THE SUPPLY AND USE OF MONEY IN THE ROMAN WORLD 200 B.C. TO A.D. 300*

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The supply and use of money are topics which lie at the heart of our understanding of the Roman economy and fiscal system. The view we take of these matters affects both our picture of everyday life and the economic models we construct to describe the structure and development of the Roman world. Monetary history is also relevant to social and political change, as medieval historians know well. In the great commercial revolution of Europe in the thirteenth century it was the increasing availability of money which allowed the payment of knights and civil servants and thus broke the hereditary grip on these functions, enabling the first post-feudal states to emerge.[1] So in the Roman world the availability of money permitted the creation of a professional standing army and of a system of salaried officials.

The medieval historian has to hand some important series of data on coinage output, coinage supply, credit, and the productivity of mines.[2] In the absence of such data the Roman historian must necessarily adopt somewhat different approaches. It has become almost orthodox in studies of Roman monetary history to believe that by establishing the number of dies used to produce a coinage it is possible to estimate the original volume of production with reasonable accuracy. This belief has encouraged the application of the method to a range of important topics in financial and economic history. A few of the most notable studies will suffice to illustrate what has been attempted. In the sphere of state finance, Crawford published a classic analysis of coinage and state expenditure under the Republic, which depended on the further assumptions that coins were struck for the sole purpose of enabling the state to make payments, and that for an extended period of the Republic all state expenditure was in new coin.[3] For the imperial period Carradice addressed the finances of Domitian through the coinage.[4] At the macro-economic level, Hopkins combined Crawford's output figures for the Republic and deducted an estimate of coins lost from circulation to produce a picture of changes in the overall money supply.[5] At what might be termed the micro-economic level, Walker made ingenious use of quantitative techniques to derive from the evidence of the base metal coins found at Bath an estimate of the total supply of base metal coin in Britain. He then divided that estimate by a figure for the population of the province and concluded that the use of coin was very restricted.[6]

The object of this paper is not to criticize any specific study, but rather to emphasize the limits to this type of procedure, and to suggest alternative approaches. The implications for the study of state finance will not be discussed. It has been shown elsewhere that there is no warrant for the view that for any sustained period all state expenditure was exclusively in new coin.[7] The possibility of using old coin for making payments means that, at least as regards the restriking of existing coin, decisions to coin might be taken for reasons other than the requirements of expenditure. Moreover, there is considerable ancient evidence for such alternative motivations to coin. It follows that the application of quantitative numismatics to the history of state finance is much more problematic than it once appeared.

This article is concerned instead with the economic aspects of monetary history. First, the limits to quantification are examined (1). It is not intended to survey quantitative techniques in themselves or to deny their validity, but rather to show that the wide margins for error, and the problems of principle involved, bedevil any attempt to draw helpful inferences about the

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[1] Spufford, *Money*, 247–8. The emphasis is on *increasing* availability. This is not to deny a significant role to monetary transactions at an earlier period.

[2] Spufford, *Money*, *passim*.

[3] Crawford, *RRC*; for detailed critiques see *NC* 150 (1990), 2 n. 5.

[4] I. Carradice, *Coinage and Finances in the Reign of Domitian A.D. 81–96*, BAR Int. Ser. 178 (1983).

[5] Hopkins, *JRS* 70 (1980), 101–25.

[6] D. R. Walker, *Roman Coins from the Sacred Spring at Bath* (1988), 301–5.

[7] For this point and what follows: Howgego, *NC* 150 (1990), 1–25.

supply and use of money from these techniques. An alternative approach is to attempt to identify the factors which affected the overall money supply, and hence to point the significance of some known developments (II). It is clear, however, that so general an approach is unlikely to permit conclusions to be drawn about the extent of money use. Much more light is shed on this topic by the directly relevant documentary and material evidence (III). In particular, such evidence reveals as mistaken the beliefs that the use of coined money as a means of exchange was largely limited to the cities of the Empire, and that it was scarcely present at all in some provinces.[8] Finally, it is argued that for the purposes of analysis and comparison, it is necessary to go beyond a delineation of the geographical extent of money use. The use of money may be defined with respect to its role not only in exchange for goods, but also in taxation, rents, wages, and credit; and its level of sophistication may be described (IV).

The treatment of money use in Sections III–IV is deliberately thematic. This has clear advantages for the purpose of analysis. Nonetheless, the result is that geographical and chronological variation may be masked to some extent. A full analysis of such variation is beyond the scope of this article, and in many cases beyond the scope of the evidence.

A broad span of time from approximately 200 B.C. to A.D. 300 has been chosen for this paper. It is necessary to set aside the late fourth and third centuries B.C., when the use of coin was developing at Rome under Greek influence, and the fourth century A.D., our view of which is heavily influenced by the survival of important legal sources, and which has different patterns of coinage. Only thus can one hope to decide to what extent these earlier and later periods differed from the age discussed here, which is characterized by a reasonably abundant coinage based on the (at least notionally) silver denarius, with significant issues of gold coin from 46 B.C. onwards, and a fiduciary base metal coinage.[9]

Naturally there were changes within the period of five hundred years covered in this paper. The denarius became by stages a world coinage, both by an increase in its area of circulation, and by the adaptation of other coinage systems so that they became compatible with the denarius.[10] From the first century A.D. onwards, and dramatically in the third century, the precious metal content of the coinage declined through reductions in weight or debasements.[11] Nevertheless, there was sufficient continuity within the period to make it worthwhile to view it as a whole.

I. LIMITS TO QUANTIFICATION

No mint records survive from the Roman world. To estimate the size of any individual issue one must count the known dies used to produce the surviving coins, extrapolate the original number of dies,[12] and multiply that number by the quantity of coins struck per die. To arrive at the total amount of coin in circulation at any given time it is necessary to perform this feat for every issue struck up to that time. A less accurate but more practical alternative is to extrapolate die estimates for the majority of issues from die studies of a few selected issues, using the relative frequency of issues in hoards as an index of their original relative sizes.[13] After that an estimate of the amount of coinage struck but already lost from circulation before the time in question must be subtracted.[14] Such loss could take place, for example, through simple loss or non-recovery of hoards, through the melting-down or restriking of old coin, through trade or other external payments, or through coin being carried away by enemies.

[8] *Pace* Crawford, *JRS* 60 (1970), 40–8.

[9] The extent to which gold and silver coin may have been over-valued in relation to their metal content is highly problematic: Howgego, *NC* 150 (1990), 17–19. S. Bolin, *State and Currency in the Roman Empire to 300 A.D.* (1958) indulges in extensive theoretical considerations of the topic, but hard evidence is lacking.

[10] M. Crawford, *Coinage and Money*; A. M. Burnett and M. H. Crawford (eds), *The Coinage of the Roman World in the Late Republic*, BAR Int. Ser. 326 (1987); Howgego, *Greek Imperial Countermarks*, 52–60.

[11] Below, p. 8 and n. 59.

[12] Extrapolation does not in fact produce a single correct number, but a statistically defined range of plausibility: W. Esty, 'Estimation of the size of a coinage: a survey and comparison of methods', *NC* 146 (1986), 185–215. If the sample is inadequate the range may be very wide indeed, cf. *JRS* 80 (1990), 231–2.

[13] The procedure adopted by Crawford in *RRC* II, Section 7. For critiques see Howgego, *NC* 150 (1990), 2 n. 5.

[14] As by Hopkins starting from Crawford's estimates for production, *JRS* 70 (1980), 101–25. Thinking about loss rates has been heavily influenced by the comparative evidence of the Lohe hoard from eighteenth-century Sweden: T. R. Volk, 'Mint output and coin hoards', in Depeyrot *et al.*, *Rythmes de la production monétaire*, 141–221.

The margins for error in every stage of such a procedure may be enormous, but it is sufficient to point to one central uncertainty. The figure chosen for the output per die is crucial but will have varied considerably in practice according to the metals involved, the size and type of the coins, the quality of the die, the skill of the mint workers, and whether or not the dies were used until they broke. We cannot estimate the variability of output with any accuracy for the Roman world, but the records of dies used and bullion coined in England between 1281 and 1327 provide a suggestive analogy from a pre-industrial context.[15] The average production from dies at different stages within this period varied from 5,000 to 74,000. Moreover, these are averages based on 136 dies and 48 dies respectively; clearly the actual output from individual dies varied in an even more spectacular fashion.[16] It may be possible to detect some particularly anomalous issues by comparing die estimates with the relative frequency of issues in hoards. Nevertheless, if one begins with potential variability in average production of this order and proceeds to further calculations, each with wide margins for error, it is easy to see that no attempt to quantify the coinage supply in the Roman world is likely to be able to support any but the most general conclusions about the economy.[17]

This is all the more true because for most purposes it is not the supply of coinage that we would like to be able to estimate but the supply of money. The workings of the monetary economy depended not only on how much coinage was 'in circulation', but also on how hard it worked (in other words its velocity of circulation). For example, if an increase in the production of coinage was taken up by a corresponding increase in coins hoarded, then it added nothing to the supply of money for the purposes of exchange. Other relevant factors are the extent to which uncoined bullion was used as money, and the role of credit. There was no negotiable paper. Thus, unlike bullion, credit did not so much add another element to the money in circulation as enable existing forms of money to work harder. Credit is therefore considered here as an aspect of velocity of circulation, as will be explained more fully below.

Quantification on the basis of coin finds is likewise of little help in determining the variations in the use of money between different regions or different periods.[18] The pattern of coin hoards known today cannot be used as a simple index of coin use, as it is heavily biased in favour of periods of insecurity, when owners failed to recover their treasure.[19] The interpretation of patterns of individual finds is also fraught with difficulties. One major concern is that the demonetization of old issues may have resulted in the worthless coins being abandoned. Any such 'losses' would reflect monetary change rather than an increase in the use of coin.[20] Aside from this, it is perhaps reasonable to suppose that there was some degree of correlation between patterns of coin loss and patterns of coin use. The more transactions occurred in a given place, the more coins were dropped. What is not at all reasonable is to suppose that coin finds today correlate with coin losses in antiquity. Even in archaeological excavations the quantity of coins recovered depends on the extent and quality of excavation, and on the nature of the site. The market area is likely to produce more coins than most other parts of a town. Sites which were paved or regularly swept will produce few coins (no doubt coins were dropped, but most will have been recovered or removed). Such variables render comparison between totals of coins found on different sites meaningless. Even in a single place one has to face the possibility that the nature and use of the site changed over time. To deny the validity of

[15] M. Mate, 'Coin dies under Edward I and II', *NC*[7] 9 (1969), 207–18, at 217–18. It is possible that variability is overstated owing to dies being carried over from one accounting period to another.

[16] Statistical techniques enable allowance to be made for variation in die-output within an issue, but not for variations in die-output between different issues: Esty, *NC* 146 (1986), 185–215.

[17] Quantification might, for example, suffice to show that certain aspects of the use of money recorded in documentary sources are within the bounds of possibility.

[18] Compare the comments by Duncan-Jones, *Structure and Scale*, 38; M. Blackburn, 'What factors govern the number of coins found on an archaeological site?', in H. Clarke and E. Schia (eds), *Medieval Archaeology Research Group. Proceedings of the First Meeting at Isegran, Norway 1988*, BAR Int. Ser. 556 (1989), 15–24; T. R. Volk, *Britannia* 21 (1990), 384–6.

[19] M. Crawford, 'Coin hoards and the pattern of violence in the late Republic', *PBSR* 37 (1969), 76–81.

[20] The most plausible example of a pattern of coin finds distorted by demonetization is provided by the excavations at Karanis: R. Haatvedt *et al.*, *Coins from Karanis. The University of Michigan Excavations 1924–1935* (1964). Twenty-four hoards containing a total of about 27,000 coins, comprising the vast majority of the coins found on the whole site, came from a single insula. The high proportion of late third-century coins may be a reflection of the withdrawal of old coin at the time of the change in the currency system of Egypt under Diocletian. Demonetization may also account for the high percentages of coins of the late third and fourth century found on British sites: cf. H. Mattingly, 'Hoards of Roman coins from Britain', *JRS* 22 (1932), 88–95. It is also noteworthy that large hoards of Greek imperial (Roman provincial) coins belong to the period of the end of that coinage: C. J. Howgego, *Greek Imperial Countermarks*, 12; 66.

simplistic quantitative comparisons is not to argue that the evidence of coin finds should be ignored. The presence of significant numbers of coins on a site may reasonably be taken to imply that coin was used there, and numismatic evidence is used in this way below. The argument here is against the use of quantification in inappropriate ways.

Chronological patterns, as opposed to totals of coins, may be confirmed by repetition at a number of sites.[21] Such patterns can be dominant to the extent that differences between sites are hard to detect, despite different histories of occupation and use. Important evidence for the supply of coinage to one area relative to another, and at one period relative to another, may be obtained, although such evidence is still in principle prey to biases caused by the deliberate discarding of demonetized coins. Relative patterns do not, in any case, permit the quantification of supply in absolute terms. Furthermore, one cannot relate losses of coin in one metal to those in another. For example, the comparative rarity of gold coins as site finds should not be taken as a fair reflection of the quantity of gold coin in circulation in antiquity. Presumably people were careful not to lose valuable coins, and took trouble to recover any they did lose. Thus, if vastly more base metal coins are found of one period than of another, it does not necessarily imply that the total value of the coin in circulation was higher in the former period. Evidence for the high value coins may be distorted or lacking altogether.

It does not help to look instead at patterns of production of coinage, for these may also be very misleading. For example, under the Roman Republic little bronze coinage was produced from the late second to the late first century B.C., but that does not mean that Romans of the late Republic did not use small change. The explanation is simple. Bronze coinage of the second century B.C. had been so plentiful that it was still available for use a hundred years later, and in some areas there were other bronze coinages to supplement the Roman issues.[22]

Thus quantitative techniques based on the coins themselves are unable to shed much light on the supply and use of money. It is necessary to seek other approaches to these subjects.

II. THE MONEY SUPPLY

The supply of money was dictated (a) by the availability of metals which could in principle be used as money, (b) by the extent to which such metals were in fact used as money, and (c) by how hard that money was made to work. The evidence is wholly inadequate to give a comprehensive account of any of these topics, but some observations can be made.

(a) *Supply of metal*

The relatively high value of gold and silver means that it is their availability which is the crucial constraint on the money supply. The quantity of these metals in the Roman world depended on three main factors: first the gain or loss connected with conquest, booty, and external subsidies, second the balance of external trade in the metals in question, and third the productivity of the mines.

The first major influx of silver into the Roman world was the indemnity paid by the Carthaginians following the First Punic War.[23] Prior to that time Roman silver coinage had been on a very small scale.[24] From the Second Punic War onwards, the period with which we are mainly concerned, Rome laid its hands by stages on the stored up wealth of the whole of the Mediterranean. First Carthage and Spain, then Macedon, Greece, Asia, Numidia, the East, Gaul, and finally Egypt fed the Roman coffers. Rich cities, such as Tarentum, Syracuse, Carthage, and Corinth, were sacked. The sums involved were massive and the immediate

[21] R. Reece, *Coinage in Roman Britain* (1987), especially chapters 5–6.

[22] A. Burnett, 'The currency of Italy from the Hannibalic War to the reign of Augustus', *Annali dell'Istituto Italiano di Numismatica* 29 (1982), 125–37.

[23] On influxes of precious metals under the Republic see *ESAR* I, 74–5; 80–1; 127–38; 228–31; 262–5; 322–6; 336–42.

[24] A. Burnett, 'The beginnings of Roman coinage', *AIIN* 36 (1989), 33–64.

impact of these accretions of wealth could be dramatic. The revenues of the Ptolemies had once been of the same order of magnitude as those of Rome in Cicero's day.[25] The increase in spending power resulting from the conquest of Egypt in 30 B.C. caused the price of property to rise steeply and interest rates to fall.[26] Within areas already under Roman control, heavy exactions brought back into circulation stored up wealth. The war-lords of the late Republic took what they could. Caesar extracted no less than 2,000 talents from a single citizen of Tralles. Brutus and Cassius raised incredible sums in the East; Rhodes and Tarsus were among those to pay a heavy price.

The siphoning off of the gold and silver of the Mediterranean world into Roman hands had a numismatic corollary in the ending and withdrawal from circulation (whether gradual or not) of most of the existing non-Roman precious metal coinages. Livy records the parade of quantities of gold *philippei* in Roman triumphs.[27] We cannot trace such mechanisms of withdrawal in any detail but the broad picture is clear. It is surely no coincidence that Rome began to produce a plentiful coinage in gold from 46 B.C. onwards, only after other principal gold coinages from Macedon, Carthage, Ptolemaic Egypt, and Gaul had ceased to circulate.

Mass depredations came to an end with the relative stability achieved under Augustus. No doubt taxes and irregular exactions continued to dislodge stored up wealth, but the dramatic expansion of the supplies of gold and silver by conquest were over. There were occasional exceptions to this pattern. The sack of Jerusalem in A.D. 70 after the First Jewish Revolt liberated so much gold that gold coin passed for half its usual value in terms of silver coin in Syria.[28] It is also possible that gold arising from the conquest of Dacia in A.D. 106 was the cause of a drop in the price of gold in Egypt in A.D. 108, but the only source for the sums of booty involved is late and guilty of gross exaggeration.[29]

Over the course of the imperial period a contrary tendency developed. Gifts and subsidies to client kings and peoples beyond the border of empire grew into regular and substantial payments, and in due course became necessary to buy off threatened attacks.[30] We cannot trace this process in any detail or put figures on it. Outflows can be documented in the first century but the evidence suggests a turn for the worse at the time of Marcus Aurelius. The scale of the problem seems to have become apparent in the early third century.[31] Caracalla is said to have paid pure gold to barbarians, but only debased gold and silver to Romans. We should recognize this as rhetoric (the gold coinage, unlike the silver, was not debased at this date), but the passage may still stand as evidence of the outflow of precious metals. Macrinus complained, again presumably with rhetorical overstatement, that Caracalla increased the amount of money paid to barbarians to equal the pay of soldiers under arms. Dio records that Macrinus himself paid off the Parthians with a total of 200 million sestertii. We must allow for exaggeration in the sources, but the general pattern of development is clear.

