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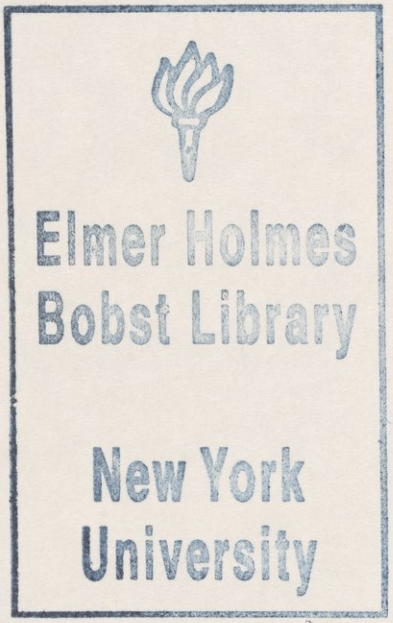
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CURRENCY AND INFLATION IN FOURTH CENTURY EGYPT

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Number 5

CURRENCY AND INFLATION IN FOURTH CENTURY EGYPT

by
Roger S. Bagnall

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ROGER S. BAGNALL

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CURRENCY AND INFLATION IN FOURTH CENTURY EGYPT

Roger S. Bagnall

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PREFACE

Books, like children, can be unplanned. Seven years ago, P.J. Sijpesteijn and I published an article on "Currency in the Fourth Century and the Date of CPR V 26" (*ZPE* 24 [1977] 111–24), but I had no intention then of pursuing the subject in any more systematic fashion. Nor, when Michael Bates of the American Numismatic Society invited me to take part in a panel on Egyptian monetary history at the 1981 meeting of the American Research Center in Egypt, did I anticipate producing more than a short report on recent research. Some accidental discoveries set me on a different path, however, and when Manfredo Manfredi invited me to spend part of May, 1981, as a visiting professor at the Istituto Papirologico "G. Vitelli" of the University of Florence, the occasion of a more extended treatment of the subject offered itself. I benefited from discussion both at ARCE and in Florence, and I take this opportunity to thank Dr. Bates and Professor Manfredi for the stimulus of their invitations. Even so, this might have remained an article were it not for K.A. Worp's insistent pleading that I not shrink from treating this or that aspect of the subject; by the time I had done so, I had nothing that a journal of today would recognize as an article. The monograph which resulted is rather technical, but I hope that its lists and conclusions will both be of use. Much more could be said about the broader context of the economic phenomena involved in the movement of price levels, but that would have taken this study far beyond its focus. I hope to provide that context in a future, more general, work on society and economy in the fourth century.

As usual, I owe a great deal to Dr. Worp's eye for aberrant detail and wide knowledge of fourth century documents. I also have a debt of gratitude to Jean-Michel Carrié and Alessandra Gara for their criticisms on various points. On the numismatic side, I have benefited from advice and criticism from William E. Metcalf of the American Numismatic Society. Three referees for the American Society of Papyrologists have helped by their comments to make the presentation clearer. Even more than is usual, however, I must emphasize that the responsibility for the views expressed here is mine.

Columbia University
January, 1985

Roger S. Bagnall

PLATE 1

OBVERSE

a.

b.

c.

d.

e.

REVERSE

a.

b.

c.

d.

e.

a. Diocletian, nummus, 295–296. *RIC* 6.18a

b. Maximian, nummus, 295–296. *RIC* 6.18b

c. Constantius II, nummus (AE3), 348–350. *RIC* 8.52

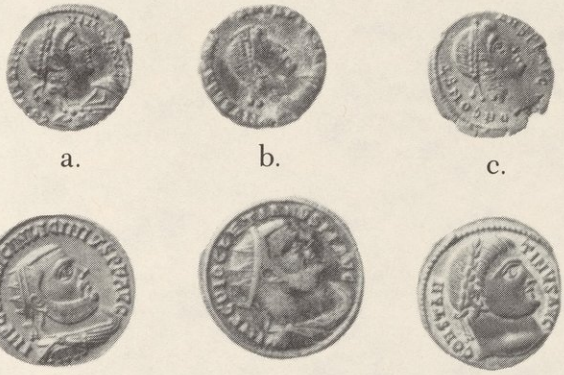
d. Constantine I, nummus, 317–320. *RIC* 7.22

e. Constantius II, nummus (AE3), 351–355. *RIC* 8.72

All coins in the collection of the American Numismatic Society.
Photographs, courtesy of American Numismatic Society.

PLATE 2

OBVERSE



a. b. c.

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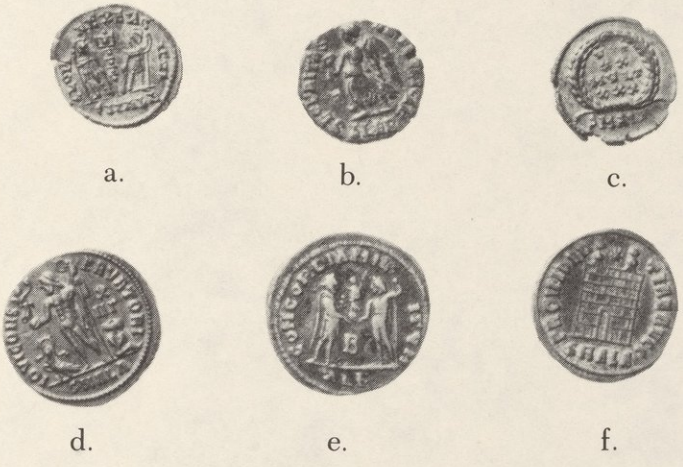
REVERSE



a. b. c.

d. e. f.

a. Constantine I, nummus, 335–337. *RIC* 7.65

b. Valentinian I, nummus (AE3), 364–375. *RIC* 9.3a, 5a

c. Constans, nummus, 347–348. *RIC* 8.34

d. Licinius I, nummus 321–324. *RIC* 7.27

e. Diocletian, radiate fraction, 296–297. *RIC* 6.46a

f. Constantine I, nummus, 325–326. *RIC* 7.34

All coins in the collection of the American Numismatic Society.
Photographs, courtesy of American Numismatic Society.

CHAPTER 1

INTRODUCTION AND METHODOLOGY

The basic outline of Egypt's monetary history from Diocletian to Theodosius has become much clearer in recent years, thanks in part to the publication of new evidence, both that clearly applicable to the Roman Empire as a whole and that specifically relevant to the Egyptian situation but of uncertain usefulness for the rest of the empire. Most of this evidence concerns the Diocletianic reforms and the first two decades of the fourth century. The evidence comes from all of the relevant sources—papyri, inscriptions, and coins. Interpreters of the new evidence have not been lacking, and the bibliography has grown to considerable proportions.[1] Much of it seems unsatisfactory to me, partly because the numismatists (who have produced most of it) have often been insufficiently well-grounded in the use of epigraphical and papyrological evidence, and have at times disregarded the sense of the texts in order to support a theory itself only dubiously grounded on the numismatic evidence. The discussion has also often ignored the other Egyptian evidence from the fourth century. The present book is essentially the attempt of a papyrological historian to summarize the progress which has been made, to advance the study of the papyri, and to make some proposals about the relationship of the papyri and the coins.

In a recent summary of the state of scholarship on this subject, Alan Bowman pointed out very clearly the dilemma of the student who would deal with the subject: it is frustrating (and often productive of bad work) to combine the results of two disciplines which have still far to go separately in creating a firm basis for work; and yet the desired "perfection of method *is* merely an ideal and we are frequently faced with the difficulty of effecting a *rapprochement* between two (or more) different sets

[1] Modern works are cited according to the bibliographical list at the end. These are selected almost entirely from the publications of the last decade and a half: as Ruschenbusch (1977, 193) remarked, the discoveries of the 1970s in this field have settled several old controversies and made much of the older literature unprofitable reading; much less is it worth criticizing views based on evidence greatly inferior to what we have now. Much fuller bibliography can be found in the notes of the works cited; a summary of the controversy is found in *Survey of Numismatic Research 1972–1977* I (Berne 1979) 201–2, by P. Bastien.

of data which are themselves imperfectly understood."[2]

The principal aim of this book is to define more precisely the changes of price level as they are seen in the papyri, that is, as quoted in the accounting units in use in the period. These changes in price levels, can be shown, I believe, to be direct reflections of the monetary history of the fourth century. I have tried to trace these connections in some detail, especially for the first half of the century, when the "silver" currency is dominant and the evidence comparatively abundant. The term "inflation" has traditionally been used for this rise in prices, and I use it in the nontechnical sense in which contemporary English mostly uses it. One of the results of this study is the view that the increases of prices are principally a result of changes in the metallic content of money and not an independent phenomenon. I should emphasize that in numismatic matters I am dependent on the work of others and make no claim to originality.

An attempt to chart the course of price levels in the fourth century is neither new nor without hazards. The importance of prices as an indicator of date in documents was recognized years ago by Wessely (Wessely, 1905), and all economic historians who have concerned themselves with this period have presented versions of the course of inflation. The papyri of the fourth century present on the face of it a spectacle of phenomenal decline in the value of copper currency. In the course of time this trend produced figures which appear ludicrous, especially to the papyrologist used to the price levels of Roman Egypt.

The results of my own study are in a broad sense consonant with this picture, but they disagree in most particulars with those of previous writers. Mickwitz, for example, in a work still widely cited as standard, enumerated the items of fourth-century evidence known to him and constructed a logarithmic graph of the course of inflation as he saw it. His scheme, which in essence described a very swift and steep inflation, also included two periods of "deflation", in which Mickwitz thought that the value of copper currency had reversed its downward course for a time. These were 314–324 and 341–345 (Mickwitz 1932, 98–114). The book on currency now most commonly cited, West and Johnson's book of 1944, also argues for two periods of "deflation", about 316 and 338. These are close to Mickwitz's, but based on somewhat different evidence (West and Johnson 1944). Rémondon's more recent article shows one putative period of deflation, around 316 (Rémondon 1957, 130–46).

In what follows I have mostly made no attempt to reconcile my findings with those of my predecessors or to justify the differences. This procedure may seem high-handed, but the papyrological evidence for our subject published in the last quarter-century is so substantial that it would

[2] Bowman 1980, 24.

be pointless to belabor differences of opinion resulting from material unavailable to earlier scholars. The reader may judge from the lists in Chapter 9 how much is new since these standard treatments. Of the sixteen wheat prices listed, for example, half are from publications of the last quarter-century. Secondly, as West and Johnson remarked (1944, 158, n.1), "great skepticism is necessary and justified in considering the readings of many published documents." I have benefited from much new evidence in the form of corrected texts of already-known documents. The deflation of 338, for example, was based on erroneous readings and interpretations of the price declarations of that year and vanishes in the face of the correct readings (which were, in fact, already available to West and Johnson).

I have used somewhat more conservative assumptions about the treatment of evidence than others, particularly Mickwitz and West and Johnson, have. These arise especially in connection with prices of gold and silver. To summarize:

1. The price of gold or silver paid in copper currency can be given precisely only when it is explicitly stated in our evidence in terms of the pound, a fraction thereof, or a gold coin like the solidus. Even then, solidi varied slightly (perhaps 2 per cent) in weight (mainly because of wear), and gold prices derived from market prices of solidi may not always be precisely comparable. Some latitude must be allowed, and small differences may not be significant. *P.Brem.* 83 shows the kind of variation possible in the solidus.

2. The prices of standard commodities can be used to produce a notional price of gold by applying a multiplier representing the number of units of the commodity normally bought by a pound of gold. This notional price may diverge significantly from the true price at any given time and place because of supply and demand, local conditions, seasons of the year, quality of the product, and other factors. Mickwitz used such figures without reservation, but they are in fact useful only to a more limited degree, namely in showing orders of magnitude and rough ranges. Nonstandard items, like houses or donkeys, are on a third level of usefulness, far less precise than wheat or barley; I have therefore used them only to a very limited extent. The figures used to "index" commodities to the pound of gold (that is, by which the price of a unit of a commodity is multiplied to get a notional price for a pound of gold) are the following (see the note at the end of the chapter for justification of the figures chosen):

lb.	silver	x12
art.	wheat	x576
art.	barley or arakos	x1152
art.	vegetable seed	x288
art.	cumin	x288
art.	beans	x792
lb.	meat	x9216
sextarius	oil	x2880
sextarius	wine	x4608
keramion	wine	x960
knidion	wine	x900
spathion	wine	x690
lb.	chaff	x160,000

3. The same reserves expressed above about the use of commodity prices for obtaining the price of gold are to a large extent true also of the direct comparison of commodity prices themselves. Especially over a short period of time, factors like seasonal fluctuation, local conditions, and quality are important. A single higher price does not demonstrate inflation, nor a lower one, deflation.

4. Prices used in transactions between the government and taxpayers for various conversions, notably in paying money instead of commodities for land taxes and in paying billon currency instead of gold and silver demanded by the government for compulsory purchases, may vary significantly from the "free market" prices, and the two must be compared with caution. In general, substitutionary (*adaeratio*) prices are more likely to be close to commercial ones, since otherwise the taxpayer will, unless very little is at stake, normally choose to purchase the commodity and deliver it. But payment for required supplies may be radically below market, as with military clothing requisitions, where prices were unchanged for almost a quarter-century (see below, p. 69), and for deliveries of gold and silver bullion (on which see p. 49).

In general, each item of evidence must be weighed in context to assess its value. Over the long run, a preindustrial economy like that of Roman Egypt may tend to keep about the same relationship among various commodities; that is, the relative prices of wheat, barley, vegetable seed, wine, meat and the like will tend to remain fairly constant over a long period unless external demand or supply alters significantly. That is not to say, of course, that short range fluctuations may not be substantial. In considering the utility of any given item of evidence, therefore, it

is necessary to try to discover if there is any reason to believe that it is out of line with other contemporary prices in comparison to the relationship among the commodities in question which can be seen to prevail in our evidence from other periods.

Valuable evidence for regional and seasonal fluctuations is found in the newly-published *P.Oxy.* LI 3628–3636, a fifth-century list of prices of eleven commodities in six nomes of the province of Arcadia during the three four-month periods of the year (i.e., the Egyptian months corresponding roughly to September–December, January–April, and May–August). As the editor remarks, it is not clear how far these prices were true market prices or officially set ones.

The following information is obtainable about fluctuations of the various items:

- Gold solidi: range of 3800 to 4000 myriads of denarii overall; no single nome varies more than 100 myr.
- Silver: no variation.
- Wheat: little change within a given nome (maximum 11 per cent difference by seasons), with wheat at harvest time in no instance lower priced than in the winter. But the price in the Arsinoite Nome (240 myr.den./art.) in May–August is less than half that in another nome the name of which is lost, and the Oxyrhynchite and Cynopolite are between the two. Overall range, 240 to 500.
- Barley: cheaper in Arsinoite and Aphroditopolite, but high in Arsinoite vis-à-vis wheat. Oxyrhynchite and Cynopolite close once again, and higher than Arsinoite. Overall range, 225 to 300.
- Lentils: range of 360 to 475; only minor (< 10%) variation within a single nome.
- Chaff: constant.
- Wine: range of 20 to 28 4/7, within Arsinoite of 20 to 27.5. Most expensive just before the vintage.
- Meat: always 24 in Cynopolite, Oxyrhynchite, and Arsinoite, 30 elsewhere.
- Salt: constant.
- Radish oil: range of 75 to 105, but apparently constant within a nome.

Given that this papyrus comes from a century or more, in all likelihood, later than most of the documentation in question in the present work, and given that the exact nature of the prices quoted here is unknown, it would be fruitless to press comparisons too far. The significant regional variations are noteworthy; without stringent official controls on local trade, they would be hard to support. And the relatively small seasonal change suggests some artificiality. All the same, the basic point is clearly demonstrated: food prices in general are not on the same order of consistency as those of precious metals.

Relating these prices to gold is a different matter. It may be true that over long periods gold tends to buy the same amount of most commodities, but gross disparities are possible from time to time. We must particularly avoid circular reasoning in dealing with this problem. Nonetheless, over the long run the ratio of bullion to wheat varied only within a moderate range, and most of the extremes can be traced to specific causes. In the prices of wheat from the Byzantine period, where they are given in gold, we find a range of about 7 to 15 artabas per solidus, with an average (and, in the sixth century, official) amount around 10 and not very many instances outside a range of 8–12. In the case of the first half of the fourth century, however, the price of wheat in gold seems—where calculable—to be higher than in the sixth century, by perhaps as much as 1/3 to 1/2. A more conservative multiple (8 art. per solidus) has thus been used in most cases, but it no doubt varied considerably.

A NOTE ON CALCULATIONS

Throughout this book the results of arithmetical calculations are presented without special explanation. The reader may verify the arithmetic by applying the formulas given here:

1) Value of pound of gold = 72 x value of solidus

(This formula applies to the Constantinian and later solidus; for the pre-Constantinian aureus or solidus, the multiplier would be 60, not 72.)

2) Value of lb. of gold when value of nummus is known or hypothesized:

VG = value of lb. of gold in denarii
WS = weight of silver in nummus (metric grams) x .8795
WN = gross weight of the nummus (metric grams) x .8795
VN = value of the nummus (in denarii)

$$VG = \frac{VN}{WS + \frac{(WN-WS)}{120}} \times 12 \times 288$$

The copper in the nummus is calculated here as being worth 1/1440 the value of gold or 1/120 the value of silver. This ratio may have varied from time to time.[3] 12 is the gold : silver value ratio, and 288 is the number of Roman grams in a Roman pound. The factor .8795 converts from metric grams into Roman grams (or scruples), which were about 13.7% heavier. The Roman pound is generally considered to have weighed 327.45 metric grams and contained 288 scruples or grammata, each of 1.137 g. The true figure for the weight of the Roman pound may have differed somewhat, but not enough to affect our calculations substantially.

3) Value of nummus from value of gold:

$$VN = \frac{VG}{12 \times 288} \times \left(WS + \frac{(WN - WS))}{120}\right)$$

This is of course the result of manipulating equation 2.

Because of the approximate character of the measures of WS and WN, and the fluctuation in the relationship of copper and gold, all results are very approximate, even though they are given with all the precision of the computer which calculated them.

Throughout this book, the abbreviations g and mg are used for metric grams and milligrams; the Greek form used in the papyri, gramma, plural grammata, is used for the Roman unit.

A NOTE ON INDEX FIGURES

Silver: see *Cd'E* 52 (1977) 322–36 for arguments, and cf. p. 28 below. In the fifth century a ratio of 14.4:1 is found in *P.Oxy.* LI 3628–3636.

Wheat: see Johnson and West 1949, 176–78. Figures in solidi indicate average of about 8 artabas per solidus (cf. above, p. 6). 576 = 8 x 72 (solidi per lb. of gold).

Barley and arakos: see Johnson and West 1949, 175–76. Barley on average is worth about half (sometimes slightly more) the value of wheat. See also Johnson, *Roman Egypt*, 312. The figures in *P.Oxy.* LI 3628–3636 show remarkably high barley values, with a differential as low as 10 per cent (but some prices are just over half the value of wheat, nearer to the normal situation).

Vegetable seed: Johnson and West 1949, 176, give only one instance. Its price in 341 was about double that of wheat; in 312 it was three times the price of wheat (cf. below, p. 65). Johnson, *Roman Egypt*, 313, shows

[3] It is the ratio implied by the Edict of Maximum Prices, where raw copper is priced at 50 denarii per lb. compared to 6000 for silver and 72,000 for gold. See M. Giacchero, *RIN* 76, 5 ser. 22 (1974) 149, n. 16.

prices in the first century about double those of wheat.

Cumin: See Johnson, *Roman Egypt*, 312, with an early imperial price about twice that of wheat in the same document.

Beans/lentils: see Johnson and West 1949, 176: beans at 2 and 2.4 carats per artaba, i.e., average of 11 per solidus: 11 x 72 = 792. A similar ratio is suggested by the figures in Johnson, *Roman Egypt* 313, which range from parity with wheat to anywhere from 50 to 80 per cent of the value of wheat. *P.Oxy.* LI 3628–3636 provide lentil prices of 8–11 art./solidus, mostly about 10–11.

Meat: see Johnson and West 1949, 185. Evidently quality can vary greatly. *P.Oxy.* XVI 1920 quotes 120 lbs. per solidus; *P.Amst.* I 77 gives 114 lbs. per solidus. The ratio in *P.Oxy.* III 202 and I 85, in 338, gives a meat/wheat ratio of 15:1 or 120 per solidus. In *P.Oxy.* LI 3628–3636, the commonest ratio is 130, but 167 is found in one place.

