"Specialized Personnel"

The Zygostatēs, the Solidus, and Monetary Technology
in the Later Roman Empire

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Bibliography
1. Introduction

"... one might have expected that after Diocletian introduced the solidus credit markets would have re-established themselves, but apparently they failed to do so on any large scale. This non-event and its explanation deserve further enquiry. Can the disappearance of specialized personnel be a sufficient explanation? Had it become significantly more difficult to recover loans at law?"

W. V. Harris

In "A Revisionist View of Roman Money", W.V. Harris asks if the disappearance of certain banking professions in the third century CE could explain why Diocletian’s attempts to restore credit markets were unsuccessful. He argues that the introduction of the solidus as a stable gold coinage should have renewed lending and borrowing, but it was stymied by the widespread decline of available creditors and credit money. This argument is fundamental. It not only shows why Diocletian’s efforts fell short, but also how the provision of "specialized personnel" — such as bankers, credit intermediaries, and public officials — could influence the success or failure of monetary policy in the Later Roman Empire. In this way, the query posed by Harris raises further possibilities. If Diocletian’s reforms failed due to the absence of key banking posts, it is also conceivable that the later success of the solidus was related to the emergence of new types of these specialized personnel. A candidate worth investigating in this respect is the public weigher of the solidus, the zygostatēs (ζυγοστάτης).

There have been arguably few weighing officials in history more important than the zygostatēs was to the monetary economy of the Later Roman Empire. The creation of this office dates to 363 CE, when the emperor Julian decreed the appointment of these individuals to be installed in towns and cities throughout the empire. Their mandate was to act as intermediaries in disagreements over the weight and purity of the solidus. This meant that they were responsible for weighing and assaying coins in order to verify that they complied with minting standards. For this reason, the expansion of this public office into local commercial life was immediate, which is apparent from the rapid appearance in Egyptian papyri. In addition to the weighing of solidi, they are found performing many diverse functions in these texts, such as collecting taxes, moneylending, and sealing gold in bags for storage or transportation.

1 W. V. Harris, "A Revisionist View of Roman Money," Journal of Roman Studies 96 (2006), 23. For similar observations concerning the solidus, see also J.-M. Carrié, "Solidus et crédit: qu’est-ce que l’or a pu changer?" in E. Lo Cascio (ed.), Credito e moneta nel mondo romano: atti degli Incontri capresi di storia dell’economia antica (Edipuglia: 2003), 267. For a recent investigation into the disappearance of these "specialized personnel" in the third century CE, see M. Silver, "Finding the Roman Empire's Disappeared Deposit Bankers," Historia 60 (2011), 301-327.
It is clear from these documents that the zygostatēs rapidly outstripped its original purpose. In fact, the establishment of the zygostatēs as a public weigher came at a critical time in the history of the solidus. The fourth century CE witnessed a massive expansion in both the supply and use of gold coinage. This brought with it the broad stabilization of price levels expressed in gold as well as complications due to the properties of the solidus as a form of commodity money. In this respect, the Egyptian papyri are especially important because they illustrate how some of the functional problems of this gold coinage were mitigated by the presence of the zygostatēs. It is consequently vital to investigate the activities of these individuals as they relate specifically to the history of the solidus. This will show that the office of the zygostatēs was a necessary part of the success of the solidus and offer greater insight into the general nature of Late Roman fiscalism.

2.1 Methods and Models — Early Work

A major disadvantage for most early investigations of the zygostatēs was the shortage of available evidence. There are scarcely any passages mentioning zygostatai in literature and epigraphical references are similarly unfruitful. They also did not leave behind many physical traces of their profession or other remains to be scrutinized by archaeologists. In lieu of many of the traditional forms of evidence, the most significant resources for the study of this public office are the papyrological texts uncovered in Egypt. However, this development has not come without its own constraints. The delayed publication of many of these papyri means that the number of available documents has only increased gradually over the last century. Fortunately, there has been a modest outpouring of texts in recent decades that offer the chance to perform a more detailed analysis of zygostatai in Late Roman Egypt.

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2 For a discussion of the literary evidence for this office, see most recently F. Carlà, L’oro nella tarda antichità: aspetti economici e sociali, (Turin: Collana del Dipartimento di Storia dell’Università di Torino, 2009), 197, n. 747-750. An index of all known epigraphical references to zygostatai (as of 2004) can be found in M. de Groote, “Offentliche Geldwiger in griechischen epigraphischen Quellen,” Mnemosyne 57 (2004), 88-96. These inscriptions are located generally in countries that were part of the Eastern Roman Empire, including Turkey, Jordan, Syria, Palestine, and Greece.

3 Several balance weights from the Late Roman period have been discovered in Egypt, but none of them have been identified as being owned by a zygostatēs. For a survey of weights surviving from this period, see J. Banaji, “Discounts, Weight Standards, and the Exchange-Rate Between Gold and Copper,” in Finanza e attività bancaria tra pubblico e privato nella tarda Antichità, (Naples: 1998), 188-193. A lead seal belonging to a "royal zygostatēs" (βασιλικός ζυγοστάτης) was found in Constantinople, but the relationship of this official to the "public zygostatēs" (δηµόσιος ζυγοστάτης) found elsewhere has not been established: M. F. Hendy, Studies in the Byzantine Monetary Economy, (Cambridge University Press, 1985), 318.

4 An index of papyrological references can be found in Appendix 1. There are 77 texts in all (75 in Greek and 2 in Coptic) and possibly one example in Arabic (P. Hal. Inv. DMG 3): B. Liebrenz, "Eine frühe arabischë Quittung aus Oberägypten," Archiv für Papyrologie und verwandte Gebiete 56 (2010), 294-314.
The first serious attempt to sort and interpret this material was undertaken by Raymond Bogaert in 1976. Although it is part of a general survey of assaying in antiquity, the author devotes considerable attention to the office of the zygostátés. However, his work is nearly four decades old and is not by any means a total inventory of papyrological evidence. In fact, it was not until 2002 that a complete index of all known references to zygostatai in the papyri was compiled by Marc de Groote. This publication is a vital introductory resource, although it contains a few minor errors and omissions. More importantly, the scope of de Groote's research is limited to prosopographical data and so it fails to deliver any substantial commentary on the material.

This feature of de Groote's study is characteristic of all modern accounts of the zygostátés. They are little more than summaries of the basic duties of these individuals. This is a significant problem because the zygostátés might not seem to deserve more scrutiny than it has attracted at first glance. The concept of weighing coinage was by no means invented by the emperor Julian in 363 CE. The formal appointment of this office was preceded by a number of professions known to have offered these services at different times in antiquity. Moreover, F. Carla has also concluded that the technology employed by zygostatai to test the weight and purity of gold coins was no different from the methods used by their predecessors. These details would seem to imply that the office of the zygostátés was neither original nor influential. In order to establish its special importance, it is accordingly necessary to examine this public office within its broader historical and monetary context.

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5 R. Bogaert, "L'Essai des monnaies dans l'Antiquité," Revue belge de numismatique 122 (1976), 5-34, esp. 28-34.
7 Omissions: P. Stras. I 31 (101-300 CE); Stud. Pal. III.2 66 (601-625 CE); P. Laur. III 110 (600 or 615 CE). Additional texts made available since 2002: BGU XIX 2788 (607-608 CE); P. Oxy. LXVII 4606 (361 CE); SB XX 14246 (7th-8th CE); SB XXII 15244 (7th CE); SB XXVI 16354 (643-644 CE). There are also three errors made by the author: 1) The author mistakenly listed BGU II 695 instead of BGU II 694; 2) P. Rain. Cent. 135 (5th-7th CE) concerns a delivery order of wheat, not meat; 3) P. Bal. II 287 (725 CE) features several different zygostatai, not just one individual.
8 One major problem is that the author does not supply a bibliography although the stated mission of the work being to "enable future scholars to investigate [the zygostatai] in a more thorough manner": de Groote 2002, 31. This is rather difficult without a list of secondary sources!
9 Greek: "δοκιμαστής" and "κολλαφρατής". Latin: "spectator" and "probator". For a list of these professions and duties with relevant passages: Bogaert 1976, 19, n.62-72.
2.2 Methods and Models — Jairus Banaji’s Agrarian Change in Late Antiquity

This contextual approach to investigating the zygostatēs requires a functional model of Late Roman fiscalism and the solidus in particular. Since the initial purpose of this office was to regulate the quality of the solidus, it is vital to understand how this type of activity impacted the circulation of gold coinage. In this respect, Jairus Banaji’s Agrarian Change in Late Antiquity is no less than a fundamental text. The main contribution of this work is its reassessment of the solidus and its role in the monetary economy from the fourth century CE onwards. Banaji’s analysis establishes a theoretical framework for interpreting the reasons behind the creation of the zygostatēs as well as other developments in its history, especially as they relate to changing patterns in the use of gold. In particular, the author provides three insights that are critical to the study of this public office.

Firstly, Banaji notes that the Late Roman monetary system was radically different from that of preceding centuries. He attributes its relative success to the introduction of the solidus, which was originally conceived by Diocletian to replace the previous gold currency, the aureus. However, it was completely reinvented during the reign of Constantine I. Unlike the earlier system of fixed denominational relationships between currencies, the value of the solidus after Constantine was attached to the floating market value of gold as a commodity. This new arrangement formed what was effectively a type of gold standard — the immediate measure of value for the solidus was its weight in gold. Furthermore, the value of all denominations was based on their equivalent worth to the price of gold in the solidus. In this way, other metallic currencies were simply tokens reproducing their value in gold, which was in principal no different coined than as bullion.

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14 “Between gold and divisional there was no fixed exchange rate, but the ‘price’ of gold, as it is called in our sources, changed frequently, in time and in space”: F. Carlà, “The End of Roman Gold Coinage and the Disintegration of a Monetary Area,” in Annali dell’Istituto Italiano di Numismatica 56 (2010), 49. Filippo Carlà has written extensively on this new arrangement since Banaji: Carlà 2010, 45-114; Carlà 2009, 476-479; “Il sistema monetario in età tardoantica: spunti per una revisione,” Annali dell’Istituto Italiano di Numismatica 53 (2007), 155-218.
16 The problems separating theory from practice were acknowledged as early as 317 CE. In C.Th. IX.22.1, Constantine condemns the already established custom of charging different rates for solidi based on their size or even the quality of the minted image: “All solidi on which Our face and venerability nostri vultus ac
The second observation made by Banaji is that the monetary economy of the Later Roman Empire did not contract as it has been assumed to have done. In fact, the use of money actually increased during the second half of the fourth century CE and remained elevated until the seventh century CE\(^9\). This is closely related to Banaji's third point, which is the gradual diffusion of the solidus as a mass currency. Banaji contends that there was a considerable expansion in the supply and circulation of gold coinage in Late Antiquity\(^9\). The major reason for this increase was that the solidus had not only become the new unit of account, but also an important medium of exchange that pervaded all ranks of social and economic life. This is fundamentally different from its predecessor, the aureus, which functioned primarily as a means of storing wealth and maintaining the patrimony of the aristocratic elite\(^20\).

The development of the solidus as both a medium of exchange and measure of value also shows the intrinsic connection between the use of a metal as the monetary standard and its price relative to other metals. This means that the introduction of a gold standard influenced a slow, but inexorable deterioration in the value of the base metal coinage in relation to gold\(^21\). A corollary of this phenomenon was a rise in social conflict

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12 "The papyri show a steady secular decline in the value of base-metal currencies (in relation to the solidus)”: Banaji 2001, 45. The author also lists the available exchange rates between gold and base metal currencies in the Egyptian papyri (300-618 CE) in Banaji 2001, Appendix 1, Table 1. This table was originally published in Banaji 1998, 197, and is a reconstruction of the data previously collected in W. Hahn, *Moneta Imperii Byzantini: Rekonstruktion des Prägeaufbaues auf synoptisch-tabellarischem Grundlage*, (Verlag der Osterr. Akad. der Wiss., 1973). Gilles Bransbourg provides an important example from the papyri in which two brothers attempt to use the favorable exchange rate from gold to base metal for their
over concerns that gold had become a powerful medium of accumulation for the aristocracy. Banaji argues that gold developed into the preferred mode of payment for the collection of taxes by the state, which enabled it to supplant taxation in kind (coemptio) as an important form of public income. This led to increased pressure exerted by both state bureaucrats and the ruling classes to commute taxes to payments of gold (adaeratio). Moreover, other forms of taxation, such as the often maligned collatio lustralis, were exacted entirely in gold or silver.

These interconnected trends of an increased valuation of gold (at the expense of base metal) and the social disharmony it produced are both clearly illustrated in a passage from Anonymous' De Rebus Bellicis 2.1-2. The writer states:

It was in the age of Constantine that extravagant grants assigned gold instead of bronze (which earlier was considered of great value) to petty commercial transactions [Constantini temporibus profusa largitio aurum pro aere, quod antea magni pretii habebatur, vilibus commerciis assignavit]; but the greed I speak of is thought to have arisen from the following causes. When the gold and silver and the huge quantity of precious stones which had been stored away in the temples long ago reached the public [aurum argentumque et lapidum pretiosorum magna vis in templis reposita ad publicum pervenisset], they enkindled all men's possessive and spendthrift instincts. And while the expenditure of bronze itself ... seemed already vast and burdensome enough, yet from some kind of blind folly there ensued an even more extravagant passion for spending gold, which is considered more precious [quod pretiosius habetur]. This store of gold meant that the houses of the powerful were crammed full and their splendor enhanced to the destruction of the poor [Ex hac auri habetur]...

