

COPPER v TIN COINS
IN SEVENTEENTH-CENTURY ENGLAND

J. Keith Horsefield

The first time that the Royal Mint produced any quantity of coins in a metal other than gold or silver was in 1672. From then until 1679 it struck half-pence and farthings in copper. When such denominations were next minted, from 1684 to 1692, the metal used was tin. From 1693 to 1701 it was again copper. The reasons for, and the effects of, this alternation of metals are the subjects of this paper.

Copper was not produced in any quantity in Great Britain until about 1690, and when used for coins it was imported from Sweden. Its exploitation in England and Wales had been hampered by an Act of Henry IV 'against the multiplication of gold and silver'.¹ The repeal of this Act early in 1689 included the provision that in future no mine of copper, tin, iron, or lead should be adjudged a royal mine even if gold or silver was extracted from it.² Thereafter 'several new veins of copper ore were discovered and mining operations were prosecuted with vigour'.³ By 1697 production was well under way. English output was estimated by a contemporary at 160 tons, of which half was attributed to William Dockwra's Copper Company and the other half to four other copper producers.⁴ There is some evidence that this may have been an under-estimate, and it is possible that by the end of the seventeenth century British production of copper may actually have approached 300 tons.⁵

This, however, was small compared with the output of tin, which at this period varied between 1,200 and 1,550 tons annually. From 1684 to 1692 it averaged 1,365 tons a year.⁶ In 1599 Queen Elizabeth I had arrogated to the Crown the right of pre-emption of all tin produced in England,⁷ and tin was also subject to the so-called 'coinage' duties of 4s. a hundredweight in Cornwall and 1s.6½d. a hundredweight in Devon.⁸ The early Stuarts customarily farmed the right of pre-emption and the 'coinage' duties together, and from 1628 to 1643 they were let at a rent of £12,000 a year.⁹ After the Civil War farming was resumed, though at first only the 'coinage' duties were let, for £2,000 - £2,500 a year.¹⁰ Efforts were made to include the right of pre-emption in the farm,¹¹ and from 1664 these were successful; however, the rent obtained was only £6,500 a year.¹² Even this proved more than the farmers could afford to pay,¹³ and the farm was surrendered in 1666 and re-let in the following year at £5,000 a year.¹⁵ This was the position when proposals to coin tin farthings were first seriously considered. For the whole period 1660 to 1688 the pre-emption and 'coinage' duties yielded a total of some £45,000 to the Crown.¹⁶

II

By the end of the sixteenth century a need for coins of smaller denominations than the silver penny had become apparent as the market economy developed. This led to a proliferation of unofficial tokens, mainly of lead, though some were of copper, brass, tin, or even leather. Some of these were issued by towns;¹⁷ more by individuals, who were frequently unable, even if willing, to redeem them.

From time to time proposals were made to remedy this state of affairs. One especially influential recommendation came from Sir Robert Cotton, who saw an opportunity to derive a revenue for the Crown.¹⁸ About the year 1612, the dates on his title-page are inconsistent,¹⁹ he proposed an official issue of coins 'upon a simple mettall'. Since he referred to the Roman monies of '*aere argenteo, auro puro puro*' it is to be inferred that his plan was for fractional coins of copper, such as had been vainly advocated to Elizabeth I by her master of the Mint.²⁰ Cotton's proposal was for an initial issue of £120,000, which should yield £10,000 to the Crown, followed by annual issues of £12,000, which should correspondingly produce a profit of £1,000 a year. The coins would be legal tender up to one shilling.

Similar proposals were put forward by several other people, including John, Lord Harington of Exton²¹ and Gerard Malynes,²² and in 1613 James I, who had been familiar with copper coins in Scotland, granted Lord Harington a patent for the exclusive production of copper farthings for three years from May 1613.²³ He was to produce a 'competent quantity' of tokens, and no others were to be 'made, used or uttered' after June 24 of that year. The proclamation did not specify whether they were to be legal tender, but the Star Chamber later declared that they were not.²⁴ The profit from the patent was intended to compensate Lord Harington for large debts which he had incurred as tutor to James's daughter Elizabeth.²⁵

Lord Harington and his son both died in 1614, and the patent was continued briefly to his widow.²⁶ In July 1616 a successor patent was awarded to Edward Woodward and Thomas Garrett, London goldsmiths, on the nomination of Lord Harington's daughter Lucy, Countess of Bedford, and of Ludovick Stuart, second Duke of Lennox;²⁷ and in 1621 another to the Duke of Lennox and James, second Marquis of Hamilton.²⁸ All the projects so far mentioned were for tokens of copper, although the king's attention was unsuccessfully drawn to the possible advantages of tin coins in a memorandum in October 1620.²⁹

Harington's farthings were to be produced by machinery, and it was at first thought that the expense of this would protect them from being counterfeited.³⁰ However, this proved to be mistaken, and in 1636 the patent was amended to require that the tokens should be identified by 'a distinction of brasse'.³¹ By that time the patent had been acquired by Sir Francis Crane, chancellor of the Order of the Garter, and Henry Frederick Howard, Lord Maltravers (later third Earl of Arundel). These two obtained a renewal of the patent for twenty-one years, and in 1639 Lord Maltravers bought out his fellow-patentee for £6,000.³² But he had only a brief enjoyment of the patent. Within a year his monopoly was threatened by the king's plan to raise money by manufacturing £200,000-£300,000 of copper coins, to be used instead of silver to make one-tenth of all payments exceeding 2s.6d. This idea was abandoned only after strong commercial protests.³³ Then the Civil War intervened, and in 1643 Parliament prohibited the production of the tokens, on the ostensible ground that the copper, being imported, 'contributed to the overbalance of trade'. The fact that Lord

Maltravers was a Roman Catholic may have influenced this decision.³⁴ He died in 1652.

The forbidden private tokens came back into their own, and for the time being nothing was done to replace them. However, in 1651 the egregious Thomas Violet sent to the Mint Committee detailed proposals for farthings and half-farthings, which, he argued, were needed by 'the poorer sort'.³⁵ While earlier proponents had advocated either copper or tin for such coins, as the case might be, Violet's memorandum was one of the earliest extant ones to include a discussion of their respective advantages. Copper, he reported, was widely used in Europe for coinage. Tin, however, was a native commodity, would give employment to many English miners and tanners, and would obviate having to buy copper from Sweden. Provided that 'the tin pieces be made so heavy, and of such fine tin by the assay, that nothing could be got by it but the pay of the workmen', he foresaw that they would 'set many thousands of people at work in the tin mines in Cornwall'. Violet recognised that there was a risk that debased counterfeits, containing lead, might easily be made; there would have to be 'an Act making it [i.e. counterfeiting or clipping the coins] treason or felony at least'. He realised also that there would have to be some restriction on the acceptability of the farthings, which should not be usable, for example, to pay bills of exchange or to pay rents. No-one should be obliged to take more than sixpence in farthings.