Wine, sextarius: see Johnson and West 1949, 178–80. Again, quality varies. Prices of 4 sol./250, 36 c./400, 46 c./1000 yield figures of 62.5, 267, and 521 sextarii/solidus. I take 240 as a reasonable value on average; it is half the value of meat. In *P.Oxy.* LI 3628–3636, wine prices are much higher, roughly equal to those of meat, as is also the case in *P.Lond.* III 984 (after 385). It is possible that the relationship in the early fourth century had changed substantially by the end of the century, but the evidence is insufficient to demonstrate this as a general proposition.

Wine, keramion: Johnson, *Roman Egypt*, 314–15, lists various prices ranging from 50–80 per cent of the value of wheat; 6 dr. seems about average in a document where wheat costs 10 dr., hence the 6:10 ratio used here.

Wine, knidion: Johnson, *Roman Egypt*, 314–15, notes the situation in *P.Cair.Goodsp.* 30 (191p), where the knidion seems to be worth somewhat more than the keramion (a range of 14 to 24 vs. 10–16; averages of 13 vs. 18, the latter probably a bit distorted by one high figure; 15 would be more normal, apparently). The index of 900 is very approximate.

Wine, spathion: cf. sextarius. It is worth about 3/4 to 5/6 of the artaba of wheat in *SB* XIV 11593 and *SPP* XX 75. The figure of 690 represents approximately the 6:5 ratio.

Chaff: *P.Amst.* I 77 gives a figure of 2,244 lbs./solidus, or 161,568 lbs. per lb. of gold. The index figure of 160,000 used here yields a gold equivalent of 12,800 in 340 (*BGU* I 21), which is close to the index figures from other commodities. *P.Oxy.* LI 3628–3636 offer a somewhat higher range, 182,400 to 192,000 lbs./lb. of gold.

CHAPTER 2
TERMINOLOGY AND CURRENCY

The currency reform of Diocletian, which will be discussed in Chapter 3, meant the introduction to Egypt of a monetary system, based on the denarius as a unit, familiar in most of the Empire but alien to the everyday life of Roman Egypt. In the Roman period, Egypt reckoned in obols, drachmas and talents in the classical Greek fashion, with the standard coin (sometimes called the stater) being the tetradrachm, and with other coins as small change. Denarii appear in some contexts involving the military or Roman citizens, but they were not in normal use in the economy. The denarius was equated to the tetradrachm (and the drachma to the sestertius, therefore); in other Greek lands, the drachma was mostly equated to the denarius. Egypt thus stood in a sort of monetary isolation.

Diocletian ended all that; but the old ways of reckoning persisted while the new began to take root. The denarius never fully displaced the system of drachmas and talents as a means of accounting, although the drachma itself disappeared as an accounting term around the mid fourth century with the great "inflation." This chapter sets out the main terms in use in the papyri and discusses the problems connected to them.

Attic drachma

('Αττικὴ δραχμή)

[West and Johnson 1944, 121–22]

'Attic drachma' is another term for the denarius, which was valued at 4 drs. of the Alexandrian currency issued before 296, but at various amounts (mostly 1 drachma) in the currency of other Greek areas of the empire.[1] The proof of the equivalence of the denarius and the Attic drachma (which was argued by Segrè), is found in *P.Panop.Beatty* 2.30–31, the note to which gives references. The term was functionally obsolete in the fourth century but remained in use early in the century (e.g., in *P.Oxy.* XVII 2113 [316p]) as it had a century earlier (*P.Oxy.* IV 705.46; on the date, cf. *BL* I 326, II.2 96). Cf. infra, p. 23, for *P.Oslo* III 83 and *PSI* VIII 965.

[1] See A. Gara, *Prosdiagraphomena e circolazione monetaria* (Milano 1976), 104–5, n. 23, for the various equivalences.

Carat

(κεράτιον)

[West and Johnson 1944, 129]

The carat is the standard accounting subdivision of the solidus in the sixth century and later, and it was used as a term for a unit of weight several centuries before. A convenient discussion is found in *CPR* VIII 27.4n. There were 24 carats to the solidus, and it was thus 1/1728 of a pound or 1/6 of a gramma of gold. Accounts were sometimes kept in carats as an actual unit of operation and then converted into larger units; cf. M. El Abbadi, *Proc. XVI Int. Congr. of Papyrology* (Am.Stud.Pap. 23, Chico, 1981) 509–16.

The earliest appearance known to me of the carat as a subdivision of a solidus is *P.Amst.* I 53, from 433p. (West and Johnson knew of none before 500.) Before that date, papyri have references to fractions of a solidus instead, e.g. *P.Oxy.* XVI 1957 (430p), where 1/2 sol. is paid for rent, or *PSI* IX 1074 (400p), where a payment of 4 1/2 1/3 solidi is specified. The (late) fourth-century account *P.Lond.* V 1653 is another instance. Fourth-century papyri also contain numerous figures for gold payments in grams, ounces, and pounds (cf. infra, Chapter VII; and for a later period, e.g., *P.Lips.* 62, 384–385p).

There are cases in which carats appear as units of currency in papyri assigned by an editor, on the basis of palaeography, to a time before 430. Such, for example, are *P.Alex.* 39 (ed.: III/IVp), *P.Amst.* I 77 (eds.: IVp), *P.Flor.* III 349 (ed.: IVp); *P.Lond.* V 1832 (ed.: IVp), and *P.Herm.* 59 (ed.: late IVp). In my view, all of these should be dated after 430 (the plates of *P.Amst.* 77 and *P.Alex.* 39 show that palaeography is no obstacle to the putting of those papyri in the fifth century, and a photostat of *P.Lond.* 1832 kindly provided by T.S. Pattie shows that a date to that century is also possible in this case).

There remain two evident instances of carats in the fourth century. In neither case are carats used as divisions of the solidus, but by themselves, evidently as a weight of gold. These are *CPR* VIII 27 of 324, in which κερ( ) are equated to 146 denarii; and *SPP* XX 96, in which amounts of κερ( ) appear, at 5 T. each. The gold prices which one would deduce from the resolution to κερ(άτια) are discussed infra, pages 27 and 38. The only other possible resolution of the abbreviation, κερ(άμιον), yields excessively low prices and other difficulties of interpretation; cf. the editors' remarks on *CPR* VIII 27.

Denarius

(δηνάριον) and

Drachma

(δραχμή)

[West and Johnson 1944, 122–28]

The drachma, which had been the basic unit of account in Roman Egypt, was treated as equal to 1/4 of the Roman denarius (or 'Attic' drachma), which was equated to the tetradrachm. After the end of the minting of the tetradrachms in 296p (infra, p. 19), the drachma nonetheless continued in use as an accounting term for payments actually made in denarii, still calculated as 4 dr. = 1 den. It gradually lost ground to the denarius and still more to the rise of price levels which made the drachma a meaningless sum. There are two instances of the drachma, presumably from the 340s, in the Abinnaeus archive (*P.Abinn.* 74 and 80.17), and one in *P.Col.* VII 160.82, between 345 and 354. I know of no instance securely datable to the period after 350. *P.Amst.* I 82 has a sum in talents and drachmas, but it must (as the editors' note implies) date around 340. The introduction of the myriad as a coin (infra) no doubt eliminated any reason to speak of drachmas. The symbol ₰ is used throughout this study (as in ancient papyri and inscriptions) to denote the denarius.

ITALIKON ARGURION (Ἰταλικὸν ἀργύριον), see *nummus*

Kerma

(κέρμα)

[West and Johnson 1944, 129]

For the fourth century, West and Johnson's statement remains correct: "In private letters κέρμα is a generic term for money." One may now add further references in confirmation (*P.Herm.* 13, *PSI* XIII 1342 [for which R. Rémondon proposed a fifth century date, see *Proc. XII Congr.* 434; *BL* VI 186, as already C. Préaux, *BL* V 91], *P.Fouad* 81). For a later and possibly more specific usage, see s.v. myriad.

Monas

(μονάς)

A discussion of this term will be found in *P.Oxy.* XLVIII 3402.4–5n.; in that text it seems to mean one myriad of myriads (i.e., 100 million) denarii or 66,700 T. Cf. infra, p. 44. All three texts with this term (the

others are *P.Oslo* III 162 and *P.Oxy.* IX 1223) seem to belong to the period around 360 and to the same archive.

Myriad

(*μυριάς*)

[West and Johnson 1944, 166]

A myriad is 10,000; the term was used originally in currency to refer to denarii, of which it is a normal multiple in the decimal system. As such it was worth 6 2/3 talents. With the rise in price levels, 10,000 denarii was no longer a large sum of money (the value of 1/2 artaba of barley in 338p, for example), and we find myriads used to reckon talents (never at this date drachmas) very commonly in papyri of the 360's and later. The myriad of myriads is also found, an attempt in effect to keep the denarius usable as an accounting term. One myriad of myriads of denarii was thus worth 66,667 T. See for examples e.g. *P.Lips.* 64 (*ca* 368p), *P.Lond.* III 984 (p.237) (*ca* 385 or later; cf. note to line 5) and *P.Laur.* III 170 (367p).

It is argued below (p. 45) that "myriad" refers to a coin (the 'Aes 3') after the "reform" of 352. This usage seems to persist for two centuries or more. Wessely already collected examples of the phrase *κέρματος μυριάδες* in the fifth and sixth centuries (Wessely 1905, 45–46), seemingly equivalent to *κέρματος νουμμία* (in his NN 117, now *CPR* VIII 62). At all events, the term *μυριάς* frequently occurs without specification of denarii in texts after 360, because *μυριάς* itself was, in my view, the name of a coin and for the reader there would be no confusion. If talents were meant, they were specified.[2]

NOMISMA (*νόμισμα*) see *Nummus, Solidus*

Nummus

(*νοῦμμος, νουμμίον*)

[West and Johnson 1944, 131–32]

The term nummus was not in common use in the fourth-century papyri. There are, however, several instances which taken together indicate that the term was used to refer to the main current copper coin, the billon piece worth 25 ✠ in the early fourth century (cf. infra, p. 24). The center of the discussion must be *P.Ryl.* IV 607, and the other evidence

[2] In *Scriptiunculae Posteriores* II 589, note to line 5, H.C. Youtie states that the term myriad can be used indiscriminately for drachmas, denarii, and talents. It is true that it can be used with any of these terms, but I know of no instance where it is used *by itself* to refer to anything except denarii.

gathered in connection with it.

Διονύσιος Ἀπίωνι
χαίρειν·
προσέταξεν ἡ θεία τύχη τῶν
δεσποτῶν ἡμῶν τὸ Ἰταλικὸν νόμισμα
εἰς ἥμισυ νούμμου καταβιβασθῆναι· σπού-
δασον οὖν πᾶν τὸ Ἰταλικὸν ἀργύριον
ὃ ἔχεις ἀναλῶσαι ἀγοράσας μοι εἴδη
παντοδαπὰ καὶ π[ο]ίας εὑρίσκεις τιμῆς.
τούτου τε ἕνεκα ἀπέστειλα πρός σε
ὀφφ(ικιάλιον)· προγίνωσκε δὲ ὡς εἰ βουληθείης
κακουργίᾳ τινὶ χρήσασθαι οὐκ ἀν-
έξομαί σου. (2nd hand) ἐρρῶσθαί σε πολλοῖς χρόνοις
εὔχομαι, ἀδελφέ.

Verso (along fibres).

(3rd hand) Φαρμοῦθι η παρέλαβα τὴν ἐπιστολὴν π(αρὰ) τοῦ ὀφφ(ικιαλίου)
(4th hand) Διονύσιος Ἀπίωνο(ς) Ἀντινοέ(ως) βοηθ(οῦ) Διονύσιος

P.Ryl. 607 is long-known and much-discussed, but still the source of difficulty. The editor translates it accurately and non-prejudicially as follows: "Dionysius to Apion greeting. The divine Fortune of our masters has ordained that the Italian coinage is to be reduced to the half of a *nummus*. Make haste, therefore, to spend all of the Italian silver that you have on purchases, on my behalf, of goods of every description at whatever price you find them." The editors suppose (the argument was Mattingly's) that "(1) τὸ Ἰταλικὸν νόμισμα (or ἀργύριον: the two are synonymous) can denote only coinage or money in general; (2) the 'Italian', i.e., Imperial, money is contrasted with some other kind of money; the latter must be the local money of Alexandria which was not minted after A.D. 296; (3) νοῦμμος is the name of a definite monetary value, probably the *sestertius* . . . (4) as already noted, the nominal value of the 'Italian' money is reduced (a measure of deflation)."

This interpretation raises problems, the most notable of which is the conflict between the claim that 'Italian coinage' refers to money in general and the statement that the nummus is a specific coin: it is impossible for a coinage, containing various denominations, to have been reduced in its entirety to a single value. Moreover, the sestertius was not used in Egypt and would (in this day of inflation when the denarius was itself worth little) have meant nothing to the recipient;[3] and if the Alexandrian tetradrachm was the standard, why is the nummus given as the benchmark? In any case,

[3] Though it is true that nummus in Roman wills on papyrus is linked to the sestertius by long-standing legal formula for a will *per aes et libram*, the coin was unknown in Egypt as currency.

a reduction of the value of imperial coinage against the Alexandrian tetradrachm is a startling idea and most unlikely: the old currency and the new are never found together in hoards, and it seems clear that the old ceased to circulate when the new was issued, perhaps in consequence of an imperial order.

On the other hand, Crawford translates "the divine fortune of our lords has ordained that the Italian monetary unit is to be reduced to the value of its half."[4] But the Greek simply cannot be translated in this fashion: if one meant to say that the nummus was reduced in value by one-half, that is not the way to say it. Crawford refers the text to a supposed Licinian reform in 317. Cf. p. 32 for this reform. Ruschenbusch, who misquotes the text,[5] argues that the 'Italian coinage' must be a specific coin not minted in Alexandria and points to the antoninianus as the only logical candidate.[6] He goes on to argue that the antoninianus (i.e. the aurelianianus) was revalued on 1.ix.301, so that the devaluation must belong elsewhere, probably in 294. He does not offer a translation, but it is extremely odd that in his table of values the 'antoninianus' is equated to the term nummus.[7]

The matter is not so simple. First, the phrase Ἰταλικὸν *νόμισμα* is without any useful parallel in the papyri. There is a partial parallel in *ἀργύριον* Ἰταλικόν in *P.Stras.* 183, where the price of an armenikon[8] is said to be 3 T. 3,000 dr. in *ἀργύριον* Ἰταλικόν. It is not obvious from the context itself what is meant, but later in the same papyrus a price for a mattress is given: *ἕκαστον ἐνταῦθα ταλάντου καὶ τεσσεράκοντα νούμμων πωλῖται*: "here each is sold for a talent and 40 nummi." The papyrus unfortunately has no date (and as a business letter probably had no date even when the top was preserved); the editor dates it to the fourth century. The price levels point to the very start of the century. The nummus is evidently a coin of which 40 are less than a talent; the nummus must therefore be less than 150 drachmas, or 37.5 ₰. It is at least clear that a specific coin is meant, not just small coins in general.[9]

Whether the same is true of *νόμισμα* is harder to say; nothing in *P.Grenf.* II 75 (308p, cf. *BL* I 191; *CSBE* 105), where the term appears in

[4] Crawford 1975, 589.

[5] Ruschenbusch 1977, 208: nu omitted from *προσέταξεν*; *νόμισμα* substituted for *ἀργύριον* in line 6; a sentence chopped off in the middle. There is no sign that he has consulted the actual publication.

[6] He rejects the small laureate copper coin, cf. 208, n. 29.

[7] Ibid., 208, where he enters the antoninianus at a value half that of the large billon coin as a consequence of his arguments.

[8] I do not know to what this word refers in this context.

[9] West and Johnson 1944, 131–32, discuss the terminology in a general way, but they lump together texts with quite different terms. 'P.Oslo 85' there is an error for *P.Oslo* 83. Their discussion is rather confused, and the notion that a reduction in the weight of copper currency in general is meant seems to me out of the question, as speculative profits obtained by getting rid of better currency promptly seem unlikely.

the phrase ἀργυρίου Σεβαστῶν καινοῦ νομίσματος suggests a specific coin, nor does *SPP* XX 85 verso i.9, where a payment of 50 T. is made ἐν Ἰταλικ(ῷ) νομίσματι, help much.[10] Rather, a coinage or currency system in general seems to be meant. On the other hand, the same *SPP* papyrus (verso i.4) has an amount ἐν νούμμοις Ἰταλικοῖς, which ought to mean a specific coin and which it is hard to separate from the other phrase. Wine at 13–14 nummi per knidion in *Pap.Lugd.Bat.* XIII 18.28 points to a specific coin also (cf. infra, p. 57). A late example of the same usage occurs in *CPR* VIII 62, of 575p.[11]

In Chapter 3 the relationship of this evidence to the coins in circulation at the time of Diocletian's reform is discussed in more detail, with the conclusion that only the 10g laureate billon piece, which I take to have been worth 25 ✠ after the reform of 301, or one of its successors can be meant here by the nummus. This coin, for long called follis by numismatists, is now coming to be called by them the nummus, in my view correctly. There is an instance of χρυσοῦν νοῦμμον in *SB* III 6222.30 (late IIIp), probably referring to the solidus and meaning simply 'gold coin'.

Solidus

(ὁλοκόττινος, νομισμάτιον, χρύσινος, χρυσοῦν)

[West and Johnson 1944, 137–39]

Diocletian's aureus or solidus (so-called in Edict 28,1a) was coined at 60 to the pound (cf. infra, p. 19), but the solidus which regularly appears in the papyri, under various names, is Constantine's, minted at 72 to the pound. There is, however, one certain reference to Diocletian's solidi, in *P.Oxy.* XIV 1653 (306p), where ὁλοκόττινοι of 4 5/6 grammata are mentioned (Diocletian's were in theory 4 4/5, or 4.8 grammata [288 divided by 60] vs. 4.83 here). Presumably the reference to 3 ὁλοκόττινα in *P.Mich.* III 218 = Naldini 15 concerns the Diocletianic solidus; the date is evidently 297.[12] The terminology for the solidus varies.

a. ὁλοκόττινος or ὁλοκόττινον (both masculine and neuter forms occur). The Greek version of the Edict calls solidi holokottinoi (see S. Lauffer, *Diokletians Preisedikt* ad 30.1a), and it is the term in *P.Oxy.* XIV 1653 (cf. supra) for the 1/60 lb. solidus. It is sometimes asserted that the word is Coptic, e.g., Naldini, *Cristianesimo* 15.9n.; West and Johnson 1944, 137. In fact, it is a Greek-Latin hybrid; see J. Černy, *Coptic Etymo-*

[10] 320/1, suggested by Skeat, *JEA* 25 (1939) 81–82, as the earliest possible date, is probably the true one, to judge from the amounts involved.

[11] The editor reads an instance of ν(ούμμους) in *P.Vindob.Sijp.* 20.2; but examination of the original by H. Harrauer has shown that there is nothing where the supposed nu is given.

[12] See J.D. Thomas, *ZPE* 22 (1976) 266–67.

logical Dictionary, 72; H. Frisk, *Greek Etymological Dictionary*, s.v., both with further citations. The earliest dated reference to a 1/72 lb. solidus known to me is the holokottinoi in *P.Col.* VII 188 (320p), but *P.Ryl.* IV 643 uses the term in the period between *ca* 312 and 318 (cf. infra, p. 62). The term is sometimes used in the same document as *νομισμάτιον*, e.g., in *P.Lond.* III 982 (p.242) = Naldini 54 and 985 (p.228). In the former of these Naldini prints a restoration by Rémondon, making the papyrus refer to [*χρύσι*] *να νομισμάτια*; cf. *BL* V 54–55.

b. The term *νομισμάτιον* for the solidus is not found in any securely dated text before 352 (*P.Stras.* I 9, cf. *BL* III 230), but it occurs in *SB* XIV 11591–11592, which must belong around 325–330 (cf. infra, p. 35), and the lack of dated texts may be owing to chance. The term *νόμισμα*, which usually means 'coinage' or 'money' in general, is used in place of the diminutive in *P.Oxy.* XIV 1729.2 and some other places; but as Preisigke remarked (*WB* III 351), the word is often abbreviated so that certainty is impossible (though this did not stop him from putting *P.Oxy.* 1253 and 1329 and other texts incorrectly under *νόμισμα*).

c. *χρύσινος* is found for the solidus in *P.Lond.* III 870 (p.235) (no date preserved) and elsewhere. Any doubt of its meaning is dispelled by *BGU* I 316 (359p), written in Askalon in Phoenicia, where a *χρύσινος* is characterized as *δεσποτικὸς τεταγραμμιαῖος δίζωδος*. The term appears also in *P.Oxy.* XX 2267, dated (on the basis of a comes rei privatae mentioned) to 360p. The author seems to allege that the villain (a rationalis rei privatae) demanded 7 chrysinoi for 3,200 myriads. As the editors point out, the value obtained for gold if chrysinos = solidus here would be about 219,430 T./lb., far less than our other evidence indicates at this date. It is unclear whether chrysinos means something other than solidus, if the context (rather unclear) is to be understood differently, or if the rate is to be seen as so obviously extortionate that it simply reflects on the rationalis' criminal character. A sixth-century example in *P.Amst.* I 56 shows a chrysinos minus carats, as normally from a nomismation.

d. *χρυσᾶ* (so accented by the editor, but the indexer enters it under *χρυσός*) occurs in *P.Oxy.* XLVII 3358.3 as a term for gold pieces. The fourth-century business letter is undated and the context provides no help in interpreting the term.