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22 On the importance of the solidus as a catalyst for social conflict in Late Roman society, see most recently P. Bell, Social Conflict in the Age of Justinian, (Oxford University Press, 2013), 88-93.
24 Known as the "χρυσάργυρον" in Greek. This tax was exacted every four years from those professions that collected fees for their work, including bankers, merchants, and even prostitutes. It was first instituted by Constantine and caused considerable distress to the populace: Zos. HN II.38.2-3; Exag. Schol. Hist. Eccl. III.39; Lib. Or. 59.15. It was finally abolished by the emperor Anastasius in 498/499 CE: C. J. XI.1: Mal. 398. The most extensive account of the history of this tax can be found in R. Delmaire, Largesses sacrées et res privata: l'aerarium impérial et son administration du IVe au VIe siècle, (Ecole française de Rome: 1989), 354-386.
This passage is key to Banaji's analysis. Anonymous "with a precision which is quite unusual for an ancient author" is describing the process by which Constantine overturned the traditional monetary system of the Roman Empire. Constantine initiated this program of reforms by looting the wealth of the ancient pagan temples and deluging the market (profusio largitio) with the gold and silver that had been recuperated. Following this, the emperor abolished other measures of value by replacing them with gold prices as a general expression of value for commodities. In the words of Anonymous, Constantine was responsible for "assigning gold instead of bronze ... to petty commercial transactions" (aurum pro aere ... vilibus commerciis assignavit). The differential fortunes of the gold and base metal currencies and the stability of the value of the solidus meant that those who held assets of gold were not subject to any substantial inflation at all.

The origin of this "profusio largitio" is contentious. One detail in particular that has recently undergone scrutiny is the extent of the temple confiscations allegedly carried out by Constantine. According to Anonymous, it was this policy that funded his monetary reforms. A more moderate view would be to assign a broader timeline to these events, which seem to have taken place several decades and by multiple emperors. This is supported by a series of metrological studies of Roman gold coinage indicating that a new source of bullion was likely introduced into the state gold supply during the fourth century CE. However, the statistics collected in this research suggest that it occurred later than the fiscal reforms of Constantine — during the latter years of the reign of Constantius II (337-361 CE). This corresponds to the period in which Howard Adelson detected a short-lived...

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26 Banaji 2001, 47.
27 This is demonstrated by the radical decline in the exchange rate between base metal and gold from the fourth to seventh century CE. The value of the solidus rises steadily from 0.083 myriads of denarii in 300 CE to 1360 myriads by 359 CE and a staggering 7680 myriads in 618 CE: Banaji 2001, Appendix 1, Table 1. A typical citizen would have to collect huge sums of base metal coins in order to be able to afford to exchange it for gold: Banaji 2001, 67, n.169. This explains why so many hoards have been found made up entirely of gold or base metal coinage, but mixed hoards are exceptionally rare. For example, RIC X lists 163 hoards made up entirely of gold coins as compared to 140 of base metal, but only 33 use mixed metallic currencies. In fact, only two of these are a combination of gold and base metal (the others are mainly gold and silver): J. P. C. Kent, The Roman Imperial Coinage 10. The Divided Empire and the Fall of the Western Parts: AD 395-491, (Spink, 1994), lxxxi-clxxvii. The importance of weight in hoarding of precious metal coins and other objects (jewellery, cutlery, etc.) has also been studied at length by R. Hobbs in Late Roman Precious Metal Deposits, AD 200-700, (Oxford: BAR International Series 1504, 2006).
28 On the temple confiscations and a general discussion concerning the supply of gold in Late Antiquity, see Appendix 2.
29 The results of this study show that trace platinum levels in gold from analyzed coins rise very suddenly during the reign of Constantius II (337-361 CE) and remain elevated for the next three centuries: Callu et al., "L'Aureus Obryziacus," in Morrisson (ed.) 1985), 80-111, esp. 92-97. The most plausible explanation is that a massive new source of gold had been found, although it its precise origins are uncertain (see Appendix 2).
depreciation in the value of the solidus, a phenomenon which might be attributed to a sudden increase in the supply of gold against the other metallic currencies.30

2.3 Methods and Models — The Solidus as a Monetary Technology

According to Banaji, the solidus reversed the effects of inflation carried over from the previous century by stabilizing price levels across the empire.31 This was at least in part due to the introduction of a gold standard in place of fixed-denominational currencies.

However, it remains to be shown where the office of the zygostatēs fit in this new system. Possibly the best means of establishing the function of this official is to develop a model that examines both the zygostatēs and the solidus as distinct forms of technology. This is based on the observation that coinage is a technology.32 It is a fairly self-evident premise and yet the theoretical consequences of this insight are broad. It demands a major reappraisal of the traits of the solidus as a technology and its introduction as a change in technology.33

Since the value of the solidus was largely decided by the market price of the gold it contained, it could be described as a typical — possibly even an archetypal — form of commodity money.34 Commodity money is conventionally defined as an object "used as a

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30 H. L. Adelson, "Silver Currency and Values in the Early Byzantine Empire," *Centennial Publication of the American Numismatic Society* (1958), 1-26, esp. 13-14. Adelson notes an uncharacteristic rise in the price of silver in the 350's CE, which persisted until the early 360's CE. Although he attributes this primarily to a shift in market demands, it is plausible that it was caused by a sudden influx of gold coinage into Egypt. However, Banaji contends that the exchange rate observed by Adelson was normal in Egypt for this period: Banaji 2001, 44.

31 F. Carlà has written that Constantine’s fiscal reforms brought "una regolarizzazione, e razionalizzazione" to the economy of the Later Roman Empire: Carlà 2009, 79. Elsewhere, R. Lopez went so far as to call the solidus the "Dollar of the Middle Ages": R. Lopez, "The Dollar of the Middle Ages," *Journal of Economic Studies* 11 (1951), 211. In contrast, Luke Lavan hurriedly assesses 350 years of monetary history in barely two sentences, concluding that, "of outright invention we can find little: except Diocletian's failed attempt to regulate prices": L. Lavan et al. (eds.), *Technology in Transition: AD 300-650*, (Leiden: Brill, 2007), xxi. G. Depeyrot also wrote that "in reality, this new coin [sc. the solidus] represented particularly no great departure from earlier monetary policy: Constantine simply reduced the weight of Diocletian’s gold aureus from about 6 grams to about 4.5 grams": G. Depeyrot, "Economy and Society," in Noel Lenski (ed.) 2006, 236.

32 See especially the chapter by Andrew Meadows on coinage in J. P. Oleson (ed.), *The Oxford Handbook of Engineering and Technology in the Classical World*, (Oxford University Press, 2008), 769-777.

33 This is part of the recent trend towards an expanded definition of ancient technology, as is shown from the introduction to Serafina Cuomo’s *Technology and Culture in Greek and Roman Antiquity*, (Cambridge University Press, 2007), 1: "Technē, and its Latin equivalent ars, covered an even wider spectrum than modern technologies. Both carpentry and medicine were technai; a rhetorician, capable of turning opinions around in the minds of his audience, and a sculptor, capable of turning a block of marble into the statue of a god, both qualified as technicians ... Once you start looking, there is no getting away from it: you find technology everywhere in the ancient world". For a recent survey of the critical developments in the study of ancient technology, see K. Greene, "Historiography and Theoretical Approaches," in Oleson (ed.) 2008, 62-92.

34 This observation has been made elsewhere: e.g., C. Howgego, *Ancient History from Coins*, (London: Routledge, 1995), 124.
medium of exchange and is also bought and sold as an ordinary good. It is almost universally a good that has an inherent or functional value, but limited supply. In this way, coinage can be seen as commodity money whenever its intrinsic value, which is the value of the metal in the coin, is equal to its extrinsic value, which is the nominal value placed on it by the state or minting authority. Ideally, this means that the value of the metal in the coin should be no different whether it is exchanged in its minted form or as bullion.

Historically, when the earliest coins were struck in Greece and Italy, they were circulated as commodity money.

As a financial instrument, there are certain attributes of commodity money that impose constraints on its use. Firstly, the money supply is often viewed as more inelastic than other forms of non-commodity money — a state that uses metallic coinage as commodity money can only strike as many coins as it has metal. For this reason, the amount of money in circulation is restricted by available metal reserves unless there are other forms of "non-coinage" money, such as credit. This reduces the amount of control the state can exercise over the money supply by limiting its ability to modify the values of its coinage in response to fluctuations in the market. Moreover, it places an extra burden on maintaining a constant stream of new metal as coins become worn or lost from circulation. This is especially problematic in a highly monetized economy, such as that found in Late Antiquity, where there is a much greater demand for coinage.


36 This principle was acknowledged by both the Greeks (e.g., Arist. *Pol.* 1257A; Nic. Eth. 1133A) and Romans (e.g., Plin. *HN*XXXIII.13). For a complete list of passages in Greek and Roman literature, see J. W. Humphrey et al. *Greek and Roman Technology: A Sourcebook*, (Routledge, 2003), 484-491. On the early development of coinage in Greece and Rome, see most recently M. Peacock, *Introducing Money*, (Routledge, 2013); R. Seaford, "The Greek Invention of Money," in H. G. Mann (ed.), *New Approaches to Monetary Economics and Theory: Interdisciplinary Perspectives*, (Routledge, 2012), 37-45.


38 It is also worth noting that commodity money can be both inconvenient to store and difficult to transport in large amounts. Transfers of money between separate locations by elite members of Roman society have been documented, but there is no evidence of a formal system that allowed for transfers between banks outside of a limited regional context in Egypt: P. Temin, "Financial Intermediation in the Early Roman Empire," *The Journal of Economic History* 64 (2004), 723-725; J. Andreau, *Banking and Business in the Roman World*, (Cambridge University Press, 1999), 20-22. For a survey of modern scholarship on the uses of credit in the Roman Empire, see W. V. Harris, "The Nature of Roman Money," in W. V. Harris (ed.) 2008, 175.

39 Andrew Wilson has calculated that even if the annual rate of coins lost in circulation was one percent, the quantity of metal coinage would halve within seventy years: Wilson 2007, 110. In this respect, the outflow of massive amounts of coinage beyond the limits of the Roman Empire was regularly cited by ancient authors.
Secondly, a system in which the value of its coins is based on their metallic content depends on its coinage adhering to exact standards of weight and purity. If this is not the case, then the effects of wear or poor minting standards result in the circulation of coins with greatly divergent weight values. In practical terms, the only certain method for ensuring that coins comply with these standards is to weigh them out. However, the need to test the physical properties of coins, especially larger sums, significantly hinders the rate of monetary exchange if it is required during every transaction. Considering the increased monetization of the Late Roman economy, this problem would have been intensified by a high velocity of circulation and accelerated rates of weight loss in coinage. Accordingly, the monetary system after Constantine demanded a particularly efficient mechanism for regulating the physical properties of its coinage and replacing those coins that were shown to be substandard.

The drawbacks of commodity money are no doubt the reason that the Roman state established a "fiduciary" or "token" coinage early in its history. This means that the extrinsic value of its coins now exceeded their intrinsic metallic content. In general, a coin with a token value is fundamentally different from commodity money since it lacks the same intrinsic value. For this reason, it is theoretically more elastic because the cost of its production should be lower in comparison to its purchasing power. The government

For example, Macrinus bought off the Parthians for 200 million sestertii (Dio Cass. LXXIX.27.1) and Pliny the Elder famously complained that luxuries from the East cost Romans over 100 million sestertii a year (Plin. HN XII.84). It was apparently no different in the Later Roman Empire, where it is recorded by Agathias Scholasticus that Justinian paid 28,800 solidi (400 lbs. of gold) to various tribes in the Caucasus (Agath. IV.20). Jan Iluk has estimated that the total amount of gold exported to other states from the fourth to sixth centuries was over 17 million solidi; J. Iluk, "The Export of Gold from the Roman Empire to Barbarian Countries from the 4th to the 6th Centuries," Münstersche Beiträge zur Antiken Handelsgeschichte 4 (1985), 79-102.

40 It is no accident that the Latin name for Rome’s new gold coin was a "solidus" (lit. "whole"), which is obviously meant to be an assurance of its weight.
41 J. W. Humphrey describes this as an "an extremely awkward system not only because of the weights of the tokens but because their actual value had to be tested at every exchange": Humphrey et al. 2003, 485.
42 The existence of fiduciary coinage in the Roman Empire is not universally accepted. According to M. I. Finley, "money was essentially coined metal and nothing else": Finley 1999, 196. This "metallist" view of Roman fiscalism has been challenged recently over what many see as a prominent fiduciary element in the valuation of Roman coins: e.g., Harris 2008, 174-207; H.-J. Dreghage et al. (eds.), Die Wirtschaft des Römischen Reiches (1.-3. Jahrhundert): Eine Einführung, (Berlin: 2002). W. Scheidel suggests a moderated approach that takes into account that "the intrinsic properties of coins and the volume of the money supply were the principal determinants of coin value and that fiduciary aspects must not be overrated": "Coin Quality, Coin Quantity, and Coin Value in Early China and the Roman world," Version 2.0, Princeton/Stanford Working Papers in Classics (2010); cf. F. Cesarano, "The Puzzle of Metallism: Searching for the Nature of Money," History of Political Economy 46 (2014), 177-210; K. Butcher and M. Ponting, "Fiduciary or Intrinsic? The Egyptian Billon Tetradrachm Under the Julio-Claudian Emperors," Schweizerische Numismatische Rundschau/Revue Suisse de Numismatique 84 (2005), 93-124.
43 This is precisely what the Roman state tried to achieve in its debasements of the silver coinage from the first to third centuries CE. For a summary of the metrology of the declining standards in purity for Roman silver coinage, see Wilson 2007, 115-120, citing Butcher-Ponting 1998; L. Cope et al., Metal Analyses of Roman Coins Minted Under the Empire, (London: 1997); Butcher-Ponting 1995.
could achieve this by either debasing the currency or reducing the weight standards of its coinage while keeping the previous nominal values for each denomination. This option would have been an especially attractive one because the state could mint more coins with the same supply. Finally, since the stated value of a token coinage was higher than the value of the metal it contained, the necessity for testing and weighing of coins in circulation was less vital.

