

ENGLISH MEDIEVAL WEIGHT-STANDARDS REVISITED

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It is with some hesitation that any historian would dispute the conclusions of so distinguished a numismatist as Dr Stewart Lyon on the subject of medieval weight-standards. However, in his recent article 'Silver weight and minted weight in England, c.1000–1320'¹ he challenged the views I myself published more than twenty years ago, and so, despite leaving that particular field of research in the interval, I welcome this opportunity to re-examine afresh some of its more controversial aspects in the light of his views and also of research published since I wrote.² This discussion, beginning with the evidence of Domesday Book, allows me to develop the subject into a more general survey of the weight standards of the medieval English coinage up to the fourteenth century, and, to discuss in particular, the use of troy and tower weight. Dr Lyon has added further comments on the latter subject below, which remains a disputed one between us.

I

My approach to the subject, as a historian, perhaps differs from the numismatist's in that I am interested in coins less as objects to be sorted, classified, weighed and dated, and more in what they can tell us about the economic and political circumstances that produced them. It seems to me that when it came to deciding on the weight standards of the coinage, governments might have respect for historical tradition, but that was unlikely to have more influence over their policy than the convenience and practicality of the coinage for their own needs, and particularly for the furtherance of their immediate political objectives. The latter included adding to their revenues by the substantial profits they could draw from changing the coin-types, which seems to have been the principal interest of the Anglo-Saxon kings; the convenience with which they could collect taxes to pay their armies, which was probably the major interest of the Danes and Normans; and also the ease with which they could exchange and use coins within territorial possessions that spanned the Channel, a matter of interest to both the Normans and Angevins. Because of these different objectives I would not expect that what is written about weight standards in 1320 was necessarily true of the England of Domesday, or of Æthelred II.³

Historians tend, also, to differ from numismatists, in their greater use of documents, and, therefore, they have more awareness of the limitations of written records when these are used to support numismatic evidence. They know that the documents are often silent about what people took for granted, or had no particular interest in recording. Dr Lyon argues that because Cnut's laws do not indicate that any change was made in weights and measures in his reign, it was likely, despite the very different weight of their coins, that both Cnut and William inherited Æthelred's era.⁴ But as Professor Pauline Stafford has stressed, the laws that survive in that period do so only partially because their committal to writing depended on the clergy,

Acknowledgements: In writing this article I have benefited from a generous and fruitful exchange of views with Dr Lyon, as well as from discussions with Dr Sally Harvey, and with Professor Michael Metcalf. I alone, though, am responsible for the views expressed.

¹ See Lyon 2006.

² For my work on weight standards and the coinage see Nightingale 1982, 1983, 1984, 1985 and 1988, republished in Nightingale 2007.

³ See, by comparison, Dr Lyon's suggested link in Lyon 2006, 234, between the deduction of 14½ sterling pennyweights for mintage and seignorage in the 1280s with what he claims was a clear surcharge of 1s. 2½d. on Domesday renders on royal manors in Somerset.

⁴ *Ibid.*, 236.

who tended to record them haphazardly, or because they reflected their special interests. Even so important a reform as that of the coinage in 973 has no documentary record.⁵ Therefore, although Dr Lyon finds it highly significant that Pegolotti never mentions troy weight in an English context, and that the earliest recorded mention of it is in an English statute of 1414, this is not surprising if troy was the normal weight standard that Pegolotti was accustomed to use in Europe.⁶ It is even less surprising considering that as late as the fourteenth century significant changes in medieval weight-standards could occur in England without any explicit, official record of the event.

One example of this is the appearance of the 16 ounce mercantile pound in England. In 1372, as in earlier records, the City of London stated that the avoirdupois pound was composed of fifteen ounces.⁷ Each ounce weighed the same as the troy ounce of 480 gr.⁸ But we learn from the little-known records of the London Grocers' Company, and not from the City's, or from any royal edict or parliamentary statute, of a significant change shortly afterwards. The City had delegated control over its avoirdupois weighing beam to the Grocers' Company, because its members habitually bought and sold their goods using the mercantile or avoirdupois pound, and so the company was given the authority to stamp, by way of authentication, the weights used by individual grocers in their retail trade. In 1386 the Company listed in its records all the weights that they held in their keeping, and by which they tested those held by others. They held thirteen weights ranging from a $\frac{1}{4}$ oz, to $\frac{1}{2}$ cwt, and they specifically identified the $\frac{1}{4}$ lb weight as one of 4 oz.⁹ This meant that the avoirdupois pound was by then divided into 16 and not 15 oz. A medical treatise written in 1395 by a chaplain of St Bartholomew's, Smithfield, confirms the change when it relates that the apothecaries used two different pounds, one of 16 oz, the avoirdupois weight, which they used to buy their supplies wholesale, and one of 12 oz in their retail trade. Both ounces were of 20 dwt, the troy weight used by the goldsmiths.¹⁰ This shows that people were undoubtedly using troy weight in the fourteenth century without naming it, because they took it for granted.¹¹

Alterations in the weight standards of the coinage, though, were very different from any made in the mercantile pound, because control of the coinage from the earliest times belonged only to the crown, and the crown never surrendered it, or lost control of it, except temporarily during the anarchy under Stephen when some barons issued coins. It cannot be emphasised too much that whatever was the king's policy towards the manufacture and exchange of coins, or the purchase of bullion, was determined by him and his advisers alone, and was usually, as the *Dialogue of the Exchequer* says, purely for his own profit.¹² The king's freedom to change his policies, or to delegate afresh the responsibility for administering them, was not limited by any supposed 'rights' of moneyers or local mints, or by the charters of his predecessors. The latter did not necessarily remain in force unless the king specifically confirmed them. Nor, in the era of changing coin types is there any evidence to support the assumption of some numismatists that the king was restricted to issuing new types at regular intervals of two or three years, regardless of whether it was in his interest to do so.¹³

Naturally, it was easier for kings to govern with the minimum of coercion if they acted with some degree of consent, and if they did not impose on their subjects the costs involved in exchanging coin-types more than was reasonable to do so. However, a king like William I, who had no hesitation in crippling his new subjects with oppressive taxation, would certainly have felt no obligation to observe any convention he may, or may not, have inherited from his

⁵ Stafford 1989, 139.

⁶ Lyon 2006, 240.

⁷ Sharpe 1905, 300.

⁸ Connor 1987, 126.

⁹ Kingdon 1883, 66; Nightingale 1995, 302.

¹⁰ Hartley and Aldridge 1936, 25, 92–3.

¹¹ Connor 1987, 127, gives fifteenth-century sources as the earliest references to a 16 oz commercial pound.

¹² Johnson 1950, 38.

¹³ See, e.g., Eaglen 2006, 56. Dr Lyon is not committed to this view, and Ian Stewart has argued strongly against it: Lyon 1976, 195; see also n.20 below.

predecessors about changing coin types at regular intervals, unless it suited his own financial and political interests. Although he profited by the practice, as his Anglo-Saxon predecessors had done, he, like the earlier, Danish, conquerors of England, had also to consider how best to exploit English wealth in coined silver so that it could most easily support his power both in England and across the Channel. This meant that the coinage had to be suitable, both in its weight and fineness, for the payment of mercenaries.