Outflows of precious metal took place not only through more or less compulsory payments but also through trade. Such figures as we have turn out to be less promising than they appear at first sight. Pliny tells us that luxuries from India, China, and Arabia cost the Empire 100 million sestertii every year, and that India alone drained half that sum.[32] In an important critique, Veyne has argued that these figures must have been drawn from records of customs dues levied on imports, that they ignore the quantity of goods exported from the Empire, and that they cannot be taken as an estimate of the drain (if any) of precious metal from the Empire.[33] These seem fair points. Pliny was after all complaining about the immorality of

[25] Veyne, *Annales ESC* 34 (1979), 215. Note, however, that the figures for Ptolemaic revenues are of doubtful reliability and interpretation (what kind of talents are meant?).

[26] Suetonius, *Div. Aug.* 41; Dio LI. 21. 5; Guey, 'L'or des Daces', 472–3.

[27] *ESAR* I, 127–38, under 194 B.C., 189 B.C., and 187 B.C.

[28] Josephus, *BJ* VI. 6. 1 (317); cf. V. 13. 4 (550).

[29] *P. Sarap.* 90 = *P. Bad.* 37; Guey, 'L'or des Daces', 466–75; *pace* West and Johnson, *Currency*, 90–3; Walker, *Metrology* III, 121–2; R. Syme, 'The imperial finances under Domitian, Nerva and Trajan', *JRS* 20 (1930), 55–70 = R. Syme, *Roman Papers* I (1979), 1–17; E. Lo Cascio, 'State and coinage in the late Republic and early Empire', *JRS* 71 (1981), 76–86, at 79; Davies, *Roman Mines*, 205.

[30] E. Luttwak, *The Grand Strategy of the Roman Empire* (1976), 114–16; C. D. Gordon, *The Subsidization of Border Peoples as a Roman Policy of Imperial Defense*, unpub. Ph.D. thesis, Michigan (1948) (which I have not seen); summary in idem, 'Subsidies in Roman imperial defence', *Phoenix* 3 (1949), 60–9; A. R. Birley, 'The third-century crisis in the Roman Empire', *Bulletin of the John Rylands University Library of Manchester* 58 (Spring, 1976), 253–81, at 271 n. 4; Duncan-Jones, *Structure and Scale*, 43; N. Lewis and M. Reinhold, *Roman Civilisation* (3rd edn, 1990) II, 390–4 no. 110; for the numismatic evidence see n. 37 below.

[31] Caracalla: Dio LXXVIII. 14. 3–4; LXXIX. 17. 3. Macrinus: Dio LXXIX. 27. 1.

[32] Pliny, *HN* XII. 41 (84); VI. 26 (101).

[33] Veyne, *Annales ESC* 34 (1979), 211–44.

expenditure on foreign luxuries. He himself was able to view the growing of flax in Egypt as a way of obtaining goods from Arabia and India, while the ostraca from Myos Hormos record natural products and manufactured goods from Egypt bound for the East, and the *Periplus*, a trading handbook of the first century A.D., lists goods acceptable in Eastern markets.[34] Thus Pliny's figures do not represent the outflow of precious metal, but it is unreasonable to deny that any net outflow took place. The *Periplus* emphasizes the quantity of coin taken to Indian markets, and large numbers of Roman coins have been found there.[35] The scale of the trade was staggering, but it appears to have taken off only from the time of Augustus.[36]

Elsewhere, coin finds suggest some loss of precious metal across the northern frontiers, particularly to Dacia in the first century B.C., but later to much of Europe to the north and east of the Empire.[37] Tacitus notes the predilection of Germans for certain types of Roman coin.[38] One cannot be certain, however, that these losses took place through trade; the later finds are more plausibly to be attributed to military or political payments. It is in any case hard to believe that trade with the relatively backward people across the northern frontier caused outflows of precious metal on a scale approaching the drain to the East. When Tiberius complained of the transfer of money to peoples outside the Empire and even to enemies in return for precious stones, he was presumably thinking about the East.[39] This complaint belongs in the same moralizing tradition as Pliny, but it does at least draw attention specifically to the outflow of money (*pecunia*). Tiberius' point and Pliny's tone would seem to lose force if they were aware of correspondingly large inflows of precious metals into the Empire from outside. Under the Republic there had been a ban on the export of gold and silver from Puteoli in 63 B.C., and numerous earlier measures against the export of gold.[40] These prohibitions may have struck the same moral note, but their focus was on a different problem, namely the conservation of precious metals within Italy, rather than within the Roman Empire as a whole. The ban in 63 B.C. was almost certainly a reaction to a temporary shortage of coin in Italy. It is thus not possible to draw conclusions about the effect of trade on net outflows or inflows of precious metals under the Republic. It is, however, still the most probable view that under the Principate there was a net outflow, and that this took a turn for the worse with the expansion of trade with the East in the early Principate.

The final important factor concerning the supply of metals was mining, a subject also bedevilled by a lack of reliable figures. Polybius recorded that the silver mines near New Carthage in Spain provided 25,000 drachmae (denarii) for the state each day in about 140 B.C., but we do not know what proportion this represented of the total sums extracted.[41] Pliny notes that in the north of Spain the gold mines of Galicia, Lusitania, and Asturias, of which the last was the most important, produced 20,000 pounds of gold each year under the early Principate.[42] The figure given by Pliny has been suspected of being too high, but even if it is correct it would only apply to one period.[43] It is at least clear from Strabo and Diodorus that Spain as a whole was the most important source of gold and silver for the Romans, but that is

[34] Pliny, *HN* XIX. 2 (7); Myos Hormos: West and Johnson, *Currency*, 77; L. Casson, *The Periplus Maris Erythraei* (1989).

[35] Casson, op. cit. (n. 34), 29–31; P. Turner, *Roman Coins from India* (1989); on which see the important comments of MacDowall, below, n. 104.

[36] Scale: Casson, op. cit. (n. 34), 35; idem, 'New light on maritime loans: P. Vindob. G 40822', *ZPE* 84 (1990), 195–206, especially 205–6 n. 29; H. Harrauer and P. J. Sijpesteijn, 'Ein neues Dokument zu Roms Indienhandel. P. Vindob. G 40822', *Anzeiger österreichische Akademie der Wissenschaften. Philosophisch-historische Klasse* 122 (1985, published 1986), 124–55. P. Turner, *Roman Coins from India* (1989), 16; cf. Strabo II. 5. 12 (118); XVII. 1. 13 (798). For the date of the beginning of trade on some scale the early imperial Arretine ware from Arikamedo is of relevance: Casson, op. cit. (n. 34), 12; 25; 228–9.

[37] M. Crawford, 'Republican denarii in Romania: the suppression of piracy and the slave-trade', *JRS* 67 (1977), 117–24, but see the note of caution by C. Rodewald, *Money in the Age of Tiberius* (1976), 42–3; L. Lind, *Roman Denarii found in Sweden 2. Catalogue, Text* (1981) lists hoards over a defined minimum size (generally twenty or more attributable coins) both from Sweden and from the whole of continental Europe to the north and east of the Roman Empire; idem, *Romerska denarer funna i Sverige* (1988); J. Wielowiejski, 'Der Einfluss der Devaluation des Denars auf die Annahme römischer Münzen durch die hinter der Donau ansässigen Völker', in *Dévaluations* II, 155–67; J. Kolendo, 'L'arrêt de l'afflux des monnaies romaines dans le "Barbaricum" sous Septime-Sévère', in *Dévaluations* II, 169–72; A. Bursche, 'Contacts between the Roman Empire and the mid-European Barbaricum in the light of coin finds', in *Proceedings of the 10th International Congress of Numismatics, London 1986* (1989), 279–87.

[38] Tacitus, *Germania* 5. 4–5.

[39] Tacitus, *Annals* III. 53.

[40] Howgego, *NC* 150 (1990), 23.

[41] Polybius XXXIV. 9. 8 ap. Strabo III. 2. 10 (147–8); the figure may represent the total of cash raised from leasing out the mines: Domergue, *Les mines de la péninsule ibérique*, 377.

[42] Pliny, *HN* XXXIII. 21 (78).

[43] Domergue, *Les mines de la péninsule ibérique*, 367–8; J. Andreau, 'Recherches récentes sur les mines a l'époque romaine. II. Nature de la main d'œuvre; histoire des techniques et de la production', *RN*[6] 32 (1990), 85–108, at 107–8.

about as far as we can get.[44] We can make a long, if incomplete, list of mining areas around the Roman world, but cannot assess their relative importance.[45] Moreover, the productivity of individual mining areas could vary greatly over time, until final exhaustion or abandonment. The acquisition or discovery of a new source could result in a rush of miners to the spot, and the short term impact could be dramatic. In the second century B.C. Italians flocked to a mine in the land of the Scordisci behind Aquileia and retrieved so much gold that within two months the price of gold in Italy fell by a third.[46] In Dalmatia, under Nero, a virgin deposit initially yielded 50 pounds of gold per day, a rate of extraction comparable to that of the mines of northern Spain.[47] Gold rushes to limited deposits illustrate variability of output in an extreme form, but even substantial mining areas could become played out.[48] The silver mines of Attica which supported the great days of Athens were of no importance in the Roman period. One also hears comparatively little of the gold and silver mines of Macedon and Thrace, which had fuelled Macedonian ambitions under Philip, or of the gold mines of Egypt, which had been exploited by the Ptolemies. Only rarely can we identify such changes over time in the Roman period, but we must remain alert to the possibilities.

Despite the inadequacies of the evidence, certain important stages in mining history may be identified. As Rome expanded it took over mines as the price of victory (*pretium victoriae*).[49] The two most significant developments of this kind will have been the acquisition of the Carthaginian sources, particularly of silver, perhaps also of gold, in southern Spain in the Second Punic War,[50] and the opening up of the gold mines in the north of Spain, which followed the campaigns under Augustus in 25–23 B.C.[51] Exploitation did not always follow immediately upon conquest.[52] The silver mines of south-east Spain were taken over rapidly, but cumulative archaeological evidence suggests that the silver of the Sierra Morena in the central south began to be worked only from the end of the second century B.C., and that extensive exploitation of silver in the south west was an early imperial development (although Riotinto was in use earlier). By contrast, exploitation of the gold in the north west followed swiftly upon the Augustan conquest. New mining technologies and the more general application of existing techniques by the Romans made the impact of widespread exploitation all the more dramatic, particularly in relation to gold in the north west.[53]

The addition of the gold mines of Dacia after the annexation of that province by Trajan may represent the last new source of any significance obtained under the Principate. If that is the case, then the impact of decline in some existing mining areas, most notably in the second half of the second century and early third century, will have been all the greater.[54] As regards silver, the lack of later pottery, coins, and literary evidence suggests that the main activity in south-east Spain ended as early as the first century B.C., but in compensation the focus of mining activity shifted to the Sierra Morena and the south west.[55] In these last two areas there is much less evidence for exploitation in the third century than earlier, and one can point specifically to the sudden collapse of the mining settlement at Riotinto *c.* A.D. 160–70.[56] As regards gold, important mines in Dacia were abandoned after the Marcomannic invasion of A.D. 167, and those Dacian mines which continued in use may have been affected by the Gothic invasions under Maximinus.[57] Furthermore, the important gold mines of north-west Spain seem from archaeological evidence to have gone into decline early in the third century.[58]

[44] Strabo III. 2. 8 (146); Diodorus V. 35–8; cf. Pliny, *HN* XXXIII. 31 (96); Davies, *Roman Mines*, 94; 99.

[45] Davies, *Roman Mines* for Europe; for a useful summary of other sources see E. Babelon, *Traité des Monnaies Grecques et Romaines* part I vol. I (1901), 773–806; also *ESAR*, *passim*.

[46] Polybius XXXIV. 10. 10–14 ap. Strabo IV. 6. 12 (208); Davies, *Roman Mines*, 175; for the reading Scordisci in place of Taurisci: Nicolet, *Annales ESC* 26 (1971), 1213 n. 5.

[47] Pliny, *HN* XXXIII. 21 (67); Davies, *Roman Mines*, 187.

[48] See Davies, *Roman Mines*, 250–1 on Attica; Egypt under the Ptolemies: C. Préaux, *L'Economie royale des Lagides* (1939), 256–61.

[49] For the phrase: Tacitus, *Agr.* 12. 6.

[50] For the view that the Romans did not obtain significant quantities of gold in southern Spain: Domergue, *Les mines de la péninsule ibérique*, 187; 193; 208.

[51] Florus II. 33 cited by *ESAR*, V, 20.

[52] The evidence is discussed by Domergue, *Les mines de la péninsule ibérique*, part 3.

[53] Andreau, *RN*[6] 32 (1990), 98; 102–3; 105; Domergue, *Les mines de la péninsule ibérique*, part 6.

[54] For the general perspective: J. C. Edmondson, 'Mining in the later Roman empire and beyond: continuity or disruption?', *JRS* 79 (1989), 84–102.

[55] Domergue, *Les mines de la péninsule ibérique*, 198–9; 210.

[56] idem, 215–23; G. D. B. Jones, 'The Roman mines at Riotinto', *JRS* 70 (1980), 146–65.

[57] Davies, *Roman Mines*, 201; 205.

[58] Domergue, *Les mines de la péninsule ibérique*, 217; Andreau, *RN*[6] 32 (1990), 98; 102–3; Edmondson, *JRS* 79 (1989), 89.

The broad approach to the supply of precious metals taken so far suggests that, with the inflow of gold and silver from booty and the mines, the supply of coinage grew from the Second Punic War until the early Empire. This approach also provides an explanation for the most notable developments of the third century A.D., namely the rapid debasement particularly of the silver but also of the gold coinage, the rarity of gold coinage, and the apparent monetary chaos.[59] The influx of precious metals from conquest seen under the Republic had given way to an outflow of subsidies and forced payments beyond the frontiers, which seem to have increased markedly from the time of Marcus Aurelius. Trade brought about a net loss of precious metals, at least after the expansion of contact with the East in the early Principate. The exploitation of mines continued to add to existing stocks, but we know of no important new mines exploited after the reign of Trajan, and some important existing mines did not recover from disruption under Marcus Aurelius or decline in the early third century. The impact of these factors will have been made all the more severe by the possibly significant rate at which existing silver stocks may be diminished by accidental loss, unrecovered burials, abrasion, corrosion, and wastage in reworking.[60] The broad parameters were set for an increasing shortage of gold and silver, leading to the debasement of the coinage, the increasing rarity of gold coin, and the monetary problems of the third century.

(b) *Utilization of the metal supply as money*

Any such explanation of monetary history on the basis of metal supply must face the objection that it is not so much the total supply of metal, as that portion of it which came into the hands of the state, which was the relevant constraint on coinage output.[61]

This topic cannot be addressed with any precision. Even the most straightforward aspect, namely the ownership of bullion from the mines, is fraught with uncertainties. The general pattern of development is tolerably clear.[62] Mines acquired by conquest became the property of the Roman state and their exploitation was leased out; such was the case with the silver mines in the south of Spain. At some time between the second century B.C. and the early Principate silver mines passed into private ownership, but the majority of gold mines remained state property. Under the Principate public or imperial ownership was resumed probably by a gradual process, although developments in this direction under Tiberius in particular were worthy of comment. Some gold and silver mines nevertheless continued in private ownership.

Ownership is not, however, the only consideration. Some at least of the state mines were leased out for exploitation by contractors, and the contractors naturally took their share.[63] Regulations of the early second century A.D. from a mine in Portugal, which probably applied to all silver mines under state ownership at least in Spain, indicate that the imperial treasury

[59] Debasement could be by reduction in weight or in fineness. For the silver coinage see Walker, *Metrology*. G. Depeyrot and D. Hollard, 'Pénurie d'argent-métal et crise monétaire au IIIe siècle après J.-C.', *Histoire et Mesure* (1987) II, 1, 57–85 attempt to show quantitatively, on the basis of coins hoarded, that there was a dramatic increase in the production of base metal coinage between A.D. 238 and 282. Nevertheless, they argue that the increasing debasement of the coinage meant that there was actually a significant decline in the total amount of silver in the coinage as a whole.

For the falling weight standards of gold from A.D. 216/17: S. Bolin, *State and Currency in the Roman Empire to 300 A.D.* (1958), 249–64. For the decrease in fineness of the gold between A.D. 253 and 268, C. Morrisson *et al.*, *L'or monnayé 1. Purification et altérations de Rome à Byzance* (1985), especially 80. Rarity of gold coinage in the third century A.D.: A. Burnett, *Coinage in the Roman World* (1987), 112–13; J.-P. Callu and X. Loriot, *L'or monnayé II* (1990), 86; 106.

[60] C. C. Patterson, 'Silver stocks and losses in ancient and medieval times', *Economic History Review*[2] 25 (1972), 205–35.

