STATE AND COINAGE IN THE LATE REPUBLIC AND EARLY EMPIRE*

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From the time of the introduction of the denarius system onwards, Roman currency gradually spread over all, or nearly all, the regions under Roman rule, in the wake of their progressive integration into the Empire. Partly, the denarius replaced previous currencies, partly it brought about the monetization of areas not yet monetized. It was therefore the most striking feature, and indeed the logical premise, of the economic unification of the Empire (in so far as one can speak of such a unification).[1] Until the Severan age, the Roman monetary system remained stable, notwithstanding the widening of the area it covered and the various changes it underwent—the introduction of new denominations and new metals, the retariffing of some elements in relation to each other, the transformation of the physical quality of the coins, for instance through debasement: in fact, there were no sudden and considerable rises of prices and Roman currency almost always enjoyed automatic confidence.[2]

The purpose of this paper is to try to argue that this very important state of affairs, namely the stability of the monetary system, was not a necessary one nor the result of chance, but was attained through an empirical understanding by the Roman authorities of some economic notions, which in turn suggested fairly effective responses to the demands of a system in which money was coinage: [3] in a word, I hope to show that there was a ' monetary policy ', intended, on the one hand, to ensure fixed relationships between gold, silver and *aes* denominations, mainly through readjustments of their intrinsic or their face value, and, on the other hand, to supply the market with adequate means of exchange, to the extent allowed by the reserves. The following account is intended to detect both these aims in the actual measures taken by the government in the course of the period between the second century B.C. and second century A.D. Though relying primarily on the evidence of the coins themselves and of their behaviour in circulation, it tries to extract a pattern of interpretation, and useful information as well, from certain scanty, but still very significant, comments in the literary sources.

According to a theory now widely accepted, put forward by the late Professor Jones in a few sentences in a couple of his papers and then more systematically by Michael Crawford, mainly in his article on ' Money and Exchange in the Roman World ', it would be legitimate to speak of a ' monetary policy ' of the Roman government only in a very limited sense: since, in Crawford's words, ' there is no reason to suppose that [coinage] was ever issued by Rome for any other purpose than to enable the state to make payments, that is, for financial reasons ', monetary policy would always have had the sole aim of allowing adequate expenditure, as in the case of debasement, or proper acquisition of income, as in the case of prevention of forgery or enforcement of the official values of the coins.[4] Even

* An earlier draft of this paper was read to a seminar in Cambridge. I should like to thank those who have helped me to improve it, in particular Prof. T. V. Buttrey, Mr M. H. Crawford and Prof. Sir Moses I. Finley. The period considered here is that chosen by Michael Crawford in *JRS* 1970, 40–6, the reasons for the choice also the same. Of course, there is no claim to have covered the whole field, or to have avoided generalities.

[1] See now K. Hopkins, in Ph. Abrams—E. A. Wrigley (edd.), *Towns in Societies* (1978), 39 f., and *JRS* 1980, 106 f.

[2] E. Lo Cascio, *MEFRA* 1980, 445 f. and references there.

[3] One can only speculate on the existence, in an only partially monetized economic system like that of the Roman Empire, of ' primitive money ' (for the concept, see P. Einzig, *Primitive Money*[2] (1976), esp. p. 309 ff.; see also F. Braudel, *Capitalism and Material Life* (1973), 330 ff.). Against a statement of Finley, *The Ancient Economy* (1973), 141, J. Andreau argues that ' l'activité bancaire... crée nécessairement un pouvoir d'achat supplémentaire ', even if it does not create materially negotiable instruments, that is even if the possibility of a direct transfer of a credit is not provided for (*ASNP* 1977, 1143). Now, it is true that the intermediary activity of a bank can produce an increase in the value of transactions (insofar as it increases the velocity of circulation of money) and that the physical quantity of money which is necessary for a given level of exchanges is therefore less than it would be in the absence of a banking system. But I know of no measures aimed at influencing the economic function of banks of deposit and credit, although more general enactments that limited hoarding or lending or obliged people to invest in land a minimum of their property (*infra*, p. 83) had obvious effects on banking activity. In any case, given the limits of this activity and given the lack of an actual ' creation of money ', it seems legitimate to leave out the whole issue.

[4] A. H. M. Jones, *The Roman Economy* (ed. by P. A. Brunt, 1974), 74, 219, 224 f.; M. H. Crawford, *JRS* 1970, 40–6; *Annales ESC* 1971, 1228 f.; *ANRW* II 2 (1975), 560 f. On a more general level, an interpretation of pre-modern monetary policies in terms of public finance is offered by J. R. Hicks, *A theory of economic history* (1969), ch. VI, esp. p. 88 f.

if we accept, however, Crawford's proposition that the function of coinage as a means of exchange, in so far as ' its use was largely limited to the cities of the Empire ', was only ' an accidental consequence of its existence and not the result of government policy ',[5] it seems to me that there is no theoretical reason for supposing that no attempt was made by the government to control, or to have an influence on, the use of coinage as a means of exchange. In other words, disinterest in the economic function of coinage is not a necessary consequence of its accidental use as a means of exchange. Moreover it does not appear to be borne out by our evidence.

I propose to undermine any interpretation of Roman monetary policy exclusively in terms of public finance, arguing that it can explain neither the stability of the Roman monetary system nor the whole range of the government's interventions, and showing that, even when the primary purpose of a single measure can easily be recognized in that it enabled the state to make its payments, this result was attained by a government aware of, and interested in, what happened to its coinage once it was in circulation.

I. THE MONETARY SYSTEM

Roman authority was always concerned to ensure the continued enforcement of the official values of its coins, even though it is probable that the first explicit ' Legal Tender Act ' was as late as the Edict of Gratidianus in 85 B.C.,[6] which presumably provided for a penalty against people refusing the coinage of the state.[7] It is worth observing that the problem was faced in response to what was going on in the market. For, first, the retariffing of the denarius from ten to sixteen asses, around the middle of the second century B.C., was provoked, as Buttrey has demonstrated, by the fact that the relationship in the market had already changed; [8] and the enforcement, by Gratidianus, of the relationship between the denarius and the new semuncial as was also a response to what was happening in the market.[9] In this context what seems to me significant is the considerable stability of the relationships between *moneta grossa* and *moneta piccola* (in the words of the Italian documents studied by Cipolla), between the coinage of big transactions and small change, after the retariffing of the denarius. In other words, what is rarely paralleled is a monetary system in which the unit of reckoning corresponds, for a very long time, to a physical coin, itself tied by fixed relationships to all the denominations in all the metals.[10] More significant, perhaps, is the stability, difficult to maintain in a system based on the contemporaneous issue of coined gold and silver, of the relationship between aureus and denarius, at least during the first two centuries of the Empire. As far as the first problem is concerned, it is not enough to argue that ' the state was always prepared to exchange silver and bronze coinage at the official rate ' ; [11] it is difficult to suppose that the relationship between aureus and as or denarius and as was ever a matter of uncertainty for a long time after the Edict of Gratidianus. Such evidence as we have on the existence of exchange rates different from the official one, between base metal and silver coinage, refers to the relationship between the silver ' main stream

[5] *JRS* 1970, 45.

