Introduction

From the earliest times there has been a close relationship between weight and coinage. But in medieval England this relationship was confused, to say the least. In a previous article I outlined the problems and offered an explanation of how they were resolved in the critical period 1344–1421. In this article I shall focus on the evolution of central control over weight and coinage, from the tenth to twelfth centuries.

The foundations for this study were laid by Stewart Lyon in the 1960s. Subsequent work by Pamela Nightingale provided new perspectives, but both authors relied to a great extent on the evidence of the coinage. For some periods the coins are plentiful, and numismatists have studied them in great detail. But unfortunately neither the coins nor the numismatists have persuaded to speak with one voice. Some documentary evidence exists, but it is fragmentary and was not written for the purpose of explaining medieval practices to modern scholars. This is particularly true of the legal codes, where Patrick Wormald’s fundamental re-evaluation has recently been applied to the numismatic evidence by Elina Screen.

Another new perspective comes from the increase in artefactual evidence in the form of weight-objects. Much of this material was not available in 1987 when Robin Connor wrote his Weights and Measures of England, and in some cases it points to quite different conclusions. However, it cannot be claimed that the story is now clear in all its details. The account to be given here will avoid speculation about mechanisms that we do not understand, and may never understand fully. One very specific conclusion is that standard weight-systems probably did not exist before the thirteenth century, so there can be little hope of ‘identifying’ an isolated weight-object simply by checking its mass. By asking better questions we can hope to throw more light on what actually happened.

1. The first millennium

The part played by Athelstan in the unification of the land we call England is described in detail in Sarah Foot’s recent study. The code of laws known as II Athelstan (c.930) or the Grately Code is probably a fair summary of his intentions, although it would be rash to make too many assumptions about its effectiveness in practice. One of these laws asserted that there should be ‘one money’ throughout the king’s realm.

During Athelstan’s reign there was some progress towards establishing machinery that could ensure observance of his laws. It was generally accepted that the king had sole rights over the coinage, and that the right to hold a market must be confirmed by a royal charter. However, there were significant limitations on the king’s power. Control of Northumbria was...
achieved in 927, but lost again in 939. Other parts of the country were nominally under Athelstan’s control, but in some places there was either no effective local authority, or an authority that did not readily conform to the king’s wishes. Another limitation was more subtle and technical: there were many different customary measures of value and weight. Consequently, even if the king had the power to levy a tax or impose fines, he could not predict the income that might result. For example, a ‘shilling’ did not mean the same thing in Mercia as it did in Wessex.8

A basic problem was that the precious metals were assessed by several different weight-systems, with Roman, Saxon, Islamic, and Viking elements. These elements will be reviewed here by looking at some examples of the weights that were in use before about 950. The objects illustrated below have been selected because we can make intelligent guesses as to their purpose. The story is by no means clear, but these objects are our best hope of progress towards understanding what happened subsequently.

The object shown in Figure 1 is a Romano-British weight, made of lead. This example was found in the vicinity of Chester, and many others of the same type have been found in that area.9 It may have been used for checking the portions of salt (salary) issued to the soldiers. The mass is 53 g, which is consistent with the accepted value of about 27 g for a Roman ounce (uncia). Although there must have been minor variations throughout the Roman world, this value is remarkably constant over a wide area and for a long period.

The shift of government from Rome to Byzantium did not immediately lead to an alteration in the magnitude of the Roman ounce. For weighing precious metals, square bronze weights were used in many parts of the Roman-Byzantine trading area.10 A common denomination was the nomisma, equal to one-sixth of an ounce. The objects shown in Figure 2 are simple bronze weights of this type, inscribed with dots and lines. These are casual finds from England, and they were almost certainly used for weighing gold. The denominations are: N = 1 nomisma and H = 8 siliquae = ⅙ nomisma. Similar examples have been found in archaeological excavations of sixth to seventh-century graves at Gilton in Kent and Watchfield in Oxfordshire.11 Although the mass of the Byzantine nomisma was originally around 4.5 g, the examples shown in Figure 2 (and many others) are somewhat lighter. The decline may have been due to the influence (especially in North Africa and Western Europe) of the Islamic coinage-standard, specifically the change in mass of the dinar, which was reduced from 4.5 g to about 4.25 g at the end of the seventh century. The objects shown in Figure 3 are bronze weights with designs in a style that appears rather more Islamic than Byzantine. These too are English finds from unrecorded find-spots, and they may date from the eighth or ninth centuries. If so, they could have been used for checking gold bullion in mancus-units (see Section 2, p. 81).

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8 Lyon 1969, 209–12.
9 Collingwood and Wright 1991. See, for example, items 2412.62, 2412.65, 2412.77.
10 Bendall 1996 provides a convenient synopsis of Byzantine weights.
11 Scull 1990, 192 and 201.
The influence of Islamic weight-standards in England is still a matter of debate, particularly in the matter of the coinage. Many years ago it was thought that the eighth-century English silver penny had a mass of about 1.4 g, and this was intended to correspond with an Islamic standard. The difficulty of coming to a definite conclusion on such matters is plain. Often the number of coins available for study is small, and many of them are in poor condition. New finds can significantly alter the metrological estimates; for example recent work on the coinage of Offa (757–96) suggests that his early coins were struck at about 1.3 g, with the later coinage around 1.4 g–1.45 g.

A related problem is that there is little evidence to suggest that the mass of each individual coin was closely controlled. The presumed method of production was to cut flans for broad pennies from a thin sheet of silver. It would have been relatively easy to ensure that the flans were all of the same area (by using a standard cutting tool), but more difficult to ensure that the sheet of silver was of uniform thickness. Hence the flans would vary in mass. It would be possible (as happened much later) to check the mass of each coin individually, but is more likely that the practice was based on averaging: that is, checking that a given number of coins had a given mass. Unfortunately, both the ‘given number’ and the ‘given mass’ are unknown, so the arithmetic can support several different conclusions.

There are several candidates for the ‘given number’, as we shall see in due course. And if the given mass was an ounce, it could have been any one of three Islamic ‘ounces’, or a Roman ounce, or a Byzantine version of the Roman ounce, or something else altogether.

At that time the Roman ounce was not forgotten in England. Together with its fractions and multiples it had been described in the *Etymologiae* of Isidore of Seville, copies of which were kept in many monastic centres of learning. These documents were only tables of relative proportions, but there is one piece of evidence that might indicate that the Roman system

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12 Skinner 1967. Skinner made a serious attempt to rationalize the traditional quaint theories about links between ancient weight-systems and the supposed system of the Anglo-Saxons, but he died before the work was finished.

13 Chick 2010. See also Naismith 2011.

14 The equation is of the form $nx = y$, where $n$ is a whole number, but $x$ and $y$ are not. If only one of these values is known, there are many possible solutions for the unknowns.

15 For Isidore, see Barney et al. 2006. The extract in Hall and Nicholas 1929, 1, is typical. Further discussion will be found in Section 3 below, p. 92.
was being used as an ‘absolute’ standard. The object known as the ‘Alfred weight’ has often been described.\textsuperscript{16} It is a block of lead stamped with the coin-dies of one of Alfred’s earlier pennies (from the late 870s), and could have been used to control the average mass of pennies produced at a mint. Its mass is approximately six Roman ounces, or half a pound (163 g). If we assume 20 pennies to the ounce (240 pennies to the ‘pound’), then 120 pennies minted from 163 g of silver would each weigh slightly less than 1.4 g, which does indeed fit in with the observed mass of the relevant issue.\textsuperscript{17} After Alfred’s reform of c.880 the mass of the penny was increased to between 1.5 g to 1.6 g, and the higher standard was maintained (very broadly) in the tenth century by Edward the Elder and Athelstan.\textsuperscript{18}

Islamic standards play another part in English metrological history, because of their influence on the weights used by the Viking invaders. The Viking \textit{ora} was roughly 25 g, and appears to correspond to six Islamic dinars; eight of these oras made a \textit{mark} of about 200 g. The object shown in Figure 4 is a lead weight from the Viking period, found on the north bank of the Humber.\textsuperscript{19} Embedded in the lead is a bronze object showing four dots. It is in fact a weight itself, one of the truncated-cube types often found in Scandinavia and England, and which have been carefully studied.\textsuperscript{20} It was used here to indicate that the main object has a mass of four oras, equal to half a mark in the Viking system.

Fig. 4. A Viking weight from England; mass 102 g, diameter 27 mm, height 23 mm. Private collection.

