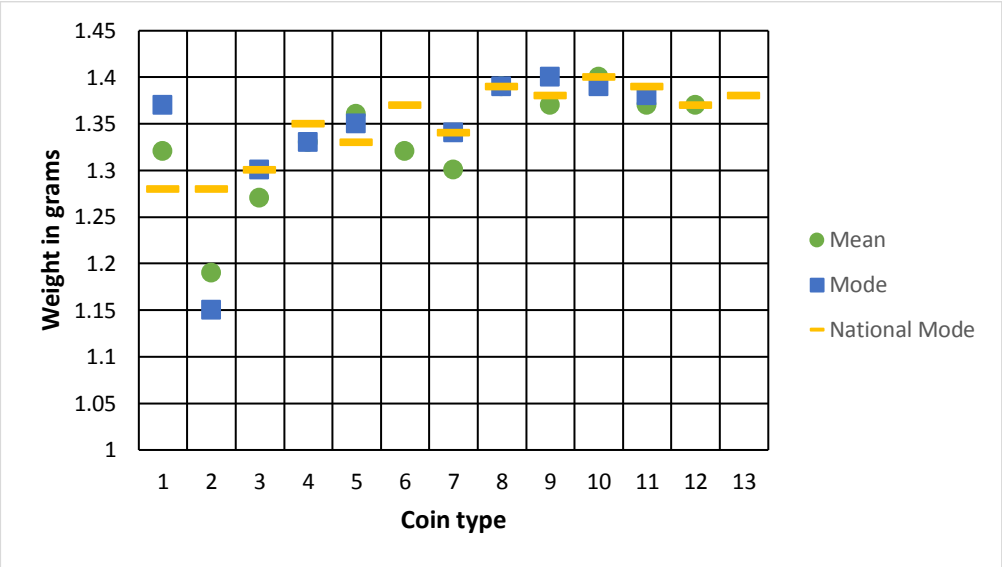


Figure 3.29: Average weights of coins of each Coin Type from the Lincoln mint

The individual histograms generally show weight distributions close to a standard distribution, with a single peak suggesting a single intended weight standard. The exception is Coin Type 2, shown at figure 3.30, which has an untidy distribution with suggestions of two or even three peaks. Even in the Coin Types with a clear single peak, the 'tails' of under- and over-weight coins tend to be quite long, indicating a low level of uniformity in the coinage weights.

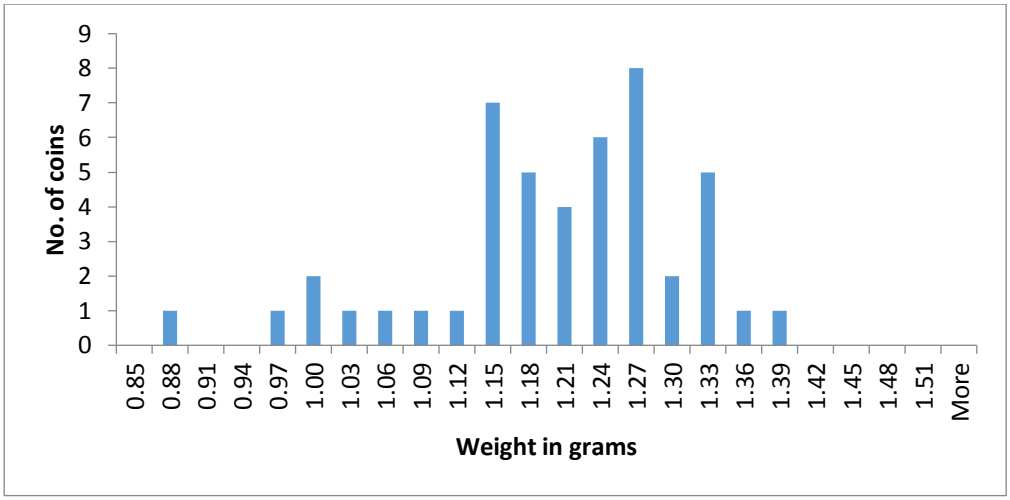


Figure 3.30: Weights of coins of Coin Type 2 from the Lincoln mint

The chart of standard deviations of the weights of the different Coin Types from the Lincoln mint indicates a trend towards greater standardisation across the period, although interestingly it seems to go in two waves: Coin Type 2 shows great variation, and the next three issues become progressively more standardised, followed by a very high level of deviation again in Coin Type 6, the standard deviation reducing thereafter for each subsequent Coin Type. By the end of the period the deviation in the weights of Lincoln coins has become very low.

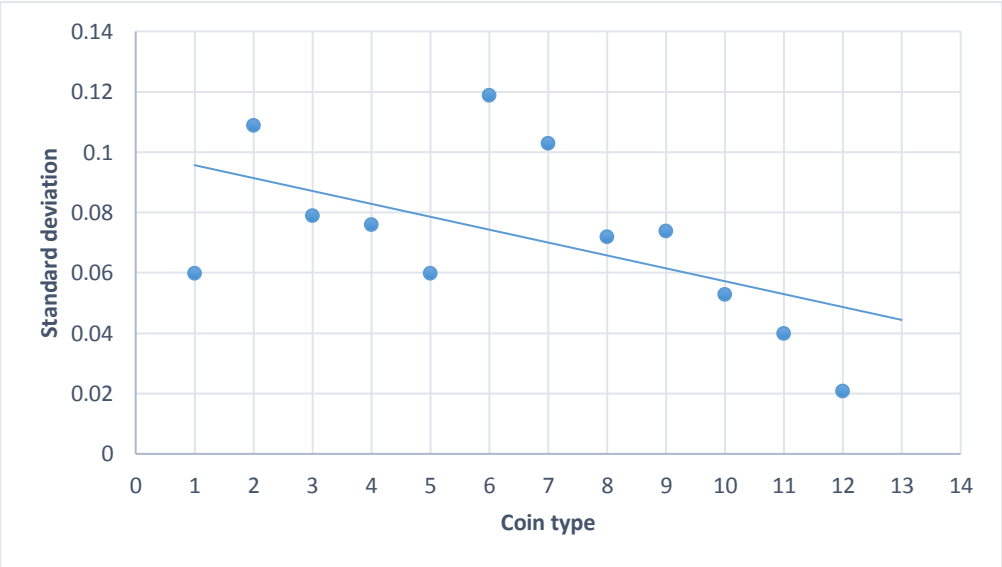


Figure 3.31: Standard deviation of weights of coins of the Lincoln mint

Since few coins have survived from the Stamford mint, comparison with the nearby Lincoln mint is difficult. The only Coin Types for which there are

sufficient extant Stamford coins to draw any conclusions are Coin Types 5 and 8. In Coin Type 5 the Stamford coins show an unusually light weight profile, with a mean of 1.27g, which contrasts to the rather heavy mean weight of 1.36g for contemporary Lincoln coins. In Coin Type 8 the Stamford coins have a very similar weight to the national average, as is common for most mints in this type, yet slightly lighter than the Lincoln average. There is therefore no indication that the Stamford mint was following the same standards as Lincoln in the weight of its coins.

3.1.3.5 Weights of Coins of the Thetford and Norwich Mints

The weights of coins of the Thetford and Norwich mints show a great deal of similarity to each other. The charts of their average weights are shown as figures 3.32 and 3.33. Both mints show noticeably lower weight profiles than the national averages, with the weights of Thetford coins being consistently lower, or equal to, the national modal average, while the weights of Norwich coins are only heavier than the national modal average in the last two Coin Types.

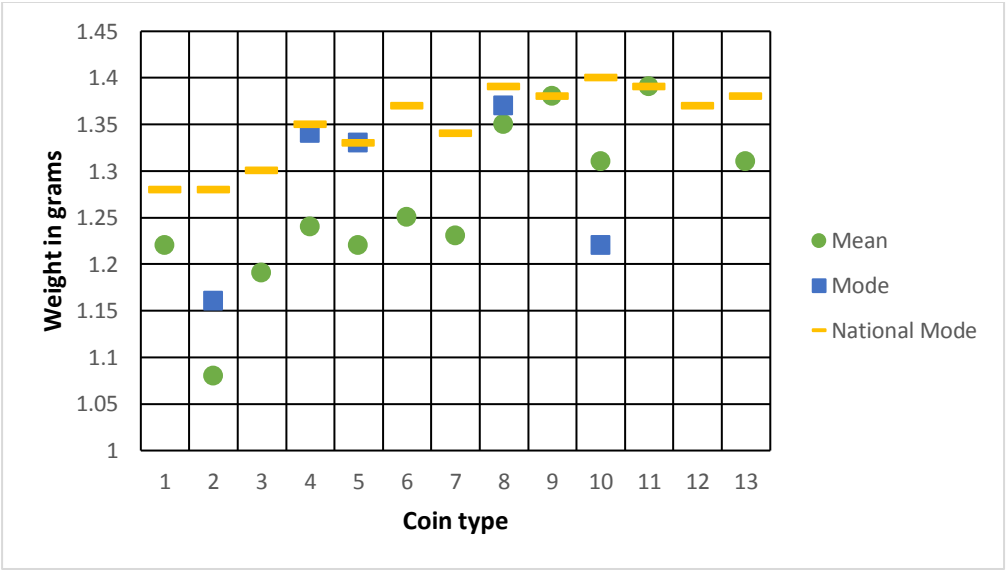


Figure 3.32: Average weights of coins of each Coin Type from the Thetford mint

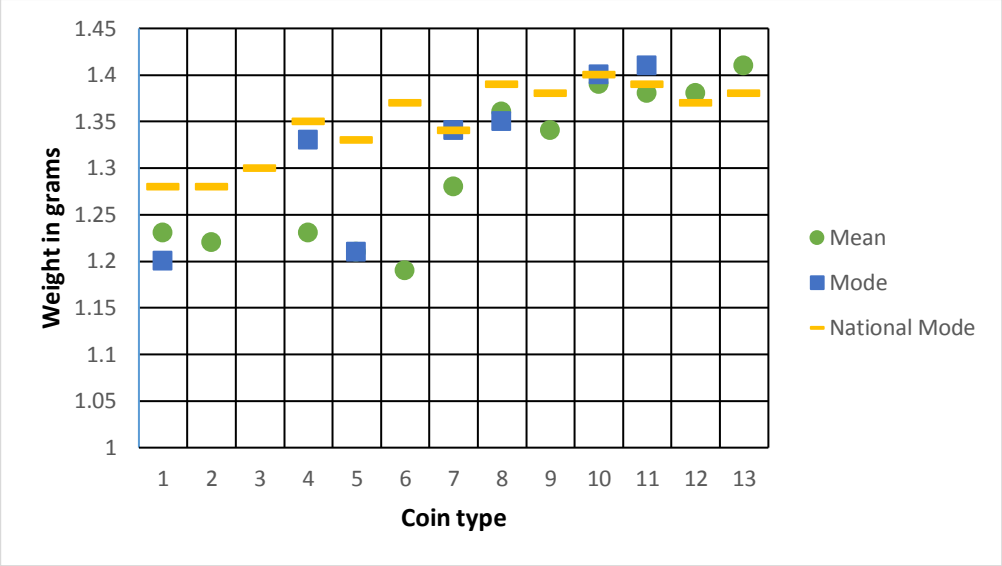


Figure 3.33: Average weights of coins of each Coin Type from the Norwich mint

The distribution histograms for each Coin Type do show some variation between the two mints, however, with the charts for Thetford being more dispersed, and occasionally suggesting more than one peak in the distribution, as in Coin Type 5 shown at figure 3.34. The charts for the Norwich mint give no indication of multiple peaks. However, it should be noted that the sample sizes for both mints are small.

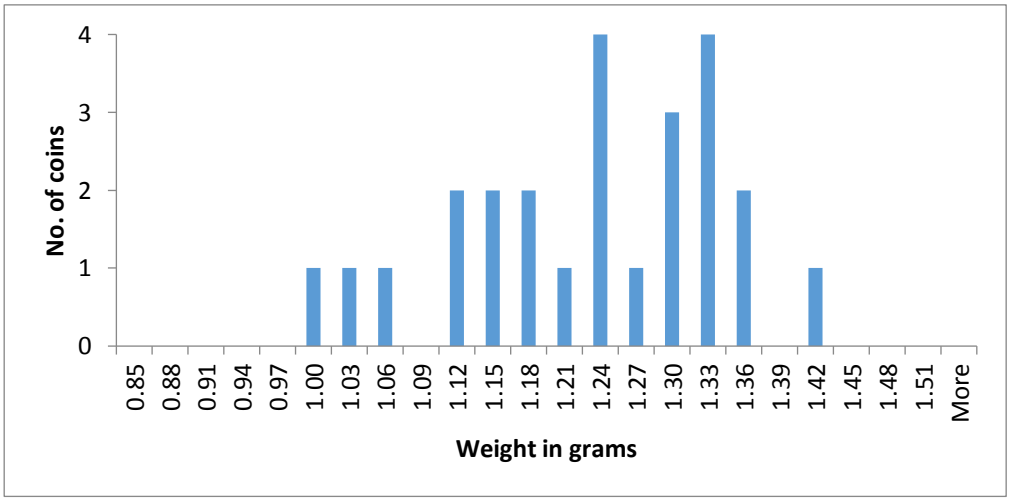


Figure 3.34: Weights of coins of Coin Type 5 from the Thetford mint

The standard deviation of each dataset suggests a fairly high level of variation in the weights of coins from both mints, particularly in the early part of the period. (The subset of weights of coins from Norwich in Coin Type 6 has an extremely high standard deviation, but it should be noted that this represents

only 3 extant coins, which clearly happen to be of very disparate weights, and thus push the standard deviation very high.) However, the trend is for lower deviation as the period progresses, suggesting increasing uniformity in the coin weights towards the end of William II's reign. Interestingly the progression of this decrease in standard deviation seems to follow a very similar course at the two mints, with the trend lines in the chart running almost parallel to each other, as shown at figure 3.35.

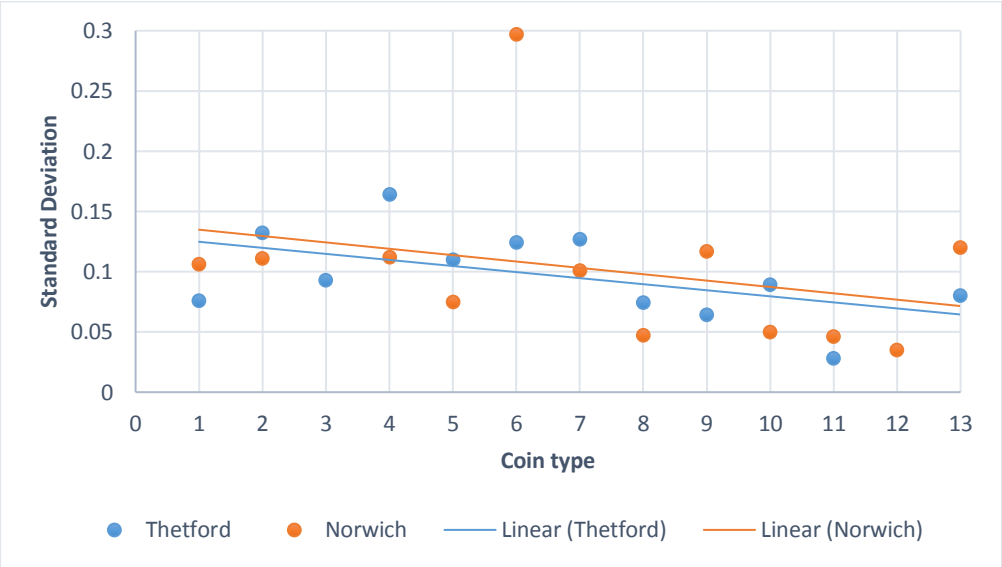


Figure 3.35: Standard deviation of weights of coins of the Thetford and Norwich mints

3.1.3.6 Weights of Coins of the Gloucester, Worcester, and Hereford Mints

The sample sizes of datasets for each Coin Type from the three West Country mints are generally very small so in many cases it is not possible to make any inferences. However, it is possible to postulate a general pattern which fits the available evidence.

For the Gloucester mint there are only sufficient surviving coins for comment in Coin Types 4, 8 and 11; for Worcester there are sufficient coins of Types 2, 8 and 10; for Hereford there are sufficient coins of Types 5, 8 and 10. For all three mints the average weights of Coin Types 8 and later are equal to, or slightly lower than, the national average for those types.

In the earlier types for which there are sufficient coins for comment, the pattern shows somewhat greater variation. At Worcester in Coin Type 2, the mean average is similar to the national average, but the mode is rather lower. At Gloucester in Coin Type 4 the modal average is similar to the national figure but the mean is considerably lower. At Hereford in Coin Type 5 both the mean and modal averages are lower than the national averages. The individual histograms for both Gloucester and Worcester give no indication of multiple peaks. The clearest example is the coins of Type 2 from the Worcester mint, shown as figure 3.36.

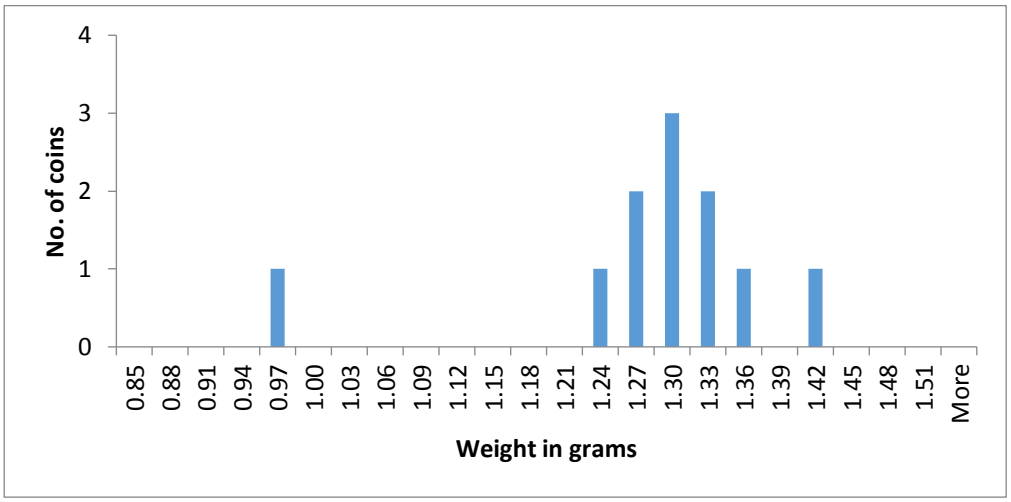


Figure 3.36: Weights of coins of Coin Type 2 from the Worcester mint

However, the histograms from the Hereford mint hint at a slightly different pattern. While the weight distributions for the later Coin Types (types 8 and 10) show a clear single peak, the distribution for Coin Type 5, shown at figure 3.37, has a suggestion of a secondary peak. The low sample size for this dataset means that this can only be a suggestion, however, and it is frustrating that there are insufficient coins of the other early Coin Types from Hereford to allow comparative distributions to be examined.

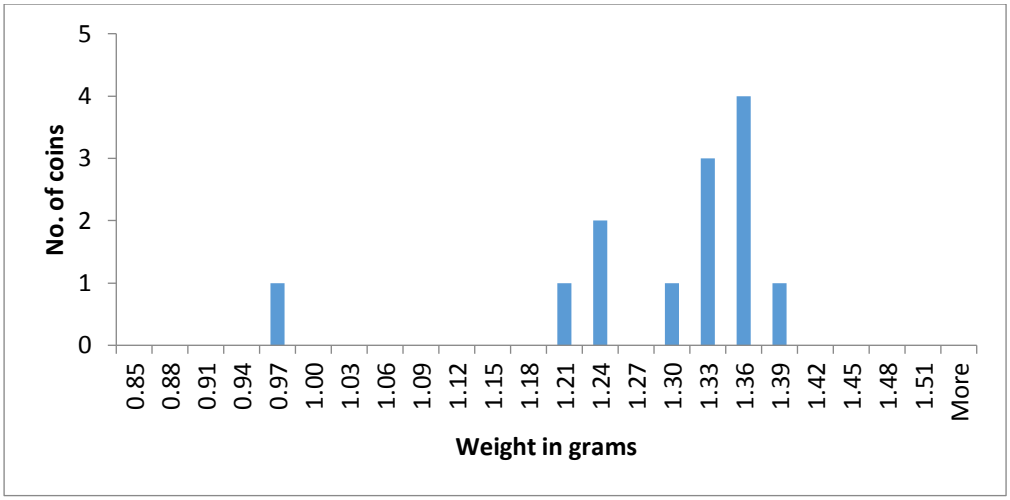


Figure 3.37: Weights of coins of Coin Type 5 from the Hereford mint

The incomplete nature of the data from these three mints does not allow for meaningful analysis of trends in the standard deviations, but it can be stated that the distribution of weights of the Coin Types of William Rufus seems to show a good level of uniformity, but where data are available for the Coin Types of William the Conqueror they seem to indicate slightly greater variation in the coin weights, especially at the Hereford mint. Overall, though, general indications tentatively suggest that the weight patterns of all three West Country mints were much more similar to those at Winchester than to the patterns show by, for example, the London mint.

3.1.3.7 Summary of Weights by Mint

Examination of patterns of coin weights shows different trends for different mints. Some mints demonstrate a high level of uniformity in the weight of their coins, the prime example being the Winchester mint. At Winchester there is low variation in coin weights from the start of the period, and the distribution patterns for individual Coin Types indicate that there was a single intended weight standard in use at the mint. The average weights of the coins are high, around or above the national average.

By contrast, some mints show a tendency for much greater variation in the weights of the coins struck there. The London mint is a good example of this.

In the Coin Types of William I, the range of weights of contemporary coins is great, and there is a suggestion that the mint may have been working to more than one intended weight standard. Average weights of coins from the mint are therefore somewhat lower than the national average. From Coin Type 8 onwards the mint generally seems to be working to a single intended coin weight but the high level of variation in weights can still be seen in some of the later Coin Types.

The picture from the Lincoln mint is less clear-cut but the overall pattern seems more similar to the workings of the London mint than to the uniformity of Winchester. The average weights of coins are rather erratic, but with a slight tendency to the heavier side.

While there are frustratingly few surviving coins of the mints of Gloucester, Worcester and Hereford, where it is possible to discern tendencies it seems that these West Country mints were working to similar weight patterns to the mint at Winchester. These mints are geographically close, and have something of a shared political history, so this may be a hint of a regional system in the coinage, although the suggestion is offered with caution due to the paucity of available evidence.

The indication of a regional picture of coin weights is much stronger for the mints of Thetford and Norwich. The average weights of coins from both these mints is consistently lower than the national average, and there seems to be a similarity of development of the weight profile of coins from the two mints. Both mints show some degree of variation within the weight distributions of individual Coin Types, although this is more pronounced at Thetford, where patterns are present to suggest multiple peaks along the London line, for which there is no evidence at the Norwich mint.

Examination of the weights of coins from the York mint is particularly interesting, hinting at a change of practice early in the period. The patterns suggested in the first two Coin Types seem to change for later types, although throughout the period there is a tendency towards high levels of variation within individual Coin Types.

Splitting the dataset of weights of complete coins into subsets for individual mints therefore reveals a complex situation, which clearly suggests that different practices were occurring in different parts of the kingdom. The patterns in the distribution of coin weights indicate variance between the mints, and there is some evidence for regional shared practice in some areas. The trend across the country is for greater uniformity as the period progresses, with evidence for the possible use of multiple intended weight standards becoming scarce in the reign of William Rufus. However, the earlier patterns of weight distribution can still occasionally be seen in this latter period, and variance between the mints still occurs in the later Coin Types.

3.2 Coin Diameters

In addition to weight, the surviving coins of the early Norman kings can also be measured by size. Specifically for this project, a 'diameter' for the coins was measured, that being here defined as the largest measurement taken from one side of the coin to the other. The other potential measurement of size would be the thickness of the coins but unfortunately it proved impossible to take a meaningful measurement for this variable using the equipment available for the project. The diameter alone, however, still gives a useful indication of the size of a coin, and patterns in this metric can be examined in a similar way to the examination of the weights of coins.

The analysis presented here follows the order of section 3.1 above. It begins with an overview of the diameters of all complete coins in the project

dataset. This group is then divided into subsets to allow consideration of temporal changes in the diameter data by examining each Coin Type separately. Geographical variation is then considered by investigation of the diameters of coins from different mints. A correlative examination is then undertaken to consider how the weight and diameter data relate to each other.

3.2.1 Diameters of the Full Dataset

When considering the diameters of the surviving coins measurements were taken from examples where at least half of the original coin was still extant. Chipped or incomplete coins were therefore included, as long as there was a sufficiently large fragment remaining to allow a diameter measurement to be taken. Cut halfpennies were also included, measured along the cut. However, cut farthings and other fragments too small to present a full diameter were excluded from this investigation.

The diameter of a coin is not a variable which has traditionally been published in coin catalogues. The Sylloge of Coins of the British Isles series, for instance, does not include this measurement, and neither does Brooke's British Museum Catalogue (Brooks 1916). Therefore, coins in the dataset which were not personally examined by the author only rarely have diameter data available and most are not included in this investigation. Additionally, where coin diameter data have been recorded, they are sometimes of a lower level of accuracy than the data measured for this project. The data subset of coins for which the diameter is known is therefore somewhat smaller than the subset of coins with weight data. In total 2786 coins have a diameter measurement accurate to 0.1mm. A further 587 coins have a recorded diameter accurate to 1mm but due to their lower level of accuracy these coins can only be used as confirmation (or otherwise) of the patterns presented by the coins with the more accurate measurement. The analyses

presented below are taken from the coins with the more accurate measurements only.

Examination of the diameters of all coins for which accurate measurements are available produces a distribution curve which is close to standard, as shown at figure 3.38. There is a clear, single peak in the distribution, with broad 'tails' to either side. This is reflected in the three averages, which are very consistent, with the mean at 19.5mm, the median at 19.4mm and the mode at 19.5mm. There is a slight skew to the histogram but unlike the histogram of coin weights (figure 3.1) the distribution of diameters has a positive skew, meaning that there are more coins with larger than average diameters than coins with smaller than average diameters. The Pearson's 2nd Coefficient of Skew is 0.48.

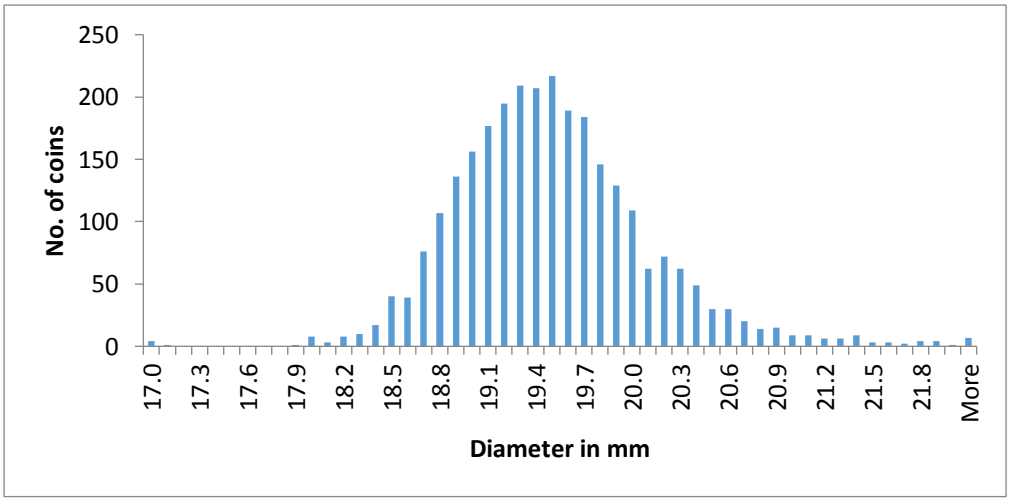


Figure 3.38: Diameters of all coins in the dataset for which accurate measurements are available

The distribution of diameters is broad, ranging from 17.0mm to 22.3mm, with a few outliers of smaller or larger sizes. The resulting standard deviation is high, at 0.623, indicating the high level of variation within this dataset. As with the weights of coins, it is likely that this overall distribution may hide variation over time, or across different parts of the country. It is therefore useful to consider the data in more detail by dividing them into temporal and geographic subsets.

3.2.2 Diameters by Coin Type

As with other subsets, there is a disparity in the number of surviving coins of each of the 13 Coin Types which have accurate diameter measurements. Table 3.3 indicates the relative sample sizes of each type. Coin Type 8 has a very large number of surviving coins, and Coin Types 2 and 5 are each represented by more than 300 coins. However, Coin Types 3, 7, 9, 12 and 13 are all represented by fewer than 100 coins. Inferences made based on data from these scarcer Coin Types are therefore presented with some caution.

Coin Type	Dates	Number of complete coins in the dataset
Type 1	1066-c.1068	163 coins (162 standard plus 1 mule)
Type 2	c.1068-early 1070s	338 coins (330 standard plus 8 mules)
Type 3	Early-mid 1070s	92 coins (91 standard plus 1 mule)
Type 4	Mid-late 1070s	175 coins (174 standard plus 1 mule)
Type 5	Late 1070s-early 1080s	335 coins (330 standard plus 5 mules)
Type 6	Early-mid 1080s	129 coins
Type 7	Mid 1080s-c.1087	69 coins
Type 8	c.1087-c.1090	988 coins (979 standard plus 8 mules)
Type 9	Early 1090s	93 coins
Type 10	Early-mid 1090s	167 coins (163 standard plus 4 mules)
Type 11	Mid 1090s	128 coins
Type 12	Mid-late 1090s	54 coins
Type 13	Late 1090s-1100	51 coins (50 standard plus 1 mule)

Table 3.3: Number of coins of each Coin Type with accurate diameter measurements in the dataset

When the diameters of coins of each type are plotted as histograms it is immediately striking that the distribution curves of most of the types are broadly similar. While there is some jaggedness to the curves, all of the early Coin Types have a distribution with a single main peak and fairly sturdy ‘tails’. The chart for Coin Type 2, presented as figure 3.39, is typical. The distribution of coin diameters does not show the marked variance from type to type that was a feature of the distribution of coin weights.

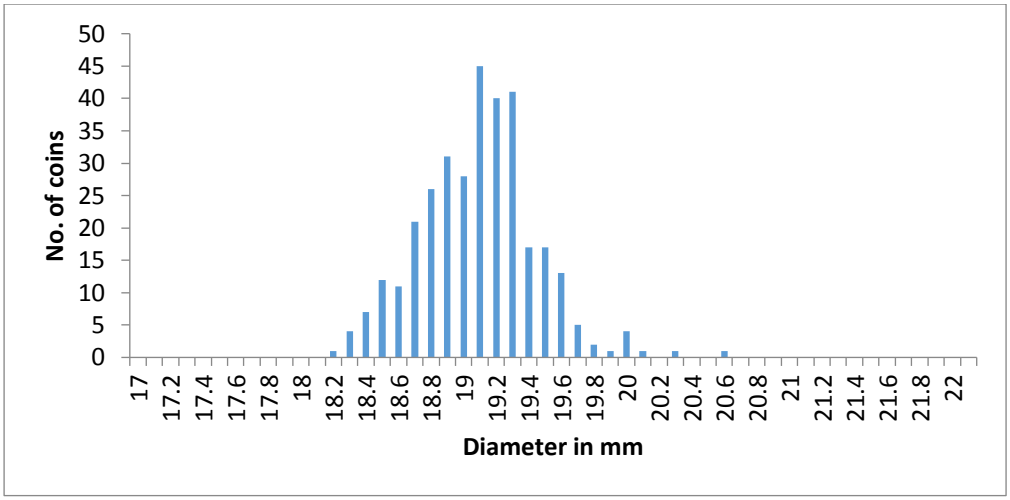


Figure 3.39: Diameters of coins of Type 2 with accurate measurements

Additionally, there are no histograms with clear indication of multiple peaks. Some charts contain anomalies, such as the spike at 18.8mm in the distribution curve for Coin Type 5, shown in figure 3.40. However, there are no charts with the 'wave' pattern of multiple peaks as seen occasionally in the coin weight distributions, such as that for Coin Type 6 (see figure 3.7 above).

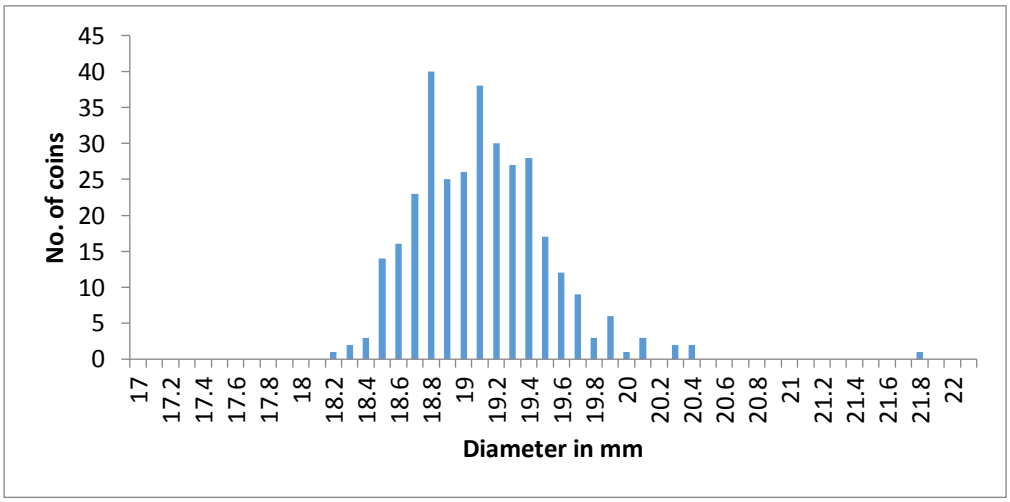


Figure 3.40: Diameters of coins of Type 5 with accurate measurements

A change occurs in the distribution curves for Coin Types 11 and 12, the former of which is shown as figure 3.41. The distribution is much broader and more ragged than for the preceding Coin Types, with a much greater spread and no clear peak to the curve. This high level of variation is present again in Coin Type 12. The histogram for Coin Type 13, however, is much more similar

to the distributions of the earlier types, as shown at figure 3.42. The sample size is very small but the pattern is neater and tighter with a curve much closer to a standard distribution.

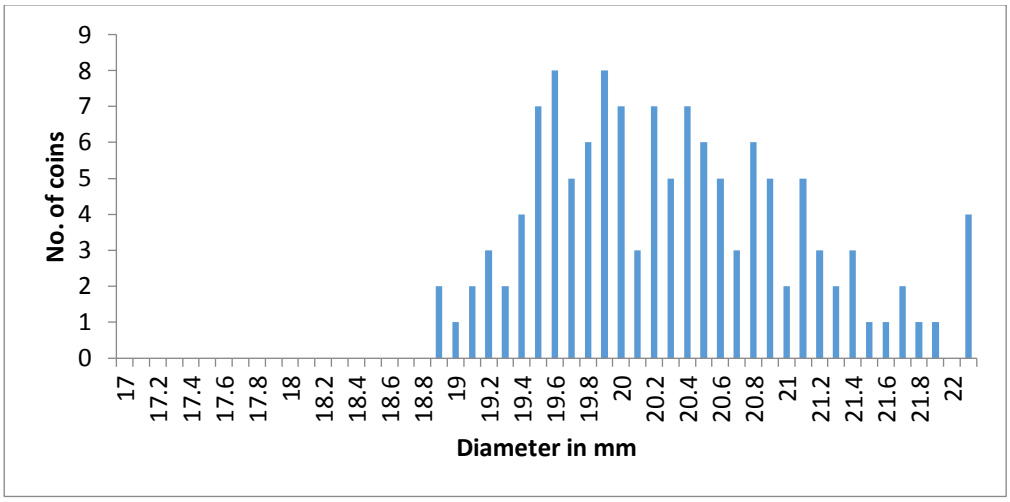


Figure 3.41: Diameters of coins of Type 11 with accurate measurements

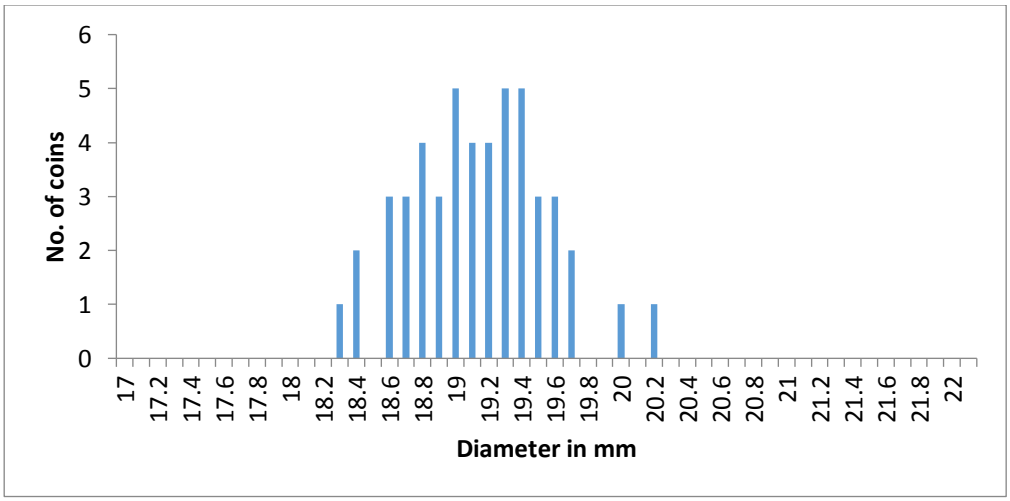


Figure 3.42: Diameters of coins of Type 13 with accurate measurements

The level of variance within the Coin Types can also be investigated through the standard deviation of the subsets of data. A chart of these details is shown at figure 3.43. The trend over the period seems to be for fairly static levels of variation within each dataset but there are anomalies at Coin Types 3, 11, and 12, which each have much higher levels of variation than the norm. This shows up clearly in the histograms for the later Coin Types, although the distribution of Coin Type 3 looks very similar to the other histograms. For all Coin Types, however, it is notable that the standard deviation of coin

diameters is much higher than that seen within the coin weights. The most variable subset of coin weights has a standard deviation of just 0.129, and the subset with least variation has a tiny standard deviation of 0.050. By contrast the most uniform subset of coin diameters has a standard deviation of 0.362 and the subset with greatest variety is up at 0.780.

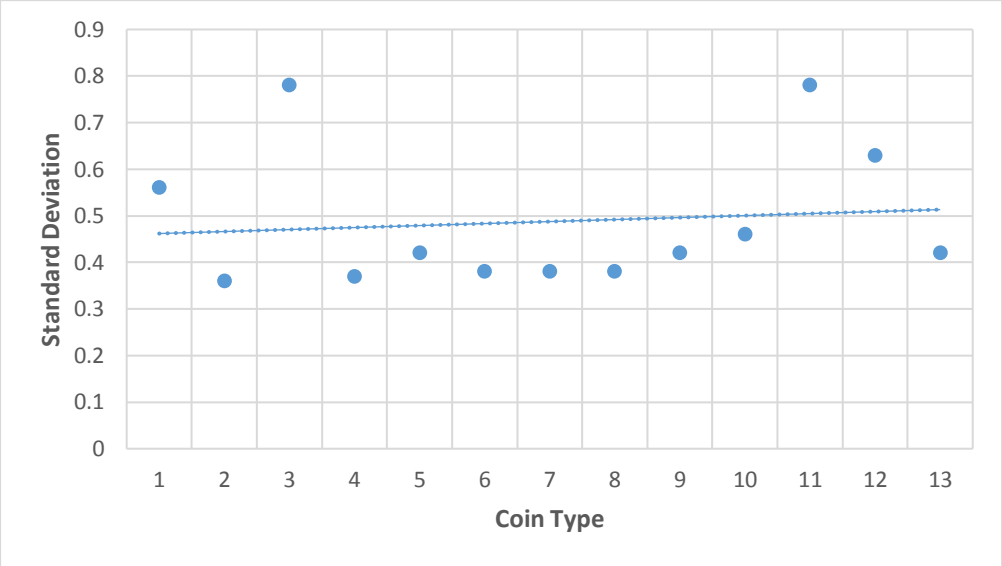


Figure 3.43: Standard deviation of diameters by Coin Type

The average diameters of the individual Coin Types present an interesting pattern of the most common size of coins across the period, as shown in figure 3.44. For the first seven Coin Types the average size is about the same, between about 19.0mm and 19.5mm. However, from Coin Type 8 onwards the average diameter increases with each Coin Type, up to Coin Type 10, for which the average is 20.2mm. Coin Type 11 has a high disparity between the three different averages, with a mean of 20.3mm, a median of 20.2mm and a dual mode of 19.6mm and 19.9mm. This reflects the unusual distribution of this type, as shown at figure 3.41 above. The coins of the subsequent type are very large indeed, with the average diameters ranging from a mode of 20.7mm to a mean of 21.1mm. However, Coin Type 13 then bucks the trend spectacularly with the average diameter of coins of that type plunging right back down to the level of the coins of William I, at 19.1mm.

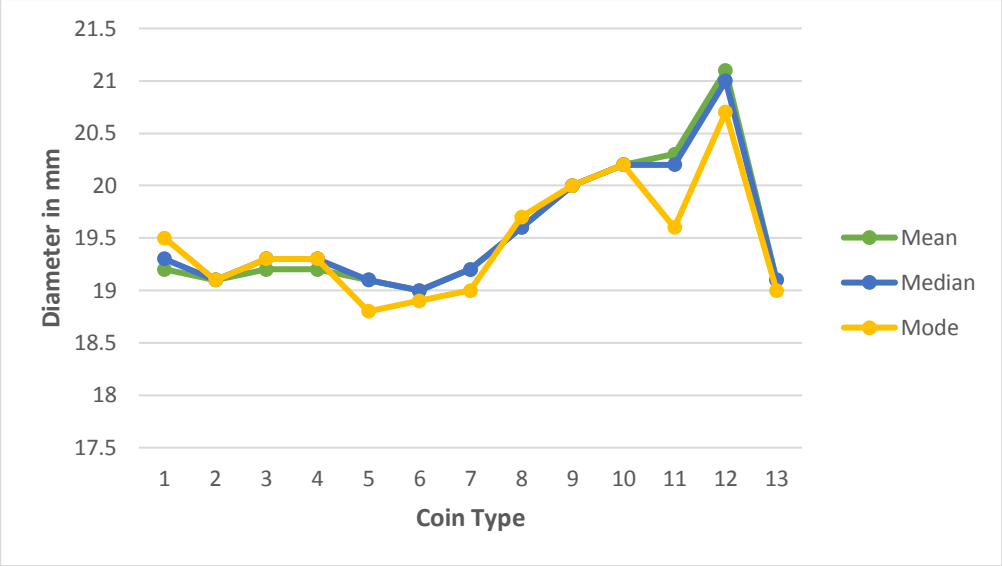


Figure 3.44: Average diameters of coins of each Type

It can therefore be seen that the pattern of the diameters of the coins of William I and II shows some marked differences to the pattern of weights of the coins. Where the coin weights start to increase from about Coin Type 4 onwards, the diameters of the coins remain fairly static until Coin Type 8. From then onwards they rise with each Coin Type, up to Coin Type 12, but Coin Type 13 has much smaller diameters than the previous coins. This is not reflected in the coin weights, with the weight of coins of Type 13 broadly similar to those of the preceding Coin Types. Additionally, the subsets of coin diameters consistently show much lower levels of uniformity than the similar subsets of coin weights, but the distribution curves are mostly close to a standard distribution, with a single peak and sturdy 'tails' of both under- and over-sized coins. There is no indication of multiple peaks in the distributions. Comparison of the Coin Type subsets against each other also indicates that the coin diameters do not show the variation of distribution pattern from type to type that is seen in the coin weights.

3.2.3 Diameters by Mint

Splitting the dataset of coin diameters into coins from individual mints allows investigation of whether there are geographical differences in the sizes of the

coins. Histograms of the coin diameters from individual mints from across the period show little variation in the shape of their distribution. They are mostly very similar to the chart for the whole kingdom, showing a distribution curve with a single peak and long, sturdy tails of both under- and over-sized coins. The position of the peak varies, depending on whether the mint is represented more highly in the earlier coins of the period, which generally have smaller sizes, or in the latter part of the period, whose coins are generally larger. The mint of York, shown at figure 3.45, is an example of the former, and can be compared to the Winchester mint, shown at figure 3.46, which is of the latter type.

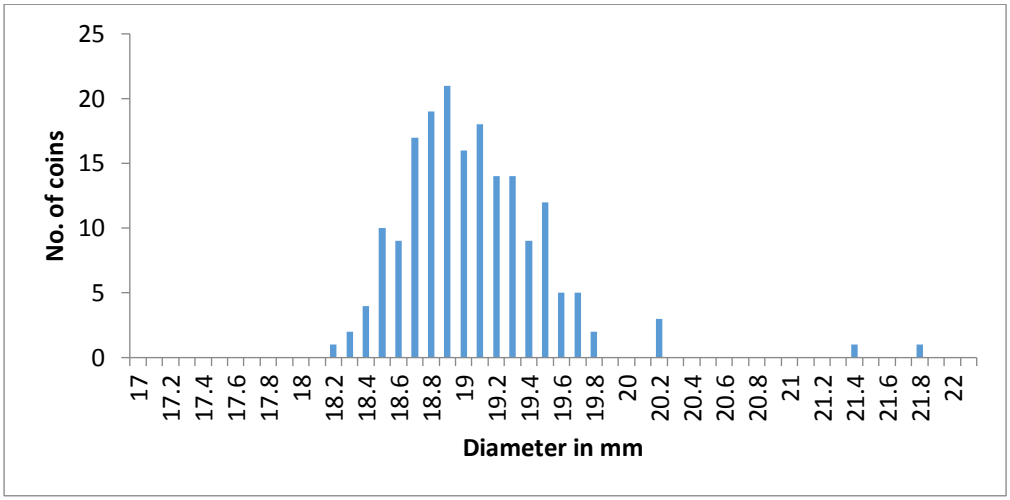


Figure 3.45: Diameters of coins of the York mint

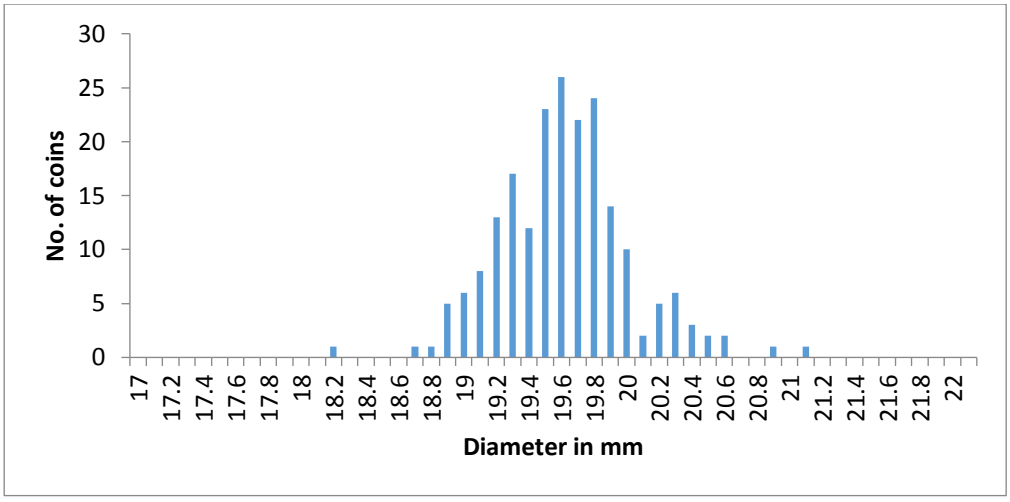


Figure 3.46: Diameters of coins of the Winchester mint

The standard deviation figures for coin diameters from each mint are also fairly similar, as shown in figure 3.47. Most mints have a figure between 0.45 and 0.60, which is rather lower than the standard deviation for the kingdom as a whole, which stands at 0.623. There are a few exceptions: Winchester shows lower variation than most mints, with a standard deviation of 0.402, while both London and Worcester show higher variation of coin diameter, with standard deviation figures of 0.701 and 0.700 respectively. In all cases, however, the variation shown within the coin diameters is much higher than within the coin weights.

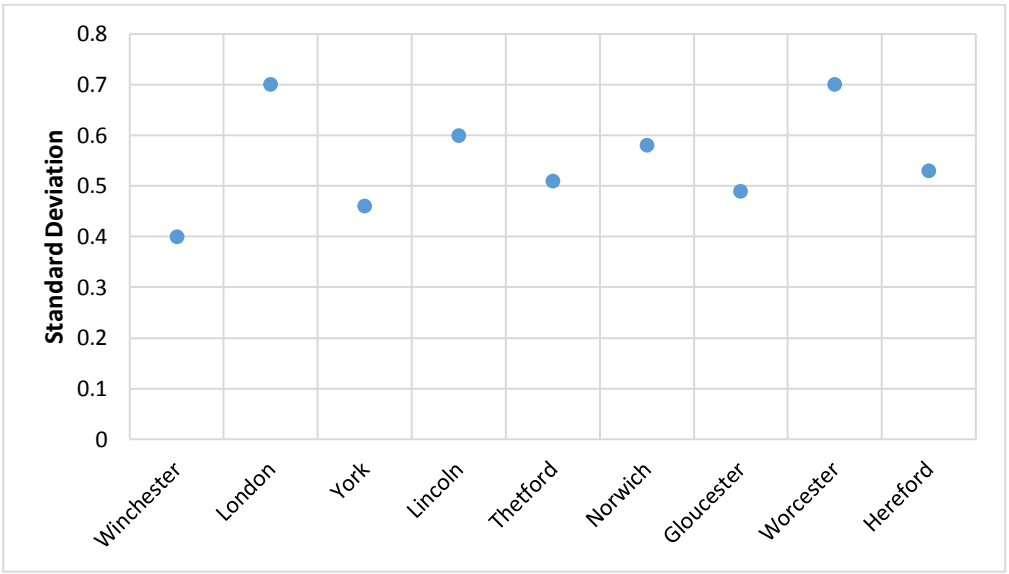


Figure 3.47: Standard deviation of coin diameters from case study mints

Unfortunately, due to the smaller number of coins for which accurate diameters are known, when the sets are divided further, into coins of individual Coin Types from particular mints, the sample sizes become very small indeed. In fact, for a number of the Coin Types, especially those in the latter part of the period, many mints are only represented by one or two coins, and thus statistical analysis is not possible. Appendix 1 includes a summary of these figures.

What analysis is possible reveals little variation between the different mints. The average diameters of coins of each type are very similar for each of the individual mints, although some patterns can cautiously be postulated. There seems to be a tendency for coins of the Winchester mint to be slightly larger than the national average, while coins of the York mint tend to be slightly smaller. This may seem to follow the pattern of the weights of coins of these mints, where Winchester coins are generally on the heavier side and York coins, from Coin Type 4 onwards, are on the lighter side. However, this is belied by the coins of Type 2 from the York mint which are heavier than the national average while their diameters are somewhat smaller. Similarly, the average diameters of coins from the Norwich mint are higher than the national average, while the diameters of Lincoln coins are lower. The pattern of weights for these mints is the opposite of this, with Norwich coins being generally of a lighter weight and Lincoln coins tending to the heavier side. This broad overview therefore seems to suggest little correlation between the weights of the coins and their diameters, and it is useful to investigate this more closely.

3.2.4 Correlative Analysis of Weights and Diameters

Examination of the diameters of the surviving coins seems to indicate patterns in the distribution of this metric which are different to the patterns in the distribution of the coin weights. This appears counterintuitive, as one might expect the size and weight of a coin to be related to each other.

Regression analysis can be used to establish whether there is, in fact, any statistical relationship between these two variables and, if so, what the nature of that relationship is. It was therefore necessary to create a subset of coins from the project dataset for which accurate measurements of both weight and diameter were known. This subset contains 2573 coins.

A scatter graph plotting the diameter of each of these individual coins against their weight (figure 3.48) shows startling variation, with a cloud of data-points spreading widely along both the weight and diameter axes. The trend line is positive, indicating that a higher weight does tend to also indicate a larger diameter but the cloud spreads far from the trend line, which suggests that many coins do not closely follow this relationship.

The overall deviation from a postulated relationship between weight and diameter can be quantified by calculating the R2 value of the trend line. This is a figure which gives an indication of how much correlation there is between the two variables being measured. An R2 value of 0 would indicate no correlation at all – that the diameter of any particular coin was completely unrelated to its weight. Conversely, an R2 value of 1 would indicate complete correlation – that the diameter of a coin could be calculated precisely from its weight. The plot at figure 3.48 has an R2 value of 0.08, which suggests that there is very little correlation between the weight of a coin and its diameter.

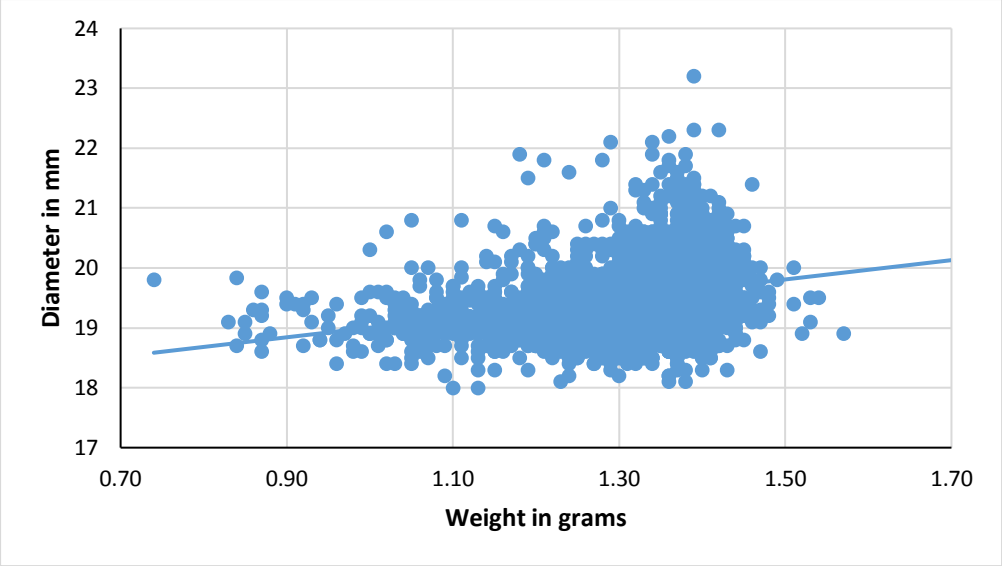


Figure 3.48: Weight plotted against diameter for all measured coins

When the dataset is divided into the individual Coin Types the results are all similar to the overall result. They are summarised in table 3.4. Many of the Coin Types show no correlation at all between the weight and diameter of individual coins, these plots having an R2 value of 0.00. Some Coin Types have R2 value of 0.01 or 0.02, and Coin Type 7 has the highest correlation, with an R2 value of 0.08. In other words, there seems to be no change over time in the level of relationship between the weight of a coin and its diameter; throughout the period the link between the two is virtually non-existent. This is shown particularly clearly in the scatter graph for Coin Type 8, which is the type for which we have the most surviving examples, and for which the variation in the weight of the coins is the lowest. The chart is shown as figure 3.49, and clearly shows the weights of the coins (on the horizontal axis) closely clumped together. Conversely, the diameters of the coins spread broadly along the vertical axis, giving a tall, oval-shaped cloud of data-points.

Coin Type	Dates	R2 Value	Sample size
Type 1	1066-c.1068	0.02	142
Type 2	c.1068-early 1070s	0.01	284
Type 3	Early-mid 1070s	0.01	78
Type 4	Mid-late 1070s	0.00	161
Type 5	Late 1070s-early 1080s	0.02	300
Type 6	Early-mid 1080s	0.00	121
Type 7	Mid 1080s-c.1087	0.08	55
Type 8	c.1087-c.1090	0.01	946
Type 9	Early 1090s	0.00	87
Type 10	Early-mid 1090s	0.00	157
Type 11	Mid 1090s	0.00	118
Type 12	Mid-late 1090s	0.02	49
Type 13	Late 1090s-1100	0.02	43

Table 3.4: Correlation between coin weight and diameter for the different Coin Types

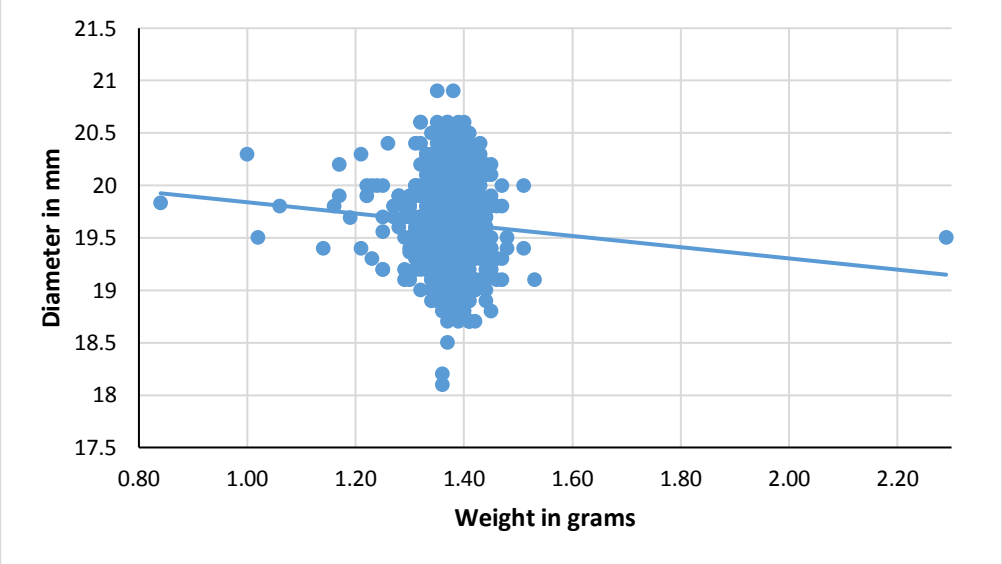


Figure 3.49: Weight plotted against diameter for all measured coins of Type 8

In most Coin Types the trend is positive, indicating that generally coins of a higher weight are likely to have a larger diameter. However, in some types, including Coin Type 8, the trend is negative, suggesting that overall a coin with a higher weight is actually more likely to have a smaller diameter. However, in all cases the R2 value is so low that these likelihoods are minimal.

Splitting the dataset into the coins of individual mints allows investigation of whether different areas of the country show a stronger relationship between coin weight and coin diameter than others. It is useful to consider the overall subsets of coins from the distinct mints. In this instance it would likely be less meaningful to split the sets further, into the coins of particular types from the separate mints, as the temporal split of the full dataset indicated little difference between different Coin Types. Additionally, the sample sizes for these subsets would be extremely small.

The plots of coin weight against diameter from the individual mints do suggest differences between them. The data are summarised as table 3.5. Some mints, such as Winchester, York, and Lincoln, show virtually no relationship between the two variables. Other mints have a stronger relationship, in many cases notably higher than the national figure. The strongest relationship is suggested at Norwich, with an R2 value of 0.29, and the value is also somewhat higher than the national figure at Thetford, Gloucester, Worcester, and Hereford. Even the highest value, however, still indicates a weak correlation between the two metrics.

Mint	R2 Value	Sample size
London	0.11	311
Winchester	0.01	186
York	0.09	163
Lincoln	0.01	173
Thetford	0.13	126
Norwich	0.29	79
Gloucester	0.14	52
Worcester	0.18	44
Hereford	0.17	52

Table 3.5: Correlation between coin weight and diameter for individual mints

3.3 Synthetic Analysis of Coin Weights and Diameters

Examination of the weights and diameters of the surviving coins of William I and II in the dataset indicates patterns of similarity and variation. The trends in the data of the two different attributes often differ from each other, and

are occasionally at odds. A synthetic overview of the information provided by these metrical analyses therefore has some interesting implications.

Analysis of the coin weights provides a picture of great variation, both across the kingdom and between different Coin Types. This is most pronounced in the early part of the period, specifically in the coinages of William the Conqueror (Coin Types 1 to 7). The average weight of coins varies from Type to Type in this early period, and within the individual Types some show greater variation than others. The weights of pennies of Coin Type 2, for instance, are particularly erratic. The histograms of weight distribution sometimes have hints of multiple peaks, which may suggest more than one intended weight standard in use. Investigating this further by examination of the weights of coins from individual mints can shed light on this suggestion. In Coin Type 6, for instance, the histogram suggests potential weight standards at around 1.38g, 1.26g, and possibly 1.14g. Examination of the coins from the Winchester mint in this type shows a clear single standard in use at that mint, with a mean average of 1.37g and a mode of 1.38g. This correlates with the heaviest of the peaks in the overall histogram. Similarly, a number of the other mints have average weights which correspond to the middle peak on the histogram: coins of the London mint have a mean average of 1.25g and a modal average of 1.24g, while coins of this type from York weigh in at around 1.23g. It seems clear, therefore, that different mints were working to different intended coin weights in some of these early types.

Examination of the coin weight data could also hint that in some areas more than one intended standard was in use concurrently within an individual mint, as Metcalf (1998) postulated. Metcalf's histograms suggest multiple weight standards in use at particular mints in the East of the kingdom in the late 10th and early 11th century, and he indicates that this continued into the early Norman period, interpreting the data for coins of Type 1 from the York mint in this way (ibid., 178-179). However, the multiple peaks in the

histograms here presented are not as clearly defined as those given in the earlier work. Metcalf's dataset for the early Norman coins was notably smaller than that used for this project, which may explain the greater definition seen in his charts. Examining the results of this project's analyses in isolation, the evidence for multiple intended weight standards is by no means conclusive; other interpretations of the results are equally valid. The histograms for the weights of coins of William I and II may simply indicate less close adherence to a standard weight at some mints than others. Whatever the specific interpretation, these patterns of greater variety are most notable at London, York, Thetford, and Lincoln. There is little evidence for this sort of diversity at Winchester, Gloucester, or Worcester. This may hint at a variation of practice between the mints of the South and West and the mints of the North and East, which roughly correlates to the areas of the kingdom which in the previous century were under the influence of the West Saxons, as opposed to those under Danish influence.

By contrast, the distribution of the diameters of the coins shows little variation from type to type or from mint to mint. The distribution curves are all reminiscent of a standard distribution, with a single peak and long, sturdy tails of under- and over-sized coins. However, the standard deviation from the average diameters is very much higher than the standard deviations of coin weights, indicating that there is much less uniformity in this attribute. This could suggest that while there may have been a loosely intended standard diameter for the coins, there was little attempt to closely monitor or control it. Unlike the coin weights, there is no indication of multiple intended coin diameter standards being in use at any time.

Both the weights and diameters of the coins show a tendency to increase over the period in question. However, the pattern of these increases differs between the two attributes. The overall average weight of coins of the first Coin Types of William I closely parallels the weight of Harold's coinage, but

from Coin Type 3 onwards the general weight of coins starts to rise. The progress of this increase varies between mints. In Coin Type 5, for instance, coins of the Winchester and Lincoln mints weigh around 1.36g, but coins of London and York are at a similar weight to those at the start of the period, having averages around 1.27g. The coins of the East Anglian mints of Thetford and Norwich are lighter still, with weights around 1.21g-1.23g. The overall average weight of coins eventually rises to around 1.38g, and most mints adopt this standard at the start of William II's reign. However, the Winchester mint seems to start working to this higher weight from Coin Type 6.

The pattern of increasing coin diameters seems to be in almost complete contrast to the pattern in the increase of weight. While the weights of coins rise steadily during the reign of William I and remain fairly constant in the reign of William II, the diameters are steady in the earlier reign and then increase across the latter period. The diameters of the coins reach their height in Coin Type 12, but then drop dramatically in Coin Type 13, wherein the average size is similar to those observed in the first seven Coin Types. These contrasting patterns of change are an indication that the weights and diameters of the coins have little relationship to each other, and this is confirmed by regression analysis of the two variables. Throughout the period the correlation between the attributes is very low indeed and an individual coin's weight seems to bear little relation to its diameter. This therefore indicates that an additional variable (or variables) which has not been measured must be affecting these metrics. It could be postulated, for instance, that the thickness of the coins is varying to a high degree and thus affecting the relationship between weight and diameter. It is unfortunate that for the current project it was not possible to devise a way of gathering a meaningful measure of the thickness of an individual coin. An alternative suggestion could be that the metallurgy of the coins varies between individual examples, such that different alloys are producing coins of

different sizes from the same weight of metal. Measurement of the composition of the coins was beyond the scope of the current investigation but future examination of this attribute could shed light on this fascinating possibility.