The Roman Empire used a form of token coinage without any major disruption until the reign of Constantine. It was his monetary reforms that dismantled the previous system of fixed denominational coinage with "inexorable permanence". The central feature of these changes was the total removal of a token value from Roman coinage. The solidus had no permanent nominal worth, but its value was based on the floating market price of gold as a commodity. However, the observation that the solidus was commodity money shows that it was arguably a major regression in monetary technology. This is because the provision of a token coinage in place of commodity money is viewed as a considerable advancement in the history of money. It raises the question of why the Late Roman state would revert to a form of money that was ostensibly less advanced and also brought with it many practical disadvantages.

It is for this reason that modern accounts of the history of technology are so important to the study of the solidus. In his short essay on coinage in The Oxford Handbook of Engineering and Technology in the Classical World, Andrew Meadows stresses the importance of viewing coinage not only as a technology, but also as a "facilitating technology". He argues that coinage stimulated other technological innovations and adaptations in response to the demands that accompanied its utilization. This is a critical point because it calls attention to the notion that coinage did not function independently of other technologies in the ancient world. Its use was determined at least in part by its interactions with other technological and intellectual processes. In this way, it closely resembles the longstanding argument made by Kevin Greene that the cultural and

44 cf. "fiduciary coinage would not of course have increased the money supply if the value of the coinage in circulation remained approximately the same (or increased less than the percentage of the debasement), with the government simply using less silver": Harris 2006, 20.
45 The evidence suggests that weighing coins was not a regular practice before the fourth century CE. Sums of coinage were counted out, but rarely tallied by weight: Harris 2008, 200; K. Strobel, "Geldwesen und Währungsgeschichte des Imperium Romanum im Spiegel der Entwicklung des 3. Jahrhunderts n. Chr.," in K. Strobel (ed.), Die Ökonomie des Imperium Romanum, (St Katharinen: 2002), 86-168.
47 "The advent of coinage thus led to an important development in the form of fiduciary financial instruments": Meadows 2008, 771.
48 Meadows cites the introduction of coinage as a major reason for advancements in gold refinement techniques: Meadows 2008, 770, citing A. Ramage et al., King Croesus' Gold: Excavations at Sardis and the History of Gold Refining, (British Museum Press, 2000), 212.
historical "context" of Greek and Roman technology was equally as significant as its "content."

It is constructive to view the solidus in this sense as a form of monetary technology that was not invented per se, but it was plucked from the "technology shelf" of available financial instruments. The entire structure of the Late Roman monetary system was subsequently engineered so that it augmented the functionality of the solidus. These observations also account for the existence of the zygostatē. While the methods employed by these individuals to test gold were not innovative, they were particularly effective in support of solidus. For this reason, some of the practical disadvantages of commodity money were mitigated by the efficient administration and deployment of their expertise. This takes into account the modern theory that innovation can take place solely in terms of any reorganization of existing technical skills or resources. This concept is especially fitting to the study of ancient technology, where it has been argued that these forms of innovation were more prominent than pure invention.

3.1 The Effects of Weight Loss on the Solidus — Literary and Legal Evidence

The principal reason that the office of the zygostatē was established and persisted for so long was the effect of weight loss on the circulation of gold coinage. In fact, the existence of this office was only one part of a trend emphasizing the weight of the gold coinage that was clearly broader and more socially pervasive than before. Consequently,

49 "Modern studies of innovation reinforce the view that the context of Greek and Roman technology was as important as its content" (Greene 2008a, 79). The collective work of Kevin Greene is especially important in demonstrating this point: e.g., K. Greene, "Technological Innovation and Economic Progress in the Ancient World: M. I. Finley Re-considered," The Economic History Review 53 (2000), 29-59; id., "Technology and Innovation in Context: The Roman Background to Mediaeval and Later Developments," Journal of Roman Archaeology 7 (1994), 22-33. This is similar to the argument made by Christopher Howgego that the spread of coinage in the Aegean should be investigated within a "purely Greek context" rather than being confined by modern anthropological models: C. Howgego, Ancient History from Coins, (London: Routledge, 1995), 14-18.

50 This expression is originally taken from Hans Singer's Technologies for Basic Needs, (Concept Publishing Company, 1977), 6. It is defined as a nation's pre-existing "supply" of usable technologies from which it can select in order to perform a specific function: Singer 1977, 12-17.

51 "The innovations can also have different characters: 1. Technological (objects). 2. Intellectual, e.g. consultancy. 3. Physical movements (which are not technology), e.g. a new transport (but without a change in technology). 4. Behavioral, e.g. a new strategy for the company's market behavior or a new organizational structure"; J. Sundbo, The Theory of Innovation: Entrepreneurs, Technology and Strategy, (Edward Elgar Publishing, 1998), 21. This means that innovation can be viewed as a modification to behavior through changes in the organizational structure or application of existing technologies. It does not necessitate the implementation of new equipment or outright inventions. In this way, static development in one technology can still benefit from increases in scale or advancements in other fields. For a discussion of this model as it applies to ancient technology, see especially Greene 2008, 78-79.

the penetration of the solidus into daily monetary exchange resulted in concerns being expressed over the weight and purity of solidi. This is very different from the centuries preceding Constantine’s reforms, when unease over the purity of the metal in coins was only expressed sporadically. In cases where these feelings were articulated, the worry voiced over the state of coinage was related to outright counterfeiting or declining artistic standards. In other cases, as in Martial’s Epigrammata, it is little more than a vague expression of doubt over the shape or quality of the coins struck by Nero.

In comparison, the condition of coinage was no longer an abstraction after the introduction of the solidus, but a daily concern. This is clearly shown in Christian writings, where the image of moneychangers testing coinage is a popular theme. In this sense, it is meant to show that in matters of faith the virtuous should to be able to discern truth from falsehood just as the moneychanger can discriminate good coins from bad. Possibly the most noteworthy example is found in John Cassian’s Collationes:

... so that we may, as the Lord’s command bids us, become good moneychangers [... ut efficiamur secundum praeceptum Domini probabiles trapezitae], whose highest skill and whose training is to test what is perfectly pure gold and what is commonly termed tested [obryzum], or what is not sufficiently purified in the fire ... to be careful by the test of the balance to see that they are not under proper weight. All of which things the gospel saying, which uses this figure, shows us that we ought also to observe spiritually; first that whatever has found an entrance into our hearts, and whatever doctrine has been received by us, should be most carefully examined to see whether it has been purified by the divine and heavenly fire of the Holy Ghost, or whether it belongs to Jewish superstition, or whether it comes from the pride of a worldly philosophy and only externally makes a show of religion.

The popular dictum (efficiamur ... probabiles trapezitae) is from Greek and is not attested in the Gospels, but is generally considered to be a genuine saying of Jesus Christ. Most

53 Harris 2006, 20; cf. Andreau 1997, 84. The paucity of evidence is illustrated in Raymond Bogaert’s survey of assaying in antiquity, which moves almost directly from Hellenistic Egypt to the creation of the zygostatēs in 363 CE: Bogaert 1976, 27-28. Possible examples of assaying coins in Roman literature do exist, including Tert. de paen. 6.5; Epict. Conv. 3.3.3; Petr. Sat. 56; Mart. Ep. 12.57.2; Plaut. Persa III.3.47.

54 Petronius describes the work of the nummularii “who see the bronze through the silver” (qui per argentum aes videt) while testing for forged silver currency: Petr. Sat. 56. This is very similar to the description given by Tertullian, who equates merchants inspecting a coin so that it is not "cut, scraped, or adulterated" (ne scalptus ne versus ne adulter) to God testing the repentance of sinners (Tert. de paen. 6.5).


56 e.g., Tert. de paen. 6.5; Augustine, En. in psalm. 132.5; Origen, Comm. Joann. XIX.1; John Moschus, Pratum spirituale 185 (PG 87); Alex. Strom. Clem. I.; Jerome, Ep. 152.


58 "... dans la parole du Christ γίνεσθε τραπεζῖται δόκιµοι, parole qui ne se trouve pas dans les Évangiles canoniques mais qui est généralement considérée comme authentique": Bogaert 1976, 19. This formula is used regularly in Christian writings: e.g., “in morem prudentissimi trapezitae, qui sculptum numisma non
importantly, the aim of this test is not to detect counterfeit coinage as it is in earlier Roman texts, but to test the standards of weight and purity.

The popularity of this motif in Late Roman literature does not suggest anything definitive on its own. However, it is meaningful when compared to general worries articulated elsewhere over the circulation of substandard solidi. In this way, it is evidence of the popular apprehension concerning the accurate testing of gold coinage. As a device with a meaning that is intended to be easily relatable to its audience, it also reflects a general familiarity among the readers with this practice. The presence of these individuals testing coins must have been a common spectacle at all levels of social life during Late Antiquity. Thus could John Chrysostom describe the practices of the trapezitai inspecting solidi as one of the focal points of commercial life at Antioch in 388 CE.

The enduring popular worry over substandard solidi is reflected by numerous references to it in Late Roman juristic texts. C.J. XI.11.1 (367 CE) states that it was already viewed as a public issue by the middle of the fourth century CE. Furthermore, if Santo Mazzarino’s dating of De Rebus Bellicis to the 350’s CE is correct, the emphasis given to the quality of gold coinage in circulation provides further proof that this was a popular concern at the time. The circulation of substandard solidi also motivated the emperor Valentinian I to begin a massive recall and melting down of solidi towards the end of the 360’s CE. This act coincides with a renewed emphasis on visibly promoting the quality of the gold coinage. Beginning in 368 CE, solidi were impressed with the letters "OB" (obryzum), which designated the purity of its gold at or near 100 percent. In light


This was also present in literature from the Romano-Germanic world, such as in the story related by Gregory of Tours about St. Martin discovering a gold coin that although it appeared to be a tremissis (one third of a solidus), was actually a solidus after it had been weighed: Gregory of Tours, *de mir. S. Mart.*, IV.40.

As in John Cassian’s Collationes I.20, Chrysostom compares the ability to discern virtue from sin to trapezitai discarding adulterated or poorly-marked solidi ("οἱ τραπεζιταὶ τὸ μὲν κιβδήλων καὶ παράσημου ἱκβάλλουσι νόμισμα"); John Chrysostom, *In Princ. Act*. IV.2. For the literary evidence of increased use of gold in the late fourth century CE, see especially Banaji 2001, 77.

"We command solidi shaped in the venerability of former emperors [solidos veterum principum veneratione formatos] to be given and received by buyers and sellers [ab ementibus et distratventibus] in such a way as to provoke absolutely no dissension, as long as they are of the required weight [debiti ponderis] and honest material [speciei probae]": C.J. XI.11.1 (367 CE).


"There must be no argument but that, as We formerly decreed, when solidi are collected on any account, they must be reduced to a firm and solid mass of refined gold [in massam obryzae soliditetemque redintegratur] ... as We mentioned above, the tax payments of all shall be melted into a mass [omnium debiti conletur in massam] ...": C.Th. XII.6.12 (366 CE). For the text of this document and an English translation, see Hendy 1985, 387-388. The solidi were collected and then melted down into ingots of refined gold, some of which have survived: J. P. C. Kent and K. S. Painter, *Wealth of the Roman World: AD 300-700* (British Museum Publications, 1977), pl. 533-536. On the history of Valentinian’s reforms and the use
of the evident public doubt over the quality of gold coins during the 360’s, it is not surprising that a state official like the zygostratēs, whose primary function was to weigh the solidus, was created. What is possibly surprising is that the state waited so long after Constantine’s fiscal reforms to introduce this post.

This question is especially relevant if Pierre Bastien is correct that all transactions made in solidi involved some form of weighing\(^6^4\). It is further problematic because the office of the zygostratēs was not formally established until several decades after the introduction of the solidus. However, it is clear that even after the creation of the zygostratēs it was not unknown that other related professions, such as bankers (trapezitai) and estate overseers (pronoētai), were involved in weighing gold\(^6^5\). It is very likely that such individuals were informally responsible for these duties before and after the establishment of the zygostratēs, at least until it became a widespread public concern in the middle of the fourth century CE. At this point, it was necessary for the state to act by creating a public office to specifically manage this issue from becoming a crisis. It also coincides with other related actions by the government during this period, such as the program initiated by Valentinian to collect and melt down old or worn solidi.

The next references to this problem are from the middle of the fifth century CE. During the intervening years, the amount of gold coinage in circulation must have increased substantially as Banaji has argued\(^6^6\). However, by 445 CE, it seems as though older solidi were again being rejected in marketplaces. In Nov. Val. 16 (445 CE), it is described as a "frequent complaint [frequens ... querela]" that in "contemptuous disregard of our ancestors, solidi stamped with their names are constantly refused by buyers [in parentum nostrorum contumeliam insigniti solidi eorum nominibus ab omni emptore recusentur]". Although the text does not explicitly refer to the metrology (i.e. qualitas) or weight loss in solidi, it is undoubtedly a reference to the established sentiment that an

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\(^6^5\) Examples of a trapezitēs weighing coins: P. Beatty. Panop. 2.93, 2.94, 2.97; John Cassian, Collationes I.20 (SC 42.101); John Chrysostom, In princ. act. IV.2. A pronoētas is documented weighing 30 solidi (which were stolen) in P. Oxy. XVI 1853 (6th CE). For a full translation of this text, see Appendix 5.3.