In recent years, many Viking weights have been found in England.\textsuperscript{21} Some of them, such as the small bronze truncated-cube types, are also found in the Viking homelands. They correspond roughly to fractions of the \textit{ora}, but there is some variation, suggesting that they were used by individual traders on a custom-and-practice basis. A more characteristic Anglo-Viking type is the series of lead weights with embedded objects, such as a piece of ornamental metalwork, or a coin. The object shown in Figure 5 is a typical example. The embedded object is a Northumbrian styca of the moneyer Leofthegn, minted in the middle of the ninth century.\textsuperscript{22} The weight was probably intended for checking two oras of silver bullion.

It must not be thought that the selection of weights illustrated above exhausts all the types of first-millennium weights found in England. Most of them are single finds, and even the few

\textsuperscript{16} Price 1841; Connor 1987, 108; Archibald 1991.
\textsuperscript{17} Blackburn and Keynes 1998, 141.
\textsuperscript{18} Blunt, Lyon and Stewart 1989, 235–47, Tables 12–14.
\textsuperscript{19} Biggs and Withers 2000, item 22.
\textsuperscript{20} Sperber 1996; Steuer 1997.
\textsuperscript{21} Blackburn 2009, 48. See also Blackburn 2011.
\textsuperscript{22} Pirie 2000, 25–9 contains a brief survey of weights inset with a styca. See also Williams 2000.
objects found in controlled archaeological excavations are not always easy to date and identify. Small bronze weights like those shown in Figures 2 and 3 continued to be made and used in England, in various forms, throughout the high Middle Ages, but it is not until the fifteenth century that we can be confident about their identification. For example, the objects shown in Figure 6 are, broadly speaking, in the tradition of the Byzantine and Islamic types. They all weigh less than two grams, which probably means that they were used for checking gold, or possibly a silver penny. However, in the current state of knowledge it would be futile to try to assign them to a specific century, or a specific weight-system.

Design features can also be misleading. One common element is the ring-and-dot motif, sometimes referred to as the ‘pelleted annulet’ or ‘bird’s eye’. It is often seen on Islamic weights, such as the first object in Figure 7. It was found in Sussex, but might have turned up almost anywhere in North Africa, Europe or the Middle East. The other objects in Figure 7 are clearly weights of some kind: all are reliably reported as English finds, but we cannot say much about them. They may have been made in England, or they may be foreign imports. Even the

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23 Holland 2009 gives a reliable account of various types of weights found at the eastern end of the Mediterranean, including (pp. 41–51) many with the ring-and-dot motif. See also Holland 1986.
suggestion that the number of ring-and-dot marks indicates a specific number of weight-units turns out to be quite wrong. The last one is probably part of a set of cup-weights from the twelfth or thirteenth centuries,\textsuperscript{24} and represents one-eighth of an ounce. Apart from that, all that can safely be said is that the users of these objects knew exactly what their purpose was, and it was probably related to the weighing of precious metal in some form.

These examples are sufficient to make the point that is unwise to seek uniformity in the weight-objects that were used in England in the first millennium AD. Weights were used for different purposes, in different places, and by people with different traditions. Even if we had perfect understanding of the events and influences operating in England at that time, we should still have to admit that the metrological picture was baroque in its complexity. From the first two hundred years of the second millennium we have more documentary evidence, and now (2012) a rapidly increasing accumulation of artefacts. This article is written in the belief that it is time to start assessing that evidence as a whole.

2. From Reform to Conquest

Around 973 King Edgar began to issue pennies of a new style, known to numismatists as the Reform Type. That there was a reform of some kind is beyond doubt, but its original purpose and scope remain controversial. Some have seen it simply as another stage in Athelstan’s programme to achieve ‘one money’ throughout the kingdom,\textsuperscript{25} while others have argued that from the outset there was a complex master-plan, involving periodic recoinages and subtle variations in the mass of the coins.\textsuperscript{26} For our purposes, speculation about exotic mechanisms that might explain some of the observed features is unnecessary, and it would only complicate the story. Perhaps the most significant point is that, for the first time in England since the departure of the Romans, it was possible for the authorities to insist that coins should pass at their face value, whatever their actual weight.

It is convenient to begin with the evidence from documents. In the law code III Edgar, promulgated in the 960s, the reference to ‘one money’ is reiterated, and is followed by the assertion that ‘there shall be one system of measurement and one standard of weights, such as is in use in London and in Winchester’. It is now thought that the phrase about weights is not original,\textsuperscript{27} but was added in the eleventh century by Archbishop Wulfstan, of whom we shall have more to say later. It may well be argued that Wulfstan was merely elaborating on what he believed to have been Edgar’s intentions, but the wording is significant, particularly the mention of a standard.

Another difficulty arising from the law codes concerns the use of the word \textit{shilling}. The word occurs in some of the old laws from Kent, Mercia and Wessex, usually in connection with the fines for certain offences. Initially it seems to have signified a definite weight of gold, then it was a gold coin of that weight. Latterly it was a unit of account – unfortunately, differing from place to place.\textsuperscript{28} Possibly the latest such occurrences are in the law codes VIII \textit{Æ}thelred and II Cnut, dated to around 1014 and 1020 respectively. In the first of these it is clear from the context that a shilling represents a small number of pence, probably five.\textsuperscript{29} This may be an example of a ‘frozen’ conventional unit (rather like the guinea in modern times), which no longer had practical significance. By this time the word ‘shilling’ was also being used in practice to denote twelve pence as a unit of account, as stated explicitly by Byrthferth of Ramsey in 1011.\textsuperscript{30} Thus the Carolingian accounting system (1 pound = 20 shillings, 1 shilling = 12 pence) had finally taken root in parts of England, and was to persist for almost an entire millennium.

\textsuperscript{24} Biggs 2011, 141. See also the comment at the end of Section 4 below, p. 97.
\textsuperscript{25} Brand 1984.
\textsuperscript{26} Allen 2012, 35–40. Dolley never published a full account of his theory.
\textsuperscript{27} Screen 2007, 152.
\textsuperscript{28} Grierson 1961; Lyon 1969, 210–12.
\textsuperscript{29} Whitelock 1996, 448.
\textsuperscript{30} Crawford 1929, 67. See also Nightingale 1984, 236, and Baker and Lapidge 2001.
Unfortunately pounds, shillings, and pence were not the only accounting units used at the beginning of the second millennium. The case of the mancus is particularly relevant, because it illustrates the kind of semantic evolution that creates problems for the numismatists and historians of today. At least four distinct meanings can be assigned to the word.

1. The Islamic gold dinar is sometimes referred to as the dinar manqûsh, meaning literally an inscribed coin. These coins circulated widely in Europe. In Spain and Italy they were known by forms of the name ‘mancus’, and the word would have been familiar to English merchants trading in those places.31

2. From the eighth century onwards the word ‘mancus’ appears in wills and charters as a unit of mass for gold bullion. Its magnitude must have been roughly the same as the Islamic coin, 4.25 g. (Weights that fit this description are shown in Figure 3.)

Because payments in gold were not always practicable, the same word could be applied to an equivalent amount of silver. This gave rise to two further interpretations.

3. Thirty silver pennies were equivalent in value to a mancus of gold, and so the word came to be used as an accounting unit for 30 pence.

4. Although the mass of a silver penny varied over time, the word was also used to denote 30 pennies of the current issue. Weights for checking a mancus-worth of silver would therefore vary in mass, as did the penny. The lead weight with an embedded bronze stud shown in Figure 8 is typical; it could be an eleventh-century survival of the Viking style. Similar examples have been found in many parts of England, and they vary considerably in size and shape. Another example is shown in Figure 9 – a lead weight struck with an impression from a die of Edward the Confessor’s Small Flan penny (c.1048–50). Some other examples of this style have been discussed by Archibald.32

It is also possible that some extremely rare Anglo-Saxon gold coins were minted mancuses, thus adding a fifth meaning to the list. The minting of gold mancuses is stipulated in the will of King Eadred,33 but no coins of that issue are known.

![Figure 8](image1.png) A lead weight, possibly for checking a mancus-worth of silver pence: mass 39.7 g, diameter 25 mm, thickness 8 mm. PAS: NMS-561B93. Private collection.

![Figure 9](image2.png) Another weight, possibly for checking a mancus-worth of silver pence; mass 37.5 g, diameter 18 mm, height 16 mm. Private collection.

Documentary references to the mancus appear to die out around 1030, but there is one from around the time of the Norman conquest.34 Even if the word itself was no longer used, the 30-pence denomination would have remained useful in commerce, and this may explain the weight shown in Figure 9.

31 Spufford 1988, 50. For finds of dinars in England, see the discussion in Blackburn and Bonser 1987, 92–4.
34 Thorpe 1865, 596.
Other customary units also created confusion. The Roman ounce of about 27 g has already been mentioned. The word *uncia* literally means one-twelfth, so the ounce was one-twelfth of the Roman pound-of-weight, and the word ‘ounce’ could also mean one-twelfth of a pound-of-account. In the eleventh century it would have contained 20 pence-of-account, thus providing a second way of dividing the pound of 240 pence: 1 pound = 12 ounces, 1 ounce = 20 pence.