No official notice seems to have been taken of Violet's plan, unless it is to be found in a comment by Sir John Harvey, calendared under the probably incorrect date 'May 1650?'.³⁶ This approved of the plan to provide farthings of tin or copper, provided that they were 'of full value' and were struck at the Mint; and suggested that there might be enough tin available from British mines to enable coins to be produced of sufficient intrinsic value to discourage counterfeiters.

In 1654 Thomas Dunsterville took up the point. He agreed that farthings were needed, but urged that the common metals - copper, brass, tin - if used for coins were liable to be counterfeited.³⁷ His solution was to use an invention of his own - a new alloy which was not generally available. He subsequently petitioned for the right to issue such coins.³⁸

In the last days of the Protectorate Violet came back with a plan for copper farthings to weigh two-fifteenths of an ounce each (twenty shillings' worth to weigh eight pounds avoirdupois).³⁹ This plan was approved by Richard Cromwell, subject to a levy of twelve pence on every twenty-two shillings' worth produced;⁴⁰ it does not, however, appear to have been put into effect.

III

The Restoration of Charles II led to plans for farthings being again considered, and in June 1661 the deputy master of the Mint, Henry Slingsby, reported to the King on the relative advantages of copper and tin. Because of the ease of working tin, and its ready admixture with lead, he advised against its use; any attempt to check counterfeiting by raising the price of tin through the right of pre-emption would mean the loss of export markets. Copper, he therefore concluded, was the fittest metal for coins.⁴¹

In 1662, and again in 1665, the Mint produced sample copper farthings and halfpence,⁴² but the only other action taken was to mint a quantity of silver pence and twopences, which failed to supply the required small

change.⁴³ In consequence, the mass of privately-produced tokens continued in circulation, in defiance of the prohibition. They afforded a living to a number of common informers, who prosecuted men and towns putting out such tokens, or blackmailed them as the price of turning a blind eye.⁴⁴

These conditions prompted the governors of the Royal Fishery, who were for ever seeking funds to revitalise their industry, to put forward in January 1665 a plan, originally suggested by Sir Edward Forde, for issuing copper farthings. They asked for a monopoly of the issue, offering terms that would have produced a twenty-five per cent profit for themselves.⁴⁵ On the other hand, Sir Richard Ford, then a farmer of the pre-emption and of the duties on tin, proposed an issue of tin farthings and halfpence, arguing that only by this means could the farmers of tin be saved from bankruptcy.⁴⁶ In this plan he was joined by Elias (or Eliah) Palmer, of Mile End.⁴⁷

Three years later Palmer reappeared, this time as a member of a group including Prince Rupert (acting through his secretary, Mr Hayes) and Henry Howard (son of Lord Maltravers).⁴⁸ They contended that tin coins would be less liable to be counterfeited; copper ones could be debased with lead. Also, copper varied in price according to conditions in Sweden, whereas the price of tin could be set by negotiations between the king, as pre-emptor, and the convocation of tanners. Palmer himself offered to pay £10,000 a year for the right of pre-emption provided that he was authorised to issue tin farthings and halfpence as legal tender.⁴⁹ This was an attractive proposition, justified (from Palmer's point of view) by the increase in demand for tin deriving from the proposed farthings. Nevertheless, tin was, of course, officially an untried metal for coins - although a small quantity of imitations of Harington's tokens had been privately provided as long ago as 1637, to the confusion of his majesty's subjects.⁵⁰

Presented with a problem of this complexity, the Treasury referred the papers to the Privy Council in August 1669.⁵¹ Much procrastination followed, but it seems that copper won the day, because in February 1671 the secretary of the Treasury addressed an enquiry to eleven eminent advisers. 'My Lords', the secretary wrote, 'intend trial of 30 or 40 pounds of copper into farthings by the Mint moneyers.' He desired them to 'consider and report the charges and the waste thereof, and the necessary expenses.'⁵²

No Treasury minute-book has survived for the period August 1670 to October 1671, so the reports of these advisers are not extant. However, they were presumably favourable, since in April 1671 the Treasury told Mr Slingsby, by now master of the Mint, of an offer by James Burkin and Henry Ward, copper merchants, to supply blanks at 14½d. a pound, and asked him to come to an agreement with them. The blanks would be imported from Sweden, for delivery in August or September 1671.⁵³ The Swedish supplier, Abraham Cronstrom, later asked for an increase in the price to 17d. a pound because of an export duty said to have been imposed by the king of Sweden at the beginning of 1672,⁵⁴ and in August 1672 a contract was in fact signed at that rate.⁵⁵ However, it was later alleged that the duty was removed in April 1673 without this being reported by Cronstrom; and although Cronstrom denied this, the price eventually paid was 14½d. a pound.⁵⁶

By November 1671 the Mint was ready to produce the coins, and the Treasury set about finding ways of raising £15,000 to finance the operation.⁵⁷ There is no trace of any copper arriving before January 1672, but by July 1672 Cronstrom had supplied £10,000 worth, over seventy tons, and Slingsby was instructed to proceed with all speed in coining farthings.⁵⁸ In August 1672 a royal proclamation gave currency to the issue.⁵⁹

The intention was to produce farthings at the rate of 20d. a pound

avoirdupois, out of which 3d. a pound was to be divided between the workmen and the officials of the Mint: $1\frac{1}{2}$ d. to the former, and $1\frac{1}{2}$ d. to the latter, to cover also 'incidentals'.⁶⁰ In practice, the average weight of the coins produced was certified to be such that only $19\frac{5}{8}$ d. went to the pound.⁶¹ This implied a profit of a little over 2d. a pound to the king, so that the intention of the authorising proclamation, that the coins would be of full value except for the cost of workmanship, was not fulfilled. Craig states that the cost of workmanship was 4d. a pound, not 3d; if so, the profit per pound would have been a little over 1d., but the proclamation was still breached.⁶²

It took some time for the new coins to be generally used, and indeed in December 1674 it was found necessary to issue a proclamation inveighing against those who hindered their acceptance, and those who continued to produce unauthorised tokens.⁶³

A year later Elias Palmer returned to the attack. He asserted that copper coins of an intrinsic value of 11d. were being minted at the rate of 22d. to the pound,⁶⁴ and as a result were being extensively counterfeited.⁶⁵ He repeated his contention that tin coins could be produced which would not be similarly copied.⁶⁶ The Treasury consulted the Mint, which disagreed, repeating the advice which Slingsby had given in 1661.⁶⁷ It added, rather acidly, that Palmer could not meet the cost of minting coins (estimated at twenty per cent of the cost of the metal) and also provide a revenue of £50,000 to £60,000 a year to the king, as he was promising, if, as he also proposed, the tin coins were made of their intrinsic value.⁶⁸ A contemporary writer, glossing the Mint's objections, added that the tin coins could not be economical because once they were worn their value would be little more than 2d. a pound; pewterers, the main English users of tin, would not buy them because to do so would be against the 'laws or orders of their Company'.⁶⁹