[6] ibid., 47.

[7] E. Lo Cascio, *Athenaeum* 1979, 235 f.

[8] T. V. Buttrey, *The American Numismatic Society Museum Notes* 1957, 57 f.; M. H. Crawford, *Roman Republican Coinage* (1974), 612 f., 621 f. Pliny's dating of the retariffing (*N.H.* XXXIII 45) is defended by P. Marchetti, in *Les ' Dévaluations ' à Rome. Epoque républicaine et impériale* (1978), 197 f., and *Histoire économique et monétaire de la deuxième guerre punique* (1978), 174 f., 325 f., but he does not seem to have overcome the two main difficulties besetting his chronology, the appearance of the mark XVI on denarii issued around 140 B.C., which would be inexplicable if they were not contemporaneous with the retariffing, and the *progressive* abandonment of the sextantal standard in the course of the first decades of the second century B.C.

[9] M. H. Crawford, *PCPS* 1968, 1 f.; but see Lo Cascio, *Athenaeum* 1979, 215 ff.

[10] What usually happened in pre-modern economies characterized by a metallic circulating medium was the progressive appreciation of full intrinsic value coins: C. M. Cipolla, *Mouvements monétaires dans l'Etat de Milan (1580–1700)* (1952), ch. I; *Money, Prices and Civilization in the Mediterranean World* (1956), ch. III; see also F. Braudel and F. Spooner, in *Cambridge Econ. Hist. of Europe*, IV, 379 f.

[11] Crawford, *PCPS* 1968, 3.

coinage ' of Rome and the local bronze denominations.[12] The denarius is worth 18 *assaria* at Pergamum and Ephesus, but only 16 asses at Rome and in the West, probably in part because the additional value attributed to the denarius produces a profit for the town and a remuneration for the service rendered by the *trapezitai* in dealing with small change, in part because of the general acceptability of the denarius, in contrast with the local bronze denominations.[13] As to the fluctuation in the value of the aureus in Egypt, it is easily explained by the fact that, by a decision of the Romans, Egypt was an autonomous monetary area.[14]

The invariability of the relationship (and, I would say, not only the official one) between aureus and denarius may be considered in itself as evidence of an *interest* of the government in monetary stability: it is not easy to find such an invariability in other periods when gold and silver coins circulated side by side.[15] It must be pointed out that the ratio between the metals would have changed continuously, as a consequence, particularly, of the exploitation of new mines or the exhaustion of old ones, had there been no attempt at regulation by the state.[16] And a changing ratio ought to have prevented the maintenance of a fixed relationship between aureus and denarius.[17] Possible solutions were threefold: control over the supply of gold and silver (and, of course, not only to the mint); a change to some sort of ' incomplete bimetallism ',[18] through e.g. debasement of the denarius; adjustment of the weight and fineness of both the coins as necessary. I do not think that theoretical shortcomings could have been an obstacle to an awareness of these devices. Several passages in the ancient sources show an awareness of the effect that a sudden increase of the available amount of a precious metal can have on its price; [19] and there is no need to suppose that this awareness could be prompted only by a sophisticated knowledge of ' economic laws ': these are among the ' pre-scientific notions ' empirically discovered by common sense.[20]

It was easy to resort to the first device, since, by the age of Tiberius, most gold and silver mines were owned by the Emperor.[21] As to the second one, from Walker's recent

[12] *The Collection of Ancient Greek Inscriptions in the British Museum*, III 481, ed. R. Hicks (= J. R. Oliver, *Hesperia* suppl. 6, 1941, 55–85), for Ephesus; *OGIS* 484 (on which see now A. D. Macro, *Greek Roman and Byzantine Studies* 1976, 169 f.), for Pergamum. Of the two Transylvanian tablets taken by Crawford to prove that the denarius could be worth 20 and 24 asses (*FIRA* III, 157; *CIL* III, p. 953, see Crawford, *JRS* 1970, 43 n. 32), the former is too fragmentary to allow sure conclusions (J. R. Melville Jones, *BICS* 1971, 103), the latter *may* attest the particular rate of exchange of the mines coins, probably issued for exclusive use in the *metalla* (see now V. M. Simić and M. R. Vasić, *RevNum* 1977, 48 f.). The fluctuating relationship between *aes* and silver or billon coins in Egypt is a rather different problem: A. Gara, *Prosdiagraphomena e circolazione monetaria* (1976).

[13] In other words, whereas it was possible to use the denarius everywhere, without exchanging it (except for petty transactions, such as the ones alluded to in *OGIS* 484), it was perhaps not possible to use local *assaria* of Pergamum elsewhere, without being obliged to exchange them (I do not see why it should be an objection to the notion of limited legal currency for civic issues that there are bronzes with an imperial obverse and a civic reverse and bronzes with a civic type on both sides: A. R. Bellinger, in *Essays in Roman Coinage presented to H. Mattingly* (1956), 147 f.): this probably made the denarius worth more than sixteen *assaria*. That the *kollybos* is a gain for the town is explicitly stated in *OGIS* 484, lines 19 f.; that it contains a remuneration for the *trapezitai* (who exercise, probably as contractors, the monopoly of the exchange) is obvious and emerges from the whole document (the attempt of A. Gara, op. cit. (n. 12), 115 f., to deny that lines 8–11 refer to the *trapezitai* is desperate).

[14] *P. Bad.* 37 = *P. Sarap.* 90 shows, indisputably in my opinion, that the *aureus* was not tied by a fixed relationship to the tetradrachm (I accept the interpretation given by J. Guey, *Mél. Carcopino* (1966), 458 f.): it is indeed possible that we face here an extraordinary occurrence (*infra*, p. 80), since it would have been impossible to maintain the equivalence between tetradrachm and denarius (L. C. West and A. Ch. Johnson, *Currency in Roman and Byzantine Egypt* (1944), 72), had the valuation of the aureus been continuously changing.