My work on the weight-standards of the Anglo-Saxon, Danish and Norman coinages in England sought to make sense of changes in the weight of contemporary coins within the context of this exploitation of English wealth by foreign conquerors for their own military and political purposes. However, subsequent research has shown that some of the statements I then made should now be modified. The first of these relates to the vexed question of the Domesday payments in pence *de viginti in ora*, which Dr Lyon also discusses in his new article. I argued in 'The ora, the mark, and the mancus', that payments specified as *de viginti in ora* describe not a surcharge of 25 per cent, as was proposed by Dr Sally Harvey, but coin struck to a fixed weight-standard of twenty pence to the ounce. The weight of that ounce, I argued, had been fixed at 27 g, c.1031, and when, after 1053, Edward the Confessor began to strike the majority of his coins to a modal weight of c.1.33 g he introduced the standard of *de xx in ora*.¹⁴ This explains the pre-Conquest reference to a payment *ad numerum de xx in ora* at Leicester, which Dr Lyon can only account for, otherwise, as an unlikely scribal error.¹⁵

Although this continued to be the official standard of weight for the coinage, the crown continued to profit from striking coins above and below that standard at different mints. This meant that English coin was only acceptable to foreigners when it was paid by weight and not by tale. It was only when the Conqueror decided to end this system and replaced it by one based on a coinage of fixed uniform weight, that coins struck to the Confessor's standard of twenty to the ounce, became payable both in England and overseas by tale. Following Professor Grierson's, and Dr Lyon's own work on the Conqueror's coinage, I concluded at the time of writing my article that the Conqueror made this change with his Sword type (*BMC* Type VI), which Grierson dated c.1080–3. The weight of the coins was then close to twenty to the ounce, and the date of the issue appeared to be close to the first reference to 'sterling', c.1078.¹⁶

Professor Metcalf's subsequent work, though, shows convincingly that although a higher weight-standard of c.1.37 g for the penny was introduced at Winchester in the Conqueror's Type IV, and at Lincoln in Type V, weight standards still varied at London, and other mints, and continued to do so in Types VI and VII.¹⁷ Only in William's Paxs issue, Type VIII, was a uniform higher weight imposed on all the mints.¹⁸ By Dolley's scheme for dating the Conqueror's coins the Paxs issue belongs to the years 1083–6, but this date has recently been questioned on the grounds of Dolley's 'arbitrary juggling with two and three year periods', and the tenuousness of the link he made between the extraordinarily large issue of this type with the oppressive six-shilling geld levied after Christmas 1083, and, also, between the extensive Beauworth hoard of Paxs coins and the fear of a Danish invasion in 1085.¹⁹ It has also been suggested that the symbolism of a Paxs coinage was far more appropriate to the beginning of the new reign of William Rufus, than to the end of his father's.

All these judgments are necessarily speculative since there is no firm evidence to rely on. If, though, there was no compelling reason why kings, least of all a conqueror as ruthless as William, should be restricted to issuing new coin types at regular intervals, rather than when it suited his needs, then Dolley's dating has more to recommend it than a scheme that, relying

¹⁴ Nightingale 1983, 252–3; Nightingale 1984, 244–5.

¹⁵ Harvey 1967, 226; *Domesday Book* I, f. 230; Lyon 2006, 234, n.58.

¹⁶ Lyon 1976, 204; Grierson 1961, 267, 274–5.

¹⁷ Metcalf 1998, 182–7.

¹⁸ *Ibid.*, 188.

¹⁹ Eaglen 2006, 56.

on fixed three-year intervals, makes William Rufus issue the Paxis type.²⁰ What Metcalf has emphasised is the radical nature of the reform introduced by the Paxis type, of a single weight-standard of *c.*1.37 g-1.38 g at all the mints. Its significance is emphasised by the fact that at least 65 mints struck the very large Paxis issue, and their usual ranking was changed. Although London, as the chief commercial centre, had hitherto been the dominant mint, it struck only eleven per cent of the Paxis issue, whereas fifteen per cent was struck in Winchester, and some other mints, like Salisbury and Southwark, also saw much higher levels of activity than normal.²¹ It would seem, therefore, that these changes were dictated by government policy, directed from Winchester, rather than by commercial need.

Metcalf concluded, on balance, that the huge size of the issue was determined by the reform of the coinage, rather than by the need to pay the oppressive geld of 1084. He linked the reform with the Domesday survey, and saw both as examples of the king's determination to enforce firmer, more centralised government on his realm. It is this aspect of the reform that raises doubts whether Paxis was first introduced by William Rufus. Only the strongest of kings would have risked making such a change in the coinage at the beginning of his reign since it potentially alienated subjects who found that they received in exchange for their old, lighter pence fewer new pennies of fixed weight. It is conceivable, in fact, that the bitter complaint made in the *Anglo-Saxon Chronicle's* obituary of the Conqueror, in 1087, that he took coin 'by weight and with great injustice from his people with little need for such a deed', was provoked by the recent imposition of the new uniform weight standard, because it must have appeared in this light to every holder of old coin.²² In 1087 William Rufus would have had little confidence in his ability to impose such a radical reform because he was regarded by many as a usurper, and he was uncertain of the extent to which his new subjects would support him against the claims of his elder brother, Robert. In these circumstances an unpopular change in the monetary system must have appeared to him and his advisers, as a dangerous, and unnecessary risk. In fact the evidence suggests that the new king was anxious initially not to alienate his subjects by novel policies of this kind.²³

In view of these uncertainties about the date when this important reform of the coinage was introduced it is pertinent to ask what purpose it served and why the crown should then choose to make the change to a fixed, uniform weight for the penny. Because the *ora* of 27 g was used at this time in a large part of northern Europe, English merchants almost certainly benefited from the new fixed weight of the coinage. It is unlikely, though, that the Conqueror put their interests before his own. The change meant that he could collect taxes directly from his English subjects in coins whose fixed value would be instantly recognised by foreigners from the image they bore when they were paid out by tale. This was of the greatest benefit when he was paying foreign mercenaries to fight under his command. It also meant that William could predict the precise amount of silver he could collect from any geld. William was certainly conscious of the need to employ large numbers of mercenaries from 1083 onwards. They were needed to protect him against the rebellion of his son, Robert, and against Robert's supporter, the French king; also against a rebellion in Maine, and subsequently against the threat of a Danish invasion of England.²⁴ It is therefore conceivable that the uniform weight of the Paxis coinage was decided in late 1083, at the same time as the six-shilling geld was ordered. In that case the symbol of peace on the coins was meant to remind William's English subjects that what they were paying for was the maintenance of the internal peace and order that he had given them, and to which the *Anglo-Saxon Chronicle* paid tribute on his death.²⁵

²⁰ *Ibid.*, 57. Lord Stewartby has strongly criticised the notion of a pre-ordained pattern of changing coin types as 'an historical improbability... because competent governments are normally ready to respond to circumstances and to develop their policies in the light of experience, while incompetent governments are forced to do so': Stewart 1990, 480. I am indebted to Dr Lyon for this reference.