Amidst these arguments and counter-arguments, it appears to have struck the Treasury that at least the diametrically opposed views about the possibility of producing imitation-proof tin coins should be capable of resolution by experiment. They accordingly instructed Palmer to produce, with the aid of the Mint, some specimen tin coins; and required the Mint, within a week, to produce, if it could, acceptable counterfeits.⁷⁰ The Mint dragged its feet for three months, but then brought forward some specimens which Palmer claimed to have had no difficulty in exposing.⁷¹ One, adulterated with lead, was revealed by 'weighing the farthings in air and water', i.e. by reference to specific gravity. The impure antimony contained in another specimen was, Palmer argued, actually more expensive than tin, and was therefore unlikely to be used by counterfeiters. A third coin was, or so Palmer asserted, pure tin.⁷²

While this was going on, minting of the copper coins continued, although it seems that there was a pause after 22 February 1676, when it was reported that £40,252.16s.11d. had been produced.⁷³ Three months later the Committee for Trade, encouraged by the Treasury-sponsored experiments to expect an acceptable substitute for copper, recommended that its use should cease, and that future coins should be made of tin. This was approved by an Order in Council on 28 June.⁷⁴ The latest batch of copper coins, with a face value of £7,281.8s.8½d., was knocked down to a private buyer for £6,965 on the understanding that he would hold them for three months before using them.⁷⁵

This was not, however, quite the end of the copper coins. In March 1679 it was found that the suppliers of copper blanks, under contract to the Mint, still held some 16,500 pounds weight of them. Charles II agreed,

despite the decision to end the issue in 1676, that these blanks could also be coined,⁷⁶ producing some £1,500 worth of farthings and halfpence. The total issue, therefore, seems to have been rather less than £42,000.⁷⁷ On this the profit to the Crown will have been some £4,500 if production costs were, as estimated, 3d. a pound. However, if Craig is right in reporting them at 4d. a pound, the profits cannot have exceeded £2,400.⁷⁸

IV

This final development was, of course, still in the future when in July 1676 Sir Robert Southwell, secretary to the Privy Council, prepared to implement the Council's Order. His first step was to ask Palmer for details of his proposals.⁷⁹ What appears to have been Palmer's response to this enquiry added several points to those put forward a quarter of a century earlier by Thomas Violet.⁸⁰ Because the copper had to be imported, the balance of trade suffered; and it was to be feared that a further drain was caused by imported counterfeits. On the other hand, tin was a 'commodity of this Kingdom'. Minting tin coins was the only way of raising the price of tin sufficiently to encourage the miners to dig more of it, and thus yield more 'coinage' duties to the Crown. This would also (contradicting Slingsby's view) benefit exports; in effect, because the foreign demand for tin was inelastic. Palmer further asserted that tin coins, hardened by a suitable alloy, could be made of a value equal to their intrinsic value, so avoiding counterfeits, because the value of tin was in British control.

But now two other interested parties appeared on the scene. One was Henry Howard, by now Baron Howard of Castle Rising, and later successively Earl of Norwich and sixth Duke of Norfolk. He claimed on 10 July 1676, that the patent granted to his father, as Lord Maltravers, in 1636, and abrogated by the Commonwealth Parliament, should be renewed to himself, giving him the sole right to produce farthings and halfpence. Lord Howard reminded the Council that at the Restoration, and again in 1669 (actually 1668) he had put forward proposals that had been rejected.⁸¹

The other intervention came from the group who had farmed the pre-emption and the 'coinage' duties from 1661 to 1666. Their spokesman was Sir William Smyth. As a condition of resuming the farm, they sought the right to coin farthings, halfpence, and pence, of tin.⁸² In August 1676 the Committee for Trade referred this request to the lord treasurer,⁸³ and by the end of 1676 agreement had been reached by which the farmers would produce tin coins at a rate not exceeding 16d. per pound of tin. They were to be ready to receive them back, if broken or defaced, at 12d. per pound. They undertook to produce £10,000 worth by Lady Day 1677, and £10,000 more by midsummer. Out of these they were obliged to exchange genuine copper farthings and halfpence, at their face value, at least until Christmas 1677.⁸⁴ The quantity to be exchanged was estimated at £40,000.⁸⁵ Because many of the copper coins in circulation were light-weight ones, or were debased,⁸⁶ this operation was expected by the farmers to produce a loss of £11,000 to £16,000. It was agreed that half the loss, up to £5,500, would be borne by the Crown.⁸⁷

No action followed on these negotiations, because the king was reported to be dissatisfied with their outcome; he toyed with the idea of replacing the farmers of tin by commissioners, as a more profitable way of exploiting the pre-emption.⁸⁸ Lord Treasurer Danby seems to have followed up this idea by purchasing and storing a large quantity of tin⁸⁹ in preparation for the operations of commissioners. However, in May 1679, following Danby's im-

peachment, Sir William Smyth's plan was, after all, approved. A grant for this purpose, for twenty-one years, associated with him the Duke of Monmouth and John Sheffield, third Earl of Mulgrave. Operations were to begin on Lady Day 1679, tin farthings, halfpence and pence being minted at 16d. to the pound weight. The copper coins were to be exchanged by Lady Day, 1680.⁹⁰

But now it was the farmers' turn to drag their feet. Their reasons are not set out, but it may be conjectured that they realised that neither as farmers nor as minters would it be possible to make enough profit to cover their rent of £12,000 a year. Danby's hoard of tin overhanging the market would depress the price for some time to come, and would involve extra costs for the capital required to hold new production in reserve. And although cheap tin would be an advantage to their mint operations, the proposed rating was too low for them to expect much profit from the coins. Finally, the additional copper coins authorised in March 1679 would add to the cost of redeeming them. Whatever the reason, the farm was not taken up. Neither was minting started, as the attorney-general ruled that this must wait until the farm was settled.⁹¹ All that happened was that in May and June 1680 the Treasury referred the terms of the 1679 agreement, and some supplementary proposals from Smyth, to two advisers, William Harbord, surveyor of Crown Lands, and Robert Napier, receiver-general and auditor of the Duchy of Cornwall, who had himself in the past farmed the pre-emption.⁹²

For the next two or three years no official action was taken about the growing shortage of small change. This was not for want of suggestions. Proposals from members of the public for the supply of farthings and halfpence were referred to the Treasury in April and October 1682, and again in December 1683.⁹³ Sir William Petty joined in, writing in August or September 1682 to Sir Robert Southwell about his *Quantulumcunque concerning money*, in which he recommended minting base-metal farthings.⁹⁴ His arguments included the novel one that copper was better used for such coins than tin, even if the copper had to be imported, because exports of tin gave England a comparative advantage in international trade.⁹⁵

The natural effect of official inactivity was the appearance of still more unofficial tokens, which in turn gave rise to a further crop of informers, who were, however, discouraged by authority, from Lord Chief Justice Jeffreys downwards.⁹⁶