Talent

(*τάλαντον*)

[West and Johnson 1944, 134]

The talent, a unit of currency in use in Egypt since Ptolemaic times (and taken by the Ptolemies from classical Greece), equalled 6,000 drachmas (and hence 1,500 denarii). So far as we know, it never represented an

actual coin but was solely an accounting term. In Byzantine Egypt it was obsolete in the sense that no Greek coinage (drachma-based) was any longer minted, but the force of habit preserved it until the seventh century. (West and Johnson 1944, 128 and 134, cite *P.Oxy.* XVI 1904 of 618p, as the latest probable instance; the term talent, however, does not appear, but κέρμα. Cf. also J.-M. Carrié, *Dévaluations* 2, 258 for the conformity of the value of the talent here to other evidence.)

Properly, the sub-unit of the talent is the drachma, but one finds talents and denarii together often enough, and even talents and drachmas and talents and denarii in the same document (e.g., *P.Sakaon* 19, 314/5p).

A curious and unique use of 'talent' to refer to 6,000 of the current coin (the 'myriad' of denarii) is apparently found in *P.Oxy.* XXXIV 2729, where sums of 2,700 myriads (den., not dr. as ed.) and 4,000 myriads are added to form [tal. myr.] 1, myr. 700. The papyrus has no date, but the value of the solidus (730 myr.) indicates gold at about 350,400 T./lb., which would indicate the early-mid 350's; a price of 50 and 52 myr. per spathion is roughly congruent with this level.

Follis

(φόλλις)

[West and Johnson 1944, 134–37; cf. A.H.M. Jones, *Roman Economy*, 330–38]

The term 'follis' for long was used by numismatists (and hence everyone else) to describe the large billon coin which I call the nummus (cf. supra). The fourth-century evidence about what the follis really was is not entirely consistent but mostly does not favor the view that one coin is meant. See J.-M. Carrié, *Dévaluations* 2, 253–70, for the follis in the sixth century.

For the fourth century, the key text is *P.Panop.Beatty* 2.301–302, of March, 300. There it is clear that a follis is valued at 12,500 ✕, or the value of 1,000 nummi at that time (cf. p. 20). Evidently it was not a coin, but a bag or purse containing coins to that value. The further history of the follis has posed problems. Some evidence comes from a new Cairo papyrus (inv. 10570),[13] an account of some official payments dated to April, 340, evidently part of a report. The amounts involved are as follows:

72 folles, . . . den.

[13] This text is published by K.A. Worp and me in *BASP* 20 (1983). I am grateful to J. Bingen for the photograph from the International Photographic Archive of Papyri, and to the authorities of the Cairo Museum for their customary generosity.

19 folles, 2,500 den.
28 folles, 7,200 den.
33 folles, 7,500 den.
9 folles, 7,000+ den.
3 folles, 8,500 den.
13 folles, 6,500 den.

It will be obvious that the denarii function as the small change for the folles; the value of the follis must therefore be higher than 8,500 denarii. On the other hand, it is likely from the pattern of the amounts that the follis is not a great deal higher than that. The amount of 12,500 ✠ used in 300 would therefore seem still appropriate. By this point it would in all likelihood be—if any sort of physical reality—a purse of 125 coins of 100 ✠ each (note that a 100 ✠ piece is needed for one of the amounts). But here it seems mainly to appear as an accounting unit 25% higher than the myriad. There is, unfortunately, no total.

The third fourth-century text of concern is *P.Cair.Isid.* 126. It is a letter from the praepositus of the 5th pagus of the Arsinoite Nome to the praepositus of another pagus, "reminding him of an imperial constitution which requires all strangers found to be residing in the villages, presumably without official permission, to be handed over to the fiscus, and establishes a reward of five folles for each person so surrendered. Since the village of Karanis has complained to Heraclides that some of its villagers are now in the pagus administered by his colleague, he requests the latter to compel the villages subject to his authority to give up any fugitives who are shown to belong to Karanis" (editors' introd. to the text).

Heraclides is identified by the editors as the known praepositus of the 5th pagus in August, 308 (*P.Cair.Isid.* 125), and the editors therefore date the papyrus to 308/9, when Isidoros himself was presumably komarch of Karanis. Identifying the follis with the coin we have called a nummus, they suggest (following L.C. West) a value of 4 ✠ for the follis. This would be a negligible reward. On the other hand, 5 x 12,500 ✠ = 62,500 ✠ was more than half the cost of a pound of gold in 309/310; renegade villagers were simply not worth that much. Even a decade later, the sum would be worth over 6 solidi, which still seems far too much. On the other hand, the proposal by Callu (1969, 360) to set the value of the follis in the papyrus at 625 ✠ is quite arbitrary, based only on what he thinks would be a fitting reward.

The truth seems to be that we cannot tell if follis in this context refers to a smaller purse or to a coin: 5 nummi would buy an artaba of barley, after all. But we have no way of telling.

CHAPTER 3

THE REFORMS OF DIOCLETIAN

Our period begins with Diocletian's first monetary reform, which in Egypt involved not only a completely new set of coin emissions, as elsewhere, but their introduction into an economy in which the standard coinage had for three centuries and more been not the normal imperial coinage but the billon tetradrachms produced in Alexandria.[1] The latter coinage stopped when the new coinage was introduced, and the old coins evidently did not circulate afterward. This monetary reform has been dated convincingly by William E. Metcalf to 296.[2] The new system consisted of the following coins: gold aurei (already called solidi[3]), at 60 to the pound, or about 5.45 g each; silver coins (called argentei), at 96 to the pound, or about 3.4 g each; laureate billon coins with the inscription 'Genio Populi Romani' on the reverse, with a weight of about 10 g; copper radiate coinage at a weight of about 3 g; and a small laureate copper coin weighing about 1.3 g but evidently never minted in Egypt. See Plates 1a and 1b for the 10g billon coin; 2e for the 3g radiate copper. There remained in circulation as well, in the empire at large, the standard coin now commonly called the 'aurelianianus', which had in turn developed from what numismatists usually call the 'antoninianus', minted under earlier emperors at a weight around 4 g. The most recent versions of this coin, from Aurelian and his successors, presumably supplied the bulk of what was in circulation, but in Egypt (where the locally minted tetradrachms had been in use) their role seems to have been small. The aurelianiani were, like the large laureate billon coins, a small percentage of silver in a copper base.

It is generally agreed that the aurelianiani were originally issued as two-denarius pieces, but we have no direct evidence for the stated value

[1] *RIC* VI 645–47 provides a general introduction to the problem. The bibliography on the coinage of Roman Egypt is large and not very pertinent here. West and Johnson 1944 is still the standard work.

[2] In a paper at the American Research Center in Egypt annual meeting, Boston, March, 1981. For the 294 date previously accepted, with an assumption of overlap before the end of tetradrachm minting in 296, see *RIC* VI 645; Crawford 1975, 578; Callu 1969, 356 ff.; but already proposing 296 for the start of the new coinage, J. Schwartz, *Schweiz. Münzbl.* 13–14 (1964) 102.

[3] Crawford 1975, 586; solidi mentioned in the Edict of 301.

of the other coins at the time of their issue, nor for the official value of the aurelianianus at the time of Diocletian's reform. It may be noted that the aurelianiani of Aurelian and his immediate successors, though of varying purity, generally contained about 4 per cent silver of their 4 g weight, thus about .16 g silver. The large billon coin of 296, on the other hand, weighing about 10 g, had a comparable silver percentage, about 4 per cent, making a silver weight of about .4 g, or 2.5 times the silver of the aurelianiani. Compared to the most recent tetrarchic aurelianiani, however, the disproportion was greater, as the latter had in many cases descended as low as 2.5 per cent silver, or .1 g silver per coin.[4]

The first solid evidence for the names and values of the coins comes from the Currency Edict of the tetrarchs published in 1971 from an inscription of Aphrodisias.[5] This inscription shows that the silver coin was called the argenteus, and that it was stated to be worth 100 denarii. Another coin was to be worth 25 denarii.[6] The Edict also states that existing coinage is still to be used, with the face value doubled, starting on 1 September 301. A few months later, the Edict of Maximum Prices gives us prices in denarii for gold and silver bullion: 72,000 ₰ per pound of gold, 6,000 ₰ for silver.[7]

A host of theories has been spawned from these bits of evidence. First, it is now widely accepted that the post-reform coin of 25 ₰ must be the billon laureate piece of 10 g. The silver content of the latter is about 1/8 that of the argenteus, and it must therefore be "worth" over 1/8 of the latter's value, or about 15 ₰; the only coin tariffed over this sum but less than the argenteus is the 25 ₰ piece.[8] This conclusion seems unavoidable. It follows that the laureate billon piece was worth 12.5 ₰ before the doubling in the reform. It has generally been assumed that the silver coins must also have doubled in price, that is, that they had been worth 50 ₰ before the reform. On the other hand, gold is quoted in the preceding year at the official price of 40 talents (T.) (or 60,000 ₰).[9] At the normal official ratio of 12:1, silver would have been worth 5,000

[4] Callu 1969, 341 ff.; Crawford 1975, 576, n. 68.

[5] *JRS* 61 (1971) 171.

[6] As Bowman (1980, 35, n. 12) says, the restoration of the text to refer to 25 denarii is inescapable, despite the attempt of Crawford (1975, 582–83) to restore *radia]ti* instead of *vigin]ti quinque* here. I do not understand Bowman's remark that "there does not seem to be agreement on which denomination this [25 ₰] must represent," citing Callu 1978, 107 ff. and Ruschenbusch 1977, 208: both of these authors identify the coin in question as the laureate billon coin with the Genius.

[7] The figures come from the Aezani copy, published by R. and F. Naumann, *Der Rundbau in Aezani* (Ist.Mitt. Bh. 10, 1973) 57; I have used the revised text by M.H. Crawford, J. Reynolds et al., in *ZPE* 26 (1977) 125–51 and 34 (1979) 163–210.

[8] Cf. Crawford 1975, 580–81.

[9] *P.Panop.Beatty* 2.216; it is noted that on the open market the gold had been bought for an actual price of 5 per cent more, or 42 T. per lb.

₰ per pound at that time, or just over 52 ₰ per argenteus at 96 to the pound. Now it is very unlikely that the argenteus was *undervalued* relative to bullion, which would be the case if it were officially valued at 50 ₰, and it is even less likely that the value of silver remained constant in the 18 months since the price just quoted, so that one would have to suppose even greater undervaluation by the time of the Currency Edict. Silver was 20 per cent higher in the Edict of Maximum Prices than in the preceding year. The silver price of this Edict would give the argenteus a silver value of 62.5 ₰, which must be a maximum value for the time of the Currency Edict, when a nominal value of 100 ₰ was assigned. It seems inevitable that Bowman is right in his suggestion that the argenteus was overvalued compared to its bullion value, whereas gold coin—for which we have no stated value to compare with its bullion worth of 1,200 ₰—was not.[10] In any case, the context in which the argenteus is mentioned in the Currency Edict is damaged, and we cannot be sure if the 'eadem pecunia' later in that Edict (referring to the doubling of values) does refer to argentei as well as to the billon coinage.

The value of the smaller denominations is still harder to establish in the absence of direct evidence. The major evidence is in fact indirect, the prices in the Edict of 301 which set maximum prices, in which practically all prices really charged (as opposed to rates which were never charged on a single item) are multiples of 2 and 5. Crawford, therefore (taking the billon laureate piece as 20 ₰, it may be noted), set the value of the small change at 5 and 2 ₰.[11] A more complicated investigation by E. Ruschenbusch resulted in the argument that almost all prices were really multiples of 2, 4 and 25, leading him to favor 2 and 4 for the two smaller pieces.[12] The difficulty with this kind of argument, of course, is that one cannot be sure if it is the lowest common denominator or a multiple of it which is in use. Anything divisible by 4 is also divisible by 2, and Ruschenbusch's argument does not take adequate account of the prices which are divisible by 10 (or by 5) but not by 25, such as 70 and

[10] Bowman 1980, 24; the other possibility, that the value of gold was 115,200 ₰ per lb. in September but lowered to 72,000 ₰ in December, seems very unlikely, despite the scholars who have propounded it, e.g., Callu 1978, 108; Lafaurie in Crawford 1978, 157. There is no reason to think that the argenteus was reduced in value in December, when silver bullion was quoted at a rate equivalent to 62.5 ₰ per argenteus (i.e., bullion at 6,000 ₰ per lb.). How Ruschenbusch (1977, 203–4) can say that the aureus was worth 1,000 ₰ at the time of the Edict of Maximum Prices is beyond my comprehension. His claim (p. 204) that 72,000 ₰ in the Edict for a pound of gold represents the free market price is made with no support; the 5 per cent discrepancy in *P.Panop.* 2 between free market and official price does not help to explain a 20 per cent difference between two official prices. If the 72,000 ₰ were a free market price, how could the multiples of 1,000 ₰ in the Edict be official prices in multiples of the supposed value of the aureus?

[11] Crawford 1975, 582.

[12] Ruschenbusch 1977, 195–201.

80.[13] Furthermore, customers can have bought routinely in multiples of the basic unit price or operated on credit until the multiple—and the value of the smallest coin—was reached.

The range suggested must, however, be approximately correct. These coins are all essentially copper (there is disagreement about whether minute traces of silver in them are accidental or deliberate[14]) and the larger of them is less than a third the weight of the 25 ₰ piece. On balance it may seem more probable that the value of the 3 g piece was 5 ₰ rather than 4. Both Crawford and Ruschenbusch consider that these coins retained their value and were not doubled in 301. This has, of course, the consequence that before that date they would have had a disproportionate value compared to the billon piece; but it would tend to confirm the argument above, that the doubling mentioned in the Currency Edict was not general but applied only to the billon coin.[15] The doubling of that coin's value would have been made more palatable by the previous disproportion. Despite Callu's suggestion that the billon coin was reduced from 25 to 20 ₰ in December, 301, it seems almost certain (from the price structure in the Edict of Maximum Prices) that the value of the billon and copper coins was not altered betwen the two edicts.[16] At the time of the Edict of Maximum Prices, then, the coins were probably worth the following amounts:

aureus	1,200 ₰	Value of the bullion
argenteus	100 ₰	Tariffed amount, 60% above bullion value
billon laureate	25 ₰	Tariffed amount; silver bullion worth 9–10 ₰
radiate copper	5 ₰	
laureate copper	2 ₰	

The few aurelianiani still in circulation must have been worth more than the 5 ₰ coins but less than the billon coin, which was intrinsically worth 2.5 to 4 times the value of the aurelianiani (depending upon which issue

[13] Cf. Ruschenbusch 1977, 195. Multiples of 2 are rare beyond 24 and could easily be produced with larger pieces plus a few 2 ₰ pieces. But a price of 80 ₰ (of which Ruschenbusch tabulates 14, a goodly number) would on his system require 2 x 25 and 7 x 4 and 1 x 2, or 10 coins, compared to 3 x 25 and 1 x 5, or 4 coins, on the model argued here. It is impossible to achieve certainty in this kind of argument.

[14] Crawford 1975, 583, suggests that the radiate and small laureate coins were intended "at any rate in theory" to contain silver; but he admits that everyone else regards the traces as accidental.

[15] Crawford 1975, 583–85; Ruschenbusch 1977, 206–8.

[16] Callu 1978, 108–9; Crawford 1975, 581 already thought the coin was 20 ₰ at all stages in the reform and never 25 ₰ until the next decade. Bowman 1980, 24, is not entirely correct in stating that "scholars who accept a follis of 25 denarii in September, 301, postulate a reduction to 20 denarii in conjunction with the issue of the Price Edict in December." Not Ruschenbusch 1977; in fact Callu is the only example known to me.

of the latter was involved).

Before turning to the coinage of the succeeding years, we must stop to examine three papyri which have variously been alleged to reflect the events described above. We start with Bowman's point that these need not all refer to the same event—an obvious remark, but one which needed making in view of the uses to which these texts had been put.[17] The first is *PSI* VIII 965, a fragment, broken at both sides, of a text citing an imperial edict.[18] It is clearly referring to the Edict of Maximum Prices (ἱερὸν νόμον ἐπὶ τοῖς ὠνίοις κατέστησαν). In lines 5–6 the writer informs his correspondent also of a change in currency: τὸ δὲ μέχρι τῆς δεῦρο ἀντὶ τοῦ δυοκαίδεκα [. The change in question is thus one from 12 (one supposes 12 [1/2]) ✠ to an amount now lost; comparison with the Currency Edict makes it a virtual certainty that the amount in question is 25 ✠.

A second text of note is *P.Oslo* III 83. Ruschenbusch has seen this again as pertinent to the reform of 301 and provided for one line an imaginative restoration (for which no justification is given) to that effect.[19] His date of 301 for the papyrus, however, is excluded by the fact that it is an extract from official correspondence involving Aegyptus Herculia, which, as Crawford had already pointed out,[20] was not created until about 315. The papyrus cannot, therefore, have anything to do with the Diocletianic reform. We will return to it later in discussing the events of the years 321–324.

The third text is *P.Ryl.* IV 607, discussed in full above (p. 13), in which the author of a letter speaks of a reduction in value of *to Italikon nomisma* to the half of a nummus. The decisive facts are that the nummus seems always to mean a specific coin of small amount (i.e., the 25 ✠ billon coin or one smaller), and that for something to be reduced to half the value of a nummus the something must be a specific coin. (It is not necessary to suppose that the general and collective word *nomisma* has the same meaning in all contexts.) Now of the coins which are possibly

[17] Bowman 1980, 24, 35, n. 13.

[18] Ruschenbusch 1977, 206, gives a full restoration of the papyrus which can only be described as a product of the imagination; he provides absolutely no justification for his restorations, nor does he acknowledge that he owes a couple of items to Jean Bingen (cf. *BL* VI 182) and to the editors of *P.Oslo* III 83 (though he discusses that papyrus on the next page). The restorations do not fit the editors' description of *PSI* 965 and are of greatly unequal length. But the essential point, that the papyrus refers to 301, does *not* depend on the restorations (as Bowman 1980, 35, n. 13 seems to imply), and Bowman is correct to reject the notion that the papyrus can be referring to a reduction from 25 to 12.5 ✠. Ruschenbusch (p. 194) rightly rejects the idea that the papyrus can be dated to 317. Ruschenbusch's restoration is reprinted in *SB* XIV 12134.

[19] Ruschenbusch 1977, 207; the introduction into the text of the follis, and the long note (207, n. 28) thereon have no basis whatsoever.

[20] Crawford 1975, 589, n. 105. Cf. *BASP* 18 (1981) 49.

'Italian' in character (meaning general imperial, not a specifically Egyptian coin like the Alexandrian tetradrachms), it is evident that the radiate copper can never have been worth half of the large billon coin, nor can the small laureate copper. On the other hand, for the reduction to have been made, there must have been a relationship in which the "Italian coin" was worth more than one-half of the nummus at some point. It is therefore excluded that the small laureate copper is the Italian coin and the radiate copper the nummus.

The following possible relationships remain to be considered:

Nummus	*Italian Coin*
25 ₰ billon	aurelianianus
aurelianianus	radiate copper
aurelianianus	laureate copper

The last of these, I think, can be excluded: a copper coin of 1.3 g can hardly have been worth even half of a billon coin of 4 g. As to the remaining two possibilities, it seems to me decisive that the nummus is spoken of here as a standard of value, and other instances show that it was known in Egypt. This is contrary to all we know of the aurelianianus, never either minted in Egypt or used there as a standard coin. The 25 ₰ billon coin, on the other hand, was minted in Egypt in great quantities and widely used; it must be the nummus, which its value here would suit very well. Most recent writers have in fact assigned the term nummus to this coin, replacing the older habit of calling it a follis.