²¹ Metcalf 1998, 188.

²² Whitelock and Douglas 1961, 164.

²³ Barlow 1983, 60, 68, 70, 74.

²⁴ Douglas 1964, 243-4.

²⁵ Whitelock and Douglas 1961, 164.

What is certainly true is that the Paxs coins aptly fit the specification needed to explain the payments *de viginti in ora* that are recorded in 1086 in Domesday Book. One might go further and argue that two, at least, of the payments recorded there can only be explained if the Paxs coinage had been introduced a short time before it was written. Domesday records what appears to be a bewildering patchwork of various types of payment that reflects different layers of custom, and the different dates when renders had been settled. Some were paid by tale, some by weight, some weighed and assayed, and others are specified as *de viginti in ora*. In a few cases, too, the latter refer to coins that had additionally to be assayed because they specify payment in *libras alborum* (or *candidorum*) *nummorum de xx in ora*.²⁶ These can be explained by the fact that although the official weight-standard was twenty pence to the ounce, and the Winchester mint was observing it from c.1072, elsewhere standards continued to vary in the Anglo-Saxon tradition from mint to mint within the same type. It was therefore impossible for tax-collectors to distinguish those of inferior weight and fineness without an assay.²⁷ Assaying, though, required time and skill, and wasted 6*d.* in each pound in the late twelfth century. This was another compelling reason why William must have wanted to make it unnecessary by ordering the whole coinage to be struck to a standard weight and fineness.²⁸

The entry for Dover in Domesday Book indicates the recent timing of the change to a fixed weight standard and is therefore evidence of the existence of the Paxs type by 1086. Dr Harvey has shown that the *Excerpta* of St Augustine's, which is a text based on an earlier stage of the Domesday enquiries, initially recorded Dover's render to the king of £24 as *viginti et quattuor librae dantur regi de xx denariis in ora cum incensione et pensa*. However in Domesday Book this had become merely a payment of the same sum *de viginti in ora*, payable by tale.²⁹ It is inconceivable that the king would accept this change if it meant giving up either a surcharge, or the certainty that the actual coin he received by tale was of full weight and fineness. He could only have that certainty in Paxs and later issues, which could easily be recognised at sight by the tax collectors. The ubiquity of the Paxs coins by 1086 may explain why Battle Abbey was then content to receive by tale a render from the Kentish manor of Wye which before that year had been paid to the Crown, *de xx in ora*.³⁰ Since the introduction of the new fixed weight standard was so very recent it is not surprising that it is stipulated in relatively few entries in Domesday Book, and only in payments to the crown. Once all earlier coin types had disappeared from circulation there would have been no need to specify in later charters that dues should be payable to the king *in denarii de viginti in ora*, since these would then be the only coins current.

Dr Lyon objects that this interpretation is brought into question by the same Domesday entry for Dover that shows the reeve paying only 24 pounds to the king *de denariis qui sunt xx in ora* and 30 pounds to the earl *ad numerum*. He goes on to say 'The apparent absurdity of the king receiving less than the earl is one reason why Dr Sally Harvey argued forty years ago that *de xx in ora* meant 'payable in pence with a surcharge of 25%'. But Dr Harvey did not give any such reason in her article, because as she would know well there was no 'apparent absurdity' in the king receiving less than the earl in Dover.³¹ The distribution of local revenues between the king and his officials varied from place to place according to different needs. Certain estates allocated to the earl were to enable him to fulfil his official functions as the king's deputy in the defence of the realm.³² Although the Conqueror was more wary than the Confessor of creating powerful earls, certain towns of strategic importance clearly needed men who enjoyed local authority and superior resources to defend them, and Dover was one of them. This was why it had been placed previously under the authority of Earl Godwin and

²⁶ Harvey 1967, 223–4. *Domesday Book*, I, f. 164, Tidenham, Arlington, Tockington.

²⁷ Metcalf 1998, 184–6.

²⁸ Brand 1994, 66.

²⁹ Harvey 1967, 224.

³⁰ *Domesday Book*, I, f. 11v.; Dugdale 1817–29, vol. 3, 244f. One of the witnesses to this undated charter was Maurice, Bishop of London, who was consecrated on 5 April 1086.

³¹ Harvey 1967, 224. She does not comment on the discrepancy between payments to the King and to the Earl.

³² Maitland 1960, 207–8.

also given specific responsibility for manning a fleet.³³ For the same reason the Conqueror had put it under the control of his half-brother, Odo of Bayeux.³⁴

It seems from the entry for Sandwich that Dover retained this responsibility for naval defence under William, and it thereby bore an additional financial burden which was over and above what the burgesses paid to the king in coin.³⁵ Chester is another example where the townspeople apparently paid more money to the earl than to the king. Again, it is likely that this was because Chester's strategic importance required the earl to draw a substantial revenue from the place which he could use, if necessary, for its defence. It is also to be noted in Chester's case that the payment to the king was not specified as *de xx in ora*. Therefore one cannot conclude, as Dr Lyon does, that the fact that the earl appeared to receive a higher payment in cash than the king from Dover, meant that any payment to the latter, which was specified as *de xx in ora*, was a way of stating that it required a surcharge of 25 per cent, instead of being, as I argue, a payment to be made in the new coins of fixed weight of the current type.

II

It is, however, on the significance of troy weight standards in the monetary history of medieval England that I differ most from Dr Lyon, and in particular with his bold conclusion, 'There can be little doubt that what we know as troy weight was not employed in any way in the English coinage in Pegolotti's time, and it probably never had been.'³⁶ I argued in 'The evolution of weight standards' that although troy weight, which was the weight of the barley grain, was the ancient weight standard of the Anglo-Saxon people, the Danish conquerors replaced it by Roman standards for a period until it was re-introduced into England by Henry II in 1158 because, like the Normans and Danes before him, he wanted his English revenues to serve his continental interests.³⁷ To do this he needed the English coinage to be related to the same troy weight-standard as those of his ancestral possessions, Anjou, Normandy, Touraine and Maine. Dr Lyon thinks that even if Henry II had acquired control of the purchase of bullion by the mints in 1158, which he doubts, 'it is improbable that he would have introduced a practice of purchasing by continental troy weight'.³⁸

This view, though, reflects the insular tradition of seeing Henry II as essentially an English king, whereas he was an Angevin with little knowledge of England. He gained his English inheritance by conquest, and saw it merely as the richest part of an empire that spread over half of modern France. In fact between 1159 and 1167 Henry II spent all but three years on the continent, and in the thirty-four years of his reign he crossed the Channel no fewer than twenty-eight times and the Irish Sea twice.³⁹ Although eight principal coinages were in use in his loosely federated continental possessions, it seems clear that Henry acted fairly speedily after his conquest of England to establish his authority over all his mints and exchanges. In Dr Barrie Cook's view his actions from 1158 onwards may exhibit a policy of achieving 'significant administrative co-ordination' between them in which, at the very least, the Angevin government was 'viewing the mints and exchanges from across its territories as in some sense a unit'.⁴⁰ Since the troy mark was used as the bullion weight in the Angevin territories by 1147 an Angevin ruler bent on harmonising his minting policy had every incentive to introduce it as the bullion weight in England.⁴¹

So complete was the control that Henry exerted over England by 1158 that if he then left moneyers with the power to exchange coins he did so because it suited his purpose at the time,

³³ *Domesday Book*, I, 3. Sandwich provided the same service to the King as Dover.