V

At last, in February 1684, an initiative came from the Mint commissioners: Sir John Buckworth (a prominent London merchant), Sir Charles Duncombe (banker, and receiver of the customs), and James Hoare, Senior, (comptroller of the Mint). They had been appointed in June 1680 to execute the office of master of the Mint, from which Slingsby had been suspended for incompetence.⁹⁷ The commissioners proposed an issue of tin farthings and halfpence, reviving the argument that tin was a native metal, unlike copper, the purchase of which benefited Sweden. They suggested that to make use of tin for coinage would probably prevent a further fall in its price, and might enhance it, to the profit of the Crown. They also said that they believed that a great part of the copper farthings had been exported to the Americas, suggesting that there would be scope for tin farthings there as well.⁹⁸

Three months later the Treasury decided upon an issue of tin farthings

and halfpence along the lines suggested. They were to be minted at the rate of 20d. to the pound of tin, instead of 16d. as in the negotiations in 1676. As the metal was available at 8d. a pound, and the cost of manufacture and distribution was estimated at 4d. a pound, a profit of forty per cent on them was expected.⁹⁹ (This would of course replace the rent which private contractors would have paid.) On 3 July 1684, the first of a series of warrants for advances to buy tin was issued to the three commissioners, the necessary £8,000 being lent to the Crown by Duncombe himself.¹⁰⁰

In December 1684 a royal warrant formally authorised the commissioners to produce tin farthings and halfpence with a copper stud in the centre of each coin.¹⁰¹ Work had actually begun some months earlier in the Skinners' Hall, Dowgate Street, which was leased from that Company in August 1684.¹⁰² Sir John Buckworth left the commission in February 1685, and the commission itself was disbanded in 1686, when Slingsby resigned and was succeeded as master of the Mint by Thomas Neale.¹⁰³ However, its members remained responsible for the production of the tin coins until Michaelmas 1688. The ubiquitous Palmer appears to have transferred his assistance to them; an account which they submitted, and which is discussed below, showed a payment to him of £120.2s.5d. for 'several services relating to this affair'.¹⁰⁴

The next development was that in June 1688 a new group undertook the farm of tin.¹⁰⁵ This comprised John Granville, first Earl of Bath, formerly lord warden of the Stannaries, and now lord lieutenant of Cornwall and Devon; Sir Thomas Griffith; Thomas Hartopp; and two merchants, Richard Holt and James Kelke.¹⁰⁶ These last four were business associates,¹⁰⁷ and Kelke as warden of the Pewterers' Company naturally had a particular interest in tin. This group, with others, put forward a series of proposals for the farm from January 1688 onwards.¹⁰⁸ The upshot of the negotiations was a contract, signed on 2 June 1688, by which the farmers undertook to pay £16,000 a year for the right of pre-emption and the 'coinage' dues.¹⁰⁹ They offered also a further £2,000 a year for the right to coin tin farthings and halfpence up to a limit of £10,000 a year for the first three years, and a total of £30,000 thereafter.¹¹⁰ The contract was to run for eleven years from 24 June 1688.¹¹¹

Almost immediately, however, difficulties emerged. Eight days after the contract was signed the Prince of Wales was born, and his rights as Duke of Cornwall made it necessary for the group to take 'good counsel'. From the outset, also, financial troubles loomed: the farmers had bought the current output of tin at the contract price of £3.10s.0d. a hundredweight, but because of 'the difficulties of the times' had been unable to sell it.¹¹²

It appears also that the contractors had not been able to start minting farthings or halfpence, even though Richard Holt, on their behalf, had taken over the plant at Skinners' Hall which the previous commissioners had been using. (Elias Palmer is mentioned as an alternative to Holt as a possible recipient for the plant, so it would appear that he was now connected with the Earl of Bath's group, though in what capacity is not clear.)¹¹³

Reporting on these difficulties in March 1689, the comptroller of the tin farm, Charles Godolphin, suggested that the farmers should be required to pay a half-year's rent of the farm (£8,000) and that other steps should be taken to resume the minting of farthings and halfpence 'as it would be a public disservice that the fabrication of tin coins should be longer discontinued'.¹¹⁴

Meanwhile James II had given way to William and Mary, and it would appear that the new monarchs were consulted as to their wishes. Possibly to assist their decision, the Mint produced specimen copper farthings dated

1689.¹¹⁵ However, in September 1689 the Treasury requested Sir Hugh Boscawen, the surveyor of the Cornish 'blowing houses', to make discreet enquiries into the price of tin 'as the King intends to coin tin farthings'.¹¹⁶

On 12 October 1689 the decision was reached to resume the minting of tin coins, and its supervision was entrusted to a fresh group of three commissioners, headed by Charles Godolphin. James Hoare, Senior, of the Mint, was again included. The third commissioner was one Andrew Corbet (or Corbett).¹¹⁷ In November these three reported that tin could be bought in London at £63.10s.0d. a ton (just under 7d. a pound) and were given an imprest of £1,000 to enable them to start work before the arrival of tin on order from Cornwall.¹¹⁸ By 24 January 1690 the Mint had produced ten tons of coins, equivalent to 1.79 million farthings, and was expecting fifty tons of tin from Cornwall.¹¹⁹ This would yield more coins than could be absorbed in England; what about Ireland? In the event, the attorney-general ruled that tin farthings could be sent to Ireland despite the existence of a patent to provide copper halfpence there, running for twenty-one years from 32 Charles II (1680-81), and now owned by Roger Moore.¹²⁰ Ultimately some £8,500 worth of farthings (over eight million) were sent there.¹²¹

By March 1690 minting had reached £2,500, but counterfeits had already appeared: the commissioners reported that a quantity of farthings 'called Prince of Wales' farthings' had apparently been lately coined, and were 'dispersed about the town'.¹²² Perhaps because of this competition, the disposal of the newly-minted official coins proved a slow business, and in April 1690 the Treasury agreed to compensate the commissioners if they had to borrow to keep the Mint working.¹²³ Their wages bill was £520 a year.¹²⁴ In May 1691, embarrassed by their inability to dispose of their output, the commissioners appealed to the Treasury, who left it to them to find outlets for the coins as they thought best.¹²⁵ For the next two months production was halted 'in expectation of tin to be delivered'.¹²⁶ The commission was reconstituted in July 1691, without Godolphin, who was replaced by Thomas Povey, a master of Requests.¹²⁷ The production of tin coins appears to have ended late in 1692.¹²⁸

The issues of these coins were far more profitable to the Crown than had been those of copper. Detailed accounts are available for the activities of the first group of commissioners (Buckworth, Duncombe and Hoare) from Lady Day 1684 to Michaelmas 1688. During the first three years of this period they produced some £22,000 worth of coins at a cost of £8,100 for tin and £5,400 for workmanship.¹²⁹ They asked for £1,800 for supervising the work, but the Treasury allowed them £1,200 only. A second account, dated 12 August 1703, deals with the eighteen months from Lady Day 1687 to Michaelmas 1688, during which Duncombe and Hoare minted a further £5,567 worth of coins, at a cost of £3,623, for which they were allowed £300 each.¹³⁰ Their payments to the Exchequer in respect of their four and a half years work totalled £9,678, some thirty-five per cent of the value of the coins produced.