Alongside the penny, shilling, mance, ounce and pound, there was a further complication, created by the Viking weight-system of oras and marks. As mentioned above (see Figure 4 for example) the Viking ora was originally a bullion weight of about 25 g, certainly less than a Roman ounce of 27 g. So the mark of 8 oras was about 200 g. This system was used extensively in the Danelaw, and following the arrival of Cnut in 1015–16 it must have been even more widespread. In Figure 10 there is a lead weight with an embedded bronze ‘Saxon cross’, which shows traces of gilding. This could have been used for checking payments of a mark in hacksilver, or in silver coins.

![Fig. 10. A lead weight: mass 195 g, diameter 43 mm, thickness 15 mm. Private collection.](image)

As with the mance and the ounce, the distinction between the mark as a unit of mass and as a unit of account became blurred. There is clear evidence that, before the Norman conquest, the ora and the mark were being used as accounting-units, alongside the shilling and the pound. In some cases the two systems were used in parallel and it can be reliably deduced that 3 oras were equivalent to 4 shillings.\(^{35}\) Thus 16 pence-of-account made one ora, and the accounting mark was 128 pence. The multitude of accounting systems used in the first half of the eleventh century is shown in Figure 11.

![Fig. 11. Units of account in the first half of the eleventh century.](image)

The diagram indicates that the relationship between theory (the units) and practice (the coinage) was rather unsatisfactory. As a unit of mass the ora was about 25 g, and if 16 pence weigh that much, then the penny must weigh nearly 1.6 g. In the early eleventh century some

issues of pennies were indeed minted at (or above) this level, but subsequent issues were much lighter.

It is unfortunate that the largest body of evidence bequeathed to us by Anglo-Saxons – the coinage from Edgar to the Norman conquest – is also the most baffling. For this period, the coins have survived in large numbers, and we might hope that a pattern would emerge in statistical terms, even if the underlying reasons remain obscure. There is now available a metrological study of over 44,000 English coins minted between c.973 and c.1090,36 and Metcalf has written a very useful commentary on it.37 The data are revealing in many respects, but sadly fail to provide satisfactory answers to some big questions. In particular: what weight-standards were used, and how were they communicated to the mints? It is clear that periodic recoinages were happening by the turn of the millennium, and they can only have been instigated by a central authority. The evidence suggests that the average mass of the penny sometimes varied markedly from one issue to the next, which might indicate that the central authority had adopted new weight-standards, for example after the arrival of Cnut.38 However, some features of the data do not support this suggestion. In practice the standard varied from place to place, and there was a gradual decline throughout the period of each issue, although it was not applied uniformly. It is hard to reconcile these features with the idea that a national standard was being rigidly imposed. The over-riding impression is that the king had the power to direct that there should be a new issue of pennies, but he was not able to control how the finer details of his directive were implemented.

One new feature of Edgar’s Reform Type was that the place of minting was specified, as well as the name of the moneyer. It is tempting to read into this development the idea that the coins minted at Ipswich (say) should be subject to regulation from an authority located in or near Ipswich. Some such authorities certainly existed in the eleventh century, but their form and effectiveness is a matter of conjecture. It could be that the shires, hundreds, and boroughs played a part in the regulation of coinage, associated with their role in the tax-gathering process. It is possible that coins minted at a certain place were intended only to circulate in the region under the jurisdiction of the relevant local authority. But if that were the intention, it certainly did not happen in practice, because we know that many coins have been found in places very remote from their mints.

The hypothesis of some local control, specifically in the matter of weight-standards, is made more attractive by the complete lack of evidence of any central mechanism. Stewartby summarises what we know about the methods of coin-production, but he concedes that nothing is known about how the mints controlled the mass of the coins they produced.39 Indeed, it is hard to envisage how the smaller eleventh-century mints could have operated a really effective mechanism for monitoring the mass of individual coins. But even in the smallest mints the hammer-men must surely have been instructed that a certain number of coins should contain a fixed amount of silver. The fixed amount might have been determined by a single physical object, a ‘mint pound’, copies of which were distributed from the centre to all mints. But there is no documentary evidence of this practice, and there are no artefacts that might be the local copies. Of course, historians will tell us not to equate ‘absence of evidence’ with ‘evidence of absence’, but in this case the metrological studies also suggest that there was no common standard. For that reason we must consider the alternative possibility that the mass of the coins was determined by the weight-standards customarily used in the locality of the mint. Wulfstan’s recommendation for ‘one standard of weights, such as is in use in London and in Winchester’ is pertinent here.

We do know that a local weight-standard existed in London. Of course, this cannot be taken as a typical example, but it is worthy of note. The will of Æthelgifu (which may date from the late tenth century, although the extant copy is later) mentions a gift of two silver

36 Petersson 1990. See also Jonsson 1977.
37 Metcalf 1998.
38 Nightingale 1984, 197–8.
39 Stewartby 1992, esp. 81.
This is the first known mention of the husting, an assembly that was later to meet weekly, and which had jurisdiction over commercial matters such as weights and measures. The origin of the husting is very likely to be found in Cnut's establishment of a centre of government in London, rather than the Anglo-Saxon capital of Winchester. A document reliably dated to 1032 records the sale of land for 180 marks of white silver be hustinges gewihte. It may be significant that the unit of mass used in these documents is the mark, rather than the ounce, allowing the possibility that the husting-weight was not the same as the one used for the king's coinage, at least after the Danes had left. It is beyond doubt that the citizens of London claimed to have separate jurisdiction over weights and measures in the later medieval period. In fact, remnants of their jurisdiction survived until the nineteenth century, in the form of the special privileges accorded to the Company of Founders. It would be unwise to rely too much on backward inference to the period before the conquest, but there is at least a suggestion that the distinctive status of London began at that time.

Outside London, we can only begin to guess at the mechanisms by which standards of weight were maintained. Fairs and markets had been held for centuries, and surely the practice of weighing was commonplace. The goods themselves were, in some cases, bought and sold by weight, and we shall have more to say about that later. For the moment, our concern is with weighing the coins and bullion used to pay for the goods, and the means by which an agreed standard was established.

Although the details are unclear, we can make a reasonable guess as to how the common practice evolved. Originally, a payment in precious metal would be assessed by using weights that were approved by the major buyers and sellers, some possibly from abroad. In due course, formal authorities of various kinds (shire and hundred courts, manorial courts, borough courts, religious houses) would take over the existing practice and try to maintain it equitably, for their own sake as well as that of the participants. And when the king realised that trade was something he could tax, he would want to impose a uniform standard that would guarantee his income. The various stages in this process can be traced over many centuries.

We have already mentioned a key figure in the administration during the first part of the eleventh century – Wulfstan, Bishop of London (996–1002) and Archbishop of York (1002–23). He not only copied the old laws of Edgar and Æthelred, but amended them, probably with the aim of providing continuity for the new laws of Cnut. He was clearly concerned to establish the doctrines of 'one money' and 'one weight', but in some respects it seems that his aims were akin to those of his Homilies, for which he is better known. A relevant document, possibly written by Wulfstan himself, is known as the Episcopus. It outlines the duties of a bishop, emphasising that a bishop must encourage good behaviour in secular matters, as well as moral ones. In particular, he must ensure that the weights and measures used in his diocese are correct. The relevant passage, as given by Liebermann in the original Anglo-Saxon, is the following:

Ne sceall he geþafian ænig unriht ne wih gemet ne fals gewiht; ac hit gebyreð, þæt [b]e his ræde fare be his gewitnesses æghwyle lahriht, ge burhríht ge landriht; æle burghemet æle wægpundern beo be his dihte gescift swiðe rihte, þe læs ænig, man ordum misteode dourh þat syngige ealles to swyþe.

Loyn provides a summary in modern English:

[A bishop] was to be active in the economic field as well as in the legal, to see by his counsel and witness that each legal right was done according to borough-right and according to land-right, and also to see that each borough-weight and pound-weight was true according to his instructions. Good faith in business was the bishop's concern.