[15] For the difficulties of maintaining a bimetallic system see e.g. K. Helfferich, *Money* (1927), 49 f., 356 f.

[16] The evidence collected by D. M. Lewis, in *Essays in Greek Coinage presented to S. Robinson* (ed. by C. M. Kraay and G. K. Jenkins, 1968), 105–10, shows the continuously changing gold-silver ratio in Athens from the middle of the fifth century to the middle of the fourth (see also W. E. Thompson, *NC* 1964, 103–23): the range of variations is not always low. We do not have comparable evidence for the period under consideration here, but the supposition seems legitimate that, even in the different situation of a big territorial empire, the range of variations would have been a wide one, unless the government intervened.

[17] Even if we admit, with Crawford, *Annales ESC* 1971, 1232, that ' free coinage ' did not exist at Rome, Gresham's law would have operated, since there was a market in uncoined precious metals.

[18] A peculiar one, if there was no ' free coinage '.

[19] [Xen.] *Poroi* 4, 10: see G. Bodei Giglioni, introd. to Xen. *de vect.* (1970), p. XLIV, p. LXXIV; Pol. XXXIV 10, 10 *ap.* Strabo IV 6, 12; Suet. *DJ* 54, 2; Jos. *BJ* VI 6, 1 (317): see Guey, art. cit. (n. 14), 472 f.

[20] Finley, *The Ancient Economy*, 20, quoting Schumpeter.

[21] O. Davies, *Roman Mines in Europe* (1935), 3; U. Täckholm, *Studien über den Bergbau der röm. Kaiserzeit* (1937), 97 f.: this is true, whatever the system of exploiting them, if the opening of new shafts was under public control.

analyses of the metal content of the denarius and from papyrological evidence we know that the face value of a silver coin did not always correspond to its intrinsic value, whereas the aureus seems always to have been a full value coin.[22] But we do not have any evidence to suggest that resort to 'incomplete bimetallism' was ever the conscious response to the difficulties of maintaining complete bimetallism. When Vespasian increased the proportion of base metal in the denarius, it is on the whole probable that he changed the system into one characterized by 'incomplete bimetallism', for the depreciation was effected by producing within the same issue, some coins with a rather low percentage of silver, some coins at a higher standard of fineness; unless we suppose that the latter were undervalued, it must be concluded that the former were overvalued.[23] But the most obvious motive for Vespasian's debasement is his being desperately short of money: [24] the Emperor was able to exploit for a while the confidence generally enjoyed by his coinage, in order to produce more coins, till Domitian had to back down, perhaps owing to the widespread discontent provoked by a denarius which was too debased.[25]

It was particularly by adopting the third device, namely the adjustment of the weight and fineness of an entire issue, that the Roman government tried, mostly with success, to counterbalance the negative effects on the coins of a changing ratio between the metals. There are fundamentally two reasons why the common explanation of debasements in terms of financial distress, such as accounts for Vespasian's depreciation and for the progressive deterioration of the silver coinage in the course of the third century A.D., cannot be generalized to all, even the smallest, adjustments of fineness during the first two centuries of the Empire. The first reason is that not all debasements occurred in periods of financial distress. The debasement of 107,[26] in the aftermath of the Dacian conquest, took place when an exceptional quantity of booty reached Rome and the exploitation of very rich mines began. As a result, the Roman mint entered a period of frantic activity, the evidence for which is the number of aurei and denarii of the last years of Trajan, much higher than that of the first years.[27] Public expenditure, after 106, was correspondingly exceptional. Unprecedented *liberalitates* followed the return of Trajan to Rome, as epigraphic and literary sources attest; and major public works were undertaken in these last years.[28] Similarly, the debasements of 148 and 161[29] occurred when it is difficult to suppose the existence of financial difficulties. The debasement of 161 was effected when Marcus and Verus could reckon upon a very rich reserve of 675 million denarii, the inheritance left, according to Dio, by Antoninus Pius.[30] The other reason why adjustments of fineness can hardly have been exclusively the product of financial preoccupations is that it would be very difficult to account for the various attempts at reversing the trend towards the worsening of the silver coinage. These attempts occurred also when there were big financial problems, as with Domitian and Pertinax.[31]

[22] D. R. Walker, *The Metrology of the Roman Silver Coinage*, I, BAR Suppl. Ser. 5 (1976); II, BAR Suppl. Ser. 22 (1977); III, BAR Suppl. Ser. 40 (1978); see E. Lo Cascio, *AIIN* 1978, 252 f.; papyrological evidence: discussed by J. Guey, art. cit. (n. 14), 449 f. (on *P. Giss.* 70, see *infra*, pp. 80–81). I think we now have clear documentary evidence of the overvaluation of a pure silver coin, the *argenteus* of Diocletian: the price of silver bullion, in the edict, was fixed at 6,000 denarii (*Edictum de pretiis*, ed. M. Giacchero (1974), 28, 9, p. 206) and there were 96 *argentei*, rated at 100 denarii each on 1 September, 301 (K. T. Erim, J. Reynolds, M. H. Crawford, *JRS* 1971, 171 f.), to the pound, the rate of overvaluation being 60%. However one reconstructs Diocletian's monetary policy, in the light of recent discoveries, I do not believe it is possible to dismiss this datum (the hypothesis of J. Lafaurie, *Rev Num* 1975, 107 f., of a radical fall in the price of gold and silver between September and November–December 301, is unbelievable). For *CTh* XIII. 2. 1 (397), see S. Mazzarino, *Antico, tardoantico ed età costantiniana* (1974), 284 f. On S. Bolin's general theory of overvaluation of ancient coins, see now Lo Cascio, *MEFRA* 1980, 449 f.

[23] Walker, op. cit., I, 87 f., 111 f.; see Lo Cascio, *AIIN* 1978, 252 f.; *MEFRA* 1980, 458 n. 44.

[24] See now Walker, op. cit., III, 115 f.

[25] Walker, op. cit., I, 96 f.; Lo Cascio, *AIIN* 1978, 256 f.

[26] Walker, op. cit., II, 7 f., 55 f.