From Michaelmas 1688 until October 1689 minting was in abeyance, but thereafter it appears to have been actively pursued, as the profit realised from October 1689 to September 1691 was £12,885,¹³¹ which implies an output of nearly £36,000. The total produced to the latter date was therefore more than £63,000.¹³²

Unfortunately we have no detailed accounts for either the second group of commissioners (Godolphin, Hoare and Corbet) or the third group (Corbet, Hoare and Povey). The only extant summary, dated 31 January 1702, relates to the work of the third group, but does not state what period it covers.¹³³

It shows their 'charge' (obligations, mainly for coins produced) as £18,548, and their 'discharge' (costs plus payments to the Exchequer) as £18,418. If this account covers the whole period of the responsibility of this group, they and the second group contributed about equally to the £36,000 worth of coins produced under William and Mary.

The final output of tin coins was a little over £65,000,¹³⁴ and if the second and third groups were as efficient as the first, the Crown must have benefited by some £23,000, spread over three reigns. It should be noted, however, that none of the available accounts make any mention of the cost of exchanging the copper coins, and it may well be that the aggregate of £23,000 should be abated by the £5,500 which the Treasury agreed to pay towards the cost of the operation.

VI

On 1 February 1692 the commissioners were told to consult the attorney-general about the prevalence of counterfeit farthings and halfpence.¹³⁵ At the same time, the supporters of copper in preference to tin took heart and began to put forward fresh proposals. In July the recently-chartered Governor and Company of Copper Miners offered to coin 500 tons in pennies, halfpence, and farthings at a rate of 24d. a pound avoirdupois, paying an annual rental of £2,500 in advance. Invited to comment, the Mint authorities reported that copper was preferable to any other base metal for such small coins. Five hundred tons at 24d. a pound would produce £112,000; if the Company could dispose of quantities as large as that, the Mint thought that its costs and the £2,500 rent could be fully covered if the coins were rated at 22d. to the pound. The Mint also advised that the contractors should be required to use the newly-available English or Welsh copper, of a similar standard of fineness to the Swedish copper previously obtained for coins.¹³⁶

Seemingly persuaded by the arguments in favour of copper, but not heeding the Mint's other advice, the Treasury accepted, on 8 February 1693, an offer by Andrew Corbet to pay a rent of £1,000 a year for the right to manufacture copper halfpence and farthings for nine years. They were to be rated at 24d. a pound, with a 'remedy' (tolerance) of one halfpenny per pound. Corbet might coin a total of 120 tons in any of the first four years and sixty tons in any of the succeeding five years. It was a condition of the agreement that he was to exchange his coins, by tale, with tin farthings and halfpence, which were then to be melted down.¹³⁷

Corbet in fact minted only a few copper farthings; they proved to be light and ill-struck,¹³⁸ the proposed contract with him was never sealed,¹³⁹ and by April the issue of his coins had been stopped.¹⁴⁰ Furthermore, protests against the abandonment of tin had begun to come in, and after the Cornish members of Parliament had joined in them,¹⁴¹ the Treasury decided that it would be better to refer the matter to the Privy Council.¹⁴²

On 9 March 1693 the officers of the Mint were again asked to advise whether tin or copper coins were easier to counterfeit.¹⁴³ A week later they answered that either could be counterfeited with equal ease and profit. They added, reversing the advice they had given only eight months earlier, that they would recommend using tin because so much was mined in England, and because their majesties would profit if the operation raised the price of tin.¹⁴⁴ To a subsequent question whether a mixture of tin and copper would be safer, they replied in the negative.¹⁴⁵ Further consideration followed, but in September the Treasury proposed to the queen, acting as regent in

William's absence abroad, that the Copper Miners' offer should be accepted, subject to their reducing the rating of the coins to 22d. to the pound, and to a limit of five years. English copper was to be used.¹⁴⁶ They repeated this advice in a further report in December, adding that the Copper Miners would pay a rent of £2,500 a year.¹⁴⁷

In January 1694 the Treasury received a proposal from Abel Slaney (an army contractor and writer on currency)¹⁴⁸ and Daniel Barton to manufacture copper farthings and halfpence, for which they offered a rent of £3,500 a year. However, the Treasury stuck to its recommendation of the Copper Miners' Company, saying that the Company had made extensive and expensive preparations, and that it was willing to increase its offer to £3,500 a year.¹⁴⁹ Rumours of all these negotiations are reflected in a series of entries in Luttrell's diary - which, however, are invariably inaccurate.¹⁵⁰

By now the condition of the tin coins had become the subject of many complaints. Petitions to the House of Commons in March 1694 criticised the coins for being worth only two-thirds or three-quarters of their nominal value, and sought assurances that they would be redeemed by tale. One group of petitioners also asked that future coins should be produced by the Mint, and not by private contractors.¹⁵¹ The Commons committee to which the petitions were referred supported both requests in a report on 17 April, which recommended that future coins should be made at the Mint, of English metal of full intrinsic value, and that genuine tin coins should be redeemed at their face value in the new coins.¹⁵² The word "copper" did not occur in the committee's report, but their criticisms of the tin halfpence and farthings made their intentions clear. The immediate effect was to throw doubt on the continued validity of the tin coins.¹⁵³

Pursuant to the committee's report, the Treasury placed a new contract in June 1694. The licencees were Sir Joseph Herne (or Heron), governor of the Copper Miners' Company, Sir Francis Parry, George Clark, and the unsuccessful tenderers in January, Abel Slaney and Daniel Barton.¹⁵⁴ They were to manufacture 700 tons of copper farthings and halfpence over seven years at the rate of 21d. a pound, with a remedy of one halfpenny a pound. Presumably in consideration of the lower rating imposed, no rent to the Crown was provided. It was, however, a condition of the contract that they would employ at £200 a year a comptroller nominated by the king; the man appointed was Andrew Corbet,¹⁵⁵ who was, however, replaced in August 1696 by Philip Shales.¹⁵⁶

A second condition of the licence was that the copper for their coins must be cut into blanks by the Mint workmen; if desired, the stamping could also be done by the Mint. The licencees elected to place the whole job with the Mint, and during 1695 these arrangements appear to have worked smoothly, although the quality of the workmanship was below the Mint's normal standard. Contemporaries complained that the coins were lighter in weight than was required, and were cast, not rolled and cut, as the licence called for.¹⁵⁷ This was apparently due to the Mint experiencing difficulty in working English copper.