40 Whitelock 1930, 100; Thorpe 1865, 533.
41 Robertson 1956, 170–1.
42 Sharpe's Calendar of Letter Books (1899–1912) contains several examples of the anomalous relationship between the national standards and those of London. In 1434 (K, 184–6) the Mayor refused to swear to observe the statute 11 H.6 c.8 concerning weights and measures, on the grounds that 'from time immemorial' the standards of the king had been those kept in the City, rather than those in the Exchequer. Indeed, in 1325 (E, 203–4) the king had ordered that the Londoners should make new weights for weighing tin in Cornwall, in order that they should be consistent with the 'standard of London'.
He was to know his flock well, to exhort them to cling to the right and to shun wrong, and to work with the secular judges in drawing up laws that would prevent injustice from arising.44

Any attempt to make a verbatim translation would require several questionable assumptions, and might lead us into the trap of thinking that the passage can be understood in the context of the mechanisms of local government in modern times. Loyn gives us an indication of what the author might have meant by *lahriht*, *burhriht*, and *landriht*, but the exact mechanisms are unknown.45 All that can be said is that they were forms of social imperative, probably comprehending ‘custom and practice’ as well as ‘law’. The bishop must use his moral authority to ensure that they are implemented consistently. The reference to *æle burghemet æle wægpundern* suggests that local standards of measure and mass were part of the process. Ideally, the local standards should be uniform throughout the kingdom, but the evidence (from the coinage in particular) suggests that they were not.

This is not a new idea, and it is now being taken seriously in mainstream numismatics. For example, with reference to the heavier Expanding Cross type of the Confessor, Metcalf remarks that ‘at each mint-place the moneyers put the directive into effect according to their own understanding of its meaning’.46 Looking ahead to the Type 7 coins of 1153/4–58, Allen asserts that ‘it is possible that there was some real regional variation in the application of the national standard’.47

We can now return to the complications arising from the array of accounting units that the Anglo-Saxons were accustomed to use in the first half of the eleventh century (Figure 11). Although the mancus was apparently becoming obsolete as a unit of account, the shilling, the ounce, and the ora were still very much alive. It is not clear if the complications were resolved as the result of a definite plan, or if it was just a matter of convenience, but the artefactual and documentary evidence provides a fairly clear picture of how the situation had changed by the early decades of the twelfth century. The traditional approach to these matters has been to examine the fine detail of the coinage, on the assumption that what has survived is a fair representation of what actually existed. Here I shall take a holistic view, and try to show how one simple change could have led to all the observed consequences.

The root of the problem was the uncomfortable relationship between the mark and the pound. The systems shown in Figure 11 implied that the mark was equal to 128 penny-units, of which 240 made a pound. So, in its simplest terms, the mark:pound ratio was 8:15, a rather awkward value. Lyon has analysed some data relating to payments for Danish ships in the reign of Harthacnut (c.1040),48 and these confirm that 15 marks were equivalent to 8 pounds as a measure of weight for silver.

Furthermore, the accounting units did not correspond with the reality of the coinage, because for many years 128 pennies did not weigh as much as a mark (about 200 g). However, *if the ora and the ounce were equal*, then both difficulties would be resolved (Figure 12).

First, the mark would become 160 pence, giving a simple mark:pound ratio of 2:3. Secondly, *if the ounce-of-weight were given its traditional (Roman) value of about 27 g*, then it would correspond to 20 pennies of about 1.35 g, much closer to the usual value in the second quarter of the eleventh century.

With respect to the process of transition, in particular the implementation of the change in the units as quantities of silver, the most troublesome feature would have been that the new ora had 20 pence, whereas the old one had only 16. In the historical record there is an episode that could be interpreted as a botched attempt to deal with this difficulty. Around 1052, the size of Edward’s Expanding Cross penny was significantly increased, so that, in most places, it weighed about 1.67 g.49 Effectively, this meant that 16 pennies weighed about 27 g, the conjectured mass of the new ora/ounce. The traditional belief was that the issue of the heavy

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44 Loyn 1962, 238.
45 Loyn 1962, 139–45. The Anglo-Saxon approach to ‘law’ is clearly described by Lambert 2012.
47 Allen 2006, 263.
48 Lyon 2006, 263.
49 Metcalf 1998, 158.
coins was linked to the abolition of the heregeld in 1051. On the other hand, Metcalf suggests that it may have been 'the monetary equivalent of a huge sigh of relief', following the reconciliation between Edward and Earl Godwine in 1052. Neither explanation is inconsistent with the administrative reform suggested here. The restoration of a ‘new Roman’ 27 g ounce/ora as the standard might be compared with the return to the Gold Standard in the 1920s, as a proud assertion of the nation’s survival and its renewed strength.

Of course, national pride is not necessarily the best guide in financial matters. We can only guess at the fate of the new heavy pennies, but common sense suggests that they were hoarded by those lucky enough to get hold of them. It must have quickly become obvious that the number of pence minted from one new Roman ounce/ora of silver ought to be 20 not 16, in agreement with the rule that 12 ounces make a pound of 240 pence. This step was implemented with the issue of the Pointed Helmet pennies (c.1053). These have an observed average weight of 1.32 g, so that 20 of them weighed nearly 27 g. (In eastern counties the new pennies were lighter, which may indicate the survival of the old ora of about 25 g.)

The details of the process by which the transition to (or restoration of) an ora/ounce of 27 g may never be completely clear. But it is worth reiterating that its consequences are undisputed facts. In the first part of the twelfth century the accounting mark was clearly understood to be 160d., witness many entries in the Pipe Roll of 1130 and elsewhere. Also, despite many periodic changes of type and regional variations, the mass of the minted penny would eventually hover between 1.3 g and 1.4 g.

One piece of evidence for the new ounce/ora is a rather unusual weight (Figure 13). This object is inscribed VN and I I, undoubtedly signifying two ounces. Since its mass is 53.5 g it would appear that the ounces are Roman, and at first it was thought that the object belonged

Fig. 13. A weight for two ora/ounces, eleventh–twelfth century? Private collection.
to the Romano-British period. Several bronze ‘cheese-shaped’ weights from that period have been recorded, but they differ in two very significant ways from the one illustrated here. First, the denomination is indicated by a classical abbreviation; in this case it would be a form of the letters upsilon beta. Secondly, they are made of solid bronze, whereas this one has only a bronze casing, with a core that rattles when the object is shaken. This mode of construction is typical of certain weights from the Viking period that are found throughout north-west Europe, including England. The Viking weights have an iron core, whereas the weight in Figure 13 is non-magnetic, and is therefore presumed to have a core of lead rather than iron. In Section 3 we shall discuss several other lead weights covered with a bronze sheath (pp. 89–90). This style is definitely not Romano-British, and it is therefore suggested that the object shown in Figure 13 is a medieval weight, associated with the restoration of the 27 g ounce/ora in the eleventh century.

The penny with a mass in the range 1.3–1.4 g appears to have been sustained, subject to only minor drifting and local variations, throughout the final years of the Anglo-Saxons and the coming of the Normans. At one time it was thought that a significant alteration had been made around 1077/8, but that is not supported by the current evidence. For example, Lyon discusses the evidence from a sample of the Paxs pennies and concludes that the average for that issue was 1.37 g. In the next section we shall look more closely at how the Normans coped with the Anglo-Saxon legacy.

3. From Conquest to Anarchy

It is said that Duke William of Normandy regarded himself as the rightful successor to Edward the Confessor. In his eyes the activities of Harold Godwineson in 1066, like those of Harold’s father in 1051, were simply attempts to disturb the proper order. Clearly, William wished to begin by acting as the leader who would preserve the customs of his saintly predecessor. In matters of weight and coinage, that presented a few problems.

It was not that the Normans were strangers to these matters. Duke William and his followers were very familiar with the so-called ‘denarial economy’, in which all payments, however large, had to be made in silver pennies. But the coinage of Normandy itself was in decline by 1066, the medium of exchange there being mainly coins from other parts of France, and possibly England. It is also very likely that the Normans were accustomed to systems of weights and measures that varied from place to place. Nevertheless, they must have been rather bemused by some of the Anglo-Saxon practices. The system of coinage could be described as a mixture of sophistication and chaos. There were periodic recoinages to be sure, even if their regularity and dating were not as rigid as some modern numismatists would have us believe. But some of the methods and practices for implementing the recoinages were probably as mysterious to the Normans as they are to us. They had little option but to work with the system as they found it, at least until they had strengthened the sinews of political power.

From the first, the new king needed a reliable source of income, and here he would have encountered the system of accounting units that the Anglo-Saxons were accustomed to use. It has been suggested above that the simplified system illustrated in Figure 12 was in use before 1066, but it is possible that the simplification was in fact the work of the Norman administration. In any event, the artefactual and documentary evidence shows that the simplified system was in use by the early decades of the twelfth century.