[27] Booty: Lyd. *de Mag.* 28 = Kriton, *FGrHist* 200 F 1, corrected by J. Carcopino, *Dacia* 1924, 31 f. =*Les étapes de l'Impérialisme romain* (1961), 112 f., see now e.g. I. I. Russu, *Studii clasice* 1972, 117 f.; mines: R. P. Longden, *CAH* XI, 232 f.; output of the mint: P. V. Hill, *The Dating and Arrangement of the undated coins of Rome (A.D. 98–148)* (1970), 36 f. and App. E; Lo Cascio, *AIIN* 1978, 75 f.

[28] *Congiaria*: Chron. of 354, p. 146 Mo.; games: *Fasti Ostienses*, ed. L. Vidman, *Rozpravy československ. Akad. Věd.*, LXVII (1957), XXI, XXII = E. M. Smallwood, *Documents illustrating the Principates of Nerva, Trajan and Hadrian* (1966), nos. 21 f., p. 31; Cass. Dio LXVIII 15 (Xiph.); public works: G. Bodei Giglioni, *Lavori pubblici e occupazione nell'antichità classica* (1974), 199 f.

[29] Walker, op. cit., II, 29 f., 33 f. 57 f.

[30] Cass. Dio LXXIII (LXXIV) 8, 3 (Xiph.); compare Eutr. VIII 8.

[31] Walker, op. cit., I, 96 f., 115 f.; III, 3, 51, 117 f., 127 f.; see also E. Lo Cascio, *RFIC* 1980, 285 f.

It seems to me that monetary adjustments in the course of the first two centuries of the Empire were, on the whole, rather attempts to adjust the relation between the intrinsic values of the denarius and the aureus to the continuously changing ratio between silver and gold, sometimes to maintain a complete bimetallism, sometimes to keep the previous level of overvaluation of silver coin. The most impressive case is perhaps Trajan's debasement of the denarius in 107. It is difficult to deny that it is to be connected with the effect of the 'windfall' of Dacian gold on the ratio between gold and silver; [32] the dating of the debasement to 107 excludes the hypothesis of Jones, 'that Trajan debased the denarius to cover his heavy war expenses, and that the windfall of Dacian gold fortuitously lowered the price of gold soon after'.[33] Trajan debased the denarius by resorting again to the system, adopted by Vespasian, of producing within the same issue some coins with a higher standard of fineness and some coins with a lower percentage of silver: [34] it is indeed possible, then, that Trajan's measure aimed at preserving the existing level of overvaluation. The abrupt change in the ratio between gold and silver seems to be at the root of the other monetary measure taken by Trajan, after his return from his second victorious campaign in Dacia, that is, the calling in of worn coins.[35] The information given by Dio seems to be borne out by the evidence of the hoards, from which denarii earlier than the depreciation of Nero, with the exception of the debased legionary denarii of Mark Antony, disappear precisely during Trajan's reign.[36] The motives behind Trajan's measure have been much debated, but it would be difficult in any case to account for its effectiveness, had there been no gain for people giving better silver coins to the state against the new debased and lighter ones. The calling in was not, in fact, properly a demonetization: Crawford has argued that 'Trajan *offrit* d'échanger l'ancienne monnaie contre la nouvelle et... pour une fois les particuliers purent se procurer de la monnaie à l'atelier monétaire'.[37] To succeed, the calling in must have involved gain for people hoarding older and much better coins. Older coins were perhaps valued as bullion and not as coins, and the gain was a result of the relative appreciation of silver against gold.[38]

The different treatment of gold and silver coins in the monetary reform of Nero may have been similarly provoked by a change in the ratio between the metals. In 64 the intrinsic value of both the gold and the silver coin was diminished, but not to the same extent: the denarius was depreciated more than the aureus. Now, according to Pliny, production of gold in Dalmatia was at a very high level during the reign of Nero. And furthermore, from the analysis of the hoards it is possible to show that the volume of aurei issued was exceptionally large in the last years of Nero, after 64.[39] In these circumstances, the most likely explanation of the different treatment of gold and silver coinage in the reform is that the government wished to adjust the relationship between the intrinsic values of the coins to a new ratio between gold and silver.

Though there *may* have been important changes in the prices of the precious metals in the short run, I do not think it illegitimate to postulate a long-run trend towards the progressive appreciation of silver versus gold during the first two centuries of the Empire. It may be significant that, whereas *P. Giss.* 70, of Hadrianic date, shows a considerable overvaluation of silver coin,[40] *P. Mil. Vogl.* 102 (which can be paleographically dated to the middle of the second century or later) seems to reveal a lesser degree of overvaluation.[41]

[32] Clearly attested, in my view, by *P. Bad.* 37 = *P. Sarap.* 90: F. Heichelheim, *Klio* 1932, 124 f.; G. Mickwitz, *Geld u. Wirtschaft im römischen Reich des IV Jhdts n. Chr.* (1932), 32 f.; J. Guey, *Mél. Carcopino* (1966), 458 f. The attempt of Walker, op. cit., II, 117 n. 3, to deny the connection is not convincing: Lo Cascio, *AIIN* 1978, 88 n. 42.

[33] *The Roman Economy*, 191 n. 3 (compare 74).

[34] Walker, op. cit., II, 7 f., 55 f.

[35] Cass. Dio LXVIII 15 (Xiph.).

[36] See now Lo Cascio, *AIIN* 1978, 82 f.

[37] *Annales ESC* 1971, 1232; see also D. Sperber, *NC* 1970, 111 f.

[38] Lo Cascio, *AIIN* 1978, 88.

[39] Pliny *NH* XXXIII 67; K. Regling, *Blätter für Münzfr.* 1931, 370 f.; M. Thirion, *Le trésor de Liberchies* (1972), 43 f. and table on p. 47.

[40] Guey, art. cit. (n. 32). 449 ff. I assume that Egyptian currency was convertible into Roman.

[41] D. Foraboschi and A. Gara, *CE* 1976, 169 f. It is true, however, that we cannot say, with absolute certainty, whether this document is prior to the great debasement of Septimius Severus: M. Vandoni, *Acme* 1956, 27 f. = *Papiri dell'Università degli Studi di Milano*, II (1961), 191 f.

The progressive appreciation of silver therefore might account for the progressive debasement of the denarius during the second century.[42]

The problem of changing metal prices may also have affected the base metal coinage, even if to a lesser extent: the issue of base metal denominations cost more in proportion to the value of the individual coin and that must have meant, in any case, a higher rate of overvaluation; moreover, the percentage of base metal coinage in the circulating medium was not substantial, in terms of value, especially once a regular issue of gold coinage had begun, and the interest in it of the Roman government would have been correspondingly lower. However, attempts to adjust the nominal value of the coins to that of the metals used to produce them—and that precisely in order to avoid confusion in circulation—seem to have been made not only, as one would expect, when base metal coinage still played a major role in the monetary system, but also when it had become genuine 'small change'. I shall take two examples of measures taken by the government in monetary matters, which *may* be interpreted in this way.