Within the variation of coin metrics from mint to mint, there is a hint of regionality. In addition to the possible variant practice of weight standards between West and East, there are suggestions of regional weight profiles. Coins of the Thetford and Norwich mints are consistently lighter than the national average, and changes in their average weights and the uniformity of their coins seem to run parallel at the two mints. Likewise, where data are available, the weight tendencies of the West Country mints seem to be similar to each other.

There are indications that some mints were producing coins of slightly larger or smaller diameters too, although the variation is very small and there does not seem to be a regional pattern to this fluctuation. However, when the correlation between weights and diameters is considered a trend seems to emerge which suggests that the relationship between these two attributes is stronger in the smaller case study mints (Thetford, Norwich, Gloucester, Worcester, and Hereford) than in the larger mints. There is no clear difference between East Anglia and the West Country, but there does seem to be a difference between these mints and the four larger mints of London, Winchester, York and Lincoln.

Metrical examination of the coins indicates a clear change in Coin Type 8, the first coinage of William II. The coin diameters start to increase from this type onwards, but the weights become less variable. There is no evidence for any mint working to multiple intended weight standards in this type, and all mints seem to be producing coins to a very similar weight, around 1.38g. This has long been recognised in the numismatic literature (see section 1.3.1 above)

and is postulated by both Metcalf (1998, 187) and Nightingale (2008, 180) as the introduction of a kingdom-wide uniform weight standard for the English penny, with associated standardisation of coin production from then onwards. Analysis of the surviving coins does provide some evidence to support this idea. The standard deviation within subsets of coin weights for these later Coin Types is generally lower than for the early types, and the pattern of standard deviation at individual mints mostly shows a tendency to decreasing values, and thus increasing uniformity of weights, as the period progresses. The variation in coin weights between mints is certainly much less pronounced in the coins of William II. However, analysis of individual mints suggests that the picture is more complicated than this, with the earlier patterns of variation occasionally re-emerging after Coin Type 8. Some of the individual histograms even show hints of the recurrence of multiple weight standards in concurrent use at particular mints in this later period, for instance at the London mint in Coin Type 10 (see figure 3.20). It appears that the use of the postulated uniform, higher weight standard was by no means uniformly practiced through the reign of William II, and that the generally-held notion that the weight of the penny was standardised across the kingdom from Coin Type 8 onwards (e.g. Stewart 1992, 58; Allen 2012a, 138) may need revisiting.

There are a number of possible reasons for the increasing weights of the coins, their varying diameters, and the fluctuating levels of uniformity of the coin weights at different points during the reigns of the first two Norman kings. They could all be influenced by a number of external factors, and interpretation of these findings requires the consideration of additional data. The next chapter examines the coin dies used to strike the coins and considers details of the mints and the moneyers which are revealed by the coins. The socio-economic implications of all these analyses are then explored in chapter 5.

Chapter 4: Analysis of Mints, Moneyers, and Coin Dies

The preceding chapter examined the surviving coins of William I and II by investigation of their tangible properties. It looked at the aspects which can be measured, namely the weight and diameter of the coins. Scrutiny of these metrical data allows statistical analysis of what the coins were like in concrete terms, and thus provides a picture of the English coinage of the late 11th century in its physicality. It also, however, provides clues to wider issues, touching on the economic, political, and social history of the period. Interpretation of the coin data in these terms requires consideration of additional aspects of the coins and the information they can reveal, and this is addressed in the current chapter. Inferences drawn from all these analyses are considered and interpreted in Chapter 5 below, and their implications for the development of the public representation of the period are expounded in Chapter 6.

In addition to their physical properties the coins hold information in a variety of other forms. One of these is the inscriptions on the coins. Coins of the 11th century were struck at a number of mints in towns across the kingdom, and each mint employed one or more moneyers to oversee the production of the coins. The legend on the reverse of each coin names the mint town in which it was made and the moneyer responsible for its production. These inscriptions therefore provide lists of both towns with the authority to make and exchange coins, and individual people involved in the minting process. This set of data can be analysed numerically to establish, for instance, the size of the moneying contingency at individual mints, or the length of tenure of particular moneyers. It can also be examined more qualitatively to suggest links between mints, and movement of moneyers around the kingdom.

A further type of information which can be revealed by the coins is indirect data about the coining dies used to strike them. This can be examined in two ways. Firstly, the die axis of the coins indicates how the two coin dies were lined up in relation to each other when striking the coin. This can reveal details about the shape of the coin dies in use at the different mints. Further, close examination of a coin in comparison to other coins of the same type can identify the individual dies used in its striking. This allows recognition of the use of unusual dies, including the rough, potentially unofficial dies noted in the numismatic literature (e.g. Brooke 1916; Elmore Jones 1955; Metcalf 1998; Allen 2012a). Classification of the coin dies also makes it possible to see where separate coins were struck using one or both of the same dies. Tracking these 'die-linked' coins can reveal details of associations between moneyers and mint towns, and of the working practices of individual mints.

This chapter begins with an examination of the names of moneyers and mints, as recorded in the inscriptions on the reverse of the coins. The die axes of the coins are then investigated, followed by an analysis of part of the dataset to identify the dies used to strike these coins. The chapter concludes with an overview of the data derived from these analyses.

4.1 Moneyers and Mints in Coin Inscriptions

Examination and correlation of the names of mints and moneyers on coins of the 11th century can provide a great deal of information. Freeman used these data to list 50 different mints working in the last Coin Type of Edward the Confessor (Freeman 1985, 530). Pagan recorded 48 mints producing coins for Harold II, and noted 146 different moneyer names on the coins (Pagan 1990). Freeman's analysis of the inscriptions on the coins of Edward the Confessor highlights that the length of tenure of individual moneyers in that reign could vary greatly, from a single Coin Type to instances where the same moneyer name appears on coins of a particular mint for over 40 years. He

also follows Nightingale's suggestion by offering evidence that moneyers in this period could have concurrent responsibility at more than one mint, and that they sometimes moved between mints (Nightingale 1982, 42-43; Freeman 1985, 46-53). The current project uses similar methods to examine the mints and moneyers named on the coins of William I and II, and investigate whether this situation continued under the new Norman kings.

4.1.1 Active Mints

In total 69 different towns are known to have minted coins in the period 1066-1100 (Allen 2012c). All of these are represented in the project database. While most attributions of mint towns to the signatures recorded in the inscriptions are widely accepted, the corpus does include some mint attributions which are not completely certain, such as Abergavenny for the mint signature FANI (Boon 1986, 67). In these instances, the most widely accepted current attribution has been used. Additionally, there are a number of coins of Type 2 with the mint signature MAINT, which is at present unidentified.

While some coins of William I or II can be attributed to each of the 69 mint towns, it is clear that not all of those towns were producing coins for the whole of the two reigns. Some mints cease production during the period, while some towns start minting coins for the first time. Additionally, the corpora of surviving coins from many of the mints have gaps where no coins are currently known of a particular Coin Type, or Types. In many cases it is likely that these gaps are caused by the vagaries of survival of coins to the present day, and it is possible that the mints were actually producing coins of those Types but none have yet been found. It is sometimes possible to postulate this situation where coins are known from that mint in preceding and succeeding Types, but this is always presented with a degree of caution.

A good example of this can be seen when the coins of William the Conqueror's first Type are examined. In total 54 towns are known to have minted coins of either the last Type of Edward the Confessor, or the single Type of Harold II. At present, only 39 towns are known to have minted the first Type of William I. This could suggest that there were 15% fewer mints making William's first coins than had been striking in the period at the end of 1065 and early in 1066. However, of the 15 towns not currently known for William's first Coin Type, nine (Cricklade, Lewes, Northampton, Rochester, Shaftesbury, Shrewsbury, Southwark, Steyning, and Tamworth) are known to have minted William's Coin Type 2, a further two (Dorchester and Maldon) are known in Coin Type 3, and another three (Bridport, Guildford, and Winchcombe) are known in Coin Type 4. In fact, therefore, with our present knowledge, Droitwich is the only town which was minting in Edward's reign and which can be said to have not minted coins in the early part of William I's reign.

Given these figures, it is tempting to postulate that the towns which were minting under Edward and Harold, but which are not currently known in William's first Type, were actually striking coins, but no surviving examples have yet been found. This is especially credible for the nine towns which are known in William's Coin Type 2, all of which are mints with relatively small outputs. Mints with smaller outputs are, of course, statistically less likely to be represented in the surviving coin sample. This may indeed be the case, but a degree of caution must be exercised when considering it. It is also possible that these smaller mints were genuinely inactive in the first couple of years after the change of ruling regime.

What can be inferred with more certainty are the instances where old mints cease striking altogether, or where new mints start for the first time. In the first circumstance we can see that the mint of Bedwyn, which was known in earlier reigns and which did strike coins of William's first Type, does not

appear on the extant coinage after that date. Similarly, the mints of Bridport and Winchcombe are not known after Coin Type 8. Towards the end of William Rufus' reign six more mints seem to cease operation, namely Cricklade, Hertford and Malmesbury, which are not known after Coin Type 11, and Guildford, Maldon and Steyning, which do not appear on currently known coins of the reign of Henry I or later.

By contrast a number of new mints began operation during the course of the later 11th century. A mint at Marlborough is known on coins from Type 3, and mint signatures for both Launceston and Pevensey appear from Coin Type 5. Coins attributed to Christchurch are known in Coin Type 7. Minting seems to start in a number of places in Coin Type 8, specifically Abergavenny, Durham, Rhuddlan, and St David's. Cardiff is also striking coins in this type, although there is a disputed example of a coin of Type 6 whose mint signature may also be Cardiff (Allen 2012a, 23). Towards the end of William Rufus' reign minting starts at Totnes, which had struck coins earlier in the century but does not seem to have been active since the reign of Cnut. Some of these new mints continue to operate for some time. Durham, for instance, becomes an important mint with a key role in the administration of the north of the kingdom (Allen, 2003). Others, however, are only currently known to have been working for a short time. Thus Christchurch, Abergavenny and St David's only have surviving coins of a single Coin Type. It can therefore be seen that while the main bulk of mint places remained active throughout the reigns of the first two Norman kings, the list of smaller mints in active production may have varied across the period.

4.1.2 Moneyer Contingents

Investigation of the lists of moneyers currently known at individual mints is fascinating and revealing, but also frustrating, as it is clear that the lists are probably incomplete. The relatively small number of coins which have survived from the 11th century means that the maxim that 'absence of

evidence does not equate to evidence of absence' must always be used when considering these coins. This applies to the mints, as noted above, and is even more pertinent when considering individual moneyers. The fact that we currently don't know any coins of a particular moneyer at a particular mint in a particular Coin Type does not necessarily mean that the moneyer was inactive in that Type; it may just be that none of his coin have yet been found. Lists of active moneyers may also be misleading due to the restriction of only being able to apply a temporal component at the level of an individual Coin Type. Each Coin Type was in production for a number of years, and a particular moneyer who appears on coins of that Type may not have been active for the whole of its period of issue. A moneyer may have stopped or started working partway through a coin issue, or have only struck coins occasionally during the period, such that the moneyers known for the Type may not all have been working concurrently. Our lists of moneyers working at a mint in a Coin Type could therefore either under- or over-represent the actual number of moneyers working at any given time. Examination of series of active moneyers can therefore only rarely provide a complete picture of the contemporary situation. However, it can give useful indications of that situation, which allow for inference of likely trends and conditions, and is therefore still a meaningful area of enquiry.

One of the ways in which lists of active moneyers can be useful is as a rough indication of the size of minting activity in particular towns. This is a very imprecise method, and more detailed analysis can be obtained from estimation of the output of the mints, by examination of the number of pairs of coin dies used, and extrapolation from those of the number of coins issued. Unfortunately, sufficiently comprehensive examination of the coin dies is beyond the scope of the current project, but consideration of the size of the moneying contingent at the mints allows for a broad indication of their size, and thereby a suggestion of the relative importance of each mint to the economy of the kingdom at any particular time. The number of known

moneyers at each English or Welsh mint has therefore been recorded for three Coin Types: Coin Type 2 (c.1068-early 1070s), Coin Type 8 (1087-c.1090), and Coin Type 10 (early-mid 1090s). These Coin Types each have large numbers of surviving coins in the project dataset, and they represent a good temporal spread across the period. Table 4.1 shows the figures for each mint, and they are plotted visually on the maps at Figures 4.1 to 4.3.

Mint	Type 2	Type 8	Type 10	Mint	Type 2	Type 8	Type 10
Abergavenny	0	1	0	Malmesbury	1	2	1
Barnstaple	1	2	0	Marlborough	0	1	0
Bath	0	3	1	Northampton	2	1	1
Bedford	2	1	2	Norwich	4	8	6
Bridport	0	2	0	Nottingham	2	2	1
Bristol	1	5	3	Oxford	7	4	6
Cambridge	0	2	2	Pevensey	0	1	1
Canterbury	2	8	8	Rhuddlan	0	2	1
Cardiff	0	3	0	Rochester	1	2	2
Chester	5	4	4	Romney	0	3	2
Chichester	0	2	3	Salisbury	1	3	3
Colchester	3	5	5	Sandwich	1	3	1
Cricklade	1	1	1	Shaftesbury	1	3	2
Derby	2	2	2	Shrewsbury	4	3	3
Dorchester	0	2	2	Southwark	2	4	3
Dover	0	5	3	St David's	0	2	0
Durham	0	1	1	Stafford	2	2	2
Exeter	5	3	3	Stamford	4	3	1
Gloucester	3	3	2	Steyning	1	1	1
Guildford	0	1	0	Sudbury	1	1	1
Hastings	1	2	3	Tamworth	2	2	2
Hereford	4	4	5	Taunton	2	1	1
Hertford	1	2	2	Thetford	6	6	7
Huntingdon	2	2	2	Totnes	0	0	1
Hythe	0	1	1	Wallingford	3	2	2
Ilchester	0	3	2	Wareham	0	4	0
Ipswich	5	6	2	Warwick	2	5	4
Launceston	0	1	1	Watchet	0	1	0
Leicester	5	2	3	Wilton	4	3	3
Lewes	2	3	3	Winchcombe	0	1	0
Lincoln	7	2	5	Winchester	6	8	5
London	11	8	13	Worcester	6	4	4
MAINT	1	0	0	York	11	4	2
Maldon	0	3	2				

Table 4.1: Number of moneyers currently known at each mint in Coin Types 2, 8, and 10

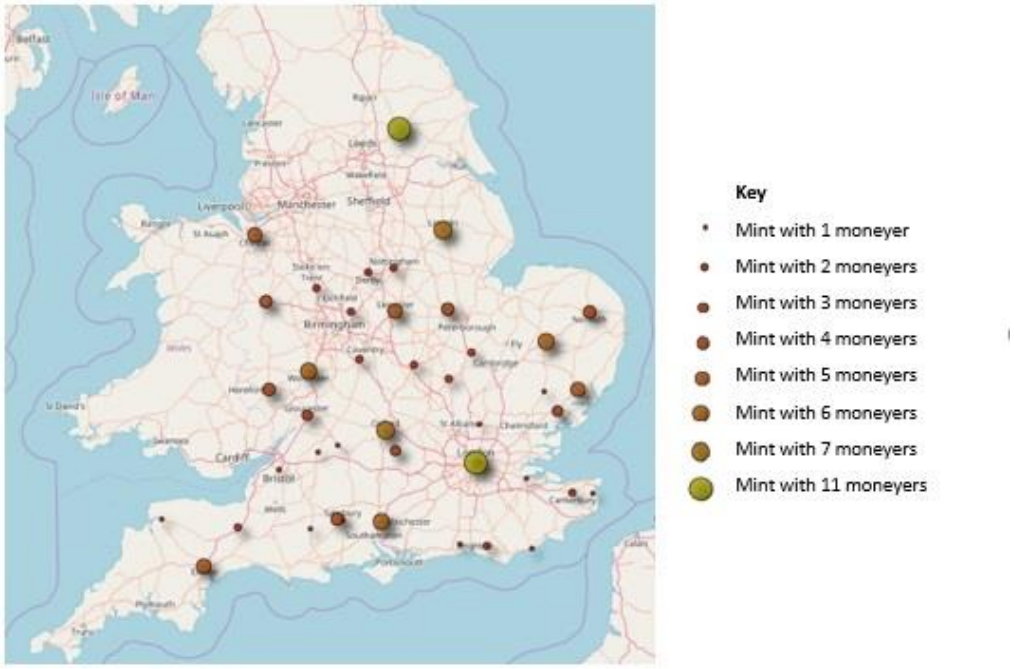


Figure 4.1: Map showing locations and moneyer contingents of mints currently known in Coin Type 2

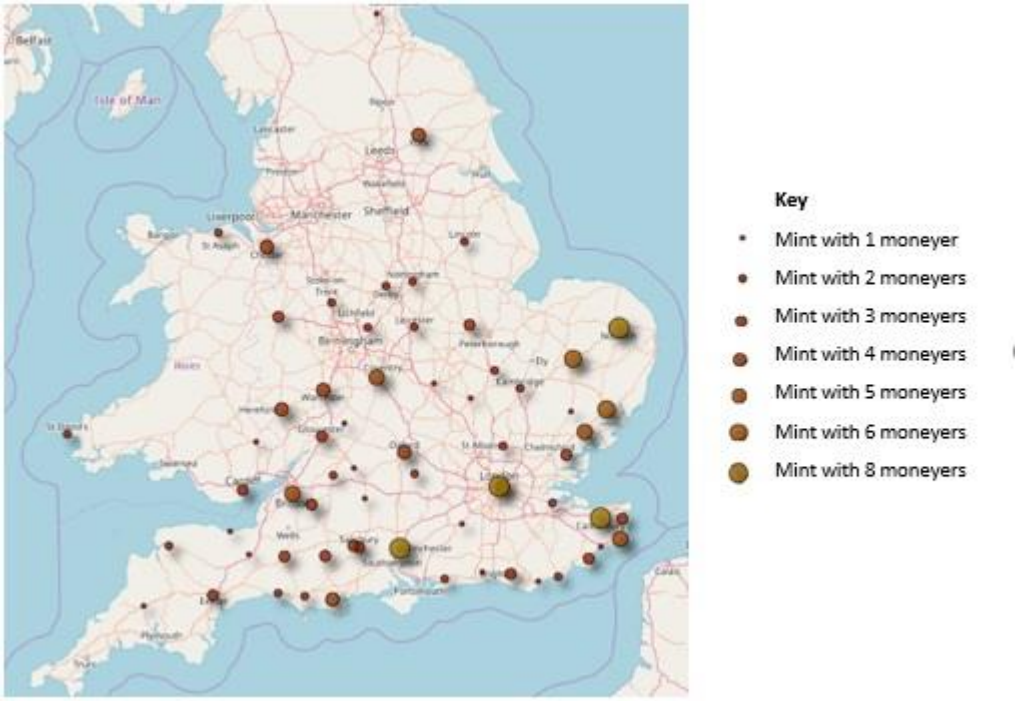


Figure 4.2: Map showing locations and moneyer contingents of mints currently known in Coin Type 8

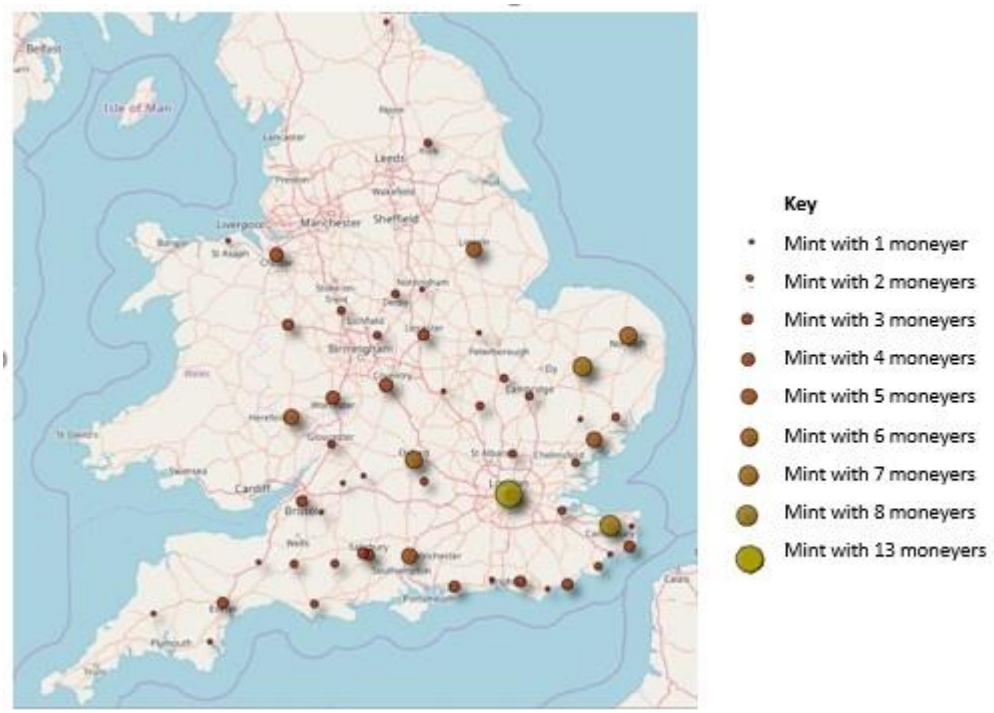


Figure 4.3: Map showing locations and moneyer contingents of mints currently known in Coin Type 10

These data suggest that the relative size and importance of the mints does change over the period of the first two Norman kings. The London mint is the largest in each case, but in Coin Type 2 the mint at York has the same number of moneyers as the mint at London. The prominence of York is much diminished in the later Coin Types. Similarly, the Lincoln mint becomes smaller as the period progresses. By contrast, however, the mints in East Anglia and the South-East, such as Norwich, Thetford, and Canterbury, become proportionally larger over these reigns. The distribution of moneyers seems to shift away from the North of the kingdom towards a larger concentration in the South and East.

The maps also show the locations of new mints. This is particularly clear in Coin Type 8, for which the largest number of coins survive, and in which we therefore have the most complete information. The new mints seem to represent an expansion of minting into areas beyond that represented by the moneyers of Coin Type 2: the new mints tend to be on the edges of the kingdom, in Cornwall, in Wales, and at Durham, and could therefore be seen

as part of the expression of Norman power in areas newly under their control. Wren, for instance, notes the establishment of minting and the development of a monetary economy as an important part of the Anglo-Norman consolidation of power in Wales in this period (Wren 2014, 132-133) and it may have played a similar role in other borderland areas. The new mints themselves are small, each having only one or two moneyers, and a number of them do not appear in the map for Coin Type 10. This may indicate that they were only minting for a short period, or that coins of this, and other later Coin Types, from these mints have not survived to the present day. This in turn would be an indication that their output continued to be small.

4.1.3 Moneyer Tenure

Examination of the reverse inscriptions of the coins can also begin to provide inferences about the practice of the role of moneyer. Investigation of which moneyer names appear in each Coin Type can, for instance, allow extrapolation of how long any given moneyer remained in post at a particular mint, albeit with provisos regarding the incomplete nature of the evidence, as detailed in section 4.2.2 above. This analysis reveals a system with a great deal of variation.

It has long been recognised that the moneyers of the English mints represent a high degree of continuity over the period of conquest. Dolley noted that at his time of writing over 70% of the moneyers known to have struck coins for Harold Godwinson were also known on the coins of William I (Dolley 1966, 11), and Allen was able to take this further, noting that by 2012 we could verify that 74% of Harold's moneyers were then also known on Coin Types 1 and/or 2 of the Norman kings (Allen 2012c, 57). Not all of these are represented in the project dataset, since some exceptionally rare coins are only currently known from examples in private collections. However, even within the coins here investigated, 66% of the moneyers identified by Pagan

as striking for Harold II (Pagan 1990) can also be seen on the coins of William's first two Types, and this rises to 77% when the later Types of William I are included. Examination of the coins also confirms that with a few notable exceptions, such as Wilton and Cambridge, as detailed, respectively, by Gareth Williams (2012) and Allen (2006), there was no wholesale replacement of moneyers at the time of the conquest. It is additionally clear that most of the moneyers of the early coins of William the Conqueror remained in post for a number of successive Coin Types.

On average, in the reigns of William I and II, any particular moneyer name seems to appear on coins for between 2 and 4 successive Coin Types. This applies to all the case study mints, with the average length of tenure varying from 2 Types at Southwark and Norwich, to 3.78 Types at Winchester, as shown in Table 4.2. There does not seem to be any particular regionality within the spread of average moneyer tenure.

Mint	Average Moneyer Tenure
London	2.36 Coin Types
Southwark	2.0 Coin Types
Winchester	3.78 Coin Types
York	3.24 Coin Types
Lincoln	2.73 Coin Types
Stamford	2.4 Coin Types
Thetford	3.1 Coin Types
Norwich	2.0 Coin Types
Gloucester	3.0 Coin Types
Worcester	3.27 Coin Types
Hereford	2.71 Coin Types

Table 4.2: Average number of successive Coin Types at each cast study mint in which individual moneyer names appear

These average figures, however, are composed from a great variety of individual moneyer tenures. Some moneyer names only appear on coins of a particular mint for a very short time; in a number of cases they are only currently known for a single Coin Type, although the small number of surviving coins makes it difficult to say whether this is an accurate representation in any given case or just an anomaly of the incomplete

survival of coins. It does, however, indicate that some moneyers were probably only in post for a few years.

On the other hand, some moneyer names appear on coins for a large number of successive Coin Types. A moneyer named Outhbern, for example, is known on coins of the York mint in all Coin Types of William I and II, with the exception of types 1, 3, 9, and 13. His name is also on York coins before the Norman Conquest, and after the death of William Rufus. The situation is similar for Godric at Thetford, whose name is currently only missing from coins of types 12 and 13. There are also many instances of moneyer names appearing on coins of nine or ten successive Coin Types of William I and II. These long-lived names present an interesting situation, as they suggest moneyers with very long tenures in post. If a moneyer was working at the end of Edward the Confessor's reign, and is also known into Henry I's reign, they must have been in the role for over 35 years. This would be a very long working life, especially in a position which would likely require the acquisition of a certain level of status and respect before an individual would receive the appointment. This could suggest that perhaps these long-running moneyer names don't refer to a single individual but may instead be instances of a moneyer role being passed from one man to another using the same name, possibly a son or other relative. Studies of Anglo-Saxon and Anglo-Scandinavian personal naming traditions suggest that it was not uncommon for families to use the same name in successive generations, so this idea is not unreasonable (e.g. Kitson 2002, Symons 2006, Piercy 2017b). It is explored further in section 5.3 of the following chapter.

The majority of moneyers lie between these two extremes, having their names on coins of a few successive Coin Types only. However, some moneyer names, having disappeared from the record for a few Coin Types, appear again later in the period. An example would be Aldgar of London, whose name is known on coins of types 1-4, and then again in types 11-13.

Additionally, there seem to be a number of 'occasional' moneyers whose names appear on coins of a particular mint repeatedly, but only for short periods each time. A Wulfgar, for instance, mints at London but is currently only known in Coin Types 1, 4, and 10. Again, these instances of recurring moneyer names may represent more than one individual man.

Investigation of the tenure of moneyers at each of the case study mints mostly shows a combination of short- and long-term appearances of particular names. However, a few comments can be made about the moneyer patterns at specific mints. The London mint does have a few long-running moneyer names but overall there seems to be a higher instance of names appearing for a short time only, and more examples of 'occasional' moneyers than are currently apparent at the other case study mints. The personnel of the London mint seem to have changed quite frequently. Coins of the Winchester mint, on the other hand, currently show a smaller number of moneyers, mostly working for a reasonable time, with just a few names which only appear for a short time.

Examination of the moneyers at the mint of York shows a clear change at the end of Coin Type 2, represented in Figure 4.4. Eleven moneyers are known in that type, nine of whom were previously striking York coins for Edward the Confessor or Harold Godwinson. In Coin Type 3, however, we currently only know one moneyer, represented by just two surviving coins. Three of the earlier moneyers appear again on coins of Type 4, and a further one in Coin Type 5, but from that point onwards the coins usually only show three or four moneyers in any particular Coin Type. Those particular moneyer names are tenacious, though, with most having long tenures in post. There are no instances of very short-lived moneyer names at York.

The Lincoln mint shows a range of lengths of moneyer tenure but there does seem to be something of a wholesale change of moneyers between Coin

Types 2 and 4, as can be seen in Figure 4.5. In Type 2 we currently known of seven moneyers: Aelmaer, Agemund, Gifel, Outhgrim, Siferth, Siward, and Wulfsi. Three of those moneyers (Aelmaer, Agemund, and Wulfsi) are not known after Coin Type 2, and they are replaced in Type 3 by Aelfnoth and Godric. Siferth is currently also not known in Type 3. The two new moneyers are only in post for that one Coin Type, and are not known again after Type 3. Additionally, Gifel and Outhgrim cease minting after Type 3 too. In Coin Type 4, therefore, the only moneyer to have had continuous tenure from Type 2 is Siward, although Siferth joins him again in this type, so may have been minting in Type 3 as well. There are also four new moneyers: Thorstan, Unspac, Ulf, and Wulfstan. By Coin Type 4, therefore, there has been nearly a complete change of personnel at the Lincoln mint.

The end of Coin Type 3 seems to mark a change of personnel at the Thetford and Norwich mints too, with four of the six Thetford moneyers changing at this point, as shown in Figure 4.6. Both of the currently known Norwich moneyers also seem to have been replaced, as shown in Figure 4.7, although the number of surviving coins is small so the picture is probably not complete. In other respects, the moneyer tenure pattern at the Norfolk mints is the usual mixture of long and short sequences of the occurrence of particular names. The sample of surviving coins of the West Country mints is unfortunately too small for any clear pattern of moneyer tenures to be discernible.

Moneyer	Edward or Harold	Type 1 (17 coins)	Type 2 (123 coins)	Type 3 (2 coins)	Type 4 (27 coins)	Type 5 (29 coins)	Type 6 (15 coins)	Type 7 (3 coin)	Type 8 (30 coins)	Type 9 (1 coin)	Type 10 (5 coins)	Type 11 (6 coins)	Type 12 (2 coins)	Type 13 (0 coins)	Henry I
Aleif															
Arcetel															
Authoulf															
Outhbern															
Outhgrim															
Sweartcol															
Thor															
Ulfcetel															
Roscetel															
Harthoulf															
Laesinc															

Figure 4.4: Tenures of moneyers of William I and II at the York mint, indicating the Coin Types in which they are currently known

Moneyer	Edward or Harold	Type 1 (19 coins)	Type 2 (55 coins)	Type 3 (10 coins)	Type 4 (37 coins)	Type 5 (38 coins)	Type 6 (7 coins)	Type 7 (9 coins)	Type 8 (65 coins)	Type 9 (8 coins)	Type 10 (9 coins)	Type 11 (23 coins)	Type 12 (5 coins)	Type 13 (3 coins)	Henry I
Agemund	■	■	■												
Garvin	■	■													
Gifel	■	■	■	■											
Leofwine	■							■				■			
Outhgrim	■	■	■	■											
Ulf	■				■	■	■	■	■	■	■	■			
Aelmaer	■	■	■												
Osberan		■													
Wulfsi		■	■												
Siferth			■		■	■		■	■						
Siward			■	■	■	■	■								
Aelfnoth				■							■	■	■		
Godric				■											
Thorstan					■	■		■		■	■	■			
Unspac					■	■	■								
Wulfstan					■										
Wihtric						■	■								
Ascetel												■	■	■	■
Folcaerd												■			
Unce														■	

Figure 4.5: Tenures of moneyers of William I and II at the Lincoln mint, indicating the Coin Types in which they are currently known

Moneyer	Edward or Harold	Type 1 (15 coins)	Type 2 (31 coins)	Type 3 (9 coins)	Type 4 (17 coins)	Type 5 (30 coins)	Type 6 (6 coins)	Type 7 (7 coins)	Type 8 (70 coins)	Type 9 (7 coins)	Type 10 (10 coins)	Type 11 (6 coins)	Type 12 (2 coins)	Type 13 (3 coins)	Henry I
Aelfwine															
Godelef															
Godric															
Godwine															
Cinric															
Goda															
Blacsunu															
Otbern															
Esbern															
Leofric															
Aelfric															
Folcaerd															
Godraed															
Godinc															
Bundi															
Neigel															
Burhard															
Brihtnoth															

Figure 4.6: Tenures of moneyers of William I and II at the Thetford mint, indicating the Coin Types in which they are currently known

Moneyer	Edward or Harold	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8	Type 9	Type 10	Type 11	Type 12	Type 13	Henry I
		(13 coins)	(8 coins)	(3 coins)	(8 coins)	(14 coins)	(3 coins)	(7 coins)	(62 coins)	(5 coins)	(9 coins)	(11 coins)	(6 coins)	(4 coins)	
Eadwine															
Godefurth															
Godwine															
Manna															
Thorgrim															
Oter															
Leofwold															
Godric															
Aegelric															
Eadwold															
Godric Brd															
Howord															
Inhune															
Ulfcetel															
Toufie															
Aelfric															
Aethelfurth															
Bricsel															

Figure 4.7: Tenures of moneyers of William I and II at the Norwich mint, indicating the Coin Types in which they are currently known

4.1.4 Moneyers at Multiple Mints

In addition to providing implications about the length of service of moneyers in post at particular mints, examination of the names on the coins can provide intimations of moneyers being related to more than one mint. These relationships appear both concurrently, suggesting moneyers with authority at multiple mints at the same time, and consecutively, suggesting moneyers moving from one mint to another.

In both cases a certain degree of caution is needed. The evidence for these relationships is solely the fact that the same moneyer name appears on coins of the two mints, and there is no certainty that identical names mean identical people. In all cases the coins could, in fact, be referring to two different moneyers who happen to have the same name. There are some factors which could mitigate this possibility, though, and thus increase the likelihood that the coins actually refer to the same man. One of these is the rarity of the name; certain names are far more prevalent in late 11th century England than others. Evidence for this can be found in surviving documentary sources, most particularly Domesday Book which includes names of the majority of men of the land-owning class in both 1066 and 1086 (A Williams and Martin 1992). The instances of occurrence of particular names in this and other documentary sources, as well as on the coins themselves, can be examined through the online database of the Prosopography of Anglo-Saxon England (PASE), and can give an indication of how common a particular name was. If the name is rare, the likelihood that it refers to the same man, or a member of the same moneying family, is high.

The second factor which may affect the likelihood of attribution to the same man is geography. If the two mints in question are physically close to each other, it is more feasible that the same man may have been able to perform the duties of the role of moneyer at both locations. This is more relevant

when considering concurrent responsibility at more than one mint than when considering the possibility of a moneyer moving from one mint to another, but it can be a useful confirming factor in both circumstances.

The surviving coins of William I and II provide a number of instances which suggest moneyers having responsibility at more than one mint in a particular Coin Type. It has long been noted that the moneyers of the geographically close London and Southwark mints were often known at both sites, and indeed in Coin Type 8 we find moneyer Godric appearing on coins of both mints, while Wulfgar is similar in Coin Type 10, and Aldgar in Coin Type 12. The London area also seems to have had links to Canterbury (about 60 miles distant). Moneyer Wulfric is known at both Canterbury and London in Coin Types 4 and 5, Aelfraed is known at both mints in Coin Types 4 and 8, and Brihtwold is known at the two mints in Coin Type 11, while in the same type Aeldraed is known at Canterbury and Southwark. None of these are very unusual names, but the recurrence of links between the two mints makes the likelihood of an association more probable. A further link between London and the South Coast mints can be seen in Coin Type 12, where a moneyer Wulfword is known both there and in Sandwich. A link between London and Thetford can be seen in moneyer Blacsunu, which is a very uncommon name, and which appears on coins of both mints in Coin Type 2.

There are some other examples where identification of a single moneyer with multiple responsibility can be made with some confidence. A Winedi is known on coins of Canterbury and nearby Romney in most of the Coin Types of William Rufus. Moneyer Outhgrim is known on coins of both York and Lincoln in the first three Coin Types. Outhgrim is not a common name, and the two towns are relatively close (about 70 miles apart) in an area of the kingdom with few other mints. A similar situation can be seen with Ulfcetel, another moneyer with an unusual name, who minted at both Cambridge and nearby Norwich in Coin Type 8. Moneyer Godelef whose name appears on

coins of Stamford and Thetford in Coin Type 8 could be another example, the two towns being around 65 miles apart, and the name being less common than many others. One could be less certain about moneyer Godric who appears at Thetford and Norwich in Coin Type 8, as the name is incredibly common. However, the very close proximity of these two Norfolk mints (about 30 miles) makes this identification more likely.

Many other possible instances of a single moneyer having responsibility at more than one mint can be identified, but cannot be stated with any degree of certainty, due to either the very high prevalence of the name (such as Leofwine, whose name appears at eight mints concurrently in Coin Type 8), or to the implausible distance between the two mints in question (such as the name Ordwi on coins of both Durham and Hereford, over 300 miles away, in Coin Type 10). Some of these occasions may indeed have been moneyers working at more than one mint but without further evidence to support the hypotheses in these instances they must generally be disregarded. Within the current dataset, therefore, there are a small number of instances where it certainly seems that a moneyer had responsibility at more than one mint, and a somewhat larger number where we could postulate such a situation with less certainty. Overall, however, these instances are relatively scarce and it is difficult to identify any temporal patterning in their occurrences. Geographically there is a seeming tendency for them to be more prevalent in the East of the kingdom than in the West, although this may be due to the smaller number of surviving coins from the Western mints.

In addition to instances of one moneyer seeming to have responsibility at more than one mint, there are a number of occurrences in the dataset which suggest a moneyer moving from one mint to another. Again, these are always offered with a degree of caution surrounding the identification of individuals, but they can be revealing. They are especially useful where they strengthen the postulation of links between particular mints. The close association

between the mints of London and Southwark can be seen in this instance, with a number of moneyers apparently moving between the two sites. A Godric is known at London from the later types of Edward the Confessor up to Coin Type 6, and is then known at Southwark in Type 7. In Coin Type 8 Godric's name appears on coins of both mints, as noted above. Wulfgar appears on coins at London prior to the Conquest and in William's types 1 and 4. In Coin Type 10 his name is on coins of both mints, and he then appears on coins at Southwark in the following type.

Similarly, moneyers may have moved between the mints of Thetford and Norwich. The name Godwine is very common but the proximity of the two mints may suggest that instances of this name here do refer to the same man or family. A Godwine is known at Norwich in the last types of Edward the Confessor, and at both Norwich and Thetford in the coinage of Harold. In William's first three types his name appears at Thetford only, and in Coin Types 4 to 11 it can be seen on coins of Norwich, suggesting that this man may have moved from Norwich to Thetford, and then back again. A moneyer Cinric, which is a much less common name, is known at Norwich on the coins of Harold and then at Thetford in William's Coin Types 1 to 5, and in Coin Type 7.

Other potential moneyer moves are less certain. A moneyer named Agemund appears on coins at Lincoln from before the Conquest until William's Coin Type 2. The name does not appear on any further coins until Coin Type 9 when an Agemund starts minting in Canterbury, and is known there into the reign of Henry I. The geographical distance between these two mints is large, and the temporal distance between Coin Type 2 and Coin Type 9 is around 20 years, but the name is very rare so there may be a familial relationship between the two moneyers.

The problem of identifying individual names from variant spellings makes a number of potential instances of moneyer moves uncertain. Moneyer Heathewulf appears on coins of Worcester in Coin Type 4, and the name Hethewi can be seen on coins of Hereford in Coin Type 5. These names are similar, so could be variant spellings of the same name, and the two mints are less than 30 miles apart, making the suggestion of a move from one to the other more feasible. A more complex, and certainly less clear, example can be seen in the moneyer names Osberan, Osbern, Esbern and Otbern. A moneyer named Osberan is known at Lincoln in Coin Type 1 only. In Coin Type 2 a moneyer named Otbern starts minting in Thetford. These two names are quite disparate, but in Coin Type 3 the name Otbern no longer appears and Osbern takes its place. Osbern is clearly very similar to Osberan. Further, however, in coins types 4, 5, and 7 neither Otbern nor Osbern are seen on the Thetford coins, but Esbern is. It is therefore unclear whether the Thetford mint had a single moneyer from Coin Types 2 to 7 who employed various spellings of his name, or whether there was a fast turnaround of three moneyers with very similar, but different names. In either case, there is a possibility that moneyer Osberan from Lincoln in Coin Type 1 could be identified with moneyer Osbern at Thetford in Coin Type 3, and therefore possibly with the single Thetford moneyer Otbern/Osbern/Esbern in Coin Types 2 to 7. Additionally, from Coin Type 8 a moneyer whose name is sometimes spelled Osbern and sometimes spelled Esbern appears on coins of Salisbury, and is known there in most types into the reign of Henry I. This may therefore either suggest a single moneyer moving from Lincoln in Coin Type 1 to Thetford for Coin Types 2 to 7, and then to Salisbury for Coin Types 8 onwards, or alternatively it may be as many as six different moneyers with similar names working consecutively in the three mints.

This last example highlights the incredible difficulty in identifying with any certainty the occasions where a moneyer moved from one mint to another. In some instances, the circumstances are compelling but in many others they

can only ever be offered as possibilities. In either case there does not seem to be any clearly higher instance of this circumstance in any particular geographical area or timescale within the project's study parameters. Inferences on this topic can perhaps be more usefully considered in generalities rather than specific occasions. Looked at from this perspective, the data do clearly indicate that the option for moneyers and moneyer families to move around the kingdom was both available and feasible, and may indeed have occurred on a fairly frequent basis.

4.2 Coin Die Analysis

In almost all cases the dies which were used to strike coins of the Early Medieval period have not survived to the present day. However, information about the dies can be obtained indirectly, by examining the coins which they were instrumental in producing. Examination of how the obverse and reverse designs align on the coin allows the calculation of a 'die axis measurement', and this has implications for the physical properties of the mint equipment used in its striking. Additionally, all coining dies of this period were hand engraved, so the design carved into the die face was slightly different for each individual die. This, of course, translates to the coins struck using those dies and a simple visual inspection of the coins can often reveal some of the differences between the dies. For instance, this can highlight occasions where the dies used were of much cruder workmanship than usual, and pinpoint examples where the dies have been altered before use. Dies of both these types could be considered 'irregular', and both occur in the coins of the first Norman kings.

Due to the variations in the coin dies, two contemporary coins will only show the exact same design if they were struck with the exact same dies. A detailed examination of the coins, therefore, can identify which examples do indeed have exactly the same design and which show the subtle variations

which come from hand-engraving of the dies. Those which are exactly the same can thus be said, with some certainty, to have been struck using the same dies. In this way it is possible to identify how many different dies were used to strike the surviving coins, and to assign an identifier to each of those dies. For the current project the identifier is an alphanumeric code, beginning with the digit of the Coin Type (1-13), then the letters Ob or Re to indicate whether the die is for the obverse or reverse face of the coin, then a running number assigned during the process of examination. Thus, the first obverse die identified for coins of Type 3 is named 3Ob001, and so on.

The examination of the coining dies of the surviving coins of William I and II involved measurement of the die axes, a systematic visual check of each coin to search for the use of irregular dies, and a detailed examination of a sample of the coins to identify the individual dies used. For the visual examinations, investigation was only possible where a photograph of the coin existed within the project data, and for the detailed investigation that photograph needed to be of a high resolution. All the coins personally examined by the author have photographs of sufficient quality, but for many of the coins whose data have been gathered from publications only low-quality images, or no images at all, are available. These have therefore had to be excluded from this particular line of investigation.

4.2.1 Die Axes

The die axis measurement of a coin indicates the alignment of the two coining dies in relation to each other at the time of striking. This measurement is usually recorded in one of two ways; the angle between the top of the obverse design and the top of the reverse design is either stated in degrees, or by the 'clockface' method, whereby an exact match is noted as '12 o'clock', a variance of around 30 degrees clockwise is noted as '1 o'clock', and so on. The former method allows for greater precision. However, die axes can only really be observed by eye, so noting the die axis measurement

is a somewhat subjective process. The level of accuracy which can be confidently stated is probably only to around 10 degrees in any case, so the 'clockface' method is not unduly inaccurate for the purpose of analysis.

For this study the coins which were personally measured have their die axes recorded in degrees, to the nearest 10. The top of the obverse design was identified based on the portrait, and the top of the reverse design was identified as the end of the arm of the central cross which is closest to the initial cross in the inscription. For coins which were not personally measured, the published die axis measurement has been used, where available. Published measurements given by the 'clockface' method were converted to degrees. This provided a dataset of 4828 coins with recorded die axes.

These measurements were then assigned to one of two categories. Die axes were noted as 'regular' if they were at 0, 90, 180, or 270 degrees, with a leeway of ten degrees either way, to allow for the subjectivity of recording. Therefore, a coin was noted as having a regular die axis if its measurement was recorded as either 350, 0, 10, 80, 90, 100, 170, 180, 190, 260, 270, or 280 degrees. All other die axes were recorded as 'irregular'.

As mentioned in section 1.3.1 in the first chapter, Dolley had noted that the vast majority of Anglo-Saxon pennies have regular die axes, with a notable exception at the mint of York (Dolley 1952). He suggested that this may indicate the use of square-sectioned coining dies at all mints other than York, which may have been using dies of circular cross-section. Subsequent finds of surviving dies have supported this theory, as detailed in section 1.3.2. The reflection of this difference of minting equipment in the resulting die axes can be quantified. There are 36 different possible die axis measurements (when recorded to the nearest ten degrees), 12 of which are classified as regular and 24 as irregular. If one were using circular dies, and thus getting a completely random alignment between the two die faces, one would

therefore expect the resulting coins to have about 33% regular die axes and 67% irregular measurements. If one were using square-sectioned coin dies, such that the two die faces could only come together in 4 different alignments, one would expect all the resulting coins to have regular die axis measurements. In practice, of course, there would be some variance to this. In a personal discussion Dave Greenhalgh noted that his experiments in reproducing medieval minting techniques have suggested that a sheath or collar was probably used to keep the two dies in place when striking (D Greenhalgh, personal communication, 26/07/2016). If this collar was not used, or was not sufficiently close-fitting, some twisting of alignment between the two dies may have occurred. However, it is possibly more likely that some of the coin designs were not engraved exactly squarely onto the die faces and these would also result in coins with irregular die axes: the dies themselves would have been in alignment but the coin designs would not have lined up accurately.

Analysis of the die axes of the project dataset supports the suggestion of the continuation of the earlier practices in relation to the shape of the dies. Investigation of the full dataset shows that about 90% of coins have a regular die axis, with only 10% having an irregular measurement. However, when the dataset is divided into coins of individual mints there is a clear difference between the mint of York and the other mints, as shown in Figure 4.8. Most of the case study mints have a percentage of irregular die axes around the 10% mark, in line with the result from the full dataset. Coins of the York mint, however, show 51% irregular die axes. This is not quite the 67% one may expect from a completely random alignment between all pairs of dies but it is certainly sufficient to suggest that the majority of coins of the York mint were struck using circular coining dies, while the majority of coins of the other mints were struck using dies of square cross-section.

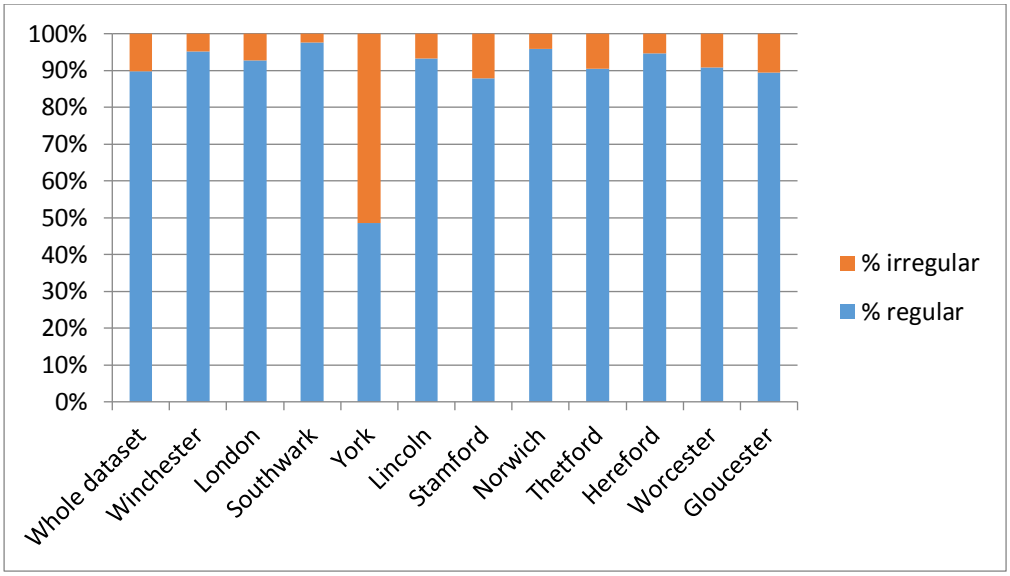


Figure 4.8: Die axes of coins of the case study mints

Both Dolley (1952) and Blackburn (2004) commented that this variant practice at York continued into the later 11th century but neither quantified it further. Splitting the dataset of coins of the York mint into individual Coin Types allows analysis of the longevity of this anomaly. Figure 4.9 shows the results of this analysis. In interpreting the figures, however, it is important to consider the sample sizes of each data subset. These are very variable, and most of the later Coin Types are only represented by a handful of surviving

coins. The results from these types therefore need to be treated with appropriate caution. Table 4.3 details the number of extant coins.

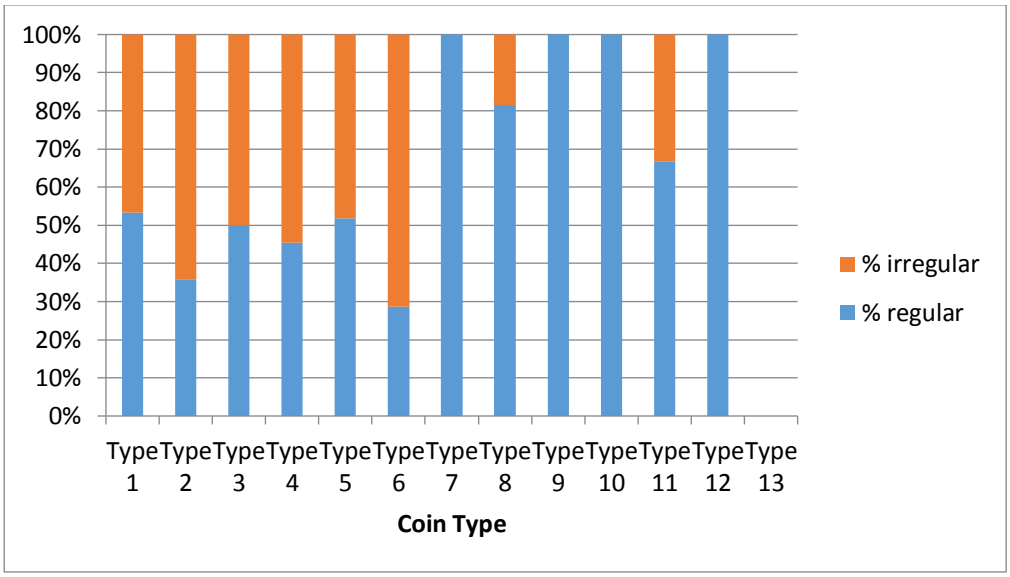


Figure 4.9: Die axes of coins of the York mint, by Coin Type

Coin Type	Number of coins
Type 1	15 coins
Type 2	115 coins
Type 3	2 coins
Type 4	22 coins
Type 5	27 coins
Type 6	14 coins
Type 7	3 coins
Type 8	27 coins
Type 9	1 coin
Type 10	5 coins
Type 11	6 coins
Type 12	2 coins
Type 13	0 coins

Table 4.3: Number of York coins of each Type in the die axes data subset

For the first six Coin Types the results indicate that the York mint was still using mostly circular coining dies. The later Coin Types seem to show a different pattern, with all the coins of types 7, 9, 10, and 12 having regular die axes. However, all these Coin Types are represented by 5 or fewer coins so the sample sizes are too small for these results to be considered statistically significant. Coin Type 8 has 27 surviving coins, and shows a

proportion of 19% of coins with irregular die axes. This is much lower than for the earlier Types, and suggests that the use of circular dies at the York mint was becoming less prevalent by this time, although the proportion of irregular die axes is still higher than the usual figure of around 10% seen at the mints where square-sectioned dies were the norm. Coin Type 11 shows a proportion of 33% with irregular die axes, but this is from a sample of only 6 coins so may again just be a statistical anomaly, rather than clear evidence of continued use of circular coin dies. It therefore seems that the moneyers of the York mint continued to use circular coin dies through most of the reign of William I, and there is some evidence that the practice was still present, if not as prevalent, in the first coinage of William II. Unfortunately, however, there are insufficient surviving coins of the later Types of William Rufus to allow inferences on whether this variant minting practice continued further into his reign.

The question of changes over the period of the first two Norman kings is also more generally pertinent, and the issue of whether there was variance over time at mints other than York can be examined by removing the York coins from the data subset, and then dividing the remaining coins by Type. This gives a picture of what was happening at the mints where coin dies of square cross-section seem to have been predominantly in use. The results of this investigation are interesting, and can be seen at figure 4.10. For the majority of Coin Types, the instance of irregular die axes is fairly stable, at around 10% or slightly lower. However, there are two exceptions. In the first Coin Type about 20% of the coins have irregular die axes, which is notably higher than usual but could still be a feature of the normal vagaries of die cutting and differing use of die collars. However, in Coin Type 3 45% of the surviving coins have irregular die axes. This is much higher than has been seen elsewhere for mints using square dies, and deserves further investigation.

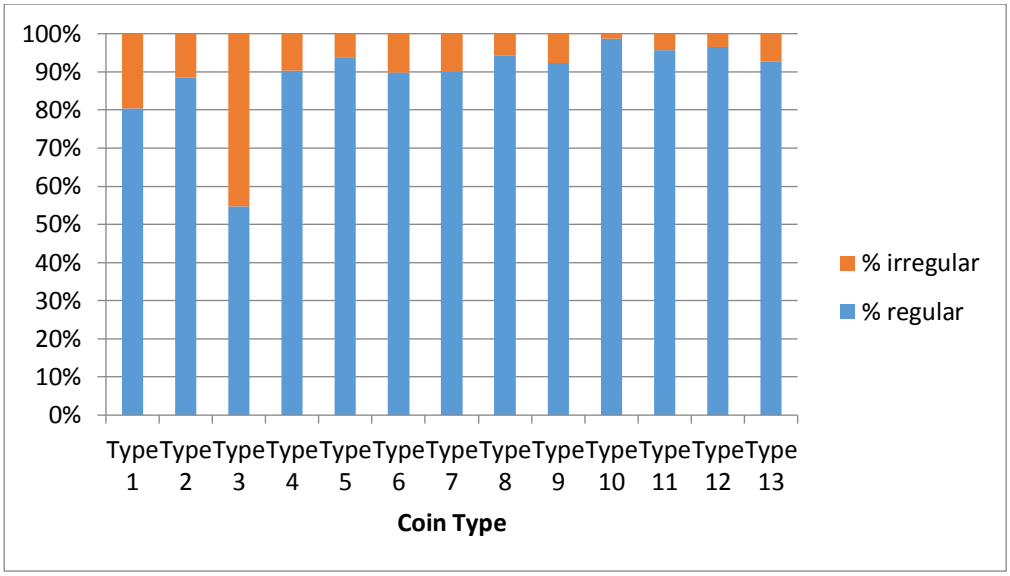


Figure 4.10: Die axes of coins of all mints except York, by Coin Type

As noted above, three possible explanations are offered for the appearance of irregular die axes on coins. The first is variance in the minting practice, where the collar which holds the two dies in place is either not used, or is not sufficiently snug to prevent twisting of the dies. However, there is no clear reason why this should be so much more prevalent in Coin Type 3 than in the preceding and succeeding types.

The second possibility is that the designs on the dies have been engraved out of alignment with the cardinal points of the die shafts. This is somewhat more likely for Coin Type 3 as the cross in the centre of the reverse design is rather more elaborate than those on the reverses of the other Coin Types. An example can be seen at figure 4.11, shown in comparison to the reverse of Coin Type 2 which has a more typical central cross. Rather than the usual cross with four straight arms meeting in the centre at right angles, the Type 3 cross has been expanded to form an open quadrilateral with terminals at each corner. This would have been rather more difficult to engrave squarely, such that each terminal points to a cardinal point of the die face, and indeed it is clear from examining the coins that many of Coin Type 3 do have somewhat misshapen central crosses. However, this may not be sufficient to explain the much higher instance of irregular die axes in this type.



Coin FZA0019; coin type 2;
Stafford mint; moneyer Wulfnoth

Coin FZA0033; coin type 3;
Winchester mint; moneyer Aelfwine

Figure 4.11: Reverse designs of Coin Types 2 and 3

The third possible explanation for irregular die axes is the use of dies of circular cross-section instead of the more common square-sectioned dies. This certainly seems to have been the case at the York mint, as detailed above. Similarly, the results shown in Figure 4.10 could have been achieved if some of the other mints were using some circular dies in Coin Type 3.

In order to examine this further, the particular mints where coins of irregular die axis occur in this Coin Type were noted. Unfortunately Coin Type 3 is one where the surviving coins are few in number, and many of the individual mints are represented by a very small selection of coins. Of the mints where some extant coins have irregular die axes, only Winchester, London, and Wallingford have sufficient coins to make any meaningful examination, being represented by 10, 20, and 23 coins respectively. At Winchester and Wallingford coins of Type 3 show about 30% irregular die axes, while at London 40% of the coins have irregular measurements. At each of these mints, this is in contrast to the patterns for the immediately preceding and succeeding Coin Types, as shown in figures 4.12 to 4.14. The figures are not sufficiently high to suggest that at these mints all the coins of Type 3 were

struck from circular dies, but they could be indicative of the use of some circular-sectioned dies amongst the usual square-sectioned ones.

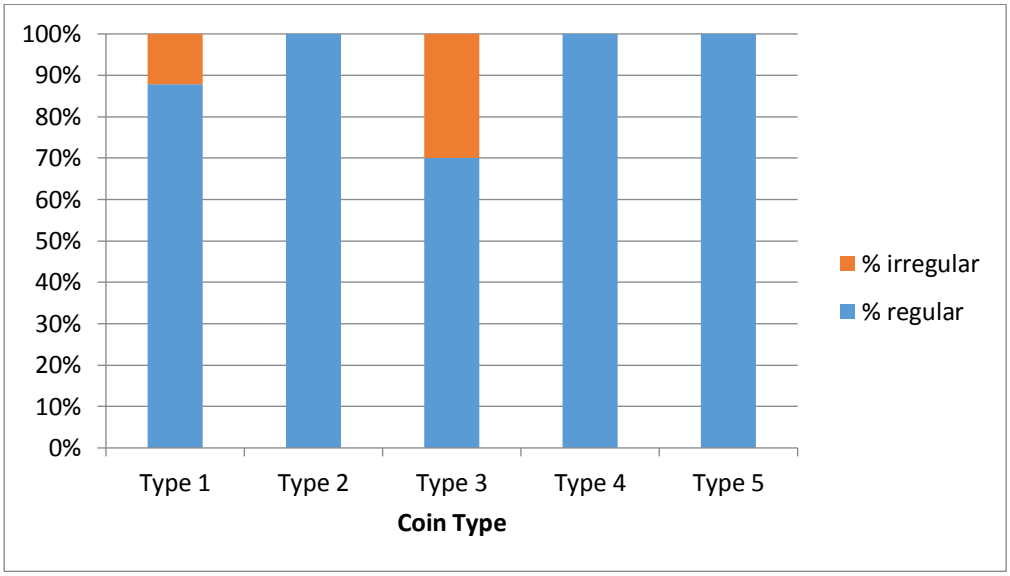


Figure 4.12: Die axes of coins of types 1 to 5 from the Winchester mint

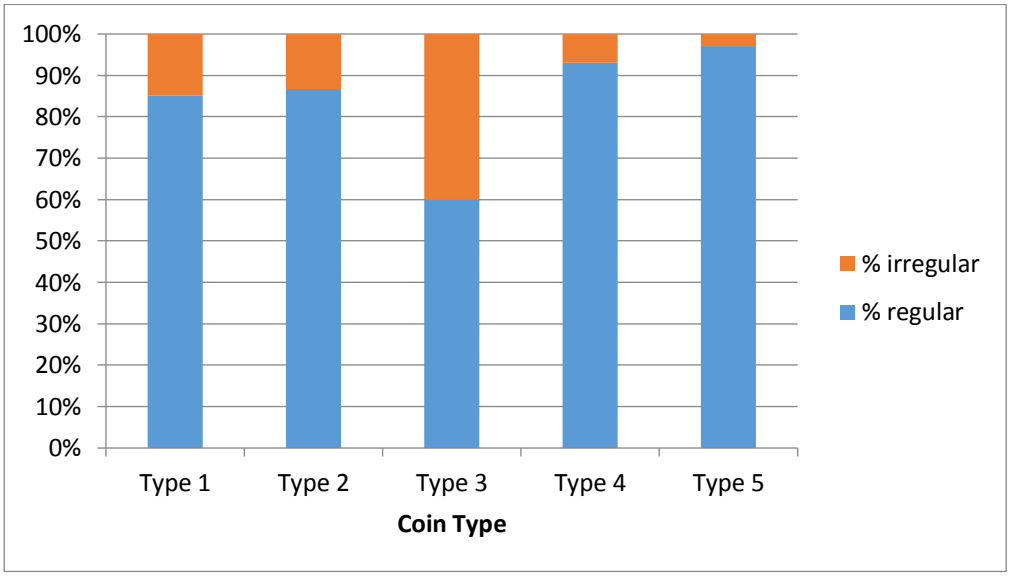


Figure 4.13: Die axes of coins of types 1 to 5 from the London mint

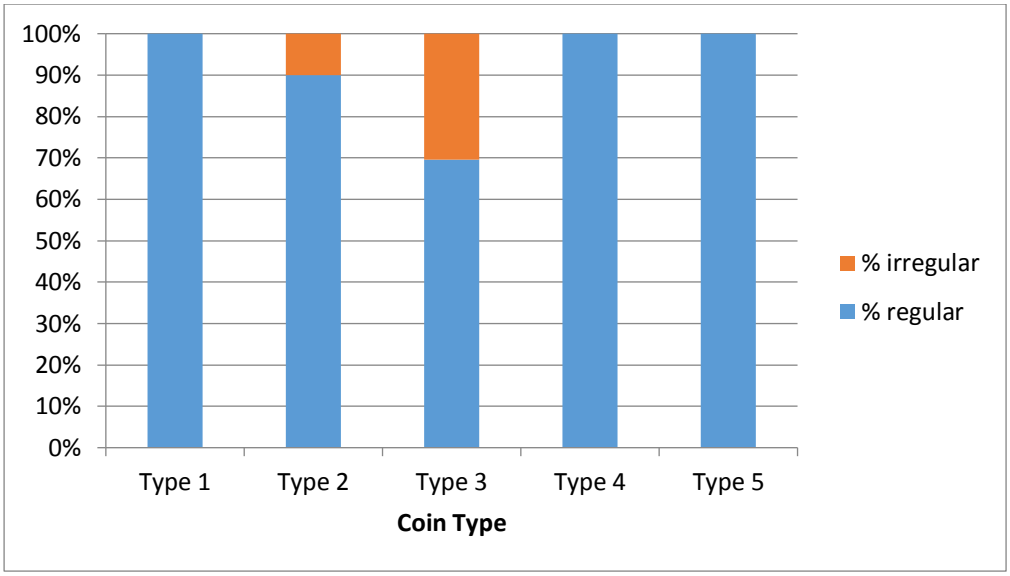


Figure 4.14: Die axes of coins of types 1 to 5 from the Wallingford mint

Some small indication of whether the anomalously high levels of irregular die axes were caused by mis-engraved dies or by the use of dies of unusual shape could be found by looking at the actual die axis measurements. If one of a pair of dies was wrongly engraved, such that the top of the design was off-set from the cardinal point of the die face, that die pairing would always produce coins with a die axis which was irregular to the same amount. In other words, if the top of the design was at 20 degrees from square, the die axis of all coins struck with that die would be irregular by a factor of 20 degrees (i.e. their die axis measurement would be 20, 110, 200, or 290 degrees). If, however, the irregularity was caused by the use of a pair of circular dies the resulting coins would have die axes which were irregular by a variety of different amounts.