[61] Unless, that is, the mint struck coins in any quantity for individuals. The evidence for such 'free' coinage in the period with which this paper is concerned is tenuous but the possibility should be borne in mind: Howgego, *NC* 150 (1990), 19–20.

[62] Strabo III. 2. 10 (148); private silver mines e.g. Plutarch, *Crassus* 2. 5; public ownership resumed: Suetonius, *Tiberius* 49; Tacitus, *Annals* VI. 19; but not completely: Ulpian ap. *Dig.* VII. 1. 13. 5. For systems of exploitation: J. Richardson, 'The Spanish mines and the development of provincial taxation in the second century B.C.', *JRS* 66 (1976), 139–52, at 145 (small scale contractors); criticized by Brunt, *Fall of the Roman Republic*, 150 (*publicani*); idem, *Roman Imperial Themes*, 396–402; J. Andreau, 'Recherches récentes sur les mines à l'époque romaine. 1. Propriété et mode d'exploitation', *RN*[6] 31 (1989), 86–112.

[63] A good case can be made that the gold mines of north-west Spain were exploited directly by the state and not leased out, although no text or inscription proves direct exploitation: Domergue, *Les mines de la péninsule ibérique*, 303–6; 337.

retained a right to half of the ore extracted.[64] What we should like to know is who actually took control of the ore once it had been smelted. The imperial treasury may have purchased some of the ore belonging to the contractors. Conversely, it is not known how widespread was the purchase by contractors of the share due to the treasury, presumably for sale.[65] There is, at least, evidence that there was a free market in gold and silver bullion.[66] Perhaps the best we can do is to point to a passage of Posidonius, quoted by Strabo, which described every mountain and hill of Turdetania in southern Spain as made of coin.[67] In the minds of these authors there was a close connection between the mines and coinage.

The influx of precious metals from all sources had a dramatic effect on levels of private luxury. Pliny chronicles the increasing quantities of gold and silver.[68] The use of silver plate and gold ornaments grew and produced a reaction in a series of sumptuary laws, which naturally proved quite unable to stem the tide.[69] Some luxury goods were ultimately melted and struck into coin, and some coin was turned into jewellery and the like.[70] None of these processes can be quantified, so we must rely on a broad perspective. In the first place the state or its representatives had a substantial claim on the two most important sources of new precious metal, namely booty and the mines. Moreover, conspicuous individual wealth could fall prey to the coercive powers of the leading men of the late Republic and of Roman emperors. It is thus likely that the level of availability of precious metals to the state kept roughly in step with their availability in the Roman world as a whole.

By the third century the supply of gold and silver to the imperial treasury from booty and the mines had dwindled, and subsidies and other forced payments to peoples outside the Empire had increased. The decline in the stocks of gold and silver in the Roman world as a whole explains why it was not possible for the treasury to make up the difference *in the long run* by increased exactions of whatever kind.[71] Hence the resort to debasement of the coinage, and the increasing rarity of gold coin.

So far, so good. However, in order to trace monetary history it is necessary to look not only at the supply of bullion but also at how that bullion was used. Two important aspects may be singled out here: the extent to which bullion was itself used as money, and the deployment of metals for coinage.

Bullion was naturally used as a store of wealth by the state. Indeed Pliny preserves some records of the metal bars stored in the treasury.[72] By way of example he states that Julius Caesar, on first entering Rome during the civil war, drew from the *aerarium* 15,000 gold ingots, 30,000 silver ingots, and 30 million sestertii in coin. The real question is to what extent bullion was used for expenditure. It has been argued elsewhere that the Roman state may have made substantial payments in gold and silver bullion at least under the Republic.[73] A passage of Lucilius makes explicit reference to the possibility of a quaestor paying out gold from the treasury on public business, at a time before gold coin was available.[74] The situation under the Principate remains unknown. Official ingots survive from the fourth century A.D., and the lack of earlier material evidence should not be taken as decisive; it is worth bearing in mind that some types of medieval ingots recorded in written sources have left no other trace.[75] It may be relevant that those in charge of public revenues in Egypt had an interest in the gold price.[76] This was perhaps because gold bullion was a useful form in which to remit surplus revenues to Rome.

[64] *FIRA*² I, 104 and 105; *ESAR* III, 166–74; Richardson, *JRS* 66 (1976), 147.

[65] Domergue, *Les mines de la péninsule ibérique*, 376–7 argues for the extreme proposition that all silver was put on the open market through purchase of the state's share by the contractors.

[66] See below, p. 10 and n. 79.

[67] Strabo III. 2. 9 (147).

[68] Pliny, *HN* XXXIII. 5 (14–16); 14 (48)–18 (57).

[69] *ESAR* I, 265; D. E. Strong, *Greek and Roman Gold and Silver Plate* (1966); C. Johns, 'Research on Roman silver plate', *JRA* 3 (1990), 28–43; sumptuary laws: G. Rotondi, *Leges publicae populi Romani* (1912), 98–9; N. Lewis and M. Reinhold, *Roman Civilisation* (3rd edn, 1990) I, 493–6 no. 171; cf. the comments of Tiberius on private extravagance, including the 'argenti et auri pondus', Tacitus, *Annals* III. 53. 5.

[70] Luxury goods to coin: Howgego, *NC* 150 (1990), 6; coin into jewellery: e.g. *P. Mich.* 218 (A.D. 296, 3 aurei).

[71] Resort to exactions might improve matters in the short run, e.g. Herodian VII. 3. 5: Maximinus coined temple dedications, statues of the gods, honorary presentations to the heroes, and any ornamentation on public buildings or city decorations. Cf. Howgego, *NC* 150 (1990), 6–7.

[72] Pliny, *HN* XXXIII. 17 (55–6).

[73] Howgego, *NC* 150 (1990), 13–14; see also Th. Mommsen, *Histoire de la monnaie romaine* II (1870), 108–10.

[74] Lucilius, *Sat.* 12 (4) ap. Nonius Marcellus s.v. Publicitus (Lindsay p. 825).

[75] Fourth century A.D.: Howgego *NC* 150 (1990), 15; medieval evidence: Spufford, *Money*, Chapter 9, at 221.

[76] *P. Baden* 37; West and Johnson, *Currency*, 89–92; Wallace, *Taxation in Egypt*, 335.

The extent to which bullion was used by individuals is also rather obscure. It is clear that individuals could hold bullion not only from the presence in coin hoards of gold and silver ingots, but also from literary references.[77] Cicero records the theft in 69 B.C. from a private house in Larinum of a quantity of coin and five pounds of gold, and also the fact that M. Cluvius at his death in 45 B.C. left both cash and a great weight of silver (*magnum pondus argenti*).[78] There was a free market in gold and silver bullion, although officials might intervene to stabilize prices.[79] Suetonius happens to tell us that Julius Caesar sold off gold in lots throughout Italy and the provinces.[80] Thus individuals could use gold and silver bullion, much like other valuable objects and property, as a store of wealth.

In defining the use of bullion as a means of exchange one enters a grey area. Any store of wealth was effective only if its value could be realized. The crucial distinction is whether the store of wealth had to be sold for money or whether it could be used directly to make payments. It is probably reasonable to infer that the use of uncoined gold or silver to make payments within the Empire was not in any sense a normal feature in the second century A.D., because Pausanias describes it as the ancient way of exchange, in specific contrast to the use of coinage.[81] There is, however, some earlier evidence for the use of bullion to pay dues.[82] The treasury was able to build up substantial reserves of gold from a tax on the freeing of slaves (the *aurum vicesimarium*), which had been instituted in 357 B.C., long before gold coin was available, and which therefore must have been paid in bullion;[83] and in 62 B.C. the proconsul of Asia confiscated substantial quantities of gold bullion which the Jews had collected to pay their dues to the Temple in Jerusalem.[84] Aside from the payment of dues, bullion could have been a convenient form in which to transfer value for the purposes of trade. It is plausible that it was this practice which led the senate on numerous occasions before 63 B.C. to prohibit the export of gold from Italy, and in 63 B.C. to ban the export of both gold and silver.[85] The conceptual link between coin and bullion is apparent from the Sullan law against forgery, in which the debasement of gold is defined as criminal alongside the adulteration of the silver coinage.[86] There is a limit to how far this argument can be pushed. The Romans did after all make a distinction between current coin (*pecunia*), which had a value fixed by the state, and merchandise (*merx*), which did not.[87] That said, from the economic point of view it is the practice rather than legal theory which matters. The evidence outlined above suggests that bullion was used to make payments in some contexts, that the scale of such activity may not have been insignificant, and that bullion should therefore be reckoned as having made a contribution to the supply of money. One advantage of approaching the money supply in terms of the use of bullion resources is to draw attention to such possibilities.

This approach also brings out the significance of changes in the deployment of metals for coinage. The most notable change of this kind was the creation of a regular gold coinage from 46 B.C., which appears in this light as the most important monetary development in the period with which we are concerned. The coining of gold bullion had the potential to increase the supply of coinage dramatically, and the evidence from Pompeii suggests that it did just that.[88]

[77] Hoards: Crawford *RRCH*, nos 193; 259; 331; 357; D. C. Cavedoni, *Ragguaglio storico archeologico de' precipui ripostigli antichi di medaglie consolari e di famiglie romane d'argento* (1854), 13 (near Aquileia). Ingots in hoards of imperial period e.g. Spain: Domergue, *Les mines de la péninsule ibérique*, 347 (Augustan hoard with 5,000 denarii and 9 silver ingots. The weights of the ingots suggest that they may have been intended to be equivalent to 100 denarii each); Egypt: *Coin Hoards* VII, 148 nos A.29; A.125.

[78] Cicero, *pro Cluentio* 64 (179); *ad Att.* XIII. 45. 3.

[79] *P. Sarap.* 90 = *P. Baden* 37 (gold, showing market fluctuations and official intervention); *P. Giss.* 47 (silver, showing market fluctuation only); West and Johnson, *Currency*, 89; 94; Guey, 'L'or des Daces', *passim*.

[80] Suetonius, *Div. Iul.* 54. 2.

[81] Pausanias III. 12. 3–4.

[82] It is also possible that some fines were paid in bullion. The expression of penalties for the violation of tombs in pounds of gold or silver, rather than in coin, was characteristic of the fourth and fifth centuries A.D. but goes back to the third. This is not, however, a clear case of the actual use of bullion. The point of stipulating a given weight of metal was that the value of the fine was maintained in the face of the debasement of the coinage and the payment itself may have been in current coin. See L. Robert, *Hellenica* III, 106–7; for an early example T. Corsten, *Die Inschriften von Kios* (1985), no. 39.

[83] Livy VII. 16. 7; XXVII. 10. 11.

[84] Cicero, *Pro Flacco* 28 (68–9); E. M. Smallwood, *The Jews under Roman Rule from Pompey to Diocletian* (1976), 126.

[85] References in Howgego, *NC* 150 (1990), 23 n. 156; also Nicolet, *Annales ESC* 26 (1971), 1223–4.

[86] *Dig.* XLVIII. 10. 9.

[87] C. Nicolet, 'Pline, Paul et la théorie de la monnaie', *Athenaeum* n.s. 62 (1984), 105–35; especially *Dig.* XVIII. 1. 1 (Paul, *Edict* 33); cf. Gaius, *Inst.* 3. 141.

[88] L. Breglia, 'Circolazione monetale ed aspetti di vita economica a Pompei', in *Pompeiana* (1950), 41–59; as noted by Duncan-Jones, *Structure and Scale*, 45. It may be no coincidence that the introduction of a substantial gold coinage belongs against the background of a number of measures to alleviate periodic shortages of coin in the late Republic: M. Frederiksen, 'Caesar, Cicero and the problem of debt', *JRS* 56 (1966), 128–41; Howgego *NC* 150 (1990), 23–4.

Analysis of eighty four groups of coins, each worth more than 100 sestertii, from beneath the volcanic destruction of A.D. 79 shows that gold coinage represented about 70 per cent of the total by value. Moreover, this calculation omits the substantial hoard of more than 1,000 aurei from the nearby villa at Boscoreale, worth over ten times the largest group of coins from Pompeii itself.

As regards the diffusion of gold coins, a detailed study of the provinces of Gaul and Germany has shown that finds of single gold coins are much more numerous than has previously been supposed.[89] These finds provide evidence of the widespread use of gold coins, which is all the more striking because of the tendency, noted above, for people to take care not to lose coins of high value.

The challenge is to delineate the role of the new gold coinage in the economy. It is obvious that gold was suitable for larger transactions and unsuitable for small. Tacitus says that the Germans living nearest the Roman Empire used silver coin because it was more useful for small transactions.[90] The implied contrast is with the use of gold within the Empire for larger transactions. A rabbinic source preserves the unsurprising insight that gold coin could not be broken down into smaller change everywhere.[91] Any attempt to be more specific about the use of gold for large transactions is hampered by the practice of recording large sums in money of account, that is in sestertii or denarii, rather than in the form in which payment actually took place. Such evidence as we have is haphazard. Legal sources stipulate the exaction of some heavy fines in gold, and gold was also used for gifts and distributions to privileged groups.[92] We can document the role of gold in the good life, as a prize in the games, a stake for gambling, or a reward for sexual favours.[93] Medieval parallels suggest that even ordinary people used gold occasionally; large sums could arise from the annual sale of agricultural produce or as payment for a completed job.[94]

In topics of this kind the papyri from Egypt usually provide valuable evidence. However, Egypt operated a closed currency system based on base silver tetradrachms struck at Alexandria. Silver coins of the kinds used elsewhere in the Empire were certainly excluded from Egypt, and it remains doubtful whether the normal use of gold coin was permitted there.[95] Papyri do at least record the use of gold for dower contracts and for priestly expenses.[96]

Gold was the most convenient form in which to transport large sums;[97] under Nero Galba took about with him a vehicle containing one million sestertii in gold (presumably in the form of 10,000 aurei).[98] Gold was also suitable for carrying smaller sums, as a few gold coins could be more easily concealed from robbers.[99] Ease of transport means that it is highly likely that gold was a component of military pay, despite the assertion by Jones that ordinary soldiers did not use gold.[100] One should not perhaps put too much weight on Suetonius' description of the increase in soldiers' pay under Domitian as being three aurei each (*aureos ternos*), but we do at

[89] J.-P. Callu and X. Loriot, *L'or monnayé II, La dispersion des aurei en Gaule romaine sous l'empire* (1990). For a preliminary study of Britain: X. Loriot, 'Les trouvailles isolées de monnaies d'or romaines faites en Bretagne', *BSAF* (1988), 72–4.

[90] Tacitus, *Germ.* 5. 3–5.

[91] *Tosefta Ket.* 6. 5; which Goodman, *State and Society*, 58 perhaps over-interprets.

[92] Fines e.g. *Dig.* II. 4. 24–5 (Ulpian and Modestinus); XLVIII. 12. 2 (Ulpian). Gifts and distributions e.g. Cicero, *Phil.* XII. 8 (20); Suetonius, *Div. Aug.* 98. 2; Suetonius, *Otho* 4. 2. Donative to those entitled to the corn dole and to the praetorian guard: Dio LXXVII. 1. 1. *Sportulae*: Duncan-Jones, *Economy*, 105–6, nos 290; 309–10. The high value of imperial gifts and distributions suggests that gold was used, at least in part; irregular gifts: F. Millar, *The Emperor in the Roman World* (1977), 135–9; *congiaria* or *liberalitates* to the populace: D. van Berchem, *Les distributions de blé et d'argent à la plèbe romaine sous l'empire* (1939); F. Millar, 'Les congiaires à Rome et la monnaie', in A. Giovannini (ed.), *Nourrir la plèbe: actes du colloque tenu à Genève les 28/29. ix. 1989 en hommage à Denis van Berchem*, Schweizerische Beiträge zur Altertumswissenschaft 22 (forthcoming); G. Spinola, *Il 'congiarium' in età imperiale. Aspetti iconografici e topografici* (1990); military donatives: P. Bastien, *Monnaie et donativa au Bas-Empire* (1988), 9; 11–16.

[93] Prize: Martial X. 74. 2–6; Suetonius, *Claudius* 21. 5; gambling: Petronius, *Sat.* 33; favours: Martial IX. 4. 1–3.

[94] Spufford, *Money*, 334–5.

[95] West and Johnson, *Currency*, 1–2; 70; E. Christiansen, *The Roman Coins of Alexandria. Quantitative Studies* (1988), 1, 14; idem, in *Coin Hoards* VII, 87–8; A. Kunisz, 'Gold coins in the monetary circulation in Egypt during the first three centuries A.D.', *Wiadomości Numizmatyczne* 27 (1983), 162–5 (English summary).

[96] West and Johnson, *Currency*, 1–2.

[97] This is obvious enough, and is even explicitly stated in a passage of the Sifre to Deuteronomy AD, 32.2; cited by D. Sperber, *Roman Palestine 200–400. Money and Prices* (1974), 89; on the date and nature of this source see Goodman, *State and Society*, 7; 10.

[98] Suetonius, *Galba* 8. 1.

[99] Josephus, *BJ* V. 421.

