

THOMAS GRAHAM'S COPPER SURVEY OF 1857

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ON 30 July 1857 the Master of the Mint gave evidence before the Royal Commission on Decimal Coinage.¹ Even those, like me, who are not enthusiastic admirers of Thomas Graham's Mastership would concede that it was a competent performance by a Master who had only been in office for two years. But with a Commission of just three members the circumstances were not as awe-inspiring as they sound, and a suspicion also exists that the questioning included rehearsed full tosses for despatch to the boundary.

Graham's evidence had been foreshadowed by the Chancellor of the Exchequer earlier in the year, when the somewhat leisurely progress of the Commission since its appointment in November 1855 had prompted a question in the House of Commons. In the course of his reply on 26 February² the Chancellor had indicated that the Commission would be calling upon the Master of the Mint to explain the time, labour and cost of providing any new coins which a decimal system would require; and this was, indeed, to be a major element of the discussion when Graham appeared before the three Commissioners on 30 July.

At the heart of what Graham had to say was a survey of the copper coinage which had been undertaken by the Royal Mint some six months before. It was a survey that bore directly on the work of the Commission since the more generally preferred decimal system of a pound of 1000 mils would almost certainly have required the replacement of the existing copper coinage. And, quite plainly, it would be useful for the Commission to have an idea of the quantity of copper coin in circulation so that it could be aware of the extent of the recoinage programme if the £-mil system were to be its ultimate recommendation.

But whether or not this was to be the recommendation of the Commission, the replacement of the copper coinage was something that had come to seem desirable for its own sake. Gladstone, as a youthful Master of the Mint, had contemplated reform in 1844;³ the French had successfully recast their low-value coins in the early 1850s; in July 1855, within two months or so of becoming Master, Graham had indicated his awareness of the case for change;⁴ and in December 1856 a contract with Heaton's for the supply of copper coin was not extended pending instructions from the Treasury as to a lighter coinage of bronze.⁵ That the existing copper coinage was heavy, cumbersome and inconvenient could not be denied. A penny of the 1850s, for instance, was not far short of a crown piece in diameter and three of them combined to weigh a massive two ounces; three halfpennies weighed an ounce; and even the humble farthing was nearly an inch in diameter and it took just six of them to make another ounce. In these circumstances it was no surprise, perhaps, that the private experiment of small bi-colour model pennies should have been a nine days' wonder in November 1847, to

Note. This paper, in its broad outline, formed the second part of my 1996 Presidential Address. It has, however, been slightly extended and I have taken the opportunity to give it footnotes.

¹ *Appendix to the Final Report of the Decimal Coinage Commissioners* (London, 1859), pp. 53–67. Hereafter referred to as *Appendix*.

² *Parliamentary Debates*, 3rd ser. 144, cols 1388–9 (26 February 1857).

³ PRO. Mint 4/40 (December 1844). The correspondence between Gladstone and James Morrison, the Deputy Master,

was apparently prompted by the complaints of Sir George Chetwynd, the well-known collector of provincial tokens, about the deteriorating state of the copper coinage. It may well be that the inconvenient nature of the copper coinage placed an additional burden on the circulation of silver (PRO. Mint 8/36, pp. 197–8 and 202–4).

⁴ PRO. Mint 1/42, p. 373 (Graham to Sir George Cornwall Lewis, Chancellor of the Exchequer, 2 July 1855).

⁵ PRO. Mint 1/42, pp. 549–50 (Graham to Heaton's, 11 December 1856).

the extent that William Wyon had had to write to *The Times* to disclaim responsibility on behalf of the Royal Mint.⁶