In order to be able to examine this it is necessary to have a selection of coins which were struck by the same pair of dies. The die study undertaken for this project, which is detailed in section 4.3 below, included identification of the dies used for coins of Type 3. There were no groups of fully die-linked coins from the Winchester mint, and only one pair of coins from the London mint, both of which had regular die axes. From the Wallingford mint, however, a number of die-linked coins of this Type have survived. Eleven coins of moneyer Brihtmaer are in the dataset, nine of which have recorded die axis

measurements. These coins were struck from two different obverse dies and three different reverse dies, using four different combinations of these dies, as represented in figure 4.15.

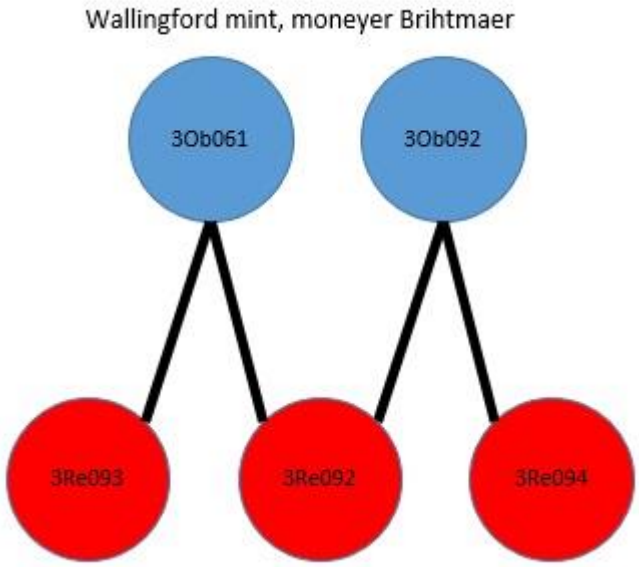


Figure 4.15: Die linkages in coins of Type 3 of moneyer Brihtmaer, Wallingford mint

There is only one coin in the dataset which was struck with obverse die 3Ob061 and reverse die 3Re093. For each of the other three die combinations, however, three coins survive with die axis measurements. For the pairing 3Ob061 with 3Re092 two coins have regular die axes and one has an irregular measurement. For 3Ob092 with 3Re092, one coin is regular and the other two are irregular. Their die axes are 30 and 50 degrees respectively. For the die combination 3Ob092 with 3Re094 the surviving coins have two regular and one irregular die axis measurement. For each die pairing, therefore, the coins have a variety of amounts of irregularity in die axis, which suggests that it is not caused by mis-engraved designs on the dies. The irregularity may be the result of using square dies without a close-fitting collar, but the result also does not preclude the possibility that these three reverse dies and two obverse dies were circular in cross-section.

With such a tiny sample of coins it is not possible to state with any certainty whether they do indicate the use of circular dies at the Wallingford mint in

Coin Type 3, and it is frustrating that without more examples to examine it is not currently possible to explore this possibility further. However, examination of the die axes of the coins does clearly allow the suggestion that while most mints were using coining dies of square cross-section, the York mint was continuing to use circular dies, and it is possible that circular dies were also used occasionally at other mints.

4.2.2 Dies of Crude Workmanship

In the introduction to his catalogue of coins of the Norman kings in the British Museum collection, Brooke noted a number of instances where coins of William I or II were struck using dies whose designs differed from those of the other mints by dint of being of "very rough work" (Brooke 1916, cxxxviii). He particularly highlighted coins of the Welsh mints, as well as those of Lincoln in Type 2, and Lincoln, Stamford and York in Type 4. Metcalf also noted rough dies in use in Wales in Type 8 (Metcalf 1987, 285) and Allen points to a similar situation in Type 10 (Allen 2012a, 116). Brooke suggested that these dies may have been of local manufacture, rather than having been made in the die-cutting centre of London where the majority of dies were created, although he noted that this is not necessarily the case and they could, instead, have been made in London by inexperienced workmen (Brooke 1916, cxxxviii). Subsequent discussion has tended to support the idea of local die cutting.

Examination of the surviving coins does indeed highlight examples from the mints and Types identified by Brooke which are clearly struck from dies of crude workmanship, such as the example of Type 8 from St David's in Wales, shown in figure 4.16, with a more representative example of the type from London shown for comparison. Beyond that, though, the examination has revealed coins of mints and Types not specified in the published discussions which may also have been struck from irregular dies.



Coin BMC0887; coin type 8;
St David's mint; moneyer Turri



Coin YOR0001; coin type 8;
London mint; moneyer Eadwine

Figure 4.16: Examples of Coin Type 8 showing use of dies of coarse work, compared to use of regular dies

A note of caution is required here, however. While in some instances, such as that shown at figure 4.16, the identification of the use of rough dies is very obvious, in many other cases it is not so clear. The official coining dies may all be of similar style and the same design but there is a lot of variation between individual dies. Some of the official dies are, of course, cruder in their execution than others and in many cases, such as the coin of Shrewsbury shown at figure 4.17, it is difficult to tell whether a die should be classified as a rough, irregular one, or whether it is just an official die of somewhat poorer

workmanship than usual. Where a coin is very worn this distinction can become even more confused. Identification of 'rough work' dies is therefore rather subjective.



Coin BMC0939; coin type 8;
Shrewsbury mint; moneyer Saegrim

Figure 4.17: Example of Coin Type 8 where the use of irregular dies is uncertain

The situation also becomes more challenging as the period progresses. The workmanship of the dies for the coins of the later Types of William II becomes increasingly poor, to the point where in Types 12 and 13 almost all the coins could be interpreted as being of 'rough work', when compared to the coins of the earlier Types. It is hence all but impossible to identify coins of these two Types which may have been struck from irregular dies. They have therefore been omitted from the analysis which follows.

The following two tables indicate the possible use of irregular dies of rough workmanship. Table 4.4 shows instances which are fairly clear, while Table 4.5 adds instances which the author suggests may show the use of rough dies, but which are less secure. A full list of the individual coins highlighted by this examination is included as Appendix 2.

Coin Type	Mint	Moneyer(s)
Type 2	Barnstaple	Leofwine
Type 2	Derby	Colbein
Type 2	Leicester	Lierie
Type 2	Lincoln	Aelmaer, Gifel, Siferth, Outhgrim
Type 3	Lincoln	Aelfnoth, Gifel
Type 3	Stamford	Leofwine
Type 3	Wallingford	Brihtmaer
Type 3	Winchester	Goldinc
Type 3	York	Outhgrim
Type 4	Lincoln	Saeword, Siferth, Thorstan, Ulf, Unspac, Wulfstan
Type 4	Stamford	Leofwine
Type 4	York	Aleif, Harthoulf, Outhbern, Outhgrim
Type 5	Shrewsbury	Wulfmaer
Type 8	Abergavenny	Aelfwine
Type 8	Bristol	Colblac
Type 8	Cardiff	Aelfsi Turri, Swegn
Type 8	St David's	Ifliwine, Turri
Type 8	Shrewsbury	Godsbrand
Type 10	Salisbury	Godwine

Table 4.4: Mints and moneyers certainly using irregular coining dies

Coin Type	Mint	Moneyer
Type 1	Bristol	Ceorl
Type 1	Ilchester	Wichxsi
Type 2	London	Godric
Type 2	Northampton	Swetman
Type 2	Norwich	Eadwine
Type 2	Thetford	Blacsunu
Type 3	Leicester	Aegelwine
Type 3	Thetford	Osbern
Type 5	Canterbury	Manna
Type 5	London	Uncertain (ANCDCN)
Type 6	Exeter	Wulfwine
Type 6	Sudbury	Wulfric
Type 8	Bristol	Brihtwold, Colblac
Type 8	Canterbury	Aelfraed
Type 8	Cardiff	Aelfsi
Type 8	Shrewsbury	Saegrim
Type 8	Wallingford	Aegelwine, Sweartlinc
Type 10	Canterbury	Brihtwold
Type 10	Chichester	Godwine
Type 10	Derby	Godwine
Type 10	Exeter	Saewine
Type 10	London	Wulfword
Type 11	Canterbury	Simaer
Type 11	Lincoln	Ascetel, Folcaerd, Thorstan
Type 11	London	Aldgar, Brunic, Ordgar

Table 4.5: Mints and moneyers possibly using irregular coining dies

The mints which appear in this list of irregular die usage form an interesting pattern. For the coins which very clearly show the use of rough dies there is an equally clear regional tendency: in the early coins of William I (Types 1-4) dies of rough workmanship appear almost exclusively in the East Midlands and the North-East. The most commonly-appearing mint in the list for this period is Lincoln, where rough dies are known for coins of Types 2, 3 and 4, on coins attributed to a variety of different moneyers. Coins of the nearby York and Stamford mints also show rough workmanship in Types 3 and 4. In Type 2 irregular dies are also known from Derby and Leicester, both relatively close to Lincoln. The exceptions to this are Barnstaple in Type 2, and Wallingford and Winchester in Type 3.

The other major period for which dies of rough workmanship can be identified is Coin Type 8. In this Type all the coins showing very clear sign of

the use of irregular dies emanate from mints in Wales (Abergavenny, Cardiff, and St David's) or in the area of the Welsh borders (Shrewsbury in the Welsh Marches, and Bristol just across the Bristol Channel from Cardiff). A moneyer in Shrewsbury can also be seen to have been using dies of poor workmanship earlier, in Coin Type 5. Salisbury in Coin Type 10 is the main exception to this regionality in the reign of William II.

If the less certain examples of the use of irregular dies are added into the analysis, the pattern remains broadly the same, but with some interesting additions. Bristol appears again, but this time very early in the period, in Coin Type 1, while Derby reappears very late, in Coin Type 10. It is interesting to note that Norwich and Thetford have coins which may indicate the use of irregular dies in the early part of the period, with both Norfolk mints appearing in Type 2, and Thetford also appearing in Type 3. Dies of rough work may also have been in use at Exeter in Types 4 and 6, and maybe again in Type 10.

It therefore seems that there was a regional element to the use of dies of rough workmanship in the coinages of William I and II. In the early period the dies mostly turn up in the Northern part of the East of the country, with a possible further regional grouping in East Anglia. In Coin Type 8, at the beginning of William II's reign, the rough dies are almost all found in Wales and its surrounding area. There are also potential rough dies from Exeter, in the far South-West of the kingdom. This regionality of use adds weight to the argument that these irregular dies were of local manufacture, rather than coming from the central die-cutting centre in London.

It is notable that all of these main areas for the use of irregular dies (The North-East, Wales, and the South-West) are on the fringes of the kingdom, and all fairly distant from the centre of royal power in the South of England. There are, of course, exceptions to this, especially when one considers the

examples which are less certain. These include Ilchester in Type 1, Northampton in Type 2, Canterbury in Types 5, 8, 10 and 11, Sudbury in Type 6, Wallingford in Type 8, and Chichester in Type 10. London itself also appears in the list, in Types 2, 5, 10, and 11. However, the main use of dies of definite crude workmanship seems to have been in the parts of the kingdom most distant from the centre of royal power.

Interpretation of the use of coining dies of rough workmanship is not simple. While the argument that they represent locally-cut dies is convincing, the reason for their production is less easy to understand. Stafford examined the situation for the earlier reign of Aethelred II and attempted to link the times and places of local manufacture of dies to known historical activities of local lords, suggesting that the local dies represented the granting of minting rights, and their revenues, to particular nobles at particular times (Stafford 1978). There is little to suggest that a similar interpretation could be offered for the coins of William I and II, especially in light of the evidence which intimates that normally all dies of this period were to be cut in London (e.g. the Domesday Book entry for Worcester: fol.172, A Williams and Martin 1992, 474). Additionally, the small sample of surviving coins means that it is highly likely that our list of times and places when rough dies were used is incomplete, and the paucity of documentary evidence for the activities of individual nobles would make such a comparison extremely difficult.

A more plausible explanation of the use of locally-cut dies in these reigns would be that they were an emergency measure at times when new dies were needed quickly and there was not time to travel to London to collect official ones. This would be consistent with the geographical location of the mints where this practice is known, and in some cases could also be linked to political needs, such as the consolidation of Norman power in Wales in the early part of William II's reign (when Coin Type 8 was in circulation). Whether it was an officially authorised practice is more difficult to judge, but the fact

that the moneyers using these rough dies seem to have made no attempt to conceal their name on the coins suggests that it may have at least been tolerated. In addition, for many of the moneyers who struck coins using dies of crude workmanship we also have other coins of the same type struck from official dies, and some of the coins struck with a rough obverse die seem to have been struck with a perfectly normal reverse die. This lends weight to the idea that the rough dies were a quick replacement for a broken official die, possibly as an interim measure until a new official die could be obtained. These circumstances also weaken the alternative argument that these rough dies represent coins struck by forgers. A further argument against that suggestion is the fact that most of the coins of rough workmanship are not struck from noticeably underweight or poor-quality silver. However, the idea that the rough dies are ad hoc replacements in times of need does not address the noticeable regionality of the practice, nor the clear change to that regional patterning over time.

A case of particular interest is the use of irregular dies for coins of moneyer Outhgrim at York in Type 3. The project dataset includes only two individual coins from the York mint for this Type, both minted in the name of Outhgrim and, in fact, both struck from the same pair of dies. With our present state of knowledge, therefore, the only coins to emanate from the York mint in this Type were struck from a pair of dies of possible local manufacture. Some of Outhgrim's coins from York in Type 4 are also from dies of poor workmanship. Outhgrim had joint responsibility at Lincoln as well as York in this period but it is notable that none of his extant Lincoln coins are struck from rough dies. This is an intriguing snippet of evidence, and may relate to the political events at York at this time. This is investigated further in section 5.2 in the following chapter.

4.2.3 Alteration of Dies

A further situation which may be identified from a visual study of the coins is the instances where a coining die has been altered before use. In these cases, it seems that the inscription on the reverse of the coin was changed, with the result that the name of the moneyer and/or the mint is less easily legible. It can be presumed that this was done in order to conceal those details from scrutiny, and in many of the identified coins struck from altered dies, there is a corresponding low weight or poor-quality fabric, thus suggesting that some kind of debasement had been applied to these coins. The implication is that the moneyers were cheating the coinage system, for their own profit, and the dies were altered in order to lessen the likelihood of the poor-quality coins being traced back to them.

Brooke identified a number of coins of William I which had been struck from altered dies (Brooke 1916, cxliv-cli). These include coins of London moneyers Aelfsi in Coin Types 1-3, and Godwine in Coin Type 2. An example of an altered die of Aelfsi can be seen at figure 4.18. Brooke has suggested that the inscription originally read '+IELFS ON LVNDENI' but it has been altered so that it now looks more like '+IDCFI ON CA[- -]ENI'.



Figure 4.18: Coin of Aelfsi of London with reverse die altered to obscure the name of moneyer and mint

The example above shows a coin which has clearly been altered but where it is possible to decipher the alteration and work out what the original inscription probably was. There are a number of instances of altered dies where the original inscription is unclear, such as the coin of Type 7 identified by Brooke (ibid., cli); it may be suggested that these were the more successful alterations. In all cases, however, since the coins are struck from official dies which have been subtly changed it is necessary to undertake a close examination of the coins, or of high-quality images of those coins, in order to identify these instances of die alteration. For the current project, as detailed in section 4.2.4 below, this detailed examination was only feasible for a small sample of the surviving coins; the available time and resources were insufficient for a comprehensive and systematic search for altered dies. The sample study which was undertaken did not reveal any additional examples of altered dies beyond those highlighted in the existing numismatic literature. These, however, are sufficient to indicate that this type of malpractice was present, especially in the early part of the period, although any quantification of the practice, or comment on its longevity, is not possible with the current data.

4.2.4 Die-Linkages

A great deal of information can be inferred from an analysis of the dies used to strike medieval coins. Close examination of the coins can identify individual coining dies, and comparison of these can establish 'die-linkages', where two or more coins were made using the same dies. In some cases, coins can be shown to be die duplicates, i.e. struck with the same pair of dies, but in other cases coins are only linked by one die, having been struck from the same obverse die but different reverse dies, or vice versa. Once these linkages have been identified, they can be interpreted to provide suggestions of working practices within mints, and connections between moneyers.

An examination of this kind must by necessity be very detailed and is thus very time-consuming. As such it was beyond the scope of this project to undertake a full die analysis of the surviving coins of William I and II. Instead, a sample of the coins was chosen for study with the hope that the results from the subset could be extrapolated to make suggestions about the wider situation. The choice of sample was partly practical – it was necessary to choose a defined set which was of a scale appropriate to the time available for the study. Examination of images of around 300-350 coins was feasible. It was also desirable to spread the study across the series of coins in order to provide an indication of whether the situation changed over the course of the first two Norman reigns. The coins selected for analysis, therefore, were those of Coin Type 3 and Coin Type 9. Coin Type 3 was issued in the early to mid-1070s, and was the third issue of William I. Coin Type 9 was in use in the early 1090s, and was the second issue of William II. These therefore both represent coinage issues created fairly early in the kings' reigns. The numbers of surviving coins of these issues in the project dataset are also roughly comparable, comprising 176 coins of Type 3 and 199 coins of Type 9.

When analysing the extant coins, it became clear that for some of those in the dataset it was not possible to identify which dies were used in their manufacture. Some coins are too worn for their designs to be closely examined, and in the case of some incomplete coins not enough survives for certain identification. Additionally, for some of the coins whose details have been derived from published data, rather than from personal examination, the photographs available for this project are not of sufficiently high quality for detailed examination. In total, therefore, it was possible to identify the dies used to strike 155 coins of Type 3 and 174 coins of Type 9.

4.2.4.1 Dies of Coin Type 3

The examination of coins of Type 3 identified 113 different obverse dies and 117 different reverse dies. This is a low ratio of reverse dies to obverse dies. Dolley noted that moneyers would usually use more than one reverse die with a single obverse die (Dolley 1961) and Dave Greenhalgh has confirmed in practice that for a pair of dies the reverse is the one more likely to be damaged, as it is the reverse die which takes the direct strike of the hammer, and therefore wears out sooner (D Greenhalgh, personal communication, 26/07/2016). One would therefore expect notably more reverse than obverse dies to have been produced. The fact that the proportions revealed by the surviving coins of Type 3 are almost equal suggests either that our sample is only a small proportion of the original coins, or that the length of issue of this type was short, such that the design of the coins was changed before many reverse dies had the chance to wear out. Either explanation is feasible, and the reality may well be a combination of the two.

Further evidence to investigate this point can be suggested by looking at the number of die duplicate coins within the sample. The original production of coins would have included many thousands of duplicate coins made with each die pairing, so a sample which was made up of a large proportion of the full set would be likely to include a large number of duplicates. As a rough

guide, therefore, if a sample contains a large number of die duplicates it is more likely to be representative of the whole, and also more likely to include examples of most of the original dies. Conversely, if a sample includes a large proportion of coins which are not die-linked in any way to another coin (known as 'singletons'), it is likely to be only a small proportion of the original and therefore less likely to be representative of the whole. For the 155 extant coins of Type 3 for which dies can be identified, 42 are die duplicates and 84 are singletons. Therefore only 27% of the coins are duplicates, while 54% are singletons. This makes it highly likely that the extant coins of Type 3 are only a small sample of the original issue. Conclusions drawn from examination of these coins are therefore offered with due caution.

The study of the dies identified 128 different pairings of obverse and reverse die within the surviving coins. 37 of these die pairings (29% of the total) are linked to another die pairing, thus representing die-linked coins where one die is common to both coins but the other is different. These pairings can be represented visually by 'die graphs'. The graphs for Coin Type 3 are presented at Appendix 3.1, and an example is shown at figure 4.15 above. The obverse dies are shown as red circles and the reverse dies as blue circles. The black lines which connect the circles represent coins, so the example above shows that we can identify at least two individual coins struck with obverse die 3Ob061, one using reverse die 3Re093 and one using 3Re092. Reverse 3Re092 has also been used with obverse 3Ob092, which in turn can be shown to have sometimes been paired with 3Re094. All these coins were struck at Wallingford under moneyer Brihtmaer. The die pairings may represent consecutive uses of dies, for instance working with 3Ob061 and 3Re093 until the reverse die broke and was replaced with 3Re092. That pair was used until the obverse die was worn out and replaced with 3Ob092, and then when 3Re092 broke in turn, 3Re093 came into use. Alternatively, the dies may all have been in use concurrently, and the linkages may indicate that there was little necessity for specific obverse dies to always be paired with the same

reverse die – a worker striking the coins may have grabbed a different combination of dies from one day to the next.

These die linkages between coins of the same moneyer at the same mint are by far the most common in Coin Type 3, with 92% of the linkages being of this type. However, there are three instances of die linkage which are more unusual. In two cases we can see linkages between different moneyers within the same mint. These are outlined in table 4.6, and the die graph of the Worcester example can be seen in figure 4.19. Pairings of this kind can offer suggestions about the practicalities of working within the mints. Perhaps moneyers occasionally passed a used obverse die on to another moneyer working in the same town, or possibly the obverse dies were viewed more as a communal store, to be used by any moneyer operating there.

Obverse die	Reverse die	Coin(s)	Moneyer	Mint
3Ob091	3Re049	BMC0198	Godric	London
3Ob091	3Re053	BMC0200	Godwine	London
3Ob052	3Re113	BMC0224; FZB0029	Eastmaer	Worcester
3Ob052	3Re114	BMV0070	Leofric	Worcester

Table 4.6: Die linkages between different moneyers at the same mint, in Coin Type 3

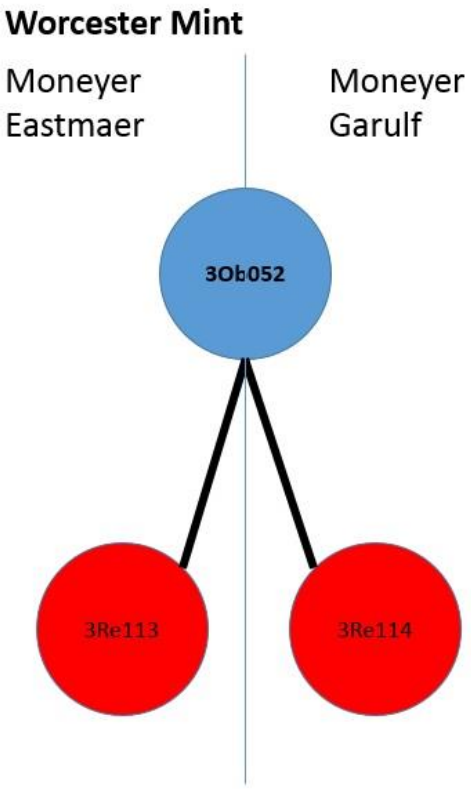


Figure 4.19: Die linkages between coins of Type 3 of moneyers Eastmaer and Garulf at the Worcester mint

The final die linkage identified in Coin Type 3 is even more unusual, representing a link between different moneyers in different mints. Coin NMW0075 was struck in the name of Sibode at London, using obverse die 3Ob033 and reverse die 3Re054. This obverse die also seems to have been used by moneyer Aelfwine at the Exeter mint, with coins FZB0025 and FZB0026 struck from that obverse, with reverse die 3Re018. Examples of these coins are shown at figure 4.20. The possible interpretations of this linkage are fascinating, as it may represent a personal connection between the two moneyers, despite the distance between the mints. Alternatively, it may imply a central administrative authority organising the transfer of a die from one mint to the other. These ideas are examined further in section 5.4 in the following chapter.



Coin NMW0075; coin type 3;
London mint; moneyer Sibode



Coin FZB0026; coin type 3;
Exeter mint; moneyer Aelfwine

Figure 4.20: Die-linked coins of moneyer Sibode at London and moneyer Aelfwine at Exeter

4.2.4.2 Dies of Coin Type 9

The analysis of Coin Type 9 showed generally similar patterns to those revealed for Coin Type 3. In total 174 coins had sufficiently clear images to allow identification of both coining dies; just slightly more than those identified in the earlier type. These coins led to the classification of 131 obverse dies and 136 reverse dies. As with Coin Type 3, this is a very low ratio of reverse to obverse dies, suggesting that the sample we have to investigate may be only a very small proportion of the original issue. This suggestion is

bolstered by the fact that the sample includes only 31 die duplicate coins, but 82 singletons. This means that for Coin Type 9 only 18% are die duplicates, which is an even lower proportion of the sample than that seen in Coin Type 3. The proportion of singletons in this sample is 47%, which is also slightly lower than the 54% found in Coin Type 3.

The analysis revealed 143 pairings of obverse and reverse die, and the die graphs for these can be seen at Appendix 3.2. Of these die pairings 46 are die linked to another pairing. As with the earlier type, the majority of die linkages represent different dies used by the same moneyer at the same mint. However, the number of die linkages between different moneyers at the same mint is markedly higher in this Coin Type than in Coin Type 3. For coins of Type 9, six instances of different moneyers using the same obverse die can be identified within the coins of the project dataset. They are summarised in table 4.7. Although the number of individual instances is still very small, this higher occurrence of the sharing of dies between moneyers is noteworthy. It may hint at a greater tendency for dies to be used communally within the mints in this later period. This too is explored further in section 5.3 in the next chapter.

Obverse die	Reverse die	Coin	Moneyer	Mint
9Ob003	9Re009	BMC2008	Leofwine	Chester
9Ob003	9Re010	EMC2339	Sunulf	Chester
9Ob008	9Re018	BMC2014	Leofwine	Dover
9Ob008	9Re098	EMC2804	Leofric	Dover
9Ob014	9Re025	BMV0249	Aelfric	Lewes
9Ob014	9Re109	BMV0250	Wineraed	Lewes
9Ob020	9Re117	EMC2666	Brihtraed	Oxford
9Ob020	9Re061	EMC2455	Wulfwi	Oxford
9Ob080	9Re122	BMV0255	Aelfgaet	Sandwich
9Ob080	9Re121	BMC2041	Aelfheh	Sandwich
9Ob084	9Re082	BMC2060	Eadwine	Winchester
9Ob084	9Re087	BMC2063	Leofwold	Winchester

Table 4.7: Die linkages between different moneyers at the same mint, in Coin Type 9

Coin Type 9 also includes a single instance of a die linkage between coins of different moneyers at different mints. In this case the link is between the mints of London and Canterbury. Moneyer Brihtwold in Canterbury struck

coin FZB0132 using obverse die 9Ob085 and reverse die 9Re003. Coin BMC2022 shows same obverse die in use by Aelfraed in London, with his reverse die 9Re032. These coins are shown at figure 4.21. This particular connection is rather more explicable than the link between London and Exeter seen in Coin Type 3, since these mints are much closer geographically. In addition, there is already clear evidence of interaction between London and Canterbury, with occurrences of moneyers with dual responsibility at both mints appearing throughout the series, as detailed in section 4.1.4 above.



Coin BMC2022; coin type 9;
London mint; moneyer Aelfraed



Coin FZB0132; coin type 9;
Canterbury mint; moneyer Brihtwold

Figure 4.21: Die-linked coins of moneyer Aelfraed at London and moneyer Brihtwold at Canterbury

4.3 Synthetic Analysis of Mints, Moneyers and Coining Dies

Examination of the towns and people named on the reverse of the coins of William I and II provides a picture of minting activity across the kingdom throughout the period. The picture shows a surprising amount of variation, with moneying contingents changing size, and individual mints growing or reducing in importance. Some towns cease minting altogether, while others start to produce coins for the first time. The larger mints are rather more stable than the small ones, but even here change is visible, with the focus of

minting activity shifting away from the Northern towns, such as York and Lincoln, and towards East Anglia and the South-East of the kingdom.

The role of moneyer also defies easy generalisation. The coins show examples of moneyers who seem to have only been active for one brief period, as well as others whose names appear on the coins for decades. Some moneyers had concurrent responsibility at more than one mint, and others may have moved between mints over time. A few of these officials can also be seen to have sometimes used their own locally-cut coining dies, instead of official dies from the die-cutting centre in London. It is unclear how legitimate this practice was but the moneyers who undertook it clearly felt sufficiently secure to retain the use of their name on the coins struck from these dies. Only very occasionally do coins show evidence of tampering with the dies to disguise the name of the moneyer or mint.

The coins also provide evidence for the working practices of the mints, and the workshop equipment used therein. Examination of the die axes of the coins shows that in most cases the moneyers were using coining dies of square cross-section, with a clear exception at the mint of York, where circular dies were in use. Additionally, there are indications of the possible use of circular dies elsewhere in the country, but only in Coin Type 3, which suggests a variation to the normal system for that particular coin issue. The timing of this variation may indicate that it was related to specific political events, such as the effects of the Northern Rebellion and the Harrying of the North; this is explored further in the following chapter.

Close examination of the coins to identify the individual dies used to strike them also provides evidence of minting practice, highlighting links between moneyers within minting towns. There is a suggestion that these links become more common in the later part of the period, thus implying a possible shift in working practice. Additionally it is interesting to note that

with the current evidence all the mints identified as having occasions where dies were shared between moneyers are in areas which in previous centuries were controlled by the West Saxons; there are currently no examples in Coin Types 3 or 9 of sharing of dies at mints in the old Danelaw areas. In a few instances the coins also show die-links between different mints, suggesting either the sharing of dies between moneyers in different locations, or the movement of dies from one place to another.

Overall, therefore, examination of the mints, moneyers and coining dies provides a picture of a dynamic and flexible minting system, and a network of mint officials with a surprising variety of working practices, careers, and opportunities for travel and the wielding of authority. These details complement and enhance those derived from the metrological examination of the coins delineated in chapter 3. The following chapter synthesises this further, interpreting the data to suggest narratives of social and personal, as well as economic and political, histories. Chapter 6 then investigates how these narratives can influence the public representation of Norman England through the UK heritage industry.

Chapter 5: Social and Historical Implications of the Coin Evidence

The preceding two chapters presented the results of various analyses of the surviving coins of William I and II. Chapter 3 delineated details of the metrical properties of the coins, highlighting patterns in their weights and diameters. Chapter 4 explored the names of the mints and moneyers given in the reverse inscriptions of the coins, and examined the indications of the dies which had been used to strike the coins. All of these analyses revealed patterns with implications for the history of early Norman England and the mechanics of the Norman Conquest. The present chapter examines these implications and develops their inferences in order to investigate what the coins can reveal about history and society in this period.

The data derived from the coin study are here pulled together under thematic headings. The notion of homogeneity and, conversely, regional variation in the coins is examined first, followed by an investigation of whether the influence of known historical events can be traced in the coin evidence. The nature and role of the moneyers is next discussed, and elements of all these themes are then combined in a consideration of the extent and effectiveness of central administrative control of the minting system. Finally, an identification and quantification of changes over the course of the period is undertaken.

These thematic interpretations of the coin evidence can be seen to constitute new narratives of the Norman Conquest and the establishment of Norman rule in England. The chapter concludes with a summary of these novel histories, and the nuances they provide to the established narrative. This has profound implications for the public representation of the period, and that aspect is developed in the succeeding chapter.

5.1 Regional Variation

At the very broadest level the English coinages of the early Norman kings can be said to have been homogenous national issues. The silver penny was the only legitimate coin in circulation, and all the mints across the kingdom concurrently struck coins with the same design. The weight and size of those coins was roughly the same, and all were struck of good quality silver. However, closer examination of the coins quickly reveals a great variety between individual pieces, and study of the corpus of surviving coins suggests patterning within that variation, some of which is related to geographical location. Section 2.3, in chapter 2, detailed the selection of six case study minting places to act as a practical and representative sample of the corpus. The sites of these mints are spread across the kingdom. Comparison of the case study areas will therefore allow identification of variations based on location, so it is beneficial to begin by summarising the results of analysis of these individual case studies. The interpretation will then be broadened to examine links between mints and assess the notion of regionality within the surviving coins.

5.1.1 Summary of Analyses of Coins of the London and Southwark Mints

The mint of London was the most prolific in the early Norman period, and examination of the extant coins originating from that mint provides a picture of great diversity. The weights of coins from the London mint are very varied, especially in the early part of the period. As discussed in section 3.3 in the third chapter, for some coin issues there may have been more than one intended weight standard in use at the mint, and in many Types the evidence for any kind of standardisation is poor, with a very broad range of coin weights being produced. In the early part of William II's reign this array of weights is greatly reduced and the coins become much more uniform. However, in the middle and latter part of the reign some of the previous diversity returns and coins of the mint are again struck to a variety of

weights, although not as broad a variety as in the earlier reign. Overall, the average weight of coins from the mint is somewhat lower than the national average. As seen in all mints, the diameters of the coins show a high level of variation. Examination of the coins from the nearby Southwark mint shows roughly similar weights and diameters to those from London, although with rather less diversity within the sets of contemporary coins.

In keeping with the size of its output, the London mint was also the largest in terms of numbers of moneyers working in each Coin Type, with eleven known for Coin Type 2, eight for Type 8, and 13 for Type 10. Some of these moneyers were in post for a long time, but a good proportion are only currently known to have worked for a short period, and there are a number of moneyers who seem to have only performed the role occasionally, their names appearing only sporadically on the coins. The moneyers of the London mint seem quite dynamic, with a number having joint responsibility with other mints, most often Southwark or Canterbury. Moneyers can also be seen to have moved between London and Southwark. The Southwark mint had a much smaller contingent of moneyers, usually between two and four.

There is a clear regularity to the die axes of the coins at both mints, which suggests that the coining dies were of square cross-section. Almost all the surviving coins of the mints were struck from dies of good workmanship, although there are a few coins from London whose dies are cruder, as well as some where the dies have been altered to obscure the name of the mint and moneyer. There are also some coins of very low weight, or unusual fabric, which may suggest forgery of coins, or at least misuse of the minting system.

Most of the coins of the London mint from Coin Types 3 and 9 were struck from separate pairs of dies, but there is one instance of a coining die being shared between two moneyers at the mint in Coin Type 3. Additionally, there are two instances of dies being shared between London and another mint; in

Coin Type 3 an obverse die was used in both London and Exeter, and in Coin Type 9 a die was used in London and in Canterbury. These are the only identified instances of coin dies being shared between different mints in Types 3 or 9.

5.1.2 Summary of Analyses of Coins of the Winchester Mint

Analysis of the coins from the mint at Winchester presents a very different picture to that from London, giving an impression of conformity rather than diversity. From the earliest part of the period coins of the Winchester mint show a high level of uniformity of weight, with no evidence for multiple intended weight standards. The coins are generally heavier than the national average. The diameters of the coins, however, are just as varied as those of coins from London.

The Winchester minting contingent is smaller than that at London, but still relatively extensive, with between five and eight moneyers known to be working concurrently in the larger Coin Types. The personnel list is also much more stable than at London, with less frequent changes, and few moneyers working for only short periods. There is little evidence for Winchester moneyers having joint responsibility elsewhere, or moving between mints.

Winchester moneyers seem to have been using square dies, and virtually all coins of the mint were struck with official dies. There is just one example of a coin struck from a die of crude workmanship. As with London, most of the coins were struck with pairs of dies used exclusively by one moneyer, but in Coin Type 9 an obverse die is shared by two Winchester moneyers.

5.1.3 Summary of Analyses of Coins of the York Mint

The coins from York suggest a changing picture at this mint. In the first two Coin Types the average coin weight is higher than the national average, but

from Coin Type 4 the weights are lower than average. There is high variation in the weights of coins from this mint, and a suggestion, similar to that at London, that in some Coin Types, pieces were being struck to more than one intended standard weight. Even in Coin Type 8, which is the most uniform across the kingdom, there is a hint of this diversity.

The size of the moneyer contingent clearly changes over time, with eleven moneyers (the same as at London) known to have been striking in Coin Type 2, but only four in Type 8 and just two in Type 10. There is a sudden reduction in the number of moneyers after Coin Type 2, and the mint seems to have gradually reduced in size from that point. In the reign of William II, the number of surviving coins from the York mint is very low, with no coins at all currently known from the very last Type. The moneyers who do remain in post, however, generally have very long tenures in the role. Some moneyers had joint responsibility at other mints and there is evidence for moneyers moving from York to new locations.

The York mint is the only one where the coining dies seem to have been of circular cross-section, and this variant minting practice continues for much of the period under consideration. There is also evidence for the use of crude dies at York in Coin Types 3 and 4, but the paucity of surviving coins of Types 3 and 9 means that the current study cannot offer any comment on sharing of dies between moneyers at this mint.

All the analyses show that there is a clear change in the situation at the York mint after Coin Type 2. This may be related to the Northern Rebellion and the Harrying of the North, and is examined further in section 5.2 below.

5.1.4 Summary of Analyses of Coins of the Lincoln and Stamford Mints

Analysis of the coins from Lincoln presents a rather confusing picture, with variation both between coins and between patterns within the data. The

weight profile of the coins changes from type to type, with some being much heavier than the national average, and some much lighter. In the early Coin Types the variation of weights produced at this mint is high, but the coins then start to increase in uniformity. However, in Coin Types 6 and 7, at the end of William I's reign, the diversity in the Lincoln coins becomes very much more pronounced, before the gradual trend towards standardisation starts again. The weights of the few surviving coins of the Stamford mint show little similarity to those from Lincoln.

The moneyer contingent at Lincoln was substantial in the early part of the period, with seven moneyers known in Coin Type 2. Similarly to York, the number of moneyers falls after this time, and only two are known for Type 8. Unlike York, though, the number of moneyers in Lincoln rises again later in William Rufus' reign, and five are known for Coin Type 10. These moneyers have a range of lengths in post, with some only minting for a short time, and others for much longer. However, over the course of Coin Types 3 and 4 there seems to have been an almost complete change of personnel at the Lincoln mint.

At least one Lincoln moneyer had joint responsibility at York, and there are also possible instances of Lincoln moneyers, or moneying families, moving from Lincoln to other mints, including Thetford. There is, however, no evidence of particular links between moneyers at Lincoln and Stamford in this period.

Coins from both Lincoln and Stamford were struck with square dies, as in most other mints. However, at Lincoln there are a great many examples of coins struck with dies of crude workmanship, and their use is known here in Coin Types 2, 3, and 4, and possibly late in the reign of William Rufus too. In Coin Type 4 all six known moneyers were striking some coins with crude dies, although they were also striking coins with official dies. There is no evidence

of the sharing of dies between moneyers at Lincoln, based on Coin Types 3 and 9.

5.1.5 Summary of Analyses of Coins of the Thetford and Norwich Mints

Coins produced at the two Norfolk mints show a great deal of similarity to each other. Both have a notably lighter weight than the national average, and they show a parallel move from diversity of coin weights towards greater uniformity as the period progresses. The early coins of the Thetford mint, however, seem to have a broader variation in weight, with some indication of possible multiple weight standards, as seen in London, while the weights of Norwich coins have no suggestion of this. As with all mints, the diameters of the coins show great variation throughout the period.

The moneying contingent at the two mints is fairly similar, with Norwich currently having four known moneyers in Type 2, eight in Type 8, and six in Type 10, while Thetford has six moneyers in Types 2 and 8, and seven in Type 10. The moneyers seem to have had a variety of lengths of tenure, although at the end of Coin Type 3 there may have been a change of personnel at both mints.

There is evidence of Thetford moneyers having dual responsibility with other mints, including Norwich. Additionally, the evidence suggests a number of instances of moneyers moving from Norwich to Thetford, and vice versa, and the possibility of moneyer moves to and from other mints.

Both Norwich and Thetford seem to have been using coining dies of square cross-section, and most coins were struck with official dies, although there are some coins of both mints in Type 2, and of Thetford in Type 3, which may have used crude local dies. The dies used for coins of Types 3 and 9 do not show any links between moneyers.

5.1.6 Summary of Analyses of Coins of the Gloucester, Worcester, and Hereford Mints

The number of surviving coins from the West Country mints is small, so the picture produced by analysis is somewhat uneven. Some general trends are identifiable, however. In the reign of William II, the weights of coins of all three mints are close to the national average, but in the earlier reign they seem to be of rather lower than average weight. Where it is possible to say, the distribution of weights seems to be similar to the uniformity of the Winchester mint, with the exception of Coin Type 2 at Hereford, which has a broader spread of weights. The diameters of all coins show high levels of variation.

The number of moneyers at these mints is smaller than the other case study areas, with Gloucester currently having three known moneyers in Types 2 and 8, and only two in Type 10. Hereford is slightly larger with four moneyers in those first two Types, and five currently known for Type 10. Worcester has six identified moneyers in Coin Type 2, and four in Types 8 and 10. There is little evidence for moneyers of these mints having dual responsibility, or moving location, apart from the tentative identification of a moneyer moving from Worcester to Hereford, as noted in section 4.1.4 of the preceding chapter. The surviving coins are too few to postulate on patterns of moneyer tenure in this region.

All three mints seem to have used square coining dies and there is no evidence of the use of local dies at these mints, despite their proximity to Wales, where crude dies are prevalent in some Coin Types. Most of the dies currently known for Types 3 and 9 seem to have been particular to individual moneyers, but at Worcester in Type 3 two moneyers shared an obverse die.

5.1.7 Links between Mints

Examination of the coins, with particular reference to the case study areas, shows some instances of clear links between individual mints. The two mints in Norfolk are an obvious example of this; Thetford and Norwich have a number of direct connections, including moneyers who worked in both locations, and an indication that they were working to the same weight standard, producing coins of similar weights to each other, but somewhat lighter than those produced elsewhere. Similarly, the mints of London and nearby Southwark shared moneyers and seem to have produced coins of comparable weights. However, coins of the Southwark mint show less diversity than those from London which may suggest that different influences were at play in the decision-making at the smaller mint. This is explored further in section 5.4 below.

In addition to these closely linked mints there are a number of other connections between mints around the kingdom. Thetford is linked to London by a shared moneyer, and may also be linked to Stamford and to Lincoln. Lincoln and York also shared a moneyer. These particular connections are between mints in the East of the country, in areas which were part of the Scandinavian-ruled Danelaw in the late 9th and early 10th centuries. While there are some similar links between geographically close towns in the rest of kingdom, such as the moneyer with dual responsibility at Canterbury and Romney, or the possible movement of a moneyer from Worcester to Hereford, in general they seem less common in the West.

As well as connections with the Danelaw mints, the mint of London also shows links with mints elsewhere in the kingdom. There is a close tie with Canterbury, in terms of both a number of shared moneyers and an instance of a coining die being used at both mints. Other links with the South Coast ports can be inferred from a moneyer with joint responsibility at London and

Sandwich in Coin Type 12. Further, the coining die of Type 3 which was used in both London and Exeter offers an example of London being connected with the wider kingdom, and this may highlight a logistical role for the mint, rather than representing a link between two specific moneyers. It is clear that London did have operational associations with the wider minting system, since the majority of the coining dies were made in the capital and then distributed to the other mints, and this movement of a pre-used die may indicate a greater extent to this logistical role.

In contrast to these identified connections between mints, there are a number of cases where a link may logically have been postulated but the surviving evidence does not support it. There is currently little indication of an association between Lincoln and Stamford in the later 11th century, for instance, despite the close ties between the two mints in the earlier medieval period, as noted in section 2.3.4 in Chapter 2. Similarly, the mints of the West Country show very little connection in terms of moneyers or coining dies. In both cases, however, this lack of evidence may be due to the small number of surviving coins rather than to an actual absence.

5.1.8 Regionality in the Coins of William I and II

The above synopses indicate that during the reigns of the first two Norman kings the minting system encompassed diversity with a number of variables. Some of these variables show only small differences between the different mints but others suggest clear distinctions between them. A few of those differences are unique to individual mints, while some form patterns which highlight regional groupings within the dataset.

The homogeneity of the coin issues can be seen in their design, with all mints striking coins with the same obverse and reverse image, and the same style of inscription. This is not surprising when one considers the postulated common origin of the dies for minting the coins, at a die-cutting centre in

London. The other main variable which shows little disparity between mints is less easy to explain. This is the diameter of the coins, which seems to be equally erratic in the corpus of pieces from each location. This is in contrast to the weights of the coins, which show clear geographical differences' suggesting that it was the weight which was the important metric; in all cases the diameter has virtually no correlation with the weight of the coins. This is examined further in section 5.2.2 below.

Other variables within the coins seem to differ from mint to mint. One example is specific to an individual mint: the die axes of the coins from York. Where there are sufficient coins to draw a conclusion, at all other mints the majority of coins have a 'regular' die axis, aligned to one of the four cardinal points, but coins of York show no indication of patterning within the die axes of their coins. This suggests that the coining dies used to strike the coins at York were of circular cross-section, while those elsewhere were more likely to be square. With the exception of Coin Type 3 (examined in section 5.2.1 below) circular dies do not seem to have been used anywhere other than York.

There are other criteria which show variance between mints, but without any kind of regional patterning. The average tenure in post of the moneyers is an example of this. Where there is sufficient evidence, it points to a variety of lengths of service for the moneyers, and most mints seem to include a range, with some moneyer names appearing on the coins for many successive Coin Types and others only for a short time. Some mints do seem to have a specific tendency, however. At York, after Coin Type 3, the moneyers are almost all long-serving, with no names appearing for just a few Coin Types. Conversely, at London there are many instances of moneyers with only a short time in post, as well as some who seem to fulfil the role on a sporadic basis. There are thus clear differences in the lengths of tenure of moneyers at different mints, but no clear regionality to the pattern.

Other variables, however, show divergence from mint to mint, but within that divergence there are patterns suggestive of regional grouping. One of these is the weight of the coins. While the profile of weights varies between mints, there are certain tendencies within those profiles which seem to have a regional element. Within individual Coin Types some mints were clearly striking to a single intended standard weight, while at other mints there was much greater diversity. Winchester is the prime example of the former, and the mints of the West Country seem to follow a similar pattern. For the latter, London is the main proponent, but indications of similar diversity can also be seen at York, Lincoln, and Thetford. This suggests that the wide variety in coin weights was common in the North and East of the kingdom but uncommon in the South and West. At a smaller scale too, regional differences can be seen. The prime example here is the mints of Norwich and Thetford, which were minting coins to a very similar weight standard to each other, but to a notably lighter standard than the national average, thus suggesting a 'Norfolk weight standard' within the coin data.

A similar regionality can be seen in the use of dies of crude workmanship, suggesting possible local manufacture. In the early part of William I's reign these dies were used in a number of mints around York and Lincoln, and possibly also in Norfolk. This again suggests a practice centred on the North and East of the kingdom. In Coin Type 8 this practice can be seen again, but this time it is mostly confined to the mints of Wales, and a few other nearby towns, such as Shrewsbury and Bristol.

The working practice and actions of the moneyers also seem to show some level of regionality. There may be a pattern to the places where coin dies are shared between moneyers within the mint, for instance. Caution is required when examining this criterion, since the surviving evidence is certainly not complete, and for the current project only two of the smaller Coin Types have

been examined for these links. However, within those two Types there is evidence of sharing dies at a number of mints, namely London and Worcester in Type 3, and Chester, Dover, Lewes, Oxford, Sandwich and Winchester in Type 9. All these mints are in the West or South of the kingdom, and all are in the area previously under West Saxon control, with the exception of London, which occupied a border location between the Danelaw and West Saxon England. None of the ex-Danelaw mints show evidence of sharing of dies in Coin Types 3 and 9. Further, if one looks at intra-mint linkages where they have been identified by previous researchers for other Coin Types, the pattern continues. Of the 40 additional die links identified by Brooke (1916) and in the various volumes of the SCBI series, only six are from Danelaw-area mints, and half of those are from London. The others are all from Coin Type 8, and comprise two links at Norwich (between Godwine and Ulfcetel, and Godwine and Howord), and one at York (between Aleif and Outhbeorn). See Appendix 4 for the full list of known linkages of this type.

While the practice of sharing dies between moneyers seems rare in the mints in the North and East, they instead seem to show a higher instance of moneyers holding dual responsibility at different mints, or of moving from one mint to another. The moneyers of the ex-West Saxon mints appear to have been more static.

A number of the variables within the coins, therefore, seem to highlight a difference between mints of the North and East of the kingdom, and mints of the South and West. The difference roughly correlates with the division in the late 9th and early 10th centuries between the area ruled by the West Saxon kings, and the area under the influence of Scandinavian rulers. The Danelaw towns developed close links with each other in that period, so the links between ex-Danelaw mints highlighted in section 5.1.7 above may therefore represent a continuation of traditions established in the earlier century. These traditions can also be seen in the preponderance of the Scandinavian

languages in the names of moneyers from the Danelaw area, particularly those of the York mint (Pirie 1975, li). Other differences between the two areas also represent a continuation of patterns established in the previous century, as noted by Metcalf. His analysis covers the period AD 973 to the eighth Coin Type of the early Norman kings, and identifies a difference in the weight profiles which he describes as "a single heavy standard […] in the west, and multiple standards in the east" (Metcalf 1998, 153). This pattern of uniformity in the West and diversity in the East continued into the reigns of William I and II, and is a further element to what may be described as separate Danelaw and West Saxon coin profiles, which are still identifiable within the corpus of early Norman coins.

On a smaller scale too, regions can be seen to have a specific profile to their coins. The Norfolk mints of Thetford and Norwich produced coins similar to each other, but variant from elsewhere, and the surviving evidence also points to general similarity between the coins of the West Country mints of Gloucester, Hereford, Worcester and Winchester.

In the introduction to the book 'Symbols of Power', Hockenhull notes how currencies can help create and symbolise group identities (Hockenhull 2015, 8-11). He is discussing groups of a much larger scale, but the point is valid for smaller groups too. While the differences highlighted by this investigation would rarely be noticeable in a single coin, for people who were dealing with large amounts of money, such as the moneyers, merchants, and revenue collectors, it would have been apparent that different regions were producing coins to different standards. It can easily be imagined that the familiarity of the coin standards of a person's home region could lead to identification with that region, as contrasted with other regions which were producing coins to standards which were strange to them. The differences seen between the ex-Danelaw and West Saxon areas in the early Norman period, over 100 years after the Danelaw was reconquered, allow inference

of a continuing Danelaw identity, and a comparable West Saxon identity, within the English kingdom. Further, in the variant practice of using circular coining dies uniquely at the mint of York, we can see a tradition which has survived in unbroken usage from the late 9th century (Blackburn 2004, 338). This could be understood as a continuing identity from the Viking Kingdom of York. Other small regional identities can also be postulated, such as the Norfolk identity, or the West Country identity. The regionality within the coins can therefore be seen as evidence of possible regional identities within early Anglo-Norman England.

5.2 Historical Events

Examination of the coins has presented a picture of a diverse and dynamic English monetary system. However, within that there are some instances where the variance in the coin corpus is particularly anomalous. In looking for interpretations of these anomalies it is tempting to turn to history and try to tie the vagaries of the coin evidence to known events which occurred in the kingdom at the time. This must always be done with a degree of caution, especially since the precise dating of the coin issues cannot be confirmed. However, there are two particular known historical events which do seem to leave traces in the coin evidence; the Northern Rebellion of 1068-69, and the First Crusade to the Holy Land in 1095-1099.

5.2.1 The Northern Rebellion and the Harrying of the North

The most serious of the early rebellions against Norman rule was in the North of England in 1068-69, when the local earls rose in support of Edgar the Aetheling, who they considered to be the rightful king. The rebels had made an alliance with the Danish king, who sent a fleet to aid their cause. After much fighting, the uprising was eventually suppressed, and in the winter of 1069-70 William's retribution for rebellion was to lay waste to the lands of the Northern rebels, burning crops and destroying property in the act which

became known as the 'Harrying of the North'. The contemporary historical accounts emphasise the devastation of this event. Orderic Vitalis, for instance, suggests that the Harrying was the cause of the deaths of over 100,000 people (*OV*, EH iv, in Chibnall 1969-80, vol. 2, 220-237). This is almost certainly an exaggeration, but is nonetheless an indication of the horror with which the event was viewed, even fifty years later when Orderic was writing.

There are a number of elements in the coin evidence which seem to show the effects of this incident. The dating of the events can be said with fair confidence to fall around the time when Coin Types 2 and 3 were being issued. Coin Type 2 was probably in circulation from around 1068 to the early 1070s, and Type 3 was issued in the early to mid-1070s. The coins in circulation at the time of the rebellion, therefore, were of Type 2, and Coin Type 3 came into use just after the Harrying of the North.

One piece of evidence which can be tied quite securely to these political events is the burying of a large number of hoards of coins within the city of York. York was at the centre of the fighting during the rebellion so citizens would understandably have feared for their property, as well as their lives. One way of trying to ensure the safety of material valuables was to bury them, with the intention of retrieval once the danger had passed. If the owner was unable to retrieve their goods, for whatever reason, they remained buried, sometimes until modern times. Four large hoards of coins have been found within the city walls of York, all of which have coins of William I's Type 2 as the latest in the group[4]. While hoards of coins of various dates have been found within the city, this is an unusually large number of contemporary depositions to find within such a small area, and they

[4] High Ousegate hoard, c.250 coins, found 1704; Baile Hill hoard, c.100 coins, found 1802; Jubbergate #1 hoard, c.600 coins, found 1845; Bishophill #2 hoard, c.50-60 coins, found 1882 (Pirie 1975, xxxiv-xxxvii)

represent substantial wealth. It is reasonable to assume, as previous research has done, that they were buried to keep them safe at the time of the Northern Rebellion (e.g. Dolley 1966, 15; Palliser 1993, 7).

Further evidence can be seen in the mint activity at York. Section 4.1.3 and figure 4.4, in the previous chapter, outline a significant change in the number of moneyers working at York, and this falls at exactly the time of the rebellion and its retribution. We know of eleven York moneyers striking Coin Type 2, but currently only one for Coin Type 3. The numbers pick up again from Type 4 onwards, but only up to five moneyers in any subsequent Coin Type. A number of authors have suggested that this reduction in the moneyer contingent at York may have been part of William's retribution for the rebellion (e.g. Dolley 1966, 13; Metcalf 1993, 197; Allen 2014, 92), and this is convincing. Lyon also notes a reduction in the estimated number of coining dies in use at York over the period of the two reigns (Lyon 2012, 46-49) and Allen suggests that this too may be a symptom of William's retribution against the town (Allen 2012a, 300).

The tiny number of extant coins of Type 3 from the York mint is startling. It may, to a certain extent, be due to the vagaries of survival of coins, but it may represent a genuine huge reduction in minting activity in the town. This would not be entirely surprising in a time of civil unrest, and the evidence supports a hypothesis that goes even further: that there could have been a complete cessation of minting at York in Coin Type 3. The only two coins which are currently known for this Type were both minted by moneyer Outhgrim. In fact, they are full die duplicates, meaning that they were both struck from the same pair of coining dies, and it is very clear that those dies are of crude workmanship, and therefore possible local manufacture. Outhgrim had joint responsibility at both York and Lincoln in this period, with his name appearing at both mints in Coin Types 1 to 3. It could therefore be postulated that at the time of the Northern Rebellion Outhgrim retreated to

Lincoln, which was further from the actual fighting, and continued minting from there. If official minting was stopped at York in Coin Type 3, there would be an opportunity for profit for a moneyer who had a safe haven elsewhere and could acquire a set of locally-cut coin dies to be used to strike coins of York, when no official dies were produced for the mint. Locally-cut dies had been used by many Lincoln moneyers, including Outhgrim, in Coin Type 2, and their use continued there in Types 3 and 4, although all the surviving Type 3 Lincoln coins of Outhgrim seem to have been struck from official dies. It is also interesting that in Coin Type 4, when the York moneyers Aleif, Harthoulf and Outhbern begin minting again after the possible hiatus of Coin Type 3, all four York moneyers are using some locally-cut dies as well as some official ones. This clearly suggests disruption to the minting process in York following the Harrying of the North, and it continues into the mid-1070s.



Figure 5.1: Coin of type 3 from the York mint, moneyer Outhgrim (Coin EMC1365)
[Image taken from EMC; coin currently in the Royal Cabinet, Stockholm]

Figure 5.1: Coin of Type 3 from the York mint, moneyer Outhgrim

The example of Outhgrim shows that it is possible to see hints of the effects of the Northern Rebellion on the careers of individual moneyers. Looking at the York moneyers as a whole, there seem to have been four possible outcomes from the unrest: they either continued minting throughout, ceased minting for a period and then started again, stopped minting at York but possibly started again elsewhere, or finished minting altogether. Of the eleven moneyers who were minting in Coin Type 2, only Outhgrim continues

to issue York coins without a break. Four other moneyers are not currently known in Type 3, but they do appear on later coins at the mint. Aleif, Harthoulf, and Outhbern are minting in Coin Type 4, and Thor appears again in Type 5.

Two of the York moneyers from Type 2 do not appear again on coins of that mint, but their names do appear on later coins at different mints. An Ulfcetel starts minting at Cambridge in Coin Type 5, and an 'Arcil', which could be an abbreviation of Arcetel, is seen on Type 5 coins of Stamford. It is by no means certain that these are the same men who were previously minting at York, but neither Ulfcetel nor Arcetel are common names, so the possibility that they are related to the York moneyers is increased. We could postulate that when the fighting broke out in the North these moneyers chose to flee from the unrest and settle in less volatile areas closer to the centre of royal power. The fact that they held the role of moneyer in York suggests that they would have been of high rank, and it is therefore not unreasonable to suppose that they might rise to a similar position in their new homes. Ulfcetel seems to have prospered at Cambridge too: in Coin Type 8 his name appears both there and at nearby Norwich.

Three of the moneyers disappear completely from the records: Authoulf, Roscetel, and Sweartcol are not seen again on any currently known coins. We could imagine that they may have resigned their position, had it stripped from them, or even died in the fighting of the late 1060s. When the rebellion broke out in 1068 the position of the moneyers at York must have been very difficult. They were officials within the Norman administrative system, and their role was a royal appointment, so they may have had an allegiance to the king. However, many of them had been in post since before the Conquest, and their position suggests that they were likely to be highly involved in local politics, so they may conversely have had sympathy with the Northern Earls. At the time of the rebellion, of course, they could not have been sure who

would emerge successful so the decision on who to support must have been fraught with potential danger. The coin evidence offers hints that the moneyers reacted to this in different ways; some clearly remained loyal to the king, and retained their role after his retribution; others may have decided to avoid the issue altogether by moving away from the area of strife and settling elsewhere; and some may have thrown in their lot with the rebels, which could explain why they do not seem to have held the position of moneyer again.

There is a further area of evidence in the coins which could shed light on the effects of William's reprisals against the moneyers of York. Section 4.2.1 in the previous chapter shows that for most of the reigns of William I and II coins of the York mint were being struck with coining dies of circular cross-section, and that this was the only mint where these dies were used; all other mints were using square-sectioned dies. However, in Coin Type 3 there is a sudden anomaly in that some mints in the South of the kingdom seem to have used some circular-sectioned dies together with some of their more usual square ones. This anomaly only lasts for that one Coin Type, but it can be clearly seen in the coins of Winchester, London, and Wallingford. It is possible that the die-cutters for these mints made a few circular dies for this Type, maybe as an unsuccessful experiment to test their use in the South. However, an alternative postulation could be that these were actually recycled dies from York: if some of the York moneyers had lost their position after Coin Type 2, it is reasonable to assume that their minting equipment would have been confiscated, to prevent them from continuing to strike coins illegally. Coining dies would have been valuable tools, and from his experimental experience Greenhalgh confirms that they were very hardy and could easily have lasted for longer than one coin issue (D Greenhalgh, personal communication, 26/07/2016). Examination of the four early medieval dies found on the Thames foreshore shows that they had iron shanks with steel heads welded to them (Archibald, Lang and Milne 1995,

172). The dies could thus be used for more than one Coin Type by having the head removed and a new one welded in its place. In his examination of the 14th century dies from Westminster Abbey and the Pyx Chapel, Cook notes that at least by that date dies were indeed being returned for refurbishment after a period of use (Cook 2000, 228). We could therefore hypothesise that if Type 2 coining dies were confiscated from disgraced York moneyers after the Northern Rebellion, they would not have been discarded or melted down, but may instead have been refurbished with Type 3 striking faces, and issued to moneyers from other mints when they came to collect their dies for the new coin issue. By the time of Coin Type 4 the circular dies may have been worn out, or they may have been unpopular with the southern moneyers, so they returned to their traditional use of wholly square-sectioned dies.

It is therefore apparent that the coins reveal a number of indications of the effects of the Northern Rebellion on the economy and the people of the city of York. However, the documentary sources suggest that the Harrying of the North was a widespread attack, so one may expect to see similar evidence of retaliation in the coins of other northern mints. In reality, though, there is little evidence which could be linked with any certainty to the event. There does seem to have been a change of personnel at the Lincoln mint over the course of Coin Types 3 and 4, with all but two of the moneyers from Coin Type 2 ceasing to mint over the course of the next two Types. However, a similar switch of personnel seems to have happened around the same time in the Norwich and Thetford mints, both of which were far outside the purported area of the Harrying of the North. The moneyer contingent at Lincoln does reduce in size over the latter part of William I's reign but unlike the sudden drop at York this takes place over a long period, and could more reasonably be viewed as part of a much wider, slow process of shift from the northern mints to those of the South and East, as demonstrated in section 4.1.2 in the previous chapter. Other northerly mints, such as Chester, Nottingham and Derby, show no obvious change in character around Coin

Types 2 and 3. It therefore seems that if these areas were affected by the reprisals after the Northern Rebellion, the effects were not sufficient, or not of appropriate type, to show up in the coinage.

5.2.2 The First Crusade to the Holy Land

In examining the coin evidence, it is apparent that at the very end of the reign of William II there is a considerable anomaly in the size and weight of the coinage. The explanation of this is by no means certain, but one can theorise that it may be related not just to political events of regional or national import, but to circumstances with international scope, namely the First Crusade to recapture the Holy Land from the Turks.

Chapter 3 examined the weights and diameters of the surviving coins of William I and II. These examinations highlighted various fluctuations in both metrics, but the coins of the last two types, Coin Types 12 and 13, show a particularly unusual pattern. The average weight of the coins of the two types is similar, around 1.35g for Coin Type 12 and 1.37g for Coin Type 13. However, the average diameter of the coins is very different. The previous four Coin Types show a gradual increase in the diameter of the coins, and Coin Type 12 continues this trend, having an average diameter of around 20.9mm. In Coin Type 13, however, the trend is suddenly bucked and the coins are struck on a much smaller flan. The average diameter of this type is around 19.1mm. In other words, the coins of Type 13 are about the same weight as those of Type 12 but noticeably smaller in diameter. This shows up very clearly in figure 3.44 in Chapter 3.

The correlative analysis of the coin weights and diameters detailed in section 3.2.4 of Chapter 3 shows little link between the two criteria at any point in the corpus. However, the anomalous results seen at Coin Type 13 are of a much greater scale than the fluctuations found in the other issues, and therefore deserve particular attention. The variation between the two Coin

Types suggests that some other metric must be at play in the composition of the coins; all other things being equal, it would not be possible for the diameter to drop while the weight remained the same. It may be that the thickness of the coins changed between the two Types, such that the same volume of metal was being shaped into a narrower but deeper disc. Alternatively, it could be that the metallurgical content of the coins changed; if the alloy was adjusted to include a smaller proportion of silver and a larger proportion of a denser metal, such as lead, this would mean that the same weight of alloy would have a smaller volume. Unfortunately, it was not possible to measure either the thickness or the metallurgy of the coins for the current project, so the development of these hypotheses must currently be one of informed conjecture.

If the variation between Types 12 and 13 is due to a change in the thickness of the coins it would difficult to interpret it beyond an interesting shift in minting practice in the kingdom. If, however, the variation indicates a change in the metallurgy of the coins it opens the possibility for an interpretation of wider significance. A change in the alloy of the coins may have been prompted by a lack of fine silver for coining, and this is a reasonable assumption for the situation in England at this time. The Rammelsberg mines in the Harz mountains of Germany, which were a major source of silver for coinage across Europe, began to run dry after around 1040 (Allen 2012a, 253) so the influx of silver from trade with German merchants probably started to reduce soon after that. However, Coin Types 12 and 13 were issued at the end of William II's reign, in the late 1090s. The depletion of the Rammelsberg mines may explain the relative paucity of surviving coins of the early Norman kings in general, but it would not solve the question of the sudden change at Coin Type 13.

Political events related to the First Crusade may instead offer an explanation for the change. In the autumn of 1095 Pope Urban II called for a pilgrimage to

reconquer Anatolia from the Seljuk Turks, and take the Holy Land back from its Muslim rulers. Aird relates how Robert Curthose, Duke of Normandy and brother of William Rufus, 'took the cross' and pledged to join the crusade (Aird 2008, 154-164) In order to do this, however, he needed to raise substantial funds. Murray highlights the extortionate cost of crusading, noting that Godfrey of Bouillon, one of the wealthiest of the leaders of the First Crusade, was forced to sell or mortgage much of his French territory prior to departure, and then to augment this income en route by extortion of protection money from Rhineland Jews, as well as support from his brother Baldwin, once the latter had conquered Edessa (Murray 1992 326-328). Duke Robert chose to raise the funds by mortgaging Normandy to William Rufus in exchange for 10,000 marks of silver (*WM*, GR I, quoted in Aird 2008, 163). William would have administrative control of the duchy in Robert's absence, and de facto right of inheritance to the title if Robert died on crusade. William agreed to this arrangement, and collected the money with sufficient rapidity for it to be shipped to Normandy in September 1096 (Barlow 2000, 365). It is not certain what form the money took, or exactly how it was collected, but Barlow suggests that it was raised from "his unwilling subjects" in England (ibid, 365).