\(^6^6\) Banaji 2001, 71.
individual should be paying more in older solidi to receive their equal value in weight. The implicit meaning is that older solidi are being valued at a discount due to weight loss.  

The problem of weight loss in solidi appears to have been a prevalent feature of monetary exchange in the fifth century. Only thirteen years after the passage in *Nov. Val. 16*, a type of exaction termed "*mutatura*" is identified as a considerable financial burden on landowners in *Nov. Maj. 7 (458 CE)*. This seems to have been a discount in the valuation of older solidi imposed by tax collectors despite the fact that the solidi were of standard weight. This custom would have been at odds with the state, which was asserting that it was the weight and purity of the gold that was the principal factor in its value and not its age or pedigree. In practice, it appears that solidi were still occasionally identified as being of "older mintage" (παλαιοχάρακτον) in Egyptian papyri. However, there is no indication that they were devalued in any way and are usually described as being of "full weight" (εὐσταθήματον). In fact, despite the pronouncements made by several emperors, coins are rarely defined by their age in papyri during Late Antiquity.

It is only at the end of the fifth century CE that the division between solidi of full weight and lightweight solidi was more wholly realized in *C.J. X.27.2*. This text refers to cash payments of taxation in kind and instructs the collecting officials to settle in solidi that are of acceptable weight (εὐσταθήμα) and to reject those that are deficient in weight (παράσταθμα). As there is no suggestion that the state officially produced lightweight solidi before Justinian, these underweight solidi were unmistakably coins that had lost weight after circulation, either by wear or intentional clipping. This shows that the circulation of worn solidi in the Eastern Empire was severe enough in the rural parts of

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67 "Therefore let it be universally known through this edict that capital punishment awaits him who believes a gold solidus of full weight [integri ponderis] in the names of My father the lord Theodosius [II], or of Our sacred female relations, or of former emperors, to be refused at a lower price": *Nov. Val. 16*.

68 "No collector shall refuse a solidus of full weight [integri ponderis] on the deceitful pretext that there is something wrong with it": *Nov. Maj. 7.14*. As in *Nov. Val. 16* and *C.Th. IX.22.1*, the weight of the gold is the most important characteristic of value.

69 "If a solidus is, perchance, reduced in value [aestimatione], the price of goods, too, should also be reduced in proportion [Pro immunitione, quae in aestimatione solidi forte tractatur, omnium quoque specierum pretia decrescere oportet]": *C.J. XI.11.2*. This appears under the heading "De veteris numismatis potestate" (*C.J. XI.11.0*) and is probably intended to counter the problem of discounts imposed on older solidi by focusing on the weight value of gold coinage.


71 In contrast, coins were suddenly defined by their age and provenance during the inflationary crisis of the 260’s-270’s CE: Harris 2006, 22-23; D. W. Rathbone, “Monetisation, not Price-Inflation, in Third-Century A.D. Egypt?” in C. E. King and D.G. Wigg (eds.), *Coin Use and Coin Finds in the Roman World*, (Gebrüder Mann Verlag, 1996), 321-39; id., “Prices and Price-Formation in Roman Egypt,” in J. Andreau et al., (eds.), *Économie antique*, (Musée Archéologique Départemental, 1997), 183-244.

72 Banaji 2001, Appendix 2, provides a full English translation.
Egypt during the reign of Justinian for the emperor to issue an edict confronting this problem.

Justinian’s Edict XI (559 CE), addressed to Peter (Barsymes), concerns what is termed "obryza" (ὑπὲρ ὀβρυζῆς), which is a fee that was being placed on gold in Egyptian city centers. This charge was seemingly the discount placed on substandard solidi from the rural districts of Egypt by a zygosstatēs or chrysōnēs (χρυσώνης) in Alexandria. These solidi are referred to as "ἀπόλυτου χάραγμα" and seem to have been exchanged at a reduced value in urban markets. The interpretation of obryza depends on the exact meaning of ἀπόλυτου χάραγμα. This expression has been the subject of a number of different and imaginative interpretations, but it is easiest to take it in its most literal form as Banaji suggests. In its simplest meaning, ἀπόλυτου probably alludes to "loose" coinage, which is differentiated from gold that is sealed in a bag or purse. This is all the more evident considering P. Ant. III 205 (7th CE), which is a written account of transactions that discriminates between sums of solidi described as "loose" (ἀπόλυτου) and gold characterized as "sealed" (οφφαγίδων). Banaji’s explanation for Edict XI thus seems both the most straightforward:

73 On the interpretation of Edict XI, see most recently Carla 2009, 220-232. It seems that previously the zygosstatēs and chrysōnai had been imposing discounts automatically under the guise of the ‘evilly conceived obryza’ (ὑπὲρ τῆς κακῶς ἐπινευμένης ὀβρυζῆς). It is unclear if “obryza” was universally used to indicate a fee charged for weighing, but it seems to have separate usages in the papyri. Klaus Maresch thinks the charge of “obryza” refers to the conversion of sealed base metal coinage to gold, which is a total misreading of the edict: Maresch 1994, 14-28; cf. J.-P. Callu, “Dénombrement et pesée: le sou théodosien,” Bulletin de la Société Française de Numismatique 34 (1979), 611. Constantin Zuckerman identifies at least two separate meanings: C. Zuckerman, Du village à l’Empire autour du registre fiscal d’Aphrodito: (525/526), (Association des amis du Centre d’histoire et civilisation de Byzance, 2004), 106. For a detailed account of the uses of obryza/ἀβρυζης in ancient metallurgy: E. Benveniste, “Le terme obryza et la métallurgie de l’or,” Revue de Philologie 79 (1953), 122-126. For a complete list of known examples in ancient literature: Halleux 1985, 48, n.54-70.

74 The duties of chrysōnai are not entirely known, but they seemed to have been a type of local financial officer or cashier: Zuckerman 2004, 102-105; Hendy 1985, 338-344; R. Bogaert, Banques et banquiers dans les cités grecques, (Leiden: Sijthoff, 1966), 87-88.

75 "So that in the future the zygosstatēs and chrysōnai amongst the Egyptians shall have no license to demand anything under the name of obryza, but the coined gold in that place [τὸ χαραττόμενον ἱκάνος χρυσίον] shall exactly resemble that in this Great City [i.e. Constantinople] ...”.

76 "And in the meantime, if there should be some weight loss in the coin called 'apolytou' [ἀπολύτεω καλουμένω χαράγματι]”; Edict XI.1.


78 P. Ant. III 205 (7th CE) is a papyrus from Antinoopolis recording an account (γνώσθη) of wages paid and received. Its full meaning is obscure, but it appears to be listing various categories of solidi being used in multiple transactions, including those gold coins that are “ἀπόλυτου νομίσματα" (loose solidi) and “οφφαγίδων νομίσματα (sealed solidi). Even if it is not entirely clear what the different types of solidi represent, P. Ant. III 205 effectively illustrates the highly variable and fluid nature of gold coins being exchanged in Egypt at this time.
Coinage which had seen considerable circulation in the rural areas and district capitals exchanged at a loss in Alexandria (the receiving center) simply because most of it comprised older solidi which circulated as loose coin (the Alexandrians called it ἀπόλυτον χάραγμα) and which had clearly lost weight to one degree or another.\footnote{Banaji 2001, 75.}

According to this reading, "obryza" was the fee imposed on gold coinage that was loose rather than sealed. It suggests that bankers in Egypt at this time, particularly those located in urban centres like Alexandria, were acting selectively against these solidi by imposing discounts or even refusing coins entirely. The reason for this was that they were older and presumed to have suffered substantial weight loss in comparison to sealed gold.

### 3.2 The Effects of Weight Loss on the Solidus — Papyrological Evidence

The circulation of underweight solidi is also reflected in the Egyptian papyri from this time, although it is not typically communicated in these exact terms.\footnote{"In den Papyri werden nicht vollwertige Solidi selten so charakterisiert, daß wir sicher sein können, daß diese Solidi als nicht vollwertig eingestuft werden, weil sie unterwichtig geworden sind": Maresch 1994, 14.} As in C.J. X.27.2, the expression used to describe coins that are deficient in weight appears to be παράσταθμα.\footnote{"minderwertigen": A. Jördens, "Fünf neue Symmachos-Papyri," Zeitschrift für Papyrologie und Epigraphik 92 (1992), 221. On the meaning of this term and its uses in the papyri: Carlà 2009, 378-390; Banaji 2001, 73; Banaji 1998, 193-196; Maresch 1994.} That this expression is intended to refer specifically to weight during this time can be demonstrated from other examples in papyri where the weight of a commodity other than gold is inadequate or lacking.\footnote{In P. Cair. Masp. I 67058 (549-550 CE), a payment is made for the deficiency (ὑπὲρ παραστάθμου) of wool (ἐρέας) in an account book from Aphroditio: Zuckerman 2004, 40-42. Elsewhere, weight deficiencies of commodities are reported for wheat in P. Vars. 28 (6th CE) as well as "Spanish oil and sauce" (ἐλαίου Σπανοῦ καὶ γάρου) in SB XII 11077 (4th-5th CE).}

In a monetary context, the nature of this practice is most reliably established in P. Oxy. I 132 (575-625 CE), which is the copy of a will of from a rural Oxyrhynchite village.\footnote{P. Oxy. I 132 is titled as an "account of gold" (γρώσις χρυσίου), which makes it clear that the sums are in gold and not units of account. For interpretations and translations of this text, see Carla 2009, 378-390; Banaji 2001, 72-3; Maresch 1994, 15-16; P. Sijpesteijn, "Deus papyrus byzantins de la collection d’Amsterdam," Chronique d’Egypte 48 (1973), 121-131.} The document pertains to three payments in gold totaling 360 solidi on the Alexandrian standard.\footnote{On the conversion of the Alexandrian Standard, see especially Maresch 1994, 39-43, 98-114; J. R. Rea in P. Oxy. LV 3805, lines 7-8.} In addition to these three disbursements, other payments are made in order to supplement the deficiencies observed in the weight of the solidi. The sums of gold are listed and followed by additional
payments made "on account of the weight deficiencies of the same solidi" (ὑπὲρ παρασταθμίας αὐτῶν νομίσματα).

The meaning of this statement is unmistakable. It classifies the solidi paid to each of the inheritants as "παράσταθμια" — clearly, the weight value of the gold did not equal the nominal value of the coins. According to calculations based on the sums listed, the average weight loss according to these three payments works out to be slightly less than 1 carat per solidus (0.946), which is approximately 0.19 grams (g) in metric terms. This is not very different from the levels of wear observed by Banaji in some hoards of a similar date. Moreover, it is noteworthy that the weight loss expressed in each of the three payments (0.93; 0.96; 0.97 carats per solidus on the Alexandrian standard) is different from the others. This denotes that each sum was individually weighed out and done so with extraordinary precision.

There are several other possible instances where παράσταθμια seems to be used to describe solidi of substandard weight. In SB XX 15183 (5th-6th CE), an enoikologos (ἔνοικολόγος) from Oxyrhynchus instructs Sophia Thaopias to hand over 375 myriads of denarii "on account of a weight deficiency" (ὑπὲρ παρασταθμίας) to a symmachos (σύμμαχος) named Praus. Although it does not specifically mention gold as the commodity, it is likely recompense from a previous payment discharged in gold. This is in part because other papyri receipts exist, which demonstrate that symmachoi were regularly paid in gold. If the sum of 375 myriads of denarii was a type of discount, it

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85 The additional payments made "on account of the weight deficiencies" (ὑπὲρ παρασταθμίας) correspond to how these deficiencies were recorded for other commodities in P. Caii. Masp. I 67058 and P. Vars. 28. The expression of weight values for solidi in this same manner certainly gives the impression that gold coins were treated like other commodities. This characteristic is certainly shown in precious metal hoards from the period: Hobbs 2006.


87 This was an employee on the Apion Estate who was responsible for the management of its urban properties: T. M. Hickey, Wine, Wealth, and the State in Late Antique Egypt: The House of Apion at Oxyrhynchus, (University of Michigan Press, 2012), 33; Sarris 2004, 65-66.


89 A symmachos was a type of messenger used frequently in Roman Egypt.

90 "Bei der παρασταθμία handelt es sich vom Wort her offenbar um eine Ausgleichszahlung bei Gewichtsunterschieden": Jordsen 1992, 221.

would have been computed during the original transaction without the necessity of a second payment. Consequently, the easiest explanation for this second payment is that the symmachos was being compensated for a previous transaction made in substandard gold coinage. Another important feature of this text is the apparent and fluid exchange between the base metal and gold coinages, which must have been an essential feature of everyday transactions.

There are further examples from the Egyptian papyri in which παράσταθμα is not employed, but there are nevertheless evident discrepancies between the weight value and nominal value of the listed sums of solidi. A demonstration of this practice, which can be reasonably attributed to worn solidi, is a fourth century CE account, P. Brem. 83. In this document, a payment (col. III.4-5) to Theodōros of 111 solidi is made "through" (διὰ) Makarios, an "assistant" (βοηθός), the value of which is stated to equate to 1 "pound" (λίτρα), 5 "ounces" (οὐγκία), and 20 "grams" (γράμματα) of "pure gold" (χρυσὸς καθαρὸς). This computes to weight loss of slightly less than one carat (0.84) per solidus, which is 0.16g.