The aurelianianus, moreover, was a coin circulated in small enough quantities that getting rid of one's entire stock of it would be feasible in a short time. If the above considerations are correct, the aurelianianus was, at some point, reduced in value from more than half of a nummus to exactly half. Our correspondent, with knowledge aforehand, takes the occasion to spend all he has. It may be added that if a general devaluation of imperial currency were in question, this tactic would be worthless, as prices would presumably follow the currency as a whole. It is the differential on a single coin which gives the opportunity for profit (or for avoiding a loss). I do not see how we can assign a date to this devaluation of the aurelianianus. Crawford has proposed that the coin was revalued upward in 294 (his date for the currency reform), from 2 ₰ to the equivalent of the radiate copper pieces, which he thinks stood at 5 ₰.[21] But at that value, it would have been worth less than half of the nummus, so that a later devaluation to half would not be possible. Given that the aurelianianus was heavier than the radiate coin and had some silver, the equivalence seems to me dubious. The truth is that we do not know at what value the aurelianianus was tariffed, nor at what date the reduction

[21] Crawford 1975, 577–78; 1978, 153.

to half a nummus took place. Even at the latter value, one should add, the valuation was a bit high.

To recapitulate, the monetary system in use in Egypt in late 301 included the aureus, argenteus, nummus of billon, radiate aes, and laureate aes, the values of which I suppose to have been 1,200 ₰, 100 ₰, 25 ₰, 5 ₰, and 2 ₰. A very small number of aurelianiani may still have been in circulation, perhaps at this point at the value of half of the nummus, thus 12.5 ₰. The tetradrachm was no doubt demonetized in 296, and the small change for the tetradrachm which had been in use in earlier times was now made obsolete by current price levels.[22]

This system is the same as that found in the rest of the empire at this time, except that elsewhere one would probably find more aurelianiani. But two factors still need to be pointed out. First, it is extremely doubtful that all of the coins mentioned above were found consistently in significant numbers in Egypt. Certainly the mint at Alexandria did not produce all of them. There is a silver issue recorded from about 295–6, i.e. before the revolt of Domitius Domitianus, but no further ones are found.[23] Nor were things much different in Antioch, where there is an issue ascribed to *ca* 298, after which there is no more.[24] That is not, certainly, a fair reflection of conditions everywhere, but in general the mints outside Rome appear to have produced very few argentei after 300. Again, there were none of the 1.3 g small laureate coppers minted in Alexandria. Ordinary currency, then, would have consisted of aurei for larger transactions, nummi for most purposes, and the radiate coins for small change.

Secondly, the monetary terminology in use in the rest of the empire has left only modest traces in Egypt. We have seen above (supra, p. 12) how rare mentions of nummi are. Denarii enter the vocabulary in the fourth century to a considerable extent, and as a larger unit eventually we find the myriad of denarii. The talent and drachma, however, remain firmly entrenched as accounting units; we find at times a hybrid system, with talents and denarii. Drachmas eventually disappear, as too small a unit for reference, but denarii and talents both remain in use throughout the fourth century and the fifth and sixth, for that matter, even though worth very little.

[22] The obol is not found in the fourth and later centuries; the restoration of triobol in *PSI* 965 seems to me very doubtful.
[23] *RIC* VI 661–62.
[24] *RIC* VI 616–18.

CHAPTER 4

CURRENCY AND PRICES, 301–326

This chapter is the first of three in which the monetary history of the fourth century after the currency reform will be investigated in more detail. Both the monetary history of fourth-century Egypt and the distribution of the available evidence of the papyri justify the three-part division of the century which I have adopted here. In each case, the information available for prices of commodities included on the list of index figures in Chapter 1 (supra, p. 4) and the index figures derived from them will be presented, then the monetary history of the period. It should be emphasized that these index figures give the price per pound of gold (in talents) obtained by multiplying the index factor times the commodity price; they do *not* represent an assertion that gold was actually sold at that price during that year, and any one figure may be seriously out of line. We begin with the precious metals, then move to other prices.

The prices for gold and silver found in the papyri are divided into two groups: official prices and market prices. These are almost entirely chronologically disjunctive: official prices are found in the period up to around A.D. 324, and market prices afterward. With one exception, therefore, only official ones occur in the majority of the period covered in this chapter. For gold, they are the following:[1]

P.Panop.Beatty 2.216	16.ii.300	40 T./lb.[2]
Edict of Prices 1,28a	xii.301	48 T./lb.
P.Oxy. XVII 2106	304–306	66 T. 4000 dr./lb.
P.Ryl. IV 616	309–310[3]	73 T./lb.
CPR VIII 27	24.vi.324	168 T./lb.
P.Oxy. XII 1430	31.vii.324	209 T./lb.

In each case, we are dealing with an officially set price; in all cases except the second, it is a reimbursement to individuals for gold supplied

[1] To avoid biasing the argument at this stage, texts without a reasonably exact date are not included here. They may be found on p. 61.

[2] This is the authorized price; the officials on the spot apparently paid 42 T. instead, causing problems.

[3] See *BASP* 17 (1980) 10–12 for the probable date; the gold price here was established by J.R. Rea, *Cd'E* 49 (1974) 165.

to the state. The difference in price between the last two, only a short time apart, is hard to understand. Either there was a sudden price change, or the government had different prices for different types of transactions. We will return later to the problem of the year 324.

Silver prices are fewer. It may be well to preface them by the statement that the ratio of the value of gold to that of silver *in official reckoning* in the first 35 years of the century was 12:1 (we have no useful contemporary evidence on the market value of silver bullion). We know or deduce this from the value given in the Edict of Maximum Prices in 301, from an Oxyrhynchite document of the early fourth century (*P.Oxy.* XLVI 3307), from the Karanis material of 307/8,[4] and from Hermopolite texts from around 335.[5] Silver prices are:

Edict of Prices	xii.301	4 T./lb.
SB VI 9253	n.d.	5.33 T./lb.
SB XIV 11345	11.viii.306[6]	5.55 T./lb.

The first of these is an official tariff, and the other two are official prices for purchasing silver. *SB* XIV 11345 corresponds to a gold price, at a 12:1 ratio, of 99,936 ₰ or 66 T. 4000 dr./lb. It seems extremely likely, therefore, that *P.Oxy.* XVII 2106, mentioned above, is to be dated from the year 306.[7] *SB* VI 9253 points to a price of 64 T./lb. for gold, presumably only a little earlier.

The course of price inflation, by the government's own reckoning, therefore, would involve slightly more than quintupling in 24 years, with a fairly smooth rate, about a doubling each decade. Unfortunately, however, these figures cannot be taken as accurately representative of the real trend of prices. We have an open market transaction in gold in about 316–318 (most likely 318) in *P.Oxy.* XLIII 3121, where a pound of gold costs 288 T., or 38 percent more than the price quoted six years later for official purchase (taking even the higher price from 324). The open market price had thus reached a point probably rather more than twice the government price. We are well on the way to what Carrié calls the fiscalization—conversion to a tax—of the compulsory purchase.[8]

The other indexable figures are as follows:[9]

301	Wheat at 1,333 dr./art. in *Edict* 1,1a
303/4	Wine priced at 300, 500, and 600 T. per keramion

[4] See *Cd'E* 52 (1977) 322–36.

[5] *ZPE* 32 (1978) 251–52.

[6] The date is corrected by J.R. Rea, *Cd'E* 49 (1974) 163, not yet known to Callu 1978, 107.

[7] Cf. Rea, ibid., 164–65 for the logistes mentioned in the Oxyrhynchos papyrus. Bowman 1980, 35 n.8, also supports 306 as the date.

[8] Carrié, 1981; cf. also *Cd'E* 52 (1977) 319–21 and *ZPE* 32 (1978) 250 ff.

[9] Once again, texts without dates are relegated to the list in Chapter 9.

	(*CPR* VI 23)
308	Beans priced at 900 dr./art. for future delivery (*P.Cair.Isid.* 87,88,89)
309	Beans priced at 700 dr./art. for future delivery (*P.Cair.Isid.* 91)
311	Wheat priced (officially) at 1,333 dr./art. (= rate in Edict of 301) (*P.Cair.Isid.* 11.50; doc. 312)
312/3	Wheat priced at 2,000 dr./art., and vegetable seed at 1 T./art. (*P.NYU* 18; for date cf. *RFBE* 37)
314	Wine costs 1800 dr./knidion (*CPR* VIII 22) Wheat costs 1 T. 2000 dr./art. (*CPR* VIII 22) Vegetable seed costs 1 T. for future delivery (*P.Cair.Isid.* 92)
315	Wheat costs 3000 dr./art. (*P.Princ.Roll* 157: adaeratio) Barley costs 1000 dr./art. (*P.Cair.Isid.* 58: adaeratio)
316	Barley costs 1000 dr./art. (*P.Princ.Roll* 114: adaeratio; see *Archiv* 30 [1984] 78) Wine costs 260 dr./sextarius (*P.Oxy.* XVII 2114: adaer.)
ca 318	Wine costs 300 dr./sextarius, 1500–1700 dr./knidion, 2800–2900 dr./spathion (Theophanes' accounts, *P.Ryl.* IV 629–639; for date cf. below) Meat costs 150 dr./lb. (Theophanes; 200–400 dr., Syria)
320	Cumin costs 5000 dr./art. for future delivery (*SB* V 7667)
321	Wine costs 2500 dr./keramion (*CPR* VI 38)
322	Wine costs 3400 dr./knidion (*CPR* VI 45), 3000 dr./keramion (*P.Oxy.* VIII 1139 recto, see introd.)
326	Vegetable seed costs 7 T./art. for future delivery (*P.Col.* VII 177)

Of these, the only possibly dubious placement is the prices from Theophanes' travel accounts, from which (with one exception) only prices paid in Egypt have been taken into account to avoid possible incommensurability of data. The outer limits established by the editor for these accounts were 317–323. The prices appear overall incompatible with the levels prevailing in the early 320s. But leeway of about a year on either side cannot be eliminated.

The indexation of all of the above-mentioned figures yields the following (official gold prices are underlined):

300	40
301	48, 127 (wheat)
302	no information
303–304	48–96, average 75 (wine)
305	no information
306	67
307	no information
308	119 (beans; 178 with 50% augment)
309	92 (beans; 138 with 50% augment)
309–310	73

311	126 (wheat)
312–313	192 (wheat), 288 (vegetable seed)
314	290 (wine), 288 (veg. seed; 432 with 50% augment); 768 (wheat)
315	192 (barley), 288 (wheat)
316	192 (barley), 200 (wine)
ca 317	288
ca 318	230 (meat), 225–334, average 266 (wine)
319	no information
320	240 (cumin; 360 with 50% augment)
321	400 (wine)
322	480–510, average 495 (wine)
323	no information
324	168, 209
325	no information
326	2,016 (vegetable seed; 3,024 with 50% augment)

A comment is needed about the 50 percent augment. In these cases we are dealing with a sale for future delivery. I have argued elsewhere[10] that the true price was normally 33–50% higher than that stated, and that these are actually loans in money to be repaid in kind. The artificially low 'price' permits a concealed high interest rate for the lender. But circumstances can vary, and we cannot be sure that the price was precisely 50% higher than the stated one in all cases. In several of them, the unaugmented price seems closer to the prevailing levels, while in other cases it is the augmented price. If we had a vastly greater quantity of evidence, we could be more certain whether the augmented or unaugmented price was likely to be in line with normal price levels, but even then we would have to allow for the possibility that unusual circumstances raised or lowered particular commodity prices in any given instance. Overall, the argument made here about the course of price levels is not seriously affected by a choice to use the unaugmented or augmented prices.

We turn now to an attempt to connect these developments to the monetary history of these years. The mint of Alexandria produced the billon nummus of 10 g (worth, it is argued above, 12.5 ₰ until 301, then 25 ₰) from the currency reform (296) until 307; and at the same time the 3 g radiate piece (5 ₰) was also minted. There are no examples of the 1.3 g laureate.[11] A major change occurs in 308, when the nummus suffers a reduction in weight. There is a considerable fluctuation of recorded weights, and these are in any case approximate. But the new weight was about 7.75 g, representing a reduction of 22.5% (and some

[10] *GRBS* 18 (1977) 85–96.

[11] *RIC* VI 660–73. There is a single example of a 5 g piece interpreted by Sutherland as a half-nummus. The antoninianus, which is evidently the coin involved in *P.Ryl.* IV 607, had very little circulation in Egypt, as noted above.

lighter examples are known).[12] This weight remains in use until 312, when another group of issues appears, again with varying weights but with an average around 5.25 g, or further 33% reduction.[13] These issues in turn continue until 318, when a new monetary 'reform' is carried out, adopting a coin of 3.4 g with a silver content of 3.3% (i.e. 112 mg per coin), a reduction in silver content of 44%.[14] This standard is in turn retained until 321, when Licinius breaks away from Constantine. These changes are not directly referred to in the papyri except for the apparent reference to the revaluation of 301 in *PSI* 965.

At some time between 321 and 324, Licinius issued a new series of coins, with which he reduced the weight of the nummus somewhat, to 3 g (Plate 2d).[15] What was more noteworthy, however, he reduced the silver content from 3.3% to .12% (from 112 mg to 3.6 mg).[16] To summarize these developments:

296–307	10 g	silver: 4% or 400 mg
308–312	7.75 g	silver: 3.8% or 295 mg
312–318	5.25 g	silver: 3.8% or 200 mg
318–324	3.4 g	silver: 3.3% or 112 mg
324–325	3 g	silver: .12% or 3.6 mg

Let us turn back now to attempt to link this monetary history to the course of prices. From 300 to 307, during a period when the currency itself[17] was stable in silver content, the level of prices of gold moved from 40 to about 67 T. (in 306p), or a bit more, on official reckoning. On the free market we cannot say, as good price information for the first decade of the century is curiously lacking. The nummus at 10 g and 400 mg of silver, with silver at 5000 ₰/lb. in 300, was worth about 7.3 denarii in silver and copper content (see above, p. 20). The same coin a year later had 8.8 ₰ of metal. But it was tariffed, as we have seen, at 25 ₰. The price of gold and silver bullion continued to rise in terms of denarii: to put it another way, the value in denarii of the metal in the nummus rose to come closer to the tariffed value of that coin, reaching about 12.2 ₰ in 306, on the government's own reckoning.

The change of 308 introduced a coin with about 295 mg, or .259 grammata of silver, a reduction in silver of over 22%. The government figure for gold in 309/310 shows only a 10% rise since 306, but our

[12] *RIC* VI 673–80.

[13] *RIC* VI 681–86.

[14] Barrandon and Brenot 1978, 128.

[15] Barrandon and Brenot 1978, 131. Crawford 1975, 589, puts this event in 317 (repeated in Crawford 1978, 153); but in 317 the decline of the silver in the nummus was minor by comparison (see above).

[16] Barrandon and Brenot 1978, 133; my calculation uses only their examples 129–140, which would reflect most closely the currency available in Egypt at this time.

[17] The billon currency, that is; gold and silver virtually ceased to be struck in these years.

scarce prices in the private sector show an index of 92–119 or (with the 50% augment) 138–178. Even if prices in 308 were abnormally high, we still find a minimum index (allowing for only 33% augment in the prices referring to future delivery) of 122 in 309p. The rise is substantial and, moreover, appears to come in 308, exactly when the coin had just been lightened. At an index of 122, the nummus would have 16.6 ₰ worth of metal. I must point out again the very defective character of our information for the period 307–311 and the approximate character of everything said here about it.

In 312 comes another reduction, this time of 33% in silver content, to 200 mg or .176 grammata. Over the next six years, the commodity prices in our reasonably abundant evidence show large divergences within a single year—up to about 50% pretty consistently, in fact. The bizarre figure of *CPR* VIII 22 for wheat sticks out of this pattern as an oddity. Repeatedly, however, figures around 288 crop up; as it happens, this is the commercial gold price attested *ca* 317–318 (cf. above, p. 28). At this price, in fact, we find that the silver of the nummus would be worth 26.6 ₰. Given the approximateness of our analyses, it would not do to push the 'premium' over face. What is clear, however, is that virtually immediately after the lightening of silver in 312, the price levels rose to compensate entirely. That six years of stability followed can be no surprise, as the face value of the currency was covered in its entirety by metal. The fluctuations from year to year and from commodity to commodity which we do see are our best evidence of just what the limits are of the method we are using.

The new currency of 318 represented a decline of 44% in silver content, to 112 mg per coin (cf. above, p. 31). A gold price of about 470 T./lb. would be needed to restore 'full coverage', the equilibrium of 312–318, in which the value in denarii of the metallic content of the coin and its tariffed value were roughly equal. After a year in which we unfortunately lack any prices, we get index figures of 360 in 320p, 400 in 321p, and 506 in 322p. If we allow for the spottiness of the evidence (especially for the fact that so much of it comes from wine, the quality of which and thus its price are highly variable), we must conclude that the market did adjust to the new silver content fairly rapidly. That the state still paid only 168 T. for gold in June, 324, shows how far from real compensation the price now was, and the 209 T. we find a month later is not a lot better.

Licinius' reduction of the coin to 3.6 mg of silver (Plate 2d) marks a radical break with the immediate past. Now Licinius marked these coins XIIΓ, which is generally accepted to mean 12 1/2, i.e., denarii (the apparent capital gamma being an epigraphical form of the sign for a

half).[18] The reduction of stated value by a half, however, which seems also to be reflected in *P.Oslo* III 83 (cf. supra, p. 23), was at best a sop to the public, an attempt to claim that the reduction was a mere 50% rather than the 96% it really was. Put another way, the reduction in silver per denarius was 93% (from 4.5 mg to .29 mg). To compensate, gold would have to rise to 1,146 T./lb. or thereabouts.[19] It did much more, but the precise chronology of its rise is unclear. The probable course of events is interesting.

It has generally been assumed by numismatists that Licinius' XIIΓ issue begins in 321, when he broke with Constantine. Given the behavior of price levels in the preceding two decades, however, we would expect immediate effects of such a reduction in silver content. We do not find any. Prices in 321 and 322 reflect the reduction of 44% in 318p, not one of 93%. We are driven to look at the less readily comparable prices. There are few even of these. But *P.Oslo* III 138, of 17.xii.323, is a lease of one room (a *topos*) for 3,000 dr. per annum. Not all rooms are the same, of course. But in general a *topos* tends to rent for about the value of one artaba of wheat (cf. the 800 T. p.a. in 360p, in *PSI* V 467, or 2,500 T. p.a. in 377p, in *P.Lips.* 17), and we might thus postulate wheat at 3,000 dr. or a bit more in the last days of 323, giving therefore an index figure of 288 or rather more. For 324 itself, we have not one usable price. It seems that Licinius' XIIΓ issue must date from 324. In this light, it is perhaps best seen as a measure of his war preparations that year; the quantities and geographical spread of its minting are very large.

This, in turn, explains the fact that its full effects were not felt. Our index figures for 325 and 326 run around 2,500–3,000, only 6–8 times those before Licinius' issue. The explanation lies in Constantine's actions when, soon after Licinius' issue (and subsequent death), i.e., in the late fall of 324, he gained control of Egypt. He kept the same coin weight, but demonetized Licinius' issues[20] and restored the silver to 2.1%, or 63 mg per coin: not much over half of what the nummus had held before 324, in fact, but a great improvement over Licinius' pieces (plate 2f).[21]

[18] Barrandon and Brenot 1978, 128; Callu 1978, 109. *P.Oslo* III 83, which speaks of a reduction in the value of the coin to 12 1/2 ✕, no doubt belongs to this point; the terminus post quem is 315 (mention of Aegyptus Herculia) and the terminus ante quem is 324, when the papyrus was reused; for the date of the verso, see *BASP* 18 (1981) 49, on *P.Oslo* III 120.

[19] How Callu (1976, 235) can call this change deflationary, I do not understand.

[20] Callu's statement (1978, 109) that this point is the time at which the denarius was on the point of disappearing from accounts, is incorrect. The accounts do not deal in coins but in accounting units, and the denarius survived far beyond these years as an accounting unit. An example (at random) is *P.Oxy.* XVI 1912.29.

[21] Callu 1976, 236.