A third condition of the licence was that the contractors would exchange tin coins for copper ones, by tale, at a rate not exceeding £200 a week, the tin to be melted down. Accordingly they gave notice that they would begin to make such exchanges on 6 November 1694.¹⁵⁸ Ten days later they were told to exchange £700 worth of tin farthings and halfpence held by the postmaster-general, at the rate of £100 a week,¹⁵⁹ and in March 1695 to exchange £200 held by the Penny Post Office at £30 a week.¹⁶⁰

The priority given to these exchanges soon caused trouble. In January

1696 a fresh series of petitions reached the House of Commons, complaining particularly about the difficulties experienced in exchanging tin coins for the new copper ones.¹⁶¹ A committee was appointed to examine the complaints, but the contractors, represented by Sir Francis Parry, successfully contested them.¹⁶²

Shortly afterwards, however, they suffered a serious setback. Parliament decided to recoin the whole of the silver in circulation, with the result that in 1696 and 1697 the Mint turned out £4,700,000 in silver coins, compared with an average of £3,500 a year during the previous six years.¹⁶³ Thus occupied, it had to divert away from stamping copper coins seven presses which had previously been made available, reducing output substantially,¹⁶⁴ and producing complaints of acute shortages of small change.¹⁶⁵

Worse still, the price of copper rose above the 11d. a pound (£102.67 a ton) on which the contractors had reckoned.¹⁶⁶ The market price quoted by Houghton rose from £90 to £100 a ton on 6 September 1695, and remained unchanged until 25 September 1696, but then altered to £120 a ton. At that level it remained until 16 April 1697, after which no further quotations were given.¹⁶⁷ It would appear, however, that the increase to £120 a ton actually occurred earlier than September 1696, since in April of that year it was mentioned in the House of Commons as the cost of copper being supplied by Dockwra's company.¹⁶⁸ In May 1696 the contractors told the Treasury that they had to pay £130 a ton for some supplies,¹⁶⁹ and this figure was repeated in a broadside reproducing the contractors' petition to Parliament.¹⁷⁰ They asked permission to alter the weight of the coins proportionately to the increased cost of the metal, and to use Swedish copper,¹⁷¹ but there is no indication that either concession was granted.

The increased cost of copper had a disastrous effect on the outcome of the contract. By Lady Day, 1696, the accounts submitted by Corbet as comptroller showed that the contractors had made a net loss of £3,986.5s.1d; they were then losing money at the rate of £87 a week.¹⁷² Part of this loss arose from the obligatory purchase and melting down of the tin coins, which produced only £60 a ton compared with the £200 a ton which they were said to have cost by tale.¹⁷³ By June 1698, when £38,400 of the tin coins had been taken in exchange, the loss had risen to £6,280.¹⁷⁴

So far the contractors had minted 509 tons of copper into halfpence and farthings; at the rate of 21½d. a pound, which they were using,¹⁷⁵ this represented £102,000 worth. This appears to have produced some symptoms of glut, and Parliament ruled that minting must cease for a year from 24 June 1698.¹⁷⁶ The contractors complained that they had no chance of making a profit on the whole job unless they were able to coin the 191 tons remaining of their agreed 700 tons, because the obligation to exchange tin coins by tale had resulted in an over-all loss to that date. As their contract was for seven years only, from June 1684, it was essential that they should be left free to complete the term, and not suffer any further interruption.¹⁷⁷ This representation was made in a petition to the House of Commons against a bill imposing a further year's halt in production. The bill was none the less passed by the Commons, but the Lords, having heard counsel for and against the ban, rejected the bill,¹⁷⁸ and no further hindrance was placed in the contractors' way. They continued to produce farthings until 1700 and halfpence until 1701,¹⁷⁹ presumably completing the £140,000 worth which corresponded to 700 tons.

The contractors had naturally expected that there would have been a sufficient margin between the rating of 21½d. to the pound and the costs of production plus the purchase of the tin coins, to have left them a satis-

factory profit. But the enhanced price of copper defeated this calculation. Mint charges were 5d. a pound,¹⁸⁰ the salary of the comptroller represented a charge of £2 a ton (a little over 0.2d. a pound) and the loss on exchanging the tin coins was equivalent to 4d. a pound of copper ones. The margin available for purchasing copper, and for profit, was therefore 12.3d. a pound. With copper costing £120 a ton (nearly 13d. a pound) or more, their margin disappeared. Abel Slaney, regarded by contemporaries as the leading licensee,¹⁸¹ petitioned the Treasury in 1702 for the right to mint more coins, on the ground that he and his partners had 'sustained great losses' on the contract.¹⁸² However, the Treasury was satisfied, in the terms of a minute dated 17 April 1705, that 'there is no want of copper money in any part of England at present', and it decided that when the need arose it should be met by the Mint, and not by private contractors.¹⁸³ In fact, except for an abortive issue of copper coins in 1714, cancelled by the death of Queen Anne, no further copper was minted until 1717, and the experiment with tin was never repeated at all.

VII

Before attempting to assess the economic impact of the issues described above, it will be well to note that the hopes of those who had proposed them were pretty uniformly disappointed. In particular, neither copper nor tin coins were immune to counterfeiting, and it was partly because of public disapproval of counterfeits that the use of each metal was discontinued in turn. The main difference in this respect was that the tin coins (1684-92) were more profitable to forge, despite the plug of copper in the middle of each, because the cost of the metal plus workmanship was substantially less than the face-value of the coins. This was much less true of the first issue of copper (1672-79), and not much truer of Corbet's abortive effort (1693) or the second official issue of copper (1694-1701).

The three official issues were for progressively larger amounts, the first copper being for about £42,000, the tin for about £65,000, and the second copper for about £140,000. These were, however, not cumulative; the contractors for the tin issue were required to purchase and cancel the preceding copper coins, and those for the second copper issue agreed to redeem and melt down the preceding tin ones. Moreover, the coins did not necessarily remain in England (we hear of some sent to Ireland and others to the Americas); and even those remaining here tended to gravitate into involuntary hoards, such as those of the postmaster-general¹⁸⁴ and of retailers.¹⁸⁵

The economic effects of these issues may be looked for in three directions: their impact on the volume of currency in circulation, and so perhaps on prices generally; their consequences for the industries producing the metals used; and their effects on the balance of payments.

As regards the volume of currency, only a negligible effect can have been produced. This is true of the third, and largest, issue, and *a fortiori* of the others. The third issue represented in all only some 0.7 per cent of the currency in existence when it began, estimated by Newton at over £19,600,000.¹⁸⁶ Even during the more active first four years of the seven over which the issue was spread, the gross addition to the circulation was only some £25,000 a year. From that sum there must be deducted approximately £9,000 annually for the withdrawal of the tin coins. Taking into account also the disappearance of unofficial tokens, not to mention the concurrent dislocation caused by the war and the recoinage, even this, the largest, issue cannot have had any discernible effect on the general price-level.