³⁴ *Ibid.*, I, 1a; *ibid.*, 262v.

³⁵ *Ibid.*, I, 262v.

³⁶ Lyon 2006, 240.

³⁷ Nightingale 1985.

³⁸ *Ibid.*, 230.

³⁹ Warren 1973, 93, 302.

⁴⁰ Cook 2006, 622–5.

⁴¹ Nightingale 1985, 205.

and contrary to what Dr Lyon thinks, this did not in any way prevent him from introducing troy weight as the means of purchasing bullion.⁴² Despite Henry I's edict giving moneyers the sole right to exchange coin (which was intended merely to prevent counterfeiters from passing on their handiwork, and did not endow the moneyers with exclusive and permanent rights over exchanges) the Pipe Roll of 1130 refers to a *cambium* or exchange held in London by people (one of them a sheriff that year) whose names are not on any coins. Moreover, as Professor Mayhew pointed out in his chapter in the *History of the Royal Mint*, there is reason to think that people other than moneyers were involved, probably as exchangers, or financiers, at the Canterbury and York mints between 1158 and 1180.⁴³

In 1158 Henry also raised the weight of the sterling penny to a standard that Derek Allen considered was 1.46 g. Dr Martin Allen has stated in his recent review of the weight standard of the Tealby, or Cross-and-Crosslets, coinage that it is certainly possible that the standard of 1158–80 was 240*d.* per tower pound with a penny weighing 1.46 g.⁴⁴ This contrasts markedly with an average weight for the penny between 1153/4 and 1158 that Allen finds was 1.33 g, although those coins also appear to display regional variations round that figure.⁴⁵ I have argued that the new standard for the Cross-and-Crosslets pennies was fixed so that the difference between the troy pound used to buy bullion, and that of the tower poise used to weigh 240 pence, should amount to the weight of 12 tower pence. This was possible because the weight of the medieval English troy pound introduced by Henry II almost certainly matched the French *livre de Troyes* of 367.2 g instead of the modern troy pound of 373.48 g.⁴⁶

It is to be expected that an Angevin king who wanted a common monetary system throughout his mainly French empire would use a French standard of weight, and it is likely that he also changed at the same time the weight of the grain from the English troy barley grain to that of the French and Flemish wheat grain, then weighing *c.*0.0476 g.⁴⁷ This would make the English troy pound one of 7,680 gr. \times 0.0476 g = 365.6 g. The new tower pound of 7,200 wheat grains, which was the weight of 240 sterling pennies, was therefore derived from the weight of the troy pound, and its grain division had the convenience of giving each sterling penny a round number of 30 gr. and a pennyweight of 32 gr. It allowed the king to maintain a common bullion weight throughout his territories and to take by weight from every troy pound of bullion of sterling fineness received by the mints the English crown's traditional seignorage of six sterling pence in the pound, and also to pay the moneyers the traditional sixpence in the pound to cover the costs of manufacturing, and exchanging the coins.⁴⁸

That continental coins were exchanged in this way for sterlings, during the Cross-and-Crosslets period, by using the troy bullion and the tower mint weights, appears from the reference in 1166 in Flanders to the *petit marc de 10s. sterling*. This Flemish mark for silver weighed half of a troy pound but it was valued at 10 shillings sterling.⁴⁹ This indicates that the Flemings expected to exchange half a troy pound of their bullion by weight for 120 sterling pennies, with the difference in weight being retained as charges by the English exchanges. The weight and name of this Flemish mark indicates a clear connection between the troy bullion weight and the English coinage of the second half of the twelfth century that Dr Lyon does

⁴² Obviously the introduction of the troy pound for bullion did not affect the use of the tower pound to weigh sterling coins taken by the sheriffs to the Exchequer. The evidence of the *Dialogue of the Exchequer* quoted in Lyon 2008 below (194, n.5–6) is therefore not relevant.

⁴³ Nightingale 1982, 46; Mayhew 1992, 93–4.

⁴⁴ Allen 2005, 232; Allen 2006, 262–3.

⁴⁵ Allen 2006, 262–3.

⁴⁶ Miskimin 1967, 41. If one subtracts the 349.9 g weight of the tower pound from the 367.2 g of the medieval Paris troy pound the difference amounts to 17.3 g. This amounts to 12 tower pence each of 1.46 g.

⁴⁷ Nightingale 1985, 202.

⁴⁸ *Ibid.*, 205. I should have made clear in this article my understanding that the King would pay from this shilling the fees of the moneyers, which almost certainly would account for sixpence of it. There is no reason to doubt that the system also incorporated the adjustments that the moneyers made when they valued foreign coins in the thirteenth century to take into account differences in fineness between sterling and continental coins.

⁴⁹ Wyffels 1967, 67–71, 83.

not comment upon, although he does identify the Flemish ounce as being the same weight as the English troy ounce.⁵⁰

If, despite this evidence for the use of the troy bullion weight, it is still thought that Henry II did nothing before 1180 to relate the various Angevin coinages to the English currency what, one wonders, was his purpose in raising the weight standard of the sterling penny to 1.46 g in 1158? This was likely to have been a very unpopular move with the King's new English subjects, since as owners of the old coin of inferior weight they had to pay substantially to change it into the new pence. The King must have had good reason for risking such widespread unpopularity. It could be, therefore, that he saw the introduction of the new weight standard for the penny, and the troy weight for bullion, as the first steps towards linking his English and continental coinages. Since sterling was by far the strongest and most influential coinage at this time it was sensible to begin any necessary changes with the English weight standard. As long as his various coinages were exchanged by weight it may have appeared sufficient at first to link them by a common weight for bullion. Only when the flow of silver to England increased during the 1170s, and royal revenues grew with it, did it become desirable to strike coins that were exchangeable at face value in England and overseas, so that Henry could employ England's wealth in coin more conveniently in his Angevin possessions.

Dr Cook's recent work on the monetary system of the Angevin empire stresses the importance of the additional changes that Henry made in 1180. He points out that unusually he brought over experts from Tours and Le Mans to participate in the Short Cross recoinage. Because the tournois/angevin, mansois, and sterling coins formed the three levels of the Angevin monetary system, Cook has suggested that the presence of experts in all three coinages may indicate that this was the occasion, rather than 1158, when measures were taken to make the English coins exchangeable by set rates with those of his Angevin lands.⁵¹ Two charters of the 1180s indicate that there was a known fixed relationship between sterling and Angevin money.⁵² The common presence of sterling pennies with other Angevin coins in continental hoards after 1180 support this interpretation.