[100] Jones, *The Roman Economy*, 192; for concrete reflections along these lines see Millar, op.cit. (n. 92, 'Les congiaires . . .'). At the other end of the scale bronze coin also had a role to play: Howgego, *Greek Imperial Countermarks*, 17–31. Military accounts on papyri are not instructive because they record sums in units of account, rather than in the coin denominations actually used (some of the transactions may be book entries only, with no use of coin): R. O. Fink, *Roman Military Records on Papyrus* (1971), nos 68–73.

least know that L. Antonius gave aurei to a chief centurion late in 44 B.C., and that an Egyptian recruit to the fleet received three aurei for travel expenses on his arrival at Misenum sometime in the second century A.D.[101] An inscription boasts of the grant to an officer in *c.* A.D. 220 of the right to have a salary paid in gold, and thus seems to indicate that it was by then abnormal for soldiers to be paid in gold.[102] There is no need to assume that this had always been the case. If gold was indeed becoming scarcer in the third century, then a change in the means of payment to the military is only to be expected.

The ease of transport of gold also made it suitable for external trade. When a gold coinage was reintroduced into England in 1344 one of the motives was to retain silver within the country by allowing the export of gold instead.[103] Without wishing to impute a similar motive to the Romans, it is interesting that the same effect can be observed. From the end of the reign of Nero gold coin came to play a significant role in the flow of precious metal to India.[104] This may in part have been a reaction to coinage reform at Rome or to changes in relative bullion values between Rome and India, but it is likely that the Romans also found it more convenient to export gold. Within the Empire the introduction of a gold coinage also presented another form in which coin could be hoarded. Thus the partial replacement of silver coins by gold, both for export and for storing wealth, will have had an important secondary effect in freeing large quantities of silver coin for use as a means of exchange.

(c) *Velocity of circulation*

We have looked so far at the supply of precious metals and at the employment of those resources as money. The third major factor dictating the money supply was how hard that money was made to work, or, in economic parlance, its velocity of circulation. An attempt has been made by Duncan-Jones to measure the velocity of circulation from coin wear, but this approach has a basic flaw.[105] From the economic point of view the velocity of circulation of coin is concerned with the number of transactions which take place, rather than with the extent to which coin was carried around. If coin is carried around but not used for exchange then it does not circulate; by contrast coin kept in a bank but transferred from one party to another does circulate. It is perhaps reasonable to suppose that there was some correlation between coin wear and the number of transactions. There was little point in carrying coin if there was no prospect of using it. However, the ways in which small sums were carried and substantial sums transported could also have had an important influence on the degree of wear. Coins loose in a container could wear each other much more than could tightly packed coins. Moreover, there may well have been different behaviour towards high and low denominations. It is easy to imagine that there was a tendency for gold coin to be carried only when it was known to be required, but that bronze may well have been carried simply as a matter of convenience. The variables of coin wear are too unpredictable to allow conclusions about velocity of circulation.

The topic is nevertheless an important one. The assumption that velocity was constant carries no credibility. Any changes in the amount of hoarding, that is in the extent to which coin was used as a store of wealth, will have had a direct effect. This is obvious enough and was understood in antiquity. Caesar sought to alleviate a shortage of coin in 49 B.C. by limiting hoarding by individuals to 60,000 sestertii, and this was not the first time such a measure had been taken.[106] Hoarding by the state (in other words the building up of reserves) will also have had an effect. State funds were not normally loaned out, although both Augustus and Tiberius made interest-free loans from imperial funds to support the status of hard-up members of the

[101] Suetonius, *Domitian* 7. 3; Cicero, *Phil.* XII. 8 (20); *Sel. Pap.* I, no. 112.

[102] *CIL* XIII. 3162. I. 18f.; II (= Pflaum III). 16; H. G. Pflaum, *Le marbre de Thorigny* (1948), 26.

[103] N. J. Mayhew, 'From regional to central minting, 1154–1464', in C. E. Challis (ed.), *A New History of the Royal Mint* (forthcoming).

[104] P. Turner, *Roman Coins from India* (1989), 11; 16; as revised by D. W. MacDowall, 'The export of Roman Republican denarii to South Asia', *Ancient Ceylon* 8 (7 on cover) (1990), 62–74; idem, 'Finds of Roman coins in South Asia. Problems of interpretation', *Ancient Ceylon* 9 (1990), 49–74; idem, 'Indian imports of Roman silver coins', in Amal Kumar Jha (ed.), *Coinage Trade and Economy, 3rd International Colloquium, January 8th–11th 1991*, Indian Institute of Research in Numismatic Studies (1991), 145–63.

[105] R. Duncan-Jones, 'Weight-loss as an index of coin wear in currency of the Roman principate', in Depeyrot *et al.*, *Rythmes de la production monétaire*, 237–56.

[106] Dio XLI. 38. 1–2.

élite.[107] For the most part state reserves were fossilized, and Tacitus blamed the growth of reserves under Tiberius for a temporary shortage of coin.[108] Although we can trace the fluctuations of state reserves for some periods, we cannot discover the pattern of hoarding by individuals. This is because the profile of coin hoards found today is arguably more a reflection of the non-recovery of hoards at times of instability than an indication of changing habits of hoarding in itself.[109] Indeed some periods of instability may have seen a decrease in hoarding. The heavy financial exactions often associated with periods of military activity will have resulted in stores of coin being brought back into circulation. Thus neither coin hoards nor coin wear are helpful indicators of the velocity of circulation and other approaches are needed.

One way forward may be to examine factors which are likely to have affected the velocity of circulation. By way of example we may consider the use of monetary credit and changes in financial structures. Monetary credit is relevant to velocity of circulation because it enabled one man's store of wealth to be used by another as a means of exchange. Loans quite simply got coins back into circulation, but other forms of monetary credit had the same effect. For example purchases on credit could allow many monetary transactions to take place with little actual use of coin, and rent arrears permitted a tenant to continue to use wealth which belonged to the landlord.

There is no evidence on which to give a quantitative estimate of monetary credit. Certain lines of argument serve at least to show that it was important, although it should be stated at the outset that the Roman state did not itself resort to borrowing except during the dark days of the Second Punic War.[110] By contrast cities in the Roman world could borrow and did so.[111]

The importance of credit is seen first and foremost from the prominence of debt as a cause of political change under the Roman Republic.[112] In relation to this topic it is hard to differentiate between monetary credit and credit in kind. Credit in kind would have been a significant part of total credit in rural areas, particularly earlier in the period.[113] Nevertheless, this political perspective serves to demonstrate the importance of credit as a whole. Further arguments may then help to clarify the importance of purely monetary credit.

It was debt that provoked the secession of the plebs in 287 B.C., and henceforth claims for the relief of debt surfaced repeatedly in *popularis* political agendas. The steps of Gaius Gracchus to limit debt payments will serve as a good example. The Social War and the activities of Mithridates led to a crisis of credit in the 80s B.C., which was aggravated by civil conflicts. Debt among the poor may have arisen largely from mounting arrears of rent, but it was also the basis of aristocratic political careers. An alliance of financially embarrassed nobles and the indebted from Rome and Italy touched off the explosion of Catiline's conspiracy in 63 B.C. If less is heard of debt under the Principate it may well be because political stability removed the opportunity for the expression of discontent. This argument is supported by the way in which debt re-emerges as an issue at times of open revolt.[114] Furthermore, around A.D. 60 Columella could still point to the immense tracts of land cultivated by the bondage of citizens.[115]

The role of debt as a cause of political change presents a powerful argument for the importance of credit in the economy. Other considerations underline the significance of specifically monetary credit. The vulnerability of the financial system to loss of sums on loan is one such consideration. The invasion of Asia by Mithridates in 88 B.C. caused the loss of so much Roman money out on loan that credit was destroyed at Rome itself. Cicero feared in 66 B.C. that if Mithridates was not stopped it would happen again.[116] Another point is that

[107] Augustus: Dio LV. 12. 3a; Suetonius, *Div. Aug.* 41. 1. Tiberius: Tacitus, *Annals* VI. 16–17; Suetonius, *Tiberius* 48. 1; Dio LVIII. 21. 5. The speech set by Dio in 29 B.C. suggests that imperial loans may have been a possibility in Dio's own day: Dio LII. 28. 3–4.

[108] Tacitus, *Annals* VI. 17. 1.

[109] M. Crawford, 'Coin hoards and the pattern of violence in the late Republic', *PBSR* 37 (1969), 76–81.

[110] *ESAR* I, 84–8; Crawford, *Coinage and Money*, 60–2. Borrowing from individuals was proposed in A.D. 70, but not taken up: Tacitus, *Histories* IV. 47.

[111] Republic: J. Andreau, *AIIN* 29 (1982), 123; Empire: Lex Irnitana § 80, González, *JRS* 76 (1986), 194; 226; Edict of Paullus Fabius Persicus at Ephesus: Bogaert, *Banques et banquiers*, 247–8.

[112] P. A. Brunt, *Social Conflicts in the Roman Republic* (1971), index s.v. debt problem; for what follows 57; 90; 94; 103; 106; 129f.; 151. Compare the perspective of Tacitus, *Annals* VI. 16.

[113] For credit in cash and kind, below Section IV (d).

[114] Gaul: Tacitus, *Annals* III. 40; Britain: Dio LXII. 2. 1.

[115] Columella I. 3. 12.

[116] Cicero, *De imp. Cn. Pomp.* 7 (19); Brunt, *Fall of the Roman Republic*, 157–9; idem, *Roman Imperial Themes*, 2.

monetary debt was a systematic part of aristocratic political life.[117] Even at the level of the individual the scale could be impressive: Caesar in 61 B.C. owed no less than 25 million sestertii. By the same token aristocrats could be significant lenders.[118] In 63 B.C. Q. Considius had 15 million sestertii out on loan. The scale of lending in the provinces was notorious and continued under the Principate.

Lower down the social scale the significance of monetary credit can be seen from the social advancement of some professional bankers.[119] The bankers, who were predominantly freedmen, were able to purchase property from their earnings. Some reached the highest honours normally available to freedmen other than the richest of imperial secretaries. This was possible despite the fact that for most purposes bankers were not used by the élite, whose requirements ran beyond the means of individual bankers, and who relied upon their social peers when in need. The betterment of professional bankers was thus in part a reflection of the use of credit by the likes of wholesale merchants, artisans, shopkeepers, and property owners below the élite.

The importance of monetary credit is also indicated by the variety of sources for loans and the sophistication of their forms. Depending upon the client and his needs, credit could be obtained from aristocratic financiers,[120] from the *publicani*,[121] from entrepreneurs,[122] from the state (at least in Egypt),[123] from civic treasuries,[124] from temple funds,[125] from foundations,[126] from bankers,[127] from money-lending partnerships,[128] from loan clubs,[129] from pawnbrokers,[130] from loan sharks,[131] and from other individuals who might lend occasionally.[132] Money-lending was sufficiently widespread for it to be a requirement to declare money out on loan in the census.[133] In addition to advances of money, credit was to be had in shops.[134] In the finance of overseas trade maritime credit continued to play its part alongside mutual associations (*societates*).[135] Money loans or arrears are attested in rural areas in Italy and in some provinces.[136] Rural debt in money, as well as in kind, was surely ubiquitous.[137]

A good idea of the sheer variety of legal forms in which debt was expressed can be gained from the list in a law from Ephesus which cancelled debts in order to encourage the people to defend their city against Mithridates in 85 B.C.[138] Papyri from Egypt and Dura drive home the point.[139] The Egyptian evidence reveals not only straightforward monetary loans and

[117] M. Frederiksen, 'Caesar, Cicero and the problem of debt', *JRS* 56 (1966), 128–41; I. Shatzman, *Senatorial Wealth and Roman Politics* (1975), 79–83; Caesar: Appian, *B.C.* II. 8; cf. Plutarch, *Caesar* 5. 4. Magistrates in cities under the Empire might also need to borrow: G. Barruol *et al.*, 'Nouvelles inscriptions exhumées d'une enceinte du bas-empire à Nîmes', *RAN* 15 (1982), 273–318, at 287 for loans by a freedman to magistrates.

[118] J. Andreau, 'Brèves remarques sur les banques et le crédit au Ier s. av. J.-C.', *AIIN* 29 (1982), 99–123; idem, 'Financiers de l'aristocratie à la fin de la République', in E. Frézouls (ed.), *Le dernier siècle de la république romaine et l'époque augustéene* (1978), 47–62; Shatzman, op. cit. (n. 117), 75–9. Senators were also heavily involved in money-lending under the Principate: Tacitus, *Annals* VI. 16. Q. Considius: Valerius Maximus IV. 8. 3. Provinces under the Republic: Crawford, *Coinage and Money*, 174. Principate, e.g. Seneca: Dio LXII. 2. 1; Tacitus, *Annals* XIII. 42.

[119] Andreau, *La vie financière*, *passim*, especially 359–438; 659–66.

[120] See n. 118 and under the Principate e.g. Pliny, *Ep.* III. 19. 8; Dio Chrys. XLVI. 8; Duncan-Jones, *Economy*, 21.

[121] Brunt, *Fall of the Roman Republic*, 169 n. 90; E. Badian, *Publicans and Sinners* (1972), 81.

[122] An attempt to render Andreau's 'affairistes et hommes de spéculation', *AIIN* 29 (1982), 99–123. Note also freedmen acting for patrons or for themselves: D'Arms, *Commerce and Social Standing*, 101–2; 107.

[123] *ESAR* II, 447; 451.

[124] Pliny, *Ep.* X. 54–5; *SIG*³ 833 (Ephesus, A.D. 120); *Dig.* L. 4. 6. 1 (Ulpian); L. 8. 2. 3 (Ulpian, on grain fund).

[125] Bogaert, *Banques et banquiers*, 113 (Delphi); 165–7 (Delos); 237–40 (Athena Ilias); 247 (Ephesus); 254–5 (Priene, Panionion); 268–70 (Olymos); *ESAR* II, 451.

[126] B. Laum, *Stiftungen in der griechischen und römischen Antike* (1914); Duncan-Jones, *Economy*, 133; 379.

[127] Bogaert, *Banques et banquiers*; Andreau, *La vie financière*.

[128] *FIRA* III no. 157; N. Lewis and M. Reinhold, *Roman Civilisation* (3rd edn, 1990), II, 130 no. 34.

[129] *ESAR* II, 454; Bowman, *Egypt*, 113–15.

[130] *ESAR* II, 458–9; Bowman, *Egypt*, 117.

[131] Short term, high interest: graffiti at Pompeii: J. Andreau, *Les affaires de Monsieur Jucundus* (1974), 119–21. High interest in Egypt: *P. Fouad* 26. High interest in general: Billeter, *Geschichte des Zinsfusses*, 109; 167–9; 228–42.

[132] *ESAR* II, 451; Bowman, *Egypt*, 116 (e.g. Tryphon).

[133] Brunt, *Roman Imperial Themes*, 336.

[134] Credit in shops: Goodman, *State and Society*, 55.

[135] J. Rougé, 'Prêt et société maritimes dans le monde romain', in J. H. D'Arms and E. C. Kopff (eds), *The Seaborne Commerce of Ancient Rome: Studies in Archaeology and History*, MAAR 36 (1980), 291–303; G. E. M. de Ste Croix, 'Ancient Greek and Roman maritime loans', in H. Edey and B. S. Yamey (eds), *Debits, Credits, Finance and Profits. Essays in Honour of W. T. Baxter* (1974), 41–59; D'Arms, *Commerce and Social Standing*, 105.

[136] Pliny, *Ep.* III. 19. 6; IX. 37; see A. N. Sherwin-White, *The Letters of Pliny* (1966), 256; 519. Credit in the countryside: Cato, *De Agri Cultura* v. 3. N. Africa: Kehoe, *Economics of Agriculture*, 176; Greece: *SIG*³ 884 (Thisbae, Boeotia). Arabia (village of Maoza at southern tip of Dead Sea): *P. Yadin* 5 (contracts of debt apparently in a business context); 11 (relating to En-gedi in Judaea); 15 cf. 27; 17–18.

[137] On credit in cash and kind, see below Section IV (d).

[138] *ESAR* IV, 559–60; Bogaert, *Banques et banquiers*, 251.

[139] O. Montevecchi, *La Papirologia* (1973), 225–9; Dura: *ESAR* IV, 226.

mortgages, but also a variety of other devices which concealed what were really loans, such as the sale of a crop before harvest, and the pledging of labour or use of land for an advance of capital.[140] From one village in the Fayum a register of business contracts for a period of sixteen months in A.D. 45–47 reveals no less than 308 agreements which were either certainly or potentially loans, amounting to a third of all contracts registered in the period.[141] Monetary credit, we may conclude, was an important aspect of the Roman economy.

As there is no evidence on which to base quantification, it is difficult to trace changes in the level of monetary credit over time. It is, however, likely that the availability of monetary credit was affected by the supply of coinage. At times of shortage of coin, fear of not being repaid would have restricted lending. Conversely, at times of glut of coinage falling interest rates may have made borrowing easier.[142] Medieval parallels tend to add credence to this picture.[143] It may not have been true at the bottom of the social scale, where arrears of payment (whether for rent, goods, or wages) are likely to have been a significant aspect of credit.[144] Shortage of coin may well have encouraged late payment at the same time as discouraging loans. All this is rather hypothetical, but what has been said above should be sufficient to show that monetary credit was important and that we cannot assume that it was maintained at a constant level. It probably fluctuated to some degree in step with the availability of coinage, but will also have been influenced by a range of social and economic factors. Monetary credit thus stands as a potentially significant but unknown variable which affected the velocity of circulation of coin and hence the money supply.