The problem was greater, however, than size alone. Dating back as they did to 1797, the coins in circulation had been struck to four different weight standards: at 16d to the lb for the cartwheels of 1797, at 18d for the halfpennies and farthings of 1799, at 24d for the issues of 1806 and subsequent years, and finally 26d for the Irish coins, which had long enjoyed an unofficial circulation and which since 1826 had actually been legal tender throughout the United Kingdom. In principle, at least, the variations in standard had not created a problem since, with the passage of time, the different coins had become perfectly familiar and the public had quietly accepted the notion that copper was merely a token coinage, but it was plainly not ideal for coins of the same denomination to differ in size. As Gladstone was later to tell the House of Commons, if an old and a new penny were shown to persons unacquainted with them, no one would ever dream that they represented the same value.⁷ And the risk of confusion was exacerbated, if Graham is to be believed, by the effects of wear, which apparently made it difficult on occasion to tell a large halfpenny from a small penny.⁸

Moreover, the copper coinage had been contaminated by the practice of defacing coins with advertising slogans, an abuse that reached such proportions as to require urgent legislation in 1853.⁹ At intervals, too, anonymous letters reached the Mint complaining that copper was injurious to health;¹⁰ and the Chairman of the Decimal Coinage Commission spoke of the greasiness, the accumulation of dirt and the oxidation which made the use of copper coins 'exceedingly distasteful'.¹¹ To these Professor Jevons added his voice, writing in 1875 that pure copper 'soon becomes disfigured; it has a disagreeable odour which it communicates to the fingers; and when exposed to damp air it becomes covered with verdigris, which is both unsightly and poisonous'.¹² These obvious disadvantages of copper could be set against the fact that by the 1850s bronze was already known to be more convenient, more likely to promote cleanliness, more durable, and more difficult to counterfeit.

So, regardless of what decision might be reached on decimalisation, there was a persuasive case for tackling the copper coinage. And if there were to be reform, then clearly it would be helpful to know how much copper was in circulation, since this would provide the best guide to how much new coin might be required. It might also be helpful, given the worn state of the coinage, to form some idea of the average loss of weight, since this would then indicate the weight of copper that would be available from withdrawn coin to set against the metal needed for the new coins. By bringing these two aspects together – the quantity of new coins required and the weight of copper that would become available – both the production and the financial implications of a change from copper to bronze would be greatly clarified.

In essence this was what Graham's survey achieved, the collection and analysis of data no doubt second nature to the distinguished scientist who was now Master of the Mint. The survey had been in his mind since at least the autumn of 1856 when he had asked George Robertson, one of the temporary clerks recruited by the Mint to supervise the copper contract at Heaton's, to examine the state of the copper coinage in Birmingham. With the assistance of shopkeepers, and with the promised cooperation of Ralph Heaton Junior, Robertson was required to determine in his sample the value of pence, halfpence and farthings, separating the

⁶ *The Times*, 8 November 1847. There is further justification for the date November 1847 in PRO. Mint 8/4 and Mint 21/4 (Miscellaneous, Nos. 1826, 1827 and 1832).

⁷ *Parliamentary Debates*, 3rd ser. 155, col. 979 (4 August 1859).

⁸ *Appendix*, p. 54.

⁹ J. Gavin Scott, *British Countermarks on Copper and Bronze Coins* (London, 1975), pp. 6–10.

¹⁰ See, for example, PRO. Mint 21/1 (No. 4879, 6 June 1827, and No. 5128, 17 May 1828) and Mint 21/2 (Miscellaneous, No. 111, 26 May 1830, Miscellaneous, No. 177, 2 March 1831, and Miscellaneous, No. 207, 18 June 1831).

¹¹ *Appendix*, p. 55.

¹² W. Stanley Jevons, *Money and the Mechanism of Exchange* (London, 1875), p. 125.

pence and halfpence coined since 1853, and also to note the quantity of counterfeits. The results were promising enough for Graham in December 1856 to warn Robertson and his fellow clerk James Mallinson that following completion of Heaton's contract their employment would be extended by a few weeks to undertake similar statistical enquiries at different locations.¹³

Robertson and Mallinson returned to London on Christmas Eve, and Graham lost little time in seeking the assistance of London brewers in allowing Robertson to examine in detail the composition and weight of their holdings of copper coin, the brewers by the nature of their business being renowned accumulators of copper.¹⁴ Finally, in January 1857, Graham formally obtained approval from the Treasury to employ Robertson and Mallinson for a period of not more than two months. In justification Graham spoke first of throwing light on the unequal distribution of copper coin that resulted from issues being made only from the Mint in London. But, more convincingly, he went on to say that, in view of any future change to the copper currency, it would be desirable to have additional and more precise information on the condition, weight and value of the coins in circulation, determining the rate of wear and the proportion of defaced and spurious coin.¹⁵