Martin Allen's suggestion that the new Short Cross type introduced in 1180 may have been struck to a standard of 246 to the pound would seem to challenge this interpretation because it implies that there was no long-term aim behind raising the weight of the penny in 1156. But as Allen himself points out, the recorded assays of the Short Cross coinage in 1181 and 1196 do not support his hypothesis of a lower weight standard from 1180, because, in John Brand's words 'any variance in the weight from standard would have an immediate effect on the result of the combustion'.⁵³ Allen's answer to this problem is to cite Brand as the authority for his suggestion that 'the results of the combustion were silently adjusted to make allowance for the lack of fineness of the coinage alloy and the loss of silver in the assaying process'.⁵⁴ However, to carry out regular assays of English coins in a way that required silent adjustments of that kind seems an unsatisfactory and pointless exercise, especially, as Brand himself pointed out 'any competent goldsmith could have removed all but a percentage point or two of impurities without difficulty'.⁵⁵

If one accepts, instead, the results of the assays of 1181 and 1196 at their face value, as signifying that the coins of those years were of full weight, and if one then analyses the weights of the coins in the Tealby and Short Cross hoards that Allen lists, the most significant difference in average weight appears not in 1180, but after the death of King John in 1216. The average of the 5,714 coins in the Tealby hoards is 1.42 g, while the average for the 1,217 Short Cross coins from 1180 down to 1216 is 1.41 g.⁵⁶ This is a slight difference considering the many factors that could influence the condition and weight of coins in the ground. One such

⁵⁰ Lyon 2006, 228.

⁵¹ Cook 2006, 628.

⁵² *Ibid.*, 629.

⁵³ Allen 2005, 230; Brand 1994, 65.

⁵⁴ Allen 2005, 230, citing Brand 1994, 69.

⁵⁵ Brand 1994, 69.

⁵⁶ Allen 2005, 229.

factor was the special selection of coins for hoards so as to exclude those that were both over as well as under the standard weight.⁵⁷ This continuity of weight is also surprising in view of the fact that after 1204, when Philip Augustus of France conquered Normandy, along with much of the Angevin empire, he ended the angevin and mansois deniers and imposed the tournois, as the French royal coinage, throughout his newly conquered lands.⁵⁸ This meant that, from the point of view of English kings, there remained after 1204 no pressing political reason why they should any longer base their monetary policy on the need to make the sterling penny readily interchangeable at face value with continental coins, by fixing the weight of each coin at precisely twenty to the ounce. Since King John's campaigns to preserve his continental possessions had also left him very short of money, it is not surprising that his last years reveal a greater readiness to tolerate coins of low weight.

This was first made clear within a year of the loss of Normandy, when a partial recoinage, which was intended to eliminate coins of light weight, still allowed any old money not more than two shillings and sixpence in the pound light to remain current. As Nicholas Mayhew has observed this was 'an unusually tolerant limit' which could be explained by the pressure on the coinage caused by the huge amounts exported to pay for Richard I's ransom and in the struggle to defend Normandy.⁵⁹ That such tolerance was seen as a temporary, if officially accepted, expedient, appears from its coupling with the issue by the mint of a poise for weighing a penny which was up to one-eighth light. It should be noted, though, that the poise was to be used only until Easter in the following year, and Class IV of Short Cross in the Bainton hoard shows that the average weight quickly returned to 1.41 g.⁶⁰

As England descended into civil war on the death of King John in 1216, and London, which was the source of much of the bullion that came into the country, fell temporarily under the control of the French prince, Louis, it is not surprising that trade suffered, less bullion was brought by merchants to the mints, and the coinage deteriorated in weight. Civil war threatened again in 1223. These events may have contributed to the lower weight of the hoards listed by Allen which were deposited after *c.*1217. Also, as Mayhew concluded, the deficiency in the used Short Cross coinage which was revealed by the Exchequer assay of 1247, 'would be entirely consistent with what we know of wear in coinage, and with the evidence of Exchequer combustions of the period'.⁶¹ 242 pence were being struck by 1256–8 from each pound of sterling silver.⁶²

Despite temporary tolerances of weight below the standard (which in any case became inevitable through wear because of the long intervals between recoinages) it was obviously considered important that the silver content of the coinage should be trustworthy, since coins could easily be weighed when they were exchanged, but not so easily assayed, unless their quantity made it worthwhile and there were expert moneyers on hand to do it. It is clear from Brand's work that whereas the silver content of the Cross-and-Crosslets coinage was very variable, as appears from the combustion rates recorded on the Pipe Rolls, that of the Short Cross coinage was remarkably even in quality, and generally within the normal tolerance rate of *6d.*, until the progressive wear of the coinage made itself felt.⁶³ In fact, as Dr Lyon points out, this aspect of the new coinage appears to have been so well known to the townspeople of Exeter that although they were required by charter to make a payment of £25 blanch, or assayed, they claimed it was unnecessary after the introduction of the new coinage to make the traditional extra payment of 12*s. 6d.* tale to satisfy the requirement of blanching.⁶⁴ It also appears from the Memoranda Roll of 1230–1, that even royal officials were by then content

⁵⁷ Archibald and Cook 2001, 25, 48. The authors contrast the composition of the selected Tockholes hoard of *c.*1218, 60 per cent of whose coins were over 95 per cent of standard weight, with the much wider spread of weights found in the coins of the Wainfleet hoard of *c.*1194–1204.

⁵⁸ Cook 2006, 672–3.

⁵⁹ Mayhew 1992, 98; Brand 1994, 13–15.

⁶⁰ Ruding 1840, I, 178; Allen 2005, 229.

⁶¹ Mayhew 1992, 108.

⁶² Allen 2005, 229, 227.

⁶³ Brand 1994, 60–2.

⁶⁴ Round 1899, 87, cited by Harvey 1967, 227.

to receive smaller sums in cash without an assay.⁶⁵ This new insistence on a consistent standard of fineness from 1180 accords with a policy of making sterling coins exchangeable at a fixed rate with Angevin coins on the continent. For this to be possible foreigners had to be able to trust completely in their standard of fineness.

III

What major changes in this system were made by the Edwardian recoinages? As Dr Lyon points out, Pegolotti's statement, c.1320, indicates that bullion was then bought and exchanged for coin not by troy, but by tower weight which was aligned with that of the Cologne mark of 233 g.⁶⁶ This shows that tower weight still remained what it had been in 1158 when Henry II introduced the new weight of 1.46 g for the sterling penny. By 1170 the Cologne mint had responded to that change by adopting for its *Magna Marca* the same weight as the tower mark. It could do this because its coins were of above sterling fineness.⁶⁷ The dates, though, show that it was copying the English weight standard, and not vice versa.⁶⁸ German merchants bringing Cologne coins to the English mints in the early fourteenth century would, therefore, have experienced no change in procedures. They continued to expect, like English merchants who were exchanging old sterlings for new ones, to have them weighed by tower weight, and to pay the seigniorage and minting charges in the same way. Did this mean, that when Flemish and French merchants, too, had to exchange their coin by tower weight, that Dr Lyon is correct in stating that troy weight 'was not employed in any way in the English coinage in Pegolotti's time'? To answer this question one must first investigate when and for what reason tower weight replaced troy for exchanging all foreign bullion at the mint.