It must have been impossible, however, to roll back the price inflation of Licinius' last year, and as a result one of the new Constantinian nummi would have been worth 38.3 denarii at the hypothetical 1,146 T./lb. level for gold. Instead of attempting an inverse split of the money, Constantine must have retariffed the coin: if Licinius' rubbish was worth 12.5 ✠, something with over 17 times as much silver could be tariffed at 100 ✠ and still seem a bargain: indeed, the coverage of the face value by silver will have been *much* higher than in 301. I should emphasize that we have no explicit evidence that 100 ✠ was the value; but it is appropriate, and the term *centenionalis*, still in use in imperial edicts in the 350s (cf. infra, p. 44), seems to have referred to what was probably the direct descendant—albeit debased—of the coin of 324.[22]

This retariffing and new issue evidently virtually halted at a certain point the enormous price rises set in motion by Licinius. At the level of 2,500 T./lb., potential for further rises was roughly limited, by the silver and copper in the coin, to another 20% or so, for the nummus was worth at this level 83.5 ✠. We do find several gold prices at the index level around 326, in fact, but none in the range more than 10% higher.

PSI VII 825 (=Naldini 44)	2,400 and 200 T. silver[23]	Private letter with instruction to buy if gold avail. at this price
SB XIV 11591.20, 26–27	2,520 T./lb.[24] 2,592 T./lb.	Amount actually paid for solidi noted in official account
SB XIV 11592.21, 25	2,592 T./lb. 2,700 T./lb.[25]	Same

None of these texts bears a dating element. We find that in all cases we are dealing with solidi (or fractions of a solidus) purchased for particular sums. The sum paid varies even in one context over a range of about 7%, and it is clear that market prices (or the weight of a solidus, of course) fluctuated, so that one did not know if gold was available at a given price until one tried to buy it. (For the question of who needed to purchase gold, see Chapter VII.) On the other hand, the overall level is

[22] Callu tells me by letter that he prefers a date of 330 for the introduction of the centenionalis. This seems less likely given the prices in the papyri; the price for vegetable seed in *P.Col.* VII 177 is particularly telling in favor of a price level at which a value of 100 ✠ makes sense for the nummus already before 330.

[23] The text (λγ b) and the translation (33 1/4) not quite match up, but both are wrong. The papyrus has ʿB, i.e., 33 T., 2,000 dr., or exactly 2,400 T./lb., as K.A. Worp first suggested to me and I have verified on the original.

[24] The prices are: line 20, 18 T. for 1/2 solidus; line 27, 35 T. supposedly for 2 sol. Comparing the next text, it seems to me likely that 35 is the price for *each* of the two solidi, and that the scribe has made a copying error. This papyrus was first published by Wessely 1905, 23 as E 187.

[25] Line 21, 18 T. for for 1/2 sol.; line 25, 25 T. for 2/3 sol. Thus 2,592 and 2,700 T./lb.

fairly consistent. The continued 1:12 gold to silver ratio is noteworthy, especially as this is our first open-market evidence for it. These texts are to be dated in general to about 325–330, probably nearer 325. Cf. p. 39 for the pay of a boethos at this time compared to that of a later period; in general, the period 325–330 is not rich in information about prices.

CHAPTER 5

CURRENCY AND PRICES, 327–351

Once past the apparent restabilization of the currency with Constantine's control of Egypt and new coinage, we find, for about a decade, a striking lack of evidence from the papyri. There is a price of 2 T. 5333 dr./art. for wheat in *PSI* IV 309 (327p),[1] but it is the level at which the government reimbursed a compulsory delivery, and the index figure of 1664 derived from it mainly shows that the reimbursement level was a third or more below market value. From this point until 335 we have almost no usable commodity prices and no dated gold prices. There are in fact precious few prices of any sort, and the 130 T. for a horse in *P.Sakaon* 62 (328p) or 40 T. for a donkey in *CPR* VII 36 (331p) do not help much; they are not, at any rate, suggestive of major changes. For the billon coinage, the issues with their weights and silver content may be tabulated as follows:[2]

325–330	3.05 g	silver 2.1% or 63 mg
330–335	2.48 g	silver 1.1% or 27 mg
336–337	1.61 g	silver 1.5% or 24 mg
337–341	1.64 g	silver 1.4% or 23 mg

We see at once that there was a major cut in silver from 63 mg to 27 mg in 330, and that the newly established level then approximately held until 341. This level would, in the same manner as earlier calculations, result in a figure of 5,521 T. for 330–335 and 7,038 T. for 336–337, for the price of gold which would reflect adequately the metallic content. The precise numbers may be different, but as approximations these will do. In fact, *SPP* XX 93[3] gives us adaeratio figures for meat and oil from indictions 5 through 8, which must be 331/2 through 334/5, giving meat prices per lb. of 4,364, 4,091, 4,073 dr. (in that order) and 6,136 dr. (doubtful reading). The average of the three certain readings is 4,176 dr., giving an index of 6,414. The one price for oil, 2 T./sextarius, gives an index of 5,760. Given the qualitative differences in oils, the agreement in index is fairly good. Our next three gold prices are of the right order of magnitude for the

[1] See "Due papiri fiorentini del quarto secolo," *StudPap* 21 (1982) 87–91.

[2] Based on Barrandon and Brenot 1977, 184–85; 1978, 128–29, 134–35, and *RIC* VIII, 60.

[3] See Bagnall and Worp, *BASP* 20 (1983).

coins of the 336–337 years:

P.Vindob. G25840[4]	7,200 T./lb.	Official account quotes 100 T per solidus
PSI XIV 1423 = Naldini 45	7,680 T./lb.	Private letter quotes 16 myriads ✕ per solidus
SPP XX 96	8,640 T./lb.	Official account like Prektis dossier[5]

As with the calculation around 325, we find that the price of gold has advanced slightly beyond the point that the quality of the coin justifies: bullion is slightly overvalued vis-a-vis the coined metal, in other words. But the discrepancy is not great. Now none of these has a date, and one might be tempted to put them a bit later than 337; but the evidence for the following period makes it unlikely that they are later than 338. The dated evidence from 335 to 341 is as follows:

335	Wheat costs 14 T./art. (*P.Lond.* VI 1914)
337?	Meat costs 1 T. 3,600 dr. for adaeratio (*P.NYU* 12; doc. may be later, meat is for 336/7; see *ZPE* 24 (1977) 122)
338	Wheat costs 24 T./art.; barley, 13 T. 2,000 dr./art.; meat costs 1 T. 3,600 dr./lb. (all from *P.Oxy.* I 85[6] and *PSI* III 202[7])
	Meat costs 2 T. 3000 dr. for adaeratio (*P.Oxy.* XXXI 2571)
339	no information
340	Wine costs 3 T./sextarius, 15 and 20 T./spathion (both *BGU* I 21)
341	Vegetable seed costs 50 T./art. for adaeratio (*PSI* VII 781[8])

When these are indexed, we find the following:

335	8,064 (wheat; seems to be considered expensive)
337?	14,746 (meat; doc. may be later)
338	13,824 (wheat); 14,746 (meat); 15,360 (barley); 23,040 (meat: adaeratio)
339	no information
340	10,350, 13,800 and 13,824 (wine)
341	14,400 (vegetable seed)

[4] Published as PER 37 in Wessely 1905, 23–24; see now *BASP* 20 (1983).

[5] In the same hand as *P.Vindob.Bosw.* 13 and *SPP* XX 75, cf. *BASP* 13 (1976) 37–38. These texts all seem to concern Prektis, the name of which is to be read in *SPP* XX 75 ii.5, as K.A. Worp informs me.

[6] Now reedited by R.A. Coles in *ZPE* 39 (1980) 115–23, with, for the first time, the complete text.

[7] With the corrections of R.A. Coles, *ZPE* 39 (1980) 124–25.

[8] My reading of πεντήκοντα instead of πενταχόσια in line 6; disregard remarks in *ZPE* 24 (1977) 117 and n. 26.

Aside from the aberrant meat price of *P.Oxy.* XXXI 2571, the level of 13,000 to 15,000 is consistently maintained from 337 on. These figures help us to date a very helpful and important text, published in part by Wessely as *SPP* XX 81 and now, with new fragments, reedited as *SB* XIV 11593. There, line 39 tells us that 183 T., 2000 dr. were paid for each of two solidi. The price per pound implied by this is 13,200 T., more than five times the price in the period around 325. A date for this papyrus would be of use, and I think one can be assigned with not too much leeway. The papyrus contains the following other prices:

meat, 1 T. 2,000 dr./lb. (16,24) [index 12,288]
wine, 20 T./spathion (18,25,42); 3 T. 2,000 dr./knidion (17,23); 6 T./knidion (43) [indexes 13,800, 3,000, 4,500]
wheat, 26 T./art. (14,21) [index 14,976]
fowl, 5 T. each (15,22)
pay of boethos, 60 T./month (37)
chartai for receipts, 6 T. 4,000 dr. for two (38)

Now it is immediately apparent that the price for a spathion of wine is identical to the price of a spathion (one of the three wine prices) in *BGU* I 21 (340), while that for wheat is just 2 T. (8.3%) higher than the price in 338. Given the normal fluctuation of prices, the difference is negligible. Meat is also not much different from the pork price in 338. The gold prices and commodity indexes both agree closely with the data above. We must, therefore, assign a date around 340 to this text: 338–341, to be cautious. One noteworthy point is a ratio of 7.05 artabas of wheat to the solidus, a rather low figure (i.e., wheat was expensive). The pay of the boethos, 60 T./month, is 6 times the rhabdouchos' pay of 325, and 7.5 times that of a boethos around that time (*SB* XIV 11592.4), the same man probably being involved in both cases. Obviously this last comparison does not have the force of that of prices of standard commodities, but in fact the ratio is not greatly different from that of gold prices. One further note on the 337–341 period: the annual rent for a house in Panopolis (the same house seems to be involved) did not change from 337 to 339 (*P.Panop.* 12 and 13). This does not mean there was no inflation in those years; but at least the rough level of prices was probably comparable. The price level indicated in the 338 documents had therefore already been reached in 337, as the meat price of *ca* 337 also indicates.

Some further documents may be dated to this period (cf. n. 5 above), and they complicate the picture somewhat, indicating once again the possible range of commodity prices. In *SPP* XX 75 we find the following:

wheat, 30 T./art.	index, 17,280
barley, 15 T./art.	index, 17,280
wine, 4 T. 2,000 dr./sextarius	index, 19,968
wine, 8 T./knidion	index, 7,200
wine, 20 T./spathion	index, 13,800

meat, 4 T. 2,000 dr./lb.	index, 39,936
boethos or phrouros, 60 T./mo.	

Meat and the knidion of wine are out of line, one high the other low (cf. the same combination in *P.Oxy.* 2571 and *SPP* XX 81). But the indexes in general point to a level a bit higher than the ones discussed immediately above and *may* be a year or so later.

The reduction of silver content in the coinage in 337 would have justified a slight rise in the price of gold stated in denarii, to about 7,182 T./lb. This figure falls between the figure of P.Vindob. G25840 and that of *PSI* XIV 1423. It seems likely that the prices in the 7,000's listed above come soon before or just after the change in 337, and *SPP* XX 96 not too much after them. It must be remembered that errors of measurement, especially of silver content, are very possible in a small sample, and if we used somewhat lower figures the picture would change: a figure of 1.6 g for the coin and 20 mg for silver would give a gold value of 7,899. Strikingly enough, however, the commodity indexes virtually all point to a much higher level, even in 337 and 338. This *may* be a phenomenon of temporary dislocation of supply and demand; we recall the remarkably low wheat to solidus ratio in *SB* XIV 11593 (cf. above, p.39).

One could advance other explanations, for example, that the stated value of the nummus was increased from its putative 100 to about 150. On the other hand, there seems little difference in price levels immediately before 341 and just after it; yet to that year is assigned another new currency change. The principal coin of this period, the still less fine descendant of the nummus of the preceding decade and a half, weighed some 1.65 g and had only .9% silver, i.e., 10.4 mg.[9] The corresponding gold price would be 10,887 T. It seems, therefore, that inflation outstripped the debasement of the currency about 338, and that the further debasement of 341 only slightly increased the price levels because the debasement barely even matched the price rise of 338. The most likely explanation of the curious situation of 337–340, therefore, probably combines the high level of commodity prices compared to gold, some overreaction to debasement, and perhaps chronological factors which the lack of precise dates on several of our documents prevent us from grasping. It may be, also, that a lower value for copper is to be used, as in *P.Oxy.* I 85 (338p), where cast copper is worth 1/3300 of the same weight of gold bullion (using the 13,200 T./lb. price for the latter). The assumption of such a value (instead of 1/1440) would yield a gold price of 16,011 T. on the basis of the contemporary coins. The decline in the value of copper may thus have been a

[9] This figure and those below come from J.P.C. Kent, *RIC* VIII, 60 ff. Kent cites two figures for silver contents, those obtained by chemical analysis and those from nondestructive neutron activation analysis. I have averaged these figures to obtain my figure: see Kent's discussion of the likelihood that the neutron activation figures are somewhat too high.

major factor in the irregular progression we find here. By 342, the price levels and silver content were more or less back in balance, on the assumption that the official value of the nummus stood unchanged at 100 ~~X~~.

From the remainder of the 340's, we have very little information. Our few precisely dated prices are worth little except in a vague way; for example, a carpetmaker in 344p pays 20 T. p.a. rent (*P.Mert.* I 33); a basement room rents for 35 T. p.a. in 345 (*P.Genova* I 22), a whole house the same year for 90 T. p.a. (*P.Harr.* 82). A horse sold for 600 T. in 346 (*P.Abinn.* 60) is no more useful.

The undated documents of the Abinnaeus archive provide a few useful prices, such as:

wheat	50 T./art.	*P.Abinn.* 68	index 28,800
barley	30 T./art.	*P.Abinn.* 43	index 34,560
wine	25 T./spathion	*P.Abinn.* 75	index 17,250

In general these prices should come from about 342–351, but we cannot be confident that Abinnaeus gathered no earlier or later papers. Can we find any help in the coins?

The new currency of 348–351, the "Fel Temp Reparatio" coinage in its first form (Plate 1c), returns us to a situation with several billon denominations. These were (a) what the numismatists call Aes 2 (large), about 5.25 g (1/60 lb.), with 2.75% silver or 144 mg; (b) "Aes 2 (small)", about 4.25 g (1/72 lb.), 1.3% silver or 55 mg; (c) "Aes 3", about 2.42 g (theoretically 1/120 lb.), with .4% silver, or 7.25 mg. Of these three, the large Aes 2 did not play a major part in minting activity, being struck in small quantities and in any case far too fine to stay in circulation; a less fine version (with 1.3% silver, or 68 mg) was therefore produced in 351.[10]

The successor to the nummus was certainly the 'aes 3' of 2.42 g and 7.25 mg of silver, a reduction in silver content of 33% from the coin of 340–348. This minute silver content and the accompanying copper would correspond to a gold price of *ca* 9,576 (copper at 1/1440 gold) or 16,349 (at 1/3300). It is to be noted that even with the lower value for copper, the intrinsic value of the copper is now almost equal to that of the silver: put another way, there is so little silver that it is only just over 50% of the value of the metals in the coin. Allowing for commodity fluctuations, this figure corresponds tolerably well to the undated Abinnaeus figures quoted above. But we are unable to fix more precisely the relationships of prices and coinage in the 340's. We have no gold prices at all. One final note: now that the copper provided half or more of the metallic value of the coin, the decline in the silver content produced a much smaller decline in the total worth of the metallic content of the coin than it had in earlier years. Correspondingly, if we had better information about the value of copper in this period it would be very useful; to date we do not.

[10] See Kent 1967 and *RIC* VIII, 61.

CHAPTER 6

CURRENCY AND PRICES, 351–400

Usable commodity prices for the 350s are scarcer than for the 340s, but there is just enough information to allow us to reconstruct what happened. For 351, we have two figures: rent of 150 T. p.a. for a house in Oxyrhynchos (*PSI* VI 707); this is the highest figure up to this time, but given diverse sizes of houses, it is not out of line with the 90 T. rental mentioned above for 345 and the 33% debasement in 348; and, equally hard to interpret, in early 351 (3.i?; cf. *RFBE* 42 n. 1), a carpet for the visit of the dux cost 1,500 T. (*P.Oxy.* XII 1431). On 25.vii.353 a palm grove of unknown size rented for 8,000 T. p.a. (*P.Oxy.* XIV 1632). These are not indexable prices, but the order of magnitude of the second one is so different from what precedes as to make it clear that some major change in the currency has intervened. The next commodity prices we have give some idea of the change:

357/8	Wheat costs 846 T./art., meat 80 T./lb. Index: wheat 487,296; meat 737,280 (*P.Stras.* 595[1])
359	Silver costs 45,333 T./lb., wheat 1367 T./art. (?) (*P.Oxy.* LI 3624–3625) Index: silver 544,000; wheat 787,200
360	Arakos costs 1,200 T./art., meat 96 T./lb. Index: arakos 1,382,400; meat 884,736 (*P.Oxy.* VII 1056)

After these prices, we lack all commodity prices for a decade. These six prices are not exactly consistent, but one would most prudently assume that the wheat price of 357/8 is low and the arakos price of 360 high, since arakos normally cost about the same as barley.[2]

The commodity prices we find around 360 imply a price for a pound of gold of between 500,000 and 1,000,000 T./lb. This range calls to mind the gold price in *P.Oslo* III 88 and in *P.Oxy.* XLVIII 3426,[3] at 1,080,000 T./lb., and that in *P.Oxy.* IX 1223, 969,200 T./lb. (a solidus there is quoted at 2,020 myriads, and the writer adds "for it has

[1] *ZPE* 27 (1977) 161–64; revised text as *SB* XIV 12154.

[2] Cf. Johnson, *Roman Egypt*, 312.

[3] I see no reason to suppose that the 2,250 myriads quoted in this text were not the full price of the solidus here, despite the use of ἀπό.

dropped," κατέβη γάρ). None of these texts has a date. A solidus at 2,000 myriads (gold thus at 960,000 T./lb.) is indicated by a price of 5 solidi per monas in *P.Oslo* III 162, the monas being 10,000 myriads (cf. above, p. 11); this latter text belongs to the same archive as the texts in *P.Oxy.* XLVIII. A solidus at about 1,350 myriads (the pound of gold thus at 648,000 T.) occurs in the also undated *P.Oxy.* XLVIII 3401. A date in the mid 350s for this text would correspond adequately to the overall limits of the archive of which it is a part.

Despite all fluctuations, then, we are talking in terms of a different order of magnitude for the price of gold. We turn to the monetary history in order to try to clarify things. A new issue appears in the early 350's (Kent dates to 353 or 354, Callu to 352) and lasts until 357, an "Aes 3" at 2.5 g and 1.2% silver (30 mg), a significant improvement over the preceding "Aes 3" with only 7.25 mg of silver (Plate 1e).[4] The issues of 357–358 are slightly lighter; no figure for silver is available, but apparently the amount is rather negligible. The same is true of the new "Spes rei publicae" coinage of 359–362, at just under 2 g and again no known silver content. Slightly better coins, at weights of 2.9 g, are produced by Jovian in 363–364, followed by Valentinian's coinage at about 2.3–2.4 g and a silver content of .2%, an almost negligible trace, in the years 364–375 (Plate 2b). To summarize in tabular form:

352?–357	2.5 g	silver: 1.2% or 30 mg
357–358	<2.5 g	silver: ?
359–362	<2 g	silver: ?
363–364	2.9 g	silver: ?
364–375	2.3–2.4 g	silver: .2% or 4.7 mg

Connecting this history to the price levels is a difficult business. It can be seen right away that there is no monetary fact from around 352 or 353—even two years in either direction—obviously corresponding to the 40–50-fold rise in price levels. Something else must be involved. It should be mentioned here that a law to be dated in 354 (*CTh* 9.23.1) forbids commerce in coins dubbed *maiorinae* or *centenionales communes*, terms never encountered in the papyri.[5] It seems probable that the *maiorinae* are the large "Aes 2" coins (with 158 mg of silver), the *centenionales* the coin earlier (and perhaps to its end) tariffed at 100 ✕, the pre-348 money. In fact, a further phrase forbids all other forbidden money to be used, suggesting a sweeping demonetization of everything except the current coinage and a ratification of earlier demonetizations.[6] Whatever the exact meaning of the regulations, it seems that some

[4] Cf. Kent 1967; *RIC* VIII, 64–65.

[5] See Callu 1976, 240, n. 62, and 1978, 113, for the text and its dating; and cf. next note.