In its final published form, the survey was simplicity itself. A quantity of £60 of copper coin was collected, apparently by Robertson, in each of the four cities of London, Birmingham, Manchester and Glasgow, the total of £240, though it sounds small, producing a sample of no less than 86,000 coins. Having been brought to the Mint, the coins were examined by Robertson and Mallinson and sorted by denomination and date into groups according to the four weight standards of 16, 18, 24 and 26d to the lb, with a subdivision that separated the coins of 1853–1856, readily distinguishable so it was claimed by their newness. The sample having been split up in this way, Darling, a retired sizer,¹⁶ weighed the coins in each group, thereby enabling a calculation to be made of the average loss of weight by wear (Table 1).

The results were unveiled by Graham in his evidence to the Royal Commission in July 1857 and subsequently published in an appendix to the Commission's Final Report.¹⁷ Though they were not without their shortcomings, the figures undoubtedly provided a valuable profile of the copper currency at that time. Broadly, they revealed a copper circulation made up of twice as many halfpennies as pennies, with a few farthings providing the balance. Predictably there were no cartwheel twopences, and that more recent innovation, the half-farthing, was also absent. This, too, was no surprise, for though it had created a bit of a stir when it was first issued in the United Kingdom in September 1844 the initial interest had quickly died away and it had rapidly resumed an almost exclusive existence as a colonial coin. Graham, indeed, could only recall one instance of its issue during the early years of his Mastership, when a mean-spirited publican had chosen it in preference to farthings as a free gift for his customers.¹⁸

¹³ PRO, Mint 1/42, pp. 514–5 (Graham to Robertson, 19 September 1856) and p. 549 (Graham to Robertson, 11 December 1856).

¹⁴ PRO, Mint 1/42, pp. 558–9 (Graham to Truman, Hanbury & Co, Combe, Delafield & Co and Whitbread & Co, 29 December 1856). Brewing has been described by Peter Mathias as, financially, one of the most 'liquid' of industries, with 'so high a proportion of sales being over the counter for cash, and returning to the brewer regularly and rapidly': *The Brewing Industry in England 1700–1830* (Cambridge, 1959), p. 320.

¹⁵ PRO, T1/6074B (file 13190/1857), Graham to Treasury, 12 January 1857, and Mint 1/42, p. 565 (Treasury to Graham,

19 January 1857).

¹⁶ The sizers checked the weights of blanks by hand but were being superseded by the introduction of automatic weighing machines. Darling's employment on the survey had been approved by the Treasury at the same time as that of Robertson and Mallinson.

¹⁷ *Appendix*, pp. 56–60.

¹⁸ *Appendix*, p. 62. Although half-farthings were made legal tender in the United Kingdom in 1842, issues did not begin until September 1844. For evidence of the initial interest see *The Times*, 21 September and 25 September 1844 and PRO, Mint 1/42, pp. 354–8 (Herschel to Gladstone, 5 January 1854).

TABLE 1. Summary of Survey

| <i>Denomination</i> | <i>Date</i> | <i>Number</i> | <i>% of Total</i> | <i>Loss of Weight %</i> |
|---------------------|-------------|---------------|-------------------|-------------------------|
| Penny | 1797 | 8,120 | 9.43 | 9.4 |
| | 1806–1852 | 12,628 | 14.66 | 9.6 |
| | 1853–1856 | 4,215 | 4.89 | 0.7 |
| | Irish | 3,393 | 3.94 | 12.7 |
| Halfpenny | 1799 | 8,513 | 9.88 | 12.2 |
| | 1806–1852 | 31,942 | 37.09 | 11.3 |
| | 1853–1856 | 8,159 | 9.47 | 0.8 |
| | Irish | 7,204 | 8.36 | 14.3 |
| Farthing | 1799 | 23 | 0.03 | 6.1 |
| | 1806–1852 | 955 | 1.11 | 3.0 |
| | 1853–1856 | 941 | 1.09 | 0.7 |
| | Irish | 37 | 0.04 | 3.7 |