Three other passages from this text involve payments with similar conversions to weight values of pure gold through various individuals. These are likewise assessed with weight losses valued at 0.6 carats (0.11g) per solidus in one payment of 10 solidi (col. IV.1.3-4) and two separate solidi both devalued by 0.5 (0.09g) carats per solidus (col. IV.1-2; IV.5-6). Considering that the nominal weight of the solidus was 4.5 grams, the scale of these measurements highlights both the technical precision that could be achieved and also the attention given to recording very small margins of weight loss.

The differential values between the number of coins and actual weight in gold clearly signify that the solidi were each weighed out (even two relatively minor payments of one solidus each) and found to be deficient. If the discounts were due to a standard charge or conversion fee, they would probably not display such disparity in the average value of the deductions (0.84, 0.6, and 0.5 carats per solidus). The explanation for these discounts is either that the coins were clipped or they had suffered weight loss due to circulation. The average deduction recorded in these sums of solidi is certainly credible.

92 An almost identical payment that was made in myriads of denarii on account of a weight deficiency in the gold is found in P. Mich. XV 740 (6th CE): "ὑπὲρ παρὰ κεράτα μισθίας γγδ"; cf. Maresch 1994, 16.
93 For a full translation of this text, see Appendix 5.1.
94 P. Brem. 83.4-5: "Θεοδόρῳ χρυσώνη νομίσματα μια / διὰ Μακαρίου βοηθόν χρυσοῦ καθαροῦ λίτρα α οὐγκία γ γράμματα κ". The psychological distinction between the full weight values of solidi, which are "pure" (καθαρά) and "underweight" (παράσταθμα) in P. Brem. 83, can also been seen in SB XXII 15248 (7th CE). In this latter document, which is an account of marbles and textiles, gold solidi are either listed as being "pure" (δέρμα) or "underweight" (παράσταθμα). In the minds of the individuals in both P. Brem. 83 and SB XXII 15248, calling solidi "pure" (either καθαρά or δέρμα) was interchangeable with describing them as being of "full weight" (εὐστάθμα).
since they correspond with the observed range of weight loss expressed in other papyri (typically a little less than one carat). If it is the case that these are worn solidi, it is an invaluable illustration of weight loss affecting solidi during the fourth century CE.

In *P. Laur.* III 110 (600 or 615 CE), weight loss is not directly referenced in any way, but is clearly understood to have an effect on the overall value of the gold. This text is an official receipt for three payments of the "public tax" (δήμοσιος) with the record of each payment and a second set of entries written in a different hand below. In these subscriptions, an individual named Phoibammôn, from Hermopolis, states that he "made \( \pi\epsilon\pi\omicron\iota\omicron\mu\eta\mu\alpha \) x solidi of full weight \( \tau\omicron\nu\nu\tau\alpha\theta\beta\mu\alpha \)" followed by their respective sums of gold. This statement signifies that this individual, possibly a zygostatēs, had not just tested the weight of each sum of gold, but rather that he had computed the real weight value of each payment and included subtractions due to weight loss.

The manner in which this practice is recorded in writing is unusual, but not entirely unique. The way that the total weight was literally "made" \( \pi\epsilon\pi\omicron\iota\omicron\mu\eta\mu\alpha \) resembles later papyrus documents such as *P. Apoll.* 82. In this text, which is a list of tax accounts deposited into a sealed bag (άποκόμβιος) of 100 solidi, the sum of gold collected is expressed as totaling 691 "counted" (ἀριθμα) solidi, but only "making" (ποιοῦνται) 653 solidi, 10 carats. Although it is not reported in writing, the difference between the two listed figures in *P. Apoll.* 82 is plainly an instance where the nominal value of the gold coins did not equate to their standard weight value. It means that the solidi had been counted out by number and then subsequently their weight value was calculated for the sake of proper accountancy. This reflects the procedure of the zygostatēs having "made" the gold listed in *P. Laur.* III 110 into solidi of "full weight" (εύσταθμα) by weighing it.

95 For a full translation of this text, see Appendix 5.2.
96 There is at least one zygostatēs named Phoibammôn (and possibly more than one individuals by this name) from Hermopolis Magna in *P. Sorb.* II 69 (617/18 CE or 633/4 CE): J. Gascou, *Un codex fiscale hermopolitique* (P. Sorb. II 69), (Atlanta: 1994), 272-274.
98 On the practice of sealing coinage in Late Roman Egypt, see chapter 4.3.
99 For other papyrological examples of "ποιοῦντα" used in this way: *P. Hamb.* I 56 (576-625 CE): *P. Lond.* II 483 (615-616 CE).
100 This is especially shown when compared to *P. Lond.* II 483 (615-616 CE), which lists 1 solidus plus 2/3 of a solidus "making" (τα ποιοῦντα) 36 1/2 carats "on the goldsmith's standard" (χρυσοχοικος σταθμος). However, it was more typical to use "ἐχομένα" rather than "ποιοῦντα" while expressing the disparity between values of solidi in later accounts. A typical line in *P. Lond.* IV 1412 reads: "Φαοφίς τινακτιόνος τα διὰ Θεοδώρου ζυγοστάτου και Ισαὰκ νοταρίου νομίσματα τα ἑξομένα νομίσματα σοφ" ("Φαοφίς 10, 13th Indiction, through Theodoros, zygostates, and Isaak, notarios, 303 solidi possessing 279 solidi").
It is impossible to establish if sums of gold recorded elsewhere as εὐσταθίμα underwent a similar process as P. Laur. III 110\textsuperscript{101}. However, the patterns and history of the usage of this term in the papyri certainly reveal one compelling anomaly. A majority of the passages in which this expression is used alongside the solidus — approximately 70 out of 129 texts — are from the sixth century CE\textsuperscript{102}. More tellingly, there is a cluster of these documents from the decades between 530 CE and 570 CE\textsuperscript{103}. In all, as many as 38 out of 42 texts that can be given a firm date are from within these four decades. The timing of these texts is especially significant because it corresponds closely to the publication of Justinian’s Edict XI in 559 CE. As has been previously discussed, this edict concerns the circulation of "loose solidi" (ἀπόλυτος χάραγμα), which Banaji interprets to mean as being substantially worn, and describes them as a problem specifically in Egypt. If the emperor felt compelled to deliver Edict XI for this reason, the fact that there were suddenly so many references to εὐσταθίμα solidi in the Egyptian papyri at this time would seemingly contradict that it was much of a problem at all. In contrast, if there were other sums of substandard solidi being "made" εὐσταθίμα (as in P. Laur. III 110), then Justinian’s Edict XI would be more comprehensible\textsuperscript{104}.

Whether the "εὐσταθίμα νομίσματα" meant coins of full weight or if was a means of accountancy for substandard solidi, its prominent usage at this time is a telling reflection of the psychology of the solidus. In a monetary environment that necessitated a system of exact weight standards for its coins, it demonstrates the emphasis attached to ensuring the full value of gold by weight. More importantly, this is not strictly a characteristic of the middle of the sixth century CE, but it is a prominent — and permanent — feature of

\textsuperscript{101} There certainly were other ways of expressing that gold was the proper weight, including formulas describing them as ʹἀριθμῷ καὶ[ι] σταθὼ πλήρῃ" ("in full number and weight"); e.g., "γίνεται χρυσοῦ νομίσματα β παρά κεράταβ β ἀριθμῷ / σταθὼ πλήρῃ ..." (P. Mich. XIII 664). This formula is attested in at least 22 papyri between the fifth and seventh centuries CE. Elsewhere, account books list quantities of other commodities like grain in this way: e.g., "πλήρης δ στός" in P. Oxy. XVI 1911.209, P. Oxy. XVIII 2195.146; P. Oxy. LV 3804.273. At the very least, this emphasizes that the value of the solidus was viewed and often calculated like other commodities in terms of weight.

\textsuperscript{102} This is mostly based on searches of the Duke Database of Documentary Papyri (\url{www.papyri.info}) for relevant texts. The approximate number of passages by century featuring this word are as follows — fourth century: 5; fifth century: 42; sixth century: 70; seventh century: 12. Passages that use εὐσταθίμα/εὐσταθίμος in Greek are virtually non-existent before its appearance in the fourth century CE. After the fourth century CE, all references in papyrus texts are in the context of gold and the solidus.

\textsuperscript{103} Based on a search of the Duke Database, there is a similar concordance for solidi characterized as δόκιμα/δόκιμος ("tested"). In fact, it is used during the same period (530-570 CE) in 39 out of 55 appearances in papyrus texts. This seems to indicate that the cluster of uses of εὐσταθίμα is part of a more general trend. However, it is possible that there is a selection bias due to the uneven survival of these documents. At most, these can only offer a broad view in support of the importance attached to the weight of the solidus during this time.

\textsuperscript{104} This correlation between historical events and papyrological usage is admittedly broad, but it clarifies the discrepancy between the papyrological texts in which solidi are "εὐσταθίμα" in comparison to "παράσταθίμα". After 300 CE, there are at least 129 instances in the papyri where solidi are described as "εὐσταθίμα", but no more than 4 instances where they are "παράσταθίμα".
monetary exchange in Late Antiquity. A final witness of this effect is Aurelios Apis, a chrysônēs from Antinoopolis, who drafted a payment receipt to Flavios Isidōros in 375 CE. He writes that he received 72 "imperial" (δεσποτικά) and "pure" (ἀπλά) solidi "without weighing and obryza and the difference" (ἀνευ σταθμοῦ / καὶ ὀμβρύζης καὶ ἀναλώματος). The wording of the document makes it clear that the normal practice upon receiving such a sum of gold was to weigh it, calculate the weight difference, and then to settle this amount. This not only signifies the popular concern over the weight of circulating gold coins, but also it demonstrates the necessity for the existence of individuals with ability to perform these measurements — like the zygostatēs.

4.1 Zygostatai at Work — Creation of the Zygostatēs

The evident concern over the weight of the solidus provides the setting into which the office of the zygostatēs was introduced in 363 CE. In fact, the creation of this office by the emperor Julian could not be a more conspicuous entry into the monetary history of the Later Roman Empire. The middle of the fourth century CE was a period that could be categorized as one of considerable disruption and change for the solidus. Fortunately, the text of Julian’s original decree announcing the creation of the zygostatēs has been preserved in C.Th. XII.7.2 and in C.J. X.73.2, the latter in an amended form. These two texts provide a meaningful historical setting for the creation of the zygostatēs, namely some of the popular anxieties regarding the circulation of inferior solidi at this time:

C.Th. XII.7.2 (363 CE)

Emptio venditioque solidorum, si qui eos excidium aut deminuunt aut ut proprio verbo utar cupiditatis, adroduct, tamquam leves eos vel debites nonnullis repudiantibus impeditur. Ideoque placet quem sermo Graecus appellat per singulas civitates constitui zygotaten, qui pro suo fide et industria neque fallat neque fallatur, ut ad eius arbitrium atque ad eius fidem, si qua inter vendentem empo remque in solidis exorta fuerit contentio, dirimatur.

105 P. Lips. I 61 (375 CE). The same Aurelios Apis is possibly attested in P. Flor. I 95 (375 CE). Flavios Isidōros was a military officer who appears in P. Lips. I 17, 20-23, 33-37, 45-56, 58-64. P. Lips. I 61 is actually the culmination of a prolonged saga involving at least two petitions and many other sundry correspondences from Flavios Isidōros. Apparently, Isidōros was charged with transporting taxes totaling 138 solidi to Hierapolis, but at some point in the process was robbed of a large portion of it and was ordered to pay back 72 solidi (the total found in P. Lips. I 61). For further details on these events, see especially C. Zuckerman, "Two reforms of the 370s," Revue des études byzantines 56 (1998), 79-139, esp. 86-90; B. Kramer, "Zwei Leipziger Papyri," Archiv für Papyruforschung und verwandte Gebiete 32 (1986), 33-46.

106 This is the only passage known to exist in the papyri that reads "ἀνευ σταθμοῦ / καὶ ὀμβρύζης καὶ ἀναλώματος", however deposits of gold are made in P. Flor. I 95 (375-377 CE) "with the tallied obryza and difference" (μετὰ τῆς ὀμβρύζης καὶ ἀναλώματος) and alternatively, "with the obryza and difference" (μετὰ τῆς ὀμβρύζης καὶ ἀναλώματος) in P. Lips. I 62 (384-385 CE). The exact meaning of these expressions is based largely on how "obryza" is interpreted, which is uncertain, but they undoubtedly show that coins were weighed in transactions involving gold.
The buying and selling of solidi is impeded if anyone clips down or diminishes or — to use the word proper to such avarice — nibbles them away, for some persons refuse them as light or inadequate. It therefore pleases us to appoint a *zygostatēs*, as the Greek word terms him, in each city, who on account of his faithfulness and industry will neither deceive nor be deceived, so that if a dispute may arise between a seller and buyer of solidi, it may be settled according to his judgment and reliability.\(^{107}\)

According to *C.Th.* XII.7.2, the primary concern of those drafting this law is the unlawful manipulation of the coins themselves\(^{108}\) — by "clipping" (*excidiunt*), "diminishing" (*diminuunt*), or "nibbling away" (*adrodunt*). As a result of this practice, the defaced solidi are rejected for being "light" (*leves*) or "inadequate" (*debites nonnullis*). However, the text of *C.J.* X.73.2, which replicates most of *C.Th.* XII.7.2, omits this portion:

*C.J.* X.73.2

*Quotiens de qualitate solidorum orta fuerit dubitatio, placet quem sermo Graecus appellat per singulas civitates constitutum zygostaten, qui pro sua fide atque industria neque fallat neque fallatur contentionem dirimere.*

As long as there has been doubt that has arisen concerning the quality of solidi, it pleases us to appoint a *zygostatēs*, as the Greek word terms him, in each city, who through their own faith and industry will neither deceive nor be deceived to settle a dispute.