It is on the whole probable that the Macedonian gold and silver mines were closed in 167 for other reasons, in addition to those given by Livy and Diodorus,[43] and it has been pointed out that there must have been a connection between the closing of the mines and the suspension in the production of silver coinage at Rome, one or two years before:[44] the latter measure, according to Crawford, would have been 'not unlike a sumptuary law', and 'smacks of nostalgia for a simpler past and of disapproval of the growth of luxury', and the former would have been 'in part a product of the same climate of opinion'. I am not sure, however, that the connection between the two measures should be seen in this way. There is reason to suppose that we face here again an attempt at achieving monetary stability: a conspicuous influx of gold and silver could have changed the ratio between the metals so radically, that it would have been impossible to maintain the official relationship between the denarius and the as.[45] The closing of the mines suspended the flow of silver to the market through whoever operated them,[46] whereas the interruption of silver coinage production, connected with a continued production of bronze,[47] meant that the minting activity of the state would not contribute to a change of the ratio between silver and bronze.

Augustan policy in relation to the base metal coinage seems to have originated in the attention paid by the government to the movements of metal prices. Between 30 and 20 B.C., after an interruption of many decades, asses were revived and were now struck at a standard slightly below semuncial. The base metal currency at that time was composed of asses struck as much as a century earlier at a higher or much higher standard. But the new lighter asses did not drive out of circulation the older and heavier ones; instead, many of the latter were halved. A plausible explanation of both the phenomena—the continued circulation of the old asses and the frequent practice of halving them—was suggested by Buttrey, followed by Crawford.[48] In the words of the latter, Augustus 'allowed or encouraged or ordered uncial and heavier asses to circulate as dupondii'. It would be important, for our purposes, to decide whether, specifically, Augustus 'allowed' or 'encouraged' or 'ordered' the revaluation of the old asses; Crawford advances arguments for accepting the last possibility. But even if we admit that the authorities simply allowed an unofficial revaluation, this would have been the most effective way of producing asses at a much lower intrinsic value without causing confusion and without obliging people to accept an unrealistic equivalence of value between old and new coins. As to the lowering of the standard, one can assume that

[42] It is indeed possible that the appreciation of silver was in part neutralized by the lower velocity of circulation of gold pieces, compared with silver ones: different coined metals, as they have different economic roles, circulate at different velocity (see the remarks of F. Spooner, *L'économie mondiale et les frappes monétaires en France 1493–1680* (1956), 68 ff.).

[43] Livy XLV 18, 3–5; 29, 11; Diod. XXXI 8, 7: see now G. Calboli, intr. to Cato, *pro Rhodiensibus* (1978), 150 f., who believes Livy: but if Livy is reliable over the motive, why were only gold and silver mines closed?

[44] M. H. Crawford, *EconHistRev* 1977, 44 f. What follows can be true only if one accepts the absolute chronology established by Crawford in *Roman Republican Coinage*, I.

[45] L. Perelli, *RFIC* 1975, 411 f., plausibly argues that the closing of the mines, as well as the measures attested by Pliny *NH* III 138 and XXXIII 78, were prompted by the wish to avoid an excessive depreciation of gold and silver and a rise in prices.

[46] Whatever the system employed by the state in exploiting the Macedonian mines: J. S. Richardson, *JRS* 1976, 143 f.

[47] Crawford, *RRC*, 47 ff., 229 f.

[48] T. V. Buttrey, *AJA* 1972, 31 f.; Crawford, in *Les 'Dévaluations' à Rome*, cit. (n. 8), 151, 154 f.

its aim was just that of striking asses using less metal. But we have to notice that the unitary value of the base metal coinage was so low that the profit would have been very small, and that Augustus had no financial problems at that time: he was enormously rich. This fact may suggest, I think, a more probable explanation of the adoption of a new standard. We know from Suetonius, Cassius Dio and Orosius that the influx of precious metal after Actium allowed a substantial increase in the number of coins issued (presumably of gold and silver coins). This increase, according to our sources, brought about a rise in prices.[49] Such a flow of gold and silver coins must have affected the ratio between gold and copper and between silver and copper; and it might have threatened the preservation of the relationship between the various denominations. Once copper became more valuable in terms of gold and silver, if a higher standard were kept, the government would have suffered a loss in issuing its copper coins and these coins would have disappeared from circulation. The revaluation of heavier asses as dupondii, too, may have been prompted by the rising price of copper.[50]

Crawford says that the Augustan reform ' displays a . . . rare awareness of the consequences of thoughtless manipulation of the monetary system '.[51] I think we can say more confidently that the revaluation of the old asses shows an autonomous interest in the existence and working of coinage as a means of exchange. Augustus did not gain anything by allowing or encouraging or ordering uncial asses to circulate as dupondii: of course, he made his lighter asses more acceptable by this device. But that cannot plausibly have been the unique aim of the revaluation. By granting a small gain to the public, Augustus was able to assure the survival in circulation of existing coins rather than let them disappear into the melting pot; moreover, he was able to double in value the amount of small change, at a stroke.[52] I suspect that precisely this was the genuine aim of the measure.

II. THE MONEY SUPPLY

By listing the various ' causes ' of currency depreciation in Medieval Europe,[53] Professor Cipolla has suggested the range of possible purposes of a monetary adjustment in a system in which money is coinage and his list therefore may be considered relevant in discussing the Roman government's behaviour.[54] Among these various ' causes ' particular emphasis is laid on ' the long-term increase in the demand for money, resulting from the long-term growth of population and/or of income and/or of the " monetization " of the economy '.[55] I believe it is worth considering the possibility that even in the Roman world a depreciation, or more generally a monetary measure, was sometimes a response, a conscious response, to a ' long-term increase in the demand for money '. Of course, to consider this possibility is to consider the possibility of decisions prompted by an independent interest in the circulating medium. Such an interest seems to be revealed, as we have seen, by the Augustan revaluation of old asses: after many decades in which there had been almost no

[49] Suet. *Aug.* 41, 2; Cass. Dio LI 21, 5; Oros. VI 19, 19: the attempt of C. Rodewald, *Money in the Age of Tiberius* (1976), 7, to dismiss this evidence carries no conviction: Lo Cascio, *AIIN* 1978, 250.