Source: *Appendix to the Final Report of the Decimal Coinage Commissioners* (London, 1859), p. 60, where the figures were reported in terms of face value. The total value of the sample was £239.18.10¹/₄d, of which counterfeits, tokens etc (not included in the above table) amounted to £3.9.4¹/₄d or 1.4% by value.

There was also the expected confirmation that the coins were old. Cartwheel pennies of 1797, for instance, made up a quarter of the pennies and nearly 9.5% by number of the total copper circulation, demonstrating that even after sixty years the 'ring pence' as they appear to have been called in the 1850s were still one of the workhorses of the copper currency. Add in the halfpennies of 1799, which formed almost 10% of the total, and the proportion of Boulton copper rises to about a fifth; and if only the Soho coins of 1805–1807 had not been aggregated in groups with later coins it would be even clearer that Boulton's coins still featured large in the copper circulation almost fifty years after his death. True, there had been substantial mintings of new copper from 1821, amounting by the end of 1856 to more than £380,000, but something like 25% of this had gone directly overseas to Treasury Chests and to the Colonies, with Ceylon taking the lion's share. Only in the 1850s had domestic issues risen to significant levels.

The bulk of the coins were therefore old and, being old, they were also worn, as is evident from the average loss of weight reported for each group. Cartwheel pennies had lost 9.4%; halfpennies of 1799 had lost 12.2% and later halfpennies 11.3%; but pride of place goes to the Irish halfpennies of 1805, which were 14.3% below their issued weight. On this scale wear is no small matter (Fig. 1). What it means is that the design is largely obliterated and that the coin may be difficult to recognise for what it is unless it has an unusual feature, like the broad rim of the cartwheels. Averages, of course, can be misleading but in Graham's figures can be seen, vividly and beyond doubt, the evidence of a deterioration that, tolerated though it might have been by the public, nevertheless seemed to demand reform. The flat surfaces had encouraged abuse and a sixth of the coins were identified as injured and defaced, as distinct from the further sixth subsequently rejected by the Bank of England as worn out, allowing Graham to claim that a third of the copper was unfit for circulation.¹⁹

So far, the results revealed a situation that contemporary comments might have led us to expect, but there were surprises. Who, for instance, would have predicted that overall the

¹⁹ The subsequent garbling of the coin by the Bank of England is referred to in PRO, Mint 8/36, pp. 41–50 (Graham to Gladstone, 19 July 1859). Lest there be surprise that such

dilapidated coins might pass freely, it is worth recalling the ease with which worn bun pennies circulated in the 1960s.



Fig. 1. Graham's survey suggests that coins as worn as these may have been typical of the copper in circulation in 1857.

proportion of counterfeits would be as low as 0.2% by value and even in Birmingham, a traditional home of the counterfeiter, still not as high as 0.5%? It is perhaps possible, given the worn nature of the coins, that not all counterfeits were recognised as such, yet it is worth remembering that the survey was undertaken not by resentful bank clerks anxious to be about their proper business but at the Mint itself by experienced officers who were being paid to perform the task. And it may also be indicative of the small extent to which the official copper coinage had been infiltrated that even tokens and foreign coins, which presumably were easier to recognise than counterfeits, formed no more than 1.3% by value.

Similarly, the proportion of Irish copper coins catches the eye, not however because it is so small but rather because it seems so large, standing overall at 12.3% by number of the sample. In Manchester and Glasgow the proportion was more than 14.5% but even in London, where it was smallest, it was still of the order of 9%. Clearly, in the major cities at least, the Irish harps were a substantial and well-integrated part of the copper circulation.