The raw military power of the Normans enabled them to compile detailed information about the conquered nation, most notably by means of the Domesday survey in 1086. The precise purpose of Domesday remains controversial, but it was clearly used to facilitate the collection of rents and taxes at the king’s treasury, which was now permanently located at

52 Collingwood and Weight 1991. See for example, nos. 2412.64, 72, 83, 85.
54 Lyon 2006, 232.
55 Mayhew 1988, 33. See also Bisson 1979 for a wide-ranging account of monetary affairs in Normandy.
Winchester. It is a mine of useful information, but many problems of interpretation remain, especially in quantitative matters. Indeed, the apparent definiteness of the data that formed the basis of the assessments is rather misleading. For example, the units of land-measurement, acres and hides, varied from place to place according to local custom and the productivity of the land being assessed. The practice of making payments in kind was dying out, the payments having been commuted into cash, but the systems that were used for checking and counting the silver coins are still not properly understood. The root of the problem lies in the fact that several different Latin phrases were used to qualify the individual payments. For example, there has been a long-running debate about the entries specifying that a sum of money (so many pounds, shillings, and pence) must be paid *de xx in ora*. The articles by Lyon and Nightingale in this *Journal* must speak for themselves; our task is to examine how their arguments relate to the broader picture being presented here.

The phrase *de xx in ora* might have several meanings, perhaps the simplest being that twenty of the pennies so rendered must weigh one ora. But, on the basis of the entry for Worcester in particular, it is clear that it must refer to a payment by number, rather than by weight. The metrological picture developed here suggests a simple explanation, which would have had a similar effect in practice. If, as has been claimed, pence at twenty to the new Roman ounce/ora of 27 g (1.35 g each on average) were the norm from about 1053 onwards, then the phrase *de xx in ora* could refer to pennies that were minted after that date. Pennies so specified would be accepted by number, provided that they belonged to the easily recognizable post-1053 types. This is essentially the conclusion reached by Nightingale, although based on a different interpretation of the metrological background.

One of Lyon’s objections to this suggestion is based on the Domesday entry for Dover. This includes the item ‘the reeve pays 54 pounds, 24 pounds to the King in pence *de xx in ora* and 30 pounds to the Earl by number’. The apparent perversity of the Earl receiving a larger sum than the King could be explained by various practical considerations but, in fact, it is not necessary to resort to special pleading. On the assumption that the King got 24 pounds in post-1053 coins, he ought to receive about 7776 g of silver, while the Earl’s 30 pounds could be 7200 pennies of any kind, which might well turn out to weigh less. If the King’s silver was destined for re-minting, he would naturally be concerned about its weight and fineness, whereas the Earl’s coins could be returned to circulation at face value.

Another contentious issue is the meaning in Domesday of the term ‘blanch farm’ – or rather, its practical significance. It is possible to see this simply as an accounting device, designed to ensure that coins presumed to be of lower fineness were assessed at a lower rate. Earlier in the eleventh century payments had sometimes been specified as being in ‘white silver’, and the implication then was that the coins (or bullion) should appear to be of good fineness. This could be checked by visual inspection of the coins themselves, or by using a touchstone and a set of touch needles. For silver, the touchstone method was certainly available in the eleventh century, and indeed touchstones that may have been used around this time have been found in Winchester. We do know that sets of touch needles continued to be used at the mints for many centuries thereafter. Unfortunately, much confusion has arisen from the assumption that the more complicated method of testing fineness by means of the ‘fire assay’ was in use at the office where rents and taxes were received. It is true that the method of *refining* silver by heating it to drive off base metals had been known since antiquity, but that is not the same as *assaying*. The Domesday references to silver that was *arsas et pensatas* (wrought and weighed) or *ad ignem et ad pensam* (compared by fire and weight) might signify silver that had been refined and tested,

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56 The acre was defined in terms of a rod (or perch), the length of which varied considerably. This was still true 200 years after Domesday (Oschinsky 1971, 444).
58 See n.41 above.
59 Oddy 1983, Figure 10.
60 Touch needles were still in use at the Calais mint three hundred years later, when no less than 679 were provided (Martin Allen, BNS address, 22 March 2011). In the sixteenth century Agricola (Hoover and Hoover 1950, 254–61) explained how different sets were used for testing different metals.
and was believed to be of the required fineness, because it had been checked by the touchstone and the scales. This refined silver could have been in the form of ingots or plate, as well as coin. There is no implication that assaying by fire was done as part of the tax-collection process. The date of the introduction of the fire assay at the office of receipt is not known for certain, but it probably happened in the first decades of the twelfth century. Incidentally, there is no documentary evidence about a numerical standard of fineness, and the traditional belief that it was 92.5 per cent is almost certainly wrong.

One point about which there is general agreement is that a major reorganization of the office of receipt took place in the early years of Henry I. It was the work of Henry's chancellor Roger, who became Bishop of Salisbury in 1102, justiciar in 1108, and who was the effective head of the administration throughout Henry's reign. The event is usually referred to as the establishment of the 'Exchequer'. The Latin word *scaccario*, meaning a chequered board, appears in a document of 1110, but its use is actually something of a misnomer. It suggests an accounting device in the form of a board or cloth (known as an abacus), that was divided into squares by vertical and horizontal lines as on a chessboard. Counters were placed on the squares, and the elementary operations of arithmetic were carried out by manipulating them. Boards of this kind had been used since Roman times, because the clumsy system of Roman numerals did not lend itself to practical calculation. Around the turn of the millennium there was a significant innovation, usually associated with Gerbert of Aurillac, who became Pope Sylvester II in 999. The board took on a more sophisticated form, in which numbered counters were arranged in columns according to their 'place-values' (units, tens, hundreds, thousands, and so on). This was the precursor of the decimal system of numeration that we use today. The Hindu-Arabic numerals and the algorithms for calculating with them became known in Europe at the same time, and they were gradually incorporated into the new system. Over a long period the moveable counters were replaced by hand-written numerals, leading to the system of 'pen-reckoning'. It is sometimes assumed that the Anglo-Saxon mints were capable of adjusting the mass of their coins within very fine limits. But it is worth remembering that, without the Hindu-Arabic numerals and algorithms, precise calculations of the required kind were incredibly difficult.

Given this background it is probable that the major innovation introduced by Roger of Salisbury was an improved form of the abacus, similar to the one illustrated in a famous manuscript at St John's College, Oxford, but specially adapted for calculating in pounds, shillings, and pence. There is some evidence that Adelard of Bath, who was the leading English scholar of the day, and who was surely familiar with the new arithmetic, was involved in this development. If that is so, the accounting methods at the new 'Exchequer' were actually based on an abacus that was rather less like a chessboard than hitherto. With this understanding, it is safe to drop the quotation marks, and speak of the Exchequer in the accepted way.

The new Exchequer was initially based in Winchester, where the office of receipt for the king's treasury was located. Two very unusual weight-objects have been found there (Figure 14) and they appear to reflect the city's importance as a financial centre, as well as the metrological changes described in Section 2 (pp. 85–6). They are composed mainly of lead, covered with a decorative copper-alloy sheath.

The first one (3195) was a casual find in 1908. It is in very good condition and weighs 202 g, indicating that it was intended for checking a mark of silver at the old Viking level. The fine construction suggests an official purpose, which could have been checking payments in coin at the office of receipt, or weighing bullion brought directly to a local mint. The second one

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62 In the *Dialogus* (Johnson, 1983, 42–3) it is stated that the fire assay was introduced by Roger of Salisbury some years after he began supervising the Exchequer.
63 Brand 1994, 58.
64 Poole 1955, 415–16.
65 Poole 1955, 416, n.1.
66 Biggs 2009. The account given in Chapter III of Poole 1912 has stood the test of time remarkably well.
67 Oxford, St John's College, MS 17, f.42r, available online at http://digital.library.mcgill.ca/ms-17/.
68 Poole 1955, 244.
(3192) was found in the archaeological excavations of the 1980s. It is similar to the object just described, but there is slight damage to the sheath, and the mass is 214 g. So there is good reason to suppose that it was used for checking a mark of silver at the level of the ounce/ora of 27 g. The fact that these weights were found in Winchester reminds us of Wulfstan’s reference (Section 2, p. 80) to the standard of weights ‘as in London and Winchester’.

A few other weights of the same general form as the two Winchester weights have been found, but none of them is quite so decorative.\(^69\) The weight shown in Figure 15 was found on the north bank of the Humber, and is in fairly good condition. Its mass is 107 g, suggesting a half-mark at the post-1053 standard.

These sheathed weights are very rare in comparison with round lead weights that have no protective covering. The latter are found regularly, both in supervised excavations and by metal-detectorists. In fact the plethora of material has hitherto been in stark contrast to the complete lack of any considered discussion of their function and date. Many were illustrated as

\(^69\) Examples similar to that shown in Figure 15 can be seen on the PAS website (www.finds.org.uk): NMS-07E411 (=UKDFD 3117) with a mass of 99.5 g, and HAMP-EEBC91, with a slightly different sheath and a mass of 76 g.
part of the Rogers Collection, but no attempt was made to go beyond the obvious facts: they are round, made of lead, and the design has been produced by casting in a mould. The designs are often nondescript, but in some cases they seem to resemble coin-types. There are now enough good examples to justify an attempt to place these weights in their historical context, although the suggestions made here must be regarded as tentative and subject to modification in the light of future discoveries. We shall discuss four examples (Figure 16) in which the design itself is clear, even though its significance is open to debate.