One can imagine that a substantial amount of the money for the mortgage of Normandy is likely to have been collected as coins, since this was a major form of the precious metal wealth of the kingdom (Murray 2006, 233). Given the timing, the coins in circulation were probably of Coin Type 12, and this may explain why relatively few coins of this type have survived to the present day, in comparison to some of the earlier types of the reign. Additionally, whether the mortgage was raised in coin or in other forms, such as bullion or artefacts, it seems certain that it would have depleted the amount of silver physically present in England from which coins could be struck. This would have been exacerbated, albeit on a much smaller scale, by the needs of the few Anglo-Norman nobles who chose to join the Crusade themselves, and

would similarly have needed to raise funds for the pilgrimage. One can imagine, therefore, that when the time came for what turned out to be the final recoinage of William II's reign, the amount of silver available to strike the new coins would have been substantially reduced from earlier recoinages. If the alloy for the coins was debased with lead, to make the silver go further, it could explain why the coins of Type 13, which retained their average weight, had much smaller diameters than previous coins. A lack of silver may have also led to a smaller number of coins being produced, which could explain why Coin Type 13 is the rarest survival from the period.

Hypothetically, therefore, the anomalous size of coins of Type 13 may be a reflection of the effects of Robert Curthose's decision to join the First Crusade and William Rufus' consequent need to collect a large sum of money and ship it out of England. This would therefore represent an indirect effect of the Crusade on the merchants and people of the kingdom. It is unfortunate that with our current knowledge it is not possible to confirm whether the metallurgy of Coin Type 13 differs substantially from the preceding Type, but future work in this area may add weight to this hypothesis.

5.3 Moneyers

The narrative of the Northern Rebellion explored in section 5.2.1 above shows how examination of the coins can reveal the personal stories of individual men of the eleventh century, namely the moneyers identified in the reverse inscriptions. In addition to occasionally offering these glimpses into particular lives, investigation of the moneyers can also contribute to discussion of the wider picture of life in England in the early Norman period.

The role of moneyer was a royal appointment, and previous research has indicated that those who held the position were of a high standing in urban society, often holding Burgess rank and having additional interests, such as

international trade (e.g. Nightingale 1982; 1995; Symons 2006). These men formed a wealthy stratum of society, and the position of moneyer was clearly one of some status. It is therefore potentially surprising that at the time of the Norman Conquest the majority of English moneyers retained their position and were not replaced with Norman incomers. Examination of the names on the coins confirms this to be the case; with a few exceptions, such as Wilton and Cambridge (G Williams 2012; Allen 2006), there was no large-scale change of personnel at the mints in 1066. These men provided an element of continuity in a key part of the administrative machinery of the realm, and the coins affirm that the minting system continued to operate effectively throughout the period.

This stability within the moneying contingent of the kingdom continued across the reigns of the early Norman kings. At the time of the death of William Rufus almost all the moneyers who appear on the coins still have names of Anglo-Saxon or Scandinavian origin, which suggests that this role was still being filled almost exclusively by 'natives' of the English kingdom. There is also a high level of continuity of specific names. Most moneyers seem to have held the post for between two and three Coin Types, so probably around six or seven years, but some names appear on the coins for much longer periods. Section 4.1.3 in the previous chapter identified some moneyers who seem to have been in post for over 35 years. This would represent a very long working life, so it is not unreasonable to suggest that in these cases the name may not refer to one individual but may instead indicate a position passed from one moneyer to another. The most logical explanation for this would be a father passing on the role to a son with the same name, but the situation does not necessarily preclude the role passing to a different relative, an apprentice, or even a widow, as long as they continued to strike coins under the name of the original moneyer, almost using it as a trade name for that particular moneying enterprise. We could

imagine that if a moneyer was trusted and respected it would be beneficial to inherit his name as well as his position.

Further to this, there is indeed evidence for particular families having ongoing interests in minting. Nightingale's work on the family of Deorman of London (Nightingale 1995) reveals that members of the family held the position of moneyer over a number of successive generations. Piercy has gone further and suggested that the recurrence of particular naming elements amongst early medieval moneyers may suggest an internal organisation by specific moneying families within the mints (Piercy 2017a). Piercy's hypothesis is founded in the Anglo-Saxon tendency for a family to favour one particular element of a two-part name and to use that repeatedly, in combination with a variety of other elements. A potential example may be found at Norwich and Thetford, where the element 'God-' is particularly common in the moneyers' names. Over the course of William I and II's reigns, Thetford has moneyers named Godelef, Godric, Godwine, Goda, Godraed, and Godinc, while Norwich has Godefurth, Godwine, Godric, and Godric Brd. In this period the 'God-' element appears in 29% of Thetford moneyers' names, and 19% of Norwich moneyers. These are high proportions, even taking into account the fact that 'God-' is a common naming element across the kingdom. In London, for instance, only 7% of the moneyers have the 'God-' naming element.

The evidence is by no means conclusive; there are a number of known families (including Deorman of London) which did not make repeated use of a particular naming element in this way, and it is unlikely that any family had exclusive use of a name component, especially a common one like 'God-'. However, while there may be no connection between these men, the fact that so many of the people of moneyer status in the Norfolk towns share this naming element is a strong indication that they may be related, and thus may represent a local moneying family.

The coin evidence also suggests that there was some flexibility within the moneying system which offered opportunities for the moneyers. The differing lengths of tenure in post shows that for some men it was a role which they held for a short period during their career while for others it was a position which they claimed for a considerable time. We can't be sure how much personal choice was involved in the decision on whether to accept, or retain, the role, but presumably it could be refused if a person had no desire to take up this sort of public office. One can imagine that for some men the status and the chance to be involved in the administration of urban society could have been as appealing as the chance to profit financially from the position. Additionally, there seem to have been prospects within the role, for instance to gain extra responsibility by moneying at more than one mint concurrently, as Wulfric did at both Canterbury and London in the middle of William I's reign.

A further aspect illuminated by study of the moneyers is the idea of personal connections and the movement of people around the kingdom. We know that some moneyers, such as the Deorman family, were merchants and traders, and therefore connected to networks of people both within the kingdom and internationally, and there are some instances of the sharing of coining dies between moneyers at different mints, such as the die of Coin Type 9 which was used at both London and Canterbury, and the various dies of Coin Type 8 identified by Brooke as having been used at two mints in close geographical proximity (Brooke 1916, cxxxix-cxl). These would seem to indicate local links and networks of moneyers. Additionally, the coins provide some hints of instances where moneyers themselves moved from one mint to another, such as Cinric who moved from Norwich to Thetford at the beginning of the period. Further, the notion that official coining dies had to be collected from London at each change of Coin Type suggests that moneyers, or their trusted representatives, would have been travelling to the

capital and back at least once every few years. For moneyers based at distant mints this would have represented a considerable undertaking, but the fact that it was an expected part of the moneying process indicates that travel around the kingdom in the late eleventh century was not just possible but was relatively common.

Investigation of the moneyers therefore provides a picture of a group of wealthy individuals in a position of high standing. They had opportunities for increasing their responsibility, and for travelling around the kingdom. They may also have had the chance to pass on their role to a successor, and to build up family interests in the minting system. The moneyers come across as men with considerable power in late eleventh century urban society.

5.4 Administrative Control and Oversight

A further discussion to which the coin evidence can contribute is the question of just how effective central administrative control over the minting system was in practicality. The background to this discussion is summarised in section 1.3.1, in the first chapter. Opinion varies, for instance, as to whether the decision on the weight of coinage struck at particular mints was made directly by the king and his advisors, or was left to provincial officials to finalise. Similarly, the significance of coins struck with dies of probable local manufacture is debated, and the extent of abuses of the system, such as coins of low weight, or struck with altered dies, is also under discussion. A number of different aspects of the coinage can therefore offer evidence pertinent to this issue.

One of the most revealing elements of the coins in relation to the question of central control is their weight. It is clear that there was no national weight standard to the pennies at least until the reign of William II, and even in this latter reign variations continue to appear. In the early part of the period

variations in coin weight between different mints are very clear. Some mints, such as Winchester, tended to strike coins of higher weight than the national average while others, such as Norwich and Thetford, made lighter weight coins. This would seem to support Metcalf's suggestion that the specific weight of the coins, while broadly dictated by royal policy, was actually set at shire level by local officials (Metcalf 1998, 64). The presence of regionality in the weights of the coins strengthens this argument, such that a decision, for instance, on the weight of coins in Norfolk is reflected in those minted at both Norwich and Thetford.

Further differences can be seen in the profile of weights of contemporary coins from particular mints. Mints such as Winchester show a high level of uniformity in their coin weights, clearly working to a specific weight standard and with little deviation in individual coins. Other mints, such as London, show a great deal of variation in the weights of contemporary coins. However, at the mints where high levels of variation can be seen this diversity appears with some consistency across the period. The broad variation of coin weights may therefore be intended and deliberate, and the evidence could be interpreted to suggest that these mints were in fact working to weight standards, but that they were using multiple concurrent standards. This would indicate that there was some degree of order and control over the coin weights at these mints too, as one might reasonably expect to find.

Given that the evidence therefore suggests control of the coin weights at some level across the kingdom, it may be more germane to query how effective that control was. This is a difficult question, especially as one can only postulate what standards were being aimed at. However, it does seem apparent that the efficacy of control of the coin weights varied from place to place. Where a mint shows high levels of uniformity in its coin weights, we can extrapolate that control of this metric was highly effective. Winchester is

the prime example of this but some other local mints, such as Gloucester and Worcester, also indicate close control. At mints such as Lincoln or London control of the coin weights seems less effective. At first glance the high levels of deviation from an average weight suggest very low levels of control, and while we can postulate that these mints may have been working to more than one weight standard, it is often difficult to pinpoint what those different standards may have been. In some cases this is due to the small number of surviving coins from which to draw our conclusions but in cases where there is a sufficiency of coins but the picture is still ragged and unclear we can offer the suggestion that control of the coin weights at those mints was not as effective as in other places.

There is also a temporal element to consideration of the efficacy of control of the coin weights; some Coin Types show greater uniformity than others. The key example here is Coin Type 8, the 'PAXS' type, which was probably the first coinage of William Rufus. It has long been noted that this Coin Type shows an unprecedented level of consistency across the kingdom, with examination of the coins showing that all mints seem to be working to a single weight standard, and that the standard is remarkably similar from mint to mint. Control of the weights of coins of Type 8 is highly effective. However, there are other Coin Types where the deviation from average weights is very high, both nationally and at individual mints. Coin Type 2 is a good example of this, and this diversity is generally more prevalent in the coinages of William I. However, high levels of deviation can be seen in later Coin Types as well, for instance in Coin Type 10, where there are clear differences between the weights of coins from different mints, and some mints are again striking coins with a broad range of weights. It seems that if control of the coin weights was greatly strengthened in Coin Type 8, after a few years it began to lapse and by Coin Type 10 it had become rather less effective. These changes over time are explored further in section 5.5 below.

In addition to their weights, other elements of the coins also offer hints about the level of central control over the minting system. The dies used to strike the coins are revealing in a number of ways. Examination of the coins shows some instances where an individual coining die was used to strike coins at the London mint and also at another mint elsewhere. While this may be evidence of personal connections between the two moneyers named on the reverse of those coins, it may alternatively be an indication of the central logistical role of London within the minting system. This is particularly convincing for the movement of dies over long distances, such as the die of Coin Type 3 which was used in both London and Exeter, as noted by Brooke (1916, cxl). This supports the generally accepted postulation that the majority of coining dies in this period were made at a central die-cutting centre at London, which in turn represents a high level of control over the creation and distribution of the dies for making the coins.

Contrary to this, however, is the use of dies of crude workmanship, which seem likely to be of local manufacture rather than coming from the central workshop in London. Section 4.2.2 in the previous chapter identified that dies of this type were in common use in the East Midlands and the North-East in the earlier half of the reign of William I, and then in Wales and its surroundings in the first Coin Type of William II. We could postulate that their use may have been a way of moneyers avoiding the fees for acquiring official dies, although in most cases where moneyers can be seen to have used local dies during William I's reign they have also used official dies too. Alternatively, they could be evidence that the moneyers in question did not have enough official dies to fulfil their minting needs and resorted to using local dies to make up the deficiency. It may have been that they had no way of getting more official dies, or that the local dies were used as an expediency in light of the logistical and temporal issues of travelling to London to acquire legitimate tools. If one tends to the former argument, this could be seen as evidence of a lapse in official control over the minting in these areas at these

times. If the latter, it is more likely a sign of a breakdown in the efficiency of the administration of the system, than in the control of the system. In either case, however, the prevalence of the use of these crude dies suggests that the practice may have been tolerated, even if not officially condoned, and indicates at least that the moneyers felt secure enough in their position to take matters into their own hands and procure and use unofficial dies in these periods at these mints.

While there may be a legitimate reason for the use of locally-cut dies in this period, there are a number of other instances which seem to be deliberate forgery or misuse of the minting system. The clearest instances here are coins struck from dies which have been altered to obscure the name of the moneyer and/or the mint, as discussed in section 4.2.3 in the previous chapter. The occasions where a coin has been struck from an altered die, and yet we are able to work out what it would originally have shown allow us to suggest specific moneyers who may have been cheating the coining system for their own profit. While these are not common, they do demonstrate that control of the minting system was not sufficiently strict to preclude abuse. Further, a coin of obscured dies of Godwine at London in Coin Type 2 (coin BMC0128 in the project database) is also die-linked to a coin of Cinric at Thetford (coin BMC0145), and another coin of the same Thetford moneyer (coin BMC0146) is linked to a coin of the unidentified mint 'MAINT' (coin BMC0130). These die linkages were identified by Brooke (1916, cxl) and they are given further significance by Allen's suggestion that the MAINT mint signature may actually refer to a fictitious mint used to suggest legitimacy on some unofficial coins of this type (Allen 2014, 100, footnote 62). These linkages therefore seem to tie Thetford moneyer Cinric into a chain of forgery, with a coin of altered die from Godwine of London, and a coin of moneyer Brihtwine at a possibly non-existent mint. This could hint at a network of forgers, and suggests that abuse of the system may have been more widespread than we can easily identify in the surviving coins; the dies

for the MAINT coins, for example, do not appear crude in execution, nor do they have evidence of alteration before use.



Coin BMC0146; coin type 2; Thetford mint; moneyer Cinric



Coin BMC0130; coin type 2; 'MAINT' mint; moneyer Brihtwine

Figure 5.2: Die-linked coins of Cinric at Thetford and Brihtwine at 'MAINT'

Kings were clearly concerned by the existence of abuse within the minting system. Early medieval law codes repeatedly include entries related to this, and the punishments for minting bad coin were harsh; the surviving law code which is most recent to the Norman Conquest is "II Cnut", which was issued around 1020. This stipulates that a moneyer striking poor quality coinage would be punished by amputation of the hand, with no possibility of taking a fine instead of the punishment (II Cnut, viii, in Thorne 2012, 380-381). Blackburn points out that by 1100 this punishment had been increased to include castration as well as the loss of the hand (Regista ii, no 501, cited in

Blackburn 1991, 51). Despite these fearsome potential consequences, however, the coins show that moneyers of early Norman England still indulged in forgery and misuse of the system. While the law codes may suggest strict control over fiscal practice, the evidence indicates that this was not an effective deterrent.

A further area for consideration when examining the level of central control over the moneying system is the appointment of moneyers. The role of moneyer was a royal appointment but there is unfortunately no surviving evidence for the mechanism for selection of the men to hold the office, and little indication of how much personal involvement the king would have had in this. It is likely that he had the power to approve or reject moneyers, and there are some instances which arguably demonstrate the removal of men from the role, presumably by the royal authority. Examples include the York moneyers who disappear from the coins after the Northern Rebellion, as discussed in section 5.2.1 above, or the moneyers of Wilton who seem to have lost their position immediately after the conquest, possibly, as Gareth Williams postulates, because of their role in striking a posthumous coinage of Harold II (G Williams 2012). To balance this, however, section 5.3 above highlights instances where moneyers seem to have developed an ongoing familial interest in the role, suggesting that they had some level of influence over the selection of their successors.

Overall, therefore, the picture revealed by the coins suggests a system under central regulation, but which also contains elements of flexibility. The kingdom's money was a key asset and was clearly under royal control, but in practicality there seems to have been a high degree of opportunity for local, or even personal, input from shire officials and moneyers. The level and efficacy of control of the minting system varied from place to place, and from time to time.

5.5 Changes and Developments

The above discussion of the level of local autonomy within the minting system highlights a key issue revealed by the coin evidence – the notion of change over the course of the first 34 years of Norman rule. While there are a number of fundamental areas where traditional patterns are surprisingly persistent, there is also evidence for development within the system, and by the end of the reign of William Rufus the coinage had begun to show notable differences to that struck at the beginning of his father's reign.

The metrical data from the surviving coins show that there are changes in their size and weight across the period. The first coins of William I are relatively small and light, similar to the last coins of Edward the Confessor and the coins of Harold II. Over the course of the reign they tend to increase in weight, reaching a peak in Coin Type 8, probably the first coinage of William II. The weight of the coins remains fairly static over this second reign, but the diameter starts to increase, until the rather startling drop in size noted in section 5.2.2 above. Both these metrics therefore seem to have a turning point in Coin Type 8.

Further to this there is evidence that the profile of coin weights at the different mints also underwent a change in Coin Type 8. In the previous Coin Types, many of the mints in the North and East of the kingdom were producing coins with a diversity of weights, and some may have been working to multiple concurrent weight standards. In Coin Type 8 these mints appear to fall into line with the mints of the South and West of the kingdom, in that they start to work to a single weight standard, and the diversity of their coin weights greatly lessens. As summarised in section 1.3.1 in the first chapter, these variations have traditionally been taken as evidence that the king imposed firmer control of the minting system in this type, and instigated a kingdom-wide penny weight, which was in use from then on (see, for

instance, Blackburn 1991, 52; Metcalf 1998, 187; Nightingale 2008, 180; Lyon 2012, 21; Allen 2012a, 138). The data generated by the current project do indeed suggest that the coinage became more uniform in the reign of William II than in the earlier reign. However, it is clear that the imposition of homogeneity, if that was indeed the intention of Coin Type 8, was by no means an abrupt and ubiquitous event. While the coins of that type do show very high levels of consistency, those of the later types of William II are much less uniform, with some mints striking coins of slightly heavier or lighter weights, and patterns of varied coin weights appearing again at mints in the ex-Danelaw area. Coin Type 10 provides a good example of this re-emergence of diversity, albeit to a lesser extent than in the coins of William I. As discussed in section 5.4 above, this may represent an attempt to increase control at the start of the reign of the new king, but over the following few years the traditional agency of local officials, including the moneyers, reasserted itself and older patterns of working re-emerged. One can imagine the officials making sure to closely follow the regulations set down by the new ruler, particularly where they represented a change to the previous system of minting, but once the king was established in his position, and had turned his attention to other matters, the minting officials may have settled back into the security of their own positions, and their exactitude may have started to wane.

The coin evidence also sheds light on other developments over the course of the period. Interesting tendencies can be observed in the location and the relative size, and thus arguably the importance, of the different mints. It is clear that as Norman power expanded into wider areas of Britain, such as Wales and the Northern border areas, new mints were opened. These mints generally seem to have been small, so it is likely that their significance was more as a symbol of the new rulership than as a practical fiscal measure, but they do represent a token of the intention to tie the whole of the kingdom into the same fiscal system, under the Norman king. This geographical

expansion of minting, however, is balanced by a trend for consolidation of the minting system in the south of the country, as noted in section 4.1.2 in the previous chapter; the northern mints, such as York and Lincoln, generally become smaller over time, while the mints in more southern areas, such as East Anglia and the south coast, tend to increase their numbers of moneyers.

Further indications from the coins hint at possible changes in minting practice over the later eleventh century. The die axes of the coins show that for most of the reign of William I the mint of York was using a variant practice to all the other mints of the kingdom, in that coins from that mint were being struck with coining dies of circular cross-section, while elsewhere square dies were in use. Figure 4.2 in the previous chapter suggests that by the end of the reign, however, the use of circular dies was decreasing at York, and although some round dies may have persisted in use until Coin Type 11, most of the surviving coins of William Rufus from that mint were likely struck with square-sectioned dies.

A separate development may have occurred in the old West Saxon areas of the kingdom. The coins show that moneyers within these mints sometimes shared, or swapped, obverse coining dies between themselves. Appendix 4 includes a list of known instances of die sharing. There is some evidence to suggest that this became more prevalent as the period went on. While it is very difficult to comment on the extent of a particular practice when the survival levels of the different Coin Types are so varied, comparison of two similarly-sized samples, namely Coin Types 3 and 9, does indicate that die sharing was more common in the latter type than in the former. Historical and archaeological evidence, most importantly that from Winchester (Biddle and Keene 1976, 397-407), indicates that moneyers within a mint may have had their own separate workshops, but the coins imply that they may have worked increasingly closely together.

Examination of the coins therefore reveals a minting system which underwent a number of developments during the course of the reigns of William I and II. None of these changes, however, seem to have been sudden or comprehensive. Rather, it may be more accurate to view the period as a slow transition from the Anglo-Saxon system towards something more uniform and tightly controlled. Investigation of the coinage of the succeeding king, Henry I, has suggested that this process continued through his reign too, with Blackburn highlighting deviation from the weight standard, occasional multiple standards, and variety within the coinage from different mints throughout Henry's reign, presenting a very similar picture to that provided by the coins of the first Norman kings (Blackburn 1991, 51-52). The changes instigated at William's Coin Type 8 are significant, but development of the English minting system was a long process and clearly cannot be tied to one specific date, or even to one particular reign.

5.6 New Narratives of Norman England

The database for the current project represents the largest set of data on the English coins of William I and II yet collated. The project has therefore comprised detailed examination of the evidence at a scale which has not previously been possible. The above interpretations show clearly that the data derived from the coins can provide insight into the social and administrative history of early Norman England. They give a picture of a society with highly complex social dynamics, and of individual people negotiating the political upheavals of the time. In many ways these interpretations represent new narratives of this period, and add nuance to our existing understanding.

5.6.1 Regional Identity

Examining the coin evidence through a geographical filter highlights variation in the coinage and minting system between different regions of England. This

evidence can therefore contribute to discussions of regional identities within the kingdom of England in the late 11th century, and this is an area which has been little studied to date.

While the notion of identity in early Norman England has been examined in a number of ways, investigations have tended to focus on aspects of identity not related to regionality. Many enquiries have understandably focused on the notions of 'Norman identity' as differentiated from 'English identity'. Ann Williams (1995), Chibnall (1999), Albu (2010), and McClain (2017) for example, all examine the idea that there was a perceived difference in identity for the native English and the invading Normans, albeit often with the proviso that in reality the distinction between the two groups became blurred soon after the Conquest, and in many aspects of life a new Anglo-Norman identity emerged. Cohen particularly, in discussing events of the 12th century, highlights the emphasis on a shared identity, when opposed to a perceived common enemy, in the form of the Anglo-Norman inhabitants of Norwich against the local Jews (Cohen 2004). Other investigations have discussed the idea of class identities within early Norman England, for instance in examination of the rising merchant class (Loveluck 2003), or research into how differences in diet might reflect class identities (Jervis, Whelan and Livarda 2017).

The idea of regional identities has begun to receive some attention in recent years. Tompsett examined the level of endurance of insular traditions in the South-West of England in the period AD 350-1150, concluding that there was strong evidence for a maritime regional identity, which endured throughout the period, but with Saxon and Anglo-Norman elements imposed onto it (Tompsett 2012, 469-471). Wren investigated identities in Wales following the incursion of Norman power into that area, but found that much of the evidence pointed to an assimilation of Anglo-Norman culture, with little material evidence for a continuing Welsh identity (Wren 2015, 293). More

recently Maclain has scrutinised the process of the Norman Conquest from a specifically regional standpoint, using the North of England as a case study. Although primarily an examination of how Norman rule was achieved in this particular area after the initial conquest, this research also highlights the development and emergence of "an Anglo-Norman northern identity" (McClain 2017, 224) which incorporated new elements but also local traditions. These existing studies all search for cohesion, or otherwise, within one particular region. However, examination of the coins offers the opportunity to study the whole kingdom, and to highlight the evidence for a variety of regional identities within a nominally homogeneous material culture which covers the entire country.

The existence of continuing identities of the Danelaw and the West Saxon area has not previously been highlighted. Metcalf noted differences between the East and the West of the kingdom, and suggested that these patterns could be seen repeatedly throughout the early medieval coinage. However, he did not link these differences to the earlier split between Danelaw and West Saxon, and he did not pursue this into any notion of regional identity (Metcalf 1993). The interpretation of this regionality in material culture as a marker of identity represents a novel way to construe the evidence.

5.6.2 Societal and Personal Effects of Historical Events

Traditional narratives of the Norman period were based on written histories, and presented a stark picture of broad, sweeping changes and imposition of new systems on the people of England. The deeds recorded were those of the kings and nobles, and the events were those of wide-reaching political import. More recent historical research has challenged that black and white view, and added nuance and complexity to the story. Archaeology and material culture studies have had an important part to play in that shift, highlighting elements of the period which do not appear in the documents, as emphasised in the introduction to the recent Society for Medieval

Archaeology monograph on the eleventh century (Hadley and Dyer 2017, 1-2). The evidence from the coins, as revealed by the current project, contributes to this re-evaluation of the period, and elaborates our understanding further.

The implications from the coins regarding the Northern Rebellion and the Harrying of the North contribute to current discussions, and add elements which are not found elsewhere. Debates are ongoing as to the severity and extent of the Harrying, with many arguing that the actual retribution, while undoubtedly horrific for those involved, was not as devastating as the written sources would suggest. Matthews, for instance, concludes that there is little evidence for the histories which present the Harrying affecting the North-West of the kingdom as severely as the North-East (Matthews 2003). Additionally, researchers are questioning two of the elements which have traditionally been cited as evidence for the destruction of the Harrying: the extensive areas of the North designated as 'waste' in Domesday Book (e.g. Palliser 1993; McClain 2017, 207), and the proliferation of row-plan villages, which seem to have been new, planned settlements in the medieval period but whose dating to the time of recovery after the Harrying is now in question (summarised by Creighton and Rippon 2017, 76-77). The coin evidence seems to support these arguments, providing compelling evidence for reprisals in the city of York immediately following the Northern Rebellion, but showing little evidence for similar punishment elsewhere.

The major area where the coin evidence can provide new details to the story of the Northern Rebellion is in its suggestions of the impact of political events on the everyday citizens of the area, and its revelation of the stories of individual people who were not of sufficiently high standing to be recorded in the written histories. The reduction, or cessation, of minting at York for the whole of Coin Type 3 (probably a matter of two or three years) must hint at massive disruption to commerce, trade, and the economy of the city and its

hinterland in this period. Once minting does pick up again in Coin Type 4 the official coining dies are supplemented for all moneyers by crude, probably locally-produced dies, and this suggests that the disruption continued for some further years. Additionally, in the moneyers, we can discern the personal histories of men of standing in urban society having to negotiate a complicated and dangerous political situation, and doing so in a variety of different ways.

Revelation of the effects of historical events for people not directly involved in their development could also be a key contribution of the coin evidence when considering the First Crusade to the Holy Land. Both contemporary and modern histories of the pilgrimage naturally focus on the events as they unfolded en route to, and in, the Middle East. They sometimes note the preparations undertaken by the crusaders before departure, and the administrative details of their lands in their absence, but little attention is given to the effects of the mass departure of nobles, and their portable wealth, on continuing society in Europe in their absence. The coins of William II may hint at the consequences of the depletion of silver from England which was a likely effect of the mortgaging of Normandy for the First Crusade.

5.6.3 Levels of Autonomy and Control

Examination of the moneyers named on the coins is a way of accessing information about the lives of individual people living and working in England in the late eleventh century. The coins make this group of people visible, in a way that other sources often don't, since many of the moneyers do not appear in surviving documents. Consideration of what the coins imply about their actions and the system within which they were working gives them agency in our construction of the past. This is something which has been touched on by previous research, but has not been examined in detail, and not articulated, in the way this project has enabled.

The coins present a picture of a group of men with a surprising level of opportunity to influence their careers and working practices. The evidence for moneyers moving around the kingdom, following local traditions in the striking of coins, and passing on their role to chosen successors seems to challenge Nightingale's assertion that all details of the minting system were determined directly by the king (Nightingale 2008, 178). Even when control of the system was tightened in Coin Type 8, that control seems to have slipped after a while, such that by Coin Type 10 the old regional minting patterns were starting to show up again. This also refutes the general numismatic acceptance that from Coin Type 8 there was a standard weight for a penny across the whole kingdom (e.g. Allen 2012a, 138). The actions of local officials, moneyers, and their workers must be seen as key to this continuing diversity.

5.6.4 Quantifying Change

The detailed study of the coinage of William I and II which has been possible in this project has allowed clarification and quantification of a number of issues which were previously only vaguely determined. It is clear that there was no national standard weight for the penny during the reign of William I and that Lyon's suggestion that a stabilised, uniform coin weight was introduced some time before 1086 (Lyon 2006, 234) has little support in the coin evidence. Metcalf (1998, 187), Nightingale (2008, 180) and others had conversely affirmed that a national penny weight was introduced in Coin Type 8, and the coins do indeed demonstrate an intention for conformity of weight across the kingdom in this type. However, the size of the dataset here examined permits contention of the notion that this uniformity was strictly imposed from that point onwards, with clear evidence revealing that later Coin Types show a return to higher levels of variability and regional diversity in the coin weights, as outlined in section 5.5 above. This supports Blackburn's assertion that variable coin weights also continue through the coinages of Henry I (Blackburn 1991, 51-52).

Examination of the indirect evidence for the coining dies has allowed identification of the use of crude, probably locally-cut dies at various mints during the reigns of William I and II. Allen's 2012 comment that no systematic study of the use of these dies had yet been undertaken for the coins of any Norman king (Allen 2012a, 116) is therefore alleviated by the current project. It is now clear that within the coinages of William I and II this practice was mostly confined to two specific times and regions, namely the East Midlands and the North in Coin Types 2 to 4, and Wales and its locality in Coin Type 8. The explanation for the practice is still open for debate, but the evidence of these coinages contributes much to that debate.

Additionally, specific queries on the coinage are elucidated by this investigation. An example is the question of the longevity of the variant practice of York moneyers using circular-sectioned coining dies while all other mints were using square dies. This anomaly has been long noted, and seems to be a direct continuation from the Viking Kingdom of York, being visible in the coins from the late 9th century onwards (Blackburn 2004, 338). Both Dolly and Blackburn noted that the practice continued into the late 11th century, but neither was able to quantify it further (ibid, 339; Dolley 1952-54, 169). The evidence presented in section 4.2.1 in the previous chapter, while not conclusive, comes much closer to being able to answer this question. It is clear that the use of circular dies at York continued at least until Coin Type 6, but the last type of William I and the coinages of William II from that mint show much less evidence of this variant practice. It is a shame that the number of surviving York coins from this period is so low, as this makes it difficult to pin the change down exactly. However, the 27 extant coins of Type 8 are a sample which is more likely to be representative than those of the later types. In that Coin Type the proportion of coins with irregular die axes is around 20%, which is double the usual amount seen at other mints but considerably lower than the c.50% seen in earlier Coin Types at York. It

therefore doesn't completely conform to the signature for the use of square-sectioned dies, but is clearly closer to it than to the signature for the use of circular dies. Perhaps it represents the continued use of a small proportion of circular dies amongst a corpus of mainly square ones. We can therefore now say that the traditional practice of using circular coining dies at York continued into the Norman period but was dying out by the beginning of the reign of William II.

5.7 Summary: Engaging Narratives of Norman England

This chapter demonstrates how the evidence from the coins can be interpreted to reveal histories of life in England in the first 35 years of Norman rule. In many cases these interpretations represent new stories, or add nuance and complexity to our existing narratives of the period. The picture of early Norman England which emerges is thus one of a dynamic and intricate society working through a period of political change and adapting to life under new rulers.

The narratives which emerge from the analyses of the coins can thus be seen as wide-ranging, naturally covering aspects of the economic history of the period but also touching on administrative, social and communal elements of the life of the kingdom. These stories reveal individual people and places, and can be seen to offer insight into what life was like at the time. This sort of insight can be very engaging, allowing people to relate to the stories of the past and to see how they are of relevance to life today. The narratives revealed by the coins could hence be rephrased into a series of questions which open up this aspect of the personal side of history; for instance, we could ask:

- What would a moneyer, or a merchant, from one part of Norman England notice when they travelled to a different area to trade?

- How did political events, such as the Harrying of the North, affect the people living and working in York, or Lincoln?
- How would a moneyer's son have envisaged his life, and career, developing?
- Was it worth the risk for a moneyer to make extra profit by cheating the minting system?
- How different would a moneyer of 1100 have found his world to that of his father in 1066, or his grandfather in the 1040s?

Highlighting these personal aspects of the narratives revealed by the coins suggests that they could be very engaging for a modern audience. They thus may have the potential to affect people's notions of this period of English history.

This has important ramifications for the study of the public representation of the late 11th century in the UK. One of the key media for the creation of collective ideas about the past is through representation in the heritage industry, and the narratives revealed by this project could conceivably have a major effect through this medium. The following chapter therefore explores the current situation within UK museums, and investigates how the new narratives of early Norman England could be received by the wider public, and how they could be presented through the heritage industry.

Chapter 6: Representation of the Early Norman Period

The interpretations given in Chapter 5 of the data presented in the preceding two chapters clearly demonstrate that the coins can reveal new narratives of the imposition of Norman rule, and of the personal and societal impact of the new regime and the events of the years 1066-1100.

This identification of new stories and addition of nuance to existing narratives of the Norman Conquest and its aftermath has the potential to develop our understanding of this important period of history. This in turn has the capacity to challenge perceptions and cultivate public appreciation of the period and of its interest and relevance to current issues. The stories revealed by the coins highlight people and places, and allow glimpses of the actuality of life in Norman England. They are thus likely to be engaging and relatable for modern audiences.

One of the key media for presenting information about the past to a wide audience is, of course, the heritage industry. Museums and historic sites are places where people seek knowledge of history, and recent research suggests that UK audiences still see museums as trusted organisations with an important role in sharing new knowledge (BritainThinks 2013, 3). Additionally, the majority of coins in the project dataset, from which the narratives have been identified, are currently held and curated by UK museums. These organisations would therefore seem to be ideally placed to share these stories with the wider public, and thus contribute to societal perception of the period and its importance.

This chapter therefore investigates the potential for the narratives derived from the coins to influence the public representation of the Early Norman

period in England. It opens with an analysis of the current state of representation in UK museums, and the use of their coin collections. The results of a survey of potential audiences for the new narratives are then presented, with the aim of determining whether people are engaged by these stories, and how they could be presented in a heritage setting. Finally, museological theory, observational best practice, and the suggestions of the survey results are synthesised to provide recommendations for the improved use of coin collections in presenting this period to a public audience.

6.1 The Current Situation in UK Museums

Numismatic objects are among the most ubiquitous artefacts held in historic collections, with many of the UK's museums having some coins or medals in their care. Section 1.3.3 in the first chapter outlined a brief history of the use of coins in museums, and also highlighted the concern that they may increasingly be becoming marginalised through a perception that they are difficult to relate to current museum aims and purposes (e.g. Orna-Ornstein 2001, Rohde 2010). That summary also noted the potential danger of this marginalisation, as collections which are seen as not fit for purpose risk being disposed of in order to realise their financial value for the museums' governing bodies, as in the high-profile case of the sale of an Egyptian statue from Northampton Museums (Kendall 2014aandb). Investigation of the potential of early Norman coins to contribute to public engagement with the past therefore has the capacity to also aid in promoting the value of coin collections within their museum context.

In order to make effective suggestions for improved use of coin collections it is vital to first assess the current situation. In addition to research of theory, this assessment is based on observational examination undertaken during visits to a variety of UK museums in the period from February 2015 to June 2017, as detailed in chapter 2, section 2.5.1. These museums include those

with a particular focus on numismatics as well as those with a specialism in the Norman period. Additionally, a number of general museums of local history were visited and investigated. Thus, a sample picture of the current museology of UK Museums, as it relates to both numismatics and the period of Norman England, is reported here. However, there are clearly limitations within these museological data which need to be acknowledged. The organisations which were investigated only represent a small sample of the total number of heritage organisations in the UK with the potential to use coins to represent the past, albeit a sample chosen through considered criteria. Additionally, primary, personal observation of the use of numismatic collections can only ever be a snapshot of a particular moment, with evidence for past examples only being available through secondary sources, such as archives and reviews, and future plans being subject to change. The data in this report, therefore, are presented with appropriate consideration for these provisos.

6.1.1 The Nature of Museum Collections

The coins which are available for public access in museum collections represent a large proportion of the extant coins from the early Norman period. However, the specific composition of those collections varies, such that the corpus may not necessarily be representative. This therefore constitutes a bias in the data, and as such it is important to consider how museum collections have been formed and why they include particular items and do not include others. The relationship between museum collections and those held by private collectors is also pertinent to this analysis.

Many early museum collections were formed in a piecemeal fashion, dependent on combinations of generous donation by benefactors, and opportunistic purchase and collection by curators. The content of coin collections was largely determined by which items had survived and were available for acquisition. By the mid-20th century, however, it had become

common for museums to be more selective, and the process of collecting started to become more formalised. Current best practice includes clear statements of the scope of a museum's collections, detailing what it intends to collect (and hence what it will not collect), as well as procedures to ensure accountability in decision-making on acquisition and retention of items. The industry standards outlined in the current requirements for Museum Accreditation specify an approved written policy for acquisitions and disposals (Arts Council England 2018, 4), as well as clear agreement on who has the responsibility to approve decisions (ibid., 3). Most UK museums therefore now have collections with a particular focus, but which may well include items from historic collections with a broader remit.

Individual museum collections can therefore be seen as selective, rather than necessarily comprehensive or representative. Regional museums, for instance, may only be concerned with collecting coins linked to their particular localities, such that the early medieval holdings of Derby Museums Trust, for example, only incorporate coins from the Derby mint (Derby Museums Trust 2014b). In larger museums too the collecting policies dictate the composition of the collections. The British Museum aimed to create as comprehensive a collection of early medieval coins as possible, but traditionally its holdings only included one example of each variety of coin. Until recently, therefore, if the museum acquired a 'better' example of a coin already in the collection, the existing coin was moved to a tray of duplicates which could be considered for transfer or exchange with other collections. In line with current policy, these coins have now been integrated into the permanent collection, but in the past coins have been transferred out of the museum in this way (G Williams, personal communication, 02/10/2015).

Many coins which are not held by museums end up in private collections. These collections too are often governed by collecting criteria, although in a much more informal way. Private collectors have their own areas of interest

and build their collections to reflect this so, much like museums, their holdings are selective. However, for some collectors there may be fewer restrictions on their acquisition than there are for museums, in terms of both scope of the collection and of purchasing budget. Coins may therefore end up in a private collection, even if they would fit the collecting policy of a particular museum. Museums and private collectors thus often come into contact, and relationships have necessarily grown up between them. These are occasionally made explicit, for example in the group of personal papers of coin collector and historian Sir Francis Hill which are held by The Collection in Lincoln, together with his coins (Lincolnshire County Council, museum object history files: Sir Francis Hill donation, acquired 1974). Hill's correspondence and purchase records offer an intriguing glimpse into the way museum curators and private collectors would share research and information on acquisitions, discuss forthcoming sales, and even negotiate who would be the most appropriate owner for individual items. The composition of museum collections has therefore also been indirectly influenced by the collecting strategies of private individuals. More directly too many museum collections include bequests from collectors, Sir Francis Hill's donation to the Lincoln museums being just one example. Coins in private collections may therefore eventually end up as part of larger museum collections too, so artefacts which are not in the public domain at a particular time may become available for public access at a later date.

It can therefore be seen that there are many factors which influence the composition of museum collections, and thereby the accessibility of particular items for researchers and the wider public. It is also clear that any one museum is unlikely to hold a comprehensive collection of coins of the early Norman period. In order to reveal new narratives, it is necessary to take an overview of the coins in many collections, but even a small group of coins can help to illustrate part of the story and has the potential to engage

museum audiences, while broader representation can be achieved by collaborative working, and loans between organisations.

6.1.2 Coins in Museums

Section 1.3.1 in the first chapter outlined the history of the use of coins in UK museums. As with many other types of collection, as the aims and purpose of museums have evolved, the way that coins are used within them has changed. In the early 20th century it was common for museums to have displays of coins arranged chronologically and taxonomically with little additional interpretation. In the latter part of the century museum practice moved away from presentations by classification and towards thematic displays which were more engaging and relatable for museum audiences. Unfortunately coin collections require a high level of research and careful handling to reveal their potential within these new schemes, so a perception developed that numismatics were difficult to deal with, and less relevant to modern museum objectives than some other types of collection (Rohde 2010, 44). In many cases this has led to coins being less frequently used, and therefore less visible within museums.

The observational survey of museums undertaken for this project indicates that there are currently two main types of display using coin collections: galleries or exhibitions focussed on numismatics, and displays using coins together with a variety of other objects. The former category includes a small number of permanent coin galleries. These can be found in some of the larger museums with a wide, national remit, such as the British Museum in London, the Ashmolean Museum in Oxford, and until recently, the Manchester Museum, all of which have, or have had, Money Galleries. These galleries focus on coins but aim to present the notion of money and its wider social and historical context. Evaluation of the galleries has been positive. Visitors to the HSBC Money Gallery at the British Museum, for instance, found it interesting and relevant (Orna-Ornstein 2001b, 23), and many felt

that galleries displaying a specific theme like this were as enjoyable as galleries dedicated to a particular time period (ibid, 15). Similarly, visitors to the Ashmolean Museum ranked 'money' as one of their favourite themes, and observational and anecdotal evidence suggests that the Money Gallery there is particularly popular (Nomikou 2013, 305-306). The author's experience of the Manchester Museum is presented as a case study below.

Where museums have no permanent Money Gallery coins are sometimes displayed in numismatic-focused temporary exhibitions. The Barber Institute of Fine Arts in Birmingham is an interesting example as it combines these two situations, having a gallery which is permanently dedicated to numismatic displays but within which the exhibition changes on a regular basis. These temporary displays allow the curators to investigate different themes through their coin collection, such as focusing on the legacy of Roman coinage in "Inheriting Rome" in 2015, or on the practice of hoarding coins in "Buried Treasures" in 2016-17. Other venues may include occasional numismatic displays as part of their changing temporary exhibition programme. These can highlight strengths of their own collections, such as the 2016 "Minted: Making Money and Meaning" display at the Grosvenor Museum in Chester, or they may host exhibitions from other institutions, such as "Hoards: the hidden history of ancient Britain". This latter display was curated by the British Museum in 2016 and, with support from the Salisbury Museum, is touring to five regional venues between October 2018 and December 2019 (British Museum 2018). Unfortunately, formal evaluation of temporary displays is less common than review of more permanent galleries, and the results of any surveys which are undertaken are not easily available for further research. The effectiveness of past displays is therefore difficult to gauge.

Coin-specific display tends to occur, or originate, in larger organisations. Numismatics in smaller museums are much more commonly seen as part of

eclectic exhibitions which include a variety of types of object. This is partly due to limitations of display space, but the extensive numismatic collections held by larger organisations also more clearly have scope for representing themes and narratives. The more limited collections in most smaller organisations may be perceived to lack the potential for this kind of representation. There are exceptions to this, of course, such as the display at Hastings Museum discussed in section 6.1.4 below, but in general there is a tendency for coins to be included with other objects simply as a way of showing the variety of material culture from a particular period of history, or of illustrating the type of money used in the past. The deeper interpretation of coins to support a narrative or to evidence societal or historical themes is rare, in part due to the perceived difficulty of communicating this type of numismatic interpretation (Rohde 2010, 37-38). Coin collections are therefore only rarely fully exploited in UK museum displays.

Consideration of the nature of displays which include coins suggests a tendency for these displays to still be rather traditional in their presentation and interpretive schemes. As examined in section 1.3.3 in the first chapter, early numismatic displays usually presented coins in taxonomic order, focusing on their classification and development as an artefact series. As with most other museum objects, interpretation was expert-led, verging on didactic, and often presented the coins simply by describing what they were in numismatic terms, rather than examining their meaning in historical and societal terms; they were presented as artefacts, rather than as evidence for narratives of the past. The legacy of these strategies of presentation and interpretation can still be seen in current coin displays. In many cases, however, this may be because the displays have been in situ for some years; there does seem to be more innovation in temporary exhibitions, such as those at the Barber Institute, or in recently refurbished galleries, such as those at Hastings Museum. Additionally, there are some good examples of participative practice, such as the project to work with members of the public

in Chester, which resulted in the 'Minted: Making Money and Meaning' exhibition (Museum Development North West 2018, 2; 17). Such projects and approaches are currently rare, but this is apparent across the sector, and does not seem to be confined to numismatics. Collaborative approaches are increasingly informing museum policy, so are likely to become more common as displays are refreshed and new projects are conceived.

In discussing the interpretation of coins through museum display it is important to acknowledge that there are specific issues in the practicalities of exhibiting coins. One of the reasons for the perception of coins as difficult to use is the undeniable fact that the physical mounting of coins for display is a skilled business, and is easy to do badly. The question of methods and processes for coin display is a fascinating and complex one, which would benefit from detailed investigation, but unfortunately this is beyond the scope of the current discussion. Similarly, exhibition is only one aspect of the use of coins in museums, with artefacts also being used for public events, talks, handling sessions, classes, and so on. However, the observational method of research used in the current project is not an effective way of capturing or evaluating this area of museum practice. It too is therefore beyond the scope of the current discussion and is not explored in detail.

6.1.3 Case study: The Manchester Museum

A significant example of UK museum use of coin collections could be found at The Manchester Museum, where until recently there was a gallery dedicated to numismatics, presenting the theme of money. The museum is a large organisation, governed by the University of Manchester. As a university museum with very broad collections the service has far-reaching aims: its stated purpose is to use its collections "….for enjoyment and inspiration, working with people of all backgrounds to provoke debate and reflection…", with objectives to promote understanding between cultures, and encourage the development of a sustainable world (Manchester Museum 2015, 2). The

numismatic collection of the Manchester Museum is extensive and wide-ranging, and has been Designated by Arts Council England as an outstanding collection (ibid., 4). As of 2014, The Manchester Museum was one of only four UK Designated museum collections where the numismatics are specified within the designation (Arts Council England 2014)[5]. As such Manchester provides an interesting case study, representing a major museum service using an important coin collection through the medium of numismatic-specific display.

A research visit to the Manchester Museum was undertaken on 23/02/2016, and was followed up by an email exchange with Nick Merriman, who was then the director of the organisation. The Money Gallery was found to be of a good size, with many numismatic items displayed in cases, together with a smaller number of objects of other types which supported the ideas represented by the coins. The overall interpretive aim seemed to be to present the concept of money, and to show how coins can illuminate past societies; the secondary interpretation was split into three broad time periods, and was then thematic, with each case displaying a different subject, such as trade, minting, religious expression, or forgery. Within the cases there was a brief thematic statement and then each coin was labelled with its numismatic classification. The interpretation of the coins was thus fairly traditional, emphasising their taxonomic descriptions at the expense of broader representation of how they provide evidence for narratives of the past. Similarly, the presentation of the coins was also quite traditional, with most pinned in sequence to a plain backboard, as shown in figure 6.1.

[5] The four collections are The Manchester Museum, The Ashmolean Museum Oxford, Birmingham Museums Trust, and York Museums Trust.

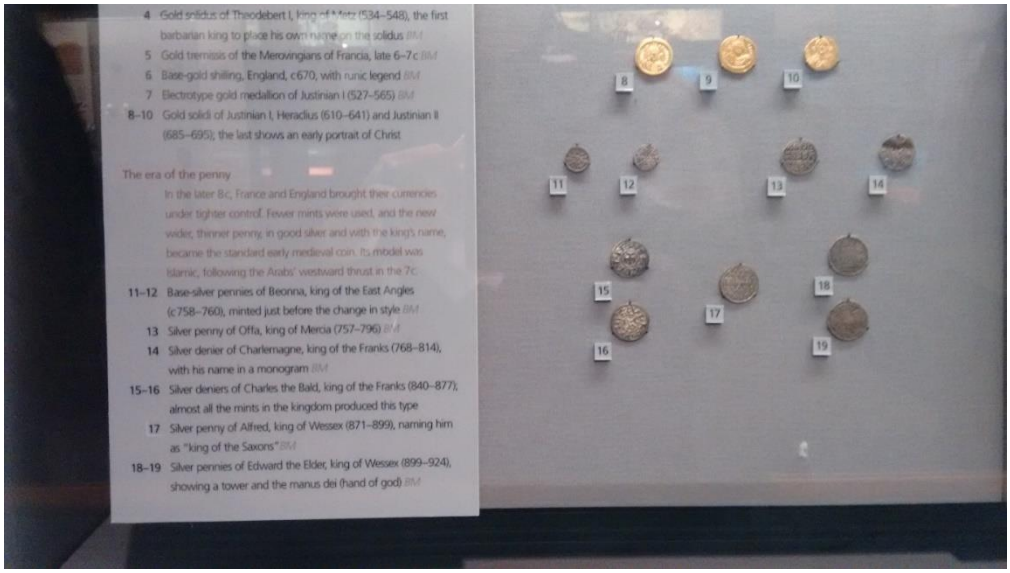


Figure 6.1: Coins displayed and interpreted in traditional fashion in the Manchester Museum

The gallery also included two additional methods of engagement with the collection. Firstly, there was a handling table, staffed by a volunteer, where visitors could pick up and examine coins and other numismatic items, and discuss them with the volunteer. The volunteer was also knowledgeable about the coins on display. Secondly, the gallery included an innovative electronic device called the 'GalleZeum', which was a digital sensory display station using 3D graphics and haptics to allow visitors to examine and 'feel' a number of virtual replicas of museum objects. On the initial visit the GalleZeum was not switched on but a return visit on 16/11/2017 allowed examination of the device. Unfortunately, none of the objects represented virtually within the machine were numismatic in nature and it would appear that it was placed in the money gallery for logistical reasons rather than because of its content.

The overall impression was that the Money Gallery used coins and other objects to present a number of interesting themes and to highlight the range of historical details which can be revealed by investigation of numismatics. The presentation was, however, very conventional. Discussion with the volunteer provided much extra information and enlivened the engagement with the collection, which otherwise may have seemed rather dry. This

perception was particularly strong when the gallery was considered in relation to some of the other galleries in the museum, which had been refurbished within the last decade. The newer galleries tended to be cross-disciplinary and much more interactive, bringing together diverse objects and prompting consideration and discussion in the visitors. Nick Merriman confirmed that the organisation "…are largely moving away from galleries on single classes of object, to galleries which reflect wider themes, and address one or both of our two objectives…" He went on to note that if they did refurbish the space currently occupied by the Money Gallery "I doubt that [the new display] would therefore be on numismatics." (N Merriman, personal email communication, 10/05/2016).

The GalleZeum device provided a particularly interesting point of investigation. During the initial research visit there seemed to be some hostility towards the device from the volunteer and a member of Front of House staff who were present in the Money Gallery: neither knew how to switch the machine on and the volunteer tried to steer me away from it, telling me that it was only for use of visually impaired visitors, despite the signage on the machine specifically refuting this. The volunteer then went on to complain that when the device was switched on visitors, especially children, ran straight to it, ignoring the displays and the handling objects. There was the feeling from the staff that the GalleZeum was detracting from the 'real' experience of the historic collection.

The placement of the GalleZeum did feel very arbitrary, since none of its content was related to the gallery in which it was situated. The hostility of the staff added to this impression. It seemed to be a missed opportunity, since the concept of the device was very engaging and if it could have been integrated with the nearby displays, and the staff could have been encouraged in its use and purpose, it had the potential to enhance the visitor experience of the numismatic collections. Following the initial research visit,

Nick Merriman did confirm that the organisation was "…still learning how to exploit it properly" (ibid.) but its signage and use had not changed by the time of the return visit 18 months later.

The Money Gallery at the Manchester Museum was therefore an interesting example of the use of coins by a large organisation. The collection was interpreted through a permanent gallery dedicated to numismatics, supplemented by object handling and personal interpretation provided by a volunteer. However, the presentation of the gallery was rather dated, especially in comparison to other spaces within the building, and there was an overall feeling that it was being left behind by the rest of the interpretation. In 2016 if felt as though the Money Gallery was existing on borrowed time. The comments provided by Nick Merriman strengthened this feeling and gave the impression that the numismatic collection, at least in its present form, did not easily fulfil the current aims and objectives of the museum. Despite assurance that at that time there were no plans to change the gallery in the next five years (ibid.), in early 2018 the Money Gallery was closed and dismantled to make way for a new Chinese Culture Gallery, which will open in 2021 as part of the "hello future" programme, an HLF-funded £13 million development (Manchester Museum 2018). The development is described as transforming Manchester Museum to become "…more inclusive, imaginative and relevant to the diverse communities we serve." (Manchester Museum 2017), thus implicitly confirming that the Money Gallery was felt to be not succeeding in those areas.

6.1.4 Representation of the Norman Period

In addition to investigation of the use of numismatics, the observational research visits conducted for this project also examined how the Norman period of English history is currently presented in UK museums. Again, there are two main categories of display: exhibition specifically focused on the

Norman period, and exhibitions which include Norman history as part of a wider display.

Presentation of Norman England as a discrete theme is rare in UK museums; it tends to be confined to heritage sites which have a specific link to the period. Norwich Castle Museum, which is housed in a Norman keep, is a prime example, as is the English Heritage site at Battle Abbey, on the site of the Battle of Hastings and the subsequent memorial monastic foundation. Both these places examine the period in some detail, as a way of interpreting their location and connecting their audiences with the history of the site which they are visiting. The displays at Norwich Castle are currently being reworked but at the time of the research visit, in June 2017, the interpretation presented the life and material culture of the castle, thus naturally focusing on the elite part of society. A few coins were included in the display, presented with other objects such as seals and harness pendants in a discussion on symbols of authority. The interpretation at Battle Abbey, visited in the same month, had two foci; one part presented the battle itself and the upheaval of the Norman Conquest, and the other looked at the institution of monasticism within the later English medieval state. Some coins were used in the former displays, albeit only as pictures rather than the actual artefacts. The interpretation of the coins was again focused on their symbolic function as a representation of power and, unfortunately, some of the details given were factually incorrect.

Beyond these site-specific displays the author found few instances of exhibition dedicated to the Norman period. None of the major national museums have a 'Norman gallery', with the period instead being covered within discussion of the wider medieval era. In fact, dedicated displays are lacking even at some museums where a Norman focus might be expected, such as Colchester Castle which, like Norwich, is a Norman keep. A research visit to Colchester in April 2016 found that the site was mainly presenting the

Roman history of the town, with the entirety of the Saxon, Viking and Norman periods covered in just a single display case. The case exhibited a variety of objects, including coins, but with no detailed interpretation.

Interpretation of the Norman period is also often difficult to pinpoint within broader displays. Larger museums may have a medieval gallery, and smaller organisations frequently have displays presenting the history and archaeology of the local area, often chronologically. The Norman period is covered by the scope of these exhibitions but is rarely presented in much detail. The archaeology gallery at Derby Museum and Art Gallery, visited most recently on 25/03/2019, is fairly typical, mentioning the coming of the Normans at the time of the Conquest, and the size of the town as recorded in Domesday Book, and then moving on to talk about the thirteenth century. Even at the British Museum mention of Norman England is minimal, with a visit on 02/10/2015 finding no discussion of the history or impact of the Normans in England, and little interpretation in either the Anglo-Saxon or Medieval galleries. When asked, the member of staff in the latter gallery was unable to direct the author to any Norman objects anywhere in the museum.

There thus seems to be something of a lacuna in the presentation of English history in UK museums when it comes to the Norman period. With few exceptions the period is largely invisible in museum displays. The Museum of Liverpool offers a somewhat symbolic example of this: a visit on 13/10/2015 found a ‘timeline’ display of the history of the area which ironically placed the Norman period at the exact point where there was a gap between two display cases, as shown in figure 6.2. One case ends with the Norman Conquest in 1066 and the next case begins in 1207. It is highly likely that this is entirely coincidental but it does present an appropriate analogy for the current presentation of Norman England in UK museums. There are a number of possible reasons for this gap, including lack of display space and resources, but it is compounded by a general paucity of Norman-era artefacts in

museum collections. This may partly be due to a historical denigration of the medieval period, and the period of conquest in particular, as explored in section 1.3.2 in the first chapter. However, it can also be related to the fact that the material culture of the Norman period in England is in many ways not clearly distinct from that which came before or after, and thus it is sometimes tricky to identify artefacts which specifically come from a Norman context (e.g. Hadley and Dyer 2017, 7-8). This causes particular difficulties if the narrative which is being presented is the traditional story of the Norman Conquest as a dramatic moment of rapid and large-scale change across English society; if one doesn't have objects which show societal change one cannot present that story in great detail. The artefacts may, however, more easily represent new narratives, such as those identified from examination of the surviving coins.



Figure 6.2: Timeline display at the Museum of Liverpool with a gap where the Norman period would be

6.1.5 Case study: Hastings Museum

The Norman period of English history is obviously important to the story of Hastings, since it was the closest town to the site of the battle which saw William I seize the kingship through the defeat of Harold II. Representation of this period is therefore significant for the Hastings Museum and Art Gallery.

The museum is governed by Hastings Borough Council and has a regional remit, stating its purpose as "…the preservation, collection, documentation and interpretation of the collections associated with the history and natural history of the area…", and its objectives as caring for the collection, increasing visitor numbers, providing excellent customer care, and improving income generation (Hastings Borough Council 2015, 2). The museum holds a small but eclectic collection of numismatic material (ibid., 7) but its main strength is identified as its collection of local and social history items (ibid., 4). As such this museum provides an interesting case study of a small, regional, local authority-run museum which does not have numismatic-specific displays but does have a perceived requirement to represent the Norman period. It therefore also provides a counterpoint to the Manchester Museum case study examined in section 6.1.3 above.

A research visit to the Hastings museum took place on 22/06/2017 and was followed up by a telephone conversation with Catherine Harvey, the Keeper of Art and World Cultures, and previously the Exhibitions Officer for the service. The main interpretive strand in the museum was a roughly chronological exploration of the history of the area, with additional galleries presenting other parts of the collection, such as fine art or world cultures, or interpreting the architecture of the museum building. The chronological display was split into two sections; the first gallery, "Before Hastings" presented regional archaeology from early man to the Viking period and the next suite of galleries took the history forward with "The Story of Hastings in 66 Objects". This exhibition took 1066 as its starting point and examined individual objects to reveal the stories they represent. Additional objects were included in the cases, and as images in the interpretation, to support the core 66 items.

The first object in the 'Story of Hastings' display was a PAXS penny of the Hastings mint. It was illustrating the coming of the Normans and was

interpreted in terms of minting in Sussex. The interpretation also suggested the effects of the Norman Conquest on the people of the area by commenting on the work of the moneyers who had to mint for three different kings in 1066. In addition, the interpretation of this object was supplemented by a 'snippet' of extra information. These snippets were presented throughout the gallery and took the form of speech bubbles giving details of individual local people known from that point in history, as shown in figure 6.3. In this case the bubble introduced Dunninc, the moneyer who had struck the coin on display, and mentioned that he had been working at the Hastings mint since 1053, before the Conquest. The story was also brought up to date by commenting that the name Dunninc could be linked to the modern local surname Dunk.

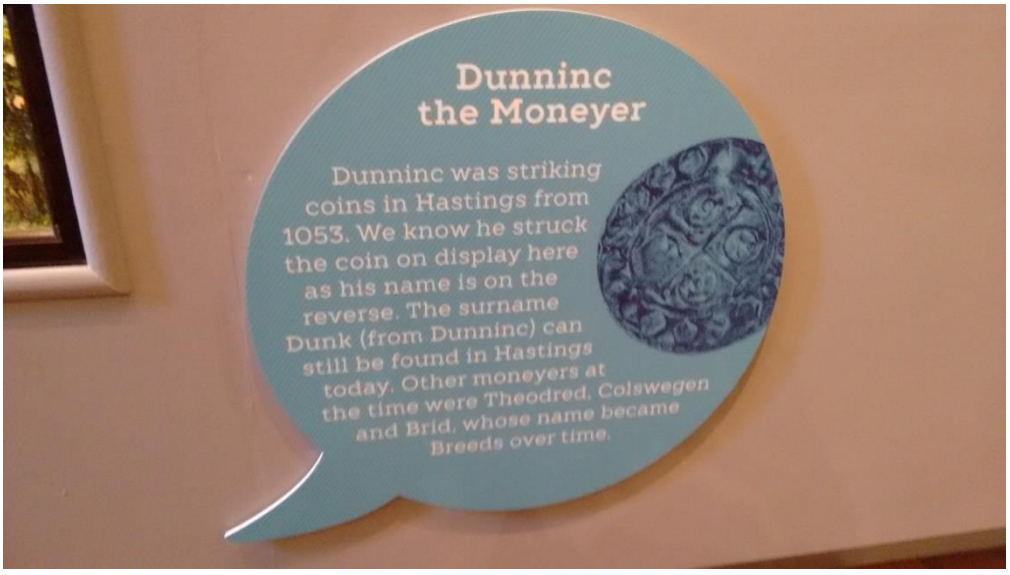


Figure 6.3: Interpreting a Norman coin with a personal story at Hastings Museum and Art Gallery

Subsequent objects presented other aspects of the Norman period, some from the elite level of society, such as Hastings Castle, but some focusing on the more everyday aspects of life, such as the wine trade. In presenting these stories the Norman artefacts were occasionally supplemented by later items, such as medieval and post medieval keys from the site of the castle. Catherine Harvey confirmed that this was partly due to the lack of artefacts in their collection which were identified as being from the Norman period; in

fact, she commented that the display contains "nearly all of our Norman objects" (C Harvey, personal communication, 01/09/2017). An effect of this, however, is also to provide a sense of continuity from the Norman period into the later history of the town. The written interpretation across the gallery deliberately included everyday activities as well as extraordinary events (ibid.). The snippets provided stories of individual people, and the text also included quotes from contemporary documents, and notes on the evidence used to arrive at the facts being presented.

The 'Before Hastings' and 'Story of Hastings' galleries were installed in 2016 in order to incorporate the local history displays from the Old Town Hall Museum with the exhibitions at the Museum and Art Gallery, following the closure of the former. The project had a small budget and a short implementation timescale. A limited, 'light touch' consultation with the local community provided input into the planning of the galleries, including some comment on which stories were included, and which objects were chosen to represent those stories. However, the paucity of Norman objects in the collection meant that this part of the story did not lend itself to this type of public consultation, and the decisions here were made entirely by the curators (ibid.). The resulting display is dynamic and engaging, using artefacts and coins to present the story of the town, including its Norman history, in a way which audiences can relate to. Indeed, Harvey confirms that anecdotal feedback has been very positive and, although it was initially conceived as a temporary display, the museum now plans to keep it in the galleries on a more permanent basis, partly in response to the positive public reaction (ibid.).

6.1.6 Summary: The Current Situation in UK Museums

Naturally the situation in UK museums and heritage organisations varies greatly, in terms of both the use and status of coin collections, and the representation of Norman England. While there are some excellent examples

of best practice in both areas, however, general trends seem to be for the increasing marginalisation of numismatics, and for neglecting, or even omitting, the period of Norman rule. The reasons for both these situations are complex, but the result is that coin collections are currently only rarely used to their full potential, while the stories of the Norman period which are presented to the public are often cursory and conservative. There is clearly scope for the new narratives revealed by examination of the surviving coins of William I and II to benefit both the utilisation of museum coin collections, and the public representation of the Norman period.

6.2 Formative Evaluation of New Narratives of Norman England for Representation in the UK Heritage Industry

The above examination of the current situation in UK museums suggests that the traditional narratives of the Norman period are not easily represented by the artefacts held in museum collections. Additionally, coin collections are only rarely being used to their full potential. These two circumstances together hint that there is potential for the new narratives revealed by the current examination of the surviving coins of William I and II to develop museum representation of the early Norman period in England. In order to evaluate this potential, the project included a survey of a variety of possible museum audiences, examining their interest in, and engagement with, the narratives.