The period between 1180–1279 is striking for the continuity exhibited by the charges for minting, and seigniorage. English and foreign merchants alike paid 6*d.* in the pound in seigniorage to the crown and sixpence to the moneyers throughout that period.⁶⁹ This fixed charge was maintained even when the number of pence struck from the pound had increased to 242 by 1259, and it seems clear from this fact that the charges were paid not by tale, but by weight in the way first established in 1158, by using the difference between the troy and tower pounds.⁷⁰ The motivation to change this system seems to have been the determination of Edward I, as recorded by the *Treatise on the New Money*, to obtain more profit from the mint. In 1279 the crown's seigniorage was raised to ninepence in a tower pound from which 243 pence were now struck.⁷¹ This meant that in 1279 the customers of the mint had to pay total charges of 19 pence for English silver and 17 pence for foreign silver. Later, though, these charges were reduced, and varied, as a means of attracting silver to the mint.⁷² The effect of these changes was to overturn the stable system which had led the Flemings to create their *petit marc de 10 shillings sterling* in the twelfth century when they first aligned their troy bullion pound with the sterling value of the tower pound. The new royal policy of varying charges made such arrangements obsolete. Instead, changes in seigniorage could be most easily executed by using the tower weight as the bullion weight and by levying the charges by tale. This was done in 1279 when the merchants were repaid in sterlings counted out at the rate of 240 pence to the pound, even though they were now struck to a standard of 243 to the pound. The king kept the additional 3*d.* for himself. This innovation indicates a clear break

⁶⁵ Brand 1994, 61.

⁶⁶ Lyon 2006, 230; Evans 1936, 255.

⁶⁷ Nightingale 1985, 207.

⁶⁸ There is no evidence to support the contention of Simpson and Connor 2004, 328, that the formal introduction of troy weight in England occurred in the late fourteenth century. The fact that the Bruges silver ounce matched the weight of the English troy ounce by 1166 shows that the strong commercial pressures which they claim caused the introduction of troy weight into the mint long antedated the fourteenth century, as, indeed, the history of the wool trade shows. By the late fourteenth century the wool trade was actually declining.

⁶⁹ Mayhew 1992, 132.

⁷⁰ *Ibid.*, 132–3.

⁷¹ Johnson 1956, 68.

⁷² *Ibid.*, 133–5.

with the past, and a policy that was dictated more by royal profit than by the political and commercial benefits of fixed exchange rates.⁷³

In one important aspect of minting policy, though, there was continuity. The mint continued to maintain the traditional sterling standard of fineness, and it is clear that it was determined by troy weight. This is not surprising since England's main trading partners still used weights related to the troy system, and the Bruges silver ounce continued to match the English troy ounce exactly.⁷⁴ Troy also remained the weight used by the goldsmiths for assaying bullion. Its use in the mint for this purpose is made plain by the document which describes how the Abbot of Bury St Edmund's was instructed in 1280 to make the king's new coins by Gregory de Rokesley.⁷⁵ Besides being Warden of the Exchange and Mint, Rokesley was an experienced merchant and goldsmith. The first part of his reply, which is recorded, no doubt as he spoke it, in French, dealt with the weight of the actual coins. 243 pence had to be struck from the (tower) pound, of which no more than six heavy and six light coins were acceptable. They were to be no more than a grain and a half heavier or lighter than the standard. The second part, in Latin, then describes the standard of fineness of the coins which was calculated in troy weight: 'The ounce weighs twenty dwt. The penny weighs 24 grains. A heavy penny weighs 25½ grains. A light penny weighs 22½ grains'.⁷⁶

Although medieval clerks used the words *sterlingum* and *denarius* interchangeably to describe either the pennyweight, or the minted penny, the weight system referred to in this Latin passage is clearly that of the 24 grain pennyweight and pound of 5,760 grains which Pegolotti reported c.1320 was also the bullion weight of the goldsmiths. He described it as *di sterlini 20 per 1 oncia e d'once 8 per 1 marco*.⁷⁷ The Latin text relating to Rokesley's speech therefore refers not to the actual weight of sterling pennies, which was 22½ gr., but to the troy pennyweight of 24 gr. which the documents record was the weight used by the mint both for assaying coin and for determining how much alloy should be added to silver to achieve the sterling standard of fineness.⁷⁸ The careful definition of the weight of heavy and light pennies was added because the changer used both light and heavy coins in the trial of the pyx, and because the assayer, as Brand showed, needed to know any permitted variation of weight from the standard since it would have an immediate effect on the result of the combustion.⁷⁹ These documents therefore indicate, as Charles Johnson, their editor, noted, that in 1280 two weight standards continued to be used in the mint for different purposes: tower to establish the weight of sterling pence, and troy to create and test its fineness, and also to establish the fineness of foreign bullion.⁸⁰

Dr Lyon, though, argues below that because the Latin text refers to light and heavy coins it is not describing the pennyweight of 24 gr., but minted pence of that standard, and since the actual coins demonstrate that the standard was, in fact 22½ gr., he thinks this shows they were not troy grains, but grains of lighter weight. He therefore concludes that the tower pound, like the troy pound, had 5,760 grains, and that all the references in the mint documents which describe a 24 grain pennyweight, are describing tower and not troy weight. As evidence he cites a document, published by Ruding, from a collection on mint affairs compiled by the antiquary Sir Robert Cotton about a hundred years after the abolition of tower weight. Ruding relies on this document as the only evidence for his assertion in his *Annals of the Coinage* that the tower pennyweight had 24 grains, and the tower pound 5,760 grains.⁸¹

However, the Cottonian table as Ruding reproduced it (illustrated below, p. 196) contains mistakes in calculating the tower equivalent of troy weight for the pennyweight, ounce, and

⁷³ Mayhew 1992, 133.

⁷⁴ Simpson and Connor 2004, 329. The English troy ounce, besides matching the Bruges silver ounce, had a ratio of 16:15 with the English tower ounce, which itself matched the Cologne ounce.

⁷⁵ Johnson 1956, 86–7.

⁷⁶ *Ibid.*, 87.

⁷⁷ Evans 1936, 255.

⁷⁸ *Ibid.*, 67, 92; Brand 1994, 60–2.

⁷⁹ Johnson 1956, 92.

⁸⁰ *Ibid.*, 70, n.1.