But what really seems to challenge belief is the under-representation of farthings. In fact they were all but absent from the survey, forming less than 2.5% of the total when, on the basis of mintage figures, the proportion should have been more like 20%. They had, after all, been minted regularly since 1821, and it can be taken as evidence of a continuing requirement that if the supply were interrupted for any length of time then private token farthings might appear, as in the early 1850s when the Mint was forced to neglect copper because of the urgent need to mint gold and silver. There can accordingly be no question that a demand for farthings existed, yet there is equally no doubt that this was not reflected in the survey and well might Graham find his statistics 'perplexing' and the history of the farthing 'singularly obscure'.²⁰

²⁰ *Appendix*, p. 61.

Even a Master of the Mint might be forgiven for struggling to understand a coin of which he, like many others, probably had no practical experience in his daily life. 'Thrust out of sight by habitual disuse, and almost out of knowledge', as his predecessor Sir John Herschel put it,²¹ the farthing enjoyed a curious and restricted existence, its less active circulation confirmed by an average loss of weight that was less than a third that of pennies and halfpennies. Graham believed that the farthing was used most freely in second-rate provision shops in low neighbourhoods, providing articles on a small scale to the poorest of people and acting in a sense as a substitute for a well-stocked cupboard. Pawnbrokers and tally shops also made use of the coin and for some people, though Graham found this hard to believe, it may have been a savings coin.²²

In the context of the survey it may be concluded that the coin failed to be located because the sample collector did not visit shops of low enough class. This reinforces more general concerns about the sampling technique adopted for the survey, restricted as it was to four major cities and seemingly unrepresentative of all parts of those cities. In particular, it may be wondered what effect the exclusion of rural areas may have had on the overall proportion of Irish coins, which would arguably have circulated less freely in the country than in cities with large Irish communities.

At the very least, therefore, the sampling is biased and the survey flawed to such an extent that doubts may be entertained about some of the conclusions that Graham allowed himself to draw from it. For instance, having reminded himself of the £800,000 or more of English and Irish copper produced at Soho,²³ he knew that the total output of copper coin since 1797 was about £1,200,000 and his estimate that up to £800,000 remained in circulation at home and abroad rested heavily on the proportion of coins of 1853–1856 found in the survey as compared with the number known to have been issued in that four-year period (Table 2). Yet recent experience shows that this is to rely on the least satisfactory part of the sample, for new coins take time to work their way into circulation and Graham's own figures showed newer coins to be noticeably more common in London than in the other three cities. And he should surely have recognised, as Gladstone did a year or two later,²⁴ that older coins lingered longer in rural areas, something that may help to explain why the old copper when it came to be withdrawn was if anything rather more worn than the survey suggested.

TABLE 2. English and Irish copper coins issued from 1797 to 30 June 1857

| <i>Denomination</i> | <i>Number issued</i> | <i>Number withdrawn and melted</i> | <i>Number presumed to survive</i> |
|---------------------|----------------------|--|---------------------------------------|
| Twopence | 722,200 | – | 722,200 |
| Penny | 121,803,144 | 7,112,160 | 114,690,984 |
| Halfpenny | 276,778,817 | 14,224,320 | 262,554,497 |
| Farthing | 99,956,004 | – | 99,956,004 |
| Half-farthing | 16,438,176 | – | 16,438,176 |
| Total | 515,698,341 | 21,336,480 | 494,361,861 |

Source: *Appendix to the Final Report of the Decimal Coinage Commissioners* (London, 1859), p. 53. Graham's figures almost certainly require minor adjustment but are not far wide of the mark. The third column relates to the withdrawal of Irish pennies and halfpennies when the English and Irish currencies were assimilated in the 1820s.

²¹ *Questions communicated by Lord Overstone to the Decimal Coinage Commissioners, with Answers* (London, 1857), p. 96.

²² As well as in the *Appendix*, Graham's views on the circulation of the farthing may be found in PRO. Mint 8/36, pp. 82–9 (Graham to Gladstone, 16 November 1859).

²³ PRO. Mint 1/42, p. 594 reproduces an account by Edward Price of Soho, 6 March 1857, though detailed figures were in fact already available from a Parliamentary Return of 3 June 1819.