Figure 16.1 has a ‘cross and pellets’ design, similar to that appearing on the reverse of silver pennies going back to the ninth century, at least. In the early Norman period it occurs on coins of the Paxs type, although in that case the pellets are more complex. The design appears on many lead objects, with a variety of sizes, and many of them could well be tokens or jetons. The object shown here is well-preserved, and it has the general appearance of a weight. Its diameter is 43 mm, thickness 6 mm, and mass 78 g. It may have been used for checking a payment of five shillings (60d.), in which case the pennies must have weighed at least 1.30 g.

Figure 16.2 resembles the reverse of the type 14 pennies of Henry I, issued c.1123–25, and often known as the ‘Pellets in Quatrefoil’ type. This object is unusual in that it bears an inscription, but unfortunately the only part of it that can be deciphered with confidence are the letters OMN. It is possible that it is a contraction of the well-known biblical quotation omnia in mensura et numero et pondere disposuisti, ‘thou hast ordered all things by measure and number and weight’. This piece is slightly smaller than the previous one (diameter 42 mm, thickness 5 mm, mass 73 g). If it was intended for checking a payment of five shillings-worth of pennies, the pennies must have weighed at least 1.22 g.

Figure 16.3 is similar to 16.2, but with a more generic design and a border of Vs instead of the inscription. These two items have the same diameter, but Figure 16.3 is slightly thicker, and

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Fig. 16. Four lead weights that may have been used for checking payments in silver. Data for each are given in the text. Private collection.
its mass is 96 g. The two pieces illustrate the problem of identifying weights that may have been used for checking payments in multiples of a penny, when the multiple cannot be inferred.\(^73\) If Figure 16.3 is a five-shilling weight (60\(d\)) the pennies must have weighed about 1.60 g, but if it is a half-mark weight (80\(d\)) the pennies must have weighed about 1.20 g.

Figure 16.4 has a rather different design, but is roughly the same size as the others (diameter 37 mm, thickness 7 mm, mass 65 g). One element of the design appears to be a representation of the paschal lamb, and there are three other elements, all similar, which may represent fleurs. The paschal lamb was the seal of the Knights Templar, who were active in England from about 1120 onwards. By the end of the twelfth century they had established themselves as financiers to the crown, and Figure 16.4 may be connected with that aspect of their activities. It could have been used to check payments in pennies of the 1.35 g standard, in which case it would represent four shillings (48\(d\)). But it may well date from a later period, when the pennies were heavier.

It is worth repeating that there are many different kinds of lead objects which appear to date from the high middle ages. It is being argued here that some of these objects were intended for checking payments in the era of the 'denarial economy', which began to decline with the re-introduction of gold coins in the thirteenth century. There are numerous difficulties that prevent definite proof of this claim, but there are also sound reasons for considering it. First, the possible alternative uses of the objects, such as weighing salt or spices, would not appear to justify the elaborate designs on some of them. Secondly, there must have been some means of checking payments made in batches of pennies, and these objects are the most likely candidates.

There is plenty of documentary evidence that large payments in pennies were routine in the twelfth century, and we might hope to find some mention of the methods that were used to check them by looking at the documents produced in the great religious houses of the period. The abbeys and priories were certainly involved in extensive commercial operations, and there are indeed references to the weights and measures that were used. But great care is needed in interpreting these documents because (as already noted above) some of them are derived from the \textit{Etymologiae} of Isidore of Seville. The very first document transcribed by Hall and Nicholas in their \textit{Select Tracts} is said to be 'officially ascribed to the tenth or eleventh century', and the editors comment that 'the classification and values of these weights and measures are confused by an unintelligent scribe'.\(^74\) A typically baffling statement, \textit{dragma est quantum denarius i argenteus pensat} appears to claim that 'a dragma weighs as much as a silver penny'. Now the dragma (drachma) was a fraction of a Roman ounce, usually one-eighth but sometimes one-sixth, and so well over 3 g. The English silver penny was never remotely as heavy as that, even in the wildest variations of the eleventh century. The only possible conclusion is that this document does not refer to the commercial operations of its time, but is actually an historical account of the old Roman coins and weights.

Another document from the same collection is ascribed to the eleventh or early twelfth centuries, and this one does appear to contain contemporary information:

\begin{quote}
\textit{Justa Gallos xx pars uncie denarius est, et xii denarii solidum reddunt. Ideoque iusta numerum denariorum iii\textsuperscript{v} uncie v\textsuperscript{v} solidos compleunt, sic et v\textsuperscript{v} solidi in tres uncias redduntur. Nam xii uncie libram xx solidos continentem efficiunt. Sed veteres solidum, qui nunc aureus dicitur, nuncupabant.}
\end{quote}

According to the Gauls, a penny is a 20th part of an ounce, and 12 pennies make a shilling. By the same reckoning, the numbers of pennies in 3 ounces and 5 shillings are the same, and so 5 shillings is three ounces. Hence a pound of 12 ounces contains 20 shillings. But we do not mean the old shillings, said to have been gold.\(^75\)

Other documents from the early twelfth century can offer relevant insights, subject to the usual warnings. In particular, there are two manuscripts that contain instructions for using the improved abacus with Hindu-Arabic numerals,\(^76\) confirming that this mode of calculation was

\[^{73}\] Biggs 2011, Appendix 1C.
\[^{74}\] Hall and Nicholas 1929, 1 (London, British Library Harl. 3017, f. 181).
\[^{75}\] Hall and Nicholas 1929, 5 (London, British Library Reg. 13A XI f. 141b).
\[^{76}\] One, ascribed to Turchill, is described in some detail by Poole 1912, 48.
already known in England, and could indeed have been introduced at the Exchequer by Roger of Salisbury. One of these manuscripts contains an enormous amount of useful information, including a table of weights and measures, with some interesting variants on the classical system of Isidore.77

It seems unlikely that we shall ever see the metrological picture of the reign of Henry I in full detail.78 Numismatists have long been intrigued by the events of 1124/5, when the mone-
yers were summoned to Winchester and mutilated for their misdeeds. It has been suggested
that this event heralded the end of the system of periodic recoinages,79 and possibly the intro-
duction of other new practices. Whatever actually happened, it must be concluded that stand-
ardization was not an accomplished fact at that time. Martin Allen’s recent survey of the
evidence regarding Henry’s pennies of type 14, minted around the time of the event, supports
that view with quantitative evidence.80

Henry died in 1135 and his nephew Stephen seized the crown. One of Stephen’s first acts was
to secure for himself the Treasury at Winchester, and with it the person of Roger of Salisbury.
The new king treated Roger with contempt, and in due course he acquired the bishop’s lands
and his personal fortune. Given this background it is rather surprising to find that the minting
of coins continued at all, but it did, albeit with very poor workmanship. Later, when civil war
broke out, coins were also issued by Matilda, the rival claimant to the throne, and a few barons.
The general picture seems to be that trade and commerce carried on, but clearly there was no
hope of enforcing the king’s writ throughout the nation.81 In such circumstances there could
be no progress towards replacing local standards of mass and measure with national ones.

Stephen’s son Eustace died in 1153, and he was persuaded to name Henry, Duke of Anjou,
as his successor. Henry II duly acceded to the throne in the following year. Coins of Stephen’s
last type (type 7) continued to be struck for a few years, and this type has also been carefully
studied by Martin Allen, who concludes that the average mass was about 1.33 g. This is con-
sistent with the traditional standard of twenty to the ounce/ora of 27 g that had been in place
for about a century, but seems to be below the standard used at the mints from 1158 onwards.82

4. The Tower pound and the Dialogus

Henry II was master of lands extending from Northumbria to the Pyrenees, of which England
comprised only a minor part. Nevertheless, England was important in his plans for territorial
expansion because there had been (at one time) a well-developed system for providing its ruler
with large amounts of cash. It is not surprising that Henry was keen to restore this system and,
if possible, to improve it. That would require complex mechanisms for managing the coinage
and its relationship with the payments made at the Exchequer. Although some documentary
evidence in the form of the Pipe Rolls is available for this period, it is far from complete.83
Furthermore, and probably by design, not all the king’s income was recorded in the rolls.84
Thus it is hardly surprising that some pieces of the administrative jigsaw are still missing.