[50] According to Crawford, in adopting the new standard, Augustus may have been ' influenced by the fact that the Lex Papiria was, as it were, the last law on the statute book ': I cannot see why this could have been of importance, given the long interval between the two measures. Furthermore, it is worth observing that the standard was not precisely the same as that enforced by the Lex Papiria, that a new alloy was used for producing *sestertii*—formerly a silver denomination—and *dupondii*, and that copper was only used for the as and its fractions. In establishing a new monetary system, there would have been no need to refer to the last law on the statute book.

[51] *Les ' Dévaluations ' à Rome*, cit. (n. 8), 155.

[52] This point is rightly made by Rodewald, op. cit. (n. 49), 140, although he objects that ' prices would probably have been pushed up as a result ': but prices in gold and silver coins had already gone up (see *supra*, n. 49, and *infra*, p. 86) and the addition to the circulating medium, prompted by the revaluation, would not have been high, given the low value of the individual coins.

[53] *EconHistRev* 1963, 413 f.; *Le avventure della lira*² (1975), 59 f.

[54] Cipolla warns that ' the circumstances listed . . . can reasonably be defined as ' causes ' only in an *ex-post* sense. *Ex-ante*, they are merely sundry types of problems which a given society may find itself called upon to solve, problems for which the depreciation of the currency is certainly not the only possible solution '. This is why I would speak rather of the *purposes* than of the *causes* of a particular monetary readjustment.

[55] The other ' causes ' listed are: ' the growth of government expenditure and deficits ', ' the pressure of social groups in the direction of profit-inflation '; ' disequilibrium in the balance of payments '; ' the mismanagement of the mints '; ' the wear of the existing stock of coins in circulation, occasionally aggravated by the practice of clipping ', ' fluctuations in the market rate of exchange between gold and silver '. All of them, except the second, have been suggested as responsible, alone or as contributory causes, for individual cases of depreciation in the ancient world too.

production of base metal coinage, a measure that provoked the survival in circulation of existing means of exchange and indeed the easy doubling of their value may have been the response of an alert government to a shortage of small change. But there are also other puzzling monetary measures which seem to find a plausible justification if they are considered as responses to this particular ' demand ', the ' demand ' for small change.

The first reductions in the weight of the as (and of its fractions) were of course a result of financial difficulties: this is stated very clearly by Pliny.[56] But it is probable that the final one did not have such a motive behind it. Before succeeding with Augustus, as we have seen, this final reduction was attempted for the first time in the 90s B.C. Pliny relates that it was introduced by a Lex Papiria, and some anonymous bronzes bear a legend, which is probably to be expanded as *lege Papiria de assis* (or *de aeris*) *pondere*.[57] Crawford attributes the law, on the basis of various considerations and of the numismatic evidence, to 91 B.C.[58] However, this year seems improbable, since we do not have clear evidence of a Papirius as a magistrate in 91.[59] It is indeed possible to date the law to 92, or to 90 or to 89, in each of which years there was a Papirius as tribune.[60] To decide between these years is evidently of importance for our purposes: if the law belongs to 90 or to 89, one may attribute to it the aim of providing more monetary resources in times of high expenditure. If it has to be assigned to Cn. Papirius Carbo, tribune in 92, such an aim would be much less likely. But even if we accept that the law was passed in 90 or 89, it would nevertheless be difficult to argue that financial distress had caused it. The issue of bronze coinage was not substantial in these and the following years; [61] moreover, the unitary value of a single piece was so small that even halving the weight would not have allowed an important increase in public expenditure. It seems to me that it is necessary to look elsewhere for an explanation of the measure. And I cannot find a better motive for it than the following: the increase in production allowed by the weight reduction could have been a device for providing more small change.[62] Of course, one has to ask a more general question: why the Roman government issued small change. It is, in my view, difficult to account for the continued issue of base metal coinage in a wide range of denominations during the early Empire, if the only motive was that the state had to make up sums of money including odd fractions of the as for its payments.[63] But base metal coinage is not the sole controversial point. Two cases of revival of small silver denominations may again be understood as an attempt to meet a particular ' demand ' of the market: the revival of the silver quinarius and of the silver sestertius in the Late Republic.

The quinarius was struck again at the very end of the second century B.C., after a long interruption. And it was struck with the types of the victoriatus, a silver denomination which had not been issued for a long time and whose original relation to the denarius system is unclear. Using the types of the victoriatus for the new silver quinarius was a device, as Crawford has shown, to establish its equivalence with old victoriati still in circulation, rated now, at the end of the second century, at half a denarius. The connection of the new quinarius with the victoriatus would explain, according to Crawford, the revival of the quinarius: this would have been struck again in order to buy supplies and pay recruits from an area such as Gallia Cisalpina, accustomed for decades not only to the circulation of the victoriatus but also to considering it a unit of reckoning.[64] It seems to me that this explanation fails to take into account the fact [65] that the revival of the quinarius was followed, after

[56] *NH* XXXIII 44. That monetary readjustments, before the semuncial reduction, were a device to face increasing state expenditure, is also the conclusion of Marchetti's wholly different reconstruction of the early phases of the denarius coinage (see *supra*, n. 8).

[57] XXXIII 46: Crawford, *RRC*, 339; 611 n. 11.

[58] *NC* 1964, 142; *RRC*, 77, 596, 610 f.

[59] Cn. Papirius Carbo surely held his tribunate in 92: G. V. Sumner, *The Orators in Cicero's ' Brutus ' : Prosopography and Chronology* (1973), 117 f.; H. B. Mattingly, *NC* 1977, 203 n. 23; Lo Cascio, *Athenaeum* 1979, 227 n. 55.

[60] Broughton, *MRR* II, 18 n. 5; 26; 30 n. 8; 34.

[61] *RRC*, 596.

[62] Lo Cascio, art. cit. (n. 59), 227 f.; analogously Ch. T. Barlow, *AJPh* 1980, 203.

[63] As Crawford believes: *JRS* 1970, 47 f. And that motive cannot explain why individual communities under Roman rule went on issuing their subsidiary coinage: I do not believe that civic patriotism is the sole justification. Even if we assume that local authorities derived income from minting (S. Bolin, *State and Currency in the Roman Empire to 300 A.D.* (1958), 244; see *supra*, n. 13), this income would have paid for the service of providing small change.

[64] *RRC*, 628 f.