One possible approach to identifying variations in the velocity of circulation is to examine changes in financial structures which are likely to have promoted the use of coin. Banks and auctions may serve as examples. Banking is problematic to define because the modern term comprises several more or less distinct occupations in Latin (*argentarii*, *coactores argentarii*, and *nummularii*), although only one in Greek (τραπεζῖται). The best definition of banking is probably that of Andreau: 'a commercial profession which consists in receiving the deposits of clients, to whom the banker furnishes "un service de caisse", and in lending the available funds to third parties as a creditor', although this formulation means regarding as peripheral important activities such as the testing of coin, money-changing, and (in the West) the provision of credit in connection with auctions.[145] Banks are found at Rome as early as coinage, but they did not appear everywhere at the same time.[146] In the East banks were widespread before the arrival of the Romans. In the West, as far as we can judge from inscriptions, banks were established later in the provinces than in Rome and Italy. No inscription records a banker in any western province before the first century A.D. Such arguments from silence have little force in absolute terms, but the pattern of banks developing later in the western provinces than in Italy is plausible. It is not hard to see that the extent of the promotion of the use of coinage by banks depended upon how widely banks were available. If banks were more widespread in the first century A.D. than earlier, the result is likely to have been an increase in the use of coinage.

As regards auctions there appears to have been a development in financial practice in the western half of the Empire. From the second half of the second century B.C. bankers (first *argentarii*, then *coactores argentarii*) began to intervene in auctions to pay the vendor and provide credit to the purchaser.[147] Both by the provision of credit and by the removal of any uncertainty about whether the purchaser could pay, this intervention allowed people to buy and sell at auctions who could not otherwise have participated so easily. It is reasonable to infer that the number of transactions was thereby increased, and that the velocity of circulation became greater.

[140] Bowman, *Egypt*, 98; 116; *ESAR* II, 450–4; Rowlandson, *Landholding*, 179–83; see below nn. 253–4.

[141] Toepel, *Studies in the Administrative and Economic History of Tebtunis*, 312.

[142] Note, for example, that interest rates fell with the increase in money available after the conquest of Egypt, see above n. 26. The ease of obtaining loans and the level of interest rates also varied between regions: *Dig.* XIII. 4. 3; Billeter, *Geschichte des Zinsfusses*, 179–80.

[143] P. Nightingale, 'Monetary contraction and mercantile credit in later medieval England', *The Economic History Review*² 43 (1990), 560–75; Spufford, *Money*, 259; 347.

[144] Compare R. H. Hilton, *The English Peasantry in the Later Middle Ages* (1975), 46.

[145] Andreau, *La vie financière*, especially 17; 47. The definition has the unfortunate effect that *nummularii*, the money-changers and coin-testers who made their appearance in the second half of the second century B.C., cannot be called bankers until after we can be sure that they began to accept deposits and lend money in the first half of the second century A.D.

[146] Appearance of banks at Rome: Livy IX. 40. 16. East: Bogaert, *Banques et banquiers*. Development in West: Andreau, *La vie financière*, 337–8 (Rome); 303 (Italy and western provinces).

[147] Andreau, *La vie financière*, 47; 155–61.

Developments in financial structures, such as the spread of banks or the intervention of bankers in auctions, may well have been as much responses to increases in the use of coin as agents of change in themselves. Either way they serve to indicate that the velocity of circulation is likely to have increased.

The foregoing considerations of financial structures and of credit have revealed some of the dynamics of the velocity of circulation of coin. It should at least be clear that velocity of circulation was an important determinant of the supply of money, and that there is no warrant for the assumption that it was constant. This is helpful in alerting us to look for signs of change, and in warning us that economic arguments which depend *faute de mieux* on velocity being constant are likely to be founded on sand.

It has been argued above that by trying to understand the factors which dictated the supply of money one can hope to identify some causes of significant change. The fact remains, however, that our assessment of the money supply is so vague that it is unlikely to tell us much about the role of money in the economy, or about variations in money use. For light on these topics it is more productive to look directly at the written sources and at certain other categories of material evidence.

III. MONEY AND EXCHANGE

This section seeks to establish how widespread was the normal use of money as a means of exchange. Once the geographical extent of money use has been established, the way is open to examine the nature and extent of money use within various aspects of the economy. The use of money as a means of acquiring goods is so basic that it must be considered in this section, alongside the general evidence for the geographical extent of money use. The roles of money in taxation, rent, wages, and credit are treated in more detail in Section IV, where the sophistication of money use is also described.

Perhaps the most revealing evidence concerning the use of money is that in literature the absence of coinage is seen either as an attribute of the ideal primitive community or as a noteworthy feature of remote and backward areas.[148] Strabo states that the absence of coinage was common among barbarians and Tacitus remarks upon barter by the more distant German tribes, as opposed to the use of coin by nearer peoples (*proximi*). Such passages make it clear that the educated classes, at least, regarded exchange by coin as normal in, and perhaps even characteristic of, the Roman world. That this was the case is borne out for the provinces for which sufficient evidence exists.

Papyri from Egypt reveal a highly monetized economy in which barter had only a small place.[149] A body of evidence which seemed to run counter to this view has now been shown to have been misinterpreted. It used to be argued that units of a private estate in the Fayum in the third century A.D. used wine as their main internal currency of exchange, and that the records of cash payments were simply a convenient fiction.[150] A comprehensive analysis of the whole of the available archive by Rathbone has shown that the estate was in essence monetized.[151] The system in operation provides an excellent example of how credit arrangements could increase the level of monetization beyond reliance on the physical use of coin. Local workers had accounts with the estate to which their cash wages were credited, and from which deductions were made for the purchase of estate produce, for the payment of taxes, and for such cash as was actually drawn. Non-local workers were normally paid in cash; other transactions between the estate and outsiders might be settled by cash or by transfers from one bank account to another. The estate was able to obtain cash when it needed to do so, but the use of actual coin was kept to a minimum. Transactions on the estate, and between the estate and outsiders, were

[148] Pliny, *HN* v. 15 (73) (Essenes); XXXIII. 3 (6–7) (barter in Homer); Tacitus, *Germania* 5. 3–5; Strabo III. 3. 7 (interior of Lusitania); VII. 5. 5 (Dalmatians, common among barbarians); XI. 4. 4 (Albanians by Caspian); Pausanias III. 12. 3–4 (ancient Sparta, India); Dio Chrys., *Or.* VII. 21 (simple hunters in Euboea); *Periplus* 6 (coast of Ethiopia); Howgego, *Greek Imperial Countermarks*, 95; Duncan-Jones, *Structure and Scale*, 34.

[149] Bowman, *Egypt*, 90–1.

[150] J. Bingen, 'Les comptes dans les archives d'Héroninos', *CdE* 26 (1951), 378–85; idem, 'Hèroninos, Théadelphie et son vin', *CdE* 63 (1988), 367–78.

[151] Rathbone, *Economic Rationalism*, 318–30.

nevertheless of a monetary nature, and it would be misleading to describe the situation as equivalent to an economy in kind.

Nor is there any warrant for the general argument that the recording of transactions in monetary terms in papyri is frequently no more than a fictional device for describing exchanges in kind.[152] Not only does such an argument amount to special pleading in the absence of any corroborative evidence, but the frequent occurrence in accounts of an additional charge for the conversion between bronze and silver coin is surely a feature of true monetary transactions.[153] Weight must also be given to the fact that a decree enforcing the acceptance of valid coin at a period of monetary or political crisis in A.D. 260 applied to all those who entered into contracts, as well as to the exchange banks.[154]

The Egyptian evidence is in line with the rabbinic sources for Galilee, which have much to say about the use of coin, but reveal no trace of barter.[155] The evidence of the New Testament for Galilee, Samaria, and Judaea also reveals a monetized economy, with only tenuous traces of barter.[156] At a more general level the inclusion in the Roman census declaration of cash held and debts due from others implies that coinage and monetary transactions were ubiquitous.[157] Furthermore, a man's domicile was defined *inter alia* by where he made his purchases, sales, and contracts.[158]

The burial of Pompeii by a volcanic eruption in A.D. 79 has rightly been taken to provide an important snapshot of the use of coin.[159] The total of 13,000 coins analysed by Breglia represents only those published up until 1950, and the variety of assemblages is perhaps more revealing than the total.[160] Coins of differing metals were found both mixed and separated; some were in purses or strong-boxes, or represent the contents of shop tills. Even more important than the coins themselves are the inscriptions and graffiti which give the prices charged for a wide range of goods and services, together with rents, loans, rewards, fines, and even some daily domestic accounts. These add up to a lively picture of a monetized economy. The substantial quantity of evidence for prices from elsewhere in the Empire, notably in inscriptions, papyri, and religious texts, all add credibility to this picture.[161]

It may seem obvious, but it is perhaps worth stating that the infrastructure was available to support a monetized economy. Archaeology and written sources bear witness to markets, fairs, shops, taverns, and even door-to-door salesmen.[162] It might be argued that some exchanges of goods in these venues or by these means were exchanges in kind rather than cash or credit sales. What has been said above about the relative lack of evidence for barter and the quantity of evidence for prices should militate against such an argument. In addition one can point to institutions which are typical of money use, such as auctions and banks.

Andreau has argued that in Italy auctions may have been held at the same time as weekly markets in the rich agricultural towns, as well as at ports and in some of the permanent markets of Rome.[163] The importance of auctions throughout the Empire is clear from the fact that a 1 per cent tax on sales was chosen, together with a tax on inheritances, to fund the regular

[152] *Pace* T. Pekáry, 'Les limites de l'économie monétaire à l'époque romaine', in *Dévaluations* II, 103–20.

[153] Howgego, *Greek Imperial Countermarks*, 54.

[154] *P.Oxy.* 1411; West and Johnson, *Currency*, 183; Bogaert, *Ἀναγέννησις* 3 (1983), 46 ff. argues that the reference to earlier measures suggests that the crisis was not the result of recent political developments.

[155] Goodman, *State and Society*, 57.

[156] C. H. V. Sutherland, 'The pattern of monetary development in Phoenicia and Palestine during the early empire', in A. Kindler (ed.), *International Numismatic Convention, Jerusalem 27–31 December 1963* (1967), 88–105, at 91–2. The passages cited to illustrate barter are not very convincing.

[157] Above, n. 133.

[158] *Dig.* L. 1. 27. 1 (Ulpian).

[159] Breglia, in *Pompeiana* (1950), 41–59; Crawford, *JRS* 60 (1970), 40–8, at 42; C. H. V. Sutherland, *The Emperor and the Coinage. Julio-Claudian Studies* (1976), 81–2.

[160] It is hard to understand Pékary's argument, op. cit. (n. 152) that the small scale of the assemblages implies that the total of coin in circulation was extremely low. As Sutherland observed, it is more likely that large sums would have been saved from the ashes than small. In any case analysis of the size of assemblages can tell us nothing about the total of the circulating medium.

[161] e.g. the tariff inscriptions from Zarai and Palmyra (*ESAR* IV, 80–2; 250–4; J. F. Matthews, 'The tax law of Palmyra: evidence for economic history in a city of the Roman East', *JRS* 74 (1984), 157–80); *ESAR* IV *passim*; D. Sperber, *Roman Palestine, 200–400. Money and Prices* (1974); West and Johnson, *Currency*; J.-P. Callu, 'Les prix dans deux romans mineurs d'époque impériale', in *Dévaluations* II, 187–214; Duncan-Jones, *Economy*; S. Lauffer, *Diokletians Preisedikt* (1971).

[162] *ESAR*; R. MacMullen, 'Market-days in the Roman Empire', *Phoenix* 24 (1970), 333–41; C. de Ruyt, *Macellum. Marché alimentaire des romains* (1983); T. Kleberg, *Hôtels, restaurants et cabarets dans l'antiquité romaine* (1957); R. Meiggs, *Roman Ostia* (1973), 270–8 'Local trade and industry', with particular emphasis on the large number of shops; door to door salesmen: Bowman, *Egypt*, 107.

[163] J. Andreau, 'Pompéi: enchères, foires et marchés', *BSAF* (1976), 104–27; Andreau, *La vie financière*, 328–9.

payments to veterans on discharge from A.D. 6.[164] That tribute from the newly annexed province of Cappadocia only enabled the sales tax to be halved gives some idea of the substantial scale of the revenue from the tax.[165]

The importance of banking is hard to judge. The principal source of evidence is the body of inscriptions mentioning bankers, which is at the mercy of uneven survival, and of geographical and chronological variations in epigraphic habit.[166] In both East and West bankers could be found in the market and harbour areas of some cities.[167] Hints of how widespread bankers were and how they could touch the lives of many can be gleaned from the fact that Herodes Atticus was able to pay his father's bequest to all Athenian citizens through the agency of banks (after deducting what the citizens owed to him), and from the specification that an Amphictionic decree of the late second century B.C. on the use of Athenian coin applied to the bankers established in the cities and to those visiting the fairs.[168] The copious evidence from Egypt shows that individuals might routinely pay their taxes either direct to the public bank or through private banks, and that banks might be established even in villages.[169] The importance of money-changing, a natural part of the banker's work, is dramatically revealed by an inscription of A.D. 209/210 from Mylasa in Asia, which seeks to uphold the civic monopoly of that activity.[170] The losses caused by illicit money-changing are so great that the city is having difficulty raising the tribute due to Rome.

The infrastructure for a monetary economy relied upon the availability of coin, and is itself evidence for such availability, although the use of credit may have gone some way towards ironing out temporary inadequacies. Both under the Republic and the Empire the structure of the coinage included denominations small enough to cope with everyday purchases.[171] Problems did arise through shortage of coin or doubts about its validity at certain times, and we know of some such occasions on which the resulting public agitation caused the government to take action.[172] At certain times the supply of base metal coinage was supplemented by the large-scale production of local imitations, although we have no way of knowing whether such outbreaks were officially inspired.[173] In addition smaller change could be manufactured by cutting up larger coins, usually into halves.[174] It need occasion no surprise that the supply of coinage proved inadequate from time to time, and varied from place to place. The importance of imitations and halving is that they show that there was a demand for coin which needed to be satisfied.

All that has been said already indicates that exchange by means of coinage was a normal feature of the cities of the Roman world. More than that, the evidence for barter is very slight in comparison with that for money use, and it is reasonable to conclude that in the cities money was the dominant form of exchange for goods. The real problem is whether the countryside and certain 'more backward' provinces fell outside this pattern.

The view that the use of money in some provinces was different not just in degree but also in type has been stated most clearly by Crawford.[175] He took the fact that the copper *as* was the

[164] Tacitus, *Annals* I. 78. 2; O. Hirschfeld, *Die kaiserlichen Verwaltungsbeamten bis auf Diocletian* (1905), 93–5.

[165] Tacitus, *Annals* II. 42. 6.

[166] Andreau, *La vie financière*, *passim*.

[167] Bogaert, *Banques et banquiers*, 253 (Ephesos, τραπεξειτικὴ στοά); 256 (Miletus, by port); 375; Andreau, *La vie financière*, 109–11; 137; 402; cf. 325–9.

[168] Philostratus, *VS* 549; Bogaert, *Banques et banquiers*, 84–5; *FD* III. 2. 139; *ESAR* IV, 332–3; Bogaert, *Banques et banquiers*, 115–16.

[169] Wallace, *Taxation in Egypt*, 296; R. Bogaert, 'Listes de taxes et banques dans l'Égypte romaine', *ZPE* 79 (1989), 207–26 (226 for villages); idem, 'Banques et banquiers à Thèbes à l'époque romaine', *ZPE* 57 (1984), 241–96; idem, 'Les ΚΟΛΛΥΒΙΣΤΙΚΑΙ ΤΡΑΠΕΖΑΙ dans l'Égypte Gréco-romaine', *Ἀναγέννησις* 3 (1983), 21–64 (42; 55 for villages).

[170] *OGIS* 515 = *Die Inschriften von Mylasa* Part 1 (1987), no. 605; Bogaert, *Banques et banquiers*, 265–8. For the activities in which money-changers were engaged see A. Macro, 'Imperial provisions for Pergamum: *OGIS* 484', *GRBS* 17 (1976), 169–79.

[171] A. Burnett, *Coinage in the Roman World* (1987), 96; idem, 'The currency of Italy from the Hannibalic War to the reign of Augustus', *AIIN* 29 (1982), 125–37, at 132–4; Duncan-Jones, *Economy*, 46–7 (wine); 145–6 (bread); Duncan-Jones, *Structure and Scale*, 143–55 (wheat).

[172] Howgego, *NC* 150 (1990), 23–4; West and Johnson, *Currency*, 183 (*P.Oxy.* 1411, A.D. 260).

[173] M. Crawford, 'Unofficial imitations and small change under the Roman Republic', *AIIN* 29 (1982), 139–64; 222–6; J.-B. Giard, 'Pouvoir central et libertés locales, le monnayage en bronze de Claude avant 50 après J.C.', *RN*[6] 12 (1970), 33–61; G. Boon, 'Counterfeit coins in Roman Britain', in J. Casey and R. Reece (eds), *Coins and the Archaeologist* (2nd edn, 1988), 102–88; R. Kenyon, 'The Claudian coinage', in N. Crummy (ed.), *Colchester Archaeological Report* 4 (1987), 24–41; A. Kunisz, 'La monnaie de nécessité à l'époque du Haut-Empire romain: Problèmes et controverses', in Depeyrot *et al.*, *Rythmes de la production monétaire*, 257–65.

[174] But some halving may reflect monetary reform: T. V. Buttrey, 'Halved coins, the Augustan reform, and Horace, *Odes* I, 3', *AJA* 76 (1972), 31–48.