[6] So *RIC* VIII, 65, proposing these identifications of the terms. Contra, Callu 1978, 113, who thinks that they are the same coin.

substantial monetary change ("reform" would be too kind) must have taken place quite recently: at a time which would correspond to the drastic increase in prices noted earlier. It is likely, in my view, that the new coinage of about 352 (the 2.5 g coins with 30 mg silver) was called something quite different from 100 ✠ on its appearance.[7] We know that thanks to the rise in the price of bullion even the earlier coin would have been worth much more than 100 ✠ at the metal prices of the middle and later 350's; the coin with 7.25 mg of silver, for example, would be worth 5,221 ✠ when gold rose even to 500,000 T./lb., and twice that when it rose to 1,000,000 T. A new coin with more than 3 times the silver: what would it be tariffed at? When we consider that after 350 the term "myriad" starts to appear without the qualification "of denarii," we may suspect that there was a coin called the myriad in this period, a coin the value of which was 10,000 ✠. A simple calculation tells us that tariffing a coin with 30 mg of silver at 10,000 ✠ would imply a gold price of 517,892 T./lb. The conformity of this level to the price levels later in the decade (and particularly to silver in 359) almost guarantees the correctness of this hypothesis.[8]

The hypothesis is in fact decisively confirmed by an examination of *P.Oxy.* XXXIV 2729.[9] In lines 35–36, we learn that bronze vessels (χαλκώματα) are bought for 1,850 and 1,900 myriads per centenarius, and thus that a pound of bronze cost 18.5 or 19 myriads. In line 34, we find that a λίτρον χωρικόν, another bronze vessel, sells for 20 *argyra* for 13 ounces. It can easily be reckoned that the pound, at 12 ounces, will cost 18.46 *argyra*. The coincidence of these two prices for worked bronze shows that the myriad and the *argyron* are identical, and as the latter must (as Carrié correctly observes) be the billon common coin of the period, the myriad is identified as this coin.[10]

[7] Kent, as we have seen, dates the new coinage to 354, as did Callu 1980, 99. But the latter (per epist.) now prefers summer, 352, which the papyri do not contradict. If the edict in the *CTh* is indeed from the same time as the new coinage, it supports dating the latter in 354; but if it follows the new coinage, it is harder to be certain. The scanty papyrological evidence cited above may justify a preference for the earlier date.

[8] Dr. Metcalf points out to me that "at precisely this period we begin to find lots of imitations. Imitations had been common enough in the West since the usurpers and went on on a large scale with Magnentius and Decentius, but now we begin to see the phenomenon of imitations overstruck on genuine coins. To me that suggests a) a shortage brought about by demonetization, b) a great profit to be made by the overstriking (given the penalties for counterfeiting, even if they were more rigidly enforced with regard to gold and silver than bronze, there had to be some inducement), and c) the effectiveness, even if short-term, of the law itself."

[9] I am using here a revised text of the papyrus to be published by J.-M. Carrié; though my interpretation of some points differs from his, I am much indebted both to his important improvement of the text and to his generosity in letting me read it in advance of publication. [It has now appeared: *Aegyptus* 64 (1984) 203–27.]

[10] J.P. Callu has informed me by letter that he would prefer to attribute the value of a

Yet further confirmation comes from lines 11–12, where we learn that a *κνίδιον διπλοῦν* was holding 4,000 myriads of *kerma*. As Carrié points out, a diploun held about 3–3.5 liters, each of which would weigh a bit over 3 kg; weight of total contents, therefore, would be between 9.5 and 11 kg. A mass of 4000 of the aes 3 of 352–358 would weigh 10 kg; of the aes 3 of 359–362, about 8 kg. Within the limits of multiple approximations, the fit is very close.

The developments for the years 357–370 are very hard to follow, since we have no silver content figures for the coins of 357–362, when the price of gold apparently reached a level about 50% or so above the hypothetical price obtained above. If the coins of 359–364 indeed had no silver (as Kent thinks was intended), they would imply a gold price of some 1,084,000–1,571,802 talents/lb., but this level was in fact apparently not yet reached. They may therefore have had a small amount of silver. Valentinian's coin with about 4.7 mg of silver may have been an improvement over the coins of the five years preceding it; at all events, it did not touch off a new wave of inflation; its metallic content in a coin worth a myriad would imply gold at 1,080,536, a close approximation of the contemporary level.

The reduced quantity of documentation available for the rest of the century necessitates a rapid treatment of that period. We have neither the papyri nor (so far) the analyses of silver in coinage to engage in the kind of study found above. From the 370s, we have prices of barley for future delivery in *P.Col.* VII 182 and 184 (372p) of 500 and 600 T. per artaba, equivalent to index figures of 864,000 and 1,036,800 (including the 50% augment appropriate to the document type), which seem still at the level of around 360.

From this point to the next plateau, evidence is almost nonexistent. An apprentice is paid 600 T. per month in 377 (*PSI* IV 287), but we have no way of indexing that. A room rents for 2,500 T. p.a. in the same year (*P.Lips.* 17). If an artaba of wheat was about the same or rather more, as we have supposed earlier, an index of about 1.5 million would be indicated. But the sorry fact is that we cannot go further. Nor does a house rental of 30,000 T. p.a. in 382 (*SB* IV 7445, cf. *ZPE* 24 [1977] 119, n. 30) help.

We can, however, identify another plateau in the later 380's. *PSI* VIII 959–960, which date around 385–390,[11] and *CPR* V 26, which

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follis, or 12,500 denarii, to the billon common coin of this period. Cf. briefly *Buletinul Societatii Numismatice Romane* 75–76 (1981–82) [1983] 161–67. In my view, the coincidence of the prices, showing that myriad and *argyron* are identical, plus the frequent occurrence of 'myriad' (and absence of 'follis') from the documentation, make this identification very unlikely; but in any event, the value of the 'follis' is not drastically different from that of the myriad.

[11] See *ZPE* 27 (1977) 161, n. 3, and 24 (1977) 123.

Sijpesteijn and I dated to 388,[12] contain gold prices of 1,800,000 to 2,160,000 T./lb., almost double the rate in the 360s and early 370s. Lack of silver analyses prevents any attempt to relate this change directly to the coinage. In 390, meat is priced at 200 T./lb., indicating an index of 1,843,200, closely compatible with the gold prices quoted. This is the last usable fourth-century price in copper currency for an indexable commodity. We do have a number of later rents in talents, which are listed in Chapter IX. More importantly, *P.Oxy.* LI 3628–3636 now indicate a range for gold itself of 1,824,912 to 1,920,960 T./lb. at some date in the fifth century, as well as various roughly corresponding commodity prices, which—using fourth century index figures—would, apart from wine, yield a range of 1,267,835 to 2,509,254: a sobering reminder of the approximativeness of a given isolated commodity price. But most of the figures in fact are in a range of about 1,800,000 to 2,100,000 T./lb., vindicating the method in general terms. In my view, they indicate no very significant change in price levels, as expressed in copper currency, by the middle of the fifth century.

Following the end of Valentinian's coinage in 375, we find no Alexandrian issues until Gratian's issues of 378–383.[13] Whereas the "Aes 3" of about 2.25 g was standard (the nummus) under Valentinian, it seems that the "aes 4" deserves to be considered the nummus under Gratian, rather than his "aes 3" of about the same weight as Valentinian's;[14] it is at all events the coin which continues under succeeding reigns, whereas the "aes 3" ends. This change ("devaluation") seems to be a good candidate for the observed rise in gold prices. The coins of 1.2 g or thereabouts would have copper in an amount that if there were no silver a gold price of 2,619,670 T./lb. would result.[15] Possibly there was still a trace of silver, since the gold price reached a level of only about 80 per cent of that indicated.

The issues of 383 to 393 remain at about the same weight, a circumstance which corresponds to our finding of a new level of stability during these years. A gold:copper ratio of 1:1800 is proclaimed officially (at least for copper by weight vs. solidi) by *CTh* 11.21.2 (396p). By that measure, a solidus of 4 Roman grams would be worth about 6,822 nummi at 1.2 grams each. But we do not know how long that ratio remained in effect.[16] In fact, a half-century later, *Nov.Val.* 16 (445p) establishes a minimum buying rate for the solidus of 7,000 unless it had been purchased from a moneychanger, in which case the minimum rate was

[12] *ZPE* 24 (1977) 123; cf. preceding note for confirming arguments.

[13] *RIC* IX, 298–300.

[14] *RIC* IX, p. xxxi.

[15] For these issues see J.D. MacIsaac, *ANSMN* 18 (1972) 59–66, on which my discussion is based.

[16] See Durliat 1980, 153.

set at 7,200. After 396, it seems that nummi weighed only about .9 g; at this level, we would expect 7,264 nummi per solidus, gold at 3,492,894 T./lb. (using 1:1440) or 9,080 nummi per solidus and gold at 4,366,117 T./lb. (using 1:1800). With no analyses of the coinage after 375 available, we are unable to be certain of the course of events. Since earlier issues showed no signs of any fiduciary role—on the contrary, prices rose quickly to establish full coverage of tariffed value—one may be skeptical that any such fiduciary situation occurred now.[17] The close match under Valentinian shows that even a minute (.2%) silver content was detected and taken into account in valuing a new coin and setting prices. I suspect that the coins of 378–396 may have had about .35% silver, those of 396–408 and later about .2%. But that is for further analysis to prove or disprove.

[17] Callu 1980, 103–4, argues also that an overvaluation of the bronze coins is improbable.

CHAPTER 7

GOLD, SILVER, AND COPPER IN CIRCULATION

We must now sketch in brief the significance for ordinary persons of the monetary history described above. First, it will be useful to examine an issue related to the problem of inflation: the availability of gold and silver bullion. It has frequently been asserted that there was no inflation in terms of gold in this period, and that the inflation therefore was of limited significance, affecting only the bronze coinage. The first statement is generally true, but the importance to the population of Egypt of inflation in bronze currency depends on the degree to which they were dependent on this money; in other words, price stability in gold is meaningful only if enough gold is available to be used as money by a large part of the population in ordinary transactions.

Alan Bowman has recently expressed the view that the amounts to be had were quite limited.[1] There is no doubt that Bowman is correct that there was not much gold or silver in the hands of most individuals at any one time; the evidence he cites is persuasive. All the same, there is good evidence that Egypt as a whole did manage to provide substantial amounts of bullion to the government, mostly (in the first decade or two of the century at least) in the form of compulsory purchases. This evidence has been gathered in an article by J.R. Rea[2] and in one by me,[3] but neither of us put the collections into a real quantitative perspective. There is now, however, evidence to do this in an approximate fashion.

We have evidence from three years. In 306, the Oxyrhynchite was expected to provide for sale to the government the amount of 38 lbs. of gold (*P.Oxy.* XVII 2106). Now we know from the same year that a rate of 1 1/2 oz. of silver per 100 artabas of wheat taxes paid was applied in the Oxyrhynchite (see Rea's remarks on this papyrus in the article cited above). I have argued in my article on this subject that equal values of gold and silver were collected from each taxpayer, with the ratio of amounts being 1:12, the official rate for the relative value of the two metals.

[1] Bowman 1980, 32.
[2] *Cd'E* 49 (1974) 163–74.
[3] *Cd'E* 52 (1977) 322–36.

It is a simple calculation to reckon that a rate of 1 1/2 oz. of silver (i.e., 36 g) implies one of 3 grammata of gold per 100 artabas. The figure of 38 lbs. of gold means a silver collection of 456 lbs. In grams, the gold comes to 10,944; divided by 3, we get 3,648 units of 100 artabas of wheat, or a total of 364,800 artabas for the nome. Some modification is necessary for the fact that, as *P.Oxy.* XLIII 3120 shows, bullion was exacted from those not engaged in agriculture as well.[4] It is, then, reassuring to find that an undated papyrus of the first half of the fourth century gives us a total wheat taxes for the Oxyrhynchite Nome of 321,278 artabas.[5] The rate attested for Karanis in 307/8 is much higher: 1 oz. gold and 12 oz. silver per 100 art. grain taxes. This is eight times the Oxyrhynchite rate of 306. One must assume that the government's needs in that particular year account for the higher level.

Finally, we are told by *P.Oxy.* XLIII 3120 of a purchase in 310 of 28 lbs., which the editor takes to be the assessment for the Oxyrhynchite Nome—correctly, in my view. The rate implied would be about 2.2 grammata of gold per 100 art., just under 3/4 of the 306 rate; silver would be collected at a rate of 1 oz., 2.5 grammata for the same amount.

Two questions are of interest: what kind of burdens is involved here, and what conclusions about the supply of bullion in the entire country can be drawn. For the first it may be noted that a solidus, 4 grammata of gold, could normally buy some 7–12 art. of wheat (cf. above, p. 7). We will adopt 8 as a figure of convenience and calculate that 1 gramma was worth 2 art. Three grammata would then be worth 6 artabas, while 2.2 grammata would be worth approximately. 4.5 art. With the silver equal in value, the bullion collected would equal 12% of the value of wheat taxes in 306, 9% in 310. These exactions were compensated, at rates set by the government. We know that the rate in 306 was about 67 T./lb., and in 310 about 73 T./lb. or a bit more. The market price of bullion was certainly higher, meaning that the taxpayer either had to pay the difference by purchasing bullion in the open market and supplying it at the official price or, if he already owned it, in effect contribute to the government the difference in value. The difference in 300 seems to have been about 5%, to judge from the fact that collectors actually paid 42 T. when the official price was 40 T. By 316, the difference may have been as much as 100%. If the difference was 50% at the time of the exactions described above, a third of the exaction would be an effective tax: say 1 gramma per 100 art. in 306. The tax effect would then be 4% in 306, 3% in 310.

Seen in this perspective, the levies of 307/8 are remarkable, the equivalent of bullion to the value of 48% of the wheat taxes for each metal, or 96% overall. If the difference in prices was that supposed above, the effect

[4] Rea, art.cit., 168.

[5] *ZPE* 37 (1980) 263–64.

would be a 32% surcharge on taxes. It remains to emphasize that the estimate used here for the gap between market and official prices is arbitrary within the range quoted, though I doubt it was much higher and it may well have been more like 20–30% in 306 or 307.

As to the total amounts for the country, we need to know what percentage of the total taxes of Egypt was paid by the Oxyrhynchite Nome; we can then calculate the approximate total for the entire country of bullion exactions. We do not have any useful figure for the fourth century. Augustus is supposed to have extracted 6 million artabas from Egypt each year; but Justinian's *Edict* 13 speaks of setting the grain taxes at 8 million (artabas, presumably).[6] The Oxyrhynchite would be responsible (using the figures given above) for some 4% to 5.4% of Egypt's grain taxes, depending on which of these figures is nearer the fourth-century reality. That seems plausible enough for a single nome.

Taking the lower figure (4%), we have only to multiply the Oxyrhynchite levies by 25 to get figures for all of Egypt, thus 950 lbs. gold and 11,400 of silver in 306; 700 lbs. of gold and 8,400 of silver in 310. An application of the 307/8 rates at Karanis country-wide, however, would indicate 6,667 lbs. of gold and 80,000 lbs. of silver; a formidable quantity. Now this year's purchase was no doubt highly exceptional, but we have no grounds to doubt that this quantity of bullion could be had—though probably not on any sustained basis. Even this figure, however, is on a per capita basis only .32 g of gold and 3.84 g of silver per person, if one assumes a population of 6 million. Person by person, therefore, Bowman is no doubt right that Egypt's people had little gold and silver. The relatively few references to solidi before mid-century confirm this impression.

For most persons, it is clear, the bronze coinage retains a primary role in monetary transactions at least until the 360s, if not throughout the century. We must now, therefore, say a few words about the circulation of this bronze coinage in Egypt. From early on after Diocletian's reform, coinage from mints outside Egypt began to enter the country in substantial quantity. The 'Cairo' hoard of nummi from the tetrarchic period published by Metcalf shows mints outside Egypt furnishing more than half of the coins (Alexandria 44.4%), with both western mints (29.2%) and other eastern ones (26.4%), well represented.[7] The means by which these coins (not very useful, one would think, for trade) entered Egypt are not well understood. But the presence of such coins is not an anomaly of this hoard. A newly published hoard from Egypt (provenance not known) shows a smaller proportion from Alexandria (34.3%), more from the West (36.2%), and about

[6] Johnson and West, *Byzantine Egypt*, 234–36. Cf. my "Agricultural Productivity and Taxation in Later Roman Egypt," *TAPA* 115 (1985).

[7] Metcalf 1974.

the same from the East (29.5%); it is dated to 337 by its publisher.[8]

Later hoards tend to reinforce this picture, though the proportion of the various mints' contribution to the total varies. In the hoard from Egypt published by Lallemand,[9] we find the following: Alexandria, 41.4%; other eastern, 55.8%; western mints, 2.8%. She cites three others published before, which yield

Find	*Alexandria*	*Eastern*	*Western*
Fayum	52%	39.2%	8.8%
Mattingly	54.7%	39.4%	5.8%
Milne	44.6%	46.7%	8.6%

By and large, then, the situation is similar in all four finds. As all of these come from the period 353–361, they suggest a considerable decline in the role of the western mints in providing Egypt's currency, compared to hoards up to 337.

Lallemand's hoard is also interesting evidence for the major monetary revaluation which I have proposed for around 352. Of the 219 coins in the hoard, 217 are Aes 2's of the "Fel Temp Reparatio" series, and mostly of the larger weights (though clearly the mints were extremely inexact); the mean, median, and mode were all about 5.52 g, heavier than the expected 5.25 g for the large Aes 2 of this series. These coins, had, as is noted above, much more silver than those that replaced them about 352. When we add to this indication the burial date adduced by Lallemand for this hoard, 353, and the fact that the Fayum hoard, composed 80% of these Aes 2 coins, is dated by her also that year; further that the Mattingly hoard (at least half made up of these same issues) is placed by her in 355,[10] we find a remarkable proportion of our hoard evidence for the century concentrated just after the drastic rise in prices and, evidently, in currency valuation. One can only regret that there are no silver content analyses for these hoards.

Another aspect of the situation is suggested by the large non-Alexandrian part of these hoards (overall about half), when taken in conjunction with the relatively modest number of issues from that mint observable in the various volumes of *RIC* pertaining to the period after 294. One suspects that the mint of Alexandria simply did not produce enough coinage—even of the bronzes, which were all it did manufacture in this period—to satisfy local demand for small change.[11]

[8] J.-M. Doyen, "Un trésor égyptien de folles constantiniens," *RBN* 128 (1982) 65–93.

[9] Lallemand 1966.

[10] Ibid., 385.

[11] This view was expressed years ago by J. Schwartz in his survey of the sources of Egyptian coins in the fourth century: *Schweiz.Münzbl.* 9 (1959) 11–17, 40–44; cf. his supplementary remarks in *Schweiz.Münzbl.* 24 (1974) 45–48, and the graphs of C.E. King in *Studien zur Fundmünzen der Antike* 1 (Berlin 1979) 96–99 for a visual impression of Schwartz's data.

A further aspect of this problem has been elucidated recently by Alessandra Gara,[12] who studies the evidence for cast coins produced by unofficial workshops in Egypt. Gara points out that the phenomenon is geographically widespread in the empire, but is in the main limited to the tetrarchic period and its aftermath. She poses the question: is this counterfeiting, coinage carried out to defraud the government by producing fake coins intended to deceive the public? Or is it a matter of local initiative (tolerated by the authorities) to supply a deficiency of coin supply caused by government inability or unwillingness to produce the needed amounts of small change? Gara argues from the proximity of the workshop to the army base at Dionysias and from the large quantity of molds found there that there was official toleration; and from the execrable quality of the reproductions that no one could have been deceived by them. In fact, she thinks, the frequent connection of these coins to army camps points to almost an official role for these coins.[13] Callu has also recently argued in favor of the view that the imitation bronze currency was tolerated because of a shortage of officially-produced coins.[14]

In sum, so far as money was in use for transactions, it was at least until mid-century and probably beyond, current bronze money, inconvenient though it was for substantial sums—one artaba of wheat at 26 T. *ca* 341 would have required 390 coins of 100 ✠ each (surely weighed instead of counted). If anything there was a shortage of it, not a superfluity. What then were the effects of inflation of the kind we have described? First, the character of the inflation is now clearer. While Diocletian's coinage maintained to *some* degree its tariffing above bullion value, prices did in fact rise fairly promptly to a level close to the 147 T./lb. for gold which the metals' worth indicates. After the next devaluation our information is less good, but several prices of an index level of 192 match a projected gold price of 190 very closely. After 312, a projected 281 is matched by a real 288, both in gold and in commodities. For the rest of the period to 375—as long as we have metal content analysis for the coins, that is—the same pattern is followed. Within the limits of coin analyses to date and their range of accuracy, and given the scarcity of papyrus documentation at many points, we can see a clear pattern: prices rise almost immediately after each debasement such that the value of gold and other metals in copper currency units is in line with the relationship between face value of the coin and its metal content.[15] Commodities followed suit, though a bit less

[12] Gara 1978.