These two texts are especially notable because they are the first explicit legal references to the circulation of gold coins that are deficient in weight. The major distinction between these two documents is the explanations given for the rejection of substandard solidi. *C.Th.* XII.7.2 seems to consider that this was due to coins being clipped or intentionally manipulated\(^{109}\). In contrast, *C.J.* X.73.2 is far less definite. The reason given for the rejection of solidi in this second text is over "doubt" (*dubitatio*) concerning the "condition" (*qualitas*) of solidi. It is far more probable in this context that *qualitas* signifies uncertainty.

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\(^{107}\) Text and translation are taken from de Groote 2002, 27-8. Other versions in English can be found in Banaji 2001, 70, and Hendy 1985, 316; cf. Carla 2009 (Italian), 196; Zuckerman 2004, 103 (French); Maresch 1994, 14 (German); Bogaert 1976, 28-29 (French).

\(^{108}\) The penalties for being caught clipping coins were apparently quite severe: *C.Th.* IX.22.1 (343 CE), which was restated in *C.Th.* IX.21.9 (389 CE) and *C.Th.* IX.21.10 (393 CE). On the literary evidence for clipping: Hendy, 316-317. The best study of the laws that pertain to counterfeiting is still found in Grierson 1956, 248-261. For a general survey of metrological fraud in antiquity, see especially M. Rizzi, "Ex iniquitatibus mensurarum et ponderum. Appunti intorno alle frodi metrologiche nell’antichità Greca e Romana," *International Review of Roman Law* 11 (2013), 288-331 (<http://www.ridrom.uclm.es/>).

\(^{109}\) *C.Th.* XII.6.13 (367 CE) describes "solidi adulterini," which seem to mean clipped coins, as being regularly substituted by local tax collectors: "whenever solidi must be paid to the account of the imperial largesses, the actual solidi shall not be delivered because adulterated [adulterini] coins are often substituted [subduntur] for such solidi ...". This is also when the solidus begins to be identified by appellations meant to ensure its purity, weight, and provenance: e.g., "δόκιµος" ("tested") is first used in 352 CE, "ἁπλός" ("pure") in 362 CE, and "δεσποτικός" ("imperial") in 364 CE. The rapid appearance of these expressions suggests an increased public concern over the condition of the gold coinage being used.
over the alloy of the coinage in circulation\textsuperscript{110}. This suggests that rather than being deliberately altered, solidi being worn through circulation were becoming problematic at this time. Although both clipping and weight loss were undoubtedly both relevant factors, it seems that the latter is far more likely to have been a widespread problem\textsuperscript{111}.

The anxiety expressed regarding the quality of solidi in the two edicts announcing the formation of the zygostatēs signifies that new forces were at work after Constantine’s monetary reforms. Firstly, it establishes that the weight and quality of gold coinage in circulation had become a substantial public concern by the middle of the fourth century CE, whether it was clipped, worn, or its physical state otherwise altered. At the very least, the issue was deemed significant enough by the state for it to make an effort to counter the effects of weight loss in solidi. Secondly, the existence of these two edicts suggests that the diffusion of the solidus was already widespread by this time. This means that the functional dominance of gold had already merged with other economic and social factors to generate the high velocity of circulation that created the "crisis" of worn solidi in the 360’s CE.

A final consideration is that the object of these edicts is the quality of solidi — not the silver or base metal currencies. This shows the particular importance attached to the regular circulation of a stable gold coinage of \textit{full weight}. By the middle of the fourth century CE, the solidus had become the principal coinage insofar as it formed a large share of monetary transactions as well as a mass currency that entered into all branches of social life. The consequence of this trend was a cumulative increase in the amount of gold circulating because more gold coinage was being put out by the state. This renewed emphasis on money also reveals an economy that was not only highly monetized, but also in which market relations were similarly pervasive.

4.2 Zygostatai at Work — Weighing the Solidus

An outstanding feature of the texts in which zygostatai are identified by their profession is the shortage of references to these individuals actually weighing gold. However, that weighing actually took place in remote regions of Late Roman Egypt can

\textsuperscript{110} In this context, "\textit{qualitas}" seems to refer to the alloy of the coin: Banaji 2001, 62. In Gregory’s \textit{Moralia in Job} 33.60 (\textit{PL} 76.711D-712A), the author describes the duties of the \textit{nummularius} examining solidi, who first assesses the "condition" (\textit{qualitas}) before moving on to the "type" (\textit{figura}), and then its weight. \textsuperscript{111} Evidence for clipping is very rare in hoards. Hendy has trouble producing any archaeological examples of clipped solidi and instead relies on citing instances where clipped siliquae (silver coins) have been found: Hendy 1985, 318, n.16. However, clipped solidi have been found in a hoard from Karianis: J. Arce, "A Solidus Hoard from the Vicinity of Karianis," \textit{Schweizerische Numismatische Rundschau} 66 (1987), 181-187.
be discerned in two papyrus letters, both from small villages during the sixth and seventh centuries CE. The first is P. Oxy. XVI 1853 (6th CE), which is a letter from Victor, the antigeouchos (ἀντιγεοῦχος) of the Apion estate, to one of his employees, Georgos. It is in fact one segment of a larger archive of letters from Victor to various other middling administrators around Oxyrhynchus. P. Oxy. XVI 1853 concerns the investigation of a theft of 30 solidi from a pronoētēs (προνοητής) in the village of Pinyris. Victor asks George to either come to the village or send another official in order to arbitrate the dispute. According to the letter, the theft was part of a raid by the villagers of another settlement, Thmoinepsobthis. This was a particularly daring act since it appears that it was carried out in the presence of the pronoētēs of Pinyris as he was weighing solidi, possibly even during a festival or public feast.

The details of the theft carried out by the villagers from Thmoinepsobthis are slightly obscure, but it appears these individuals stole "the scale belonging to the pronoētēs" (τὸ ζύγιν τοῦ προνοητοῦ), which was also "holding underneath it 30 solidi" (ἔχων κάτω καὶ τριάκοντα νομίσματα). In this sense, it could be assumed that the pronoētēs was in the act of physically weighing out solidi with his scale and balance when the village was attacked. The amount of gold is a substantial one (30 solidi) and is possibly connected to the collection of taxes since pronoētai were involved in taxation. Moreover, as it seems to have occurred at some sort of public event, this would be an ideal time to collect arrears from the citizens who had assembled to celebrate. Although the text does not strictly involve the presence of a zygostatēs, it is still significant because it shows solidi being weighed in the rural parts of Late Roman Egypt.

112 The antigeouchos was the chief administrator of the Apion Estate and intermediary between the rest of the estate management and the Apions. On the duties of the antigeouchos, see most recently Hickey 2012, 21; Sarris 2006, 75-79.
113 For a full translation of this text, see Appendix 5.3.
115 Each settlement (ἐποίκιον) on the Apion estate seems to have had one "steward" (προνοητής): cf. P. Oxy XVI 1916, 2031, 2032, 2034. For a revealing list of the duties of the pronoētēs, see the surviving work contract for one of these individuals: P. Oxy. I 136 (583 CE). On this position, see most recently Hickey 2012, 59-60; Sarris 2006, 78-80; R. Mazza, "P. Oxy. XVI 1911 ei conti annuali dei pronoetai," Zeitschrift für Papyrologie und Epigraphik (1998), 161-172.
116 "ἐβαλον γὰρ εἰς κόμην / εἰς τὴν ξενίαν καὶ ἔλευσαν τὸ ζύγιν τοῦ προνοητοῦ αὐτῶν ἔχων κάτω καὶ τριάκοντα νομίσματα" ("For they [from Thmoinepsobthis] struck into the village during the feast and stole the scale of those [from Pinuris], which had underneath it 30 solidi"): P. Oxy. XVI 1853.2-3. As for the circumstances of the attack, "fights and brawls in inns and during festivals were common": W. Riess, "Between Fiction and Reality: Robbers in Apuleius’ Golden Ass," Ancient Narrative 1 (2000), 270.
117 e.g., P. Oxy. XVI 1846, 1853, 1855.
A second papyrus text depicting the weighing of solidi is SB VI 9400 (525-575 CE), which is a letter from an official named Hēras Dionysios to his employer, Herodēs. Although Hēras Dionysios does not specify his profession, he could very well have been a zygostratēs. In the letter, Hēras Dionysios reports complaints being made against him by local inhabitants of an unspecified village. The concerns expressed by the local villagers are related to the weights being used by Hēras Dionysios to measure gold (χρυσίον) and what he terms "keratia" (κέρατια), which was almost certainly intended to refer to the base metal coinage, the follis. According to the villagers, Hēras Dionysios had been using heavier weights for gold and lighter ones for the keratia. The accusation is that Hēras Dionysios was defrauding them of the full value of their gold by intentionally operating his scales using heavier weights (βαρυτέρου ὄντος τοῦ ζυγίου) for the gold coins. However, he claims that he used the weights belonging to the village, which are the same ones he used on previous occasions, and not those from the city.

This letter is significant for a number of reasons. Firstly, it is an unambiguous example of both gold and base metal currencies being physically weighed out in a village setting. This fact alone substantiates Jairus Banaji’s general assertion that gold was available to ordinary citizens in a rural context. Secondly, it demonstrates the serious concern felt not only by administrators and bureaucrats, but also by local villagers over the accuracy of weight measurements being taken for coinage. The fear expressed by the villagers over weight standards is especially acute—they are accusing Hēras Dionysios of trying to defraud them of their gold in particular. This rather poignantly illustrates the unique function of the solidus as the principal measure of value in Late Antiquity. Finally, the dating of this letter (c.525-575 CE) corresponds to the period when Justinian’s Edict XI (559 CE) cites that the circulation of worn solidi was problematic in rural Egypt.

118 Formerly P. Vindob. G. 25874. For a full translation of this text, see Appendix 5.4. On this text and a translation into German, see H. Gerstinger, “Sieben neue gräko-ägyptische Papyrusbriefe byzantinischer Zeit (VI.-VII. Jh. n.Chr.) aus der Sammlung "Papyrus Erzherzog Rainer”,” Wiener Studien 70 (1957), 113-115; cf. Banaji 2001, 70.
119 "ἐµαθὼν, ὡς οἱ ἄτο τῆς κόμης ... ἔµπισαντό με / ὡς βαρυτέρου ὄντος τοῦ ζυγίου, ὧν ὑποδέχομαι / τὸ χρυσίου ... καὶ τῶν ἀποὶ κερατίων / ἐλασσοτέρων ὄντων": SB VI 9400.2-7.
120 "γράφω / τοίνυν, ὡς οὕτω ζυγίον ἔλαβον μεθ’ ἐμαυτοῦ ἄτο / τῆς πόλεως οὕτω ἀλλὰ τῇ ἀλλὰ τῷ ζυγίῳ / ἐδέξαµαι Διονυσίου τοῦ γραµµατέως τῆς κόµης": SB VI 9400.9-12. The use of different scale weights (in addition to the already troublesome local weight standards) for measuring solidi was common in Late Roman Egypt. As early as 384 CE, Symmachus delineates between the weight of pound standards according to the “urban” (urbanis ponderibus) and a more “generous” balance (trinitae largioris examine), which suggests the use of variant standards. This is also seemingly the case in Late Roman Egypt, where it appears that the Apion estate used a slightly heavier Roman pound for their measurements of gold: Banaji 1998, 190. The most exhaustive survey of local Egyptian weight standards and accountancy practices can be found in Maresch 1994, 82-158.
121 Banaji 2001, ch.8. See also Sarris 2007; Sarris 2006; cf. Hickey 2012.
It is clear that gold coinage had a special place in the minds of ordinary citizens as both the money *par excellence* and the preferred medium of exchange. The fear expressed in *SB VI 9400* exhibits the desperate efforts of regular citizens to secure the full weight of the gold. In this way, it also corroborates the comments made by Anonymous in *De Rebus Bellicis* 2.1-2 that gold had become the dominant instrument of commercial exchange.

More importantly, it shows that the disparity it caused was most deeply felt by the lower classes, who suffered economically by the devaluation of base metal currency over time. The trepidation shown by the villagers in *SB VI 9400* at the prospect of being cheated out of their gold is a particularly dramatic example of this ongoing socioeconomic struggle.

In fact, the most direct reference to a zygostatēs formally weighing out gold coinage is found in *P. Oxy. LXIII 4395*, which date to 499-500 CE. This text is an unusually thorough draft of a private loan that took place in Alexandria between Aurelios Agathocles, the lender, and Flavios Iulianos, the debtor. Although the sum of the loan is only 10 solidi, which is not an abnormally large amount considering that the same Flavios Iulianos has elsewhere received loans as massive as 1455 solidi, the document runs in excess of 150 lines. It meticulously records every detail of the loan as well as naming its various participants and their duties performed. Included in this lengthy catalog of witnesses and guarantors is a zygostatēs named Peter, whose contributions are central to the final execution of the transaction. Peter acknowledges in writing that "through me [δι’ ἐμοῦ] were weighed out [ἐσταθμίσθησαν] and delivered [παρεδόθησαν]" the 10 solidi to Iulianos from Agathocles.