[175] Crawford, *JRS* 60 (1970), 44–5.

lowest denomination common in Belgium and Germany to prove that coin was little used as a means of exchange in the northern provinces. This argument is not convincing. It is true that the *quadrans* (a copper coin worth a quarter of an *as*) is found in some quantity on Italian sites, in contrast to the situation in the northern provinces. This is scarcely an observation from which to derive dramatic inferences, however, as the *quadrans* represented a very small sum, and it is actually hard to find anything priced as low as this.[176] The *as* would have been adequate for many of the purchases of everyday life.[177] It may be that in the northern provinces of the early Principate purchases tended to be in larger quantities and at less frequent intervals or, for all we know, that debts were settled periodically, but such a picture is far removed from Crawford's hypothesis of a world in which coin was little used as a means of exchange.[178]

It is presumably not contentious that the degree to which coin was used may have varied between different provinces and different periods. The world into which Rome expanded embraced peoples in different stages of social and political development. In Central Gaul before it became a Roman province the introduction of small change into the coinage has been plausibly linked to changes in Celtic society towards state formation and urbanization.[179] The initiation of a coinage *tout court* has been linked with the process of state formation in the Po valley at the end of the third century B.C.[180] This sort of analysis is nicely supported by Overbeck's study of South Germany, which establishes a connection between the ending of coinages in the area in about 60 B.C. and the end of the oppida-based civilization as a result of the movement of Celtic peoples from east to west.[181] Coinage was not used again until the arrival of the Romans. It looks as though the production of coinage and the subsequent introduction of small denominations are indicative of stages in the development of towns.

Annexation by Rome brought the formation of towns where they did not already exist. This process was in part deliberate Roman policy and in part economic. Frontier provinces are unlikely to have paid for themselves, at least initially, and the injections of money from other provinces through the pockets of soldiers and veterans will have been responsible for the further development of towns and villages.[182] In addition to the impetus given to monetization by increased urbanization, the extensive use of coin by the soldiers themselves will have had a galvanizing effect. Vast quantities of coin have been recovered from military sites on the northern frontier,[183] and the tablets from Vindolanda bear witness to the routine use of coin in a military context.[184] Extracts from one of the Vindolanda letters make it easier to visualize this process:

> I have several times written to you that I have bought about five thousand modii of ears of grain, on account of which I need cash. Unless you send me some cash, at least five hundred denarii, the result will be that I shall lose what I have laid out as a deposit, about three hundred denarii, and I shall be embarrassed. So, I ask you, send me some cash as soon as possible . . . See with Tertius about the 8½ denarii which he received from Fatalis. He has not credited them to my account . . . Make sure that you send me some cash so that I may have ears of grain on the threshing floor . . . A messmate of our friend Frontius has been here. He was wanting me to allocate (?) him hides and that being so, was ready to give cash . . . I hear that Frontinius Julius has for sale at a high price the leather ware (?) which he bought here for five denarii apiece.

[176] C. E. King, 'Quadrantes from the River Tiber', *NC*[7] 15 (1975), 56–90. The area of circulation of quadrantes may have been underestimated. Finds from Arabia are probably to be explained by military use: J. M. C. Bowsher, 'Trajanic quadrantes from Arabia', *NC* 147 (1987), 166–8. David MacDowall informs me that Domitianic quadrantes have been found in substantial quantities in the excavations at Nijmegen. Perhaps the small size of quadrantes has resulted in a recovery rate lower than that of larger coins on some sites.

[177] Above, n. 171.

[178] England managed for much of the Middle Ages with no denomination smaller than a silver penny, but it would be ludicrous to deny that money was extensively used as a means of exchange.

[179] D. Nash, *Coinage in the Celtic World* (1987), 53–5; Crawford, *Coinage and Money*, 171–2.

[180] Crawford, *Coinage and Money*, 80.

[181] B. Overbeck, 'Celtic chronology in south Germany', in A. M. Burnett and M. H. Crawford (eds), *The Coinage of the Roman World in the Late Republic*, BAR Int. Ser. 326 (1987), 1–17.

[182] A. R. Birley, 'The third century crisis in the Roman Empire', *Bulletin of the John Rylands University Library of Manchester* 58 (Spring, 1976), 253–81, at 269; M. Fulford, 'Demonstrating Britannia's economic dependence in the first and second centuries', in T. F. C. Blagg and A. C. King (eds), *Military and Civilian in Roman Britain. Cultural Relationships in a Frontier Province*, BAR British Ser. 136 (1984), 129–42.

[183] e.g. H. Chantraine, *Novaesium VIII. Die antiken Fundmünzen von Neuss* (1982); C. M. Kraay, *Die Münzfunde von Vindonissa (bis Trajan)* (1962).

[184] A. K. Bowman, J. D. Thomas, and J. N. Adams, 'Two letters from Vindolanda', *Britannia* 21 (1990), 33–52, at 41–52; A. K. Bowman and J. D. Thomas, *Vindolanda: the Latin Writing-Tablets*, Britannia Monograph Series IV (1983), 47; 84–5; and index 154–6 s.v. *as*, *denarius*, *semis*, and *victoriatus*.

The full use of coinage no doubt spread unevenly and took time to develop.[185] We should not forget, however, that the use of coinage, including small denominations, was familiar in many areas before annexation by the Romans, and elsewhere change could have been rapid. It remains to ask whether there were areas of the Roman world, notably the countryside, where the normal use of coinage as a means of exchange never penetrated.

Crawford has argued that 'the use of coined money as a means of exchange was largely limited to the cities of the Empire'.[186] He cited as evidence the fact that of the thirty coins found at a villa near Capua all but one were already old during the period of occupation, and also notes another villa which produced only one coin. This slender base of fact will clearly not support the conclusion drawn. Burnett, apparently following Crawford, stated that 'the excavation of rural sites, such as Roman villas, has revealed a dearth of coins' and interpreted this to imply that '[coins] were not normally used to any very large extent by the rural population'.[187]

Advances in archaeology and a significant amount of documentary evidence dictate a substantial revision of this position. It is hard not to be impressed by the over 30,000 coins excavated at the village of Karanis, admittedly one of the larger villages in the prosperous area of the Egyptian Fayum.[188] Karanis may be considered untypical either because it was a sizeable village or by virtue of its location. However, the increasing number of careful excavations of more truly rural sites show that coins are to be found scattered in the countryside in quantity, and not just in 'developed' areas such as Italy, but also in 'more backward' provinces like Britain.[189] In addition it is almost certainly the case (although no thorough treatment of the topic exists) that the majority of Roman coin hoards found in modern times come from rural rather than urban sites. It is true of hoards from Roman Britain, and also more generally of hoards of medieval coins.[190] This does not mean that there was originally more hoarding in the country than in towns, as hoards concealed in towns are more likely to have been recovered in antiquity. It does, however, emphasize the quantity of coins in rural areas. It is implausible to explain away all these hoards as buried in the countryside by city-dwellers. What is needed is not further proof that coin was available in the countryside, but an analysis of the differences (if any) in the patterns of coin loss between urban and rural sites. Then we would be able to consider questions such as whether the use of coinage took longer to penetrate the countryside.[191]

If more work is needed to compare town and countryside, it is even more important to understand what we mean by 'countryside'. As a result of archaeological surface survey it is clear that in the past there has been far too ready acceptance that communities (whether towns, villages, or hamlets) were the dominant form of settlement.[192] The proportion of the population living in dispersed habitations has been seriously underestimated. This new perspective needs building into our analysis of coin finds and into our understanding of the use of money. For example, if taxes were exacted predominantly in coin in some provinces, and a significant proportion of people inhabited the countryside, it seems to follow that there was an important requirement for coin in the countryside in those provinces. Furthermore, in describing inhabited sites in the countryside there is a need to differentiate between villages, hamlets, villas of various types and sizes, other farmsteads, and isolated buildings. Lloyd has drawn attention to examples from Italy of coins being found in the excavations of a medium-sized *villa rustica*, of a small to medium farmstead, and even of an isolated small building.[193]

[185] For a case study see: D. Nash, 'Plus ça change . . . : currency in Central Gaul from Julius Caesar to Nero', in R. Carson and C. Kraay (eds), *Scripta Nummaria Romana, Essays Presented to Humphrey Sutherland* (1978), 12–31; but note the comments of Crawford, *Coinage and Money*, 275.

[186] Crawford, *JRS* 60 (1970), 45.

[187] A. Burnett, *Coinage in the Roman World* (1987), 96.

[188] R. Haatvedt *et al.*, *Coins from Karanis. The University of Michigan Excavations 1924–1935* (1964). On the peculiar nature of the coin finds at Karanis, above n. 20.

[189] Italy: J. Lloyd, 'Forms of rural settlement in the early Roman Empire', in G. Barker and J. Lloyd (eds), *Roman Landscapes* (1991), 233–40. Britain: R. Reece, 'Coins and villas', in K. Branigan and D. Miles (eds), *The Economics of Romano-British Villas* (1989), 34–41; idem, *Coinage in Roman Britain* (1987), 76–7; 129–31.

[190] Spufford, *Money*, 384; cf. A. Robertson, 'Romano-British coin hoards: their numismatic, archaeological and historical significance', in J. Casey and R. Reece (eds), *Coins and the Archaeologist* (2nd edn, 1988), 13–38, at 26–7.

[191] Such an analysis has been attempted for Britain and the principal difference appears not in the first century but in the appearance on urban sites of a higher proportion of coins of the period A.D. 260–96 as compared with the period A.D. 330–402 than is the case on rural sites, see above n. 21.

[192] Lloyd, op.cit. (n. 189).

[193] ibid.

Apart from the coins themselves, various forms of documentary evidence reveal the use of money in the countryside. Papyri from Egypt show that exchange by means of coinage was very significant and widespread even at a village level.[194] To illustrate this one may draw attention to two series of documents of the first century A.D. from villages in the Fayum: a dossier of appeals for justice, mostly directed to the chief of police, from Euhemeria, and a ledger from the public records office of Tebtunis.[195] The petitions from Euhemeria mention a number of thefts of cash from farmsteads; in one case two lots of 120 silver drachmas and 4 silver drachmas respectively were stolen, and also a belt in which were 4 drachmas in copper. A mason is said to have made off with a concealed hoard of coin and jewellery from a house in which he was working. There are also a surprising number of assaults which led to the theft of money being carried about the person, or to the loss of coins in the ensuing struggle. In some cases we learn the reason for which the money was being held or carried: it was needed for the payment of rent, or for the purchase of goods, or it derived from the sale of opium, or was being administered for the gymnasiarch, or had been received on account of an undertaking from a freedman of a member of the imperial house. All this is very lively and is nicely complemented by evidence for cash requirements from the register of business contracts at Tebtunis.[196] Over a continuous period of sixteen months in A.D. 45–7 there were recorded 113 loans and fourteen mortgages. The impact of this evidence for cash loans is not much diminished even if one assumes that they arose from economic hardship caused by a low flood of the Nile.

One difference between town and country may be that there was a seasonality in the flows of substantial sums of money in agricultural communities, with rents and debts being paid after the harvest, but the close economic interaction between town or village and agricultural land implies that smaller transactions were regular.[197] It is also noteworthy that taxes could be paid in instalments when the sums were large, or in order to make payments into convenient round sums.[198] It is tolerably clear that the Egyptian countryside was monetized, and the real question (as so often) is whether the situation in Egypt also pertained elsewhere.

The evidence from outside Egypt does not permit any definitive answer to the question, but a range of anecdotal information provides support for the view that the use of coin was widespread in rural areas throughout the Empire. Polybius happens to refer to the use of coin in country inns in Gallia Cisalpina, and it need occasion no surprise that people carried coin when travelling through the countryside.[199] Something more emerges from Millar's study of Apuleius' novel the *Golden Ass*, written in the second century A.D. and set in Greece.[200] Not only in villages but even on country properties purchases and wages are in cash, and specialist crops are produced to sell rather than for immediate consumption. Transfers of produce without cash appear only as gifts among the richer households. For the use of coin on farms one can point to Cato's advice that the *paterfamilias* should review the cash accounts on arrival at his farm.[201] In the same vein Columella recommended that an illiterate slave overseer for an estate would be more likely to bring money to his master on the grounds that he would be less able to falsify the accounts, and he enjoined that the overseer should visit town or the weekly market only in order to make purchases and sales in connection with his duties.[202] Cash even played a part in the lives of sharecropping tenants on imperial estates in North Africa.[203] The surviving regulations envisage the payment of a fee for pasturing animals, the sale of fruit at market, and borrowing against the security of land. On one estate there is a mention of shops (*tabernae*). A passage in the Mishnah concerning the return of defective coin in the villages of Galilee, which specifically contrasts the procedure in the villages with that in the large towns, is clear evidence of the use of coin at a village level.[204] The same impression is given by the

[194] Bowman, *Egypt*, 90–1; Rathbone, 'The ancient economy', 165.

[195] Euhemeria: *P. Ryl* 125; 127–8; 133; 136; 138; 141; 144–5; 150–1. Tebtunis: *P. Mich.* 237–42; on which, Bowman, *Egypt*, 115; West and Johnson, *Currency*, 82; and in detail Toepel, *Studies in the Administrative and Economic History of Tebtunis*.

[196] If one includes other forms of contract which either certainly or potentially conceal loans then the number of loans for the period rises to 308, or a third of all contracts registered. Toepel, op.cit. (n. 195), 289; 312.

[197] Rents and debts paid after harvest: Bowman, *Egypt*, 104, but close interaction between town/village and country (pp. 105–6). Seasonality of flows in rural areas during Middle Ages: Spufford, *Money*, 382–6.

[198] Wallace, *Taxation in Egypt*, 123; 296; Bogaert, 'Listes de taxes et banques dans l'Égypte romaine', *ZPE* 79 (1989), 207–26, at 221–2.

[199] Polybius II. 15.

[200] F. Millar, 'The world of the Golden Ass', *JRS* 71 (1981), 63–75, at 72–3.

[201] Cato, *De Agri Cultura* II. 5.

[202] Columella I. 8. 4; 8. 6.

[203] Kehoe, *Economics of Agriculture*, 174–6.

[204] *Mishnah*, *Baba Metzia* 4. 6; over-interpreted by Goodman, *State and Society*, 57.

archive of Babatha, a woman who lived in the village of Maoza at the southern tip of the Dead Sea, in the province of Arabia.[205] The archive includes documents ranging in date from A.D. 93/4 to A.D. 132. There is evidence for relatively straightforward use of coin: in order to pay a dowry, or the crown tax, or, potentially, as payment for labour, or as a penalty for failure to fulfil a contract. There are also indications of more sophisticated uses of money in the village: contracts of debt in a business context, a courtyard in a village in Judaea mortgaged to a Roman centurion for 60 denarii, and a 'trust fund' invested in loans by guardians to produce a regular income for the support of an orphan.

No one is likely to assume that the level of coin use was as high in the villages and countryside as it was in the towns. Barter and other forms of redistribution of goods will have had a place alongside monetary exchanges. Nevertheless, on the basis of the evidence available to us, it appears that it was only the remoter areas outside the towns and villages and areas of settled agriculture to which the normal use of coinage as a means of exchange never penetrated.[206]

IV. THE CHARACTER OF MONEY USE

It has been argued that the use of money was widespread in the Roman world, and that in the cities, at least, money was the dominant means of exchange for goods. This does not get us very far in the analysis of chronological and geographical variations in the degree of money use, or in the comparison of the Roman economy with other historical economies. For these purposes one needs to define the role of money not only as a means of exchange for goods, but also in such areas as (a) taxation, (b) rents, (c) wages, and (d) credit. The sophistication of money use may also be described (e).

These topics present particular problems for the historian. In the first place, papyrological evidence means that we are much better informed about Egypt than elsewhere. There is a temptation to set Egypt on one side, as a unique province which had a peculiar system of agriculture based on the flooding of the Nile, and an administrative system which was centralized to an unusual degree. This is a temptation to be avoided, for reasons which Rathbone has stated succinctly: 'there was great regional diversity in the society and economy of the classical world in general, rather than a peculiar chasm between Egypt and the rest of that world, but ... behind this general diversity there were also similar and at times even identical economic developments for which the Egyptian evidence provides a keyhole on a much wider panorama'.[207] The universal applicability of conclusions drawn from Egypt cannot, however, be taken for granted.

A second problem is that the evidence for other provinces is very variable in nature and in quality, and not infrequently missing altogether. In these circumstances it can be very difficult to generalize. With taxation there is some possibility of creating a plausible theoretical model, because the picture of income from taxation in cash and kind can be viewed in the light of the requirements of state expenditure and distribution. It is hard to see how one might create a similar type of model for rents, wages, or credit.

Only for taxes are there recent analyses for the Roman world as a whole of the balance between the use of cash and the use of kind. This is not the place to embark on a thorough synthesis of the evidence for rents, wages, and credit. The following discussion is intended to give a flavour of the evidence, indicate some of the problems in its interpretation, and draw attention to some observations which may have wider relevance.

(a) *Taxation*

Taxation was extracted by the Roman state both in coin and in commodities (principally grain) and to some extent in corvée labour, which was imposed like a tax and was sometimes

[205] *P. Yadin* 5; 11; 15; 16–18; 21–2; 27.

[206] For the lack of coinage in places of extreme remoteness, see n. 148.

[207] Rathbone, 'The ancient economy', 159.

commuted for money.[208] Cities likewise exacted a combination of coin, commodities, and labour for local purposes,[209] but it is for state taxation that one can hope to grasp something of the overall picture.