The most visible of Henry’s reforms was the recoinage of 1158. In the Dialogus de Scaccario,
an invaluable document written about twenty years after the event, we find an assertion that
has a familiar ring:

\[ \ldots \text{postquam rex illustris cuius laus est in rebus magnis excellenterior sub monarchia sua per uniuersum regnum unum}\]
\[ \quad \text{pondus et unam monetam instituit} \ldots \]
\[ \ldots \text{our noble King, whose great deeds win the highest praise, appointed one weight and one money throughout}\]
\[ \quad \text{all the realm under his sway} \ldots \]

77 Oxford, St John’s College, MS 17; available online at http://digital.library.mcgill.ca/ms-17.
78 Allen 2012, 138–42 provides the fullest available discussion of the metrology of the coinage of Henry I.
79 Blackburn 1990.
80 Allen 2009, 97.
84 Gillingham 1984, 145.
85 Johnson 1983, 10.
So the illustrious King Henry II had decreed that there should be one weight and one money throughout the realm. Of course, this is not new: Wulfstan had decided that Edgar intended to say something similar long ago, but neither Edgar nor Wulfstan had made much progress towards implementing the ‘one weight’ claim. The belief that Henry’s decree may have been more than a vain hope depends on another statement from the *Dialogus*: . . . *et ad idem pondus omnes monetarii teneantur operari* . . . (…and all moneyers are bound to work to the same weight).\(^{86}\)

Here is an authoritative contemporary statement to the effect that all moneyers work to the same weight standard – but, as usual, there is no indication of what that standard might have been, or how it was transmitted to the moneyers.

From the numismatic point of view the recoinage of 1158 has one obvious feature, a new type of reverse for the penny, with a ‘cross-and-crosslets’ design. It can be inferred that there were several other changes in the organization of the mints and moneyers, some of them completely new, and some being simply restoration of practices that had lapsed under Stephen.\(^{87}\) We do not know how the supply of silver for the new coinage was obtained, but we do know that the dies from which the coins were struck were made centrally, so there must have been a mechanism for distributing them. The same mechanism could have been used for distributing ingots of silver and standard weights, but there is no direct evidence of that. We also know that in 1158 the number of mints was reduced significantly, but maintaining control over them would still have been a difficult task.

Despite the lack of documentary evidence, 1158 is important from the metrological point of view because it could well mark the introduction of a truly national standard of mass. The evidence of the coins suggests that the Cross-and-Crosslet pennies were significantly heavier than their predecessors. Instead of an average of about 1.35 g, the new pennies seem to be close to 1.46 g. This would imply a pound of \(240 \times 1.46\) g, that is, about 350 g. Significantly, there is good independent evidence for this value. In 1526 the standard pound then in use at the Tower mint was replaced by a new standard, which we know as the *English-troy pound*. The ratio between the two standards was stated explicitly to be 15:16, and by a chain of reliable and well-documented comparisons we can be fairly certain that the English-troy pound was about 373 g.\(^{88}\) Thus the earlier pound would have been about \(15/16 \times 373\) g, or 350 g. That is almost surely the magnitude of the *Tower pound*, which is mentioned by that name in documents going back to 1280. The period from 1158 to 1280 is an irritating gap in an otherwise convincing picture, but there is no evidence of a change in the mint standard during that period. So, although the introduction in 1158 of the Tower pound of 350 g cannot be totally beyond doubt, it is by far the most likely hypothesis.

Some circumstantial evidence is provided by the administrative background to the changes of 1158, in particular the restoration of the Exchequer under Henry II. Henry himself was born and raised in France, but he visited England often and it is thought that around 1145 he had encountered Adelard of Bath.\(^{89}\) After his accession he set out to re-establish the kind of administration that Adelard had helped to set up in the era of Roger of Salisbury. At the Exchequer, the key figure was Nigel, bishop of Ely, who was persuaded by Henry to oversee the restoration.\(^{90}\) His qualifications were twofold – he had been treasurer in the time of Henry I, and he was the nephew of Roger of Salisbury. Nigel’s son, Richard fitz Nigel, was officially appointed as treasurer, possibly as early as 1156.\(^{91}\) These two men were responsible for what historians like to call the ‘technical details’ of the Exchequer, and they may well have also been involved in planning the recoinage of 1158. The fact that Richard fitz Nigel was the author of the *Dialogus*, which contains the passage about the *idem pondus* quoted above, reinforces this conjecture. If the *idem pondus* was the Tower pound, we could rest easy.

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\(^{86}\) Johnson 1983, 12.

\(^{87}\) Mayhew 1992, 87–92.

\(^{88}\) Biggs 2011, Appendix 1A.

\(^{89}\) Haskins 1913.

\(^{90}\) Johnson 1983, 42.

\(^{91}\) Karn 2007, 311.
The relationship between the mints and the Exchequer leads us to consider why the magnitude of the new pound might have been set at 350 g. One possible explanation lies in the French connections of the king and his officials. Great fairs had been held at the city of Troyes in the Champagne region of France since the time of Charlemagne, and there was a mint at Troyes in the tenth century, if not earlier. In 1147 there is a reference to the ‘mark of Troyes’ as a weight-standard, and by the end of the twelfth century it was recognized as a benchmark. For example, in 1188 Pierre de Courtenay established for the county of Nevers a coinage of pennies to be minted at the rate of xvi solidos et viii denarios de pondere in marca Trecensi. This mark of Troyes was also the mark of Paris, and became the basis for what we shall call the French-troy weight-system. (For the avoidance of doubt, it must be stressed that it was not the same as the later English-troy system mentioned above.) There is good evidence that the French-troy mark was about 245 g, although this can be established with absolute certainty back to about 1266 only. The coincidence of this hiatus with the gap in the English evidence is unfortunate, especially so because we have explicit records of the relationship between the French-troy system and the Tower system from the fourteenth century onwards. The Tower pound of 350 g implied a mark of 233 g, so the ratio between these two marks was 21:20. According to Pegolotti that was the exact ratio in about 1320, and it was confirmed by the men of science in the eighteenth century.

The fact that French-troy weight had a 21:20 relationship with Tower weight led Pamela Nightingale to suggest that the magnitude of the Tower pound was chosen for that reason. If silver was received by the French-troy weight, and paid for in coins minted by the Tower weight, there would be a profit of one penny for each 20 penny-weights received. There are several reasons for doubting that this mechanism was implemented in practice, or indeed that the French-troy system was ever used officially as a weight-standard in England, but the neatness of the ratio may well have been the initial motivation for establishing the Tower mark of 233 g. An alternative motivation would have been to establish a simple ratio between the old mark of 216 g and the new one, in which case the ratio 15:16 would be a candidate. But here we must stop, lest we enter that branch of historical metrology which ‘manipulates figures and calculates correspondences among standards almost in a vacuum’.

It is also worth stressing that many questions can never be answered by arithmetic alone. What is the significance of the word sterling? The evidence cited above (Section 3, pp. 88–9) suggests that it was a standard of fineness rather than a standard of weight. Here the observations of Grierson remain pertinent, but they need to be integrated with more recent research. Why did Henry II introduce heavier coins, if profit was his main aim? It must imply that there were alternative mechanisms for guaranteeing a decent return, particularly in the transitional period immediately after 1158. Indeed, a subsidiary question arises naturally: was the pound of the Exchequer (libram scaccarii), as mentioned in the Dialogue, the same as the pound used at the mints? And finally: how many pence were produced from a pound of silver at the mints? There is now good evidence that the number was always slightly more than 240.

Taking a broader view of the metrological picture, it appears that the basic mass-units, the ounce/ora, the mark, and the pound, increased in magnitude several times in the high middle ages, as shown in Table 1. Whether this happened by accident or design is unclear.

Ideally, we should like to be able to trace the changes by looking at the weights that have survived. But there are many reasons why weight-objects can present a confusing picture: for

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93 Nightingale, 1985, 205.
94 Bisson 1979, 136 and 201–2.
96 Evans 1936, 245.
98 Nightingale 1985, 205.
100 Lang and Crosby 1964, 1.
102 Johnson 1983, 11.
103 Allen 2012, 144–7.
instance, it is rare for a weight from this period to display its denomination or purpose, and the objects themselves usually show clear signs of wear, which means that their intended mass can only be estimated. In this light, we can only hope to find clues by examining the artefactual evidence closely, but sceptically.

One class of objects that has not been mentioned thus far is the series of square lead weights. They bear some resemblance to the round ones discussed in Section 3 (pp. 91–2), but there is even less evidence of uniformity regarding their design or purpose. Some of them could well go back to the early medieval period, and may have been used for weighing commodities in the markets. But some, such as those shown in Figure 17, have ‘cross-and-pellet’ designs that might indicate the weighing of coins or bullion. The masses of these particular examples (240 g and 295 g) are unhelpful. However, another square weight (Figure 18) has the design of the game known as Nine Men’s Morris, and is interesting because its mass of 233 g is exactly right for a Tower mark. It could have been used for checking a payment of one mark in silver.