This survey can be seen as formative evaluation of the narratives for presentation to the public, in that it is an interim process which could be used to inform the development of the narratives into a physical display. Summative evaluation of any subsequently mounted display would then follow, but survey at this theoretical stage constitutes part of the developmental process for dissemination of the knowledge derived from examination of the coins. The importance of this type of evaluation is

becoming increasingly apparent in the UK heritage industry, as organisations move to improve the opportunities for input and participation by their audiences in the curation of their collections and the development of exhibitions and events (cf. industry guidance by Grey, Gardom and Booth 2006, 52-55; Foster 2008, 8-10; Derby Museums Trust 2014a, 14). The current survey can therefore be seen as a pilot study for future research, as well as an examination of the potential for coins to contribute to the public representation of the past.

6.2.1 Articulating the New Narratives

Chapter 5 above shows how the data derived from examination of the surviving coins can be interpreted to reveal narratives of life in early Norman England. Some of these narratives develop and add nuance to our existing understanding of the period, while others represent new stories. They have the potential to be interesting and engaging for the public, but in order to disseminate them they need to be articulated in an accessible way. This articulation necessarily represents a form of interpretation in and of itself; forming the data into narratives for presentation to participants in the evaluative survey. The process therefore has an influence on the evaluation and must be considered when analysing the results of the survey.

The narratives detailed in chapter 5 present a picture of a kingdom with a great deal of regional variation in the way its citizens were affected by the introduction of Norman rule. There was, however, a consistently high level of continuity from the earlier period in both the personnel and the processes of the monetary and fiscal systems, with change coming only gradually over many decades. The interplay between local autonomy and central control over the system can be seen in the coins, shifting towards the latter over the course of the period. The coins also offer glimpses into the lives of individual people living and working in England, and reveal hints of how they reacted to key events of the time. The coins thus present an alternative to the

traditional narrative of the Norman Conquest as an explosive moment of rapid, wholesale change, showing that for some aspects of life the Conquest was in fact just a single part of the gradual, ongoing development of the medieval kingdom.

The key points of this interpretation can be summarised as individual narrative threads. They include:

- Diversity of experience between different areas of the kingdom, contributing to shared regional identities.
- Continuity of minting practice throughout the period.
- Moneyers with considerable power within their roles, and high status within society.
- The persistence of individual moneyers, and moneying families.
- Evidence for sophisticated systems of trade and surprising amounts of travel around the kingdom, and abroad.
- Varying levels of effectiveness of central governmental control over the minting system.
- The effects of key political events on ordinary people living in the kingdom.
- A gradual move towards increasing homogeneity and control of the system.

For the purpose of evaluation, it was decided to present five of these narratives to potential museum audiences. These were selected for their relative clarity, and to present a range of different themes. The chosen narratives were:

- ‘Rebellion and Retribution’: The Northern Rebellion and the Harrying of the North, and their effects on life in York, including the way individual moneyers chose to react to the events happening around them.

- ‘Doing Things the Old Way’: The strong continuity of minting practice across the period of conquest, and how elements of the moneying system from late Saxon England can still be seen in the coins right to the end of William II’s reign.
- ‘Breakin’ the Law’: The continued instances of low weight coins and altered coining dies, despite the harsh punishments proscribed for moneyers striking poor coinage, and the implications of this for the level of control over the minting system.
- ‘Making Money’: The lives of the moneyers, including their high status, and opportunities for moving around the kingdom, and for potentially passing on their role to a chosen successor.
- ‘The Local Story’: The clear variations between different mints, and their suggestions of regionality within the kingdom.

In order to articulate these narratives in an accessible way, each was written as a short summary, of around 150 words, using simple prose and avoiding jargon. A second text of more detailed additional information was written for each story, and a text outlining the evidence used to arrive at the narrative was also created. These texts were worked into a pdf with clickable links to allow navigation around the document. The document also included a brief introduction to Norman coins, and a page of ‘headline’ titles to allow individual stories to be selected. The stories were each accompanied by images of coins directly relevant to the tale being told. Overtly interpretive elements, such as different narrators or interactive games, were avoided, in order to present the stories as factually as possible. However, the author acknowledges that it is not possible to present historical narratives entirely objectively, and that the responses to the survey would necessarily have been somewhat influenced by the language and images used, and the aesthetic of the document. The final document, as it was presented to participants in the evaluation, can be seen at Appendix 5.

6.2.2 Evaluating the Narratives

The evaluation undertaken for this project aimed to address two main areas of research enquiry: how engaging the narratives revealed by the coins are, and how they could effectively be presented in a museum setting. As detailed in section 2.5.3, in Chapter 2 above, the narratives were presented to a research group of potential museum visitors, who were then directed to complete an online questionnaire to assess their responses. The text of the questionnaire can be seen at Appendix 6.1.

The questionnaire first captured some demographic information about the respondents, in terms of their usual habits for visiting museums and heritage sites, and their prior knowledge about Norman history, and about coins. The next questions aimed to assess the impact of the stories, by noting how much of the narrative document the respondent read, and asking which stories interested them, which made them want to find out more, and which surprised them or changed the way they thought about the Norman Conquest. The final set of questions asked the participants how they would like to see the stories presented in a heritage setting, requesting them to rank different themes, types of information, and narrator 'voices' in order of preference. The desirability of different display elements and potential supporting activities was also queried.

The evaluation attracted 91 responses. In addition to the overall group response, the demographic information allowed the participants to be allocated to different sub-groups, in order to investigate whether responses varied according to the particular situations or interests of the participants. These groups have been named and designated as follows:

- Heritage Professionals: 32% of respondents (29 people) work or volunteer at museums.

- Childcare and Education Professionals: 7% of respondents (6 people) visit heritage sites with children as part of their job (i.e. they are teachers, scout leaders etc.)
- Family Group Visitors: 40% of respondents (36 people) visit with children who are family or friends.
- Visitors Without Children: 59% of respondents (54 people) do not visit with children at all.
- Lone Visitors: 53% of respondents (48 people) visit alone.
- Social Group Visitors: 78% of respondents (71 people) visit with adults who are family or friends.
- Medieval Historians: 47% of respondents (42 people) stated that they 'knew quite a lot' or 'had quite extensive knowledge' of the medieval period of British History.
- Anglo-Norman Historians: 43% of respondents (39 people) stated that they 'knew quite a lot' or 'had quite extensive knowledge' of the Norman Conquest.
- Numismatists: 15% of respondents (14 people) stated that they 'knew quite a lot' or 'had quite extensive knowledge' of historic coins.
- Numismatists of the Eleventh Century: 10% of respondents (9 people) stated that they 'knew quite a lot' or 'had quite extensive knowledge' of English coins from 1000-1100 AD.

An individual respondent could be part of one or many of these sub-groups. Analysis of the responses to the survey first looked at the whole group, and then examined each sub-group separately, before finally comparing each of these results.

Many of the questions in the survey resulted in responses which could be analysed numerically. However, some questions asked participants to rank different suggestions in order of preference. In order to analyse these the responses were translated into 'points', with the lowest ranked choice being allocated 1 point, then next 2 points, and so on up to the highest ranked

choice. The most preferred option therefore received the most points, and the results could be numerically investigated.

6.2.3 Results of the Evaluation

The full dataset of responses to the questionnaire can be seen at Appendix 6.2.

6.2.3.1 Responses from the Full Set of Participants

Most people read most of the document. The introduction pages, the page with the 'headlines' of the stories, and 'some or all' of the story summary pages were read by 99% of respondents. 93% of respondents felt moved to explore the stories in more detail by reading some or all of the extra information pages, and 88% of respondents read some or all of the pages of evidence used to arrive at the narratives.

All five of the narratives were popular amongst the respondents. When asked to choose one or more story which 'particularly interested' them, even the least favoured one was selected by over 50% of participants. The individual stories which most interested contributors, or stuck out most in their minds, were the one about striking false coinage, and the one about the Northern Rebellion. The story about continuity of earlier practices through the early Norman period was the least popular, as shown in figure 6.4.

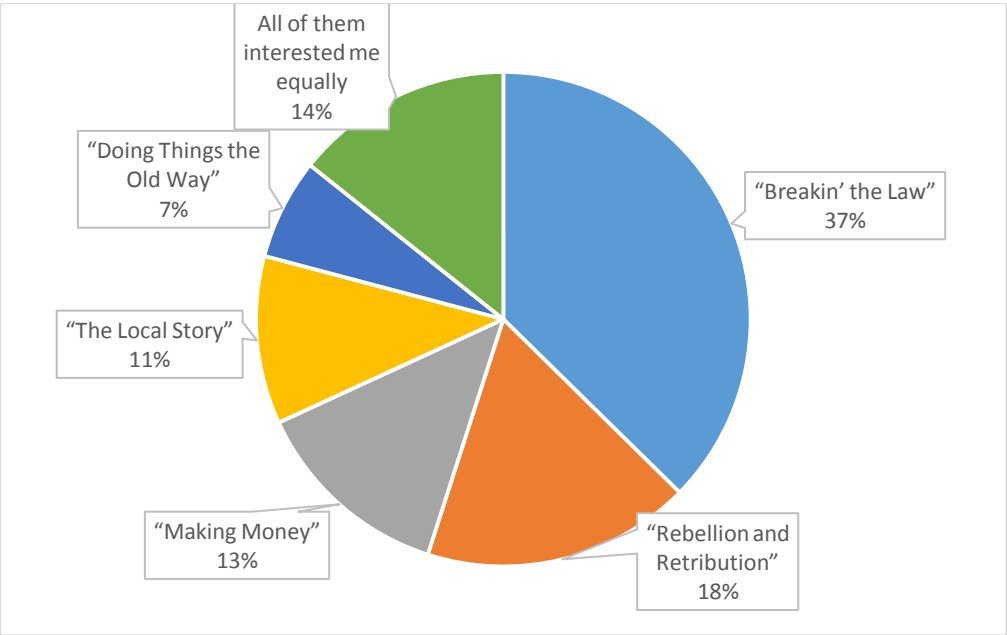


Figure 6.4: Popularity of individual narratives amongst all survey respondents

All of the stories caused some respondents a desire to find out more, with 'Rebellion and Retribution' having the greatest effect (48% of respondents). 'The Local Story' was the second most popular, prompting this reaction in 42% of respondents, while the other 3 stories were all chosen by the same proportion of participants (40%), although they were not necessarily the same individuals in each case. Only 15% of respondents said that none of the stories particularly made them want to find out more.

Similarly, all five of the stories were marked as causing surprise in some participants, and/or making them think differently about the period. The most effective in this respect were 'Rebellion and Retribution' and 'Doing Things the Old Way', which were each noted by 34% of respondents. 'The Local Story' and 'Making Money' came next, and even the story with the least responses on this issue, 'Breakin' the Law', was marked as surprising by 26% of respondents.

These responses suggest some interesting things about the different stories included in the document. The criteria examined by the survey could be classified as the interest of the story, whether it prompted curiosity, and

whether it was in some way unexpected. Based on these criteria, the story which elicited the most response was 'Rebellion and Retribution': it was marked as interesting by 82% of respondents, and was the second most popular individual story. It can also be seen as the most effective story for prompting people to want to find out more, and at surprising readers or making them think differently about the Norman Conquest (jointly with 'Doing Things the Old Way' for the latter criterion). 'Breakin' the Law' was also a very popular story, being marked as interesting by 75% of respondents, and being by some margin the single story which stands out most in respondents' minds. However, it seems to have been less effective at prompting people to want find out more, or at surprising them or making them think differently about the period.

'Making Money' received fairly average scores on all counts. 'The Local Story' was somewhat less interesting to respondents than other stories. However, it was rather more effective at making people want to find out more, receiving the second highest number of responses for that criterion. It was in the middle of the chart for eliciting a response of surprise.

'Doing Things the Old Way' could be seen as the least popular of the five stories. It received the lowest number of responses for interest and was only chosen by 7% of participants as the story which stuck out most. It received an intermediate score for making people want to find out more. It was, however, considerably more effective at confounding people's expectations, being marked for this by 34% of respondents – the joint highest score with 'Rebellion and Retribution'.

The next few questions in the survey examined how participants felt the stories could be interpreted in a museum display. In terms of topics for such an exhibition there was a clear preference for finding out about the makers of the coins, followed by interest in the rules and regulations of coining, as

seen in figure 6.5. Information about the king was by some way the least popular choice.

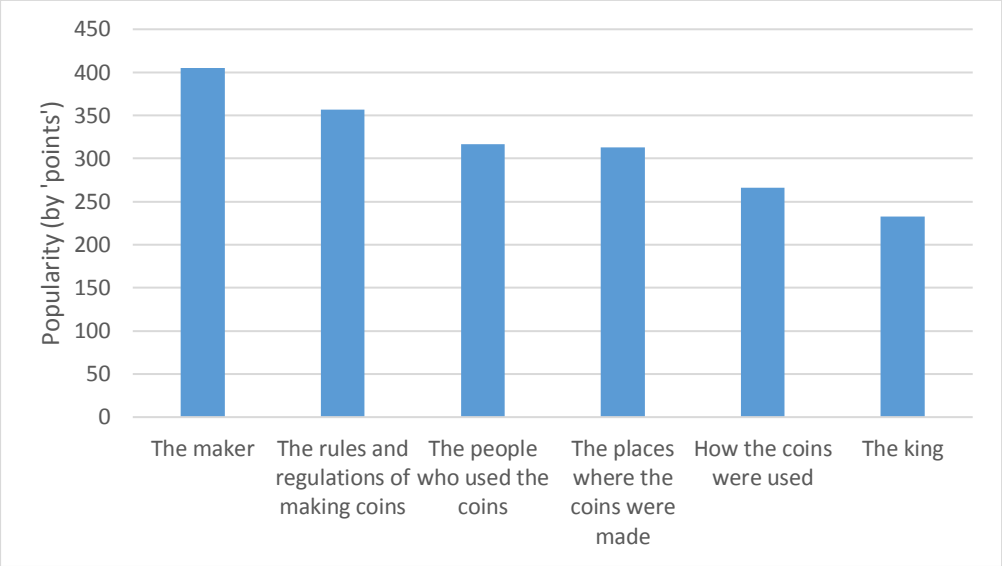


Figure 6.5: Popularity of suggested topics for museum display

Survey participants were then offered six styles of presentation for the data. Of these six there were three which were notably more popular than the other three: ‘Stories of individual people’, ‘Practical details (e.g. how coins were made)’ and ‘Stories of important historic events’. Presentation of the evidence for the conclusions being presented was ranked next. ‘Museum information’ and ‘Technical details of coins’ received the fewest ‘points’, as shown in figure 6.6.

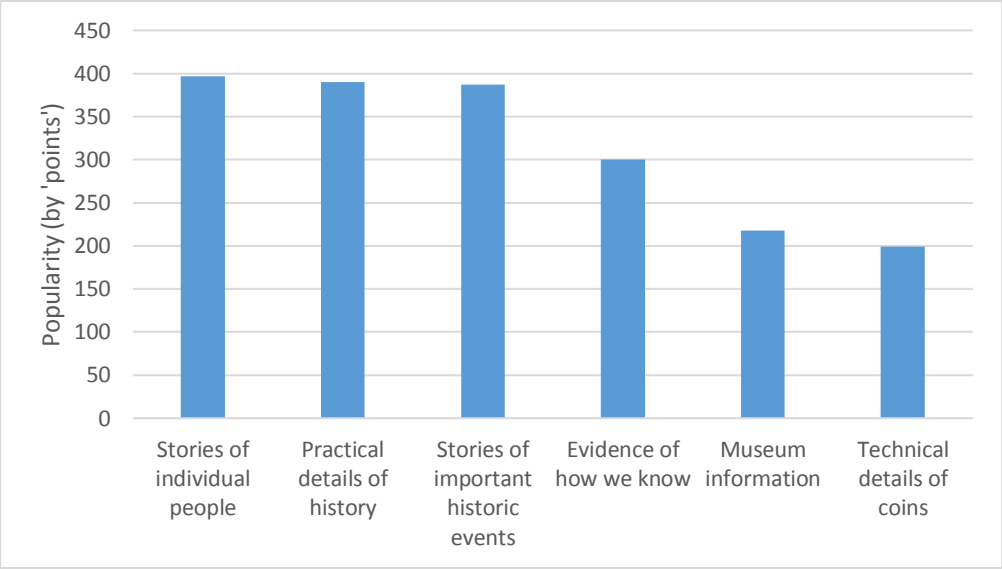


Figure 6.6: Popularity of suggested content of museum display

Examination of these potential styles of presentation was followed by a question about the narrative 'voice' of an exhibition, summarised in figure 6.7. The most popular choice here was that of a modern researcher, gathering the evidence and putting the pieces together; in other words, showing how the stories presented were arrived at. This was followed by stories told from the point of view of a medieval person. The voice of a modern expert presenting the facts, such as a historian or museum curator, was the next most popular choice, with the option for thoughts and ideas provided by members of the public receiving the least interest, by some margin.

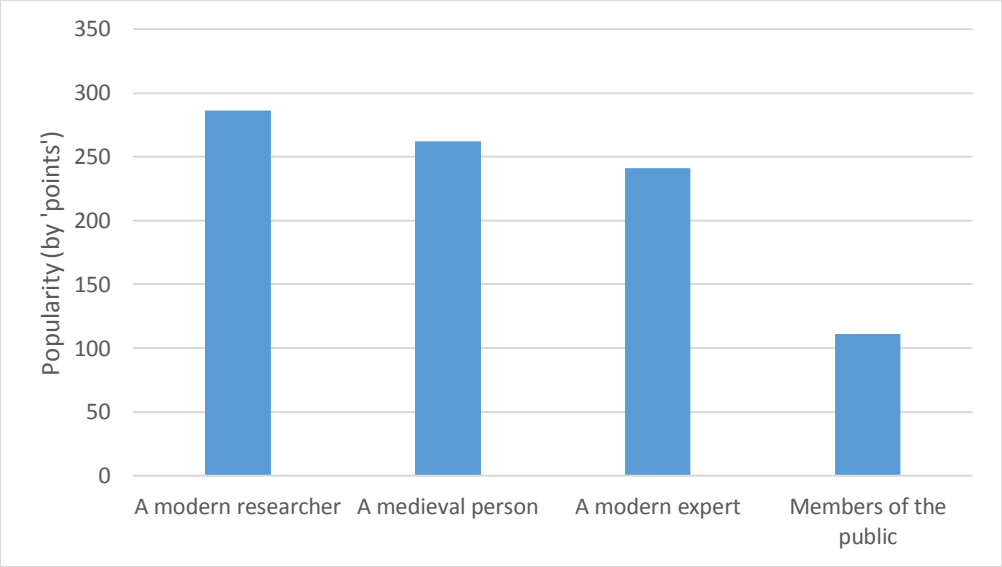


Figure 6.7: Popularity of different narrative voices for museum display

The final set of questions in the survey looked at what elements participants would like to see included in a heritage presentation of narratives of the Norman period. All respondents felt that having the actual coins in a display was needed, with the majority (77%) feeling that this was essential, while the other 23% marked it as desirable. The result was less clear-cut for the inclusion of 'other objects and documents from the period (not just coins)', with 50% marking this as desirable while 45% considered it essential. 2 people felt that it was not needed, and 2 people didn't mind either way.

54% of respondents felt that it was desirable to have information available digitally in the museum gallery. 9% felt that this was essential but 11% considered that it was not needed. Respondents were even more ambivalent to the suggestion of digital information accessible on visitors' own devices, such as online data or apps. Again 9% felt that it was essential but only 41% marked this as desirable while 22% felt that it was not needed.

The respondents were more positive about the suggestion of 'Extra information and further reading', although the question did not specify what format that might take. 13% of participants felt that this was essential, with a further 63% considering it desirable. 10% of respondents felt that it was not needed.

The suggestion of participation in the exhibition through 'the chance to contribute your own thoughts and ideas' was not very enthusiastically received, with only 1 person marking it as essential and 20% of participants considering it desirable. 40% of participants felt that this aspect of display was not needed, while 38% did not mind whether it was there or not.

The responses to the suggested display elements were mirrored somewhat in the responses to proposals for additional activities to support any potential exhibition. The chance to handle the coins was clearly the most popular choice, with talking to experts ranked second, followed by trying out historic activities. The chance to join in with discussions was not popular, with only the opportunity to talk to medieval re-enactors being ranked as less appealing. This is shown in figure 6.8.

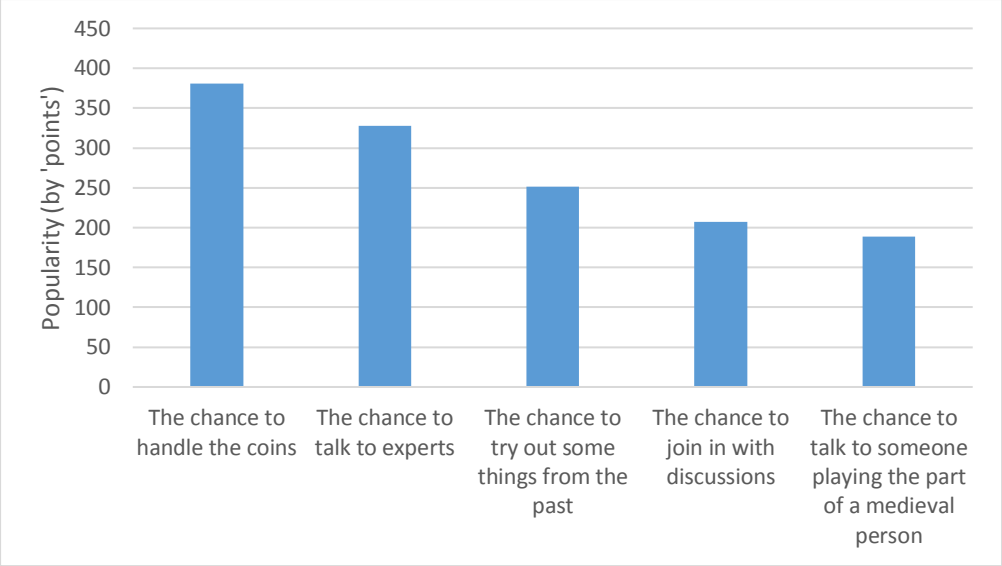


Figure 6.8: Popularity of potential supporting activities

6.2.3.2 Responses from Subsets of Participants

Following examination of the full set of responses to the survey, the data were filtered into subsets based on the criteria detailed in section 6.2.2 above. This allowed investigation of whether particular museum user groups may have specific needs and expectations which differ from the overall reactions. Most of the responses from individual groups were very similar to those provided by the full set of respondents, but there were some key variations for each group, which are outlined here.

6.2.3.2.1 Heritage Professionals

In terms of topics for display the Heritage Professionals group gave rather lower ranking to 'the rules and regulations of making coins'. This topic was the second most popular in the full group but only came fourth in the ranking for Heritage Professionals. Conversely, this group were more interested than general in stories of important historic events, which was their most popular content choice, while it was only third when all responses were examined together.

In addition, this group generally seems to view digital information in a display as more desirable than essential. The response from the Heritage Professionals was 61% for desirable and only 4% for essential, while the overall response was 54% and 9%, respectively. On the other hand, Heritage Professionals were somewhat more enthusiastic than the full group about audience participation through 'the chance to contribute your own thoughts and ideas'. However, it was still a rather muted enthusiasm: none of them felt this was essential, but 32% marked it as desirable (as compared to only 20% of the full group). Similarly, only 21% felt that it was not needed (rather than the 40% of the full group).

6.2.3.2.2 Childcare and Education Professionals

This subset was a very small group, comprising only six respondents. Analysis of their results can therefore only be viewed as an indication, and is not in any way statistically significant.

For interest, curiosity, and surprise Childcare and Education Professionals consistently showed preference for 'Breakin' the Law' and 'Rebellion and Retribution', while the overall group response was different for different criteria. 'The Local Story' and 'Doing Things the Old Way' were consistently the least popular amongst this group. Similarly, the group ranked 'the places where the coins were made' as the least popular choice for the topics of a display, while it was only fourth (of six) in the overall ranking. This is consistent with the lowered interest in 'The Local Story' narrative amongst this group.

There was a slightly increased interest in the theatrical aspects of interpretation, with 'a medieval person' just pipping 'a modern researcher' for the most popular voice for exhibition text amongst this group, in a reversal of the result from the overall group. Also 'the chance to try out some things from the past' was the Childcare and Education Professionals' second

favourite option for accompanying activities, while it was ranked third (behind 'the chance to talk to experts') by the overall group.

The major difference when considering how important different aspects of display would be are that the Childcare and Education Professionals all felt that it was essential to include other objects and documents as well as coins, while the overall group generally felt this was desirable rather than essential. Somewhat unexpectedly, however, the Childcare and Education Professionals were fairly ambivalent to the provision of digital content, reflecting the overall result. They were also similarly not enthusiastic about the chance to contribute their own ideas.

6.2.3.2.3 Family Group Visitors

In terms of digital content, the Family Group Visitors were slightly more enthusiastic than the full group, with a higher percentage marking both in-gallery digital information and information you can access on your own device as 'desirable', while the percentage marking these aspects as 'not needed' was lower. Conversely, a notably lower percentage of this group felt that extra reading was desirable, and a higher percentage marked this option as 'not needed', and a similar result was seen for the chance to contribute their thoughts and ideas.

6.2.3.2.4 Visitors Without Children

When noting which stories surprised this group, 'Rebellion and Retribution' was marked by the fewest number of people, while in the overall group it was the most commonly chosen. This group's preference for 'Breakin' the Law', however, is much more pronounced than for the full group responses.

The group of respondents who only visit without children were a little less enthusiastic about the provision of digital information, both in-gallery and

accessible on visitors' own devices. Although about the same proportion marked these options as 'essential' or 'desirable' as in the full group results, a larger proportion of this sub-group marked these as 'not needed'. In contrast, when considering the option of extra information and further reading, a higher proportion of this group considered it 'desirable' and a lower proportion marked it as 'not needed'.

6.2.3.2.5 Lone Visitors

This group was less attracted to 'Breakin' the Law' than the overall group, responding to it less positively in terms of both making them want to find out more, and in terms of which stories surprised them.

There were also some minor differences in the order of preference for the content of display. The three most popular choices for content were the same as for the full group, but were in a different order. Similarly, at the bottom of the ranking, the Lone Visitors preferred 'Technical Details of Coins' to 'Museum Information', but the difference was very small in both cases.

6.2.3.2.6 Social Group Visitors

There were no real differences between the responses from this group and the responses from the full set of participants. This is not too surprising, however, since this group is very large, comprising most of the participants in the survey: only 22% of respondents did not fit into this particular subset.

6.2.3.2.7 Medieval Historians

'The Local Story' come out poorly amongst this group when asked which stories made them want to find out more. It was the least popular, marked by only 36% of the group.

The Medieval Historians group showed a small preference for an exhibition to be 'voiced' by a medieval person telling their story from the past, with a modern researcher coming second. This is a reversal of the response from the overall group.

When rating the importance of different aspects of display, the Medieval Historians group was even more enthusiastic about the need for the actual coins than the overall group. Also, while this group was broadly in agreement with the overall response to the option of in-gallery digital information, they were less enthusiastic than the full group to the idea of digital information accessible from visitors' own devices. A smaller proportion marked it as desirable, and a larger one marked it as not needed. Additionally, they were less keen than general on the idea of having the chance to contribute your own ideas, with nearly half marking this as not needed. On the other hand, they were more enthusiastic than the full group about the need for extra information and further reading.

6.2.3.2.8 Anglo-Norman Historians

This group was only slightly smaller than the group of 'Medieval Historians', comprising 39 people, as compared to 42. However, it is possible that not all people who consider themselves to be quite knowledgeable about the Norman Conquest would also consider themselves knowledgeable about the Medieval Period in general. There may therefore be less overlap between the groups than might be expected. There were certainly some notable differences between their responses.

None of the individual stories surprised more than 26% of this group, and a third of the group stated that none of the stories had surprised them at all; in the full group response each of the stories was marked as surprising by at least 26% of respondents, and only 21% stated that none of the stories surprised them.

This is the only group which didn't mark 'The king' as the least popular choice for topic of display interpretation – here it was marked fifth of six, with 'How the coins were used' at the bottom.

As with the wider Medieval Historians group, the Anglo-Norman Historians showed a small preference for an exhibition to be 'voiced' by a medieval person telling their story from the past, with a modern researcher coming second.

Interestingly, when rating the importance of different aspects of display, the Anglo-Norman Historians were slightly less enthusiastic than the overall response about the need for the actual coins in the display. This contrasts with the wider Medieval Historians group above.

When ranking suggested activities to accompany an exhibition, the Anglo-Norman Historians were more interested in 'the chance to join in with discussions' than in 'the chance to try out some things from the past', ranking the former third and the latter fourth (of five). This is a reversal of the response from both the overall group and the Medieval Historians subset.

6.2.3.2.9 Numismatists

When asked to mark which stories interested them, the responses from the Numismatists group were notably different from those of the overall group; Numismatists were much more interested in 'Doing Things the Old Way', while 'Breakin' the Law' was of interest to a notably smaller proportion of this group. Additionally, when asked to choose the single story which interested them most, 'Rebellion and Retribution' was chosen by the smallest number of Numismatists, while it was the second most popular choice amongst the full group.

Somewhat surprisingly, even the Numismatists were not particularly interested in having the technical details of the coins, such as their numismatic classifications or their weights and measurements, included in a museum display – as with all other groups this option received the fewest 'points' and was the least popular of the choices of topic.

It is also remarkable that when rating the importance of different aspects of display, the Numismatists were slightly less enthusiastic than the overall response about the need for actual coins to be present. Only 71% of Numismatists felt this was essential, as opposed to 77% of the overall group.

The Numismatists' opinion of digital information was quite positive with a somewhat higher proportion considering it desirable, both in-gallery and accessible on visitors' own devices. They were also more enthusiastic about the chance to contribute their own thoughts and ideas, with 36% considering this desirable, and 29% feeling that it was not needed. The overall group response was 20% desirable and 40% not needed.

When ranking suggested activities to accompany an exhibition, the Numismatists were more interested in 'the chance to join in with discussions' than in 'the chance to try out some things from the past', ranking the former third and the latter fourth, as the Anglo-Norman Historians group also did.

6.2.3.2.10 Numismatists of the Eleventh Century

This group only comprised nine participants so, similarly to the Childcare and Education Professionals, responses from the group could only be considered as indications of possible trends, rather than as in any way significant. In addition, the answers provided by the Numismatists of the Eleventh Century were very similar to those given by the Numismatists subset, with no significant variances to highlight.

6.2.4 Analysis

The results of the survey clearly indicate that the narratives derived from the coins have the potential to be both interesting and engaging for museum audiences. In addition, all the stories presented prompted curiosity in some of the participants, making them want to find out more. There was also an element of unexpectedness to the stories, making people question their pre-existing ideas about the Norman Conquest; each of the stories elicited this response in some of the audience, including a small but notable percentage of participants who considered themselves to already be quite knowledgeable about English medieval history and numismatics.

The most popular stories were 'Rebellion and Retribution' (about the Northern Rebellion and the Harrying of the North) and 'Breakin' the Law' (about the incidence and potential penalties for striking poor quality coinage), which suggests that stories of dissent, transgression, and punishment were popular amongst these respondents. More broadly, they seem to have been most interested in narratives of people and events, and details of the practicalities of life in the past. Stories of places, and more abstract ideas such as 'continuity' were less appealing. The role of the moneyers was favoured over the role of the king, suggesting a preference for details of the lives of more ordinary members of society, rather than the ruling elite. On the other hand, stories of the objects in modern times, and the classifications and measurements of coins, were less popular as potential methods of interpretation.

When investigating the notion of narrative voice for a museum display, it is interesting that in general respondents did not want the traditional, didactic, expert view, but neither did they want the more open, discursive, public view. They instead opted for either a presentation which included some indication of how the stories were revealed, or an immersive (if ultimately

fictitious) historic storytelling approach. This suggests some preference for seeing how the stories were arrived at, rather than simply being presented with them as a finished product, and this is reflected in the fact that the 'How do we know' evidence pages of the document were almost as frequently read as the story pages, as noted above. There was clearly interest in having access to the evidence used to formulate the narratives, as well as in the narratives themselves.

Interestingly, when considering possible additional activities to accompany an exhibition, the responses contrast with the responses to the question of narrative voice. For activities, the chance to speak to an expert was ranked highly, while the chance to speak to someone playing the part of a medieval person was not very popular. Respondents therefore seem to have different desires for different formats; where they are speaking to someone in person they are more interested in interacting with an expert, and less interested in talking to someone playing the part of a person from the past, but where they are reading exhibition interpretation they are more enthusiastic about hearing a voice from the past and less interested in hearing from an expert.

Some of the responses also confounded what may have been expected from such a survey. A case in point is the notion of audience participation and the chance to contribute to museum presentation. Respondents to the survey were not very enthusiastic about either the chance for visitors to include their own thoughts and comments in a display, or the opportunity to take part in discussions and debates as accompaniment to the display. This seems to contradict previous work which has suggested that modern museum audiences want opportunities to participate in all aspects of museum work, in order to feel a deeper sense of ownership and meaningful engagement with heritage (e.g. Black 2011; Simon 2012). It is possible that this is due to the nature of the evaluation, in that a written survey suggesting the concept of contributing to a display does not allow participants to actually experience

the satisfaction and engagement that such interaction could produce; the idea of taking part may be outside the usual experience of habitual museum visitors and therefore could, in fact, be confusing and a little alarming for someone who has not experienced it. Thus, whatever the reasoning behind it, the survey indicates some resistance to the notion of participative museum interpretation.

In both the display and the supporting activities, the chance to see and handle the coins themselves was very popular. However, interest in the academic classifications of the coins was low. This may have been an expected response from general museum visitors but it is somewhat counterintuitive to see that even amongst people with a special interest in numismatics these details were not considered to be essential, being the least popular choice for inclusion in a display.

The survey also confirms that different audience groups have different desires for their museum experiences. In actuality, of course, it is likely that each individual visitor has a particular set of needs which may be slightly different from other visitors, but by looking at particular groups of people some trends can be revealed. The small group of Childcare and Education Professionals who completed the survey showed a clear preference for displays to include a variety of objects, rather than just coins, which may be expected to be more interesting and engaging for children. That same group, together with the Family Group Visitors, also showed an inclination towards the more theatrical aspects of museum work, such as the narrative voice of an imagined person from the past, or the chance to try out historical activities. Conversely, they were less interested in the chance to talk to, or hear from, a modern expert such as a museum curator or historian.

In contrast, people with a pre-existing level of knowledge about the subjects being presented had a higher preference for the chance to interact with an

expert, as well as for access to additional information within the display. These suggestions scored more highly amongst the Numismatists and the Anglo-Norman Historians than they did for the overall group. Perhaps this is related to having a higher level of background knowledge, thus making the idea of being involved in a discussion less daunting, and more appealing than the idea of trying out some re-enactment.

Responses to the idea of information being available digitally were also varied. Overall the response was less enthusiastic than might have been expected, but Family Group Visitors were more inclined to receiving details in this format than the overall group. Interestingly, though, the small group of Childcare and Education Professionals did not mark digital information as particularly important. Similarly, Heritage Professionals showed less of a preference for this than the full dataset. This may represent a greater awareness of the practicalities of mounting and maintaining displays.

Overall, therefore, the survey highlights some interesting responses to the narratives being discussed, and to the suggestions for presenting these narratives in a heritage setting. The survey did not go into any detail about the reasoning behind participants' responses, and there is much which is hinted by this survey but which would be more useful and meaningful if it were investigated in more depth. The evaluation here presented, however, represents an excellent proof of concept, and confirms the potential for the coins of William I and II to positively influence public representation of the early Norman period within the UK heritage industry.

6.3 Recommendations for Use of Coins in UK Heritage Organisations

There are a great many aspects which could be considered when examining the use of coins in UK heritage organisations. Although it would be extremely

valuable, and interesting, a full exploration of the topic is unfortunately beyond the scope of the current project. The recommendations presented here are therefore drawn solely from the observation of current best practice in UK museums described in section 6.1 above, combined with the results suggested by the evaluative survey of the narratives derived from the coins of William I and II described in section 6.2. In particular the issue of display techniques for coins is not addressed. Some of the suggestions are necessarily specific to the early Norman period of English history, but others have wider relevance to the general use of public numismatic collections, and to the use of other objects which are sometimes marginalised within museums. The recommendations here described have also been summarised into a practical guide, intended for the use of museum staff. This can be found at Appendix 7.

It is clear that numismatic collections have a lot to contribute to the work of museums, but it is equally clear that in many cases this is not currently recognised. The author's previous research (Rohde 2010) confirms that there is a perception amongst heritage professionals that coins are difficult to use, and less relevant to current organisational purpose than other types of collection. A clear example of this perception can be seen in the case of The Manchester Museum, examined in section 6.1.3 above, with its implicit suggestion that their Money Gallery was not fit for purpose within the museum's current aims, and the result that it has been dismantled and the coins returned to storage. The perception of the difficulty of working with coins can only be heightened by the ongoing loss of professional subject specialist expertise within the sector (e.g. Blackburn 2008; Stoddart and Sugden 2008), and this increases the threat of public numismatic collections becoming marginalised and underused.

This project provides explicit evidence that numismatics can illuminate much more than just the type of money which was used by past societies. The

investigations here undertaken show how coins can illustrate narratives which shed light on a huge range of aspects of the past, revealing stories of individual people and events, and details of everyday life. They can contribute to presentation of complex ideas, from the notions of currency and value, to discussions of group and personal identity, or societal and political ideas such as governance, autonomy, and power, in a way that audiences find interesting and engaging. The evidence presented by coins can therefore help museums to prompt curiosity and consideration of important, meaningful issues for today's society, as well as providing fun and informative stories about local, national, and international history. Numismatic collections thus have huge potential to support the aims and objectives of modern museums and heritage organisations.

In many cases, in order to fulfil this potential, a review of each organisation's numismatic holdings would be beneficial. Revisiting collections with a broad, open view of the sorts of stories they could illuminate would help to move away from the usual focus on coins as simply evidence of past fiscal systems. This could reveal unexpected new narratives, and would also identify where numismatics can help to illustrate other aspects of history and society. The efficacy of this sort of assessment can be enhanced through expertise and advice from Subject Specialist Networks, such as the Money and Medals Network, or through working with local special interest groups, such as numismatic societies. Additionally, working collaboratively with other organisations, through knowledge sharing and object loans, could increase the collection of coins available, and thus expand the stories and issues to whose presentation they can contribute. Strengthening of these professional networks is clearly important; in the current sector climate they represent a vital way of filling the widening skills gap within individual museum services' knowledge of numismatics and the practicalities of their use. They also offer a channel for dissemination of new research and best practice, as well as a

way of identifying particular artefacts and brokering loan agreements to complement the collections of any particular museum.

In some instances, the narratives revealed by the coins are not the traditional stories which heritage organisations are used to telling. In the case of the coins of William I and II, they support a story of general continuity from the late Saxon period, in contrast to the traditional narrative of cataclysmic, kingdom-wide change at the time of the Norman Conquest. With the exception of particular events, such as the Northern Rebellion, the coins suggest a gradual development of English society, which began long before 1066, and continued throughout the reigns of the Norman kings, representing a relatively steady progression from the Saxon state to the culture of the 'High Medieval' period. This story is also indicated by other items of material culture from the period, most of which do not show any clear change linked to the instigation of Norman rule. This has commonly impeded efforts to identify artefacts from the Norman period with any degree of certainty, and has therefore made it challenging to present Norman England as a discrete entity within the chronology of a museum collection. This may have contributed to the current paucity of reference to the period in UK museums, as noted in section 6.1.4 above. Embracing the story of continuity and gradual development revealed by the coins and other objects could address this issue; museums need not avoid presenting the Norman period due to a lack of artefacts which show the changes wrought by the Conquest; they could instead use their collections to emphasise the continuity and development of aspects of English society across this period of political upheaval.

Effective use of coins for exhibition can be achieved both through display focused on numismatic collections, such as the British Museum's touring exhibition "Hoards: The Hidden History of Ancient Britain", or through inclusion in eclectic displays with a variety of other objects, such as "The

Story of Hastings in 66 Objects". In either case, interpreting the coins through the stories they reveal and the issues they illuminate can add interest and depth to their meaning for museum audiences. The survey conducted for this project suggests that public engagement is most pronounced for stories of individual people, specific events, and details of everyday life in the past, all of which can be supported by evidence from numismatic items.

The project also confirms the value and importance of front-end and formative evaluation. Consultation with potential audiences, both at the initial instigation of planning and while ideas are being developed, will clearly lead to projects which more effectively engage those audiences. In particular it may challenge some embedded museological assumptions, such as the notion that museum visitors are generally reassured by a didactic, expert tone to display interpretation, or the feeling that there is a strong interest in stories of how artefacts ended up in a particular museum collection. A good example is the provision of information in digital formats, both within a display and for consumption outside the museum. It may be suspected that this would be an increasingly important requirement, especially among certain classes of visitor, such as school groups. However, the particular set of people who responded to the survey for the current project were generally ambivalent about this provision, with many considering it desirable rather than essential, and a considerable proportion (between 11 and 22%) considering that digital information was not needed. Additionally, the example of the GalleZeum at Manchester Museum (discussed in section 6.1.3 above) emphasises the importance of digital provision being integrated and relevant to the display it accompanies, rather than just being inserted for the sake of using the technology.

Further to this, the survey within the current project suggests that potential museum audiences are not very enthusiastic about the idea of participative projects which allow them to contribute and affect museum display and

interpretation. This could be due to the nature of the evaluation undertaken, which may not be the most effective way of testing visitors' response to the notion of collaborative working. However, it does indicate that there is a need for careful consultation with audiences about the desire for participation, and the nature of that involvement.

The opportunity to examine, and preferably handle, real artefacts is still an important draw for museum audiences, with survey participants all wanting to see actual coins in a hypothetical display about Norman England. However, respondents indicated that full classification information about the coins was not generally desired. Of course, there will always be some visitors who do want to know these details so they should certainly be made available, both for those few interested users and for museum documentation. However, contrary to traditional coin display, it is clearly not necessary to make these details visible to everyone as part of the primary display interpretation. This sort of layering and variety within interpretation can be very beneficial. The survey verifies that different audiences have different needs, so the more diversity of interpretation which can be provided, the more visitors will feel that their needs have been satisfied. Visual interpretation with a variety of modes and voices, such as that supporting "The Story of Hastings in 66 Objects" described in section 6.1.5 above, is valuable, as is a broad programme of supporting activities and events.

It can therefore be seen that, where time and resources allow, coin collections can be used effectively to engage museum audiences. The coins had a fundamental role in both the administrative structure of the medieval kingdom and in the urban life of the period, and the narratives which they reveal are fascinating, accessible, and relevant to modern audiences. The coins both enhance our understanding of the period and allow a broad range of people to connect with it in a meaningful way. Numismatic collections can thus clearly and specifically contribute to organisational aims and objectives.

There are certainly many challenges to achieving this, stemming from the current levels of resource and, relatedly, specialist knowledge in the heritage sector, as well as the inherent peculiarities of numismatics for display and use in a traditional museum setting. A number of sector organisations, notably the Subject Specialist Networks (for instance the Money and Medals Network and the Society for Museum Archaeology) are working to address these issues, but they remain unfortunately prevalent. The challenges, and potential mitigations, are explored further in section 7.2 in the final chapter. It is clear, however, that despite these concerns, the coins of William I and II have substantial and functional potential to influence and strengthen the public representation of the early Norman period through the UK heritage industry.

Chapter 7: Final Conclusions and Future Directions

The analyses and interpretation presented in this thesis have interrogated the coins of William I and II to reveal new narratives of the early Norman period, and to highlight the situation in UK museums with regard to both numismatics and the representation of Norman England. This closing chapter synthesises all the preceding discussions to provide final conclusions which highlight the importance of the original research here undertaken. The challenges facing the implementation of the research recommendations are considered, and suggestions are presented for essential future work to extend and augment the findings.

7.1 Conclusions

7.1.1 Numismatic Conclusions

This project drew together a dataset of surviving English coins of William I and II which is of unprecedented size. By weighing, measuring, and photographing 3271 coins, and collating the published data on a further 2228, a database was created which contains details of the largest set of these coins yet assembled. All 13 Coin Types of the first two Norman kings, and all the currently-known mints for those types, are represented within the dataset. The quantity of information is sufficient to allow detailed and statistically significant analysis, in a way that cannot be meaningfully achieved with smaller collections of data. The project capitalised on this extensive dataset by interrogating it in a great variety of ways, including statistical analysis of metrical attributes, assessment of the regularity of die axes, geographical and temporal plotting of the named moneyers and mints, and a partial study of the individual coining dies used to strike the coins. In this way a number of important factors were revealed, which can contribute to ongoing numismatic discussions.

Analysis of the weights of the coins reveals a pattern of great variation in the reign of William I, with clear differences between mints, both in average coin weight and in the level of consistency between contemporary pennies. In a few of these early Coin Types the pattern of weights could be interpreted by Metcalf's suggestion that some mints were working to more than one intended weight standard (Metcalf 1998, 56-66). However, the evidence is not as clear-cut as it seemed from Metcalf's much smaller dataset, and a more compelling argument seems to be that in those mints the intended standard weight was not adhered to as closely as in some other mints. In the eighth coin issue, the PAXS type, there is a marked reduction in the diversity of coin weights with the majority of coins from across the kingdom weighing around 1.37g. This would seem to support the existing idea that a national standard weight for the penny was imposed in this type (e.g. Nightingale 2008, 180; Allen 2012a, 138). However, this project's detailed examination of the weights of the coins of the succeeding types has revealed that if a standard pennyweight was introduced in the PAXS type, it was not applied consistently thereafter, as had previously been assumed. Rather, the traditional patterns of diversity of coin weights between mints, and diversity of intra-mint consistency of weight, reappear in some of the later types of William II. A consistent, standard pennyweight for coins of the English kingdom was not achieved, even by the end of William Rufus' reign.

The project also reveals diversity in the size of the coins, here examined through a measurement of their diameter. The patterning within this metric is much more obscure than within the coin weights, however, and the relationship between the weight and diameter of the coins is not apparent. In particular the stark variation in average diameter between Coin Types 12 and 13, while the average weight of the coins remains consistent, is intriguing. It raises questions about the composition of the coins, which cannot be answered by the analyses undertaken in this project, indicating the potential

for further investigation, as discussed in section 7.3 below. The examination of the diameter of the coins has thereby highlighted the importance of measurement and documentation of all aspects of the artefacts in order to identify change and avoid numismatic assumptions.

Examination of the die axes of the coins has confirmed the notion, espoused by both Dolley (1952-1954) and Blackburn (2004), that the moneyers of the York mint were striking coins from dies of circular cross-section while the mints across the rest of the kingdom were using square-sectioned coining dies. These previous studies simply noted that this practice continued into the late 11th century, but the current project has been able to quantify it more closely: the evidence for the use of circular dies at York is clear for most of the reign of William I. However, in the eighth coinage, which was probably the first type of William II, the proportion of York coins which were likely struck from circular dies is smaller, and for Coin Types 9 to 13 the evidence suggests that the York moneyers were exclusively using square-sectioned coining dies, in line with their compatriots elsewhere in the kingdom. This variant local practice therefore seems to have died out in the late 1080s.

The project has additionally identified a further anomaly through study of the coins' die axes. In Coin Type 3 there is evidence that some circular coining dies were used at mints other than York, including Winchester, London, and Wallingford. This divergent practice is only apparent in the one Coin Type, and its possible interpretations are examined in section 7.1.2 below.

Consideration of the coining dies used to strike the coins included a systematic search for the use of dies of rough workmanship, which seem likely to have been of local manufacture in opposition to the usual contemporary practice of creating all dies at a single die-cutting centre in London, from which they were distributed to the mints. As Allen has noted (Allen 2012a, 116), no such investigation has previously been undertaken for

the coins of any of the Norman kings. This analysis revealed two clear periods of use of these locally-cut dies, and each has a notable geographical restriction. In the early part of William I's reign (Coin Types 2 to 4) rough dies were in use at various mints of the East Midlands and the North-East but are not found elsewhere in the kingdom. This may have been an expedient related to the distance of these mints from the central die-cutting centre in London, but it may alternatively have been a continuation of a traditional practice, in these areas of some remove from the centre of royal power in the South of the kingdom. The use of rough dies appears again in Coin Type 8, but in this period they are exclusively found in the mints of Wales and its vicinity. On this occasion it seems likely that the use of locally-cut dies was a practicality related to the physical distance from London and to the instigation of minting in an area which had no tradition of striking coinage.

A more detailed examination of the dies used to strike the coins was undertaken for Coin Types 3 and 9, representing the first die study of coins of the early Norman kings to look at the whole kingdom, rather than focusing on one particular mint. The die study only included a small proportion of the total dataset, but even this pilot study revealed interesting results. The coins of types 3 and 9 suggest that the practice of sharing dies between moneyers working in the same town may have been linked to mints in areas previously under the control of the West Saxons; these two Coin Types provide no examples of this practice at mints in the old Danelaw area of the kingdom. Additionally, the practice is more prevalent in the later Coin Type, suggesting a possible change in the working of the mints as the period progressed.

7.1.2 Social Historical Conclusions; New Narratives of Norman England

The numismatic and statistical analyses of the coins in the project dataset revealed patterns and anomalies which can be interpreted within a social historical framework, in order to deepen our understanding of the early stage of Norman rule in England. These interpretations elucidate the administrative

and financial systems of the kingdom, but also shed light on the lives of people living through the period. As such they add nuance to the existing story, and challenge some prevailing notions, thus representing new narratives of early Norman England.

In the absence of detailed contemporary written documents, the coins constitute the best source of evidence for the administration of the fiscal system of the kingdom over the period of the Norman Conquest. The overarching story is one of continuity, in terms of both personnel and practice. With a few exceptions, the moneyers who were minting for William I were the same men who were minting for Edward the Confessor and Harold II, and the role continued to be held by men of Anglo-Saxon or Anglo-Scandinavian origin throughout the period. Additionally, as noted in section 7.1.1 above, there is great tenacity in the traditional patterns of coin weights and minting practice at the various mints. Although it is clear that changes were instigated in Coin Type 8, and that the coinage subsequently moved towards greater standardisation, the traditional variations between mints can still repeatedly be seen in coinages right up to the end of the period of study.

The results of this investigation can therefore contribute to ongoing discussions on decision-making within the minting system, and the level of central control over the mints and moneyers. The very high level of variation between the outputs of different mints in the reign of William I supports the suggestion of Petersson (1991) and Metcalf (1998) that while the overall scheme of coinage for the kingdom was decided centrally, the detailed decisions on minting were made at a more local level. This suggestion is bolstered by the endurance of traces of these geographical differences in the coinage of William II, after the PAXS issue which has traditionally been seen as the instigator of a nation-wide uniformity of coin weight. These arguments weaken Nightingale's assertion that decisions down to the last detail were made solely by the king and the royal advisors (Nightingale 2008, 178). The

other issue affecting this debate, however, is the level and efficacy of central control over the system; even if detailed decisions were handed down from government, they would have little effect if there was no meaningful way of enforcing them. The coins offer hints to this question too, with the rare but continual occurrence of lightweight coins, or those struck from altered dies, suggesting that oversight of the system was not comprehensive. Additionally, the use of locally-cut dies of rough workmanship in the North-East and the East Midlands may be an indication of less effective policing of the system in the early part of William I's reign. Throughout the period the high levels of consistency in the coinage of some mints, such as Winchester, as compared to the great variance seen at other mints, such as London, suggest varying levels of control at the different mints. The PAXS coinage may represent a general tightening of central control over the minting system but, again, the presence of variation in later coinages, albeit at a lower level than in the earlier part of the period, suggests that this control was still not absolute.

The persistence of variations in the coins of different mints also hints at regionality within the coinage. This is particularly clear in the coins of the Norfolk mints of Norwich and Thetford, which show great similarity to each other but variance from the coins of other mints, in terms of patterns of weights and levels of uniformity. The coins of the West Country mints of Hereford, Worcester and Gloucester show a similar local patterning, although it is less pronounced than for the Norfolk mints. Further, there seem to be patterns within the coin data which show the persistence of variations between the mints in the areas previously subject to Danish customary law and those previously under the rule of the West Saxons. There is thus a suggestion of a continued Danelaw identity, and a comparable West Saxon identity, in the coinage even at this late date. Even more specifically the minting practices of the 9th and early 10th century Viking Kingdom of York can be seen to endure at least until the late 1080s. This evidence for continued regional identities within the united late 11th century kingdom of England has

not previously been articulated in this fashion, and thus represents a new narrative thread to the story of the Norman Conquest and the embedding of Norman rule over the kingdom.

The coin data can also be seen to reveal details about the lives and role of the moneyers. This is a group of named individuals who were not part of the major landowning elite but who were instrumental in the administration and functioning of urban society. As well as a very high level of continuity of personnel from before the Conquest, the coins indicate continued variety and opportunity within the role, with some moneyers only holding the post for a short time while others appear on the coins for a number of decades. Some moneyer names are so long-lived that they may in actuality represent one moneyer passing on the role to a successor who had, or took, the same name. This concurs with Ann Williams' observations about the persistence of Anglo-Saxons and Anglo-Scandinavians in positions of power in the strata of society below the ruling elite (Williams 1995), and documentary research supports the notion of family interests in the role of moneying (e.g. Nightingale 1995; Symons 2008). Links can also be seen between moneyers, both within mints and in other towns, and individuals sometimes appear to move from one town to another, or hold joint concurrent responsibility at more than one mint. All of which suggests a group of men with some degree of control over their careers, and indicates a dynamic network of officials, undertaking a surprisingly high level of travel around the kingdom.

Moreover, the coin evidence can illuminate the lives of individual people, and hint at how specific political events affected them and those living around them. The Northern Rebellion and the Harrying of the North is the prime example of this: the large number of contemporary coin hoards found within the city of York suggest a time of great unrest, when citizens buried their wealth for safekeeping and were unable to return to retrieve it; the extremely limited number of coins of the York mint from the time of the

Harrying hints that the mint may have almost ceased production for a while; the reduction in the number of moneyers at the mint after the rebellion implies a curtailing of the city's power by the king; the names of the moneyers on the coins show that while some retained their post after the rebellion, some had fled to other cities, and still others lost their position completely. Further, the sudden brief appearance of coins struck with York-style circular coining dies at mints in the South of the kingdom at the time of the Harrying of the North may be an additional element to the story, representing the possible redistribution of dies confiscated from disgraced York moneyers. The numismatic evidence therefore reveals a wealth of information about the Rebellion and its retribution, and this example clearly indicates the vital role which coins can play in exposing new narratives of known historic events, and how they impacted on real people at various levels of society.

The stories revealed by the coins can therefore present a varied and nuanced picture of early Norman England. The narratives shed light on particular times of great stress for the people of the kingdom, such as the Northern Rebellion, but they can also present a broader picture of the period as a whole, and this wide view is one of continuity and opportunity. The coins suggest that far from the traditional notion of the Norman Conquest as a precipitous moment of sweeping change across English society, in the matter of the monetary system it had little immediate impact. It can instead be seen as just a small part of a gradual development which had been proceeding for some time before 1066, and which continued throughout the reigns of the first Norman kings.

7.1.3 Museological Conclusions

The composition of the project dataset is a key contributory element of the outcomes of the study, representing a particular subset of coins which has not previously been defined for examination. It is specific, in that it focuses

on the coins which are held in museum collections, supplemented by those whose data are easily accessible through publications. In other words, these coin data are all available within the public domain, and the dataset therefore represents the numismatic items which are accessible to everybody. It also means that the narratives revealed by the project analyses can all be told by the coins held in public collections. There is therefore great potential for the stories imparted by the coins to be communicated to a wide audience, and thus to affect public representation of the early period of Norman England.

However, the observational research undertaken for the project indicates that in both the use of numismatics and the representation of Norman history, current UK museum practice is failing to capitalise on the potential of the collections. Coins are no longer common in displays, and when they are used, they are often interpreted simplistically, or presented through traditional schemes of taxonomic classification with expert-led interpretation. Where museums are moving towards more immersive, participatory, cross-disciplinary exhibitions focused on particular themes or issues, numismatic collections are becoming less visible within their displays. This has certainly been the case with The Manchester Museum, for example, as explored in section 6.1.3 in the previous chapter, and can be seen to represent an implicit perception that coin collections are less relevant to current museum aims than other artefacts. This trend substantiates the author's previous work which suggested that numismatics are becoming marginalised in UK museums, partly due to a perception amongst staff that coins are difficult to fit into the interpretive schemes of modern heritage organisations (Rohde 2010). Similarly, it is currently rare to find any detailed exploration of the history of Norman England in UK museums. The period is sometimes skipped over completely in chronological history displays, or covered by very brief interpretive statements. The narrative being presented is usually the traditional story of shock, oppression, and rapid societal

change, which is difficult to show using the artefacts available in most museum collections; this is a story which is clearer in the written sources than in the material culture, and is thus not ideal for depiction through museum display. The new narratives revealed by the analyses undertaken for this project come directly from museum coin collections, and thus have much greater potential to be effectively presented in UK museums.

Furthermore, these new narratives are demonstrably interesting and engaging for potential museum audiences. The project surveyed 91 members of the public, from a variety of social groups, and received a positive reaction to all the stories with which they were presented. This pilot study exemplifies the potential of the stories derived from the coins to appeal to the public and to prompt curiosity about the period. The survey also suggests that the new narratives have the potential to confound people's assumptions about the Norman Conquest and the period of Norman rule in England; all of the stories presented were recorded as causing surprise in some respondents, or making them think differently about the period. It is therefore clear that the narratives derived from the coins have great potential to affect public representation of the Norman period of English history.

The results of this project can also be seen as a key contribution to the debate on the value assigned to museum coin collections. As discussed in the initial context for the project, in section 1.3.3 at the beginning of the thesis, changing perception of the purpose of museums within society has led to a shift in the notion of the value of museum collections. Growing financial constraint within the public sector has exacerbated this, and there is now a pervasive feeling that it needs to be clearly shown that collections are directly contributing to organisational objectives in order to confirm their value to the museum. Collections which are perceived to be less useful in these terms are seen to have less value to the organisation; their value as cultural assets is diminished, which opens the way for consideration of their

value as financial assets of the governing body of the museum. Thus, marginalised collections, such as numismatics, are at increased risk of being identified for potential deaccession and disposal in order to realise their commercial value. This project presents compelling evidence that far from being extraneous to current museum aims and objectives, numismatic collections have the potential to be extremely relevant and beneficial to modern heritage users. Numismatics are a key source of evidence for life in the past, and can reveal and present fascinating narratives which captivate and intrigue museum audiences. Public coin collections offer access to these stories for everyone, in a way that private collections cannot. They thus broaden entry to the area of coin research and discovery, and could potentially begin to undermine the elitism of the numismatic sector. The coins in UK museums therefore have immense cultural value, and thus great organisational value for the institutions which hold and care for them.

It is therefore disappointing that there are so few numismatic collections in the UK which have been awarded Designated status by ACE. Further, the four Designated collections which specify numismatics within their Designation all do so as part of wider collections, rather than holding Designation specifically for their coin collections[6] (Arts Council England 2014). Revisiting collections to assess and acknowledge the cultural and organisational value of numismatics could lead to more institutions applying for Designation for those collections in the future. This would show a clear sign of the importance of these artefacts, and could be a further guard against their marginalisation and the threat of disposal.

[6] The Manchester Museum, the Ashmolean Museum in Oxford, and York Museums Trust all have their entire holdings designated, but do specify that this includes their numismatics. Birmingham Museums Trust has four Designated collections, one of which is “Birmingham history (including numismatics)” (Arts Council England 2014, 37)

7.2 Challenges to Implementation of Research Recommendations

The ideal outcome from this research would be a shift in the way museums view their coin collections, and a commensurate increase in their meaningful inclusion in heritage presentations of the past. It would also lead to a reassessment of the way the early Norman period is represented in the UK heritage industry, and could thus increase public engagement with, and interest in, the period and the material culture remains thereof. However, the current situation within the sector presents a number of fundamental challenges which need to be acknowledged and mitigated in order to effectively implement this outcome.

One clear barrier to the implementation of these findings is the perception of numismatic collections amongst heritage staff. The author's previous research suggested that coin collections are often seen as complicated to interpret and difficult to display. Additionally, their financial value and easy portability add security concerns to any plan for their use (Rohde 2010). The observational research presented here, in chapter 6, corroborates this impression. The motivation to dedicate the necessary time and resources to make changes in the way numismatics are used is therefore likely to be low, unless there is a clear understanding of the potential benefits of such action. The current project provides evidence to this effect, but in order to be effective it needs to be disseminated to sector peers.

A particularly pervasive obstacle to implementation of any research recommendations is the problem of communication of findings, both to academic peers and to wider sector colleagues. Cross-disciplinary research is vital for making connections between different branches of study, and this project highlights how numismatic investigation can inform archaeological and historical interpretation of the past, and how this can affect museological

theory and, ultimately, real world practice. However, traditional academic communication channels, such as journals and conferences, still tend to be focused on a particular single discipline, such that the results of a multi-disciplinary study may not reach all those whose areas of interest it concerns. Communication beyond the academic world is even more challenging. Few heritage professionals can afford the time to read and consider the wide variety of potentially relevant academic publications and presentations, and the results of relevant research projects may therefore frequently be missed by those working in the sector. At the very least it may take many years for new findings to disseminate through the sector to the people designing and creating museum displays, and this issue can only be exacerbated by increasing financial constraint and the loss of specialist roles in museums, which leads to generalist staff having responsibility for more areas of work, as well as increasing workloads.

In such circumstances professional sector networks have an increasingly important role in dissemination of new knowledge. Subject Specialist Networks, such as the Money and Medals Network, or the Society for Museum Archaeology, can highlight new research to interested parties, or advise their members on the latest position in respect to particular collections or periods. Beyond these formal organisations, local contacts and personal connections between heritage professionals are vital for lively debate and dynamic discussion of new ideas and research results. Unfortunately, a natural result of organisational 'belt-tightening' tends to be an increased insularity, as a lack of resources necessitates prioritisation of the aims of the individual institution over networking and knowledge sharing between organisations. Distillation of this project's research recommendations into a short, functional report containing practical suggestions and guidance, such as that presented in Appendix 7, may offer the best chance of publicising the results of the investigation to professional colleagues. A short report which is quick and easy to read can help get the

most important points across without requiring much reading time, and could encourage interested curators to then seek out further information. Dissemination of such a report through the museological press and the SSNs would also widen its reach.

Furthermore, certain trends in museological practice may present challenges to the implementation of the recommendations of this project. As mentioned in section 1.3.3 in the first chapter, although generally positive for audience engagement, the move away from traditional taxonomic presentation and didactic interpretation did lead to a decreased presence of numismatic collections in museum displays. Additionally, the effort to make heritage presentations interesting and relevant to modern audiences has led to an increasing trend for thematic, rather than chronological, display. Unless the theme chosen is specifically numismatic, such as the HSBC Money Gallery at the British Museum, thematic display can decrease the visibility of coins in museums as, to a non-specialist, they may not immediately suggest relevance to broad themes. Such seems to have been the case at The Manchester Museum, discussed in section 6.1.3 of the previous chapter, where the money gallery has been removed and numismatics are not common in the thematic displays elsewhere in the museum. Additionally, as well as being less clearly suited to numismatic items, such interpretive schemes also contribute to neglect of particular periods of history, such as Norman England. Without the framework of a chronological presentation there is no necessity to include subjects which are not easily represented by the museum collection, and thus they can often be passed over or dealt with only superficially. The British Museum presents an example of this, as noted in section 6.1.4, as its galleries focusing on individual periods of history are not presented as a chronology, and the Norman period is not represented in either the Anglo-Saxon galleries or the Medieval galleries. The move towards thematic display could therefore be injurious to both numismatics in displays and to representation of the Norman period. Evidently this needs to be

carefully considered when creating new displays, in order to find a balance which supports engagement with a broad range of collections and historic periods.

Additionally, it is very clear that a contributory factor in all barriers to implementation of the research findings is the current financial climate within the heritage sector. As alluded to above, lack of available resources, decreasing numbers of staff, increasing workloads, and the loss of subject specialist curatorial roles all exacerbate the problems facing numismatic collections, as they make it increasingly difficult for heritage staff to find the time to get to know their collections and experiment with their effective use. This can, however, be mitigated somewhat by sector specialist networks, who provide vital services for identification of collections and training of museum personnel, and can thus help to reduce the uncertainty staff feel when dealing with coin collections.