²⁴ *Parliamentary Debates*, 3rd ser. 155, col. 979 (4 August 1859).

The modern way would be to sample more comprehensively and to calculate an annual wastage rate by comparing the coins found of each date with the number believed to have been struck with that date. For various reasons this would not have been easy for Graham and there is no evidence that he made the attempt. Though his figure of £800,000 reduced the estimate of £1,000,000 produced in 1844 by James Morrison, Deputy Master of the Mint, and adopted by Herschel in 1853,²⁵ as events were to show it nevertheless made insufficient allowance for losses of the older coins. In 1864, when copper had been flowing back to the Mint for the best part of three years, Graham was obliged to report to the Treasury that 'a result is now apparent, which although often observed in the calling in of an old coinage, may excite some surprise, namely, that a large portion of the old copper coin has been *lost* during the period of its circulation'.²⁶ Eventually the total withdrawn, from the Colonies as well as the United Kingdom, was to reach £580,000, still well short of Graham's £800,000. At that time, in 1877, Charles Fremantle, the Deputy Master, looked again at the 1857 survey and persuaded himself that the number of Boulton's coins suggested a likely quantity to be withdrawn of £580,000, an astonishingly convenient figure that raises doubts about Fremantle's statistical integrity.²⁷

Whatever the shortcomings of the survey, however, it seems right to acknowledge and applaud an initiative that sought to provide, in a more thorough form than ever before, a properly informed basis for a change to the currency. It is true that there had been previous surveys of opinion, as with the silver currency in 1811 and copper in 1824 and 1852, and investigations to establish loss of weight through wear, as with silver coins in 1787 and 1798 and copper in 1853. But these had been relatively small-scale affairs, whereas what Graham undertook in 1857 was a serious statistical exercise which took two months to complete, which cost money and which required Treasury approval.²⁸ And it served its immediate purpose by providing evidence that Gladstone used to good effect to justify the replacement of copper by bronze²⁹ and that Graham employed in framing his financial estimates for Gladstone and the Treasury and in determining the quantities to be minted of the new bronze coins.³⁰

In the longer term Graham's survey of 1857 may be claimed to have set the pattern for the future, since such surveys have become a regular feature of the planned development of the coinage.³¹ Graham's initiative has therefore taken root and those of us who have been happy to criticise him in the past ought, in this respect at least, to give him his due.

²⁵ PRO. Mint 4/40 (Morrison to Gladstone, 3 October 1844) contains the estimate of 5000 tons or £1,000,000 adopted by Herschel in 1853 (*Report from the Select Committee on Decimal Coinage* (London, 1853), p. 50). Though a more detailed memorandum sent by Morrison to Gladstone in December 1844 is not present in Mint 4/40, the basis of his estimate is however clear from a memorandum sent to an earlier Master, J. C. Herries, on 17 June 1829 and kindly made available to me by Mr Mark Rasmussen of Spink & Son.

²⁶ PRO. Mint 8/36, pp. 339–46 (Graham to Treasury, 27 April 1864). Changing his story as he went along, he had already explained to the Treasury that he had thought of £850,000 as a maximum and £680,000 as a minimum and that

he now favoured the latter figure (Mint 8/36, pp. 315–20, Graham to Treasury, 24 February 1863).

²⁷ *Royal Mint. Six Annual Report* (1877), pp. 9–10.

²⁸ PRO. Mint 6/5, fols 148–50 and Mint 6/58, fol. 86 record payments of nearly £100 to Robertson, Mallinson and Darling.

²⁹ *Parliamentary Debates*, 3rd ser. 155, cols 978–81 (4 August 1859).

³⁰ PRO. Mint 8/36, pp. 52–6 (Graham to Gladstone, 30 July 1859) and pp. 100–05 (Graham to Treasury, 29 March 1860).

³¹ See, for instance, R. G. de Glanville, *The numbers of coins in circulation in the United Kingdom* (London, 1970), and P. B. Kenny, 'The number of coins in circulation', *Economic Trends* No. 495 (January 1995), 23–31.