⁸¹ Ruding 1840, I, 7.

hundredweight. It appears from Dr Lyon's researches that Ruding was responsible for these mistakes in transcribing the original document, which he obviously found confusing. Ruding's errors, though, do not make the original Cottonian analysis of the grain division of the tower pound any more satisfactory as an historical source, and although Ruding's *Annals* have long been a well-known source on mint affairs in general, his claim that the tower pound contained 5,760 grains has not been accepted by Grierson, Connor, Zupko, or any other modern authority on medieval weight standards.⁸² Ruding, though, rightly identified the tower grain of the Cottonian manuscript as the wheat grain, citing as his authority one of the several thirteenth-century sources which say that the sterling 'shall weigh thirty-two grains of wheat dry in the midst of the ear'.⁸³ These sources demonstrate that the pound was then still divided into the French wheat grains which, as I have previously argued, replaced the older English barley grain in 1158. They describe a thirteenth century pound which contained $240 \times 32 = 7,680$ wheat grains. All the authorities referred to above accept that these are the equivalent of 5,760 barley or troy grains.⁸⁴ The royal proclamation of 1526 which abolished tower weight declared that the tower pound weighed $\frac{3}{4}$ of a troy ounce less than the troy pound.⁸⁵ From this it can be seen that the tower pound must have contained either 7,200 wheat grains, or 5,400 barley or troy grains. The Cottonian manuscript, though, led Ruding to make the mistake, which he corrected in a later reference, of drawing up a table which made the 32 wheat grains of the pennyweight the equivalent of the $22\frac{1}{2}$ troy grains of the sterling penny, and, as a result, he concluded, erroneously, that there were 5,760 grains in the tower pound.⁸⁶

However, Ruding also printed *in extenso* in his *Annals* another Cottonian document, again signed by Sir Robert himself, which is closely related in subject matter to the first, and uses the same technical term of a 'journey' of 30 troy lbs of bullion as equalling 32 tower lbs of sterling coin. Since it has particular relevance to this enquiry about whether and how troy weight was used in the medieval mints it is worth quoting. 'There is a weight which hath been used in England from the beginning, in the king's mints, till of late years, and derived from the Troy weights; for by the Troy weight of 12 ounces the merchant bought his gold and silver abroad, and by the same delivered it in to the king's mint, receiving in counterpoise by Tower weight, which was the prince's prerogative, who gained thereby $\frac{3}{4}$ of an ounce in the exchange of each pound weight converted into money, beside the gain of coining, which did rise to a great revenue, making for every 30 lb Troy, being a journey of coined money, 32 lb Tower'.⁸⁷

This information, of course, agrees with the proclamation of 1526 which abolished tower weight, on the difference between the tower and troy pounds.⁸⁸ The phrase 'beside the gain of the coining' probably relates to the additional gain the crown could make from the profits of the shear and the foundry, since it obviously could not mean that the crown profited from minting charges paid by tale, as well as from the difference in weight between the two pounds.⁸⁹ Since this document has clear links with the first Cottonian manuscript which Dr Lyon relies on for his evidence, it should be accorded the same degree of authority. If the first manuscript can be used to justify an argument for a novel granular division of the tower pound, then the second strengthens my case that from the reign of Henry II up to 1279 the mint exchanged bullion delivered to it by troy weight for sterling coin of tower weight, with the difference covering the seigniorage and minting costs. This evidence for the continued use of troy weight in the mint finds support, also, in the proclamation of 1526, which referred to the Duke of Burgundy's old coin lacking 'in their fineness of the sterling 20d in a pound

⁸² Grierson 1975, 178; Connor 1987, 110, 125; Simpson and Connor 2004, 349; Zupko 1977, 28.

⁸³ Ruding 1840, I, 7; Connor 1987, Appendix A, 320.

⁸⁴ Connor 1987, 124.

⁸⁵ Hughes and Larkin 1964, no. 112, 160.

⁸⁶ When Ruding 1840, I, 295, refers to the statute of 12 Henry VII which described the sterling as containing 32 wheat corns he wrote 'it is evident that the sterlings in that statute are pennyweights, and not the coins of that name'.

⁸⁷ Ruding 1840, I, 92.

⁸⁸ Hughes and Larkin 1964, I, no. 112, 160.

⁸⁹ Ruding 1840, I, 88, 91–2.

weight troy' as a description of what was happening *before* 1526. It thereby indicates that the troy pound continued to be the weight used for the assay when coin was exchanged.⁹⁰

Despite the traditional description of the pennyweight as 32 wheat grains continuing in some later official documents, including a statute of 12 Henry VII, c. 5, the pennyweight is described by 1280 as containing 24 grains.⁹¹ The *Treatise on the New Money*, of c.1286–7, also records that the weight system then used for the assay and the composition of sterling alloy was the troy system of a 24 gr. pennyweight.⁹² Dr Challis has shown how the assayer's pound, and the ready-reckoner, that are also recorded in these documents, enabled the mint to produce silver of sterling standard with a sliding scale of charges related to the quality of the bullion brought to it.⁹³ The assayer's pound weighed half a troy ounce, and contained as many grains (10 dwt × 24 gr. = 240 gr.) as a full troy pound does pennyweights (12 oz × 20 dwt).⁹⁴ This meant that for every grain of difference at the assay there was one pennyweight of difference in the full troy pound, and it thereby allowed the results of assaying a small amount of metal to be read off easily in terms of the latter.⁹⁵

Although the use of an assay predated Domesday Book, the *Dialogue of the Exchequer*, written in the late 1170s, describes an Exchequer assay which used a full pound weight of coin, rather than half a troy ounce. This was also true of the Exchequer assay recorded in 1248.⁹⁶ This may indicate that the assayer's pound was not then in use, and it may not, therefore, much pre-date 1280. Its introduction certainly made an assay less wasteful of silver. One might, therefore, link its introduction with the mint reform of 1262 whose importance has been stressed by Nicholas Mayhew. By this reform the profits of the foundry, which had formerly accrued to the moneyers, were now paid to the Crown. Generally the profits from the assay amounted to about one-third of the profits of the exchange, and in normal times they were a significant sum.⁹⁷ However the accounts for the foundry and Exchange were only merged by 1279.⁹⁸ Again, this seems to emphasise Edward I's keen interest in making all aspects of the mint's work as profitable to him as possible, and his readiness to make major changes in the system to achieve that end.

What changes were made in the mint's use of tower and troy weight standards after 1279 once all bullion and plate was weighed by tower weight? If one collates the information contained in the *Treatise on the New Money* written c.1286–7, with that in its revised version of 1290–1300, then it appears that the procedure when a merchant brought bullion to the exchange was as follows: firstly the exchanger weighed it by tower weight, and then valued it according to how much more or less alloy it contained than the sterling standard of 18½ troy pennyweights to the troy pound.⁹⁹ If it equalled the sterling standard, then fourteen and a half tower pennyweights were separated from it to pay the king's seignorage of 9d. and the minting costs of 5½d. This would normally be done from 1279 by tower weight, except on the rare occasion of that recoinage when payments were made by tale.¹⁰⁰

For silver of a quality which was assessed as inferior to the sterling standard, the exchanger removed by weight the number of pennyweights per pound by which he estimated it fell short. But this time the weight used was that of the troy pennyweight.¹⁰¹ The amount deducted was called the tally. A bill was written and given to the merchant specifying the weight of what remained of the bullion, after the deductions, and giving the date when it was received. The separated silver of the tally was then taken to the Master of the Mint who added it to the rest

⁹⁰ Ibid.

⁹¹ Johnson 1956, 67, 87.

⁹² Ibid., 67. This is the date for the composition of *The Treatise* given by Mayhew, instead of its editor's choice of c.1280: Mayhew 1992, 123.

⁹³ Challis 1988, 76–86.

⁹⁴ Ibid.