There are therefore substantial challenges to the realisation of the potential of coin collections to contribute to public engagement with the Norman period of English history. However, the research presented in this thesis provides an indisputable example of how coins can reveal new narratives of the past which deepen our understanding, as well as being intriguing and engaging for museum audiences. It also represents specific evidence of the benefits of revisiting historic coin collections, and developing their use in museums, which in turn could help address the concern, or apathy, with which numismatic collections are viewed by heritage staff, and the organisational value which they assign to them. Implementation of the research recommendations has the capacity to effect not just academic and public appreciation of Norman England, but also the perception and status of the coin collections held in UK heritage organisations.

7.3 Future Research Directions

The research undertaken for this project has yielded excellent results, but has also highlighted the essential need for further research. Examination of the coins has answered the specific research questions outlined in the project plan, but has also prompted further questions which cannot be answered by the current project. Additionally, many areas of the project investigation can be seen as small pilot studies, which evidence the utility of their methodology and show the benefits that could be achieved by expanding on them.

The project examined a particular set of coins, in that it focused on those available in the public domain. This successfully allowed meaningful statistical analysis, and the identification of the narratives which can be told by those coins available to general museum visitors. However, the numismatic results could be verified and strengthened by expanding the dataset as much as possible and including the measurements of additional coins. It would be beneficial to visit museum collections which it was not possible to visit for the current project, including those UK organisations which hold only small numbers of coins, as well as the important overseas collections, particularly the Royal Coin Cabinet in Stockholm, the Hermitage Museum in St Petersburg, and the Royal Coin Cabinet in Copenhagen, as noted in Chapter 2, section 2.5.1. It would also be advantageous to include the coins held in private collections; while these coins do not currently contribute to the discussion of effective use of coins in heritage settings, they could expand the dataset for statistical analysis and thus contribute to the robustness of interpretation of the coin data. Additionally, detailed examination of newly-discovered coins, such as the Bath and North Somerset hoard of coins of Harold II and the first type of William I (G Williams, personal email communication, 04/02 – 04/03/2019), together with future coin finds, will expand and develop the findings of the research into the currently-known coins.

Further, this project has confirmed the numerous advantages of a detailed study of the coins of particular reigns of English kings in the early medieval period. It would therefore be desirous to look at the coins of other kings in the same way. In particular, examining the coinage of Henry I would continue the story revealed by the current project. It is now clear that standardisation of the English coinage was not complete or comprehensive by the end of William Rufus' reign, which raises the question of whether it was therefore Henry Beauclerk who effectively enforced conformity across the kingdom, or whether, as Blackburn suggests, the diversity in the coinage continued further into the medieval period (Blackburn 1991). Similarly, focusing on the reigns of Edward the Confessor and Harold II, using the techniques employed in the current project, would further develop our understanding of the context into which the coins here examined were introduced. Likewise, further study of the contemporary coinages of Normandy and the rest of Ducal France, and their relationship to the Norman English coinage, has the potential to greatly enhance our perception of the wider European context for the English coins.

The detailed die study undertaken for coins of types 3 and 9 can clearly be seen as a pilot for a wider study. Even these relatively small datasets yielded fascinating information when subjected to this type of analysis, as described in Chapter 4, section 4.2.4. A full die examination of the remaining coins in the project dataset would complete this picture, providing additional details about the size of the coinage, the manufacture of the coins, the workings of the mints, and the careers of the moneyers.

Furthermore, the research results could be greatly enhanced by the inclusion of analyses which were beyond the scope of the current project. Examination of the metallurgy of the coins would be particularly beneficial. This would allow consideration of whether the fineness of the coins varied between

mints, or changed over time, and would thus further illuminate the supply chain for the English coinage, as well as contribute to the discussions on contemporary forgery and the effectiveness of control over the minting system. In addition this would support investigation of the unusual circumstance of the sudden change in the size of the coinage between types 12 and 13, as noted in Chapter 3, section 3.2.2, and the hypothesis that this may be related to the effects of the First Crusade to the Holy Land, as suggested in Chapter 5, section 5.2.2.

Another methodological analysis which was beyond the scope of the current project is a detailed examination of the documentary evidence from the period. This has the potential to deepen our understanding of the context of the narratives revealed by the coins. In particular it could be extremely profitable to trace the appearance of known moneyers in the historical record and compare the details revealed by the documents to those known from the coinage.

Museologically too this project encourages further research. The observational examination of the current situation in UK museums, with regards to both representation of the Norman period, and the use and status of numismatic collections, suggests a worrying situation, which would benefit from more detailed examination. The work undertaken as part of this project could, again, be viewed as a pilot study, confirming the requirement for further research in both these areas. Expanding the number of institutions visited, formalising interviews with staff and visitors, and attempting some quantification of the results would produce a robust picture of the situation across the sector. Specific issues suggested by the current research results could be usefully investigated, such as whether the trend for thematic displays has impacted on the marginalisation of numismatic collections, or on the paucity of representation of the Norman period in UK museums. Detailed examination of what affects professional attitudes to particular collections or

time periods would also be extremely pertinent. Such research would provide specific and incontestable evidence of the current status of numismatics in UK museums, and could quantify and highlight the potential threat to their survival in the public domain. The research could be enhanced by comparison with the status of other potentially marginalised collections, and by the situation in other countries. The evidence thus collected would be invaluable in the preparation of further practical recommendations for improvements in the sector.

Similarly, the survey of audience response to the narratives revealed by the coins represents an initial study which opens the way for more targeted investigation. The responses of particular audience groups are especially interesting, and further research focused on those subsets of people would provide greatly enhanced understanding of their engagement with the coin stories, and of their requirements from museum displays and events. Particular focus could usefully be aimed at further examining the survey respondents' general apathy towards digital technologies to see if this varies for different specific groups. Similarly, the use of alternative evaluation techniques would be a more effective way of examining users' attitudes to participative museum practice, and could investigate whether the disinterest implied by the current survey results is representative of the wider audience experience.

Additionally, the survey has shown the value of evaluation of this type in the early stages of planning for an exhibition. Were such an exhibition to come to fruition, continued formative evaluation throughout the production process, as well as summative evaluation of the finished product, would enhance audience enjoyment of the display, and further evidence the value and vital importance of museum numismatic collections.

The wide variety of further research which is suggested by the results of the current project testifies to the key importance of this study. It has successfully brought together numismatic, social historic, and museological methodological techniques to produce a cohesive work which highlights the wealth of data held within the coins of William I and II, and the vast potential of those coins to not just enhance our understanding of the period, but also to engage wide audiences and influence public representation of Norman England. The project has revealed new narratives of one of the most iconic periods of English history, and provided incontrovertible evidence that the coins held in UK museums can communicate those narratives in ways which are intriguing and interesting for visitors. The results of the project confirm that far from being irrelevant to modern museum aims and objectives, public numismatic collections are a vital resource for investigation, discovery, and connection between audiences, museums, and the past.

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Appendices

The regulations of the University of Nottingham surrounding the length and word count of submitted doctoral theses do not permit the inclusion of the full set of project data. These data are, however, available on application from the author, at acfrohde@gmail.com

Appendix 1: Summary of Metrical Coin Data

Key: S.D. = standard deviation Skew = Pearson's Second Coefficient of Skew

Whole period	Kingdom	London	Southwark	Winchester	York	Lincoln	Stamford	Thetford	Norwich	Gloucester	Worcester	Hereford
WEIGHT												
# of coins	4599	559	120	397	220	244	59	175	134	74	64	73
Mean	1.32g	1.30g	1.35g	1.37g	1.28g	1.33g	1.32g	1.27g	1.32g	1.35g	1.33g	1.34g
Median	1.35g	1.33g	1.37g	1.37g	1.31g	1.35g	1.36g	1.32g	1.35g	1.38g	1.36g	1.37g
Mode	1.38g	1.38g	1.38g	1.37g	1.31g	1.38g	1.39g	1.37g	1.38g	1.38g	1.36g	1.39g
S.D.	0.100	0.119	0.067	0.067	0.104	0.106	0.096	0.138	0.103	0.089	0.084	0.086
Skew	-0.78	-0.70	-0.81	-0.21	-0.64	-0.65	-1.19	-1.09	-0.81	-1.11	-0.80	-1.02
DIAMETER												
# of coins	2785	338	64	205	183	190	45	137	88	56	46	53
Mean	19.5mm	19.5mm	19.9mm	19.6mm	19.1mm	19.4mm	19.2mm	19.3mm	19.6mm	19.3mm	19.5mm	19.6mm
Median	19.4mm	19.3mm	19.8mm	19.6mm	19.0mm	19.3mm	19.1mm	19.3mm	19.6mm	19.2mm	19.5mm	19.7mm
Mode	19.5mm	19.1mm	19.7mm	19.6mm	18.9mm	19.1mm	19.2mm	19.2mm	19.8mm	19.2mm	18.9mm	19.8mm
S.D.	0.623	0.701	0.630	0.402	0.461	0.603	0.457	0.508	0.583	0.488	0.700	0.535
Skew	0.48	0.85	0.24	0.11	0.39	0.37	0.70	0.23	0.14	0.37	0.03	-0.45

Appendix 1: Metrical Coin Data

Coin Type 1	Kingdom	London	Southwark	Winchester	York	Lincoln	Stamford	Thetford	Norwich	Gloucester	Worcester	Hereford
WEIGHT												
# of coins	242	24	-	34	15	11	4	10	11	1	4	1
Mean	1.27g	1.30g	-	1.27g	1.30g	1.32g	1.20g	1.22g	1.23g	-	1.22g	-
Median	1.28g	1.29g	-	1.28g	1.34g	1.33g	1.22g	1.22g	1.25g	-	1.25g	-
Mode	1.28g	1.29g	-	1.28g	1.35g	1.37g	-	-	1.20g	-	1.25g	-
S.D.	0.089	0.129	-	0.030	0.120	0.060	0.174	0.076	0.106	-	0.079	-
Skew	-0.19											
DIAMETER												
# of coins	162	17	-	20	15	8	3	11	9	2	3	1
Mean	19.2mm	19.3mm	-	19.5mm	19.4mm	19.0mm	19.0mm	19.1mm	19.1mm	-	19.3mm	-
Median	19.3mm	19.3mm	-	19.6mm	19.4mm	19.1mm	19.0mm	19.1mm	19.0mm	-	19.4mm	-
Mode	19.5mm	19.1mm	-	19.5mm	19.5mm	19.1mm	-	19.2mm	18.9mm	-	-	-
S.D.	0.560	0.395	-	0.254	0.286	0.518	0.153	0.217	0.307	-	0.416	-
Skew	-0.42											
Coin Type 2	**Kingdom**	**London**	**Southwark**	**Winchester**	**York**	**Lincoln**	**Stamford**	**Thetford**	**Norwich**	**Gloucester**	**Worcester**	**Hereford**
WEIGHT												
# of coins	418	67	2	7	101	47	1	24	6	3	11	4
Mean	1.21g	1.15g	-	1.26g	1.27g	1.19g	-	1.09g	1.22g	1.31g	1.26g	1.19g
Median	1.23g	1.17g	-	1.27g	1.28g	1.21g	-	1.12g	1.20g	1.31g	1.28g	1.21g
Mode	1.28g	1.22g	-	1.31g	1.40g	1.15g	-	1.16g	-	-	1.25g	-
S.D.	0.129	0.134	-	0.042	0.109	0.109	-	0.132	0.111	0.010	0.112	0.138
Skew	-0.48											
DIAMETER												
# of coins	330	58	1	6	82	43	3	23	6	4	9	4
Mean	19.1mm	19.2mm	-	19.2mm	18.9mm	19.3mm	19.1mm	19.1mm	18.8mm	18.9mm	19.1mm	19.1mm
Median	19.1mm	19.2mm	-	19.2mm	18.9mm	19.2mm	19.2mm	19.1mm	18.9mm	19.0mm	18.9mm	19.1mm
Mode	19.1mm	19.1mm	-	19.2mm	18.8mm	19.2mm	-	18.8mm	18.8mm	-	18.9mm	-
S.D.	0.362	0.250	-	0.207	0.310	0.248	0.265	0.333	0.186	0.294	0.456	0.183
Skew	-0.12											

Appendix 1: Metrical Coin Data

Coin Type 3	Kingdom	London	Southwark	Winchester	York	Lincoln	Stamford	Thetford	Norwich	Gloucester	Worcester	Hereford
WEIGHT												
# of coins	138	15	-	8	2	9	3	5	1	2	5	2
Mean	1.25g	1.28g	-	1.30g	-	1.27g	1.30g	1.19g	-	-	1.27g	-
Median	1.26g	1.28g	-	1.30g	-	1.30g	1.32g	1.21g	-	-	1.30g	-
Mode	1.30g	-	-	1.29g	-	1.30g	-	-	-	-	-	-
S.D.	0.094	0.092	-	0.024	-	0.079	0.044	0.093	-	-	0.078	-
Skew	-0.46											
DIAMETER												
# of coins	91	15	-	6	-	6	3	5	-	2	3	1
Mean	19.2mm	19.3mm	-	19.4mm	-	19.2mm	19.1mm	19.5mm	-	-	18.7mm	-
Median	19.3mm	19.4mm	-	19.4mm	-	19.2mm	19.2mm	19.3mm	-	-	18.6mm	-
Mode	19.3mm	19.4mm	-	-	-	19.1mm	-	19.2mm	-	-	-	-
S.D.	0.780	0.328	-	0.351	-	0.137	0.208	0.508	-	-	0.656	-
Skew	-1.23											
Coin Type 4	**Kingdom**	**London**	**Southwark**	**Winchester**	**York**	**Lincoln**	**Stamford**	**Thetford**	**Norwich**	**Gloucester**	**Worcester**	**Hereford**
WEIGHT												
# of coins	255	42	-	13	25	33	2	13	8	6	4	3
Mean	1.30g	1.30g	-	1.35g	1.27g	1.33g	-	1.24g	1.23g	1.24g	1.31g	1.31g
Median	1.32g	1.32g	-	1.35g	1.29g	1.33g	-	1.30g	1.24g	1.30g	1.31g	1.31g
Mode	1.35g	1.32g	-	1.34g	1.25g	1.33g	-	1.34g	1.33g	1.35g	1.35g	-
S.D.	0.092	0.084	-	0.026	0.093	0.076	-	0.164	0.111	0.149	0.053	0.010
Skew	-0.82											
DIAMETER												
# of coins	174	23	-	5	21	27	3	8	6	1	4	3
Mean	19.2mm	19.2mm	-	19.4mm	19.1mm	19.3mm	18.8mm	19.2mm	19.3mm	-	18.8mm	19.4mm
Median	19.3mm	19.3mm	-	19.4mm	19.1mm	19.3mm	18.7mm	19.3mm	19.3mm	-	18.9mm	19.5mm
Mode	19.3mm	19.3mm	-	-	19.1mm	19.3mm	-	19.4mm	19.3mm	-	18.9mm	19.5mm
S.D.	0.370	0.512	-	0.158	0.223	0.236	0.404	0.210	0.393	-	0.200	0.115
Skew	-0.62											

Appendix 1: Metrical Coin Data

Coin Type 5	Kingdom	London	Southwark	Winchester	York	Lincoln	Stamford	Thetford	Norwich	Gloucester	Worcester	Hereford
WEIGHT												
# of coins	433	67	3	23	24	30	13	25	10	6	2	13
Mean	1.29g	1.28g	1.21g	1.36g	1.27g	1.36g	1.27g	1.22g	1.21g	1.25g	-	1.28g
Median	1.31g	1.28g	1.23g	1.37g	1.27g	1.37g	1.26g	1.23g	1.21g	1.31g	-	1.31g
Mode	1.33g	1.23g	-	1.36g	1.21g	1.35g	1.15g	1.33g	1.21g	-	-	1.24g
S.D.	0.098	0.075	0.049	0.064	0.094	0.060	0.105	0.110	0.075	0.154	-	0.110
Skew	-0.71											
DIAMETER												
# of coins	330	47	1	19	25	26	10	21	8	7	2	12
Mean	19.1mm	19.0mm	-	19.2mm	18.9mm	19.3mm	18.9mm	19.0mm	19.3mm	18.9mm	-	19.1mm
Median	19.1mm	19.0mm	-	19.2mm	18.8mm	19.3mm	18.9mm	19.0mm	19.3mm	18.9mm	-	19.1mm
Mode	18.8mm	19.2mm	-	19.1mm	18.9mm	19.4mm	18.8mm	18.6mm	19.3mm	18.7mm	-	18.8mm
S.D.	0.419	0.394	-	0.281	0.626	0.318	0.298	0.256	0.270	0.173	-	0.369
Skew	0.05											
Coin Type 6	**Kingdom**	**London**	**Southwark**	**Winchester**	**York**	**Lincoln**	**Stamford**	**Thetford**	**Norwich**	**Gloucester**	**Worcester**	**Hereford**
WEIGHT												
# of coins	174	26	3	20	12	5	3	5	3	2	2	1
Mean	1.28g	1.25g	1.26g	1.38g	1.23g	1.32g	1.32g	1.25g	1.19g	-	-	-
Median	1.30g	1.26g	1.25g	1.37g	1.24g	1.32g	1.34g	1.20g	1.32g	-	-	-
Mode	1.37g	1.24g	-	1.37g	-	-	-	-	-	-	-	-
S.D.	0.100	0.093	0.040	0.017	0.0113	0.119	0.053	0.124	0.297	-	-	-
Skew	-0.44											
DIAMETER												
# of coins	129	17	2	14	14	7	4	5	1	1	2	1
Mean	19.0mm	19.0mm	-	19.2mm	18.7mm	18.9mm	19.1mm	19.0mm	-	-	-	-
Median	19.0mm	19.0mm	-	19.3mm	18.7mm	18.9mm	19.1mm	19.1mm	-	-	-	-
Mode	18.9mm	19.2mm	-	19.3mm	18.7mm	18.8mm	19.1mm	19.1mm	-	-	-	-
S.D.	0.382	0.250	-	0.189	0.220	0.135	0.082	0.200	-	-	-	-
Skew	0.34											

Appendix 1: Metrical Coin Data

Coin Type 7	Kingdom	London	Southwark	Winchester	York	Lincoln	Stamford	Thetford	Norwich	Gloucester	Worcester	Hereford
WEIGHT												
# of coins	149	37	1	14	2	4	-	6	6	1	1	-
Mean	1.26g	1.20g	-	1.37g	-	1.30g	-	1.23g	1.28g	-	-	-
Median	1.30g	1.22g	-	1.38g	-	1.34g	-	1.23g	1.34g	-	-	-
Mode	1.34g	1.30g	-	1.38g	-	1.34g	-	-	1.34g	-	-	-
S.D.	0.122	0.140	-	0.029	-	0.103	-	0.127	0.100	-	-	-
Skew	-1.06											
DIAMETER												
# of coins	69	9	1	10	2	3	-	1	3	-	1	-
Mean	19.2mm	19.1mm	-	19.2mm	-	19.0mm	-	-	19.5mm	-	-	-
Median	19.2mm	19.1mm	-	19.3mm	-	19.1mm	-	-	19.5mm	-	-	-
Mode	19.0mm	19.0mm	-	19.2mm	-	-	-	-	-	-	-	-
S.D.	0.380	0.274	-	0.428	-	1.002	-	-	0.058	-	-	-
Skew	0.38											
Coin Type 8	**Kingdom**	**London**	**Southwark**	**Winchester**	**York**	**Lincoln**	**Stamford**	**Thetford**	**Norwich**	**Gloucester**	**Worcester**	**Hereford**
WEIGHT												
# of coins	1839	116	73	234	28	58	21	61	59	43	23	37
Mean	1.37g	1.39g	1.38g	1.38g	1.36g	1.40g	1.38g	1.35g	1.36g	1.38g	1.38g	1.38g
Median	1.38g	1.39g	1.38g	1.38g	1.37g	1.39g	1.38g	1.37g	1.37g	1.39g	1.38g	1.39g
Mode	1.39g	1.39g	1.38g	1.39g	1.37g	1.39g	1.37g	1.37g	1.35g	1.38g	1.36g	1.39g
S.D.	0.053	0.039	0.036	0.067	0.040	0.072	0.030	0.074	0.047	0.060	0.028	0.022
Skew	-0.37											
DIAMETER												
# of coins	979	74	36	110	14	36	11	44	37	33	14	24
Mean	19.6mm	19.5mm	19.6mm	19.8mm	19.4mm	19.2mm	19.5mm	19.5mm	19.8mm	19.3mm	19.8mm	19.8mm
Median	19.6mm	19.5mm	19.7mm	19.7mm	19.5mm	19.3mm	19.7mm	19.6mm	19.8mm	19.3mm	19.7mm	19.8mm
Mode	19.7mm	19.6mm	19.7mm	19.7mm	19.5mm	19.2mm	19.9mm	19.4mm	19.8mm	19.2mm	19.6mm	19.8mm
S.D.	0.385	0.297	0.358	0.281	0.120	0.416	0.458	0.510	0.309	0.277	0.277	0.389
Skew	0.29											

Appendix 1: Metrical Coin Data

Coin Type 9	Kingdom	London	Southwark	Winchester	York	Lincoln	Stamford	Thetford	Norwich	Gloucester	Worcester	Hereford
WEIGHT												
# of coins	172	38	4	13	-	7	2	7	3	1	2	2
Mean	1.35g	1.36g	1.37g	1.38g	-	1.37g	-	1.38g	1.34g	-	-	-
Median	1.38g	1.37g	1.40g	1.38g	-	1.40g	-	1.37g	1.39g	-	-	-
Mode	1.38g	1.38g	-	1.40g	-	1.40g	-	-	-	-	-	-
S.D.	0.096	0.071	0.100	0.033	-	0.074	-	0.064	0.117	-	-	-
Skew	-0.75											
DIAMETER												
# of coins	93	14	1	4	1	5	1	3	2	1	1	1
Mean	20.0mm	20.2mm	-	20.4mm	-	20.0mm	-	20.0mm	-	-	-	-
Median	20.0mm	20.1mm	-	20.4mm	-	19.9mm	-	20.0mm	-	-	-	-
Mode	20.0mm	19.9mm	-	-	-	19.9mm	-	-	-	-	-	-
S.D.	0.415	0.325	-	0.457	-	0.228	-	0.351	-	-	-	-
Skew	0.26											
Coin Type 10	**Kingdom**	**London**	**Southwark**	**Winchester**	**York**	**Lincoln**	**Stamford**	**Thetford**	**Norwich**	**Gloucester**	**Worcester**	**Hereford**
WEIGHT												
# of coins	319	49	11	7	3	9	3	9	8	1	9	5
Mean	1.35g	1.35g	1.30g	1.39g	1.39g	1.40g	1.40g	1.31g	1.39g	-	1.38g	1.37g
Median	1.36g	1.35g	1.28g	1.39g	1.38g	1.40g	1.40g	1.32g	1.40g	-	1.36g	1.38g
Mode	1.40g	1.33g	1.28g	1.37g	-	1.39g	-	1.22g	1.40g	-	1.34g	1.38g
S.D.	0.085	0.076	0.093	0.018	0.026	0.053	0.010	0.089	0.050	-	0.034	0.014
Skew	-0.51											
DIAMETER												
# of coins	163	22	8	3	2	2	3	7	4	1	5	5
Mean	20.2mm	20.2mm	20.4mm	20.2mm	-	-	19.9mm	20.0mm	20.1mm	-	20.7mm	20.2mm
Median	20.2mm	20.3mm	20.4mm	20.2mm	-	-	20.1mm	20.2mm	20.1mm	-	20.8mm	20.2mm
Mode	20.2mm	20.6mm	20.2mm	-	-	-	-	19.5mm	20.1mm	-	-	20.2mm
S.D.	0.463	0.317	0.185	0.300	-	-	0.596	0.454	0.082	-	0.259	0.148
Skew	-0.15											

Appendix 1: Metrical Coin Data

Coin Type 11	Kingdom	London	Southwark	Winchester	York	Lincoln	Stamford	Thetford	Norwich	Gloucester	Worcester	Hereford
WEIGHT												
# of coins	237	46	8	9	6	22	-	4	11	5	-	2
Mean	1.37g	1.37g	1.36g	1.37g	1.33g	1.37g	-	1.39g	1.38g	1.39g	-	-
Median	1.38g	1.37g	1.37g	1.38g	1.37g	1.38g	-	1.40g	1.39g	1.38g	-	-
Mode	1.39g	1.38g	1.37g	1.37g	1.38g	1.38g	-	-	1.41g	1.36g	-	-
S.D.	0.050	0.038	0.028	0.044	0.079	0.040	-	0.028	0.046	0.028	-	-
Skew	-0.80											
DIAMETER												
# of coins	128	23	6	4	5	16	-	4	5	3	-	-
Mean	20.3mm	20.5mm	20.8mm	20.1mm	19.8mm	20.4mm	-	19.5mm	19.9mm	20.3mm	-	-
Median	20.2mm	20.6mm	20.9mm	20.0mm	19.7mm	19.9mm	-	19.4mm	20.2mm	20.2mm	-	-
Mode	19.6mm	21.1mm	20.9mm	20.0mm	19.6mm	19.5mm	-	-	-	-	-	-
S.D.	0.778	0.697	0.413	0.193	0.249	1.189	-	0.668	0.829	0.404	-	-
Skew	0.37											
Coin Type 12	**Kingdom**	**London**	**Southwark**	**Winchester**	**York**	**Lincoln**	**Stamford**	**Thetford**	**Norwich**	**Gloucester**	**Worcester**	**Hereford**
WEIGHT												
# of coins	83	18	7	-	2	5	-	2	5	1	1	1
Mean	1.33g	1.35g	1.29g	-	-	1.37g	-	-	1.38g	-	-	-
Median	1.36g	1.37g	1.33g	-	-	1.37g	-	-	1.38g	-	-	-
Mode	1.37g	1.37g	-	-	-	-	-	-	-	-	-	-
S.D.	0.090	0.052	0.104	-	-	0.021	-	-	0.035	-	-	-
Skew	-1.02											
DIAMETER												
# of coins	54	12	3	1	2	4	-	2	5	-	1	1
Mean	21.1mm	21.5mm	21.0mm	-	-	20.3mm	-	-	21.0mm	-	-	-
Median	21.0mm	21.3mm	20.7mm	-	-	20.2mm	-	-	21.1mm	-	-	-
Mode	20.7mm	21.3mm	20.7mm	-	-	20.2mm	-	-	21.2mm	-	-	-
S.D.	0.629	0.586	0.462			0.271			0.255	-	-	-
Skew	0.25											

Appendix 1: Metrical Coin Data

Coin Type 13	Kingdom	London	Southwark	Winchester	York	Lincoln	Stamford	Thetford	Norwich	Gloucester	Worcester	Hereford
WEIGHT												
# of coins	77	8	8	4	-	1	3	3	3	1	1	1
Mean	1.35g	1.39g	1.36g	1.29g	-	-	1.37g	1.31g	1.41g	-	-	-
Median	1.37g	1.38g	1.37g	1.29g	-	-	1.39g	1.32g	1.42g	-	-	-
Mode	1.38g	1.38g	-	1.29g	-	-	-	-	-	-	-	-
S.D.	0.072	0.019	0.051	0.053	-	-	0.067	0.080	0.120	-	-	-
Skew	-0.90											
DIAMETER												
# of coins	50	6	5	1	-	1	1	1	2	-	1	-
Mean	19.1mm	18.9mm	19.1mm	-	-	-	-	-	-	-	-	-
Median	19.1mm	19.0mm	19.1mm	-	-	-	-	-	-	-	-	-
Mode	19.0mm	18.6mm	19.1mm	-	-	-	-	-	-	-	-	-
S.D.	0.424	0.519	0.164	-	-	-	-	-	-	-	-	-
Skew	0.09											

Appendix 2: Table of Coins Struck with Irregular Dies

Certain Identifications

Mint	Moneyer	Coin Number
Type 2		
Barnstaple	Leofwine	BMV0041
Derby	Colbein	SCB0023
Leicester	Lierie	BMC0090
Lincoln	Aelmaer	EMC0818
Lincoln	Aelmaer	EMC0819
Lincoln	Gifel	BMC0094
Lincoln	Gifel	EMC1278
Lincoln	Gifel	SCB0025
Lincoln	Siferth	BMC0097
Lincoln	Siferth	BMC0100
Lincoln	Siferth	BMC0101
Lincoln	Siferth	EMC0825
Lincoln	Siferth	EMC0826
Lincoln	Siferth	EMC1282
Lincoln	Siferth	EMC1283
Lincoln	Siferth	EMC1286
Lincoln	Outhgrim	EMC1209
Type 3		
Lincoln	Aelfnoth	BMC0190
Lincoln	Aelfnoth	BMV0061
Lincoln	Gifel	BMC0191
Stamford	Leofwine	EMC1345
Wallingford	Brihtmaer	EMC1364
Winchester	Goldinc	BMC0221
York	Outhgrim	EMC0062
York	Outhgrim	EMC1365
Type 4		
Lincoln	Saeword	EMC1294
Lincoln	Saeword	EMC1295
Lincoln	Saeword	EMC1309
Lincoln	Siferth	BMC0244
Lincoln	Siferth	BMC0245
Lincoln	Siferth	EMC0268
Lincoln	Siferth	EMC1291
Lincoln	Siferth	EMC1292
Lincoln	Siferth	EMC1293
Lincoln	Siferth	EMC1296
Lincoln	Siferth	FZB0035
Lincoln	Thorstan	EMC1297

(Type 4 cont.)		
Lincoln	Thorstan	EMC1298
Lincoln	Thorstan	FZB0036
Lincoln	Ulf	BMC0246
Lincoln	Ulf	BMC0247
Lincoln	Ulf	EMC1299
Lincoln	Ulf	EMC1300
Lincoln	Unspac	BMC0248
Lincoln	Unspac	EMC1301
Lincoln	Unspac	EMC1302
Lincoln	Wulfstan	BMC0249
Lincoln	Wulfstan	BMC0250
Lincoln	Wulfstan	BMC0251
Lincoln	Wulfstan	BMV0077
Lincoln	Wulfstan	EMC1303
Lincoln	Wulfstan	EMC1304
Lincoln	Wulfstan	EMC1305
Lincoln	Wulfstan	EMC1306
Lincoln	Wulfstan	EMC1307
Lincoln	Wulfstan	EMC1308
Lincoln	Wulfstan	SCB0059
Stamford	Leofwine	BMC0275
Stamford	Leofwine	EMC1346
Stamford	Leofwine	EMC1347
York	Aleif	BMV0089
York	Aleif	EMC1394
York	Aleif	EMC1395
York	Aleif	SCB0079
York	Harthoulf	BMV0090
York	Harthoulf	EMC1396
York	Harthoulf	EMC1397
York	Outhbern	EMC0787
York	Outhbern	EMC1398
York	Outhbern	EMC1399
York	Outhgrim	EMC0284
York	Outhgrim	EMC1400
York	Outhgrim	EMC1401
York	Outhgrim	SCB0080
York	Outhgrim	SCB0081
Type 5		
Shrewsbury	Wulfmaer	SCB0104
Type 8		
Abergavenny	Aelfwine	FZA0068
Abergavenny	Uncertain	FZA0069
Bristol	Colblac	NMW0091
Cardiff	Aelfsi Turi	BMC0584

(Type 8 cont.)		
Cardiff	Swegn	FZA0080
Cardiff	Uncertain	BMC0583
Shrewsbury	Godsbrand	BMC0938
St David's	Ifliwine	BMC0888
St David's	Ifliwine	NMW0114
St David's	Ifliwine	NMW0115
St David's	Turri	BMC0883
St David's	Turri	BMC0884
St David's	Turri	BMC0887
St David's	Turri	NMW0096
St David's	Turri	NMW0097
St David's	Uncertain	BMC0889
St David's	Uncertain	BMC0890
Type 10		
Salisbury	Godwine	BMC2130

Uncertain Identifications

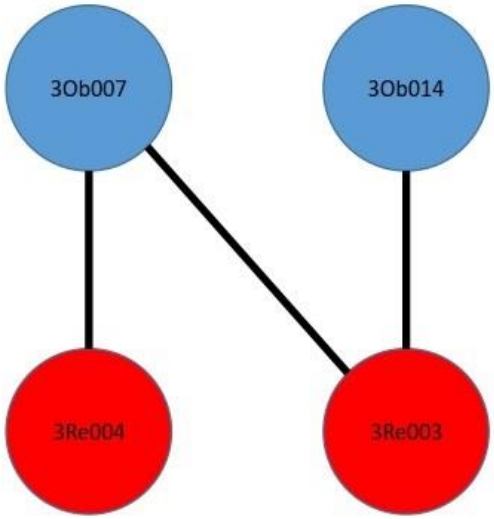
Mint	Moneyer	Coin Number
Type 1		
Bristol	Ceorl	BMC0003
Ilchester	Wichxsi	BMC0025
Type 2		
London	Godric	EMC0239
Northampton	Swetman	EMC0944
Norwich	Eadwine	BMC0132
Thetford	Blacsunu	BMC0117
Type 3		
Leicester	Aegelwine	SCB0042
Thetford	Osbern	BMC0214
Type 4		
Lincoln	Unspac	SCB0058
Type 5		
Canterbury	Manna	NMW0021
London	Uncertain (ANCDCN)	NMW0060
London	Uncertain (ANCDCN)	NMW0061
London	Uncertain (ANCDCN)	NMW0062
London	Uncertain (ANCDCN)	NMW0063
Type 6		
Exeter	Wulfwine	BMC0406
Sudbury	Wulfric	BMC0431
Type 8		
Bristol	Brihtwold	FZA0076
Bristol	Brihtwold	NMW0089
Bristol	Colblac	EMC0316
Canterbury	Aelfraed	FZA0079
Cardiff	Aelfsi	BMC0582
Shrewsbury	Saegrim	BMC0939
St David's	Turri	BMC0885
St David's	Turri	FZA0114

(Type 8 cont.)		
St David's	Uncertain	BMV0171
Wallingford	Aegelwine	BMC1018
Wallingford	Sweartlinc	SCB0163
Type 10		
Canterbury	Brihtwold	FZA0147
Chichester	Godwine	FZA0148
Derby	Godwine	BMC2080
Exeter	Saewine	BMC2087
London	Wulfword	EMC2569
Type 11		
Canterbury	Simaer	FZB0151
Lincoln	Ascetel	BMC2194
Lincoln	Folcaerd	BMC2196
Lincoln	Folcaerd	FZB0156
Lincoln	Thorstan	FZB0157
London	Aldgar	BMV0287
London	Brunic	BMC2201
London	Ordgar	BMC2206

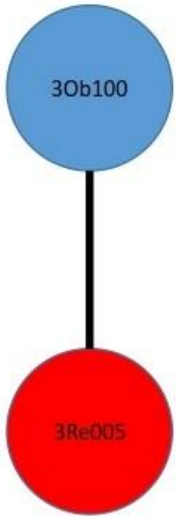
Appendix 3.1: Die Graphs of Coin Type 3

Bristol Mint

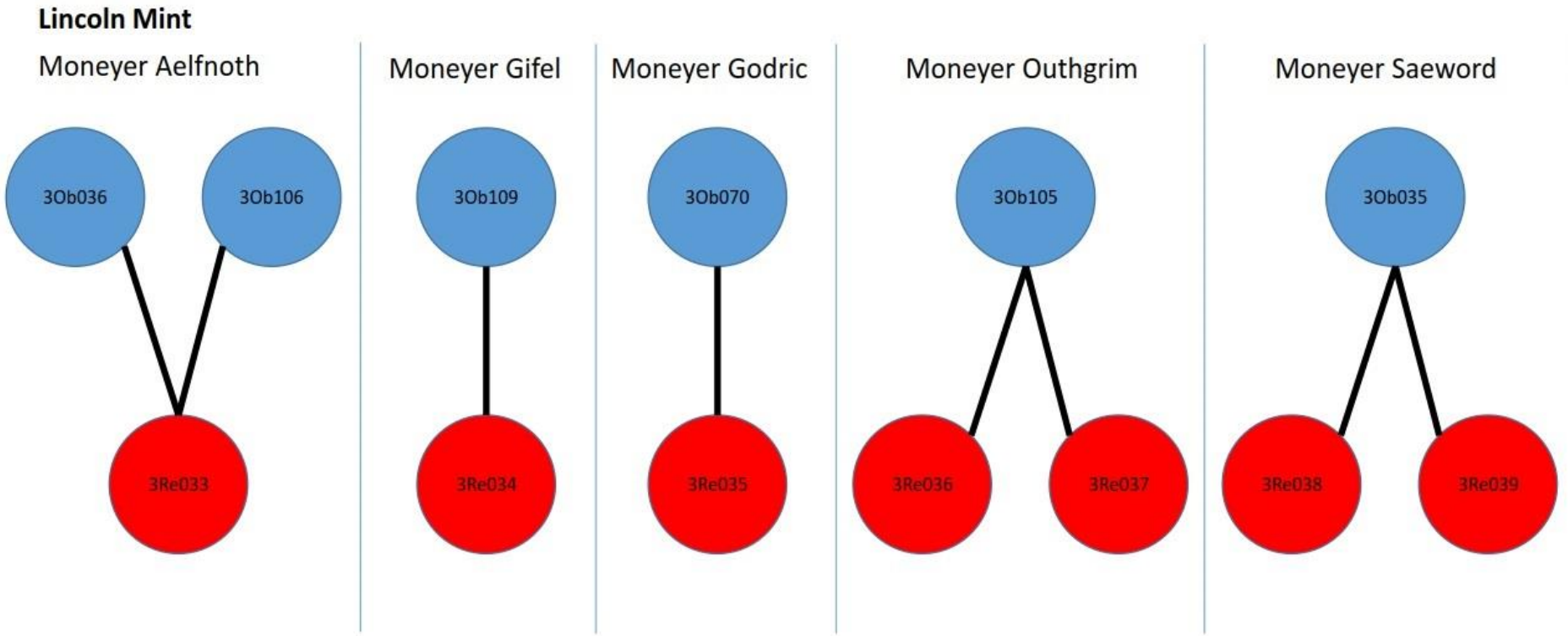
Moneyer Ceorl



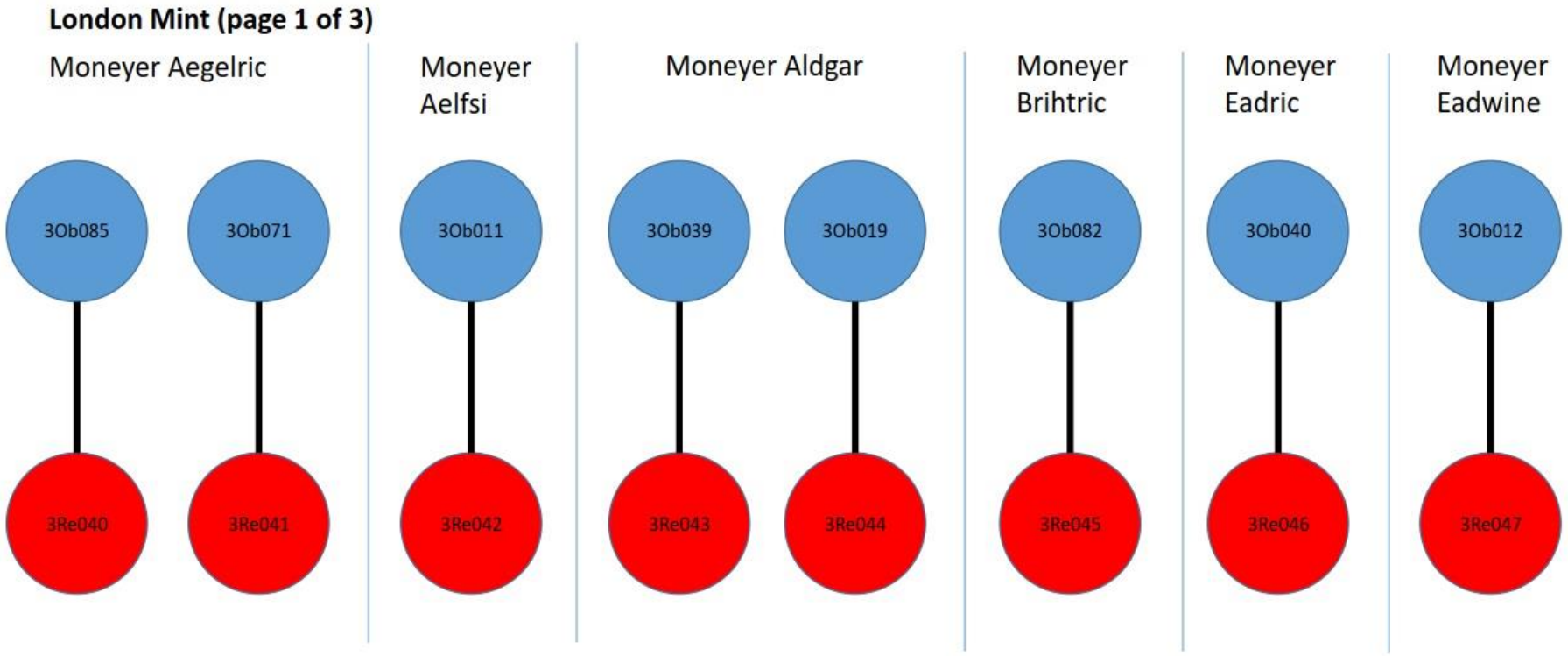
Moneyer Leofwine



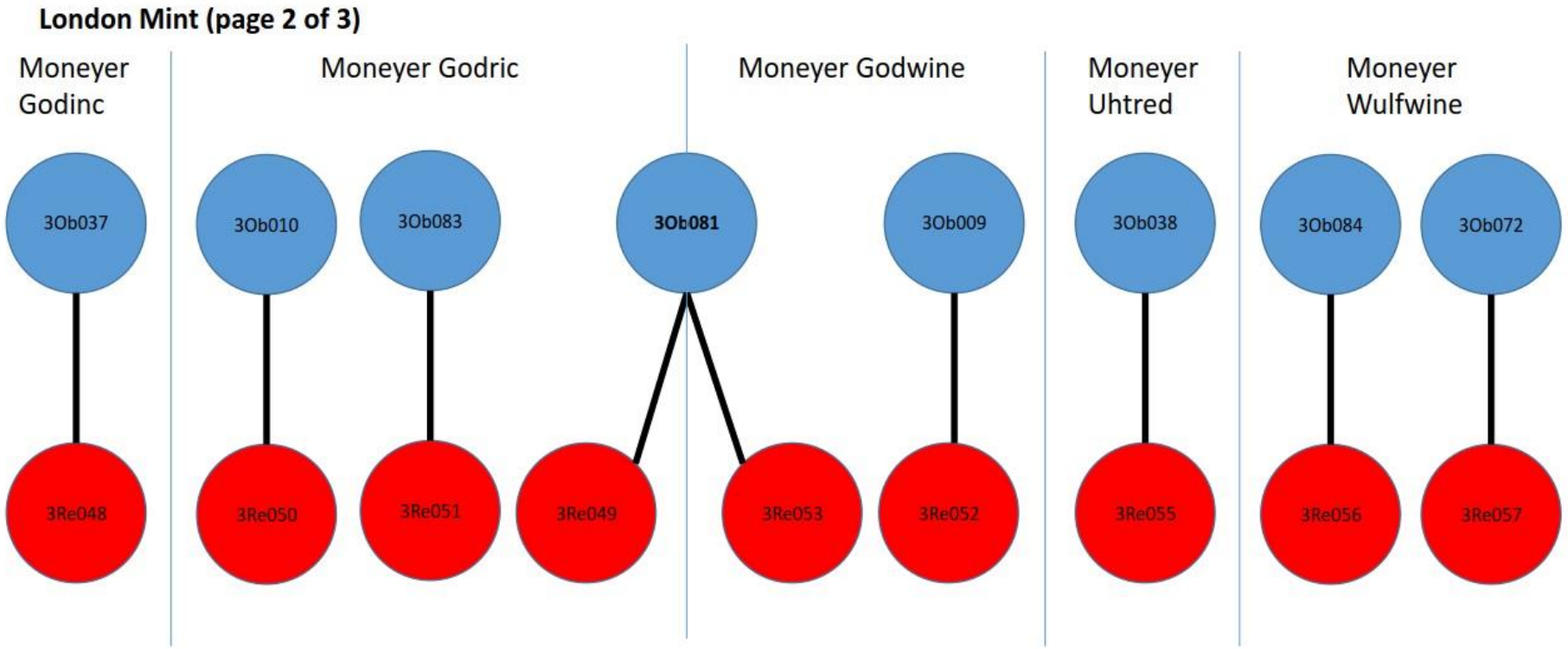
Appendix 3.1: Die Graphs of Coin Type 3



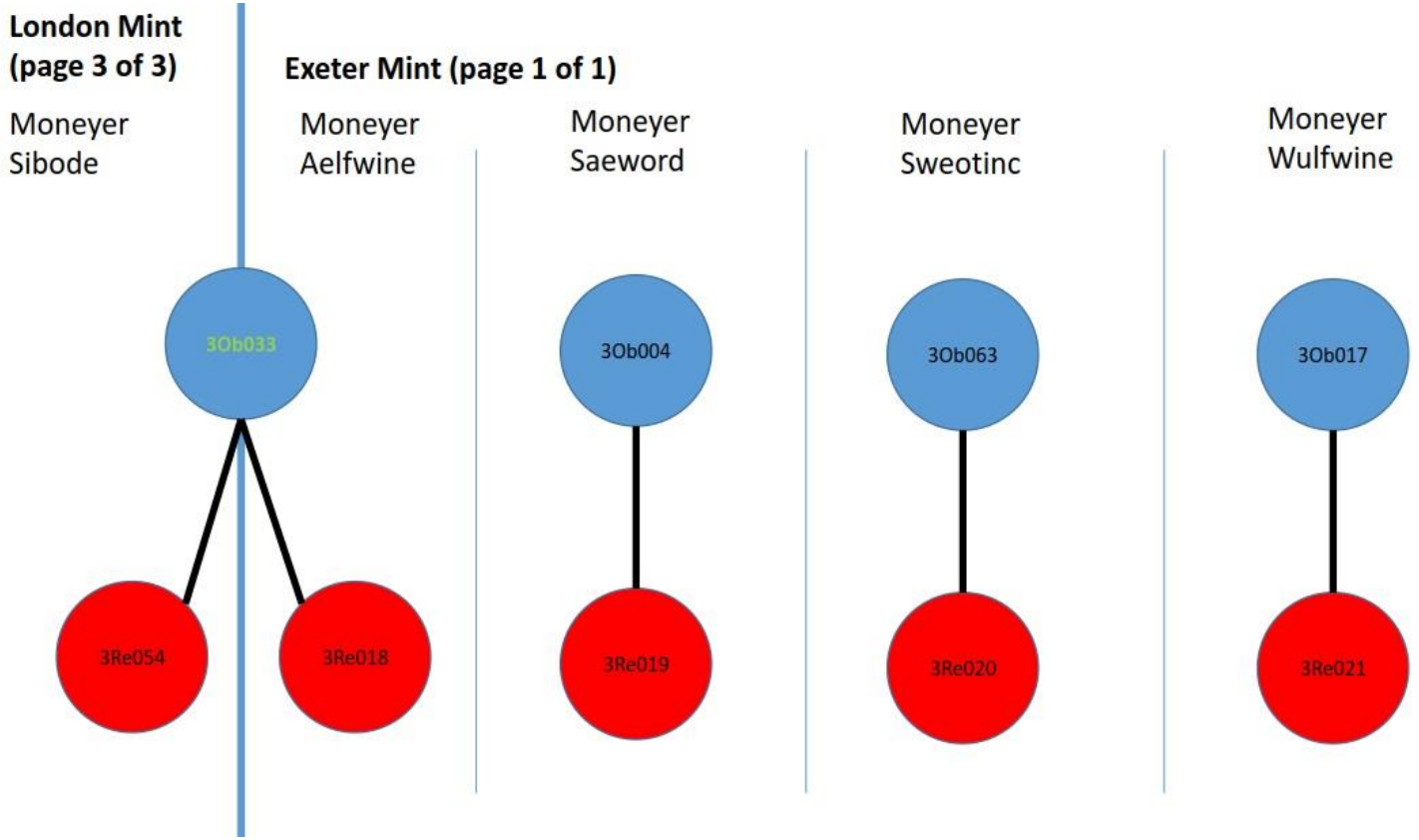
Appendix 3.1: Die Graphs of Coin Type 3



Appendix 3.1: Die Graphs of Coin Type 3



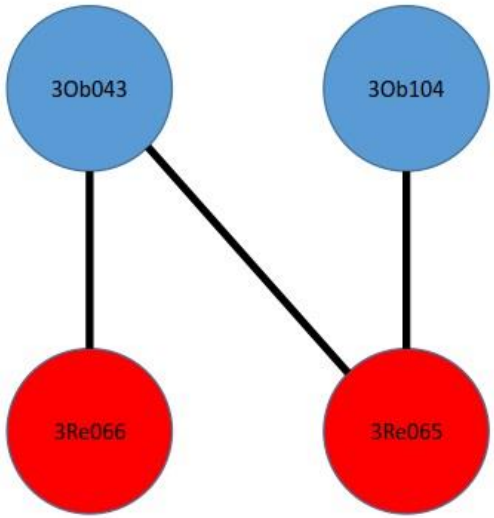
Appendix 3.1: Die Graphs of Coin Type 3



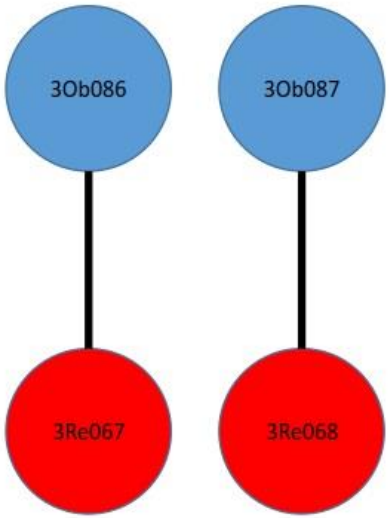
Appendix 3.1: Die Graphs of Coin Type 3

Nottingham Mint

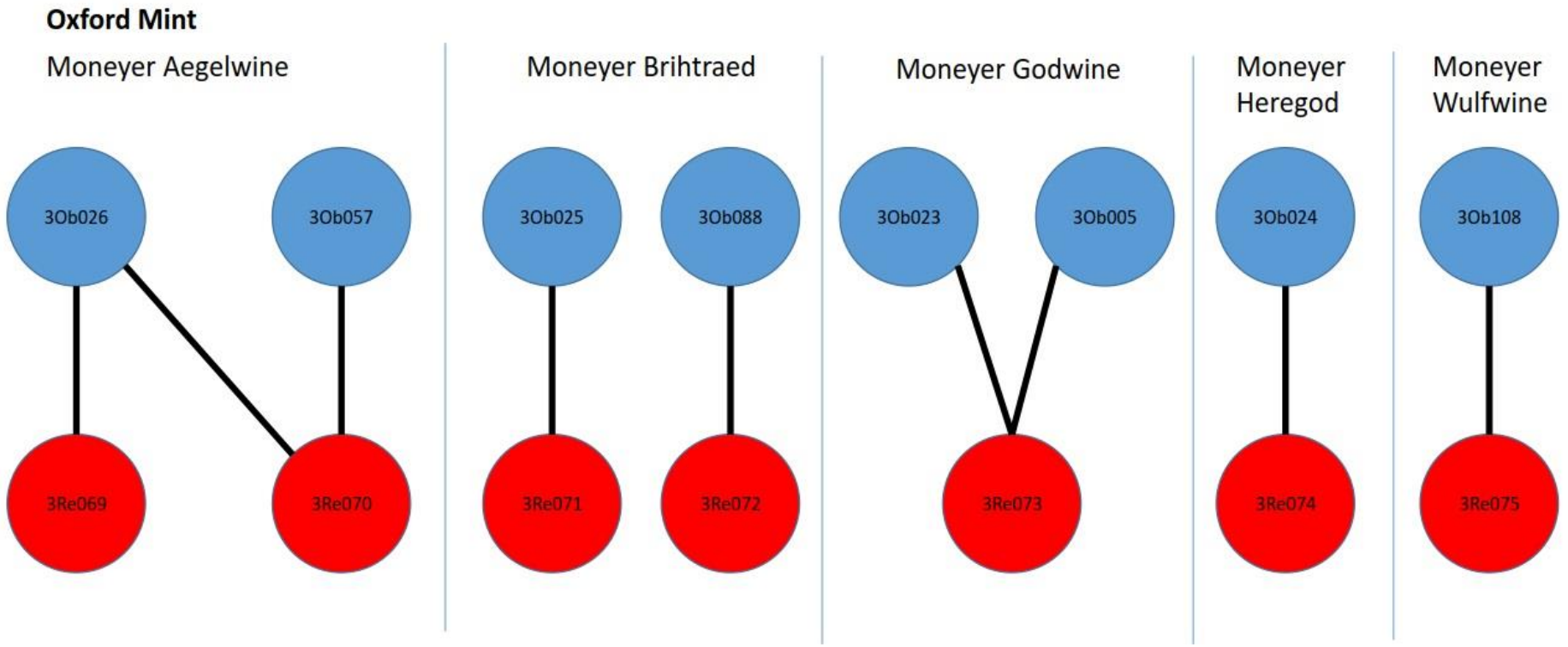
Moneyer Forna



Moneyer Manna



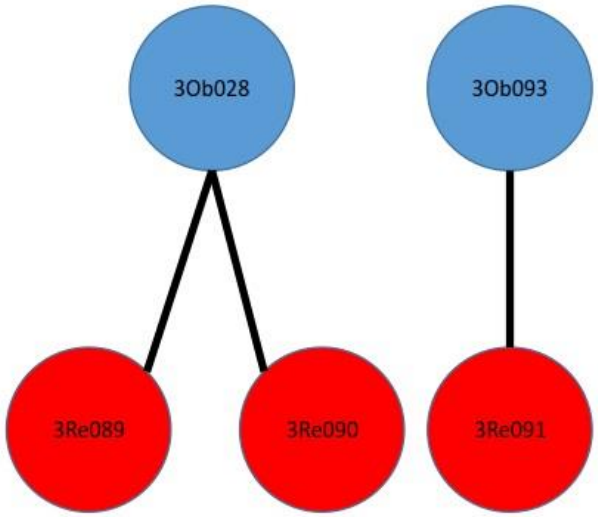
Appendix 3.1: Die Graphs of Coin Type 3



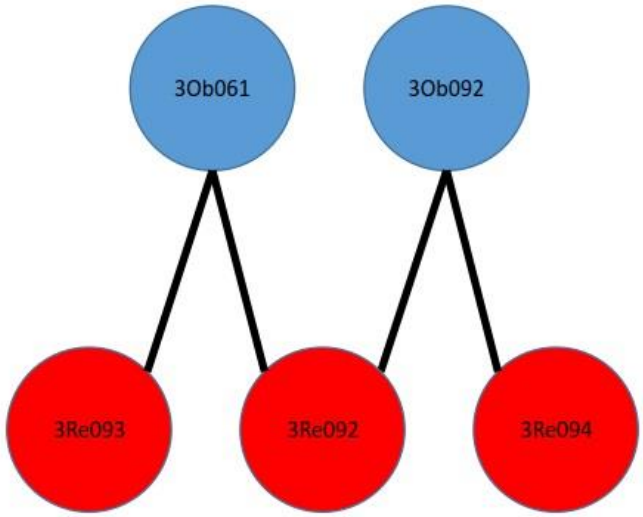
Appendix 3.1: Die Graphs of Coin Type 3

Walllingford Mint (page 1 of 2)

Moneyer Brand

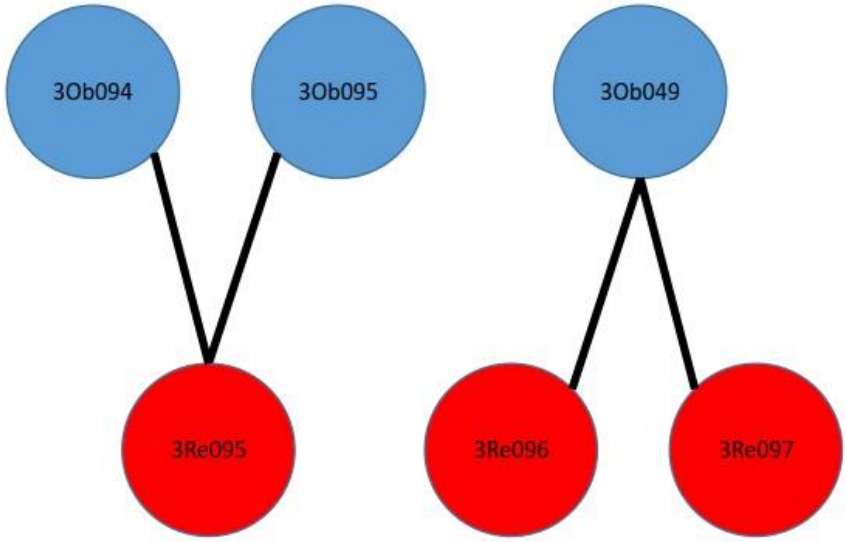


Moneyer Brihtmaer



Walllingford Mint (page 2 of 2)

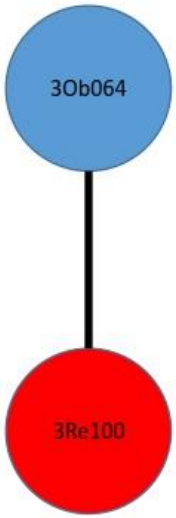
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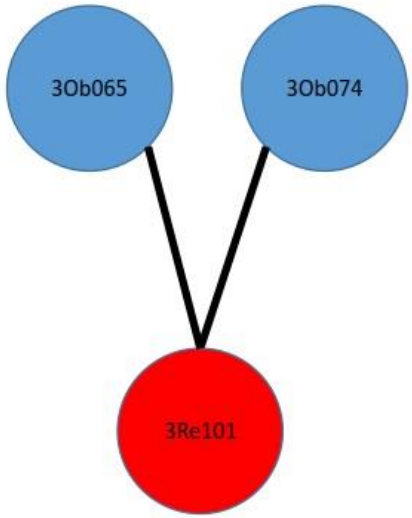
Appendix 3.1: Die Graphs of Coin Type 3

Wilton Mint

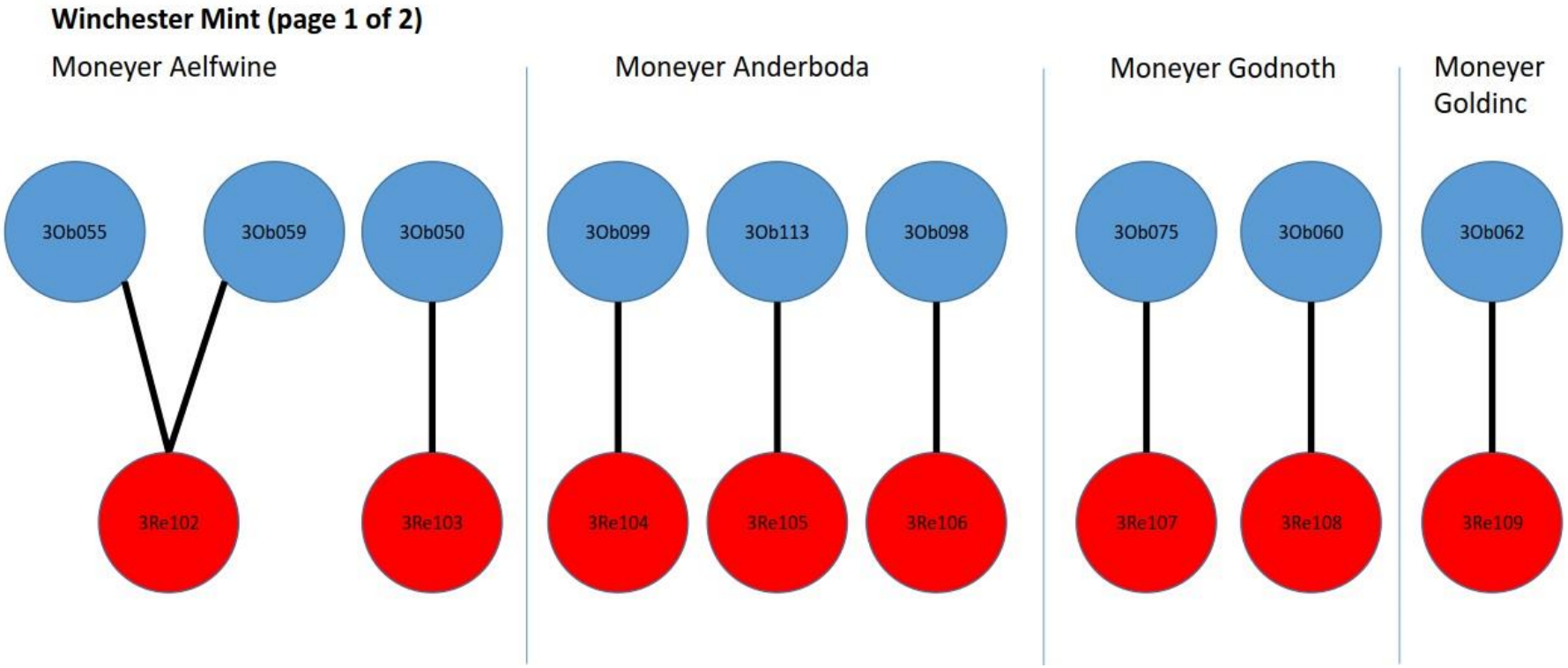
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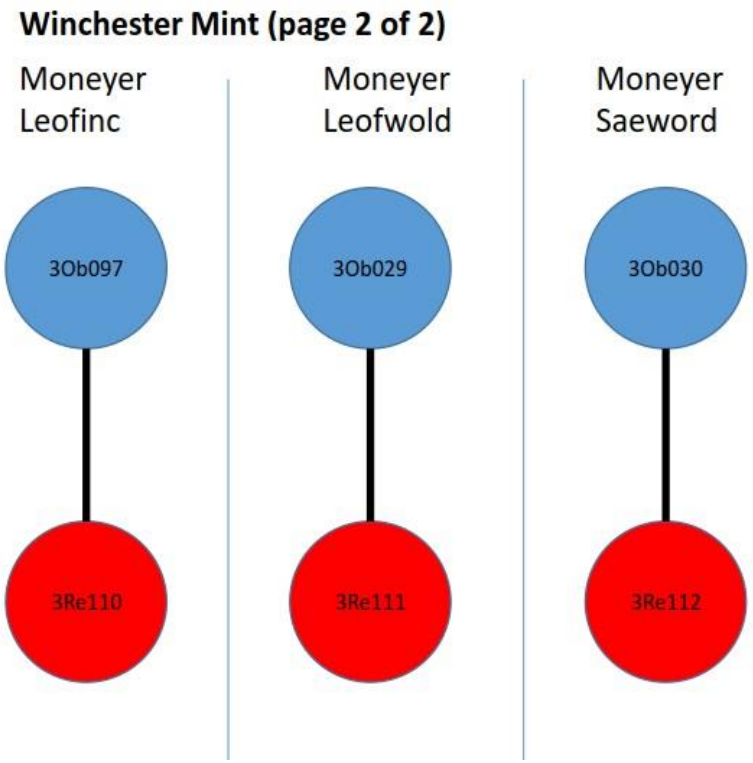
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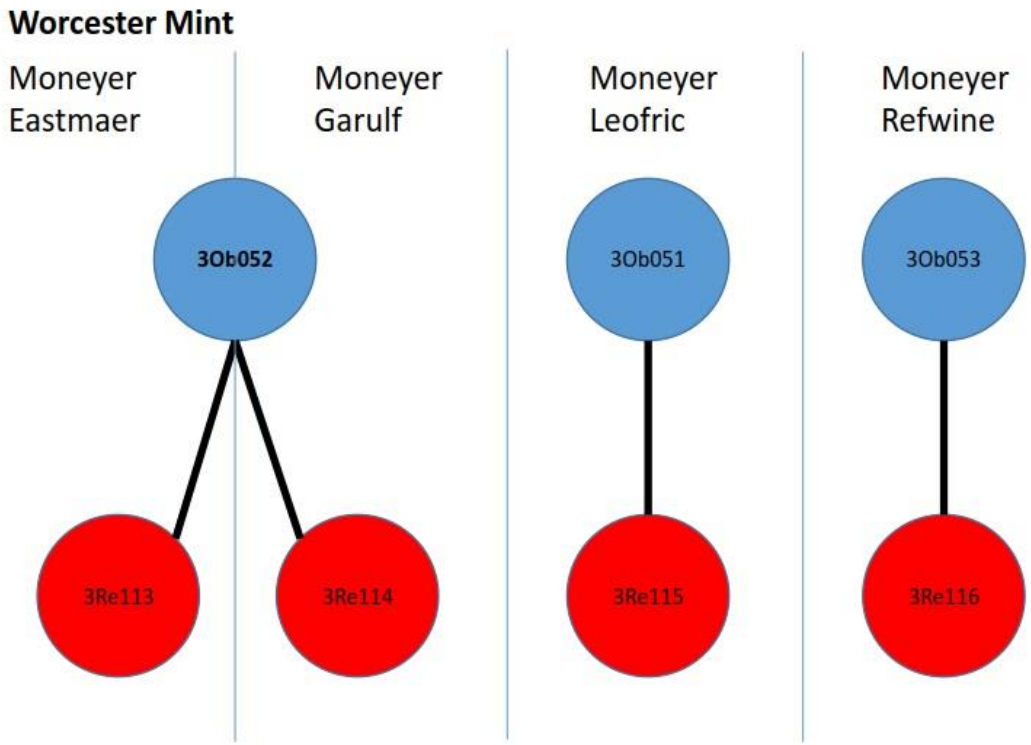
Appendix 3.1: Die Graphs of Coin Type 3