The mix in the forms of state taxation varied from province to province, and we do not have the evidence to give a full account. Modern economic models suggest, quite convincingly, that grain would have been more important in the provinces that were heavily engaged in the provision of corn for Rome or for Roman armies, and that coin would have been more significant in other areas, where the military burden was not unduly heavy in relation to the capacity to pay tax.[210]

We happen to know most about two provinces in which grain was the dominant constituent, that is to say in Sicily under the Republic and in Egypt under the Empire.[211] The evidence from Egypt shows that it is important to understand not only how a province paid tax but also why it paid tax in the way it did, before conclusions are drawn about monetization. Land tax in grain was the main constituent of revenue, but that was because Rome needed grain from Egypt. Not only is the province said to have fed Rome for four months of the year, but grain was needed for Roman troops and officials in Egypt, for distribution in Alexandria and the nome capitals, possibly for military units in other eastern provinces, and, when supplies permitted and shortages occurred, for cities and client rulers of the East.[212] Thus it is not necessary to infer that Egypt was insufficiently monetized to pay tax in coin. The fact that the poll tax was exacted in money demonstrates the universal availability of coin.[213] This is supported by the fact that although tax on grain land was paid in kind, tax on vineyards and garden land was in cash.[214] Furthermore, taxes due in kind — including the increasingly regular exactions for the army — were often commuted to cash.[215] Despite a bewildering range of taxes in money one gets the impression that the opposite — the payment in kind of taxes due in cash — was comparatively rare. It also seems that, notwithstanding Rome's requirement for grain, a greater proportion of taxes was paid in coin under the Romans than under the Ptolemies.[216] The Egyptian economy was, as we have seen, monetized at all levels, and there was a tendency towards payment in coin. To complete the picture it is, however, fair to make the point that the exclusion of cash from a significant part of payments of tax removed a stimulus to an even greater use of coin.

Developments in the third century A.D. present separate problems. The rigidity of the tax system ('no new taxes') meant that in the face of inflation the government was forced to turn increasingly to exactions in kind, in particular for their major expense, the army.[217] Requisitions for military purposes may be traced back to the Republic.[218] The evidence for a systematization of the *annona militaris* under Septimius Severus is decidedly weak, but there

[208] cf. Tacitus, *Annals* IV. 6. 4 (*frumenta et pecuniae vectigales*); Neesen, *Untersuchungen zu den direkten Staatsabgaben*; Brunt, *Roman Imperial Themes*, chapter 15; Duncan-Jones, *Structure and Scale*, part V.12; also H. Engelmann and D. Knibbe, *Der Zollgesetz der Provinz Asia*, *Epigraphica Anatolica* 14 (1989), 93–5, §31–2 on *decuma* and *scriptura*. Tax in commodities other than grain: e.g. *P. Yadin* 16 (A.D. 127) payment in respect of groves of date palms in Arabia due in dates and (for the crown tax) in money. Corvée e.g. Tacitus, *Agr.* 13; 31; 32.

[209] Cities levied taxes for their own benefit. These were mostly indirect: A. H. M. Jones, *The Greek City from Alexander to Justinian* (1940), Chapter 17. For a direct tax: J. Oliver, 'A new letter of Antoninus Pius', *AJP* 79 (1958), 52–60. Civic taxes seem mostly to have been in coin but some cities levied corn or olive oil direct from producers: *Dig.* L. 4. 18. 25; *SEG* XV. 108; and cities might expect to purchase produce at below market value: *Dig.* VII. 1. 27. 3. Cities relied to a much greater extent than the Roman state on enforced contributions of work: *Dig.* L. 4. 1 (*munera* for the Roman state tended to involve money rather than work). Charter of Urso: *CIL* I², 594 XCVIII; Lex Irnitana: J. González, 'The Lex Irnitana: a new copy of the Flavian Municipal law', *JRS* 76 (1986), 147–243; §83; Duncan-Jones, *Structure and Scale*, 174–5; Goodman, *State and Society*, 147; Bowman, *Egypt*, 69; in detail: N. Lewis, *The Compulsory Public Services of Roman Egypt* (1982). Hence the importance of exemptions: F. Millar, 'Empire and city, Augustus to Julian: obligations, excuses and status', *JRS* 73 (1983), 76–96.

[210] Garnsey and Saller, *The Roman Empire*, 95–6.

[211] Cicero, *II Verr.* 3. 5 (11)–6 (15); 70 (163); Wallace, *Taxation in Egypt*.

[212] Wallace, *Taxation in Egypt*, 336; Josephus, *BJ* II. 385–6; Rathbone, 'The ancient economy', 171–6.

[213] Neesen, *Untersuchungen zu den direkten Staatsabgaben*, 134. The evidence seems insufficient to prove that in other provinces the poll tax was always exacted in coin, *pace* Duncan-Jones, *Structure and Scale*, 187; 198; evidence in Neesen, op. cit., 117–35.

[214] Wallace, *Taxation in Egypt*, 6.

[215] Wallace, *Taxation in Egypt*, e.g. 24; 154; index 512 s.v. *adaeratio*; for speculation on the scale of *adaeratio* see Rathbone, 'The ancient economy', 174.

[216] Bowman, *Egypt*, 94; A. Gara, 'Aspetti di economia monetaria dell'Egitto romano', *ANRW* II 10.1 (1988), 912–51, at 926–8; 935.

[217] Jones, *The Roman Economy*, 168–9; 177; 197–8; idem, *The Later Roman Empire 284–602* (1964) 1, 30; taxation in coin continued to some degree: A. Bowman, 'The economy of Egypt in the earlier fourth century', in C. E. King (ed.), *Imperial Revenue, Expenditure and Monetary Policy in the Fourth Century A.D.*, BAR Int. Ser. 76 (1980), 23–40, at 27.

[218] Jones, *The Roman Economy*, 168–9 n. 96; 180.

is no doubt that the scale of exactions grew in the third century.[219] Some customs dues, and perhaps other taxes, were converted from cash to kind.[220] On the expenditure side the salaries of soldiers and high officials lagged behind inflation, and the shortfall was partially made up by allowances in kind.[221] This development should not be overstated. The salaries of soldiers did go up to some extent. Furthermore, in compensating for the shortfall, the rise in frequency of cash donatives was much more important than the increase in allowances in kind.[222]

The reversion to an economy in kind, which was far from complete as far as the state was concerned, does not seem to have taken place to any significant extent in private transactions. For example, the patterns of rent in Egypt show no shift towards payments in kind.[223] So in the third century we again see that it is the requirements of the state which restrict the use of coinage, rather than a shortage of coin forcing changes from below.

(b) *Rents*

Like taxes, rents were paid variously in cash or kind. It is reasonable to assume that urban rents were normally paid in cash for want of a suitable alternative.[224] Obligatory labour services were rarely more than an incidental addition to other forms of rent.[225]

With agricultural rents, the evidence does not permit an assessment of the relative importance of payments in cash and kind across the Roman world, although both forms were geographically widespread. Egypt again provides the most prolific documentation.[226] A detailed study of leases in the Oxyrhynchite nome shows that cash rents were associated with land producing fodder crops, flax, and grapes, but that rents on land under other crops were paid either in that crop or in wheat.[227] The nature of the rent was thus fixed by the type of produce, and the system shows no sign of change throughout the first three centuries A.D. The use of wheat as a form of rent was no doubt promoted by its acceptability for tax payments. This is easy to see in the case of land which was imperial estate, for which the rent comprised the tax payment, but the point also has force for other types of land on which taxes in kind were levied from the landowner.[228]

Rents in kind might be expressed in fixed amounts or as a share of the crop. The most detailed information on sharecropping is to be found in the regulations governing the exploitation of formerly uncultivated land on imperial estates in North Africa.[229] Payments of a range of produce from grain and olives to honey were made by the tenants (*coloni*) to *conductores*, to whom they also owed six days of labour each year.[230] Since the land was imperial estate the dues included both rent and tax. We have already seen that the *coloni* used

[219] Jones, *The Roman Economy*, 197–8 n. 27; idem, *The Greek City from Alexander to Justinian* (1940), 329–30 nn. 94–5; D. van Berchem, *L'annone militaire dans l'empire romain au IIIe siècle* (1937); idem, 'L'annone militaire est-elle un mythe?', in A. Chastagnol (organizer), *Armées et fiscalité dans le monde antique* (1977), 331–9; R. Develin, 'The army pay rises under Severus and Caracalla and the question of Annona militaris', *Latomus* 30 (1971), 687–95; G. Rickman, *Roman Granaries and Store Buildings* (1971), 278–83; Garnsey and Saller, *The Roman Empire*, 94–5.

[220] R. E. A. Palmer, 'Customs on market goods imported into the city of Rome', *MAAR* 36 (1980), 217–33, at 220; 226. It may be relevant that the crown-tax involved the presentation of an actual crown at least once under Aurelian (*P. Oxy.* 1413). The crown-tax had grown out of the practice of offering golden crowns to the Ptolemies on accession, but had become in the Roman period a regular money tax, supplemented by irregular larger exactions on special occasions, A. Bowman, 'The crown-tax in Roman Egypt', *BASP* 4 (1967), 59–74.

[221] P. A. Brunt, 'Pay and superannuation in the Roman army', *PBSR* 18 (1950), 50–71, at 69; Jones, *The Roman Economy*, 208–11.

[222] Duncan-Jones, *Structure and Scale*, 105–17.

[223] Rowlandson, *Landholding*, 276; Mickwitz, *Geld und Wirtschaft*, 120–2.

[224] Cash rents for accommodation in Egypt: Mickwitz, *Geld und Wirtschaft*, 124.

[225] P. Garnsey, 'Non-slave labour in the Roman world', in Garnsey (ed.), *Non-Slave Labour*, 34–47, at 42; Kehoe, *Economics of Agriculture*, 273, index s.v. labor services. A notable exception relates to rural accommodation: rooms in barrack blocks (*epoikia*) on a private estate in the Egyptian Fayum in the third century A.D. were rented out for 40 drachmas plus a piglet plus twenty four days' labour per person for each year. The labour component of the rent was the most valuable, although it is possible that it was actually remitted in cash in some cases: Rathbone, *Economic Rationalism*, 177.

[226] Hennig, *Untersuchungen zur Bodenpacht*.

[227] Rowlandson, *Landholding*, *passim*, especially 266–9; for Egypt in general: *ESAR* II, 81–2. Domain land: Wallace, *Taxation in Egypt*, 11, cf. 37.

[228] For an alternation between rent in cash and in kind on the same piece of land, as the crop and hence the nature of tax payments changed, see *P. Mich* II 121 recto with notes; Mickwitz, *Geld und Wirtschaft*, 121.

[229] Kehoe, *Economics of Agriculture*.

[230] It is unclear whether the *conductores* leased the land and sublet some of it to the *coloni* or whether the *conductores* leased some land for themselves and also the right to collect the dues from *coloni*.

money for a range of purposes, and there is no need to assume that they could not have paid their dues in coin. Sharecropping had advantages for all parties: the government needed much, if not all, of the produce, the dues were easy to assess and could be collected by the *conductor* at the threshing-floor or equivalent, and the *coloni* benefited from sharing with the landlord the risks on the size and market price of the crop.

Reasons for the adoption or continuation of sharecropping in Africa must remain speculative, but Pliny the Younger provides a useful insight into how such a decision might be made on private land in Italy.[231] He contemplated a change to sharecropping because fixed money rents had led the tenants into a vicious cycle of arrears. The dominant consideration is for the tenant to be shielded from part of the risk on land which does not reliably provide both for the needs of the tenant and rent for the landlord, and hence to allow the extraction of rent in some form. There is no warrant for the assumption that sharecropping was the dominant form of exploitation in either Africa or Italy.[232] It does appear to have been the normal form of rent in Galilee, but was rare in Egypt except for vineyards.[233]

Sharecropping provided greatest protection to the tenant. Fixed payments in kind protected him only from low market prices, but not from poor crops. Nevertheless, it is a reasonable inference from the terms of leases of temple land from Mylasa and Olymos in Asia that it was regarded as preferential for tenants to pay fixed sums in kind rather than in money.[234] It may be that fixed as opposed to variable rents in kind were not widespread outside Egypt, because Gaius was able to ignore them in contrasting *coloni* who rented for fixed sums of money with sharecroppers who paid variable quantities of produce.[235]

Money rents, like rents in kind, were widespread geographically. They are attested, for example, in Narbonensis, Italy, Asia, and Egypt.[236]

Foundations, which existed throughout the Roman world for the support of children, the upkeep of public works, and the provision of regular feasts, games, or cash distributions, might be in the form of landed property which was rented out for a regular cash income.[237] Such evidence demonstrates a role for money rents, but cannot establish their overall importance. It is equally true that the importance of rents in kind cannot be demonstrated except in a few areas and specific contexts.

Two conclusions may perhaps be drawn from the evidence on rents. First, the dominant factors in dictating rent in kind were the need to protect the tenant from various risks, the need of the government for grain (on imperial estates), and the need for grain to pay tax (outside imperial estates). No doubt sometimes the lessor also required the produce for consumption. There is no suggestion that coinage was simply unavailable. Second, the substantial use of payments in kind for rent, as for taxes, restricted rather than encouraged the use of coin.

(c) *Wages*

Both cash and kind were used for wages also. Types of wage range from cash alone,[238] through mixed cash and kind (the element in kind might be a bonus or part of the basic

[231] Pliny, *Ep.* IX. 37; A. N. Sherwin-White, *The Letters of Pliny* (1966), 520–2.

[232] Kehoe, *Economics of Agriculture*, 38 argued that the Lex Manciana and hence sharecropping applied to all imperial estates and not just to formerly uncultivated land. His case is against the natural reading of the inscription and is not entirely convincing.

[233] Galilee: Goodman, *State and Society*, 33; Egypt: Hennig, *Untersuchungen zur Bodenpacht*, 6–7.

[234] *ESAR* IV, 692–3; *Die Inschriften von Mylasa* I, no. 216 (Mylasa); II, no. 830 (Olymos); cf. L. Robert, *Le sanctuaire de Sinuri près de Mylasa* I (1945), 74–5.

[235] *Dig.* XIX. 2. 25. 6 (Gaius).

[236] Narbonensis: unassigned land belonging to the *colonia* of Arausio: A. Piganiol, *Les documents cadastraux de la colonie romaine d'Orange* (1962), 57–60. Italy: M. I. Finley, 'Private farm tenancy in Italy before Diocletian', in Finley (ed.), *Studies in Roman Property* (1976), 103–18, at 106–7 concludes, without sufficient evidence, that a fixed annual money payment was probably the most common form of rent; Pliny IX. 37; X. 8. 5, rents from his estates at Tifernum Tiberinum brought in 400,000 sestertii each year; the city of Pompeii leased out farms, houses, pasture, and shops for cash: *ESAR* V, 102–3. Asia: money rents were usual for temple land at Mylasa: n. 234 above. Egypt: nn. 226–7 above.

[237] e.g. S. Mitchell, 'Festivals, games and civic life in Roman Asia Minor', *JRS* 80 (1990), 183–93. The income from foundations usually reflects the rate of return expected from property, and only rarely the higher rate expected from cash out on loan: Duncan-Jones, *Economy*, 33; 81; 132–6. In general: B. Laum, *Stiftungen in der griechischen und römischen Antike* (1914).

[238] Italy: S. M. Treggiari, 'Urban labour in Rome: mercenarii and tabernarii', in Garnsey (ed.), *Non-Slave Labour*, 48–64. Egypt: Hengstl, *Private Arbeitsverhältnisse*, 106–12; n. 241 below for cash wages with a provision of food on top.

wage),[239] to kind alone (either in a stipulated measure or as a share of the crop).[240] In some cases food or accommodation might be provided for the employee in addition to his wage.[241] Both cash and kind were probably used for wages throughout the Roman world. It is again impossible to estimate their relative importance, as we have a significant amount of information only for Egypt. Moreover, labour was supplied in a great variety of legal forms and on terms which varied with the degree of dependence of the employee. There is, however, little to suggest that wages in kind played any significant role outside agricultural contexts.

The papyrological evidence does allow something of a general picture to emerge for Egypt.[242] Piece-workers and workers hired by the day were almost exclusively remunerated in money. Contracts of work rarely made provision for keep. It is also reasonable to assume that workers in *ergasteria* were paid in money, at least when the work was not connected with agricultural produce. Employees who lived in the house of their employer generally received food and clothing on top of a cash wage. Estate workers received a mixed wage, with the basic means of subsistence being provided in kind. It is probable that the provision of accommodation was largely confined to estate workers and employees who were taken into their employer's home. In these contexts the employer might also pay taxes for the employee.

This general picture is largely borne out by a detailed study of some estate accounts from the Fayum in the third century, in particular in respect of the distinction between casual labour and longer-term estate workers.[243] Casual labour, defined as labour for part of the year only, was almost exclusively remunerated in cash. By contrast, permanent year-round employees of the estate, who might be life-long retainers or contracted to the estate for a number of years, received a mixture of cash and kind and (probably) accommodation. The wheat received by these permanent employees was more valuable than the cash element of their salaries.