This rather formal and protracted text of the loan, which seems excessive considering that it was drafted for the seemingly quotidian sum of 10 solidi, is notable for several reasons. Firstly, the zygostatēs is described as being "of the locality of the Caesareum [τόπου Καισαρίου]," which was a neighborhood in Alexandria that housed the temple dedicated to the imperial cult. The necessity to define the specific location inside the city where Peter is operating suggests that there were more than one zygostatēs

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123 *P. Oxy. LXIII 4394*. This is a remarkable loan for both its physical size (256 lines) and the total amount of gold (1455 solidi) — in both respects, it is the biggest known example of a papyrus loan dating to Late Antiquity (although documents naming much larger loans being made have been found, particularly *PSI I 76*). On this text in relation to the history of loans in Egypt: P. van Minnen, "Money and Credit in Roman Egypt," in Harris (ed.) 2008, 236-237.

active in Alexandria, and probably a great number of them in a city of that population size and with its highly monetized market economy. This rather incidental detail raises broader questions concerning the distribution of these individuals in both urban and rural settings as well as the geographical range, or territory, in which they applied their expertise.\(^{125}\)

Secondly, the date of this loan to the very end of the fifth century CE demonstrates that individuals described as zygostatai were still performing their original public function well after the creation of this office in 363 CE. This may not seem altogether unsurprising, but it is important to note because the title for this office came to signify a different meaning and purpose in its later history.\(^{126}\) It also establishes that the public concern over the circulation of worn or substandard solidi was still significant at this time since it prompted the demand for public weighers. Finally, because it is an unusually thorough and comprehensive text, it includes written details usually omitted in other loans that are less extensive in their documentation. This means that it is possible that similar loans or other transactions made in gold involved the actual weighing and assaying of the sums of money without stating it explicitly in writing.

In this respect, the papyrus *P. Oxy. XVI 1886* (472 CE) is a revealing illustration of both the emphasis placed on securing the full weight value of gold and the measures undertaken by individuals when it is shown to be deficient.\(^{127}\) This document contains an official petition to a *defensor civitatis* (ἐκδικος), involving gold owed by a zygostatēs named Anastasios. The introduction to this text in the *Papyri Oxyrhynchi XVI* refers to it as an "unpaid debt", which is misleading. It is more likely describing a difference shown between the weights of a sum of gold before and after it had been weighed by a zygostatēs. The implication is that the zygostatēs withdrew a sum of 52 carats of gold after depositing it into a sealed bag (σφραγίς) and returning it to the petitioner. However, the zygostatēs from the original transaction died before the difference was repaid, but the liability was...

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\(^{125}\) For a list of geographical locations where zygostatai are found in the papyri, see Appendix 4.

\(^{126}\) On the evolving function of this office in the collection of taxes, see Chapter 5: "The Zygostatēs and Taxation".

\(^{127}\) For a full translation of this text, see Appendix 5.5. Other commentaries on this text can be found in Hendy 1985, 344; Bogaert 1976, 32-33; Johnson-West 1944, 191.

\(^{128}\) The *defensor civitatis* (ἐκδικος) was a type of legal representative in Late Roman Egypt. Robert Frakes has written extensively on the evolution of this office after the fourth century CE: e.g., R. M. Frakes, *Contra Potentium Inurias: The Defensor Civitatis and Late Roman Justice*, (Munich: C. H. Beck, 2001); cf. V. Manno, *Ricerche sul "Defensor Civitatis,"* (Giuffrè, 1984).

\(^{129}\) "ἐδεξάμην τὴν αὐτούς σφραγίαν, καὶ μεθ’ ὀλίγης ταύτην / λύσας ὁ προειρημένος ζυγοστάτης παραπέφαναν / κεράτια πεντήκοντα δύο" ("and having handed this over I received his sealed bag and the above zygostatēs having unfastened it showed less [i.e. a difference] by weight of 52 carats"): *P. Oxy. XVI 1886.5-8*. 

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subsequently acknowledged by his son, who is also described as his assistant (μισθιος). The petitioner appeals to the defensor that the son be incarcerated until he repays the missing amount.

Considering the context of *P. Oxy.* XVI 1886, this text is almost undoubtedly an instance where the zygostates has weighed a sum of gold and sealed it in a bag or pouch for his client. The gold thus deposited in the bag was returned to the petitioner, Aurelios Joseph, to be used for an unknown purpose. This purpose might be more evident had the clause indicating the reason of the transaction survived. Similar to *SB VI* 9400, ordinary citizens are accusing a public official of defrauding them of their gold by manipulating its weight. Setting aside the question of the general probity of zygostatai, it demonstrates once again the particular significance of maintaining weight value in cases where gold coinage is involved. This is especially true since 52 carats of gold would have been no small sum to the average citizen. The urgency of recovering this deficit is unmistakable considering Aurelios Joseph’s efforts to formally appeal to his local defensor and that he requests the son of the zygostates be imprisoned until the debt is fully repaid.

The events described in *P. Oxy.* XVI 1886 are additionally significant because they are a direct reversal of the intended effect of the zygostates. They represent not only a breakdown in the function of the zygostates as a reliable agent for testing solidi, but also

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130 This is a notable example of a zygostates employing an assistant (μισθιος), who is also evidently his son. Presumably, the son was intending to follow his father into the trade. Other examples where a zygostates is employing an assistant (either a μισθιος or βοηθος) are found in *P. Cair.* Cat. 10432 and *SB* XIV 12005.

131 This is definitely a “public” zygostatas (ζυγοστάτης) as public officials in Byzantine Egypt. In the case of this document, the individual is definitely a “public” (δημόσιος) zygostates and so it is obvious that he is a public employee. For other examples of this usage, see also *BGU* III 837 and *SB* XXVI 16354. However, as Bogaert and others have noticed, the vast majority of texts do not make this distinction apparent: e.g., Carla 2009, 199; Hendy 1985, 317-318; Bogaert 1976, 33.

132 The deceased Anastasio is described as a “public zygostates” (δημόσιος ζυγοστάτης). There is a great deal of disagreement concerning the status of zygostatai as public officials in Byzantine Egypt. In the case of this document, the individual is definitely a “public” (δημόσιος) zygostates and so it is obvious that he is a public employee. For other examples of this usage, see also *BGU* III 837 and *SB* XXVI 16354. However, as Bogaert and others have noticed, the vast majority of texts do not make this distinction apparent: e.g., Carla 2009, 199; Hendy 1985, 317-318; Bogaert 1976, 33.

133 The sum of 52 carats equals to 2 solidi plus 4 carats on the 24 carat standard or 2 solidi plus 12 carats on the “private standard” (διπλωτικός ζυγός) of Oxyrhynchus: Banaji 1998, 185-193; Maresch 1994, 32-44. As points of comparison for the value of this gold, an unskilled laborer in Egypt generally seems to have earned around 1 solidus per year in the fifth and sixth centuries CE (Johnston-West 1949: 194-6), while a symmachos made 2.25 solidi in *SB* XXI 14400 (6th CE) and a pronoëtes in *P. Oxy.* XVI 1912 (566 CE) managed the equivalent in gold and kind of 3.79 solidi per year. As Christopher Kelly wrote, “one solidus was no mean amount. A single working person could live for several months on such a sum; the poorest could perhaps live for a whole year on only a little more”: Kelly 2004, 141. See also Banaji 2001, Appendix 1, Tables Ia/11b for a list of professions and their salaries for this period. On wage scales and payments in Late Antiquity: e.g., W. Scheidel, “Real wages in Early Economies: Evidence for Living Standards from 1800 BCE to 1300 CE,” *Journal of the Economic and Social History of the Orient* 53 (2010), 425-462, 440-442; Kelly 2004, 141-145.
the impact of this breakdown on the local use of gold. It is evident that the exchange of the solidus was heavily dependent on regular measurements in order to ensure the weight value of coins. This would have been an especially relevant concern for the solidus due to its central function in daily monetary transactions. Without the broad provision of this expertise at every level of exchange, circulation could be disrupted by uncertainty over weight, which is clearly the case in *P. Oxy. XVI 1886*.

4.3 Zygostatai at Work — Sealing Gold

The contents of *P. Oxy. XVI 1886* introduce a slightly different, but very closely related, service performed by the office of the zygostatēs. This was depositing weighed solidi into bags or other vessels, which were marked by weight and then sealed. Of course, it was common throughout antiquity for small denominations of coins to be carried or stored in loose purses manufactured out of cloth or leather. In contrast, a purse of gold that had been weighed by a zygostatēs was fastened (σφραγίσαι) with their seal (σφραγίς or βούλλα), which was called either an ἀποκόμβιον or a "σφραγίς*. The

135 There are a number of other papyri documents and letters voicing mistrust and concerns by citizens over similar manipulations to the weighing and discharging of gold by zygostatai (e.g., *SB VI* 9285; *SB VI* 9400). This has led Michael Hendy to characterize the office of the zygostatēs as a "byword for corruption": Hendy 1985, 317; see also Callu 1979, 611 (on Synesius of Cyrene, *Ep.* 127). The impact of "trust" in social and market relations has not been heavily studied, but a recent publication by Steven Johnstone explores how this concept was integral to market activity in the Greek World: *A History of Trust in Ancient Greece*, (University of Chicago Press), 2011, especially 35-61; 81-110. However, since the author’s study only covers Classical and Hellenistic Greece, some of his arguments are not applicable to the Late Roman Period. In particular, Johnstone contends that a primary reason for establishing trust relationships at this time was the general inconsistency of measures being taken in the Greek World, which stands in opposition to the precise measurements of the solidus used in the Later Roman Empire. In this way, it appears that a significant element of producing trust in Late Antiquity was the technical expertise of specialists and their ability to devise technological solutions to human problems: Cuomo 2008, 29-34; Cuomo 2007, ch.5.

136 A pouch of loose coins was generally called a "βαλλάντιον" or "ἀπόδεδωμοσ" in Greek and a "saccus" or "saccelus" in Latin, but they could also be termed a "θύλαξ"/"θυλακός" and "μαραπίτσιον" in the papyri. This conflation of possible names is evinced from Epiphanius’ de mensuris et ponderibus, which has survived in both Latin and Greek (and Syriac) versions and equates a βαλλάντιον to a follis, but also to a θυλακος and sacculum: M. Hendy, *Coinage and Money in the Byzantine Empire*, 1081-1261, (Dumbarton Oaks Center for Byzantine Studies, 1969), 303-309.

137 The original meaning of "σφραγίσαι" is to physically enclose an object using a signet (σφραγις) to impress a seal on it and secure its contents: Bogaert 1997, 120. This verb has a diverse history of literal and metaphorical applications, which goes back to Classical Greek literature: e.g., *Eur.* IA 38 (sealing a votive tablet); *Aesch.* *Eum.* 828 (the sealed thunderbolt of Zeus); *Hdt.* II.38 (sealing the horns of a bull). It was frequently used later by Roman writers (e.g., Plut. *Pomp.* 5; *Arr. Epict.* II.13.7) and in biblical texts (e.g., Isaiah 29:11; John 6:27). It also refers to a large variety of sealed objects and materials in the papyri, including wills (*Chr. Mit.* 309; *P. Oxy. XVI* 1901; *P. Oxy. LXIII* 4354), jewelry (*CPR* I 30), olive oil (*P. Abinh.* 4), letters (*P. Oxy.* XIV 1677; *P. Ryl.* IV 604), and even a dead body (*P. Bodl.* I 167).

138 e.g., *P. Apoll.* 82 (693-696 CE); *P. Apoll.* 83 (651-700 CE).

139 e.g., *P. Oxy.* XVI 1886; cf. "σφραγίς" in Justinian’s *Edict XI*. Curiously, a similar process of metonymy seems to have determined the popular name of the base metal coinage, the φόλλις. This is theorized to have been borrowed from the Latin "follus" ("bellows") after the leather purses in which it was circulated: A. Pontani, "Ancora su Pallada," *API* IX 528, ovvero il bilinguismo alla prova,” * Incontri triestini di filologia classica* 6 (2007), 187-196; Callu 1979, 73-79; A. Cameron, "The Follis in Fourth-Century Egypt,” *The
major difference between these and conventional purses was that the contents could not be accessed unless the seal was physically loosened. In this way, they were effectively single monetary units that circulated at a fixed weight. This system was particularly advantageous to the exchange of solidi because it could allow the same sum of gold to change hands without the necessity of weighing it at every transaction\(^\text{140}\). It also had the additional benefit of protecting the coins from the effects of wear due to repeated handling at every transaction.

It is worth noting that the practice of storing coins and precious metals in sealed bags was by no means a new arrangement by this time\(^\text{141}\). In fact, there is evidence to suggest that they were used at previous times in Roman history. References in juristic writings from the third century CE identify a type of purse called a "sacculum signatum", "pecunia obsignata", or "pecunia clausa", which seems to designate coinage that had been deposited into sealed containers\(^\text{142}\). As their title suggests, they were affixed with a seal in order to certify the number and value of the contents. Additionally, a mosaic from Smirat in North Africa shows an image of sealed bags of coinage that are described as "sacci" in the underlying inscription and marked on the outside as containing 1000 denarii\(^\text{143}\).

However, the most notable example by far is the discovery of so-called "tesserae

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140 The benefits of this type of system are possibly best explored in Abraham Udovitch’s study on banking operations in the Islamic World during the Middle Ages: A. L. Udovitch, "Bankers Without Banks: Commerce, Banking, and Society in the Islamic World of the Middle Ages," in The Dawn of Modern Banking, (New Haven: 1979), esp. 264-267. As part of his investigation of commercial activities taking place during this time, he examines the circulation of sealed purses of metallic coinage used in payments made both locally and internationally. He determines that this activity was greatly facilitated by the established practice of labeling each bag with the number of coins it contained and its corresponding weight value. By doing so, bankers and traders could participate in market exchange without the necessity for weighing and assaying at every transaction.