Appendix 3.1: Die Graphs of Coin Type 3



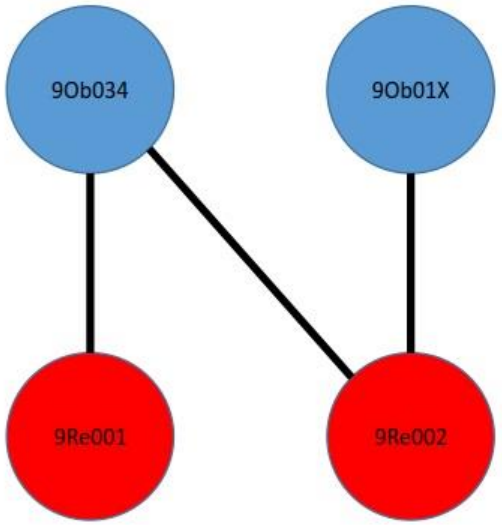
Appendix 3.1: Die Graphs of Coin Type 3



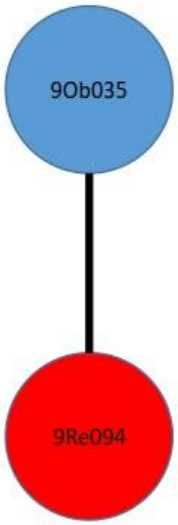
Appendix 3.2: Die Graphs of Coin Type 9

Bristol Mint

Moneyer Brihtword



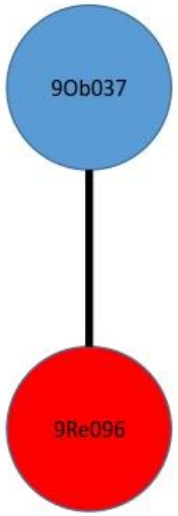
Moneyer Colblac (single coin)



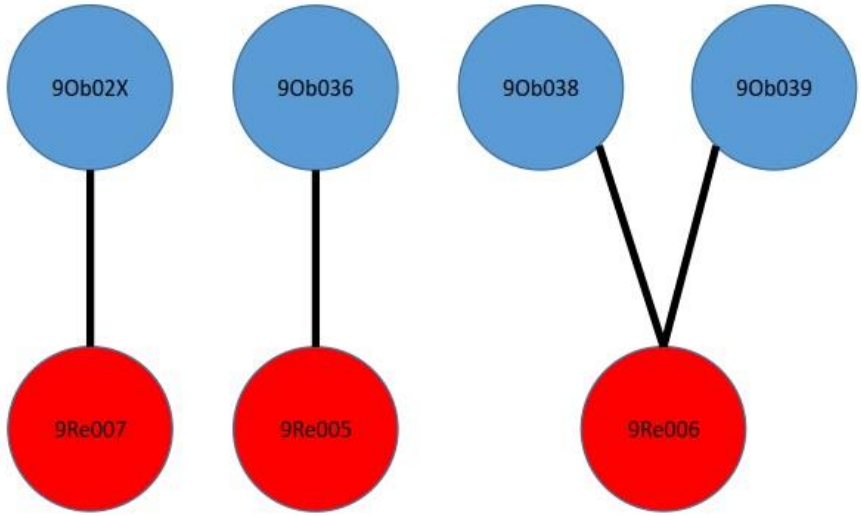
Appendix 3.2: Die Graphs of Coin Type 9

Canterbury Mint (page 1 of 2)

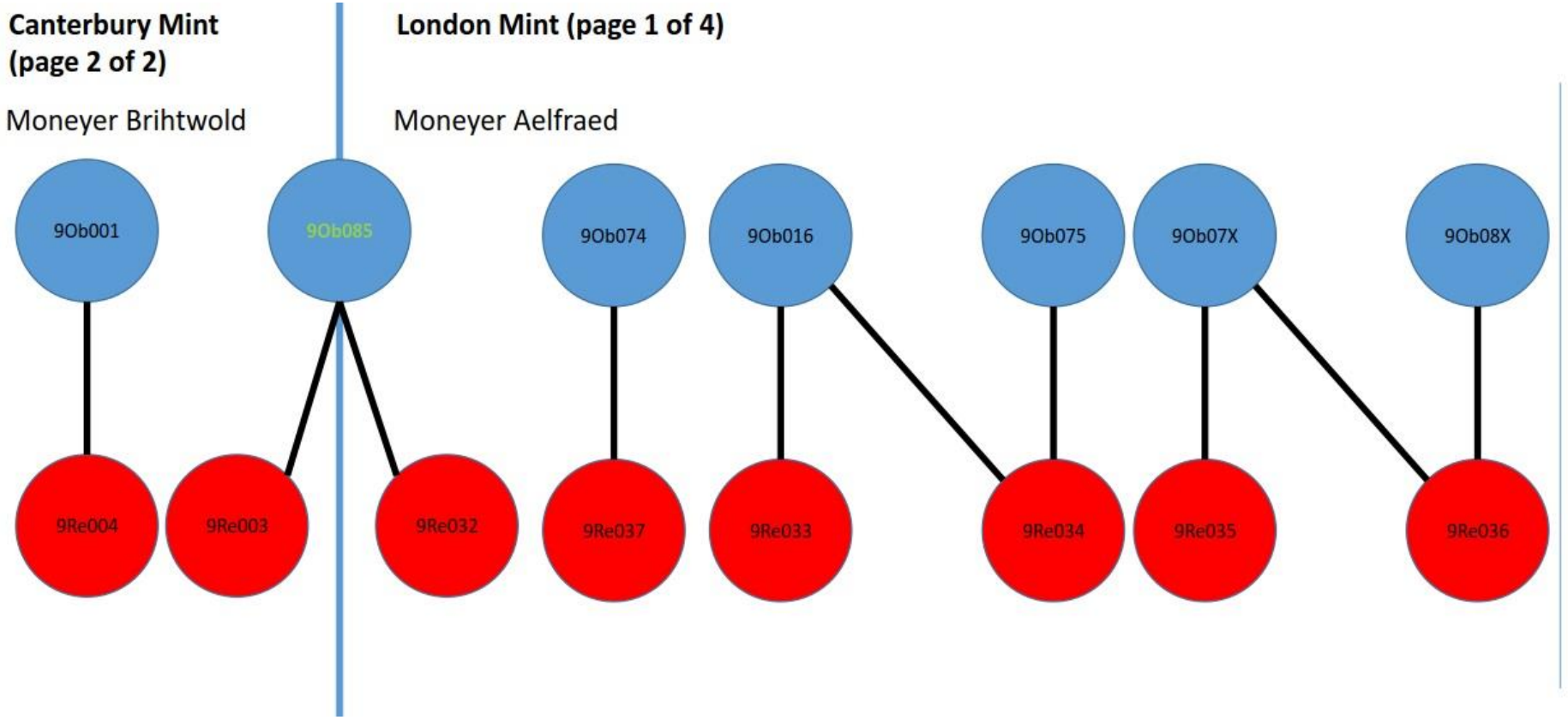
Moneyer Aegelric (single coin)



Moneyer Winedi



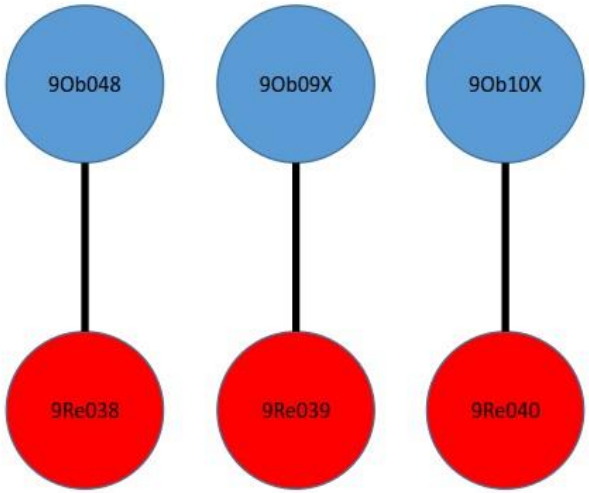
Appendix 3.2: Die Graphs of Coin Type 9



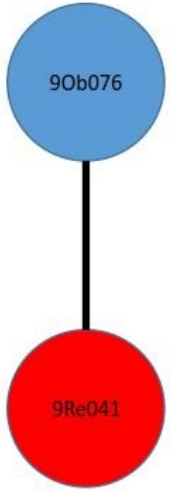
Appendix 3.2: Die Graphs of Coin Type 9

London Mint (page 2 of 4)

Moneyer Brihtwine



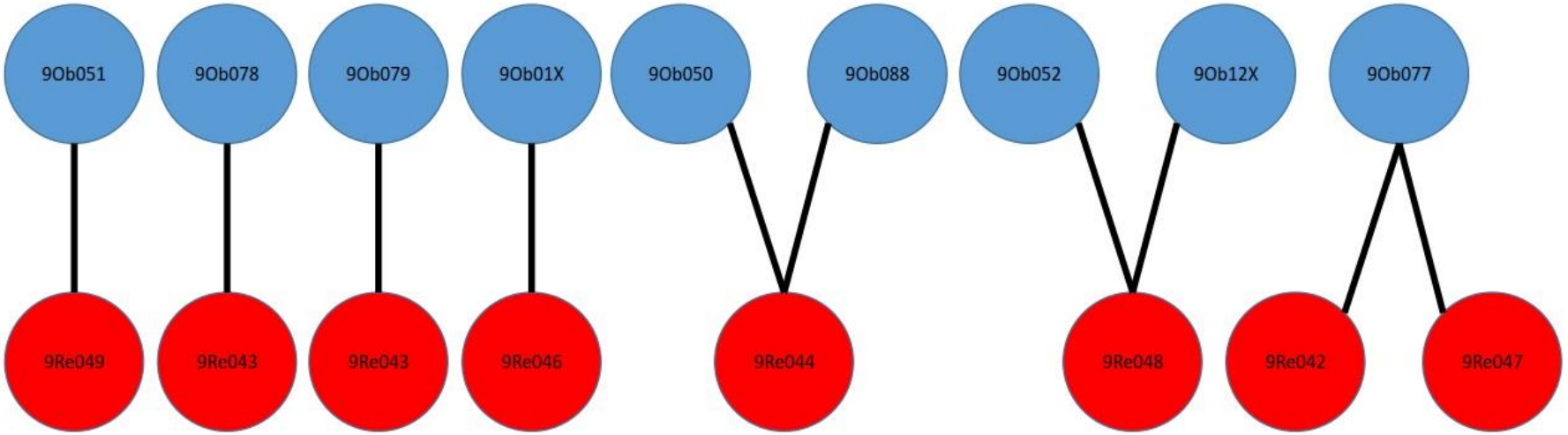
Moneyer Brunic (single coin)



Appendix 3.2: Die Graphs of Coin Type 9

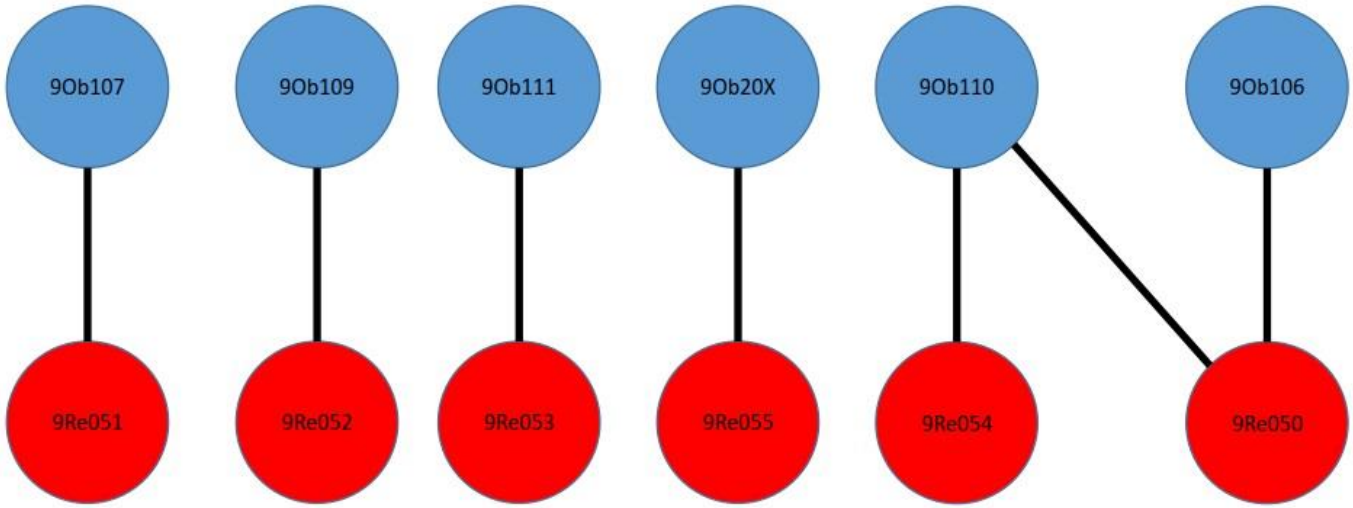
London Mint (page 3 of 4)

Moneyer Eadric

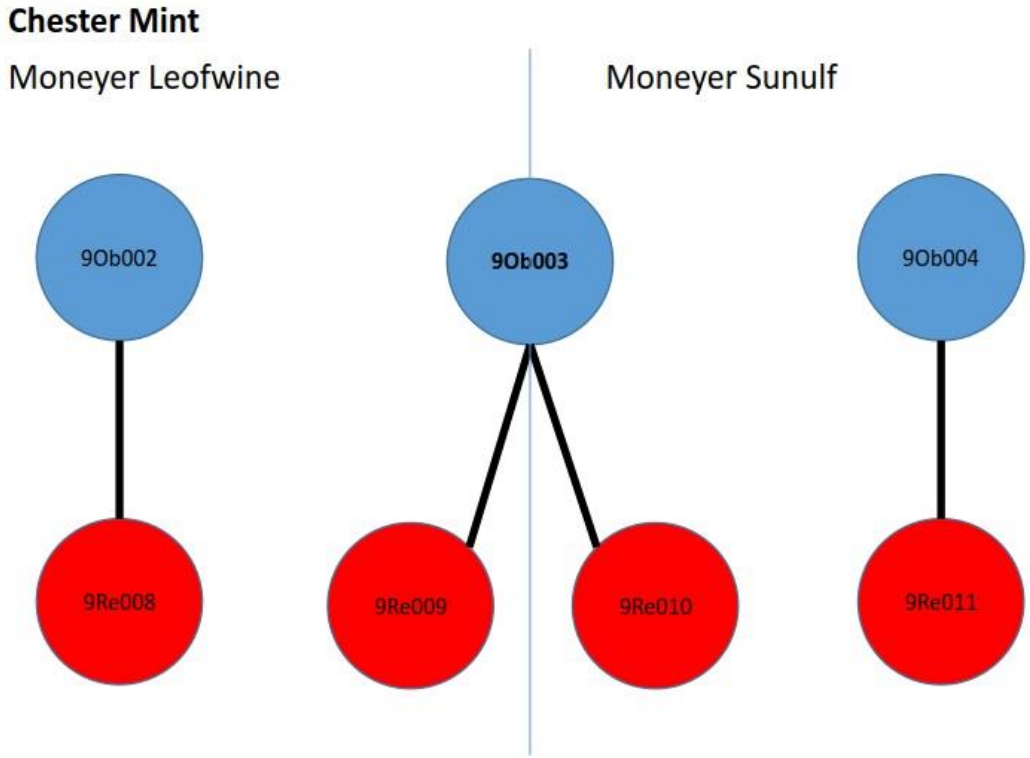


London Mint (page 4 of 4)

Moneyer Eadwine



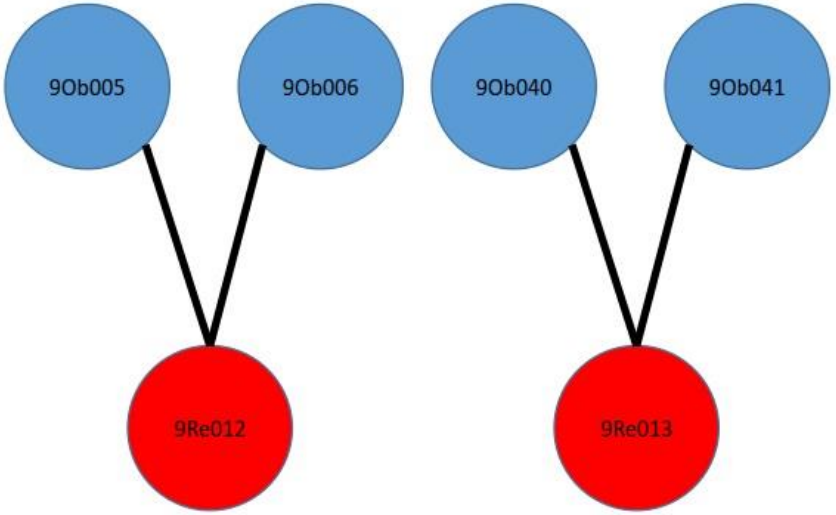
Appendix 3.2: Die Graphs of Coin Type 9



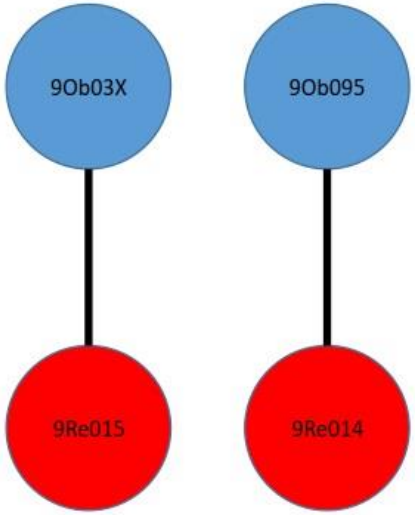
Appendix 3.2: Die Graphs of Coin Type 9

Chichester Mint

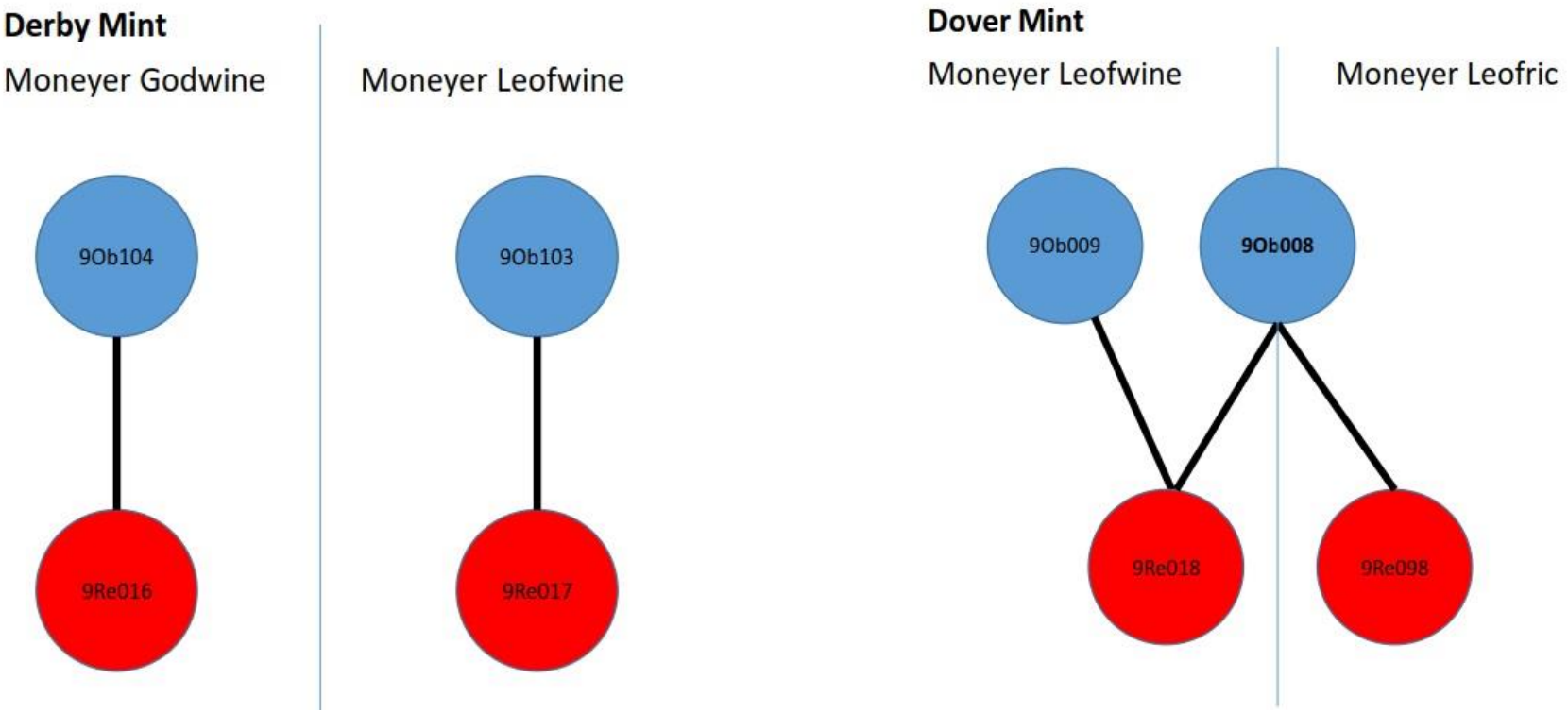
Moneyer Brunman



Moneyer Eadwine



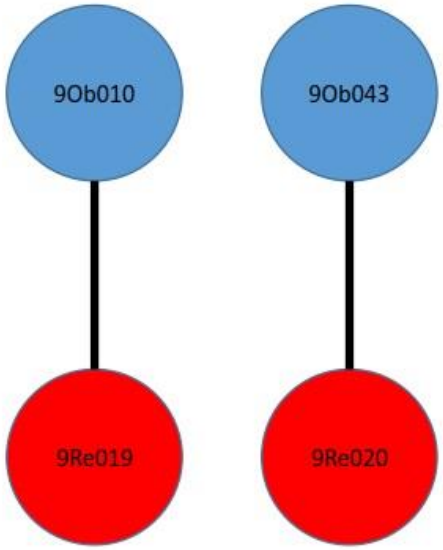
Appendix 3.2: Die Graphs of Coin Type 9



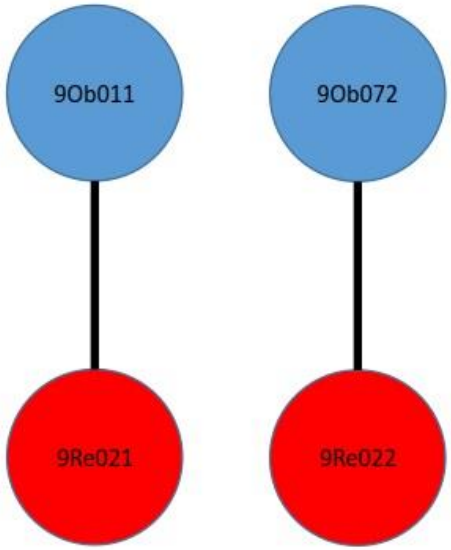
Appendix 3.2: Die Graphs of Coin Type 9

Exeter Mint

Moneyer Brihtwine



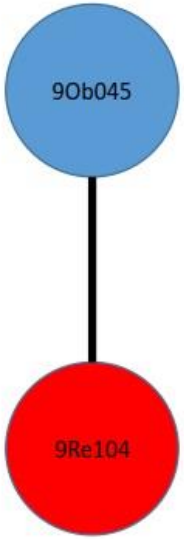
Moneyer Saewine



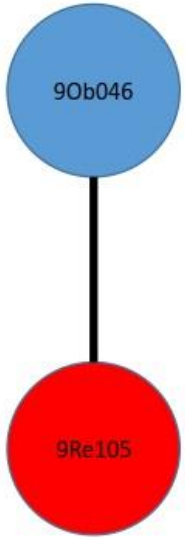
Appendix 3.2: Die Graphs of Coin Type 9

Ipswich Mint

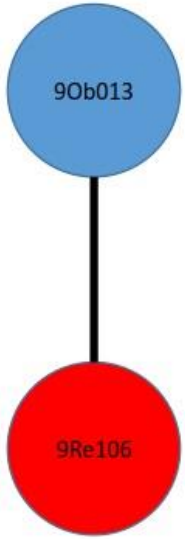
Moneyer Aelfric
(single coin)



Moneyer Leofwine
(single coin)



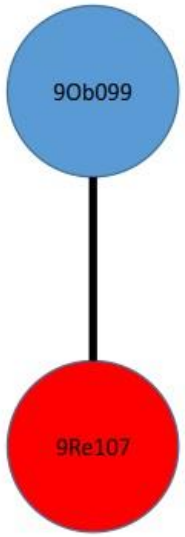
Moneyer Swegn
(single coin)



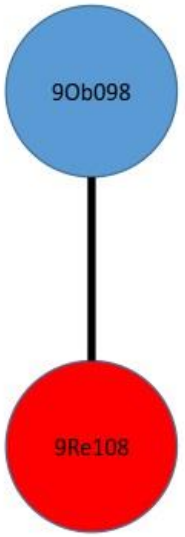
Appendix 3.2: Die Graphs of Coin Type 9

Leicester Mint

Moneyer Godric (single coin)

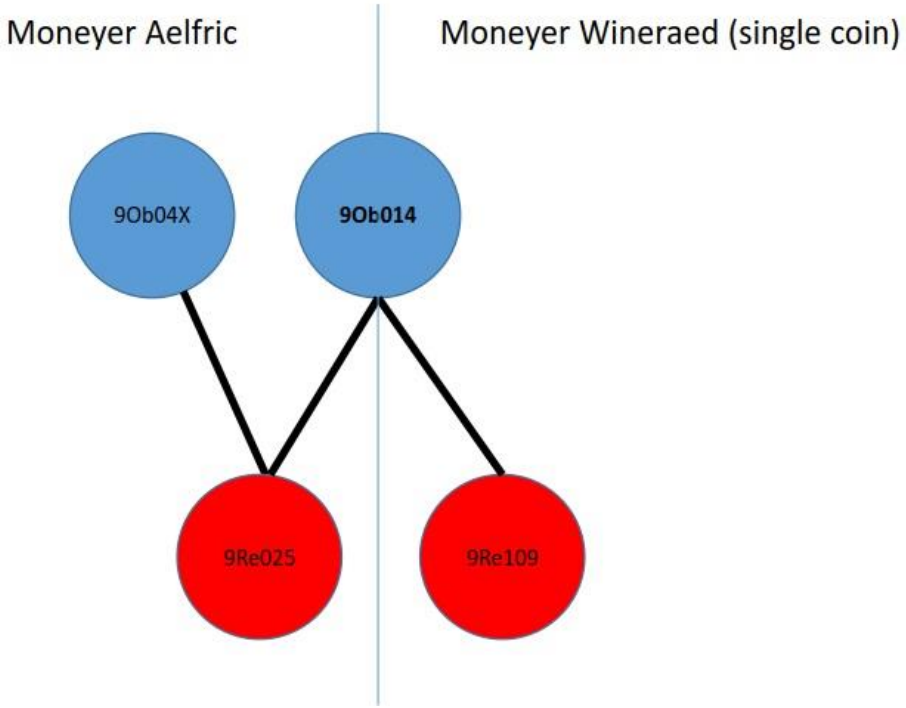


Moneyer Lierie (single coin)

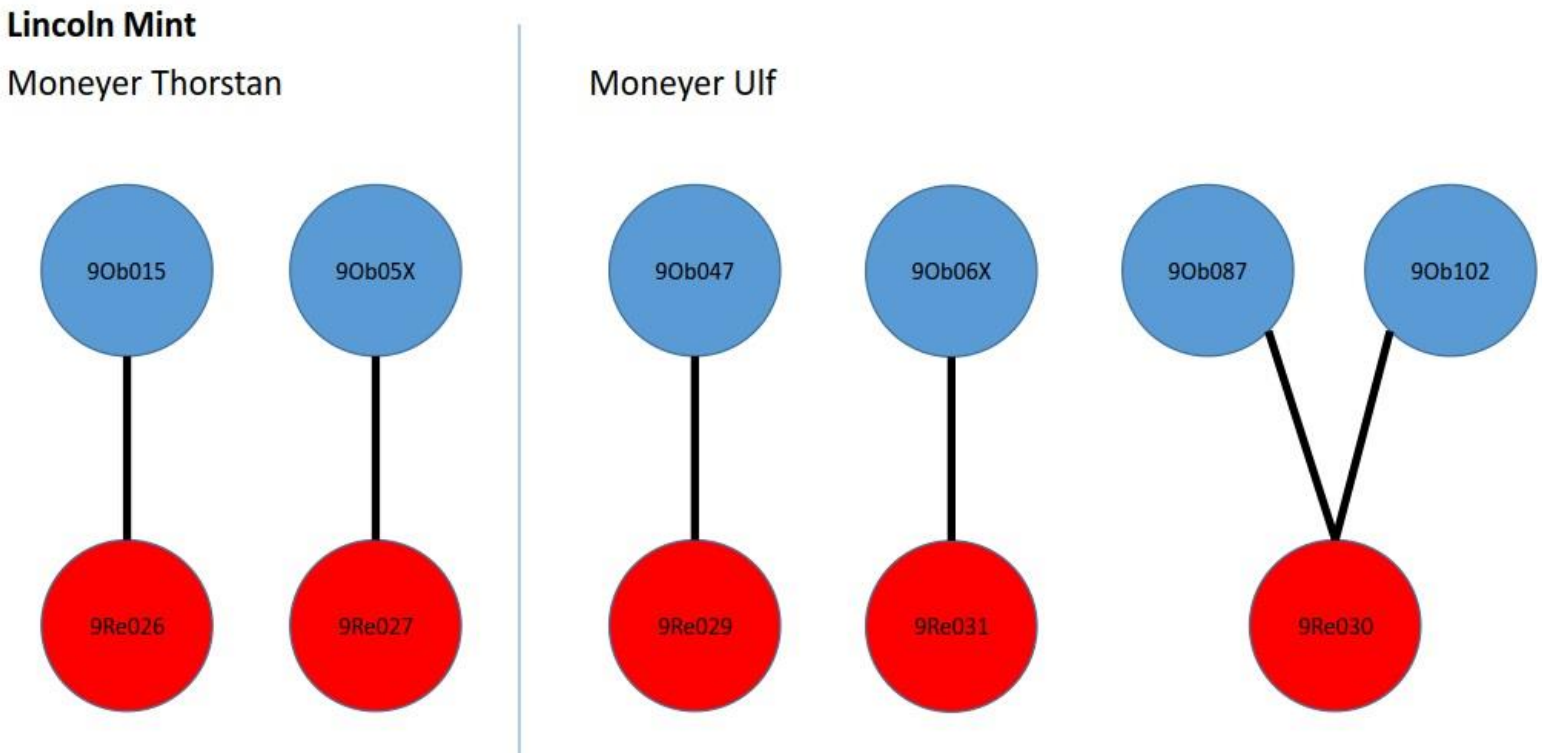


Appendix 3.2: Die Graphs of Coin Type 9

Lewes Mint



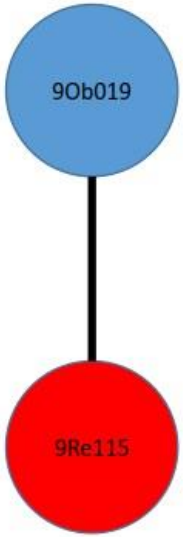
Appendix 3.2: Die Graphs of Coin Type 9



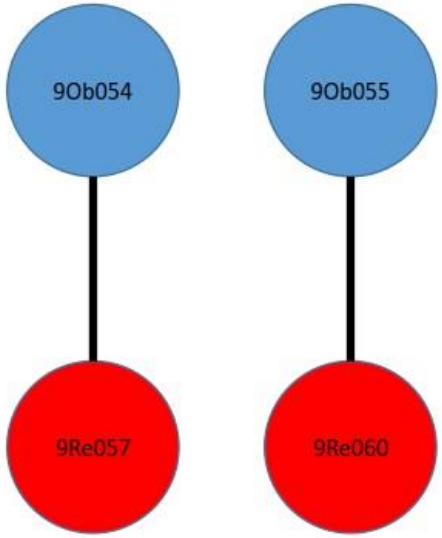
Appendix 3.2: Die Graphs of Coin Type 9

Norwich Mint

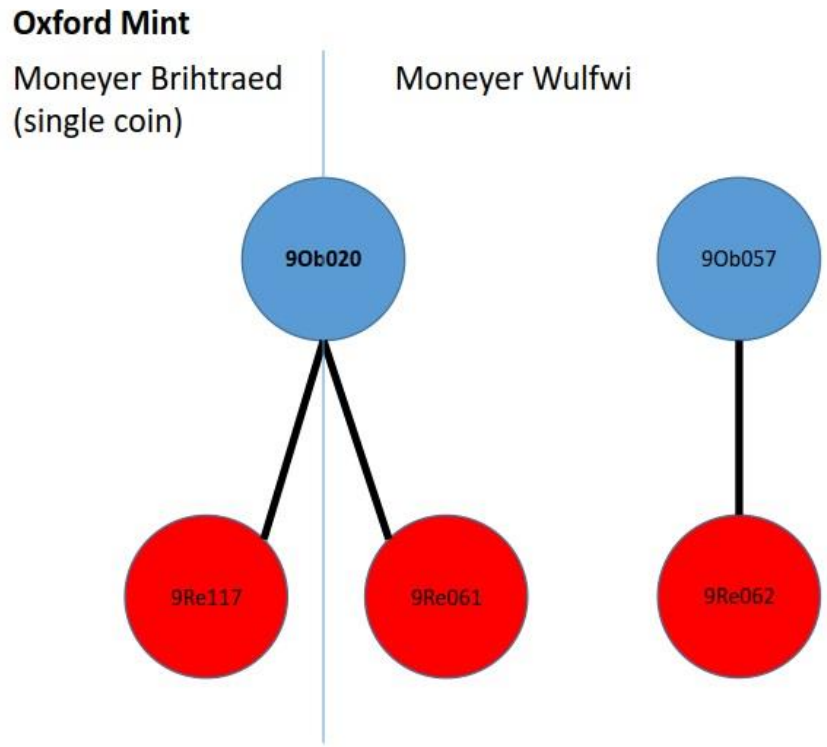
Moneyer Aegelric (single coin)



Moneyer Godwine



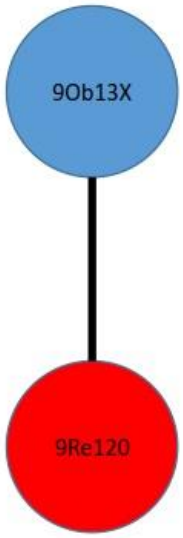
Appendix 3.2: Die Graphs of Coin Type 9



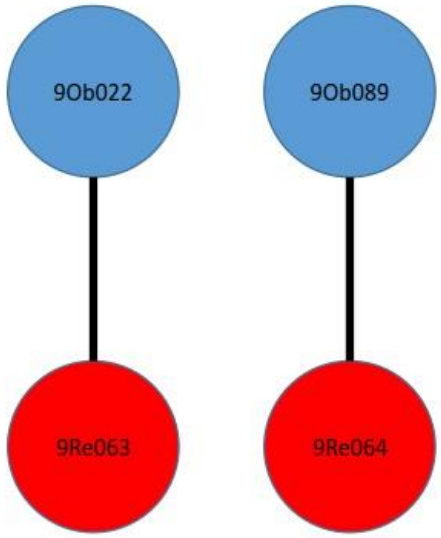
Appendix 3.2: Die Graphs of Coin Type 9

Salisbury Mint

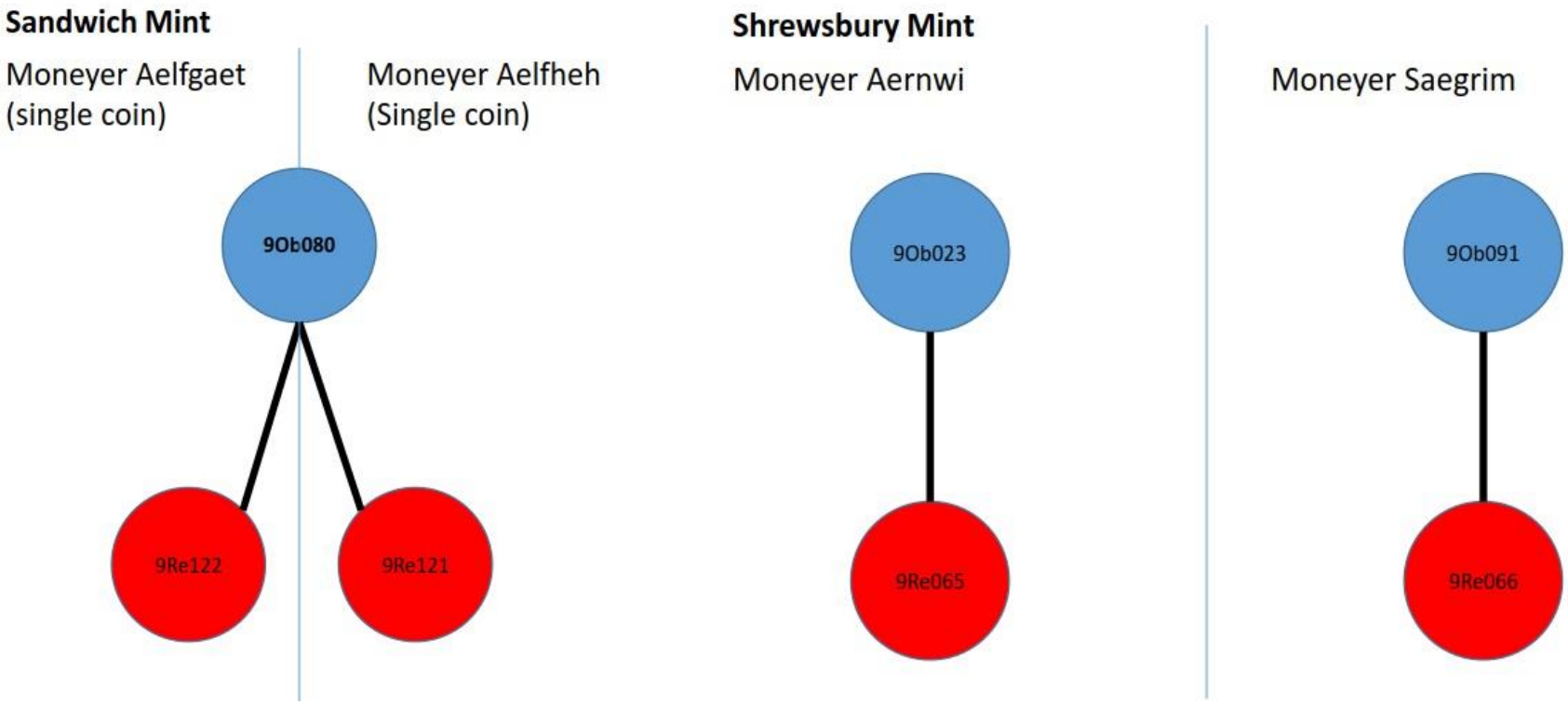
Moneyer Esbern (single coin)



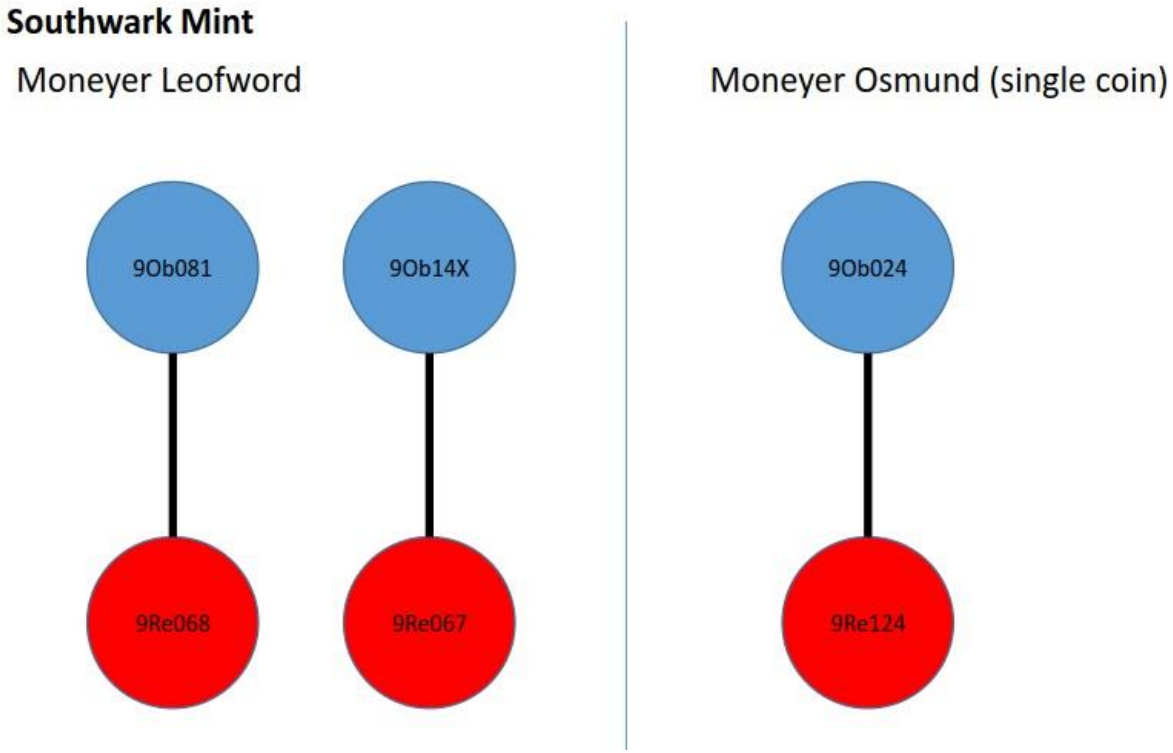
Moneyer Godwine



Appendix 3.2: Die Graphs of Coin Type 9



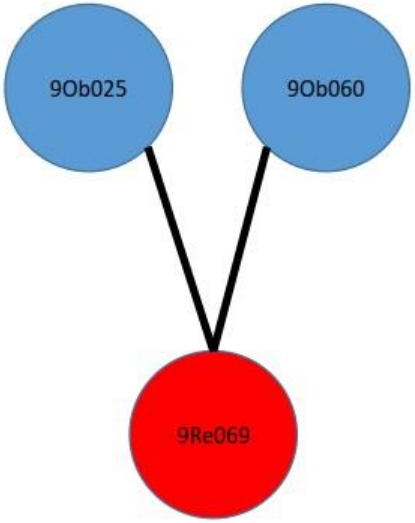
Appendix 3.2: Die Graphs of Coin Type 9



Appendix 3.2: Die Graphs of Coin Type 9

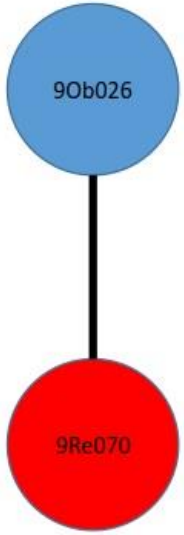
Stafford Mint

Moneyer Godric

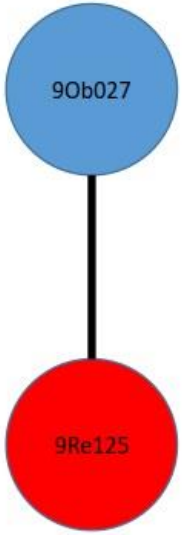


Stamford Mint

Moneyer Brunstan



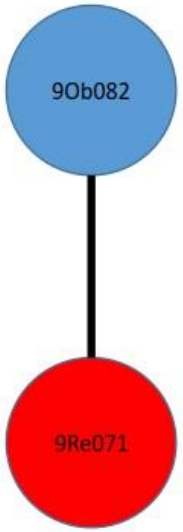
Moneyer Wulfword (single coin)



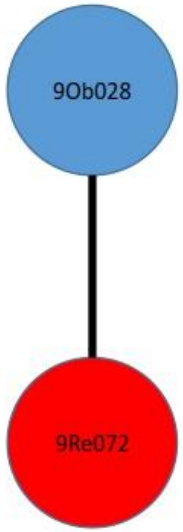
Appendix 3.2: Die Graphs of Coin Type 9

Tamworth Mint

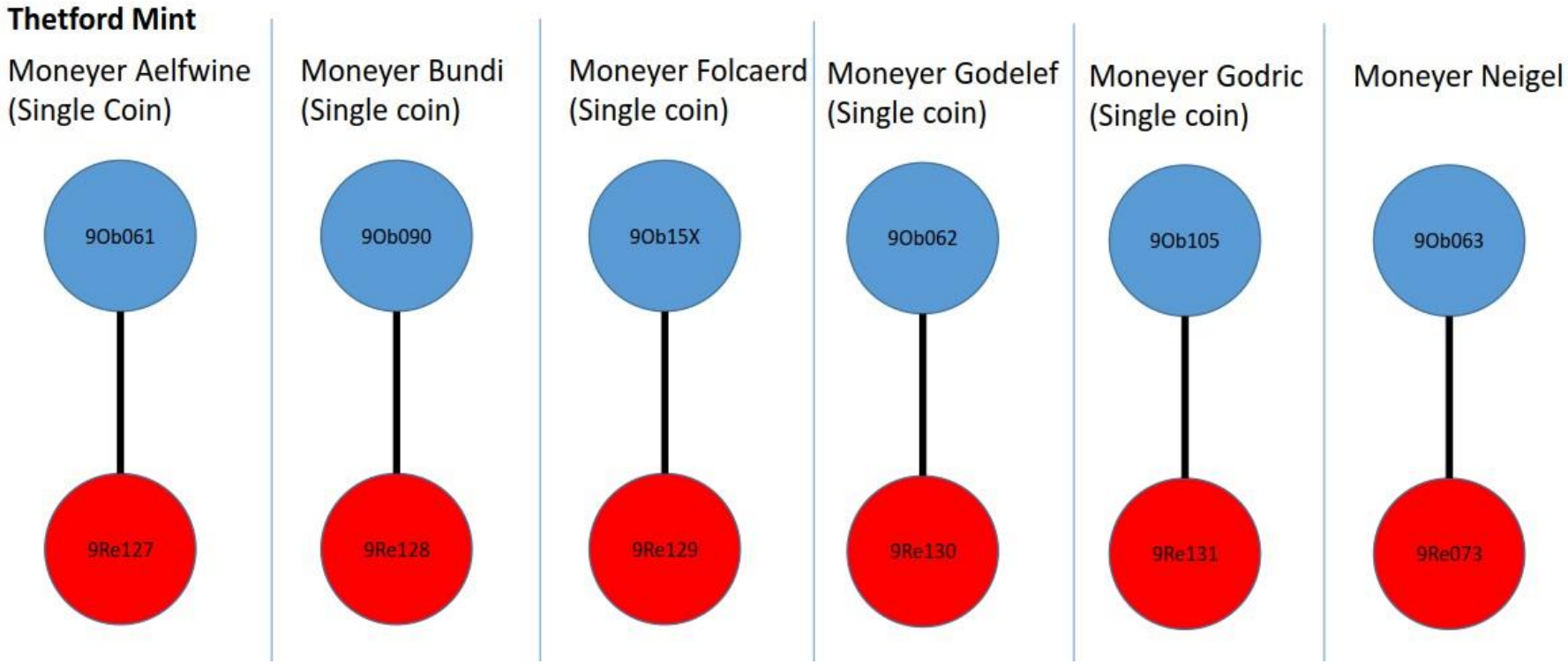
Moneyer Brunic



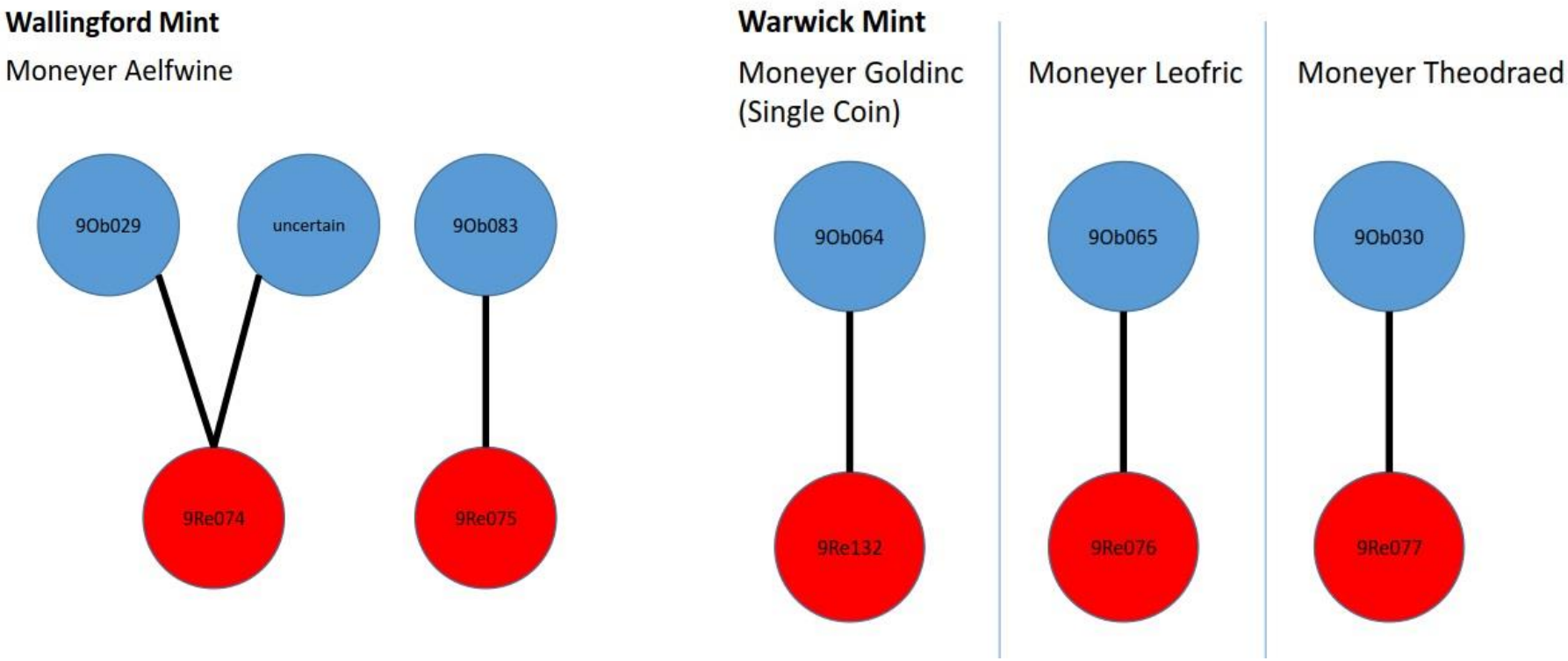
Moneyer Colinc



Appendix 3.2: Die Graphs of Coin Type 9



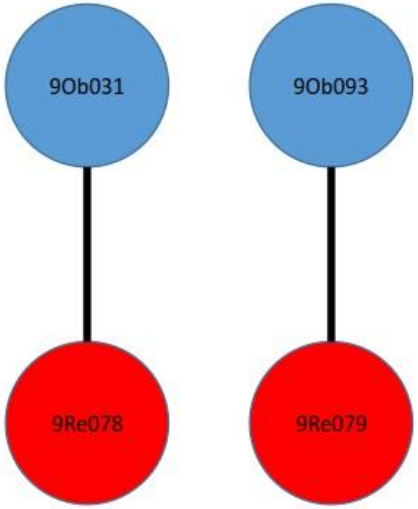
Appendix 3.2: Die Graphs of Coin Type 9



Appendix 3.2: Die Graphs of Coin Type 9

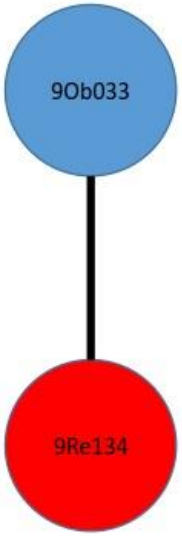
Wilton Mint

Moneyer Aelfwine

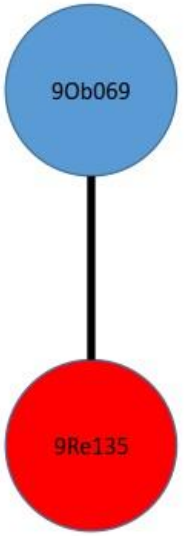


Worcester Mint

Moneyer Aelfgaerd (single coin)

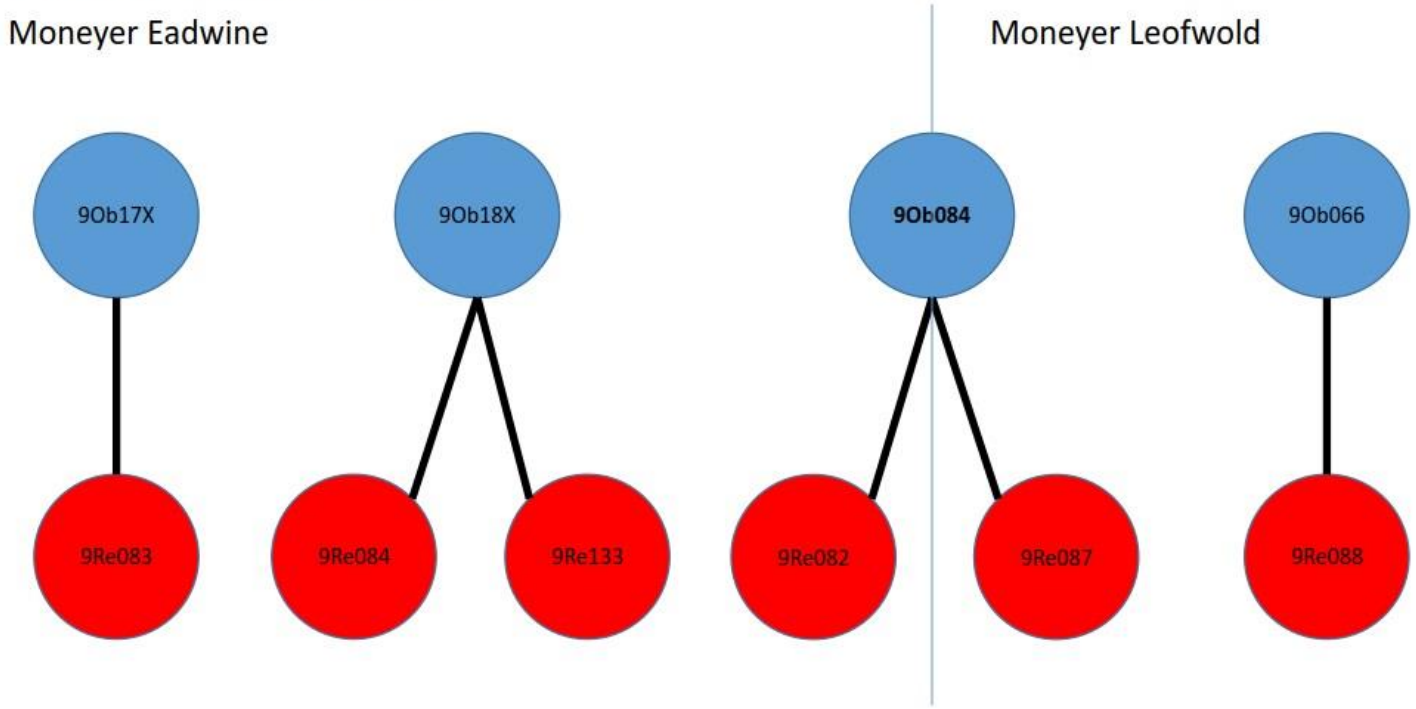


Moneyer Eastmaer (single coin)

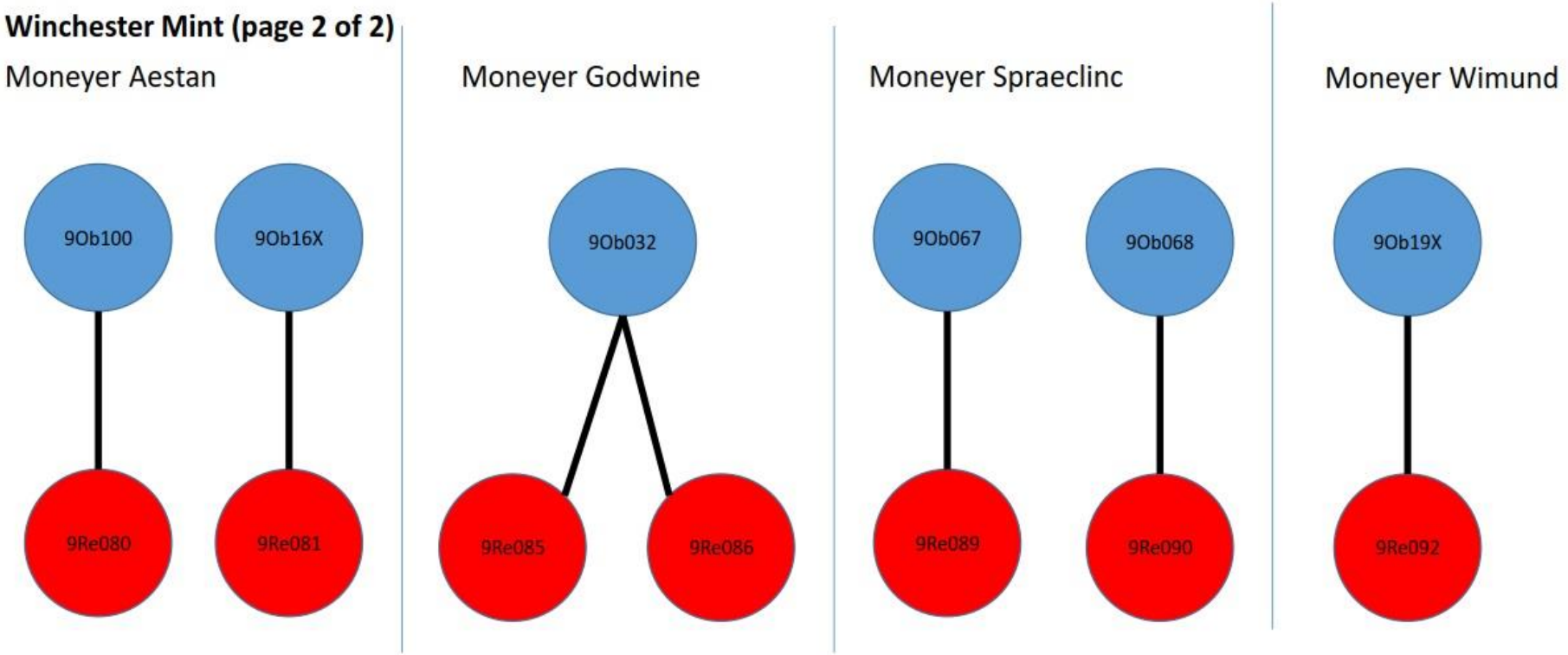


Appendix 3.2: Die Graphs of Coin Type 9

Winchester Mint (page 1 of 2)



Appendix 3.2: Die Graphs of Coin Type 9



Appendix 4: Known die-linkages between different moneyers at the same mints

Mints in the ex-Danelaw area are highlighted in bold type, with London in bold and italics

Type 2:

- Wallingford (Sweartlinc and Brihtmaer)

Type 3:

- ***London (Godric and Godwine)***
- Worcester (Eastmaer and Leofric)

Type 5:

- Exeter (Saewine and Wulfwine)*
- Oxford (Godwine and Aelfwi)

Type 6:

- Winchester (Aestan and Leofwold)*

Type 7:

- Winchester (Aestan, Godwine and Leofwold)*

Type 8:

- Bath (Aegelmaer and Osmaer)*
- Bristol (Swegn and Brunstan*; Swegn and Leofwine)
- Canterbury (Aelfraed and Wulfric)*; (Aelfraed and Burnoth)*; (Godric and Wulfric)*; (Godric and Simaer)*
- Dover (Eadword and Goldwine)*; (Leofwine and Lulfric)*
- Exeter (Leofwine and Saewine)*; (Leofwine and Saemaer)*
- Gloucester (Silacwine and Wulfgaet)
- Hereford (Ordwi, Aegelwine and Leofstan)
- Ipswich (Aelfric and Wulfwine)*
- ***London (Eadric and Eadwine)****
- **Norwich (Godwine and Ulfcetel)*; (Godwine and Howord)***

- Sandwich (Aelfheh and Aelfgaet)
- Shaftesbury (Aelfnoth, Cnitwine and Godesbrand)*
- Shrewsbury (Aernwi, Godesbrand and Saegrim)*
- Wallingford (Aegelwine and Sweartlinc)*
- Wilton (Sefara and Saewine)*
- Winchester (Aestan and Spraeclinc)*; (Aestan and Brunic)*; (Aestan and Leofwold)*; (Godwine and Leofwold)*
- Worcester (Baldric and Saewine)*
- **York (Aleif and Outhbeorn)**

Type 9:

- Chester (Leofwine and Sunulf)
- Dover (Leofric and Leofwine)
- Lewes (Aelfric and Wineraed)
- Oxford (Brihtraed and Wulfwi)
- Sandwich (Aelfgaet and Aelfheh)
- Winchester (Eadwine and Leofwold)

Type 10:

- ***London (Eadric and Leofsi)****

Type 11:

- Canterbury (Aelfraed and Wulbold)*

Sources:

Die-linkages in coin types 3 and 9 confirmed by the Author's observation

From Brooke, 1916: All entries marked *

From Blunt and Dolley, 1969:

- Coin Type 8; Sandwich

From Metcalf, 1969:

- Coin Type 2; Wallingford
- Coin Type 5; Oxford
- Coin Type 8; York

From Grinsell et al, 1972:

- Coin Type 8; Bristol; Swegn and Leofwine
- Coin Type 8; Gloucester

From Accession Register at National Museums Wales:

- Coin Type 8; Hereford

Appendix 5: Visual Document Introducing Coin Narratives, for Evaluative Survey

For the purposes of this appendix, the page order of this document has been rearranged to make it read more smoothly as a linear narrative. The original document was designed to be navigable in a non-linear way, through the use of hyperlinks.

Coins and the Norman Conquest



In 1066 William of Normandy conquered England and was crowned king. This was a huge political change, but what did it mean for the people of the kingdom? The objects which they have left behind can give us some clues.

I am examining the coins issued by William the Conqueror (William I) and his successor William Rufus (William II). The coins reveal fascinating stories about life in England under the new Norman kings.





I would like to introduce you to some of these stories of the people of England, and the Norman Conquest.



This is the front of a silver penny of William the Conqueror.



It shows the king wearing a crown and holding a sword.

The lettering around the edge reads "WILLELM REX", meaning 'King William'.

The coin shows a strong, military ruler, proudly proclaiming that he is the rightful king of England. This idea of William as a conquering king, ruling by the sword, is a common image of the Norman Conquest.

But there is another side to the coin...

Click here for next page →

This is the back of the silver penny of William the Conqueror.
It gives extra information about Norman England:



Places
Coins were made at mints in towns.
The name of the town where this coin was made is shown as EFR, short for 'Eoferwic', the old name for York

People
The coin mints were run by officials known as moneyers.
The moneyer responsible for making this coin is shown as HRÐVOLF, or Harthoulf

Time
The designs on the coins were changed every few years. We call these different designs 'Types'.
This is a coin of Type 6, which means that it was made in the early to mid 1080s

The history of England after the Norman Conquest is more than just a tale of a conquering king. The details on the coins give us clues to the stories of real people and places in England under Norman rule.