It may be that payments in kind were largely confined to agricultural contexts in which the worker actually needed the produce concerned for himself or his family.[244] However, this explanation is unlikely to cover the contractors (*karponai*) who provided labour for the vineyards in return for approximately a third of the freshly pressed grape juice, which was presumably then sold.[245]

A glance at a selection of evidence for wages in Egypt leaves the impression that wages in cash were considerably more common than wages in kind, although this does not amount to proof.[246] The impression does, however, gain in plausibility from the observation that even on private estates in Egypt, where one would guess that the circumstances would have been most favourable to permanent employment, there was a tendency for the greater part of the unskilled work to be performed by casual labourers paid in money, rather than by the nucleus of permanent employees.[247]

The probable dominance of cash for wages in Egypt, and the existence of cash wages elsewhere (the importance of which is harder to estimate), provide testimony to the use of coin in everyday life. Again, however, the use of kind for some portion of wages was a restraint on monetization. Even more important is the qualification that wage labour was not the dominant form of work in the Roman world.[248] Short-term hired agricultural labour was probably of importance everywhere.[249] Longer-term wage labour may have been of greater significance in areas, like Egypt, where slavery was not prevalent.[250] Nevertheless, wage labour constituted a

[239] Bonus in kind: Cato, *De Agri Cultura* 144; Rathbone, *Economic Rationalism*, 253. Cash and kind as basic wage: Hengstl, *Private Arbeitsverhältnisse*, 106–12.

[240] Wheat: ESAR II, 306–7 gives several examples from Egypt. Wine: Rowlandson, *Landholding*, 259 (Egypt). Share of crop: Cato, *De Agri Cultura* 136–7; the laconic Latin has given rise to differing interpretations: *ESAR* I, 167–8; 377; Tenney Frank, 'An interpretation of Cato, *Agricultura*, 136', *AJP* 54 (1933), 162–5; R. Goujard, 'Politio, politor (Caton, *Agr.* 136)', *Rev. Phil.* 44 (1970), 84–92; idem, *Caton, De l'agriculture* (1975), 284–6. Harvesting of dates in Arabia for surplus of crop over a fixed quantity due to owner: *P. Yadin* 21–2 (A.D. 130).

[241] Food on top of cash wage: *FIRA* III no. 150 (Dacia); P. Brunt, 'Free labour and public works at Rome', *JRS* 70 (1980), 81–100, at 90–1; *ESAR* II, 301 (Egypt); Hengstl, *Private Arbeitsverhältnisse*, 106–12 (Egypt); Goodman, *State and Society*, 39–40 (Galilee); S. Lauffer, *Diokletians Preisedikt* (1971), 118ff. ch. VII; 160ff. chs XX–XXI (*operarii* assumed to receive maintenance as well as wage).

[242] Hengstl, *Private Arbeitsverhältnisse*, 106–12.

[243] Rathbone, *Economic Rationalism*, 88–174.

[244] Mickwitz, *Geld und Wirtschaft*, 140.

[245] Rathbone, *Economic Rationalism*, 193.

[246] *ESAR* II, 301–10.

[247] Rathbone, *Economic Rationalism*, 153; 391–3.

[248] For a general account of the diffusion and importance of wage labour: M. Corbier, 'Salaires et salariat sous le haut-empire', in *Dévaluations* II, 61–101.

[249] P. Garnsey, 'Non-slave labour in the Roman World', in Garnsey (ed.), *Non-Slave Labour*, 34–47, at 42.

[250] Hengstl, *Private Arbeitsverhältnisse*; B. Adams, *Paramonē und verwandte Texte. Studien zur Dienstvertrag im Rechte der Papyri* (1964); Rathbone, *Economic Rationalism*, 88–147.

relatively small part of a workforce embracing free independent workers, slaves, and other forms of dependent labour.[251]

(d) *Credit*

Like taxation, rents, and wages, credit might be in money or in kind. The evidence from Egypt is important in giving an impression of the balance between money and kind in that province, and also in demonstrating the complexity of forms which credit might take. In the Roman world as a whole, we may examine the extent to which commodities played a part in banking, but cannot assess the importance of other forms of credit in kind.

In Egypt loans in kind might be in a wide range of produce, usually agricultural in nature, but the only important form was of corn for seed.[252] Except where seed loans were included in the terms of a tenancy, they could be expensive. Interest for the period between sowing and harvest could be as high as 50 per cent, in contrast to a legal maximum of 12 per cent per annum on cash loans. The high rates for seed loans may be explained in part by the need for storage, and by the fact that corn will have been most scarce when borrowed at the time of sowing, and most plentiful when repaid after the harvest. Nevertheless, the rates may also be a reflection of the precarious position of the farmers (presumably a good crop meant there was no need to borrow seed for the next year).

Various expedients other than simple loans were found to enable cash to be borrowed, sometimes at rates higher than the legal maximum, presumably by those who were unable to obtain ordinary loans. Types of contract were employed in which the true rate of interest could be hidden, and it is often hard to decide whether contracts were in reality concealed loans or not. Payments in advance for goods or services provide good examples. Crop sales in advance employed the language of loans, and the low prices paid imply high rates of interest.[253] Work service contracts could involve payments in advance (which in some cases had to be repaid), and some leases with rent paid in advance seem to be connected with an immediate need for cash.[254] Thus some contracts of these last two types may be viewed as 'antichretic', that is as loans in which work or the use of land or residence was given in lieu of interest.

Of the surviving documents relating to loans for the Roman and Byzantine periods, roughly 60 per cent relate to loans in money, 20 per cent to various forms of loan in a mixture of money and kind, and 20 per cent to loans in kind.[255] The evidence is mostly from the countryside. Thus simple numerical analysis may overstate the importance of loans in kind, which are not much in evidence at the nome capital of Oxyrhynchus. It should be remembered that we have next to no information about Alexandria, where money loans are likely to have been even more dominant than at Oxyrhynchus.

Banking was highly monetized. The grain officials in Egypt (*sitologoi*) may have behaved in some ways like bankers in wheat and barley.[256] They kept deposits, paid to order, made transfers, and even authorized 'payment' in distant granaries. Indeed there were documents similar to cheques drawn in grain, and credit notes for grain could circulate. However, commodities did not play any significant role in banking proper.

There is a little evidence for banks being involved in the transfer of wheat or oil in respect of loans, rents, or the state purchase of wheat, but the important point is that such operations in kind by banks were very rare.[257] Outside Egypt, indications of the involvement of banks with commodities are also tenuous. An obscure passage of Gaius states that a banker should compensate silver with silver, wheat with wheat, and wine with wine.[258] In addition, a

[251] Garnsey and Saller, *The Roman Empire*, 111–12.

[252] D. Foraboschi and A. Gara, 'L'economia dei crediti in natura (Egitto)', *Athenaeum* 60 (1982), 69–83; Foraboschi and Gara, 'Sulla differenza tra tassi di interesse in natura e in moneta nell'Egitto Greco-Romano', *Proceedings of the XVI Int. Congr. of Papyrology* (1981), 335–43; Mickwitz, *Geld und Wirtschaft*, 128; 207–25; *ESAR* II, 460–1; Rowlandson, *Landholding*, 242–5; O. Montevecchi, *La Papirologia* (1973), 229.

[253] R. S. Bagnall, 'Price in "sales on delivery"', *GRBS* 18 (1977), 85–96.

[254] Toepel, *Studies in the Administrative and Economic History of Tebtunis*, especially 130; 142–4; 178–205; 265–6; *ESAR* II, 156; 451–4.

[255] Foraboschi and Gara, *Athenaeum* 60 (1982), 70. They do not list the evidence for loans in money, so it is not possible to make separate calculations for the Roman and Byzantine periods from their published work.

[256] ESAR II, 448; Fr. Preisigke, *Girowesen in griechischen Ägypten* (1910), 131 (cheques).

[257] R. Bogaert, 'Les opérations en nature des banques en Égypte gréco-romaine', *Anc. Soc.* 19 (1988), 213–24.

[258] Andreau, *La vie financière*, 553 (Gaius, *Inst.* 4. 66).

receptum, the legal form by which a banker undertook to pay to a third party the debt of a client, could relate to objects other than coin.[259] This evidence is sufficient to put us on notice that commodities may have played a part in the activities on the fringe of banking, but the absence of other indications of such activities renders it difficult to attach any importance to them.

One should not conclude from the monetization of banking that credit in general was predominantly monetized. Bankers were in the first place money-men, and others may have provided loans in kind. We happen to know of the existence of seed loans in Syria, and there were some legal pronouncements on credit in kind, but the evidence does not exist to enable an assessment of the importance of such practices outside Egypt.[260]

(e) *Sophistication*

Roman banking may have been largely monetized, but it also betrays a distinct lack of sophistication in the use of money by comparison, say, with Italy after the commercial revolution of the thirteenth century.[261] In late medieval Italy it was possible to make payments by transfers between different banks, and both cheques and negotiable paper came into existence. Perhaps even more important was the bill of exchange, which proved vital in the development of commercial exchange in western Europe of the fourteenth century.[262] At its simplest the bill of exchange was an IOU which could be purchased in one place and exchanged for cash from a third party in another place. These facilities performed the important function of allowing money to be transferred from one place to another without the cost, inconvenience, and insecurity involved in the transport of coin.

In the Roman world, outside Egypt, there are no traces of affiliations between banks in different places. Unless this is simply a result of defective information for the other provinces, this means that, in default of any clearing system, banks could not be used to transfer funds from one place to another.[263] Perhaps even more important, although the benefit of debts might be transferred from one person to another, there were no bills of exchange and no system of negotiable paper. Furthermore, 'cheques', in the sense of orders addressed by payers to their bankers but given to the payee, are unknown outside Egypt, except for a particular form arising out of Jewish law.[264] Again it is possible that the evidence for cheques outside Egypt simply does not survive. However, the total absence of such evidence may reasonably be taken to imply that, if cheques did exist, they were not important. Even in Egypt cheques relied upon the trust of the payee (there was no relevant legislation), and there is no evidence that cheques could be endorsed so as to become negotiable. The vulnerability of banks, in which interest-bearing deposits could be withdrawn on demand and partnerships were dissolved by the wish or death of one party, cannot have been conducive to the development of complex procedures, or to the full use of such services as were offered.[265]

In the Roman world the possibility of moving funds without the physical transfer of coin was thus largely confined to the élite, who could rely on friends with widespread interests, or to those who, like governors under the Republic, could make private use of the system for the transfer of tax revenues through *publicani*.[266] Under the Principate there appears to be no evidence of private individuals taking advantage of the government's mechanism for the transfer of revenues either through provincial treasuries (*fisci*) or through *publicani*.[267]

[259] Andreau, *La vie financière*, 600–1.

[260] Syria: *ESAR* IV, 147; 227. Legal pronouncements: e.g. *C. J.* IV. 32. 23; Billeter, *Geschichte des Zinsfusses*, 288–305.

[261] Spufford, *Money*, Chapter 11 on the medieval evidence.

[262] Spufford, *Money*, 254.

[263] Affiliations in Egypt: *ESAR* II, 447; Bogaert, *Banques et banquiers*, 30. No clearing system: Andreau, *La vie financière*, 564.

[264] Egypt: R. Bogaert, 'Recherches sur la banque en Égypte gréco-romaine', in T. Hackens and P. Marchetti (eds), *Histoire économique de l'Antiquité* (1987), 49–77, at 73–7; R. S. Bagnall and R. Bogaert, 'Orders for payment from a banker's archive: papyri in the collection of Florida State University', *Anc. Soc.* 6 (1975), 79–108; Rathbone, *Economic Rationalism*, 325–6. Jewish law: Bogaert, *Banques et banquiers*, 340–1 n. 206.

[265] Bogaert, *Banques et banquiers*, 350–1; Andreau, *La vie financière*, 530 ff.; 629; 631–2.

[266] Transfers by élite: J. Andreau, 'Financiers de l'aristocratie à la fin de la République', in E. Frézouls (ed.), *Le dernier siècle de la république romaine et l'époque augustéene* (1978), 47–62, at 51–5; *Dig.* XLV. 1. 122 (Scaevola) for a loan taken out at Rome and repaid in a distant province. *Publicani*: E. Badian, *Publicans and Sinners* (1972), 77.

[267] Tax farming for indirect taxes persisted under the Principate: Brunt, *Roman Imperial Themes*, chapter 17, 'Publicans in the Principate'.

Societies create different financial structures in response to different needs. Part of the explanation for the lack of sophistication of Roman banking may be that banks were not for the most part used by the élite.[268] Some of the élite, as has been noted, were able to draw on their own influence or widespread interests, or on those of their peers, to transfer moneys. The organization of Roman business cut across boundaries of rank and status, and thus may have gone some way to make such facilities available further down the social scale.[269] The analysis of Roman banking is valuable because it demands such explanations, and for what it says about the uncomplicated needs of those who relied upon banks.

The history of banking may also offer an approach to the analysis of regional differences in the levels and sophistication of money use. A region could, of course, have an economy based on the use of money without the presence of bankers. A certain minimum amount of monetary activity must have been required before a community could provide a livelihood for a professional banker. Just as in big cities bankers could be found in the areas of greatest monetary activity, namely in the markets and harbour areas,[270] so they are more likely to have been attracted to busy towns.

Viewed in this light, the evidence from Egypt for the establishment of banks in villages can be seen as indicative of a considerable level of money use in the countryside.[271] In contexts where banking services were required intermittently, such as at fairs, bankers could put in temporary appearances.[272] Andreau has bravely grappled with the problems of the very uneven survival of the epigraphic evidence to produce some interesting observations along these lines. In Italy outside Rome bankers are found most frequently close to Rome, in ports, and in towns which held weekly markets (*nundinae*).[273] In the Latin-speaking provinces, the more Roman the character of a community (for example *coloniae*, *municipia*, and military sites), the greater the likelihood of evidence for bankers.[274] Furthermore, the level of monetary activity dictated the degree of specialization. Outside Rome, Ostia, and Portus there was a greater tendency for the roles of bankers and debt-collectors to be combined (*coactores argentarii*).[275] This type of observation shows how one might begin to identify different levels of monetary activity, although worries about inadequacies and biases in the surviving evidence remain.

The foregoing discussion has attempted to show how to proceed beyond a simple description of the Roman economy as monetized. Patterns of money use may be defined not only in respect of exchange for goods, but also with reference to taxation, rents, wages, credit, and the sophistication of finance. This approach provides an objective method to identify geographical and chronological variations, and to compare the Roman economy with other economies. As a broad generalization, the Roman world was one in which money was the normal form of exchange for goods, at least in the towns, but money use was relatively unsophisticated. Agricultural produce, particularly corn, played a significant role alongside coin in taxation, rents, wages, and credit. This need not be seen as a reaction to a lack of coinage. Various factors promoted the use of kind, such as the need of the government for corn, the consequent requirement for corn to pay some taxes, the avoidance of the unacceptable risks to farmers which would have arisen from the requirement to make fixed cash payments in certain contexts, and the basic requirements for food to consume and seed to plant. The use of money for taxation, rents, wages, and credit shows how money use was embedded in the structure of the economy, but the use of kind alongside money in all these areas acted as a brake on the level of monetization of the Roman world.

V. CONCLUSIONS

In retrospect it can be seen that the blinkers of orthodoxy concerning quantitative numismatics have led scholars to push on beyond the limits of their techniques in pursuit of general conclusions about financial and economic history. Alternative approaches to monetary

[268] See above, n. 119.
[269] On the importance of *clientela*, *familia*, and *societates* (partnerships) in business and the substantial role of freedmen, see D'Arms, *Commerce and Social Standing*, 39–45; 149–71.
[270] Above, n. 167.
[271] Above, n. 169.
[272] Above, n. 168.
[273] Andreau, *La vie financière*, 327–9.
[274] ibid., 325–7.
[275] ibid., 165; 316–17.

history have been relatively neglected. The approach adopted here is to analyse the money supply in terms of the availability of metals which could in principle be used as money, of the extent to which such metals were in fact used as money, and of how hard that money was made to work. In this way certain important developments may be identified and explained. Increases in the supply of gold and silver from booty and the mines suggest a rise in the total value of coined money from the Second Punic War until the early Empire. The probable decline in the availability of these metals in the third century provides a context for the rapid debasement, the rarity of gold coinage, and the apparent monetary chaos of that century. Consideration of the deployment of metals as money brings out the potential for a dramatic increase in the supply of coinage as a result of the creation of a regular gold coinage from 46 B.C. onwards. It also forces one to address the question of the extent to which bullion was used as money. The economic consequences of changes in the money supply depended not only on the supply of coinage, but also on how hard coinage was made to work (its velocity of circulation). In this context the development of financial structures, and in particular the availability of credit, can be seen as important determinants. This type of broad approach does not produce definitive answers, but it is fruitful in indicating possibilities and connections.

As regards the use of money in the economy, a combination of documentary and material evidence indicates, in contrast to earlier views, that the normal use of coin as a means of exchange was ubiquitous in the Roman world. That is to say that coin was used both in towns and in areas of settled agriculture, and in the 'less developed' as well as the 'more sophisticated' provinces. In that sense the Roman world is correctly described as monetized. It is more useful, however, to view monetization not as an absolute which is either present or absent, but as something which may be present in varying degrees and in different ways. The monetization of the Roman world may be described with reference to the use of money not only for the purpose of exchange for goods, but also for taxation, rents, wages, and credit, and by analysis of the sophistication of money use. The overall picture suggested here is that money was the dominant means of exchange for goods, at least in the cities, but that agricultural produce, particularly corn, played a substantial role alongside money in taxation, rents, wages, and credit. The use of money in all these areas shows how money use was embedded in the structure of the economy, and the use of kind does not need to be explained by a shortage of coin. Nevertheless, the use of kind within important areas of the economy restrained the level of monetization, and money use remained relatively unsophisticated. Approached in this broader context, monetary history can be seen to be intimately linked to other topics of fundamental historical interest. It may thus be regarded as one of the central areas of debate about the nature of the Roman economy.

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