[65] Nothing may be inferred from the presence of a halved denarius in the Maserà hoard: M. H. Crawford, *Roman Republican Coin Hoards* (1969), no. 162. The Pachino hoard (no. 151) contains denarii which are both halved, and carelessly broken.

a decade, by the revival of the sestertius, through the same *lex Papiria* which lowered the weight standard of the as.[66] The revival of the sestertius cannot be plausibly justified,[67] if one does not admit that its aim was to ease commercial transactions, by supplying a denomination not struck for a long time.[68]

Another case of depreciation may have been a response to a more general ' increase in the demand for money ': the monetary reform of Nero. I have said that the different treatment of gold and silver coinage was probably the result of the relative appreciation of silver against gold. But there is something else that is uncertain and much debated: why the depreciation also affected, if to a lesser extent, the aureus. The explanations put forward even recently are very disparate and there is no need to rehearse them here.[69] But there are hints, in some of the more recent treatments of the subject, that the reform was an attempt to meet a ' long-term increase in the demand for money '. Kunisz writes that ' il semble... que la cause véritable de la réforme monétaire de Néron soit liée à l'évolution de la vie économique de l'Empire '.[70] Mary Thornton has argued that the monetary measure, which was paralleled by a big programme of public expenditure, was a far-sighted (and successful) attempt at remedying general stagnation. The increase in the output of the mint that was permitted by the reform allowed an increase in public expenditure, working as a sort of ' deficit spending ': the greater demand for commodities brought about an increase in ' real income ' and not inflation, since there were unemployed resources.[71] Whatever our judgement may be on such an impudently modernizing view, I think that there is some truth in this statement, as also in that of Kunisz's. Hoard evidence seems to suggest that the adjustments of both the gold and the silver coinage were so calibrated as to allow a more substantial issue of coinage and, at the same time, to avoid an abrupt and general disappearance into the melting pot of earlier and better coins.[72] But may we say that this was a *conscious* response to an increase in the demand for money ? I would notice that the conditions under which such an increase occurs may have been there, during the decades before the reform. We can only conjecture a growth of population, but a growth in income and in the ' monetization ' of the economy are the probable result of a long period of internal peace with the likely development of commercial activity and the progressive assimilation of new areas into the economic and monetary system of the Empire. If the state's expenditure had been rigidly limited during this time, by the level of its ordinary income, there would have been no increase in the quantity of currency available, to keep pace with an increase in production for the market. Consequently there would have been a downward trend in commodity prices and a progressive appreciation of money.[73] But was there such a limitation in public expenditure in the decades before 64 ? The evidence of the hoards, used by Kunisz in order to show a limited production of *new* coin, can be interpreted in more than one way.[74] But we have other evidence on public expenditure. Tiberius is censured for his stinginess. In the first year of the reign of Caligula, there would have been a remarkable increase in public expenditure, if we can believe Suetonius, but this sudden and temporary increase was followed by a period of confiscations, sales of imperial properties, reduction in expenditure

[66] Crawford, *RRC*, 77 f., 338, 341, 611.

[67] H. Zehnacker, *Actes du 8ème Congr. Intern. de Numismatique, New York 1973* (1976), 384, bases much of his argument, with which in general I agree, on the Pachino hoard.

[68] See also Zehnacker, ibid., 386. The fact that issues of silver sestertii, after the Lex Papiria, were very few and sporadic, does not reveal anything about the aim behind their revival.

[69] For a recent survey, see L. Perelli, *RSI* 1975, 726 ff.; now Lo Cascio, *MEFRA* 1980, 445 f.; D. W. MacDowall, *The Western Coinages of Nero*, Num. Notes and Monographs, no. 161 (1979), 135 f.

[70] A. Kunisz, in *Les ' Dévaluations '*, cit. (n. 8), 92; *WN* 1976, 129 ff.

[71] M. E. K. Thornton, *TAPA* 1971, 621 f.; *ANRW* II 2 (1975), 149 f.

[72] *MEFRA* 1980, 455 f.

[73] I am not sure that Crawford is right in assuming (*ANRW* II 2 (1975), 591) ' that in a world where a precious metal coin was a piece of bullion an increase in the supply of currency did not necessarily lead to inflation, since there was also an apparently insatiable demand for objects of precious metal and coin could be and was made into jewellery '; but even admitting this, if jewellery could not be made into coins (as Crawford believes, see *supra*, n. 17), one has to postulate a deflationary trend, when market production increased more than the supply of coinage: an increase in the velocity of circulation is improbable, if there is no improvement in financial and commercial techniques or in means of transport. Of course, in the long run, there are several ways in which an economic system can adjust itself to a disproportion between volume of transactions and quantity of money (or there can be ways in which public authority reacts to it, apart from currency depreciation, see Cipolla, art. cit. (n. 53), 417 f.), but the most immediate result of this disproportion will be a change in the level of prices.

[74] *AIIN* 1978, 85 n. 38.

on veterans and new taxes.[75] There was substantial public expenditure under Claudius; but it was made possible by a rationalization of financial and fiscal administration and by confiscations. If expenditure increased, the state's income increased as well, which meant that more money was withdrawn from the economic system.[76] We may conclude that the conditions under which disequilibrium could be created between an increase in production and in the 'monetization' of the economy on the one hand and a quantitatively fixed currency on the other hand probably existed in the decades before 64. Now, the problem is whether this disequilibrium may plausibly have prompted actual monetary measures, like the reform. We have to establish how an increase in the demand for money could be understood and conceptualized by the issuing authority, which means that we have to discover what the actual political goals were that made it convenient to satisfy this demand. In other words, we have to single out the negative effects that failing to satisfy this demand could provoke at different levels: economic, social, and political.