Click here for next page →

Stories of Norman England

[Click on each coin if you want to know more]



Rebellion and Retribution

What happens when your town rebels against the king?



Doing Things the Old Way

How much actually changed when the Normans took control?



Breakin' the Law

There were brutal punishments for making bad coins – but did that stop it happening?



Making Money

Who were the people behind the coins?



The Local Story

What happened in your part of the country?

Click here to go to the end →

Rebellion and Retribution

Who do you support?

William I conquered England in 1066 but in 1068-69 there were rebellions against him in the North of the kingdom, and into Staffordshire and Derbyshire. The people in the towns had to choose whether to support the rebellion, or stay loyal to the king. Eventually William defeated the rebels and punished them by destroying towns, villages and crops in the retaliation known as 'The Harrying of the North'.

York was at the centre of the fighting. The moneyers who made the coins at York reacted to the crisis in different ways. Outhgrim continued to issue coins throughout the period. Others may have chosen to flee to other towns. Some, like Aleif and Thor, stopped working for a while but started up again after the Harrying. Others moved away permanently, like Ulfcetel who moved to Cambridge.



Coin made by moneyer Outhgrim at York, just after the Harrying of the North



Two coins of moneyer Ulfcetel. The first is from York, made around the time of the Northern rebellion. The second is from Cambridge, made about 6 or 7 years later

Half of the York moneyers stopped making coins altogether. They may have given up their position, or had it stripped from them, or they may even have died in the fighting.

← Click here to go to back to the stories

Want to know more? Click here for extra info! →

Extra Information

Rebellion and Retribution

Who do you support?

The Battle of Hastings in 1066 was a decisive moment in William I's conquest but it took many years to gain full control of the kingdom. Some of the Earls supported an English candidate, Edgar the Aetheling, who they thought was the rightful king. The Northern Rebellion in 1068-9 was in support of Edgar and was a serious threat to the new king. There was no certainty that William would remain in power.

The moneyers were important people, and were in a difficult situation: they owed their position to royal appointment but the North was a long way from the centre of royal power, and had a tradition of independence. The rebellion had a lot of local support.

Many of the moneyers seem to have kept their head down during the period of crisis. For a while the mint in York almost stopped producing coins. After the rebellion, coin production increased but the York mint was made much smaller. It was never as large or important again.



Six of the eleven York moneyers lost their position at this time. In some cases the equipment they used for making coins seems to have been confiscated, and given out to moneyers at different mints.



Coins of Roscetel and Sweartcol, issued about the time of the Northern rebellion.
As far as we know, neither Roscetel nor Sweartcol held the position of moneyer anywhere again.

← Click here to go to back to the stories

How do we know? Click here for the evidence →

Extra Information

Rebellion and Retribution

How do we know?

The names of the moneyers on the back of the coins show the reduction of the York mint after 1070:

Coin Type 2	Coin Type 3	Coin Type 4	Coin Type 5
c.1068-1070	early - mid 1070s	mid - late 1070s	late 1070s - early 1080s
Aleif	Outhgrim	Aleif	Aleif
Arcetel		Harthoulf	Harthoulf
Authoulf		Outhbern	Outhbern
Harthoulf		Outhgrim	Outhgrim
Laesinc			Thor
Roscetel			
Outhbern			
Outhgrim			
Sweartcol			
Thor			
Ulfcetel			

Moneyers working at York

Some of these moneyer names also show up on coins of other mints:

Until the mid-1070s Outhgrim's name appears on coins of both Lincoln and York. He probably had responsibility in both towns. He continued minting York coins during the rebellion, but he could have been based in Lincoln.

From Coin Type 5 there is an Ulfcetel on coins from Cambridge and an 'Arcil' (possibly an abbreviation of Arncetel) on coins from Stamford.

We can't be sure that this was the same Ulfcetel and Arncetel who were previously working at York, but neither of these are very common names. It seems likely that these are the same men. They may have fled from York at the time of the rebellion and settled elsewhere in the country.

The equipment used to make coins in York was slightly different to elsewhere in the country. The dies which were used to stamp the designs onto the coins were usually square but York moneyers used circular dies. This shows up on the coins, in the way the front and back designs line up in relation to each other.



Coin die from York, of circular cross-section

Coin die of square cross-section, found in Lincoln



The coins produced at other mints just after the Harrying of the North suggest that some of them were using circular dies for the first, and only, time. These unusual dies may have been confiscated from York moneyers who had lost their position.

← Click here to go to back to the stories

Sticking with tradition



Coin of King Harold, issued in early 1066



Coin of William the Conqueror, issued between late 1066 and around 1068.

Both coins are by moneyer Ulfcetel of York

Doing Things the Old Way

After the Norman Conquest most important English officials were replaced with new men from Normandy. However, this didn't happen with the moneyers who made the coinage. Many of the men who made coins for William the Conqueror were the same men who had made coins for the previous kings. Some new moneyers were appointed but they were also English, not Norman.

The coins looked similar to the old ones too. The portrait of William on his first English coins is almost the same as the portrait on the coins of Harold, who was king before the Conquest.

Traditionally there was a lot of variety in the English coinage. The Normans gradually increased central control over coin production, and tried to make the coins more similar across the kingdom. Some moneyers didn't stick to the new standards too closely, though. The traditional variations still show up in some places, right up to the end of the century.

← Click here to go to back to the stories

Want to know more? Click here for extra info! →

Extra Information

Sticking with tradition

Doing Things the Old Way

Many of the moneyers who worked for Edward the Confessor and King Harold continued in their role after the Norman Conquest. Overall around 70% of Harold's moneyers also made the early coins of William the Conqueror. This does vary from mint to mint, though. In many towns a few moneyers changed and in some, such as Wilton, all the moneyers were replaced. However, where a change of personnel did happen the new moneyers seem to have been local men, rather than Norman incomers.

These men also seem to have continued the existing complex system of coin production. The coins had the same design and value across the kingdom but there were regional differences in the size and weight of the coins, and in how they were made. These variations can still be seen in William I's coins.

The Norman authority gradually took more control over the system, and there was a move towards greater standardisation of coins. For the first coins of William Rufus a standard weight of 1.38g was introduced for all mints. However, this control over coin production was never complete. Even after the move to standardisation there were often differences in the coins.

Two coins issued under William Rufus, in the early – mid 1090s. They should weigh 1.38g.



Coin from Lincoln weighing 1.44g



Coin from Thetford weighing 1.18g

There was clearly still some leeway for the moneyers to continue their traditional minting practices.

← Click here to go to back to the stories

How do we know? Click here for the evidence →

Extra Information

How do we know?

Doing Things the Old Way

The names on the coins show how many of William I's moneyers had previously worked for Edward or Harold.

Moneyers of the London Mint	Aelfsige	Aelfwine	Aelmer	Eadwine	Ealdgar	Godric	Swetman	Wulfgar	Wulfnoth	Wulfwine
Minting under Edward or Harold:	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No
Minting in William I's 1st type:	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Moneyers of the York Mint	**Authulf**	**Harthoulf**	**Laesinc**	**Outhgrim**	**Roscetel**	**Thor**	**Ulfcetel**			
Minting under Edward or Harold:	Yes	No	No	Yes	Yes	Yes	Yes			
Minting in William I's 1st type:	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Moneyers of the Lincoln Mint	**Aethelmaer**	**Agmund**	**Garfin**	**Gifel**	**Osbeorn**					
Minting under Edward or Harold:	Yes	Yes	Yes	Yes	No					
Minting in William I's 1st type:	Yes	Yes	Yes	Yes	Yes					
Moneyers of the Winchester Mint	**Aelfwine**	**Anderboda**	**Leofinc**	**Leofwold**						
Minting under Edward or Harold:	Yes	Yes	Yes	Yes						
Minting in William I's 1st type:	Yes	Yes	Yes	Yes						

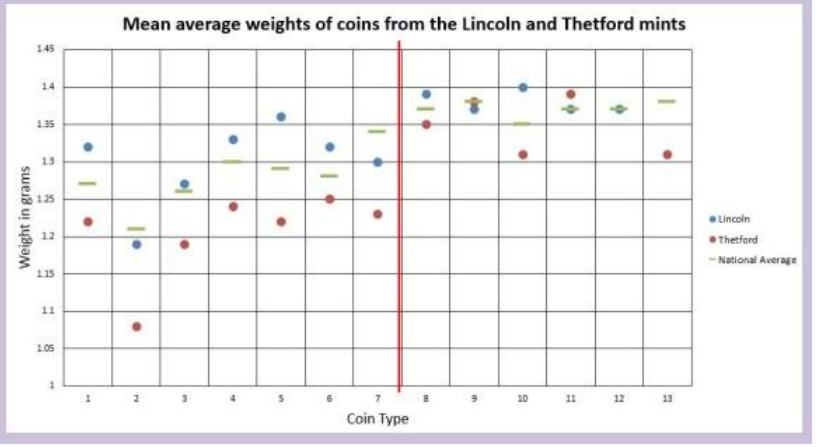
Moneyers of William's 1st coins at four of the major mints

The names of the new moneyers are almost all in the Old English or Scandinavian languages. The coins do not show moneyers with Norman French names until the end of the century.

Regional differences can be seen in the average weight of the coins. The mints of Thetford and Lincoln are good examples. Coins of Types 1 to 7 were issued under William the Conqueror. In all those Types Thetford made coins which were lighter than the national average. In most of those cases the coins of Lincoln were heavier than average.

Coins of Type 8 are much more standardised than the earlier coins, around 1.38g. Even here, though, Thetford's coins are slightly lighter than average while Lincoln's are heavier.

After Type 8 the weights of the coins are fairly similar to the national average. However, there are times, such as coin Type 10, where the old patterns show up again!



← Click here to go to back to the stories

Breakin' the Law

What would you risk for more profit?

In Medieval England there were laws governing the quality of the coinage. All the coins made anywhere in the kingdom should have been the same weight, and made of the same fine silver. It was the job of the moneyers to ensure that this happened.

The punishments for making bad coins were harsh. Usually the moneyer's hand would be chopped off, but sometimes the punishment included castration as well, or even the chance of being executed.

Despite these brutal deterrents, moneyers still allowed bad coins to be made. Many coins were lighter than they should have been, which would have allowed the moneyer to make more profit for himself. The extra profit must have been substantial to justify the risk of mutilation!



Coin of moneyer Siferth at Lincoln; surviving coins of this Type usually weigh about 1.28g. This one weighs 1.04g

Coin of moneyer Godraed at Thetford, weighing only 1.00g instead of the usual 1.38g for this Type



However, in order to be punished, the moneyer would need to be caught. The procedures for upholding the law were very different from today. The chance of being caught seems to have been low, so maybe the risk wasn't so great after all...

← Click here to go to back to the stories

Want to know more? Click here for extra info! →

Extra Information

Breakin' the Law

What would you risk for more profit?

Medieval English kings tried to ensure the quality of their coins by issuing regulations about their weight and silver content. Controlling this was one of the main responsibilities of the moneyers of each mint. However, if the moneyers made lightweight coins or used poor quality silver, they stood to make a substantial profit.

In order to give some accountability, the back of each coin showed the name of the moneyer in charge of its production. That way, if a coin was found to be poor quality, it would be clear who was to blame. Sometimes moneyers tried to hide their names on the coins to make it harder to tell who was responsible.



Reverse of a coin made in Warwick. It originally named a moneyer called Aelric but has been altered to read Lifric instead

The law codes detailed brutal punishments for people involved in making bad coins. These included mutilation, or death. Some law codes allowed the moneyer to try and prove his innocence by undertaking an ordeal, and some allowed them to pay a fine instead of taking the punishment. Both these options could have still been crippling, though, either physically or financially!

Moneyers had to weigh up the chance of extra profit against the risk of being caught and punished. We find many lightweight coins, so clearly they often thought it was worth the risk. There are light coins from throughout the reigns of William I and II. The kings did not achieve effective control over this aspect of the coinage.

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How do we know? Click here for the evidence →

Extra Information

Breakin' the Law

How do we know?

Surviving law codes from the earlier Anglo-Saxon period tell us the punishments which could be applied for making bad coin. The rules in place under the Norman kings were probably similar.

'Aethelstan's Grately Code' (around AD 925-930):

- amputation of the hand for making light coins or coins of poor silver
- could appeal for trial by ordeal instead of taking the punishment – this meant being forced to endure an injury, such as plunging your arm into boiling water. If the injury healed well it was a sign that you were innocent, if it didn't heal properly you were guilty

'Aethelred II's Wantage Code' (around AD 997):

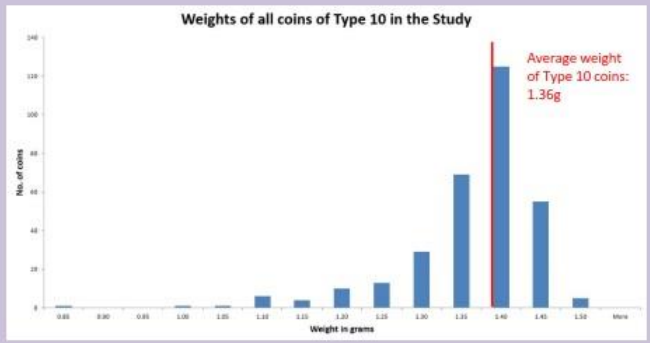
- a moneyer must pay a fine in silver to be allowed trial by ordeal; he would be killed if found guilty

'II Canute' (around AD 1020):

- amputation of the hand without the possibility of paying a fine instead of taking the punishment

Examining the weights of the surviving coins shows how many light coins were made. There are lots of coins which are lighter than the overall average – and some which are very much lighter! These variations are most acute in the early coins, such as Type 2 on the left below, issued around 1068 – 1070. The moneyers were making fewer light coins later in the period but there were always some. The chart on the right shows the coins of Type 10, issued in the early 1090s.





← Click here to go to back to the stories

Making Money

The People behind the Coins

The moneyers who had responsibility for making the coins were important men within the towns. The role of moneyer was a royal appointment. They could often be rich merchants or artisans, as well as holding their position at the mint. They and their families were usually of high status. Women could hold property in their own right, so moneyers' wives were sometimes independently rich too.

Some moneyers had responsibility in more than one town, such as Winedi who issued coins in both Romney and Canterbury during the reign of William Rufus.

There is also evidence of moneyers moving around the kingdom. Osbern, for example, first issued coins for William the Conqueror at Lincoln, then moved to Thetford, and then minted coins at Salisbury for William Rufus.

In total Osbern made coins for over 35 years. This is a long working life for a moneyer, so maybe the original Osbern's son, also called Osbern, took over the family business after a period of apprenticeship with his father.

Three coins of moneyer Osbern



Lincoln mint;
c.1066 - 1068



Thetford mint;
early – mid 1070s



Salisbury mint;
early – mid 1090s

← Click here to go to back to the stories

Want to know more? Click here for extra info! →

Extra Information

Making Money

The People behind the Coins

The moneyers were probably not the men who actually made the coins. They were managers, who oversaw the teams of workers that did make the coins. Moneyers had a lot of responsibility, though. They were required to ensure that coins of the correct design were issued, at the right time, and to the right standards of weight and quality of silver. Moneyers in port towns also had responsibility for exchanging foreign coins for English ones.

The position of moneyer was also a sign of status. The men who held the position seem to have had the rank of 'Burgess', meaning that they were among the most important men in their towns.

Some moneyers' status and influence was extended by having responsibility at more than one mint town. This type of dual responsibility happened frequently at the linked mints of London and Southwark. Elsewhere it is rarer, but there are examples from all over the kingdom.



Two coins of moneyer Godric, issued around 1087. The first was made for the London mint and the second for the Southwark mint.

The English moneyers also seem to have moved from town to town quite frequently. They are amongst our best examples of this sort of dynamic social movement in the Norman period.

← Click here to go to back to the stories

How do we know? Click here for the evidence →

Extra Information

Making Money

How do we know?

The most important evidence about the moneyers is the names on the back of the coins. We can occasionally find more information about them from historical documents. These rare mentions in the documents provide extra evidence of the social status of the moneyers.

Tracing the location of moneyers involves looking at the combinations of people and places named on the coins. It is not absolutely accurate because we can't be certain that two coins with the same moneyer name actually refer to the same person. There may be more than one man with the same name. Some names, such as Godwine or Leofric, are very common. Other names are rare, and in those cases we can be more confident that the coins are naming the same person.



Coin of moneyer Saewine of Wilton, issued early – mid 1070s



Coin of moneyer Saewine of Wilton, issued mid 1090s

Sometimes a moneyer name appears on coins issued at the same time but from different mints. These moneyers may have had responsibility at both mints.

Coins issued from different mints at different times are more common. They allow us to suggest moneyers moving 'permanently' from one mint to another, and occasionally even on to a third mint.

Documents also show that it was common for people in England in the 1000s to share names, or parts of names, across different generations of their family. This makes it likely that some moneyers' names which appear on coins over a long period actually refer to different members of the same moneyer family, rather than just one individual. The name Saewine, for instance, appears on coins of the Wilton mint from 1066 until the mid-1090s, and again in the reign of Henry I (1100 – 1135). This is unlikely to be the same man for the whole time!

← Click here to go to back to the stories

The Local Story

How are things done in your neck of the woods?

England in the 1000s was a diverse kingdom. Different regions had their own traditions and politics.

The mints which made the coins were spread out across the kingdom. Coins were made in 68 towns during the reigns of the first two Norman kings. The coins from all the mints were supposed to be the same, but things were actually done differently in different places.



Map showing the locations of all the mints in England and Wales which made coins for William I or II



Coin of moneyer Siword, minted in Winchester in the late 1070s, weighing 1.38g



Coin of moneyer Brihtric, minted in London in the late 1070s, weighing 1.28g

The moneyers of Winchester, for instance, used strict standards for their coins. They also adopted a new, heavier, coin weight in the late 1070s. This was a decade sooner than most mints.

By contrast, the moneyers of the London mint produced coins in a wide range of sizes and weights. They generally moved to the new weight standard in 1087, but even then there was still lots of variation in the coins.

The smaller mints had different minting patterns too. The coins from the East Midland mints are more like the ones from London than Winchester.

← Click here to go to back to the stories

Want to know more? Click here for extra info! →

Extra Information

The Local Story

How are things done in your neck of the woods?

The situation in English towns after the Conquest was not the same across the whole kingdom. Local politics, administration, and the reaction to the new rulers varied from place to place.

Winchester was the administrative centre of England. Since the 900s it had been at the heart of the royal territory and the king's main treasury was still housed there. Royal power was strong in Winchester, and the coins were closely regulated.

By the year 1000 London was the commercial centre of England. It was the largest port in the kingdom and part of an international trade network. The town had a large population of rich merchants, and its citizens had a reputation for independence. Royal control was less secure in London. Regulation of the coinage at London seems to have been less strict than at Winchester.



Coin of moneyer Halden of the Nottingham mint, issued in the late 1090s; this coin is very light, at only 1.22g

Variations can also be seen in the smaller towns. Coins from the mints in the West of England, such as Gloucester, Hereford and Worcester, were quite standardised, and similar to those from Winchester.

The important mint at Lincoln, and the smaller nearby mints such as Nottingham, made coins with lots of variety. The coins from these mints are more like the London coins.

← Click here to go to back to the stories

How do we know? Click here for the evidence →

Extra Information

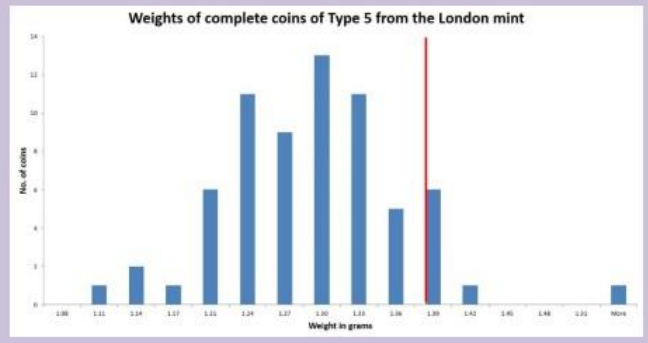
The Local Story

How do we know?

Examining the weights of the surviving coins from different mints can show how things varied between places. We can see how things changed over time by splitting the coins up into their different designs, since the designs were used at different times. The different designs are known as 'Types'.

Coins of Type 5, issued between the late 1070s and the early 1080s, show that the Winchester mint had already moved to using the new standard weight of around 1.38g (shown as a red line on the charts below). The coins from the London mint, however, were mostly of a lower weight, averaging around 1.30g. Coins from London don't start conforming to the new higher weight until Type 8, issued in the late 1080s.





The charts also show that there is a much bigger range of weights in the coins from London. The Winchester coin weights are all clustered together while the London weights are more spread out. This suggests that the weight of coins from the Winchester mint was closely controlled. In London it may have been less important to achieve a standard weight for all the coins – or control over the coin weights was less effective than in Winchester.

The pattern of weights is similar for all coin types at Winchester. At London, though, things change over time. The later coin types have less variation in weight, suggesting that the coins became more closely controlled as time went on.

← Click here to go to back to the stories

Coins and the Norman Conquest

These are just some of the stories being revealed by the coins of William the Conqueror and William Rufus. I hope you found them interesting!

I would really like to hear your thoughts and feedback about these narratives.

Please click here to fill in the questionnaire: https://nottingham.onlinesurveys.ac.uk/coins-and-the-norman-conquest

(or you can continue to scroll down; below this page you will find the extra information for the stories of Norman England. The link to the questionnaire is repeated at the very end too)







Many thanks!
Anja Rohde

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Appendix 6.1: Questionnaire to Record Responses to Visual Narrative Document

Questionnaire

This questionnaire forms part of my PhD research: The English Coinages of William I (1066-1087) and William II (1087-1100) and their Implications for our Understanding and Public Representation of the Norman Conquest

The project is looking at the coins of the first two Norman kings which are held in public museum collections. The project has two aims:

- to investigate what the coins can tell us about England after the Norman Conquest
- to research how the museums which look the coins can use them to tell stories of the past

As part of this research I have created a document to introduce some of the stories revealed by the coins. This questionnaire will evaluate how effective and interesting those stories are. The results of the questionnaire will help me investigate how museums can use their coins effectively in exhibitions and displays.

Before completing this questionnaire you need to have had a look at the document “Coins and the Norman Conquest”.

If you have any questions, or would like any further information, please contact me at acxar@nottingham.ac.uk

Anja Rohde, Doctoral Researcher
University of Nottingham

Consent

Please read the following statements. If you agree with them, please answer 'yes' and you will be taken to the questionnaire. The survey has 12 questions, and should take you about 10-15 minutes to complete.

I confirm that:

(a) I am over 16
(b) I have understood the purpose of this study
(c) I am aware that all data are anonymous and that there will not be any connection between the personal information provided and the data
(d) I have been informed that there are no known risks or hazards associated with participating in this study
(e) I have not shared the display document with anyone

By submitting this questionnaire, I agree that my answers, which I have given voluntarily, can be used anonymously for research purposes

Yes / No

About You

Question 2

		A. never	B. very rarely	C. sometimes	D. frequently	E. Very frequently
2.1	Do you often visit museums and heritage sites?					
2.2	Do you often browse the websites of museums and heritage organisations?					

Question 3

If you visit museums, who do you usually go with? (Please tick all which apply)

A	I visit alone
B	I visit with adult family or friends
C	I visit with children family or friends
D	I visit with children as part of my job (e.g. you are a teacher or scout leader)
E	I work or volunteer at museums

Question 4

Before you looked at the "Coins and the Norman Conquest" document, how much did you know about the following subjects?

		A. I had no prior knowledge	B. I knew very little	C. I had some general knowledge	D. I knew quite a lot	E. I had quite extensive knowledge
4.1	The Medieval period of English history					
4.2	The Norman Conquest					
4.3	Historic coins					
4.4	English coins from 1000-1100 AD					

About the Stories in the Document

The document started with 3 pages of introduction, then there was a page with 5 story headlines. Each of the 5 stories had a summary page, a page of extra information and a page of evidence explaining how we know about the story.

Question 5

Which bits of the document did you read? (Please tick all which apply)

A	I read the introduction pages
B	I read the page with the 'headlines' of the stories (the page titled "Stories of Norman England")
C	I read some or all of the story summary pages
D	I read some or all of the extra information pages
E	I read some or all of the "How do we know?" evidence pages

Question 6

Which of the stories were you particularly interested in? (Please tick all that apply)

A	"Rebellion and Retribution" (about the Harrying of the North and the moneyers of York mint)
B	"Doing Things the Old Way" (about continuing traditional practices after the Norman Conquest)
C	"Breakin' the Law" (about the risks of making poor quality coins)
D	"Making Money" (about the people who made the coins)
E	"The Local Story" (about the way things were done in different parts of the country)

Question 6.1

Of the stories which you have ticked above, which one interested you most, or sticks out most in your mind?

A	"Rebellion and Retribution" (about the Harrying of the North and the moneyers of York mint)
B	"Doing Things the Old Way" (about continuing traditional practices after the Norman Conquest)
C	"Breakin' the Law" (about the risks of making poor quality coins)
D	"Making Money" (about the people who made the coins)
E	"The Local Story" (about the way things were done in different parts of the country)
F	All of them interested me equally

Question 7

Did any of the stories make you want to find out more? (Please tick all that apply)

A	"Rebellion and Retribution" (about the Harrying of the North and the moneyers of York mint)
B	"Doing Things the Old Way" (about continuing traditional practices after the Norman Conquest)
C	"Breakin' the Law" (about the risks of making poor quality coins)
D	"Making Money" (about the people who made the coins)
E	"The Local Story" (about the way things were done in different parts of the country)
F	None of them in particular

Question 8

Did any of the stories surprise you, or make you think differently about the Norman Conquest? (Please tick all that apply)

A	"Rebellion and Retribution" (about the Harrying of the North and the moneyers of York mint)
B	"Doing Things the Old Way" (about continuing traditional practices after the Norman Conquest)
C	"Breakin' the Law" (about the risks of making poor quality coins)
D	"Making Money" (about the people who made the coins)
E	"The Local Story" (about the way things were done in different parts of the country)
F	None of them in particular

About Telling the Stories

Question 9

Which of the following topics interests you most about the coins? (Please rate these from 1 to 6, where 1 is the most interesting and 6 is the least)

9.1	The maker
9.2	The people who used the coins
9.3	The places where the coins were made
9.4	The rules and regulations of making coins
9.5	How the coins were used
9.6	The king

Question 10

What sort of information are you most interested in finding out? (Please rate these from 1 to 6, where 1 is the most interesting and 6 is the least)

10.1	Stories of individual people (e.g. Outhgrim, who made coins in York and Lincoln)
10.2	Stories of important historic events (e.g. The Harrying of the North)
10.3	Practical details (e.g. how coins were made, or how people travelled around the country)
10.4	How we know (e.g. graphs and statistics, the evidence for the stories)
10.5	Technical details of individual coins (e.g. scholarly classifications, the weight and measurement)
10.6	Museum information (e.g. where the coins were found, or how they came to be in the museum collection)

Please feel free to note any particular things which you would like to find out:

Question 11

If these stories were told to you in a museum display, whose viewpoint would you be most interested in hearing? (Please rate these from 1 to 4, where 1 is the most interesting and 4 is the least)

11.1	A medieval person, telling their story from the past
11.2	A modern researcher, gathering the evidence and putting the pieces together
11.3	A modern expert, such as a historian or a museum curator
11.4	Members of the public, contributing their thoughts and ideas

Question 12

For you and the people you usually visit museums with, how important would it be to include the following 6 items in an exhibition telling the stories?

		A. Essential	B. Desirable	C. Not needed	D. Don't mind
12.1	The chance to see and examine the actual coins				
12.2	Other objects and documents from the period (not just coins)				
12.3	Information available digitally in the museum gallery				
12.4	Digital information you can access on your own device (e.g. online, or as an app)				
12.5	Extra information and further reading				
12.6	The chance to contribute your own thoughts and ideas				

Question 13

If the museum were to hold a special event related to the display, which of the following items would you most like to see? (Please rate these from 1 to 5, where 1 is the most interesting and 5 is the least)

13.1	The chance to handle the coins
13.2	The chance to try out some things from the past (e.g. dressing up in medieval-style clothes, or having a go at making your own coin)
13.3	The chance to talk to someone playing the part of a medieval person
13.4	The chance to talk to experts, such as historians or museum curators
13.5	The chance to join in with discussions with other visitors, curators and experts

Question 14

Please feel free to leave any comments, thoughts, or other feedback here:

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q1	Q2.1	Q2.2	Q3	Q4.1	Q4.2	Q4.3	Q4.4	Q5	Q6	Q6.1	Q7	Q8
1	Yes	D.	B.	B. ,C.	B.	B.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,C.	C.	A.	A. ,D.
2	Yes	D.	D.	A. ,B. ,C. ,E.	C.	C.	B.	B.	A. ,B. ,C. ,D. ,E.	A.	A.	A. ,B. ,D.	A. ,B.
3	Yes	D.	D.	A. ,B. ,E.	D.	D.	D.	D.	A. ,B. ,C. ,D. ,E.	E.	E.	B. ,E.	B. ,E.
4	Yes	D.	C.	A. ,B.	C.	C.	C.	C.	A. ,B. ,C. ,D. ,E.	A. ,B.	A.	A. ,B.	A. ,B.
5	Yes	D.	E.	B. ,C. ,E.	E.	D.	C.	C.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	A.	A. ,B.	A. ,B. ,D. ,E.
6	Yes	D.	D.	A.	E.	D.	D.	D.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	E.	A. ,B. ,C. ,D. ,E.	D.
7	Yes	C.	A.	B.	B.	A.	A.	A.	A. ,B. ,C. ,D. ,E.	C. ,D.	C.	C.	B.
8	Yes	C.	B.	A. ,B.	B.	B.	A.	A.	A. ,B. ,C. ,D. ,E.	D. ,E.	D.	D. ,E.	B. ,C. ,D. ,E.
9	Yes	C.	B.	B.	B.	B.	B.	A.	A. ,B. ,C. ,D.	A. ,B. ,C. ,D. ,E.	C.	A. ,C.	A.
10	Yes	C.	A.	B.	D.	D.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	D.	B. ,E.
11	Yes	E.	E.	A. ,B. ,C.	E.	C.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,E.	E.	A. ,E.	A.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q1	Q2.1	Q2.2	Q3	Q4.1	Q4.2	Q4.3	Q4.4	Q5	Q6	Q6.1	Q7	Q8
12	Yes	C.	C.	B. ,C.	C.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	A. ,C.	A.
13	Yes	C.	B.	C.	C.	C.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D.	C.	D.	B. ,D. ,E.
14	Yes	D.	E.	A. ,B. ,E.	D.	E.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,D. ,E.	D.	A. ,B. ,C. ,D. ,E.	D. ,E.
15	Yes	C.	B.	A. ,B. ,C.	C.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D.	C.	B. ,C.	F.
16	Yes	C.	C.	B.	D.	D.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	C.	F.	C.
17	Yes	B.	A.	C.	C.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	B.	E.	B. ,D. ,E.
18	Yes	E.	E.	A. ,B. ,C.	C.	B.	B.	B.	A. ,B. ,C. ,D. ,E.	B. ,C.	B.	B.	B.
19	Yes	D.	D.	A. ,B.	E.	E.	C.	C.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C.	C.	A. ,B. ,C.	F.
20	Yes	C.	C.	B.	C.	B.	C.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	D.	B. ,D. ,E.	B.
21	Yes	E.	E.	A. ,B. ,C. ,E.	D.	C.	B.	A.	A. ,B. ,C. ,D.	A. ,B. ,D.	A.	A. ,B. ,D.	F.
22	Yes	D.	D.	A. ,B. ,E.	D.	D.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	C.	C. ,D. ,E.	C.
23	Yes	E.	C.	A. ,B. ,C.	D.	C.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,D. ,E.
24	Yes	C.	D.	B. ,C.	E.	D.	B.	B.	A. ,B.	A. ,B. ,E.	F.	F.	F.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q1	Q2.1	Q2.2	Q3	Q4.1	Q4.2	Q4.3	Q4.4	Q5	Q6	Q6.1	Q7	Q8
25	Yes	D.	B.	A.	C.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,C.	C.	F.	F.
26	Yes	D.	C.	A.	C.	D.	A.	A.	A. ,B. ,C. ,D. ,E.	C. ,D. ,E.	E.	E.	C.
27	Yes	E.	D.	B. ,C. ,E.	C.	C.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,D.	B.	A. ,B. ,E.	B.
28	Yes	E.	D.	B.	E.	D.	B.	B.	A. ,B. ,C. ,D. ,E.	B. ,C. ,D.	C.	C.	F.
29	Yes	E.	C.	A.	D.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	D.	B.
30	Yes	D.	D.	A. ,B.	B.	B.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C.	C.	A. ,C.	A. ,B. ,C. ,D. ,E.
31	Yes	B.	A.	B.	B.	B.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C.	C.	F.	C.
32	Yes	B.	B.	B. ,C.	C.	C.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,D. ,E.	E.	E.	B.
33	Yes	B.	C.	C.	C.	C.	D.	C.	A. ,B. ,C. ,D. ,E.	A. ,B. ,E.	B.	A. ,B. ,E.	A. ,B. ,E.
34	Yes	E.	C.	A. ,B. ,C.	C.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	D.	A. ,B. ,C. ,D. ,E.	B. ,D. ,E.
35	Yes	D.	C.	A. ,B. ,C. ,D.	E.	D.	C.	B.	A. ,B. ,C. ,D. ,E.	C. ,D.	C.	C.	F.
36	Yes	C.	C.	A.	D.	C.	D.	B.	A. ,B. ,C. ,D. ,E.	A. ,D.	D.	F.	E.
37	Yes	E.	E.	A. ,B. ,C. ,E.	E.	E.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,E.	E.	C. ,E.	A.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q1	Q2.1	Q2.2	Q3	Q4.1	Q4.2	Q4.3	Q4.4	Q5	Q6	Q6.1	Q7	Q8
38	Yes	E.	E.	A. ,B.	E.	D.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,D.	D.	A. ,B. ,D.	B. ,D. ,E.
39	Yes	C.	A.	C.	C.	D.	B.	A.	C.	A. ,B.	A.	B.	F.
40	Yes	E.	D.	A. ,E.	D.	D.	D.	D.	A. ,B. ,C. ,D. ,E.	A. ,B. ,D.	F.	B. ,D.	A.
41	Yes	C.	A.	A.	D.	D.	D.	D.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	A. ,B. ,C. ,D. ,E.	F.
42													
43													
44	Yes	C.	B.	B.	C.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	C.	A. ,C. ,D. ,E.	A. ,D. ,E.
45	Yes	D.	D.	A. ,B.	D.	B.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D.
46	Yes	E.	E.	B. ,E.	E.	E.	E.	E.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C.	A.	A. ,B. ,C.	E.
47	Yes	E.	D.	A. ,B.	D.	D.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	A. ,B. ,E.	F.
48	Yes	C.	B.	A. ,B.	C.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	E.	B. ,D. ,E.	C.
49	Yes	D.	B.	A. ,B. ,C.	B.	C.	D.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,D.	B.	B. ,E.	A. ,B. ,C. ,D. ,E.
50	Yes	D.	E.	B.	B.	B.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	C. ,E.	A. ,B. ,C. ,D. ,E.
51	Yes	C.	B.	B. ,C.	D.	D.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D.	C.	A. ,C.	A. ,B. ,C. ,D. ,E.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q1	Q2.1	Q2.2	Q3	Q4.1	Q4.2	Q4.3	Q4.4	Q5	Q6	Q6.1	Q7	Q8
52	Yes	B.	C.	B.	C.	D.	A.	A.	A. ,B. ,C. ,D. ,E.	C. ,E.	C.	F.	F.
53	Yes	C.	C.	C. ,D.	D.	D.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,C.	C.	A. ,C.	C.
54	Yes	C.	C.	B.	E.	D.	B.	B.	A. ,B. ,C. ,D. ,E.	B. ,C. ,D. ,E.	C.	D. ,E.	B.
55	Yes	D.	D.	B.	C.	C.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,D.	D.	E.	D.
56	Yes	E.	D.	B.	C.	C.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,E.	A.	A. ,B. ,C. ,D. ,E. ,F.	B. ,C.
57	Yes	C.	B.	C.	A.	A.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,C. ,E.	C.	F.	C.
58	Yes	B.	B.	B. ,C.	B.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D. ,E.	D.	D.	F.
59	Yes	D.	D.	A. ,B. ,C. ,D. ,E.	C.	C.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D. ,E.	C.	A. ,D. ,E.	A. ,C.
60	Yes	D.	C.	B. ,E.	C.	C.	B.	B.	A. ,B. ,C. ,D. ,E.	C. ,E.	C.	F.	C. ,E.
61	Yes	E.	E.	A. ,B. ,E.	C.	B.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,C.	C.	F.	A. ,C.
62	Yes	D.	C.	B. ,E.	D.	E.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,E.	A.	F.	A.
63	Yes	C.	C.	A. ,B.	C.	D.	D.	D.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	A. ,B. ,D.	E.
64	Yes	D.	B.	B.	C.	D.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,E.	E.	A. ,E.	F.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q1	Q2.1	Q2.2	Q3	Q4.1	Q4.2	Q4.3	Q4.4	Q5	Q6	Q6.1	Q7	Q8
65	Yes	D.	C.	B.	B.	B.	A.	A.	A. ,B. ,C.	C. ,D. ,E.	C.	C. ,E.	E.
66	Yes	E.	E.	A.	C.	B.	B.	A.	A. ,B. ,C. ,D.	C. ,D. ,E.	C.	C. ,D.	E.
67	Yes	D.	C.	B. ,C. ,D.	C.	C.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C.	C.	A. ,B. ,C. ,D. ,E.	A. ,C.
68	Yes	E.	D.	A. ,B. ,E.	E.	E.	E.	E.	A. ,B. ,C. ,D.	B. ,C.	C.	C.	F.
69	Yes	E.	E.	B. ,E.	D.	D.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	B. ,C. ,D.	B. ,C. ,D.
70	Yes	C.	B.	B.	A.	A.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,C.	A.	A.	A. ,C. ,D.
71	Yes	D.	C.	A. ,B.	D.	D.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D.	C.	B. ,D.	A. ,D.
72	Yes	D.	C.	A. ,B. ,E.	C.	C.	D.	C.	A. ,B. ,C. ,D. ,E.	A. ,D. ,E.	D.	A. ,B. ,C. ,D. ,E.	A. ,D. ,E.
73	Yes	E.	E.	C.	B.	B.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D.	D.	A. ,B. ,C. ,D.	B.
74	Yes	C.	B.	A. ,B. ,C.	B.	B.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,E.	A.	A.	A.
75	Yes	E.	E.	A. ,B. ,C. ,D. ,E.	D.	C.	C.	C.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D.	D.	A. ,D.	A. ,D.
76	Yes	C.	B.	B.	B.	A.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D.	A.	A.	A. ,D. ,E.
77	Yes	C.	B.	B. ,C.	D.	C.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D.	D.	C. ,D.	F.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q1	Q2.1	Q2.2	Q3	Q4.1	Q4.2	Q4.3	Q4.4	Q5	Q6	Q6.1	Q7	Q8
78	Yes	D.	C.	A. ,B. ,C.	D.	D.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	A.	A. ,B. ,C. ,D. ,E.	F.
79	Yes	B.	C.	A. ,B.	C.	C.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D.	C.	A. ,B. ,C. ,D. ,E.	B. ,E.
80	Yes	C.	B.	B. ,D.	E.	E.	D.	C.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	C.	F.	F.
81	Yes	D.	C.	B. ,E.	E.	E.	B.	A.	A. ,B. ,C.	B. ,C. ,D.	C.	D.	C.
82	Yes	D.	C.	A. ,E.	C.	D.	C.	B.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	A. ,B. ,C. ,D. ,E.	E.
83	Yes	D.	C.	C.	D.	D.	B.	A.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	B.	A. ,B. ,C. ,E.	B.
84	Yes	E.	D.	A. ,B. ,E.	B.	B.	A.	A.	A. ,B. ,C. ,D. ,E.	A. ,C. ,E.	C.	A.	A. ,C.
85	Yes	E.	E.	A. ,B. ,E.	D.	D.	C.	C.	A. ,B. ,C. ,D.	A. ,C. ,E.	A.	A. ,E.	A.
86	Yes	E.	C.	E.	D.	D.	D.	C.	A. ,B. ,C. ,D. ,E.	B. ,C. ,D.	C.	C. ,D.	B. ,C. ,D.
87	Yes	E.	D.	B. ,C. ,E.	E.	D.	C.	B.	A. ,B. ,C.	A. ,B. ,C. ,D. ,E.	E.	F.	F.
88	Yes	E.	D.	A. ,B. ,E.	C.	C.	C.	C.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D.	C.	F.	B.
89	Yes	D.	D.	A. ,B. ,E.	C.	C.	B.	B.	A. ,B. ,C. ,D. ,E.	A. ,C. ,D. ,E.	C.	A. ,C. ,E.	C. ,D.
90	Yes	E.	D.	A. ,C. ,E.	E.	E.	C.	D.	A. ,B. ,C. ,D. ,E.	A. ,B. ,C. ,D. ,E.	F.	B.	E.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q1	Q2.1	Q2.2	Q3	Q4.1	Q4.2	Q4.3	Q4.4	Q5	Q6	Q6.1	Q7	Q8
91	Yes	E.	C.	A. ,B. ,E.	B.	B.	B.	A.	A. ,B. ,C. ,E.	A. ,B. ,E.	A.	A. ,E.	F.
92	Yes	E.	D.	A. ,C.	E.	E.	E.	D.	A. ,B. ,C. ,D. ,E.	B. ,E.	E.	A.	A.
93	Yes	E.	E.	A. ,B. ,C. ,E.	D.	C.	C.	C.	A. ,B. ,C. ,D.	A. ,B. ,C. ,D. ,E.	A.	E.	A. ,B. ,E.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q9.1	Q9.2	Q9.3	Q9.4	Q9.5	Q9.6	Q10.1	Q10.2	Q10.3	Q10.4	Q10.5	Q10.6
1	5	3	2	6	1	4	6	5	1	3	4	2
2	6	4	3	5	1	2	4	6	5	1	3	2
3	2	6	4	3	5	1	3	1	2	6	5	4
4	6	5	2	4	3	1	4	1	6	5	3	2
5	2	1	3	6	5	4	3	6	2	4	5	1
6	5	6	4	3	2	1	5	6	4	3	1	2
7	4	3	5	6	2	1	1	3	5	4	6	2
8	1	3	5	2	4	6	1	2	4	5	6	3
9	4	3	5	6	2	1	2	6	5	1	4	3
10	6	4	5	3	2	1	6	1	5	4	3	2
11	2	4	3	5	6	1	5	3	2	1	4	6

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q9.1	Q9.2	Q9.3	Q9.4	Q9.5	Q9.6	Q10.1	Q10.2	Q10.3	Q10.4	Q10.5	Q10.6
12	5	3	4	6	2	1	5	6	4	3	2	1
13	6	3	2	5	4	1	6	3	5	4	2	1
14	6	5	3	2	1	4	6	4	5	2	3	1
15	4	1	5	6	2	3	2	3	6	4	5	1
16	5	2	4	6	3	1	3	4	5	2	1	6
17	5	2	3	6	4	1	6	2	5	4	3	1
18	4	1	3	2	6	5	3	4	2	5	6	1
19	5	2	3	4	1	6	5	6	4	3	2	1
20	6	1	3	4	5	2	6	4	5	3	2	1
21	6	3	1	2	5	4	4	6	5	3	1	2
22	6	2	5	4	3	1	6	4	5	2	1	3
23	6	5	4	2	3	1	6	3	4	5	2	1
24	4	3	5	1	2	6	5	6	4	3	2	1

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q9.1	Q9.2	Q9.3	Q9.4	Q9.5	Q9.6	Q10.1	Q10.2	Q10.3	Q10.4	Q10.5	Q10.6
25	5	3	4	6	2	1	2	5	6	1	3	4
26	3	1	4	5	2	6	4	3	6	2	1	5
27	6	5	4	2	3	1	5	6	4	1	2	3
28	3	5	2	4	6	1	2	3	6	4	1	5
29	4	6	2	3	5	1	6	3	5	4	1	2
30	2	4	3	6	5	1	2	4	6	3	1	5
31	4	2	3	6	1	5	6	5	1	3	4	2
32	6	3	1	5	4	2	3	4	5	6	2	1
33	2	6	3	1	5	4	5	6	4	1	2	3
34	1	2	5	3	4	6	1	3	2	4	6	5
35	5	4	1	6	2	3	5	2	6	4	3	1
36	5	1	4	2	3	6	1	3	6	4	5	2
37	2	5	3	1	4	6	3	6	4	5	1	2

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q9.1	Q9.2	Q9.3	Q9.4	Q9.5	Q9.6	Q10.1	Q10.2	Q10.3	Q10.4	Q10.5	Q10.6
38	6	1	5	4	2	3	6	5	4	1	2	3
39	3	4	2	1	5	6	5	6	3	2	1	4
40	5	4	6	3	1	2	6	5	4	3	1	2
41	4	1	5	6	2	3	6	5	4	3	2	1
42												
43												
44	6	4	5	3	2	1	6	4	5	3	1	2
45	6	2	4	5	3	1	5	2	6	4	3	1
46	3	2	5	6	1	4	4	6	3	5	1	2
47	4	1	6	5	3	2	4	3	6	5	2	1
48	6	1	4	5	2	3	5	2	6	4	1	3
49	3	2	4	6	5	1	1	3	5	4	6	2
50	6	3	4	5	2	1	4	5	6	3	1	2
51	6	3	1	2	4	5	5	6	4	3	1	2

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q9.1	Q9.2	Q9.3	Q9.4	Q9.5	Q9.6	Q10.1	Q10.2	Q10.3	Q10.4	Q10.5	Q10.6
52	4	1	5	6	2	3	3	6	5	4	1	2
53	4	3	1	6		5	4	6	5	3	1	2
54	5	6	2	3	1	4	6	2	5	4	3	1
55	6	3	4	5	2	1	6	3	5	2	4	1
56	6	5	2	1	4	3	6	4	3	2	1	5
57	6	3	5	4	2	1	6	5	3	4	2	1
58	6	5	2	3	4	1	4	3	6	5	2	1
59	1	5	2	4	6	3	5	6	3	4	1	2
60	2	5	6	4	3	1	2	4	3	5	1	6
61	5	4	3	6	1	2	3	6	1	5	2	4
62	2	4	6	3	5	1	3	4	5	2	1	6
63	2	3	4	5	1	6	5	6	3	2	1	4
64	4	5	6	3	2	1	6	5	3	4	1	2

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q9.1	Q9.2	Q9.3	Q9.4	Q9.5	Q9.6	Q10.1	Q10.2	Q10.3	Q10.4	Q10.5	Q10.6
65	3	5	6	4	2	1	3	6	5	2	1	4
66	4	5	2	6	3	1	2	1	3	4	6	5
67	5	2	4	6	1	3	6	5	4	3	1	2
68	5	1	6	2	3	4	5	4	6	3	1	2
69	2	5	3	6	4	1	4	3	6	5	1	2
70	5	6	1	2	3	4	4	6	3	5	1	2
71	5	4	1	3	6	2	4	2	6	5	3	1
72	6	3	5	1	4	2	6	5	3	4	1	2
73	6	5	3	4	2	1	6	5	4	2	1	3
74	6	1	5	4	2	3	5	6	4	1	2	3
75	6	5	3	2	4	1	5	2	6	4	1	3
76	6	5	4	3	2	1	5	6	4	2	3	1
77	2	4	1	5	6	3	4	5	6	1	3	2

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q9.1	Q9.2	Q9.3	Q9.4	Q9.5	Q9.6	Q10.1	Q10.2	Q10.3	Q10.4	Q10.5	Q10.6
78	6	4	1	3	2	5	5	6	3	4	1	2
79	2					1	1					
80	6	4	3	5	2	1	6	5	4	2	1	3
81	5	6	2	3	1	4	6	5	4	3	1	2
82	5	2	4	6	3	1	5	3	6	4	2	1
83	6	5	3	2	1	4	6	5	3	4	1	2
84	4	2	3	5	1	6	5	6	4	3	2	1
85	2	6	3	1	4	5	6	5	4	2	1	3
86	3	4	2	6	5	1	5	4	6	2	1	3
87	6	2	5	4	1	3	6	5	2	4	1	3
88	6	5	4	3	2	1	6	4	5	2	1	3
89	6	5	1	2	3	4	5	6	4	1	2	3
90	4	3	5	6	2	1	3	2	4	6	5	1

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q9.1	Q9.2	Q9.3	Q9.4	Q9.5	Q9.6	Q10.1	Q10.2	Q10.3	Q10.4	Q10.5	Q10.6
91	5	6	3	4	2	1	3	6	2	5	1	4
92	2	5	3	4	6	1	3	4	6	5	2	1
93	6	5	3	2	4	1	3	5	6	4	1	2
	405	**317**	**313**	**357**	**266**	**233**	**397**	**387**	**390**	**300**	**199**	**218**
	1st	**3rd**	**4th**	**2nd**	**5th**	**6th**	**1st**	**3rd**	**2nd**	**4th**	**6th**	**5th**

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q11.1	Q11.2	Q11.3	Q11.4	Q12.1	Q12.2	Q12.3	Q12.4	Q12.5	Q12.6
1	3	4	2	1	A.	B.	B.	B.	D.	D.
2	2	3	4	1	A.	B.	B.	B.	B.	D.
3	4	3	2	1	A.	A.	B.	C.	B.	C.
4	2	4	3	1	A.	B.	D.	D.	B.	D.
5	4	3	2	1	A.	B.	B.	B.	A.	D.
6	3	4	2	1	B.	C.	B.	B.	B.	B.
7	3	4	2	1	A.	B.	B.	D.	C.	D.
8	1	2	4	3	B.	B.	B.	B.	B.	B.
9	3	4	2	1	A.	A.	D.	C.	D.	C.
10	4	3	2	1	A.	D.	D.	C.	C.	C.
11	4	3	2	1	A.	B.	C.	C.	B.	C.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q11.1	Q11.2	Q11.3	Q11.4	Q12.1	Q12.2	Q12.3	Q12.4	Q12.5	Q12.6
12	4	3	2	1	A.	A.	B.	B.	B.	D.
13	2	4	3	1	A.	A.	B.	D.	B.	D.
14	4	3	2	1	A.	A.	B.	B.	B.	C.
15	4	3	2	1	A.	B.	D.	D.	B.	D.
16	4	2	3	1	A.	A.	B.	C.	B.	C.
17	2	4	3	1	A.	A.	B.	B.	B.	D.
18	1	3	2	4	B.	B.	D.	B.	B.	C.
19	4	3	2	1	A.	B.	A.	A.	B.	C.
20	2	3	4	1	A.	B.	D.	C.	B.	C.
21	4	2	3	1	A.	B.	D.	D.		C.
22	4	3	2	1	B.	B.	D.	B.	B.	D.
23	2	4	3	1	A.	B.	B.	B.	A.	D.
24	4	3	2	1	B.	A.	D.	A.	A.	C.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q11.1	Q11.2	Q11.3	Q11.4	Q12.1	Q12.2	Q12.3	Q12.4	Q12.5	Q12.6
25	2	4	3	1	A.	A.	D.	D.	B.	C.
26	2	3	4	1	A.	A.	D.	D.	B.	C.
27	3	4	2	1	A.	A.	B.	B.	B.	B.
28	1	4	3	2	A.	A.	A.	A.	B.	A.
29	2	4	3	1	A.	A.	B.	B.	B.	C.
30	4	3	2	1	A.	A.	B.	D.	B.	B.
31	2	3	4	1	A.	A.	B.	B.	B.	C.
32	4	3	2	1	A.	B.	B.	A.	C.	D.
33	3	2	4	1	A.	B.	B.	B.	B.	C.
34	2	3	4	1	A.	B.	B.	C.	B.	C.
35	4	2	3	1	A.	A.	D.	D.	D.	C.
36	4	3	2	1	A.	A.	C.	B.	B.	C.
37	1	3	4	2	A.	A.	D.	D.	A.	D.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q11.1	Q11.2	Q11.3	Q11.4	Q12.1	Q12.2	Q12.3	Q12.4	Q12.5	Q12.6
38	3	4	2	1	A.	B.	B.	C.	A.	C.
39	2	3	4	1	B.	A.	B.	B.	D.	D.
40	3	4		2	A.	B.	B.	B.	B.	B.
41	1	4	3	2	A.	B.	B.	B.	B.	B.
42										
43										
44	3	4	2	1	A.	A.	B.	B.	B.	C.
45	2	4	3	1	A.	B.	D.	D.	B.	C.
46	2	3	4	1	A.	B.	D.	C.	B.	B.
47	2	4	3	1	A.	B.	C.	C.	A.	C.
48	4	3	2	1	A.	A.	B.	A.	B.	D.
49	2	4	3	1	B.	B.	C.	B.	C.	C.
50	4	2	3	1	A.	A.	B.	B.	B.	C.
51	4	2	3	1	A.	A.	B.	B.	D.	D.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q11.1	Q11.2	Q11.3	Q11.4	Q12.1	Q12.2	Q12.3	Q12.4	Q12.5	Q12.6
52	2	4	3	1	B.	B.	C.	A.	A.	D.
53	4	3	2	1	A.	A.	A.	B.	B.	D.
54	4	3	2	1	A.	B.	B.	C.	B.	C.
55	4	2	3	1	B.	B.	D.	D.	B.	D.
56	4	3	2	1	A.	B.	B.	C.	B.	C.
57	2	4	3	1	B.	C.	D.	D.	C.	C.
58	3	4	2	1	A.	A.	A.	B.	D.	D.
59	2	3	4	1	B.	A.	D.	D.	B.	D.
60	4	2	3	1	B.	B.	B.	B.	B.	B.
61	3	4	2	1	A.	A.	B.	D.	D.	D.
62	4	1	3	2	B.	A.	B.	D.	B.	D.
63	4	3	2	1	B.	B.	A.	B.	D.	D.
64	4	3	2	1	B.	A.	B.	B.	B.	D.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q11.1	Q11.2	Q11.3	Q11.4	Q12.1	Q12.2	Q12.3	Q12.4	Q12.5	Q12.6
65	2	3	4	1	A.	B.	B.	B.	B.	B.
66	1	3	4	2	A.	A.	C.	C.	B.	C.
67	4	3	2	1	A.	A.	B.	D.	B.	B.
68	4	3	2	1	A.	A.	B.	D.	C.	D.
69	4	3	2	1	A.	B.	B.	C.	C.	D.
70	2	4	3	1	A.	A.	C.	C.	B.	D.
71	4	2	3	1	B.	B.	C.	B.	A.	C.
72	2	3	4	1	A.	A.	B.	B.	B.	D.
73	2	4	3	1	A.	B.	A.	B.	D.	B.
74	2	4	3	1	B.	B.	D.	D.	B.	D.
75	1	4	3	2	A.	A.	D.	D.	B.	B.
76	3	4	2	1	B.	B.	D.	A.	A.	C.
77	1	2	3	4	A.	B.	B.	C.	B.	C.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q11.1	Q11.2	Q11.3	Q11.4	Q12.1	Q12.2	Q12.3	Q12.4	Q12.5	Q12.6
78	4	3	2	1	A.	A.	B.	D.	B.	D.
79	1				B.	B.	A.	A.	A.	B.
80	4	3	2	1	A.	A.	B.	C.	B.	D.
81	1	3	4	2	A.			C.	B.	
82	3	4	2	1	A.	A.	A.	B.	B.	B.
83	3	4	2	1	A.	B.	B.	B.	B.	C.
84	4	3	2	1	A.	B.	D.	D.	D.	D.
85	3	1	4	2	B.	B.	B.	D.	D.	B.
86	4	2	3	1	A.	B.	C.	D.	D.	D.
87	4	2	3	1	A.	A.	D.	D.	C.	C.
88	1	4	3	2	A.	A.	C.	B.	A.	B.
89	4	2	1	3	A.	B.	B.	B.	B.	B.
90	1	4	3	2	A.	D.	B.	C.	B.	C.

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q11.1	Q11.2	Q11.3	Q11.4	Q12.1	Q12.2	Q12.3	Q12.4	Q12.5	Q12.6
91	2	4	3	1	A.	A.	B.	C.	B.	C.
92	4	3	2	1	B.	B.	B.	B.	A.	B.
93	3	4	2	1	A.	B.	B.	D.	C.	D.
	262	**286**	**241**	**111**						
	2nd	**1st**	**3rd**	**4th**						

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q13.1	Q13.2	Q13.3	Q13.4	Q13.5
1	5	2	3	4	1
2	3	2	1	4	5
3	4	3	1	5	2
4	5	2	1	4	3
5	3	1	2	5	4
6	1	2	3	4	5
7	5	3	2	4	1
8	5	2	4	3	1
9	5	2	1	3	4
10	2	1	4	5	3
11	4	5	3	2	1

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q13.1	Q13.2	Q13.3	Q13.4	Q13.5
12	5	4	3	2	1
13	3	4	1	5	2
14	1	2	3	5	4
15	5	2	1	4	3
16	5	4	2	3	1
17	5	4	2	3	1
18	4	2	1	5	3
19	5	2	1	4	3
20	5	4	1	3	2
21	4	5	3	2	1
22	5	2	4	3	1
23	5	3	4	2	1
24	3	5	2	4	1

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q13.1	Q13.2	Q13.3	Q13.4	Q13.5
25	5	4	1	2	3
26	5	1	2	4	3
27	2	3	4	5	1
28	5	1	2	4	3
29	5	2	1	4	3
30	4	5	1	3	2
31	5	4	3	2	1
32	1	2	3	5	4
33	5	3	1	4	2
34	1	2	3	5	4
35	5	2	1	4	3
36	5	3	2	4	1
37	5	1	2	4	3

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q13.1	Q13.2	Q13.3	Q13.4	Q13.5
38	5	3	1	4	2
39	3	2	1	5	4
40	5	2	3	4	1
41	5	2	1	4	3
42					
43					
44	4	2	1	5	3
45	5	1	2	4	3
46	5	1	2	3	4
47	5	2	1	4	3
48	5	3	1	4	2
49	5	4	1	3	2
50	4	5	2	3	1
51	1	4	2	5	3

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q13.1	Q13.2	Q13.3	Q13.4	Q13.5
52	4	2	3	5	1
53	3	4	5	2	1
54	5	2	1	4	3
55	5	4	3	2	1
56	4	5	2	3	1
57	5	4	2	3	1
58	1	2	4	5	3
59	3	4	2	5	1
60	5	4	3	2	1
61	5	1	2	4	3
62	5	2	1	4	3
63	4	2	3	5	1
64	5	4	2	3	1

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q13.1	Q13.2	Q13.3	Q13.4	Q13.5
65	5	1	2	4	3
66	5	4	1	3	2
67	5	4	3	2	1
68	5	2	4	1	3
69	5	4	1	3	2
70	2	1	3	5	4
71	5	1	2	3	4
72	5	2	1	4	3
73	5	4	2	3	1
74	5	2	1	4	3
75	5	2	1	4	3
76	4	5	3	2	1
77	5	4	1	3	2

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q13.1	Q13.2	Q13.3	Q13.4	Q13.5
78	5	3	1	4	2
79			3	2	1
80	5	2	3	1	4
81	3	5	1	4	2
82	5	1	3	4	2
83	5	3	1	4	2
84	2	1	5	4	3
85	3	4	2	5	1
86	5	4	3	2	1
87	4	3	2	5	1
88	5	2	1	4	3
89	5	4	3	2	1
90	5	2	1	4	3

Appendix 6.2: Responses to Evaluation Questionnaire

Response	Q13.1	Q13.2	Q13.3	Q13.4	Q13.5
91	3	2	1	4	5
92	5	2	1	3	4
93	4	5	3	2	1
	381	**251**	**189**	**328**	**207**
	1st	**3rd**	**5th**	**2nd**	**4th**

Appendix 7: Practical Guide for Museum Use of Numismatic Collections

The following suggestions have arisen from an academic research project, and are based on observation of current sector best practice, and a survey examining the engagement of potential museum audiences with stories of the Norman Conquest revealed by the surviving coins of the period. This document aims to translate these theoretical findings into useful, practical suggestions for enhancing museums' use of their coin collections.

Easy, Quick Fixes

- **Put real coins in your displays**. Adaptations to your displays can improve the look, legibility and impact of your coins, but the most important factor is having them there in the first place!
- **Light up your coins.** Good lighting makes a huge difference to how coins look in a display; bright light makes coins legible, as well as highlighting them in cases with other, larger objects. A raking light angled across the surface will show up the details especially well.
- **Show the extra details.** Coins are small, and double-sided, which can make them tricky for people to examine. Techniques such as providing magnification, or presenting large-scale photographs, can easily make them clearer and more accessible.
- **Steer clear of traditional mounting and design.** Traditional methods of displaying coins can be very dull! A series of coins pinned to a board, with numbers relating them to details in a separate label, will only attract the interest of a few visitors. Adaptations such as raising coins to eye level, bring them to the front of the case, or mounting them sandwiched in Perspex to show both sides, will make them more enticing. Interspersing the coins with their interpretation can increase the feeling of their being integral to the stories being told.

- **Audiences like a story**. Coins can explain so much more than just what money was used in the past. Interpreting them in terms of the people, places and events which they reveal makes them engaging and interesting. See 'Behind the Scenes' below for suggestions for identifying these stories.
- **The classifications of coins do not need to be part of the main interpretation**. In the survey, even people with a particular interest in numismatics did not feel that inclusion of their taxonomic details in a display was important. Layer your interpretation so that the information is available somewhere, but you do not need to put it on the coin labels. Use the space for more interesting interpretation!
- **Where possible, include interpretation in a variety of styles and tones**. Snippets of extra information, access to additional reading, or guides aimed at different audiences can really enhance engagement with the display for a broad range of visitors.
- **Show the evidence**. Survey participants responded very positively to interpretation which explained how we arrived at the conclusions on display, rather than just presenting the stories as established facts.
- **Let people handle the coins**. If there are resources available for public events, simple handling sessions, with staff or volunteers to answer questions, were the most popular suggestion for survey respondents.

Creating New Displays

- **You can include coins in all types of display**. Displays focused entirely on coin collections can be really effective, but coins can also make an excellent contribution to wider displays with other artefacts. They can enhance the stories presented by other collections, as well as adding new narratives.
- **Consider touring displays**. Large organisations such as the British Museum sometimes create exhibitions which can be loaned to other organisations. These are particularly compelling when combined with extra objects from the local collection.

- **Evaluation is vital at every stage**. Consultation with target audiences from inception through to installation helps create displays which successfully engage visitors. Don't make assumptions about what your users want or need from a new exhibition – ask them!
- **The provision of information in digital formats is not necessarily essential**. Many of the survey participants were ambivalent to digital interpretation, both in the gallery and on their own devices. If they are used, digital projects should always be integrated and relevant to the display, rather than just for the sake of using the technology.
- **Audience participation needs careful consideration**. Visitor experience can be greatly enhanced by chances to collaborate with the museum on the creation of displays, or by the inclusion of participative elements to object interpretation. However, it is essential to consult carefully with potential audiences about their desire for participation, and the nature of that involvement.

Behind the Scenes

- **Find out what stories your coin collections tell**. Numismatics can reveal a wealth of information about all sorts of issues, not just about the financial systems of the past. Revisiting your collection with a broad, open view can help to highlight the fascinating stories which the coins can tell. Some of these stories may not be what you expect! Investigations of this type can be strengthened by liaising with sector specialists, such as the Money and Medals Network, or with local special interest groups, like numismatic societies.
- **Collaborate with colleagues**. Knowledge sharing and object loans between organisations can help to fill skills gaps as well as increasing the pool of artefacts available for display. No one museum is likely to have a comprehensive collection of coins, so the stories they can tell will be greatly augmented by input from other collections and curators.

- **Utilise professional networks**. The Subject Specialist Network for numismatics is the Money and Medals Network, and they can provide advice, training and contacts across the sector. They can also point you to the latest research on particular time periods or areas of collections.
- **Consider Designation.** If investigation of your numismatic collection reveals particularly important stories or an especially excellent selection of coins, you should consider applying for Designated status from Arts Council England. Liaising with the Money and Medals Network will give a good idea of whether your collection is outstanding. Designated status would be a way to acknowledge and celebrate the cultural value of your coins, as well as opening up avenues for funding and development.