⁹⁵ Ibid.; Johnson 1956, 67.

⁹⁶ Johnson 1956, 54.

⁹⁷ Mayhew 1992, 118–20.

⁹⁸ Ibid., 119.

⁹⁹ Johnson 1956, 68.

¹⁰⁰ Ibid., 68.

¹⁰¹ Ibid., 72–3.

of the molten bullion in the crucible to bring it up to the sterling standard. Repayment to the merchant was made after minting by the same tower weight of sterlings as that specified in the bill, namely the weight of bullion he had brought, less the deductions for the tally and for the seigniorage and minting charges.¹⁰² In this way bullion was bought and exchanged by tower weight, but its fineness was determined by troy weight.¹⁰³ Sterling pennies, of course, continued to be struck to tower weight. The system used in the mint to carry out these operations from 1279–80 therefore continued to use both troy and tower weight standards. It worked well because they were linked by their common grain of troy weight.

However, by the time that Pegolotti was writing *c.*1320, it appears from his evidence that the English troy grain had increased in weight to 0.0648 g. Professor Miskimin has shown how such an increase would explain the ratio that Pegolotti reported between the gold and silver Flemish marks of 21:16 instead of the 20:15 to be expected from the number of ounces in each mark. He explained this unusual ratio by the grain of the Flemish silver mark changing to match a new, slightly heavier English grain, when the pound was redivided into 5,760 gr., while that of the Flemish gold mark remained that of the French system.¹⁰⁴ If Miskimin is right this would mean that before 1320 the English troy pound had assumed its modern weight of 373.48 g and its division into 5,760 gr. Why should this happen and when?

The most likely reason would be to accommodate a slightly different weight for the sterling penny. 1279–80 was the first recorded occasion when 243*d.* were struck from the tower pound, and it is obvious that the intention was to make this arrangement permanent to accommodate higher charges.¹⁰⁵ If, as seems likely, the mint was still using up to 1279 a tower pound of 7,200 wheat grains, then its re-division into 243 pence presented the moneymen with a penny which, from their point of view, had an impossible weight to manufacture with any consistency, namely one of 29.63 gr. instead of 30 gr. This is most likely the reason why the wheat grain was replaced by the barley, or troy, grain, the other generally accepted unit of weight in northern Europe. By this substitution each sterling penny struck at 243 to the tower pound, would be allotted a more manageable 22¼ gr. A new technique which was introduced in 1279 also made it much easier to work with a weight that incorporated a quarter grain. It appears that instead of the coins being cut individually from square flans, droplets of silver were poured on to a plate, and then flattened. This process made it much easier to produce coins of a weight accurate to a quarter grain.¹⁰⁶ The disadvantage was, though, that a tower pound composed in this way of 243 pence would have weighed 5406¼ troy grains.

This was not only an awkward pound weight for bullion, but if these had been the old, lighter barley grains of 0.0637 g, then they would have produced a tower pound of only 344.4 g instead of 350 g. Rather than reduce the weight of the pound it appears that the decision was taken to increase the weight of the troy grain from 0.0637 g to 0.0648 g, an increase that was sufficient to maintain the traditional weight of the tower pound at 350 g.¹⁰⁷ Since it was important to maintain the link between the tower and troy weights, which was effected by the use of the same grain, they also increased the English troy pound to its modern weight of 373.48 g. The Flemish mints found it convenient for their silver mark to follow this change in the English weight standard, in the same way that they had followed it for two hundred years, because of the strong commercial links between the two countries created by the wool trade. They preserved, though, the French weight of their gold grain, thereby creating the unusual ratio between their two marks. By contrast, when the English mint began striking a gold coinage in 1344 it made sure that the weight of its gold grain was related to that of the troy grain of the silver coinage, so that the value of the gold and silver coins could be linked

¹⁰² *Ibid.*, 95.

¹⁰³ *Ibid.*, 70, n.1.

¹⁰⁴ Miskimin 1967, 41–2.

¹⁰⁵ Mayhew 1992, 134, Table 3.

¹⁰⁶ *Ibid.*, 127.

¹⁰⁷ Simpson and Connor 2004, 349.

by a uniform weight standard. Accordingly the grain of gold was fixed at a weight which was the same as 60 silver grains of troy weight, or $2\frac{1}{2}$ troy pennyweights.¹⁰⁸

This consistent attachment to troy weight standards explains how sterling coins maintained a fixed exchange rate with several coinages in north-west Europe throughout most of the thirteenth century, and even beyond. For example 20 shillings sterling was worth 80 shillings in Tournois coins for most of this period.¹⁰⁹ Other coinages show similarly by the round sums in which they valued the English pound (as 20*s.* in Cologne in 1208; as 70*s.* in Artois in 1265; as 65*s.* in Flanders, and 60*s.* in Brabant in 1270–5) that despite the debasement of many of them there continued to be an easy and well-understood exchange rate with sterling, based on accepted standards of troy weight and fineness. This is confirmed by the finding of many French-made weights of about the year 1300 in the River Seine, near the Pont du Change in Paris, which weighed divisions of the English mark calculated at 24 pennyweights to the ounce, the troy weight. To emphasise this point some were even labelled Apothecary's.¹¹⁰

In summary this paper has argued that troy weight, based on the French troy pound, was restored to the English monetary system by Henry II from 1158 after a period when the Danish and Norman conquerors had used weight systems related to the Roman or Byzantine pound. Henry II made the change as an essential part of his design to unify the weight standards of his territories and to relate their varied coinages one to another. It also seems likely that at the same time Henry introduced the French wheat grain in place of the old English barley grain. He thereby created an English troy pound containing 7,680 gr., which many English sources attest was the standard in the thirteenth-century. However, it seems from the evidence of French weight standards, that the troy grain used by the English mints in the twelfth and thirteenth centuries was lighter than it subsequently became. This meant that the English troy pound, which Henry had introduced as the bullion pound, weighed *c.*366 g and its 7,680 wheat grains each weighed *c.*0.0476 g. The difference in weight between this pound and the tower pound of 240 pence, which weighed $240 \times 1.46 \text{ g} = 350 \text{ g}$, allowed the king to levy 12*d.* in seigniorage and minting charges by means of which a fixed exchange rate could be maintained with the coinages of his other Angevin territories.

This system survived the break-up of the Angevin empire until Edward I's determination to profit more from his mints led to the replacement of the wheat by the barley, or troy grain, in the re-coinage of 1279–80. At the same time the mint increased the weight of the troy grain slightly so that both the sterling penny, and the bullion weight, or troy pound, should be divisible into a relatively easy number of grains, or half grains, that the moneyers could cope with in their work, and which would allow the crown to increase and vary its charges. Despite these changes in the weight of the grain there can be no doubt that the English penny and its pennyweight remained throughout this period related to troy standards of weight. Because of this the sterling coinage maintained its connections with the other coinages of western Europe, and directly influenced the weight standards used for the silver coinages of Flanders and Cologne.

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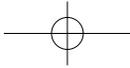
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¹⁰⁸ Johnson 1956, 83.

¹⁰⁹ Spufford 1986, 209–10.

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