[13] Gara 1978; cf. also Schwartz, supra, n. 11, in a similar vein.

[14] Callu 1980, 102.

[15] It is obvious that I cannot subscribe to the view that the currency of this period was essentially token in character and the inflation caused by its oversupply, as claimed by C.R. Whittaker in King 1980, 1 ff. (see Bowman 1980, for bibliographic detail).

evenly and consistently, as the character of commodity prices dictates. This behavior is as marked when silver is only .2% as when it is 3.8% of the coins' content.

Such precision may be surprising in a culture which we think of as technologically rather primitive. We cannot avoid the conclusion that someone—moneychangers, no doubt—was able to calculate the bullion content of coins quite precisely. They can have done this, I think, only by melting down a quantity of each new issue and analyzing it. Such a procedure of assaying is known in Mamluk times in Egypt, and we have no reason to suppose that it was not followed also in antiquity.[16] The appearance of fractions of weight as low as 1/192 gramma (about 5.8 mg) for gold in the papyri (e.g., *SB* III 7034) suggests the capability of making rather precise determinations of precious metal content.

Provided that in general commodity prices were adjusted to reflect changes in metallic composition of coins, what economic effects would have ensued?[17] The results will have differed greatly according to the circumstances of the individual. Peasants and very small landowners had most of their assets in land, produce, and tangible property (reserves in gold and silver if they could afford it), items not much affected by these price changes. They paid most of their taxes in kind, a minority in the current small change and some, as we have seen, in bullion.[18] Even if they held some small coinage, the market's ability to distinguish good from bad (or bad from worse) coinage would have preserved its value against a new emission. It is important to remember that most of the 'inflation' involves not a continuous process of price rises, with an oversupply of money chasing too few goods, but fairly sudden, episodic alterations in price levels caused by a new issue of coins with a lower content of precious metals.

The same circumstances will have prevailed for the wealthier landowners, whose riches lay in their lands. It must be remembered that inflation's problems in a modern society derive in large part from the fact that such a large part of the assets of individuals, corporations, pension funds, and the like are held in intangible obligations with a fixed value in units of currency. Such assets were relatively unimportant in ancient economies, except for those who lent money at interest (and to these we will return). Similarly, the income of most of the wealthier part of society was in commodities, not in units of currency. Artisans and businessmen of most stripes will have held the bulk of their assets in raw

[16] See J.L. Bacharach, *Proc. of the 8th Int. Congr. of Numismatics* (Paris/Basel, 1976), 501–11, esp. 504; see also his remarks in *NC* 7 ser. 11 (1971) 267–81.

[17] I reserve a fuller and more documented discussion of this subject to a book I hope to write on society and economy in fourth-century Egypt.

[18] On taxation levels, see my remarks in *TAPA* 115 (1985).

materials and finished products, not in what we might call financial assets.

The exceptions to the pattern depicted above were those holding financial assets and those paid in units of currency at fixed rates: soldiers, imperial administrators, and moneylenders. These classes are not discrete, for we find soldiers and officials lending money in the papyri with great frequency. An interesting example is the centurion's will of 320 from Karanis (*P.Col.* VII 188), with the many loans outstanding; but some of them are in solidi, which would not be affected by the debasement of the currency. It is, however, worth remarking that the fourth century saw a marked rise in acquisition of land by members of the military, as Jean-Michel Carrié has shown;[19] is this to be seen as a defense against depreciation of assets in coin? It seems, moreover, that the government compensated in part by paying more income in kind and less in currency. Still, it is likely that the common soldier and lower-ranking bureaucrats lost if anyone did when the currency was weakened.

Lending money at interest for repayment in a fixed number of units of billon currency must have been a somewhat risky business, for the value of a loan outstanding could be reduced substantially by the issue of a new wave of currency. It is, perhaps, not surprising that we find more loans in kind, and loans of money repayable in kind, than loans of cash; and for substantial sums, loans were mostly stated in solidi once those came into widespread circulation. Both the cause and effects of the price rises which we see in the papyri, therefore, can be seen as characteristic of the relatively primitive ancient economy.

[19] *BCH* 100 (1976) 159–76.

CHAPTER 8

UNDATED PAPYRI—SOME PROBLEMS

In this chapter I will attempt to clarify the date of various undated papyri containing indexable prices and to treat a few other problems. A handful of not exactly dated pieces were treated in Chapters 4–6 because by providing a cluster of data they were helpful to the argument.

1. *P.Oxy.* XXXIV 2728: ed. "III/IV." Spathion of wine priced variously at 1600, 1700, and 1800 dr., i.e., with index of 184, 195.5, and 207 (average 195.5). A date between 312 and 318 seems probable, although 308–312 is not completely excluded, given the variability of wine quality.

2. *P.Stras.* 559: ed. "c. 315." Knidion of wine priced at 1900 dr. (index: 285), wheat at 1 T. 1000 dr./art. (index: 672). The period 312–318 is indicated, with the years 318–323 just possible.

3. *P.Cair.Isid.* 28: ed. "ca. 312–3." Wheat priced at 1 T./art. for adaeratio (index: 576). Date is *ca* 312–323, hard to fix within that period given the evident fluctuation of wheat in the decade. I do not find the editors' prosopographical argument for the exact date of this text compelling.

4. *P.Oxy.* XXIV 2421: ed. "early IV." Wheat priced at 3,936 dr./art. and barley at 2,620 dr./art. for adaeratio. Indexes: wheat 378, barley 507. The relationship is out of joint. The recto (*P.Oxy.* XXIV 2422) is dated to A.D. 290. The problem of the incongruous adaeratio figures for this decade appears once again (cf. above, p. 32). Date (to be cautious) *ca* 312–323.

5. *P.Ryl.* IV 706: ed. "early IV." Wheat priced at 2,000 dr./art. (index 192), barley at 2,000 and 2,100, evidently also 2,500 dr./art. (index 384–480, average 422); arakos at 2,000 and 3,200 dr./art. (index 384–614, average 499); beans at 3,000 and 3,800 dr./art. (index 396–502, average 449). Wheat is clearly out of line. The entire text is to be dated *ca* 318–323.

6. *Pap.Lugd.Bat.* XIII 18: ed. "IV." Price of 13 and 14 nummi for a knidion of wine mentioned. If this is the pre-325 nummus of 25 ~~X~~, the prices are 1,300 and 1,400 dr., indexed at 195 and 210. A date *ca* 312–318 seems most likely. If one assumed a nummus of 100 ~~X~~, the level would be four times the above, or the higher price indexed at 840. This level is impossible, in my view, for a time after Constantine's reform and

the introduction of a 100 ✕ nummus. The date *ca* 312–318 thus seems probable.

7. *P.Ross.Georg.* III 6: ed. "end of IV." Wine of top quality priced at 2 T./spathion (index 1380). Likelihood favors a date soon after Licinius' debasement of the currency, thus *ca* 324, unless oil is meant, in which case it is hard to arrive at any date.

8. *P.Oxy.* X 1288: ed. "IV." A keramion of wine for 2 T. 2000 dr. (index 2240). Tow is also priced at 1 T. 2000 dr. Note that in *SPP* XX 96 it is at 4 T./lb., or three times the price here. If *P.Oxy.* 1288 is dated *ca* 324–330, a tripling parallels that of the price of gold from 325 to 337 almost exactly, and the wine index is close.

9. *P.Oslo* III 146: ed. "IV." Wine priced at 3 T./keramion (index 2880). A date *ca* 324–330 is indicated.

10. *P.Oxy.* X 1298: ed. "IV." Wine priced at 7 T./spathion. The index is 4830, which does not fit any known level of gold price. Unless the wine price is simply aberrant, a date *ca* 330, just after the debasement which unhinged the level of 2,500 T./lb., seems indicated.

11. *SB* XII 10784: ed.: first quarter of IV. Part of a house sold for 270 T. House prices are not easily comparable, but an entire house is sold for 14 T. 4000 dr. in 318 (*SB* X 10728), and in 320 one floor rented for 3000 dr. p.a. (*P.Panop.* 11); even a low rate of return (6%) would indicate a capital value of almost 8 T. There is a dearth of figures until the 25 T. rent for a house paid in 337 (*P.Panop.* 12). This latter figure would give a capital of perhaps *ca* 400 T., with which 270 T. for part of a house makes sense. A date *ca* 330–340 seems indicated.

12. *P.Amst.* I 82: ed. ca. 340. Wine priced at 3 T. 1200 dr./sext., index 14,746. The probable range of dates for this level is *ca* 337–348.

13. *P.Ant.* I 46: ed. "2nd quarter of IV." Remarkably divergent prices appear: wine at 5 T./knidion (index 4,500) but also (for new wine) at 24 T./spathion (index 16,560). Oil at 6 T. 4000 dr./sextarius. N.B.: the editor's introduction mistakenly speaks of a price of 50 T. per knidion, or per 50 bricks; both are in fact 5 T. I am inclined to think that as elsewhere the knidion is a less reliable measure and a date *ca* 337–348 is likely.

14. *P.Lond.* III 984 (p.237): ed. IV. The sextarius of wine and the pound of meat are equated, whereas normally that quantity of wine is worth twice as much as a pound of meat. Both are set at 200 T./lb. This is the price of meat attested in 390. At that date, this would have to be bad wine! But a later date cannot be excluded.

15. *SB* III 6086. This curious papyrus has been discussed at length by various authors with varying results, in that some have claimed that it demonstrates that gold and silver stood in an 18:1 relationship, others that it was 10:1. The most recent full study, that of L. C. West, *AJP* 62 (1941) 297–99 (followed by West-Johnson, 185–86), rejects a 10:1 ratio

and asserts that only an 18:1 ratio is found.[1] The facts are otherwise, however.

The purpose of the document is nowhere stated. The recto contains two entries (a single name with each) of an account in gold and silver as follows (I have schematized the original layout):

	GOLD				SILVER			
Ln.	*lbs.*	*oz.*	*gr.*	[*grs.*]	*lbs.*	*oz.*	*gr.*	[*grs.*]
1	1	2	5 41/48	341 41/48	11	10	12	3420
				As follows:				
3		1	16 1/3	40 1/3	1	4	19 1/3	403 1/3
4		6	25/48	144 25/48	5		5 1/2	1445 1/2
5		2	12 3/8	60 3/8	2	1	2 5/8	602 5/8
6		2		48	1	8		480
7		1	4 1/10	28 1/10		11	17	281
8			20 13/24	20 13/24		8	15 1/3	207 1/3
9	1	3	5/8	360 5/8	12	6	7 1/2	3607 1/2
				As follows:				
11		2	13 3/4	61 3/8	2	1	13 3/4	613 3/4
12		1	8 1/4	32 1/4	1	1	10 1/4	322 1/4
13		6	18 11/30	162 11/30	5	7	16 1/3	1624 1/3
14		1	12	36	1	3		360

(lines 15 and 16 are too fragmentary to use)

It should be noted that some of the amounts above are restored by the editors. It is clear that the amount collected in silver is ten times the amount in gold by weight; this is the source of the assertion that gold is worth ten times what silver is. A similar situation is found in *P.Oxy.* XII 1524 (early IVp). The amounts are large if they are payments by or for individuals: person 1 paid the equivalent of 1,368 art. of wheat, person 2, of 1,442 art. No bullion exaction of which we know reached anything like this level, even for very well-off landowners. One must reserve judgment of the character of this account. The probabilities favor the assumption that the value in silver officially equals that in gold, but we cannot be sure of that.

On the verso, we find a similar account, but in each entry some of the silver has been replaced with gold; as an example:

[1] Rémondon 1957, 139 and n. 2, dates the papyrus under Constantine, perhaps as a result of West-Johnson, who give Constantine's reign (and Licinius' death) as a *terminus post quem.*

GOLD	SILVER
6 oz. 14 1/2 1/3 1/8 gr. [158 23/24 gr.]	2 lbs. 1 oz. 2[2] gr. [622 gr.]

as follows

[5] oz. [4] 1/3 1/24 gr. plus for 1/2 the silver, (namely 2 lbs. 1 oz. 22 gr.), 8 1/2 1/8 1/96 sol.= 1 oz. 10 1/2 1/12 gr.	for the other half: 2 lbs. 1 oz. 22 gr.

It is clear that the original assessment was 5 oz., 4 3/8 gr. gold [124 3/8 gr.] and 4 lbs., 3 oz., 20 gr. [1244 gr.] of silver. The 10:1 ratio found on the recto is thus maintained. On the other hand, the payer wishing to avoid paying silver could pay gold at an 18:1 ratio (34 7/12 gr. gold for 622 gr. silver). The calculations in succeeding lines (which are set forth in *AJP* loc.cit. by West) yield the same result. The payments on the verso yield the equivalent of 497 art. wheat, 576 art., 1,753 art., and 192 art.

Since we have seen elsewhere (a) that in the earlier fourth century the ratio 12:1 is generally found, and (b) that the government tended to collect equal values of gold and silver, we may ask why 10:1 and 18:1 both occur here, albeit with different functions. The 10:1 ratio has the effect of lowering the silver due. On the other hand, delivering gold rather than silver is encouraged by the 18:1 rate. But since we know neither date nor purpose of this text, it is not good evidence for the normal gold:silver ratio at *any* date.

Durliat (1980, 142–44) quite arbitrarily assumes that the true ratio is 14.4:1, arriving at this figure by assuming that we must discount 18:1 (for reasons he cannot discern but assumes must be operative). One may apply to his analysis his own conclusion about the papyrus: "la raison de ces opérations comptables nous échappe." (It may be pointed out that the view of Durliat, adopted from West-Johnson 1944, 108, whereby *P.Oslo* III 162 would also point to a 14.4:1 ratio, has been torpedoed by *P.Oxy.* XLVIII 3402; see the discussion of *monas* in Chapter 2, above.)

CHAPTER 9

PRICES CLASSIFIED BY OBJECT

The above chapters have dealt with various commodities which can be indexed more or less precisely; that is, where the item is sufficiently standardized that comparisons are possible. The citations have been arranged by chronological segments, which may create difficulties for the user of this work interested in the course of prices for one particular commodity. To provide convenient reference for such cases and to gather conveniently the prices of other goods and services not indexed, the present chapter presents systematically the prices known to me. Dates in italics represent dates assigned by me on the basis of the prices and have no independent basis. The index of sources (Index 2) will enable the reader to find pages where these texts are discussed and bibliography cited.

A. Gold

		Per pound
P.Panop.Beatty 2.216	16.ii.300	40 T.
Edict of Prices 1.28a	xii.301	48 T.
P.Oxy. XVII 2106	304–*306*	66 T. 4000 dr.
P.Ryl. IV 616	309–310	73 T.
P.Oxy. XLIII 3121	317–318	288 T.
P.Ryl. IV 643	ca *312–318*	288 T.
CPR VIII 27	24.vi.324	168 T.
P.Oxy. XIV 1430	31.vii.324	209 T.
PSI VII 825 = Naldini 44	ca *325–330*	2,400 T.
SB XIV 11591	ca *325–330*	2,520–2,592 T.
SB XIV 11592	ca *325–330*	2,592–2,700 T.
P.Vindob. G25840	ca *330–337*	7,200 T.
PSI XIV 1423 = Naldini 45	ca *330–337*	7,680 T.
SPP XX 96	ca *337–339*	8,640 T.
SB XIV 11593 = *SPP* XX 81	ca *338–341*	13,200 T.
P.Oxy. XLVIII 3401	ca *350–360*	648,000 T.
P.Oxy. XXXIV 2729	ca *350–355*	350,400 T.
P.Oxy. IX 1223	ca *360–375*	969,200 T.

P.Oslo III 88	ca *360–375*	1,080,000 T.
P.Oxy. XLVIII 3426	ca *360–375*	1,080,000 T.
P.Oxy. XLVIII 3429	ca *375–385?*	1,557,678 T.
PSI VIII 959–960	ca *385–390*	1,800,000–2,160,000 T.
CPR V 26	ca *388*	2,016,000 T.

All of the above prices are treated in the narrative chapters except *P.Ryl.* IV 643 and *P.Oxy.* XLVIII 3429. In the Rylands text, 7 solidi cost 42,000 ✕, i.e., 4 T. ea., hence 288 T./lb. This is (as argued above) the basic index figure for 312–318, and the papyrus therefore belongs in this period.

In the Oxyrhynchos papyrus, a solidus seems to be quoted at 3,245 myriads or 21,633 T. Earlier in the same papyrus occur other figures which are very different, 6,000 T. and 8,300 T. These may be partial prices or not a price at all, rather "small change" for the solidus, completing the figure rather than giving an equivalent.

Several published texts which have been claimed or have seemed to provide gold prices do not do so, in my opinion. These are the following:

a. *SB* III 7034 = P.Vindob.inv. G 14014 (only partially published; published in full by K.A. Worp and me in *BASP* 20 [1983]). West-Johnson 1944, 162, give a date "circa A.D. 350" on the basis of a *presumption* that 1/48 + 1/192 grammata of gold = 25 T. Rémondon 1957, 146, places it in the 350's, apparently, with a gold price of 414,720,000 ✕/lb. gold (276,480 T./lb.). In fact, however, 25 T. seems to be another element of the payment rather than equivalent to the gold, as is clear from a fuller transcription.

b. *P.Lond.* III 1259.14 (p.240) was used by West-Johnson 1944, 161, but with doubts about the reading. The reading is all right (I have checked it on a microfilm), but the phrase ἀπὸ τιμ(ῆς) ὁλοκ(οττίνου) seems to indicate only part of the price and is thus useless.

c. *P.Ryl.* IV 713 seems to indicate a price of 3 myriads per solidus: τιμ(ῆς) ὁλοκο[ττί]νων [ὡ]ς παρ(ὰ) μ(υρ.) γ γ(ίν.) μ(υριαδ.) ιη (δην.) ’Γφ (line 4). But the lacuna filled with an omega is actually 3–4 letters wide; nor can I accept μ(υρ.) γ as a reading (I thank the John Rylands Library for a photograph of the papyrus); and at the end one must read ’Hφ (there is no sign for denarii preceding). In sum, we do not know *how many* solidi equalled 188,500 denarii.

B. Silver

		per Pound
Edict of Prices	xii.301	4 T.
SB VI 9253	ca *305*	5 T. 2000 dr.
SB XIV 11345	11.viii.306	5 T. 3312 dr.
P.Oxy. LI 3624	359	544,000 T.

C. Iron, wrought

		per Pound
P.Oxy. I 84	316	360 dr.

D. Bronze/Copper

There are clear, incontrovertible prices for χαλκός in *P.Oxy.* I 85 (reedited by R.A. Coles, *ZPE* 39 [1980] 115–23); in cast form, 4 T./lb.; in worked form, 6 T. 4000 dr./lb. We do not have a gold price from 338, but the nearest one is 13,200 T./lb. Cast bronze is thus worth *ca* 1/3300 of the value of gold, worked bronze 1/1980. We have no way of knowing how much these ratios fluctuated.

P.Ant. I 38, reedited by M. Manfredi in *Atti XI Congr. Int. di Pap.* (Milano 1966) 245 ff. (text in *SB* X 10257), contains prices for a substance quoted in two forms, κατεργαζομένου and χυτοῦ. It is quoted by the pound, and the traces are compatible with [χαλ]κοῦ. The price for worked is 62 ₰/lb., for cast, 31 ₰/lb. Manfredi argued that the metal was bronze (silver is excluded; at this date [spring, 300] silver was 3 T. 2000 dr. per lb., gold at 40 T./lb.). Cast bronze would be, at these prices, 1/1935 the value of gold; worked, 1/968.

M. Crawford and J. Reynolds, *ZPE* 34 (1979) 164, have expressed doubt about this view. After rejecting (properly) Lafaurie's view that the papyrus refers to the cost of working silver, they go on to doubt that it refers to any metal or the working of anything: all they see is a commodity in two states. This will not do. We know (1) that the item in question was sold by the pound, (2) that it came in two forms, χυτός and κατεργαζόμενος,[1] and (3) that its price per pound went from 31 den. 'raw' to 62 den. worked. The adjectives rule out meat and tow, and I do not see what commodities are possible except metals. Of these, the price is too low for gold and silver, and the lacuna too short for lead, [μολύβ]δου, or tin, [κασιδηρ]ίου. It is dubious whether iron would fit ([σιδή]ρου), and the one price we have for iron, 360 dr./lb. in 316p (*P.Oxy.* I 84) points to an iron/gold ratio of 1/4,800, considerably higher than any value known for bronze.