Now, what were these negative effects? Let us take military pay: if military pay could not be adjusted downwards, a fall of prices was equivalent to its rise in real terms. Or take taxation: if its level could not be adjusted downwards, a trend of deflation meant its burden becoming heavier in real terms; that was perhaps the reason why precisely during the reign of Tiberius there was such widespread discontent over the burden of taxes in Achaia and Macedonia, in Gaul, in Judaea, in Syria. The shortage of liquidity provoked a rise in the rates of interest: the *gravitas faenoris* in Gaul was one of the reasons for the resentment which led to the rebellion of Florus and Sacrovir in A.D. 21.[77] But, above all, in times of crisis, lack of liquidity would affect not only the world of production and exchange, but even financial relationships among the aristocracy. We know of financial crises arising in the Late Republic and Early Empire: in 89–86, in 63, in 49–44 B.C. and in A.D. 33, which were determined, at least partially, by an *inopia rei nummariae*, by a *caritas nummorum*.[78] In time of crisis, lack of liquidity brings about a sharp rise in the rate of interest and a fall in land prices, and it becomes difficult to repay debts. The connection between quantity of money, level of the rates of interest and land prices was already realized in the Ciceronian age, as Nicolet has shown: the 'law of Bodin', the basis of the modern 'quantitative theory of money', had been 'discovered' by the contemporaries of Cicero, by looking at what happened during these crises. And it is not by chance that, in his polemic against Malestroict about the causes of inflation in sixteenth century Europe, Bodin referred precisely to certain passages in the literary sources on the Late Republic and Early Empire.[79]

Some of these passages show, indisputably in my opinion, that the Roman authorities *tried* to remedy these negative effects by various measures, whose aim was to increase, at least in the short run, liquidity. As Crawford puts it, the possible ways of increasing liquidity were five: to increase issues of new coins, to accord loans or subventions, to limit hoarding, to forbid the export of coinage, to oblige people to invest in land. Crawford excludes the possibility that the Romans ever resorted to the first device; as to the second, he thinks that the state intervened to lend money during the Empire, when this function of credit 'ne correspondait pas à un réel besoin'. With regard to the measures which limited hoarding, he says that that taken by Caesar in 49 was not effective and was abandoned, since it would have been impossible to discover those contravening it, without the use, which Caesar did not encourage, of informers. In fact, Tiberius used informers when he re-enacted the law: and the re-enactment was devised in order to seize the properties of the rich. Further, the cases of prohibition of the export of coinage relate to the specific problem of the *aurum Iudaeorum* and have nothing to do with a general interest of the government in keeping high the degree of liquidity. Finally, the Caesarian law which compelled people to invest a minimum amount of their property in Italian land was also ineffective, for the same reason

[75] Suet. *Tib.* 46–9; *Gai.* 37, 39, 40 f., 44; Cass. Dio LIX 21, 5. Even if Frank's basic arguments in his use of numismatic evidence are wrong (Rodewald, op. cit. (n. 49), 8 f.), I believe it legitimate to assume that public expenditure was very low during the reign of Tiberius: *JRS* 1978, 201 f.; *AIIN* 1978, 247 f.

[76] Frank, *ESAR*, V, 40 f.

[77] Tac. *Ann.* I 76; II 40, 42; A. Grenier, *REL* 1936, 373 f.; *ESAR*, III, 514 f.; A. J. Christopherson, *Historia* 1968, 354 f.

[78] C. Nicolet, *Annales ESC* 1971, 1212 f.; see also M. W. Frederiksen, *JRS* 1966, 132 f.

[79] Nicolet, loc. cit.; on the polemic, see e.g. Spooner, op. cit. (n. 10), 82 f.; P. Vilar, *Oro e moneta nella storia* (1971), 113 f.

as the measure on hoarding: it needed the intervention of informers. When informers became active the law was *de facto* revived, thus producing the crisis of 33.[80]

It seems to me that, whatever the mechanisms at work in the crises of 49–44 B.C. and A.D. 33, whatever conclusions we draw from what Cicero says about the *aurum Iudaeorum*, the two Caesarian measures, on hoarding and on investment in Italian land, show that the necessity of keeping high the degree of liquidity was a necessity felt by the Romans and one that the authorities considered worth meeting. Crawford says that these measures were ineffective, which is possible. But that is not the important point here: the point is that they were thought of as effective ways of satisfying, in time of crisis, a 'demand for money', and that there is no other way of explaining them unless one does accept that this was their end. When the Roman government was able to meet this demand in a more effective way, it did so: and that happened, for example, when the acquisition of booty allowed the production of large quantities of new coinage. It is well known that this occurred after Actium: Cassius Dio, Suetonius and Orosius, as we have said, narrate the effect of the increase in the quantity of money issued on the rate of interest and on commodity prices.[81] The passage in Suetonius is particularly interesting, since it regards these effects as a form of Augustus' *liberalitas*, just like interest-free loans later granted by the Emperor: '*Liberalitatem* omnibus ordinibus per occasiones frequenter exhibuit. *Nam et* invecta urbi Alexandrino triumpho regia gaza tantam copiam nummariae rei effecit, ut faenore deminuto plurimum agrorum pretiis accesserit, *et* postea, quotiens ex damnatorum bonis pecunia superflueret, usum eius gratuitum iis, qui cavere in duplum possent, ad certum tempus indulsit'. It seems to me that this passage demonstrates the awareness of Suetonius and, it would seem legitimate to say, of the authorities of an aspect of economic policy which modern definitions consider characteristic of monetary policy: the control of the money supply, in order to have a positive influence on production and exchange.[82]

Even with Caesar it is possible that an attempt to increase liquidity was made beyond the palliatives cited above. Production of gold coins becomes quantitatively remarkable with the issue of Hirtius in 46.[83] To put into the economic system coined gold, and now with a fixed relationship with silver coins, could have been in essence a way of meeting a 'demand for money'.

To sum up, the understanding of the connection between quantity of money, level of rates of interest and prices seems in the Roman world to have suggested reasonable, though not always effective measures to avoid intolerable loss of liquidity. The limitations of government action were not mainly a consequence of theoretical shortcomings, but arose whenever metal reserves could not be easily increased.

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[80] Crawford, *Annales ESC* 1971, 1228 f.; for the credit function performed by the Roman state, E. Gabba, in *Studi Fanfani* (1962), I, 61 f.; Caesarian measure on hoarding: Cass. Dio LXI 38, 1–3; re-enacted by Tiberius: Suet. *Tib.* 49, 2; prohibition of the export of coinage: Cic. *pro Flacco* 67; *in Vat.* 12; Caesarian law *de modo credendi possidendique intra Italiam*: Tac. *Ann.* VI 16; Cass. Dio LVIII 21; Suet. *Tib.* 48, 1; see Rodewald, op. cit. (n. 49), 1 f., with my remarks in *AIIN* 1978, 243 f.

[81] *Supra*, pp. 81–82.

[82] See e.g. G. Bannock, R. E. Baxter, R. Rees, *The Penguin Dictionary of Economics* (1972), 286; A. Seldon, F. G. Pennance, *Everyman's Dictionary of Economics*[2] (1976), 237.

[83] M. Bahrfeldt, *Die römische Goldmünzenprägung* (1923), 30.