However, this does not of course preclude its affecting the cost of the metal itself.

As the copper for the first issue of coins (1672-79) was imported, the British industry was involved only from 1693 onwards. Corbet's abortive issue (1693) was too small to have any impact, but that managed by Slaney and others required 509 tons of copper in the four years from June 1694 to June 1698. This seems to have absorbed an appreciable fraction of the total British output, even if this reached the possible total of 300 tons a year. The natural result was a considerable increase in the price of copper, affecting not only the contractors for halfpence and farthings, as noticed above, but other users as well. For example, the cost to the British Navy of copper articles, which averaged £146 a ton in 1693 and 1694, rose to £158 a ton in 1695, £187 a ton in 1696-1700, and £205 a ton in 1701.¹⁸⁷ It is true that these were war years, but this was no less true in Amsterdam, and there the price of copper rose only by ten per cent from 1694 to 1701.¹⁸⁸

The effects of the introduction of the tin coins were of a different order. The total output of tin in Cornwall and Devon during the nine years (1684-92) when they were being minted was 12,287 tons.¹⁸⁹ This was 1,200 tons greater than in the preceding nine years, and 800 tons greater than in the succeeding nine. As the quantity required for the coins was only some 350 tons in all, they clearly made only a minor contribution to the enhanced output at the time. However, on the assumption that the whole 350 tons was additional to what would otherwise have been produced, it can be calculated that it would have required on average the employment of perhaps 300 tinner.¹⁹⁰ This was a far cry from the 'many thousands' of new workers envisaged by Thomas Violet.

The fact that output between 1684 and 1692 was so much greater than in the years before and after that period makes it unsurprising that the price in fact fell, the tinner receiving between $6\frac{1}{2}$ d. and $7\frac{1}{2}$ d. a pound in 1684 and between $5\frac{1}{2}$ d. and 6d. a pound in 1692.¹⁹¹ This again ran counter to expectations, which were that to use tin for coins would increase its price.

None of the three issues which we have examined appears to have had any noticeable impact on the balance of payments. The effect of the necessary imports of copper between 1672 and 1676 cannot be quantified because no general trade figures exist before 1697. It is, however, known that trade with Scandinavia was brisk; between 1701 and 1705, for example, imports from Sweden averaged £195,000 a year.¹⁹² It seems unlikely that, even thirty years earlier, the addition of some £6,000 a year to such imports was significantly detrimental, despite the anxieties expressed by the Commonwealth Parliament thirty years before that again.

So far as the second copper issue (1694-1701) is concerned, the balance of payments will have been affected only to the extent that the manufacture of the coins diverted to home use copper that otherwise would have been exported. There is no evidence of such an effect: exports of copper, which were in any case very small (£3,683, under thirty-five tons, in 1697) rose each year until 1700.¹⁹³ After that, they fell again.

As regards the tin coins, little diversion from exports might *prima facie* be expected, because prices in foreign markets tended to be higher than at home.¹⁹⁴ In any case, exports appear to have varied so much from year to year that the impact of any such diversion might not be distinguishable. Unfortunately, for the years when the coins were being produced (1684-92), statistics of the exports of tin are available only for Cornwall (true, the principal producer) and are even fairly complete only for one year, 1685.¹⁹⁵

They were then 193 tons (fourteen per cent of output), but this was more than twice the known exports in 1681, and more than six times those in 1697, these being the nearest years for which data are forthcoming. Taken in conjunction with the fall in price, noted above, these facts suggest that the balance of payments was unaffected by the minting of tin.

NOTES

1. 5 Henry IV, c.4.
2. 1 William & Mary, c.30, s.4, explained by 5 William & Mary, c.6.
3. W.R.Scott, *The Constitution and Finance of English, Scottish and Irish Joint-Stock Companies to 1720* (Cambridge, 1912, reprinted New York, 1951), II, 430.
4. John Houghton, *A Collection for Improvement of Industry and Trade* (1697). (1727 edition, II, 186).
5. A principal source of copper was Cornwall, and all ore dug there was shipped to South Wales or Bristol for smelting. Such shipments of ore totalled 1,420 tons in 1694, rising to 2,164 tons in 1696. (James Whetter, *Cornwall in the 17th Century* (Truro, 1974), p.117). The copper content of ore from Cornish mines in the first thirty years of the nineteenth century averaged 8.6 per cent (calculated from J.R.McCulloch, *A Dictionary...of Commerce*, second edition, (London, 1834), p.399). If this applied in 1694-96, the output of copper from Cornwall alone would have risen from 122 to 186 tons. Copper was also produced elsewhere in England and Wales. Also, the grade of ore produced may have been higher in 1694-96 than in 1800-30, when it was actually tending to fall.
6. Calculated from data in G.R.Lewis, *The Stannaries* (Truro, 1908), p.256.
7. F.C.Dietz, *English Public Finance, 1485-1641* (New York, 1932, reprinted London, 1964), II, 90.
8. Lewis, p.149.
9. *Calendar of State Papers Domestic* (hereafter CSPD), 1634-35, p.586; CSPD 1635, p.606; CSPD 1660-61, p.508.
10. CSPD 1660-61, p.497; CSPD 1667, p.96.
11. CSPD 1661-62, p.445.
12. *Calendar of Treasury Books* (hereafter CTB), 1660-67, p.264; CSPD 1663-64, p.660, corrected by CTB 1669-72, p.208.
13. CSPD 1666-67, p.192; CSPD 1667-68, p.144; CSPD 1671, p.546.
14. CSPD 1666-67, p.192; CTB 1669-72, p.208.
15. CSPD 1667-68, p.112; CTB 1667-68, p.209.
16. C.D.Chandaman, *The English Public Revenue, 1660-1688* (Oxford, 1975), p.125.
17. For Bristol issues see C.E.Challis, *The Tudor Coinage* (Manchester, 1978), p.209 (copper); and CSPD, 1611-18, p.184 (lead).
18. Sir Robert Cotton, 'The Manner and Meanes how the Kings of England have from time to time supported and repaired their Estates', reprinted