The terminology suits bronze (or copper) well, on the contrary: we find χυτός elsewhere to refer to it (references in *P.Col.* VII 141.26n., where I erroneously refer *P.Ant.* 38 to silver). The price is near enough to be credible in relationship to gold. Compare *CTh* 11.21.2, where a 1:1800 ratio is given. I conclude that the burden of proof is on anyone denying that the material is bronze.

[1] The notion that one should read [χυτ]οῦ in line 17 (Crawford and Reynolds refer to it as 16) is certainly wrong: if it were so, not only would the χυτός/κατεργαζόμενος distinction be lost, the material would *never* be identified in the document!

E. Wheat[2]

		Per Artaba
P.Oxy. XXXVI 2798	305	1200 dr.
P.Cair.Isid. 11	312	1333 dr.
P.NYU 18	312/3	2000 dr.
CPR VIII 22[3]	314	1 T. 2000 dr.
P.Princ.Roll 157	315	3000 dr. (adaeratio)
P.Stras. 559	ca *312–318 (or 323)*	1 T. 1000 dr.
P.Cair.Isid. 28	ca *312–323*	1 T.
P.Oxy. XXIV 2421	ca *312–323*	3,936 dr.
P.Ryl. IV 706	ca *318–323*	2,000 dr. (?)
PSI IV 309	327	2 T. 5333 dr.[4]
P.Lond. VI 1914	335[5]	14 T.
P.Oxy. I 85	338	24 T.
SB XIV 11593	ca *338–341*	26 T.
SPP XX 75	ca *339–342*	30 T.
P.Abinn. 68	ca *348–351*	50 T.
P.Princ. III 183 v 3,4	ca *353*	334 T.[6]
P.Stras. 595 = *SB* XIV 12154	357/8	846 T.
P.Oxy. LI 3625	359	1367 T.

F. Barley

		Per artaba
BGU XIII 2334	304	5 T. 1500 dr. per basket (capacity?)
P.Cair.Isid. 58	315	1000 dr. (adaeratio)
P.Princ.Roll 114	316	1000 dr.
P.Oxy. XXIV 2421	ca *312–323*	2,620 dr.
P.Ryl. IV 706	ca *318–323*	2,000 and 2,100 dr., prob. also 2,500 dr.
P.Oxy. I 85	338	13 T. 2000 dr.
SPP XX 75	ca *339–342*	15 T.
P.Abinn. 43	ca *348–351*	30 T.

[2] Johnson-West 1949, 177, give a price for wheat in *P.Lond.* III 984 (p. 237) of 1600 T. for 480 art. But the identity of the commodity is not preserved, and in any case the price is probably *per artaba* (cf. under wine and meat for this text. I wonder if the commodity is barley.)

[3] = PER E2000.

[4] Reimbursement for compulsory purchase; see p. 37, n. 1.

[5] See H. Hauben, *Proc. XVI Congr.* 447–56.

[6] The recto is a piece of official correspondence referring to the third indiction (344/5) as past, the fourth (345/6) evidently present, and dated by the consuls of 345. The verso reflects a reuse probably only a decade or less later. The wheat figure gives an index of 192,384, which is far higher than the price in *P.Abinn.* 68 but far below *P.Stras.* 595 = *SB* XIV 12154. A date near the actual retariffing of *ca* 353 (see supra, p. 45) seems indicated. I am grateful to Ann E. Hanson for sending me a photocopy of the papyrus and her observations, confirming the editors' reading.

P.Col. VII 182, 184	372	500 and 600 T.[7]
P.Oxy. XLVIII 3410	ca *375–385*	1500 T.[8]
P.Lips. 63	388	30 mod./9 art. for 1 sol.
P.Amst. I 77	post *430*	2 carats

G. Arakos

		Per artaba
P.Ryl. IV 706	ca *318–323*	2,000 and 3,200 dr.
P.Oxy. VII 1056	360	1,200 T.

H. Vegetable Seed
λάχανον, λαχανόσπερμος

		Per artaba
P.NYU 18	312/3	1 T.
P.Cair.Isid. 92	314	1 T., future delivery
P.Col. VII 177	326	7 T., future delivery
PSI VII 781	341	50 T., adaeratio

I. Cumin

		Per artaba
SB V 7667	320	5000 dr., future delivery

J. Chaff

		Per pound
BGU I 21	340	480 dr.
P.Amst. I 77	post *430*	93.5 lbs. per carat (2,244 lbs./solidus)

K. Flax

P.Oxy. I 102	306	1 T. 3,500 dr. rent per sown aroura
P.Oxy. XXXI 2585 and *P.Oxy.* XLV 3255	315	4 T. rent/aroura
P.Oxy. XLV 3257	318	3 T. 1000 dr. rent per aroura

L. Beans

		Per artaba
PER E 206[9]	ca *300–312*	800 dr.
P.Cair.Isid. 87,88,89	308	900 dr. fut. delivery
P.Cair.Isid. 91	309	700 dr. fut. delivery
P.Ryl. IV 706	ca *318–323*	3,000 and 3,800 dr.

[7] For future delivery.

[8] Indexed, the price would point to gold at 1,728,086 T./lb., rather closer to our prices of the 380's than those of the early 370's.

[9] Wessely 1905, 25.

M. Wine

		Per unit
CPR VI 12	300/1	300 dr./keramion
CPR VI 23	303/4	300, 500, and 600 dr./ker.
P.Oxy. XLIX 3507	ca *308–312*	900–1000 dr./ker.?[10]
CPR VIII 22	314	1800 dr./knidion
P.Oxy. XVII 2114	316	260 dr./sext. (official)
P.Ryl. IV 629–639	ca *318*	300 dr./sextarius
		1500–1700 dr./knidion
		2800–2900 dr./spathion
P.Oxy. XXXIV 2728	ca *312–318*	1600,1700, 1800 dr./spathion
P.Stras. 559	ca *312–318*	1900 dr./knidion
Pap.Lugd.Bat. XIII 18	ca *312–318*	1300, 1400 dr./knidion[11]
CPR VI 38	321	2500 dr./keramion
P.Oxy. VIII 1139 recto	322	3000 dr./keramion
CPR VI 45	322	3400 dr./knidion
P.Charite 36	ca 322 (ed.)	3700 dr./knidion
P.Ross.Georg. III 6	ca *324*	2 T./spathion
P.Oxy. X 1288	ca *324–330*	2 T. 2,000 dr./keramion
P.Oslo III 146	ca *324–330*	3 T./keramion
P.Oxy. X 1298	ca *330*	7 T./spathion
P.Vindob. G25840	ca *330–337*	2 T./sextarius
SB XIV 11593	ca *338–341*	3 T. 2000 dr./sextarius
		20 T./spathion
P.Cair.Preis. 45	ca *338–341*	3 T./sextarius[12]
SPP XX 75	ca *339–342*	4 T. 2000 dr./sextarius
		8 T./knidion
		20 T./spathion
BGU I 21	340	3 T./sextarius
		15 and 20 T./spathion
P.Amst. I 82	ca *337–348*	3 T. 1200 dr./sextarius
P.Ant. I 46	ca *337–348*	5 T./knidion
		24 T./spathion
P.Abinn. 75	ca *340–348*	25 T./spathion
P.Lond. III 984 (p.237)	ca 385	220 T./sextarius
	(or later)	
PSI VIII 959	*ca* 385–388	4000 T./knidion
P.Lond. V 1773	454	500 T./knidion

[10] The unit is not specified; the editor takes it to be the keramion. If it is either that or the knidion, the index would amount to somewhere between 135 and 160. The writer says that the price of wine has fallen. A date of 308–312 seems most likely, a bit later than the editor's "sometime in the reign of Diocletian."

[11] Cf. supra, p. 57.

[12] On a photograph in the possession of K.A. Worp I have seen that the reading μη in line 7 is sound; what follows is less clear (not an eta), perhaps (δρ.) 'E, giving a price of 3 T. 312.5 dr./sext.

N. Oil

		Per sextarius
P.Ryl. IV 629–639	ca *318*	1000 dr. (in Antioch)
SPP XX 93	*ca* 334/5	2 T.[13]
P.Ant. I 46	ca *337–348*	6 T. 4000 dr.
PSI VIII 960	*ca* 385–388	16,000 T./knidion
P.Oxy. XIV 1753	390	40 sextarii per solidus

O. Meat

		Per pound
P.Ryl. IV 629–639	ca *318*	150 dr.[14]
P.Lond. III 1259 p.239	ca *330*	3200 dr.(liver same price)
P.NYU 12	337 or later	1 T. 3600 dr.
P.Oxy. XXXI 2571	338	2 T. 3000 dr. (adaeratio)
PSI III 202	338	1 T. 3600 dr.
SB XIV 11593	ca *338–341*	1 T. 2000 dr.
SPP XX 75	ca *339–342*	4 T. 2000 dr.
P.Stras. 595 = *SB* XIV 12154	*ca* 357	80 T.[15]
P.Oxy. VII 1056	360	96 T.
P.Oxy. XIV 1753	390	200 T.
P.Lond. III 984 (p.237)	ca *385 or later*	220 T.
P.Amst. I 77	post *430*	114 lbs./solidus

P. Other Foods

PSI III 202	338	fish	1 T. 4000 dr./lb.
P.Lond. III 1259 p.239	ca *330*	fowl	1 T. 2000 dr. ea.
SB XIV 11593	ca *338–41*	fowl	5 T. ea.
BGU I 21	340	vinegar	1 T. 60 dr./sextarius
P.Abinn. 43	ca *342–51*	dates	15 T./artaba
P.Mert. I 34	347	salt	10–14 T.(unkn. quant.)
P.Oxy. XIV 1753	390	honey	25 sextarii/solidus

Q. Donkeys

P.Oxy. XLIII 3143	305	15 T.
SB I 5679	307[16]	5 T.
P.Berl.Leihg. I 21	309	6 T. 3500 dr.
P.Cair.Isid. 86	309	2 T. 3000 dr.
P.Oxy. XLIII 3145	*ca* 310 (ed.)	12 T.
P.Corn. 13	311	10 T.
P.Oxy. XIV 1708	311	10 T. 4000 dr.
SB VI 9214	311	6 T. 3000 dr.
P.Cair.Isid. 72	314	20 and 27 T.

[13] Bagnall and Worp, see *BASP* 20 (1983).
[14] In Egypt; 200–400 dr. in Syria.
[15] Cf. *ZPE* 27 (1977) 161.
[16] Cf. *RFBE* 31.

SB XIV 11278	316	39 T.
CPR VII 36	331	40 T.

Several undated sales of donkeys deserve listing and brief discussion:

P.Oslo III 134	ed.: III–IV?	132 dr.

This text must belong to the third century. Its price has no relation to fourth-century donkey prices.

SB VIII 9829	ed.: III	2 T.

If this text belongs to the fourth century, it must come from the first few years: such a date is proposed by C. Balconi, *Aegyptus* 54 (1974) 62.

PSI VIII 882	ed.: *ca* 330	40 T.

The editor, following advice from Segrè on the price, dated the papyrus around 330. C. Balconi, *Aegyptus* 54 (1974) 62 speaks of the price of 39 T. in her papyrus as "già quello degli anni trenta," but this is pure circular reasoning. The editors of *CPR* VII 36 claim that *PSI* 882 dates after 337: their basis is the phrase ἀργυρίου Σεβαστῶν νομίσματος, "weil hier der Pluralis Σεβαστῶν steht" (*CPR* VII 36.7–9n.). This is nonsense: the plural is found earlier, for example in *P.Stras.* III 278 of 316p, the precise year of Balconi's 39 T. donkey! Nothing precise may be concluded about the date of *PSI* 882 from the price. See now *P. Oxy.* LI, p. xiii *ad P.Oxy.* XIV 1627 for evidence from notarial signatures for a date in the 340s.

R. Other Animals

P.Grenf. II 74	302[17]	camel	9 T.
P.Oxy. XLIII 3144	313	horse	30 T.
P.Cair.Isid. 72,73	313/4	horse	70 T.
P.Cair.Isid. 72	314	horse	50 T.
P.Sakaon 62	328	horse	130 T.
P.Abinn. 60	346	horse	600 T.
P.Abinn. 80	*ca* 342–351	horses	70–350 T.
P.Abinn. 80	*ca* 342–351	cows	600–800 T.

[17] Cf. *RFBE* 24.

S. Military Uniforms

WChrest. 186 = *BGU* II 620	302	4000 dr./sticharion 5000 dr./pallion[18]
P.Cair.Isid. 54	314	4000 dr./sticharion 5000 dr./pallion
P.Oxy. XLIV 3194	323	4000 dr./sticharion 5000 dr./pallion
P.Ant. I 39	324[19]	3475 dr. gross for sticharion and chlamys
PSI IV 309	327	1 T./sticharion 10 T./chlamys[20]
P.Lond. III 1259 (p.239) verso	342/3 (?)	40 T./chlamys

There is some problem or factor at work in *P.Ant.* I 39 which we cannot identify, as we might expect a sticharion and chlamys togther to cost 7 T. 2000 dr. At all events, the prices found from 302 to 323 are identical to those given in the Edict of Prices in 301 for the lowest quality military clothing. Since all of these 'prices' represent reimbursement to individuals for supplying these garments to the state, it is clear that in effect the payment declined to a sixth of the true value by 312–318 and perhaps a tenth by 323. The rise in reimbursement by 327 tries to mask an actual decline in percentage of value reimbursed to about one twenty-fifth. At this point the levy is almost a pure tax, as gold and silver exactions became (cf. p. 28). Carrié has suggested that only the cost of labor was reimbursed.[21] A further quadrupling of prices by 342/3 does not keep pace with a sextupling in price levels generally, but it comes closer.

T. Miscellaneous Goods

Wool	*P.Sakaon* 95	301	37 lbs. for 3000 dr.
Glass	P.Oxy.ined.[22]	317	4 T./100 lbs.
	P.Oxy. XLV 3265	326	22 T./100 lbs.
Tow	*P.Oxy.* X 1288	ca *324–30*	1 T. 2000 dr./lb.
	SPP XX 96	ca *337*	4 T./lb.
	P.Oxy. XLVIII 3429	ca *375–85*	350 T./bundle
Papyrus	*SB* XIV 11593 = *SPP* XX 81	ca *338–41*	3 T. 2000 dr./roll
	P.Panop. 19 ix	342	6 T. 4000 dr./roll
Hides	*P.Abinn.* 81	345	200 T. (Babylonian)
	P.Oxy. VII 1057	362	5000 T.

[18] See J. Lallemand, *L'administration civile de l'Egypte* (Bruxelles 1964) 261; *BL* V 12, VI 12.

[19] Cf. *CSBE* 109.

[20] See *StudPap* 21 (1982) 87–91.

[21] Carrié 1981, 453.

[22] See *P.Oxy.* XLV 3265.

Clothing	*P.Abinn.* 81	345	387 T. sleeved garment 473 T. Dalmatian cloak 513 T. tunic
Hair sack	*P.Abinn.* 68	*ca* 342–351	30 T. ea.
Carpet	*P.Oxy.* XII 1431	352	1500 T.

U. Productive Land

P.Mich. XV 719	286/7?	4200 dr./ar.
CPR VII 14	305	2 T. 5727 dr./ar. sale[23]
P.Lips. 6	306	2 T. 3429 dr./ar. sale, katoikic land
SB VI 9219	319	1 T. 4154 dr./ar. sale
CPR I 10 = *SPP* XX 80	*ca* 321[24]	2 T. 5143 dr./ar. sale
P.Gen. I 10	316[25]	1200 dr. rent for part of 3 1/4 ar.
P.Princ. II 79	326	inheritance, 1/3 share is worth 70 T.
P.Vindob.Sal. 12	334	1/6 of heliasterion rents for 8 T. 2000 dr.
P.Col. VII 181	342	9 1/2 ar. grainland sold for 50 T.
BGU IV 1049	342	3+ ar. grainland sold for 2000 T.
BGU III 917	348	1000 T./1 ar. grainland, sale
SB XIV 11877	348	124 T. for 2 palm trees, sale
P.Oxy. XIV 1632	353	8000 T./p.a. rent for palm grove
P.Vindob.Sijp. 11	453	30,000 T./p.a. rent for a ktema[26]

V. House Property

		Price—full house unless said
P.Sakaon 59	305	sale: 9 T. (Arsin.)
P.Sakaon 60	306	sale: 10 T. (Arsin.)
BGU I 306	306	rent: 1200 dr. p.a. for cattle-shed
P.Mil. II 55 = *SB* VI 8998	307	rent: 2400 dr. p.a.
Archiv 27 (1980) 55	309	sale: 13 T. (Arsin.)
SB X 10728	318	sale: 14 T. 4000 dr.
P.Panop. 11	320	rent: 3000 dr. p.a., one floor
P.Oslo III 138	323	rent: 3000 dr. p.a., topos

[23] Arable land with brick well.
[24] Cf. *CSBE* 8, n. 3.
[25] Cf. *BL* I 158.
[26] Cf. *BL* V 61–62.

PSI IV 300	324[27]	sale: 15 T. for pottery works[28]
P.Panop. 12	337	rent: 25 T. p.a. for part
P.Oxy. XLVIII 3386	338	rent: 20 T. p.a., half house
P.Panop. 13	339	rent: 25 T. p.a. for part
SB XII 10784	ca *330–340*	sale: 270 T. for part
P.Cair.Goodsp. 13	341	sale: 100 T. for psilos topos (Hermop.)
P.Mert. I 33	344	rent: 20 T. p.a. for carpet-maker
P.Harr. 82	345	rent: 90 T. p.a. (Oxy.)
P.Genova I 22	345	rent: 35 T. p.a. for basement room (Oxy.)
P.Abinn. 22	*ca* 342–351?	rent: 1,500 T. p.a. (Alex.)[29]
PSI VI 707	351	rent: 150 T. p.a., half house (Oxy.)
P.Oxy. XIV 1695	360	rent: 6000 T. p.a. for part
PSI V 467	360	rent: 800 T. p.a. for topos
P.Lips. 17	377	rent: 2,500 T. p.a. for topos
SB IV 7445	382	rent: 30,000 T. p.a.[30]
BGU III 940	398	rent: 12,000 T. p.a. (Herakl.)
P.Oxy. XLIV 3203	400	rent: 8,000 T. p.a. for exedra and cellar (Oxy.)
SB VIII 9931	405[31]	rent: 7,000 T. p.a.
P.Berl.Zill. I 5	417	rent: 11,000 T. p.a. for 2 rooms (Hermop.)
P.Oxy. XVI 1957	430	rent: 1/2 sol. p.a., 3 rooms
P.Oxy. VIII 1129	449	rent: 8,000 T. p.a., 2 rooms

W. Salary of Rhabdouchos

		Per month
P.Oxy. XXXVIII 2859	301	1 T. 1500 dr.
PSI IX 1037	301	2 T.
P.Oxy. XIV 1626	325	10 T.

[27] Cf. *BASP* 17 (1980) 16.

[28] The papyrus reads in line 13, [*ματος ταλάντων δ*]*εκαπέντε*, (*γίνεται*) (*τάλαντα*) *ιε*/., as R. Pintaudi has kindly verified for me.

[29] To be dated post 351? Cf. *BL* V 2.

[30] See *ZPE* 24 (1977) 119, n. 30.

[31] *BL* VI 161.

X. Salaries, other

		Per month
P.Oxy. XII 1499	309	bath attendant: 2,000 dr.
CPR VIII 22	314	various: 2 T. or 2 T. 3000 dr.
SPP XX 85 recto	320	most occupations: 3,000 dr. grooms: 3,500 dr. paidagogos: 1 T. miller: 1 T.
SB XIV 11592	*ca* 325	boethos: 8 T.
SB XIV 11593	ca *338–41*	boethos: 60 T.
SPP XX 75	ca *339–341*	boethos, phrouros: 60 T.

Y. Other Personal Services

P.Oxy. VI 896	316	painting baths of Oxyrhynchos: 6 T. 4000 dr.
P.Vindob.Sal. 8	323?	watering vineyard: 10 T. p.a.
P.Ryl. IV 660	338	18 T. for captain's service[32]
SB V 8007	ca *337–351?*	slave sold for 913 T. 2000 dr.
P.Abinn. 64	*ca* 342–351	male slave sells for 1200 T.
PSI IV 287	377	apprentice paid 6000 T./month

Z. Miscellany

P.Oxy. XLVI 3270	309	14 T. 3000 dr. for sale of fishing rights
P.Oxy. XVII 2113	316	naulon to Byzantium is 200 dr. for arable land, 8 dr. per olive tree, 400 dr. per ar. of pasture
P.Abinn. 62	350	2000 T. penalty for breaking contract

[32] Cf. Youtie, *Scriptiunculae* I 73–75; but he cannot be right about pay being for a year.

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