Fig. 17. Two square lead weights with cross-and-pellet designs. On the left: 240 g, 53 × 50 × 14 mm; found near Chelmsford. On the right: 295 g, 51 × 47 × 8 mm. Private collection.

Fig. 18. A square lead weight with the Nine Men’s Morris design: mass 233 g, height 18 mm, side 44 mm. Private collection.

104 Biggs and Withers 2000. Some of the items illustrated, such as nos. 58–60, p. 28, may date from the early medieval period.
A rather different style of weight, the so-called ‘cup-weight’, might possibly reveal useful information. Most weights of this kind are made of a copper alloy, which is more durable than lead, and so the observed mass is likely to be a fairly good indicator of the intended value. The style originated in Roman times, and appears to have been revived in the twelfth century, one characteristic feature being that the rims are decorated with the ring-and-dot motif that can be traced back by various routes to the influence of Islam (see Figure 7, p. 79). This fact, together with their widespread distribution, suggests that the cup-weights were used by merchants whose business involved payments in gold or silver, as well as by the goldsmiths who worked with the metals. However, the evidence relating specifically to the twelfth century is, as yet, far too vague to form the basis of any definite conclusions.

5. Weight and coinage in 1200

By the end of the twelfth century there had been some progress towards ‘one money and one weight’, but the ideal was far from being achieved. The mints were under central control and uniformity was supposed to be the order of the day, but the raggedness of the coins themselves does nothing to convince us that strict supervision was being enforced. John Brand’s careful investigations into the organization of the mints and exchanges are remarkable, in that he found no mention whatsoever of the distribution of standard weights to the mints, although he was able to find evidence of the distribution of dies, and even standards of fineness. Nevertheless, the evidence for the Tower pound of 350 g as the standard used at the mints is almost conclusive. It is also reasonable to think that the Exchequer was operating efficiently and, consequently, that the royal rents and taxes were being paid in silver of good weight and fineness. But many questions of detail remain, despite the evidence of the Dialogus. Outside the royal administration there was clearly a lot to be done before standards of mass could be imposed nationwide. The problem had been recognized in the days of Wulfstan, but a satisfactory conclusion was not achieved until the end of the fourteenth century. Unfortunately, many writers have assumed that uniform systems of ‘troy’ and ‘avoirdupois’ weight were already well-established in the twelfth century, and this has led to the widespread acceptance of anachronistic conclusions.

The mention of ‘avoirdupois’ leads to the question of weighing commodities other than the precious metals. The precious metals (including coins) were used in the markets to buy goods, and were weighed to check their value. In some cases the goods themselves were sold by weight, although many common items, such as grain, were assessed by measuring their volume rather than their weight. Furthermore, there were different weight-systems for different goods: indeed the existence of a generic ‘mercantile pound’ is debatable. The observed variability of the contemporary weight-objects, especially the leaden ones which could have been used as market-weights, does not suggest uniformity. It is true that by the end of the thirteenth century there was a mercantile pound of 15 ounces, the ounce being the one in use at that time for weighing precious metals, where the pound was 12 ounces. But the earlier evidence is sketchy. There is a reference to a 15-ora pound in the law code IV Æthelred but it is unsatisfactory because it is known only in the form of a Latin copy from the twelfth century. Not surprisingly, several different interpretations of the relevant passage have been proposed. It could simply be a statement of the fact that 15 oras of 16 pence made a pound of 240 pence, as shown in Figure 11. On the other hand it could be an early attempt to establish a relationship between the units of weight used for commercial goods and those used for coin and bullion. If so, it was ahead of its time.

There are very few documentary references to units of weight for commodities before the Norman conquest. In III Edgar it is stated that a wey of wool shall be sold for 120 pence.
This looks rather like one of Wulfstan’s later additions, but it surely dates from before the Conquest. Of course we do not know precisely the magnitude of the wey (or the penny for that matter) at that time. In the fourteenth century there were attempts to relate the system used for weighing wool to a generic mercantile pound, and eventually it was accepted that a *sack* of wool, then equal to two weys, should be 364 ‘avoirdupois’ pounds of 454 g. On that basis, it is reasonable to suppose that in the days of Edgar and Wulfstan a wey of wool was in the range 80–5 kg. The point is that, in practice, a unit of this size would have been incommensurable with the units employed for regulating the coinage.

At the end of the twelfth century it seems likely that most commodities were still sold by local and customary weight-systems, in units that were unrelated to the pounds used at the mints and the Exchequer. However, some far-sighted royal officials had recognized the need for an objective standard of mass, and for it to be widely available for comparison. One possibility was to use the current silver penny for this purpose. The evidence for this comes from the Assize of Bread, a sophisticated mechanism for regulating the size of the loaf of bread that was traditionally sold for the fixed price of one-farthing. As the price of grain varied, the size of the loaf varied accordingly: if, for example, grain became more expensive, then the loaf was smaller. The idea may have originated in the Carolingian era, but the earliest English version of the Assize of Bread dates from the time of Henry II.\textsuperscript{110} From our point of view the significant point is that the size of the loaf was expressed as a weight in units of pounds, shillings, and pence. It would not have been feasible to weigh each loaf against penny coins, but the weights that were used for this purpose could, in theory, be checked by anyone who had enough pennies. The current pennies were based on the Tower pound, so that the weight of a loaf was in fact being stipulated in the Tower weight-system. (Much confusion has been created by Connor’s belief that the system was in fact English-troy, but he subsequently withdrew from that position.\textsuperscript{111})

Richard, son of Henry II, was crowned in 1189, and at his coronation he is said to have made the usual heroic declaration that there should be ‘one weight’ throughout his realm.\textsuperscript{112} Richard was soon to be distracted by simpler forms of heroic endeavour, but fortunately some progress was made in his absence. In 1196 there was issued at Westminster a document referred to as the Assize of Measures, attributed to Hubert Walter (justiciar 1193–98). One objective of the Assize was to standardize the measures used in the cloth trade, and in this matter it had a very significant consequence for the history of English metrology: the institution of a standard yard made of iron. The practice of constructing and distributing physical objects in order to establish uniformity of weights and measures was known in antiquity, but its implementation in medieval England almost certainly begins with the Assize of 1196. Yard measures of iron are referred to in several contemporary documents.\textsuperscript{113}

The impact of this Assize on weights and weight-systems is less clear. The original Latin version, as published by Stubbs in the *Chronica* of Roger of Hoveden, contains the sentence:

*Pondera etiam et librae et caeterae pesiae sint ejusdem quantitatis in toto regno, secundum diversitatem mercaturarum.*\textsuperscript{114}

Weights also, and scales, and other measures of dimension, are to be of the same quantity throughout the kingdom, according to the different nature of the commodities.\textsuperscript{115}

This indicates the imposition of common standards of weight *in toto regno*, but seems to confirm the view, stated above, that different weight-systems could be used for different commodities. The Pipe Roll for 1197 contains some relevant entries. In the London and Middlesex account there is a payment of £11 11s. 6d. for ‘a purchase to make iron rods and beams and weights to send to all the counties of England’.\textsuperscript{116} The sum of money is substantial, but unlikely

\textsuperscript{110} Cunningham 1910, 567–9.
\textsuperscript{111} Connor 1987, 197. For his change of view, see Connor and Simpson 2004, 106. A recent discussion of the Assize of Bread, but assuming troy units, has been given by Davis 2004.
\textsuperscript{112} Connor 1987, 90.
\textsuperscript{113} Connor 1987, 91, 234.
\textsuperscript{114} Stubbs 1871, 33–4.
\textsuperscript{115} Trans. Riley 1853, 410.
\textsuperscript{116} Stenton 1931, xxii, 160.
to have been sufficient to pay for the enterprise in full. There are a few other entries in the pipe roll, indicating that standards may have been made locally, but paid for by the Exchequer.\textsuperscript{117} The limitations of this procedure are obvious, and sadly it was to be many years before an effective distribution of weight-standards was achieved.

REFERENCES


Biggs, N., 2011. 'Checking the current coins 1344–1421', \textit{BNJ} 81, 119–43.


Hall, H. and Nicholas, F.J., 1929. 'Select tracts and table books relating to English weights and measures (1100–1742)', \textit{Camden Miscellany XV} (London).


\textsuperscript{117} Stenton 1931, 17, 24.


Liebmann, W., 1903–16. Die Gesetze der Angelsachsen (Halle).