56. CTB 1669-72, pp.1094-95; CSPD 1675-76, p.476; CTB 1676-79, p.1267.
57. CSPD 1672, p.312. 58. CTB 1669-72, p.1088.
59. Charles II: *Proclamation*, 1672. 60. CSPD 1673, pp.144, 153, 187.
61. CSPD 1676-77, p.202.
62. CSPD 1676-77, p.202. Craig, p.175, quotes, without naming his source, 12d., increased to 14½d., as the cost of the copper; 4d. as the cost of fabrication and distribution; and 22d. as the rating of the coins; leaving the Crown 'a profit of 3½d. a pound, or 16 per cent on cost'. See also Craig, p.427.
63. Charles II: *A Proclamation enjoyning the Prosecution of all such Persons as shall make or utter any Farthings, Halfpence or Pence...with Private Stamps* (5 December 1674).
64. The figure of 11d. presumably represented the estimated worth of a coin, allowing for the cost of melting, though even so 5½d. a pound for copper seems improbably low. The rate of 22d. to the pound was evidently currently discussed (see note 62 above), but it appears safer to accept the rate of 19¾d. as in the text, as this is calculated from figures certified by James Hoare, Senior, comptroller of the Mint. See also note 73 below.
65. CSPD 1676-77, p.160. 66. CSPD 1676-77, p.250.
67. CSPD 1676-77, p.123; Historical Manuscripts Commission, *Report 79* (Lindsey), p.176.
68. CSPD 1676-77, p.149.
69. John Collins, *A Plea for the Bringing in of Irish Cattel...* (1680), pp.13-14; John Collins, *Salt and Fishery* (1682), p.156.
70. CTB 1676-79, p.32; CSPD 1676-77, p.34.
71. CSPD 1676-77, pp.117, 123, 133, 142, 149-50.
72. CSPD 1676-77, pp.160, 191-92.
73. This absorbed 492,271 lbs. 4½ oz. of copper (CSPD 1676-77, p.202). The calendar also records that '£32,696.0s.8d. had been distributed and £7,561.16s.3d. remained in hand (sic)'. No farthings or halfpence dated 1676 are listed by Peck.
74. CSPD 1676-77, p.191; PRO, Mint 1/1, pp.176-78. Craig, p.176, incorrectly gives the date as 11 August.
75. CTB 1676-79, p.1051. 76. CTB 1676-79, pp.1266-67.
77. Craig, p.176, estimated the total at £55,000-£60,000, but he expressly based this on the Mint's forecast of output, which does not appear to have been realised.
78. There is no entry in Chandaman for profits from this coinage.
79. CSPD 1676-77, p.234.
80. CSPD 1676-77, pp.249-50, 482; cf. p.215.
81. CSPD 1676-77, p.215.
82. CSPD 1676-77, p.453; CTB 1679-80, p.802.
83. CSPD 1676-77, p.273. 84. CSPD 1676-77, p.453.
85. CTB 1679-80, p.802. 86. CSPD 1676-77, p.218.

to the Crown as £21,000. The difference between these figures and those in the text may be explained by the fact that the second account of the original commissioners had not been rendered when Godolphin reported. Chandaman, p.361, shows a revenue from farthings totalling £16,442 for the period Michaelmas 1684 to Michaelmas 1688.

133. CTB 1702, p.296. 134. CTP 1556-1696, p.365.
 135. CTB 1689-92, p.1477. 136. CTP 1556-1696, p.249.
 137. CTB 1693-96, pp.39-40. 138. Craig, p.182.
 139. CTB 1693-96, p.69.
 140. Narcissus Luttrell, *A Brief Historical Relation of State Affairs from September 1678 to April 1714* (Oxford, 1857), III, 67.
 141. CTB 1693-96, p.69. 142. CTB 1693-96, p.93.
 143. PRO, Mint 1/1, p.193. 144. CTB 1693-96, pp.103-104.
 145. CTP 1556-1696, p.286. 146. CTB 1693-96, p.330.
 147. CTB 1693-96, p.415.
 148. His writings include *A Method for an Immediate Coinage...* [1695]; *A Proposal for a Fund...*[1695]; *Proposals humbly offered...for preventing Clipping, Coining, &c.* [1695].
 149. CTB 1693-96, p.459.
 150. Luttrell, III, 224, 240, 245, 246, 292, cf. II, 359.
 151. *Journals of the House of Commons* (hereafter *JHC*) XI (1693-97), 125, 144.
 152. *JHC*, XI, 163, 170. 153. *CSPD* 1694-95, p.125.
 154. CTB 1693-96, pp.666-67. 155. CTB 1693-96, p.688.
 156. CTB 1696-97, p.226.
 157. *The case of several tradesmen and dealers in and about the City of London...* [1696?] (hereafter *The case of several tradesmen*).
 158. CTB 1693-96, p.796. 159. CTB 1693-96, p.826.
 160. CTB 1693-96, p.953. 161. *JHC*, XI, 388.
 162. *JHC*, XI, 545-49. 163. Craig, p.416.
 164. CTP 1556-1696, p.555.
 165. *The case of several tradesmen; also Proposals to the Parliament for Redress of the Common Calamity...* (1696).
 166. CTP 1556-1696, p.365. 167. Houghton, under dates cited.
 168. *JHC*, XI, 549. 169. CTB 1696-97, p.11.
 170. *The case of the contractors for making and vending copper halfpence and farthings* (1696) (hereafter *The case of the contractors, 1696*).
 171. CTB 1696-97, p.11. 172. CTP 1556-1696, p.509.
 173. *The case of the contractors for making copper halfpence and farthings* [1699] (hereafter *The case of the contractors, 1699*). CTB 1697-98, p.68. The figure of £200 implies that the tin coins contained on average only some ninety per cent of their nominal weight of tin. In fact, the report made to the Treasury in February 1698 (CTB 1697-98, p.68) showed that the average rating of the tin coins exchanged was 21.43 d. to the pound instead of the contractual 20d. to the pound.

174. *The case of the contractors, 1699.* 175. *The case of the contractors, 1696.*
176. *JHC*; XII (1697-99), 268. The Act was 9 & 10 William III, c.33; it received the royal assent on 5 July 1698.
177. *The case of the contractors, 1699.*
178. *JHC*, XII, 651 (18 April 1699); *Journal of the House of Lords*, XVI (1696-1701), 458 (29 April 1699).
179. Peck, pp.171, 173. 180. *CTB 1693-96*, p.667.
181. *The case of several tradesmen.* 182. *CTP 1702-07*, p.123.
183. *CTP 1702-07*, p.337. 184. *CTB 1693-96*, pp.1324, 1436.
185. *JHC*, XI, 125. 186. Craig, p.193.
187. Sir William Beveridge and others: *Prices and Wages in England* (London, 1939), p.678.
188. N.W.Posthumus, *Inquiry into the History of Prices in Holland* (Leiden, 1946), p.377.
189. Lewis, p.256.
190. The number of tanners in 1697 was estimated at a minimum of 8,000, [T.Tresillian], *Aggravatii Venetiani, etc...* (1697), p.7. The output of that year, a depressed year (*The Tanners' Greivances* [sic], 1697, passim), was the lowest of the decade (2,382,034 lbs.). This would give an average per man of something under 300 lbs. a year. The average output in the 1690s was 2,547,657 lbs. (Lewis, p.256). If Tresillian's estimate was valid for the whole decade, the average output per man was something less than 318 lbs. a year, which would have required the employment of a minimum of 273 men.
191. Whetter, p.196.
192. Elizabeth Boody Schumpeter, *English Overseas Trade Statistics 1697-1808* (Oxford, 1960), p.18.
193. Schumpeter, pp.19, 23. 194. Whetter, pp.195-98.
195. Whetter, p.192.