141 The practice of sealing precious metals of fixed weights into sealed cloth or linen bags certainly predates the advent of coinage. A number of papers have been published recently that propose the regular use of sealed bullion as far back as the twelfth century BCE: e.g., R. Kletter, "Iron Age Hoards of Precious Metals in Palestine — An 'Underground Economy'?” Levant 35 (2003), 139-152; C. M. Thompson, "Sealed Silver in Iron Age Cisjordan and the 'Invention' of Coinage,” Oxford Journal of Archaeology 22/1 (2003), 67-96. This has generated considerable debate over whether these objects constitute a proper monetary context or are more aptly viewed as a form of 'proto-coinage'; R. Kletter, "Coinage Before Coins? A Response, “Levant 36 (2004), 207-210; S. Gitin and A. Golani, “A Silver-Based Monetary Economy in the Seventh Century BCE: A Response to Raz Kletter,” Levant 36 (2004), 203-205; D. M. Schaps, The Invention of Coinage and the Monetization of Ancient Greece, (University of Michigan Press, 2004), esp. 34-56.

142 e.g., "sacculum signatum" ("a sealed purse"); Digg. 16.3.1.36; Digg. 16.3.29pr; Digg. 18.3.8; "sacculum signatum" Digg. 16.3.26.2; "pecunia obsignata" ("sealed money"); Digg. 16.3.25.1; Digg. 22.1.1.3; "pecunia signatum"; Digg. 46.3.39; "pecunia obsignavit"; Digg. 17.5.6.1; Digg. 22.1.7; Digg. 22.1.41.1. These expressions are also mentioned by Roman writers, including Cicero (e.g., Cic. Top. 57), but it is only in the fourth century CE that "sacculum" and "sacculum" are used widely in a context denoting that its contents are sealed (e.g., Jér. Ép. 117.8; Ambros. de Nab. 8.39; Syn. Ép. 127).

143 As interpreted by Hendy 1985, 339, who cites the work of A. Beschaouch: "Nouvelles recherches sur les soudalités de l’Afrique romaine," Comptes rendus des séances de l’Académie des Inscriptions et Belles-Lettres 121 (1977), 486-503. A second possible example is a mosaic from the Piazza Armerina, which features bags interpreted by A. H. M. Jones to be folles; Jones 1959, 34.
nummulariae”, which are small rods of inscribed bone or ivory that have been unearthed at a number of Roman archaeological sites. These objects, which date mostly from the first century CE, appear to have been used to seal pouches of coinage that had been inspected and counted by banking officials.

The relative abundance and the similarity in likeness of these items from multiple locations indicate that they were part of a larger system of handling coinage. However, although there are obvious correspondences in form and appearance, the tesseræ nummulariae were fundamentally dissimilar in their purpose and context from the sealed bags of solidi produced by zygostatai. Firstly, the inscriptions found on these objects do not clearly indicate that the coinage they enclosed had been scrutinized more closely than being counted and inspected for forgery. Secondly, the surviving evidence suggests a very specialized use and that the circulation of these sealed bags was very limited. The purses or other containers fastened with tesseræ nummulariae seem to have been used mostly by companies of tax collectors and a small circuit of banking professionals. This is because it is theorized that they were primarily meant for the storage of large volumes of coinage, which could then be easily tallied (such as the bags of 1000 denarii shown in the mosaic at Smirat). It made accountancy as well as the transportation of these sums far more convenient, but it was not frequently required outside of this specific context.

The system of sealed coinage that arose in the fourth century CE was very different from this practice. The most significant aspect of this change was that it was no longer restricted to a small population of financial experts as it had apparently been for the tesseræ nummulariae. In contrast, sealed bags of coins evolved into a regular—and arguably crucial—part of monetization at all levels of social life. They were also adopted for the base metal currencies. In the case of base metal coinage, Michael Hendy’s

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146 In fact, at no point do any of the inscriptions state that the commodity sealed by the tesseræ is coinage: Andreau 1997, 81-4; Petrucci 1991, 261; Bogaert 1976, 27.

147 R. Herzog, who was the first to hypothesize the true purpose of these objects, admitted that a tesseræ was probably not a regular feature of monetary exchange in the Roman Empire. He imagined it being used as part of a network of wealthy financiers, private bankers, tax collectors, and other individuals who frequently oversaw the movement of large volumes of physical money. Aldo Petrucci later argued that they devised as a means for creditors to efficiently manage their incoming and outgoing loans. Andreau has put forward several models, but for each he has stressed that the tesseræ nummulariae circulated among a very closed population of highly specialized individuals or tax collectors. He rightly emphasizes the likelihood that such an arrangement was configured in order to facilitate large-scale transactions of coins over long distances regardless of who was involved. See Andreau 1997, 87-89; cf. Petrucci 1991, 265.
assertion that the exchange of coins in sealed purses was initially due to inflation in the late third century CE is probably correct\textsuperscript{148}. The circulation of sealed purses or bags of base metal coinage was apparently common enough by the beginning of the fourth century CE to attract the disapproving attention of the state. In \textit{P. Beatty Panop. 2.93-97} (300 CE), the trapezitai are denounced for imposing charges exacted "on the pretext of purses" (προφάσει / βαλλαντίων), which is presumably the difference between loose and sealed coinage\textsuperscript{149}.

After the massive changes to monetary policy during Constantine’s reign, it appears that the circulation of the gold solidus was at least partly dependent on packaged units of these coins. Unfortunately, sealed bags of coinage do not usually survive in the archaeological record\textsuperscript{150}. The discovery of the \textit{tesserae nummulariae} — inscribed bone or ivory rods used to seal coins in the Roman Empire — without any trace of the bags they once secured is confirmation of this general observance. In lieu of physical evidence, the obvious alternative is to probe the literary and documentary sources for verification of this practice. There are a number of documentary references to the practice of issuing and receiving sealed purses of gold during the Late Roman and Byzantine Periods. These examples are widely divergent in both their context and value, which ranges from as little as 1 1/3 to as many as 2000 or more solidi\textsuperscript{151}.

The most compelling evidence by far is the material published by Gerard Génelle in 2007\textsuperscript{152}. Although his study seem to have been largely ignored, Génelle’s examination of the uses of the Latin term, \textit{sacculus} (“moneybag”), in the written works of Saint Augustine of Hippo is especially important to the study of Late Roman monetary history. The

\textsuperscript{148} According to Michael Hendy, the dramatic reduction in the value of silver coinage in the second half of the third century CE generated a widespread shortage of denominations of medium value. Since there was also a corresponding shortfall of available gold coinage, this meant that nearly all transactions were settled in small denominational currency. Consequently, any purchase that involved more than a minimal sum would have been "absurdly cumbersome" because it required large and unwieldy quantities of coinage. The natural solution was to use purses containing standard numbers of lesser value coins, which essentially became single monetary units of greater worth: Hendy 1985, 339. On the early inflation of the follis, see A. Wassink, "Inflation and Financial Policy under the Roman Empire to the Price Edict of 301 AD," \textit{Historia: Zeitschrift fur Alte Geschichte} (1991), 465-493; Callu 1979; L. Ruggini, "A proposito del follis nel IV secolo," \textit{Atti della Accademia Nazionale dei Lincei} (1959), 306-319.

\textsuperscript{149} \textit{P. Beatty Panop. 2} (300 CE) consists of a series of letters from Aurelios Isidóros to Apollinarios in the city of Panopolis. It as an extensive document with an equally extensive bibliography, but see recently R. Rees, \textit{Diocletian and the Tetrarchy}, (Edinburgh University Press, 2004), 33-36; Kelly 2004, 116-120. For a more complete bibliography, see Carlà 2009, 50, n.111.

\textsuperscript{150} A small number of hoards comprising base metal or gold coins have been identified as being likely deposited in a sealed bag or other containers. This is mostly based on the assumption that the presence of a large number of coins struck from the same die sets or round numbers of coins (e.g., 72 solidi would equate to exactly 1 pound of gold) also represent such purses: Hendy 1985, 342-3.

\textsuperscript{151} For a complete list of these examples: Hendy 1969, 323-327.

primary conclusion drawn from his work is that the bag of money as both a conceptual motif and real-life object was pervasive in his writing. More importantly, the author contends that a sacculus represented a sealed bag of gold coins. To further illustrate his point, the author investigates one written piece for evidence of the characteristic uses of sealed gold during the saint’s lifetime:

A very poor man came upon a purse [sacculus] with about 200 solidi, unless I am very much mistaken about its sum … Mindful of the law, he put up a poster [pittacium] in public. For he knew he ought to return (the gold), but he did not know to whom he could return it. He put up the poster in public — the other man, he who had lost the solidi, came to that place, and sought out the other man. With the poster having been found and read, he who was lamenting and had wandered all around, came to the (other) man. And just in case (the second man) was striving for (gold) belonging to others, he (the first man) asked for proof, asked about the condition of the sack [qualitatem sacculi], the seal [sigillum], and also the number of solidi. And when the other answered all (these questions) reliably, he returned what he had found. This (second) man, filled with joy, seeking to pay back a reward, offered about a tenth (of the gold) — twenty solidi — which he refused to accept. So he offered him ten (solidi) — he refused to accept it. So he asked him to accept at least five (solidi) — the other man refused. Angered, the man threw the purse to the ground: “I have lost nothing,” he said, “if you do not accept anything from me, I have lost nothing” … Defeated, the other man finally accepted what was offered. Immediately, he disbursed the whole (sum) to the poor, he did not discharge one solidus into his own home.

Setting aside its moralizing objective, the details of this parable raise a number of possibilities about the function of these objects and the context of their use.

One immediately notable aspect of this story is that it offers no surprise that a beggar might come across a substantial quantity of gold coins in a purse. That an individual kept such a sum of gold and that they were transporting it in this way was apparently not an outstanding event. It also becomes evident that this purse, which is only termed a sacculus in the text, was affixed with a seal when the beggar asks the owner to identify its mark (“sigillum”). This corresponds with Généle’s conclusion that a sacculus

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154 Généle cites no less than 15 passages from Augustine’s writing that refer to sacculi containing gold solidi: Généle 2007, 73, n.30.

155 Sermo 178.8.
primarily meant a sealed bag of gold in the mind of Saint Augustine. Moreover, since this sermon was meant to be recited to an audience, the inclusion of these elements in the narrative without any remark suggests that its listeners were already familiar with these objects. Of course, Augustine’s congregation was not made up entirely of bankers and financial specialists, but ordinary citizens from a relatively obscure part of North Africa.

The actual purpose of these objects is less clear from Augustine’s writings. In Sermo 178, the sacculus containing 200 solidi was being carried on a journey or transported for an unknown reason, which is how the beggar came to find it out in the open. Génelle accordingly envisions the sealed moneybag bearing gold as principally a medium for securing and transporting wealth (a “bourse-sac”). He differentiates this from a regular purse (a “bourse-porte-monnaie”), which is carried around and used for all the sundry transactions of normal commercial life. Enclosing the contents of a bag of coins with a seal was also an effective method for guaranteeing their value and avoiding what he calls “malversations” — corruption or malpractice, especially in terms of substituting inferior quality coinage for gold or silver. These points are undeniable, but they should not fundamentally limit the other established uses of this medium. A sacculus could certainly be a single monetary unit, or even money that is "locked away" (pecunia clausa) as Augustine defines it in Sermo 101.6, but for practical reasons it could also transform into a means of payment. Augustine occasionally acknowledged such exchanges in his works.

The writings of Saint Augustine as seen through the analysis of Gerard Génelle underscore the high visibility of gold coinage at all levels of social life. In this respect, it is significant that gold currency was not a neutral facet of Late Roman culture, but one that was also socially charged. This is even shown by the beggar in Sermo 178, who is described as being "mindful of the law" (memor legis) when he decides to advertise his discovery. Although it is obviously intended to be an expression of his virtue, it reflects a special awareness of the pressures exerted by the authorities in matters where gold is present. Finally, despite their material absence in the archaeological record, these sealed moneybags were arguably a popular means of using and dispensing gold. The prevalence

\textsuperscript{156}cf. "Quid est sacculus? Pecunia clausa, id occultum sapientia ... Accipite spiritum sanctum. Fons in te esse debet non sacculus; unde erogatur not ubi includatur": Sermo 101.6.

\textsuperscript{157} Génelle 2007, 66.

\textsuperscript{158} “Si dans le sermon 178 d’Augustin et dans les exemples précédents, il est clairement fait allusion à des bourses scellées, c’est qu’une fois le sceau apposé, leur contenu, comme nous l’avons déjà précisé, ne peut et ne doit être modifié. On voulait ainsi éviter des malversations, par exemple en soustrayant des pièces au contenu du sac d’argent ou en les remplaçant par des pièces de moins bonne qualité” (Génelle 2007, 72). An example of this practice survives in Synesius of Cyrene, Ep. 127, which records an individual (probably a zygostates) replacing gold with copper; J.-P. Callu, "Dénombrement et pesée: le sou théodosien," Bulletin de la Société Française de Numismatique 54 (1979).

\textsuperscript{159} These are listed in Génelle 2007, 73, n.32.
of sealed gold offers some indication of the existence of individuals like zygostatai in North Africa although they are not explicitly mentioned in any of the texts. Certainly, it indicates that the regular demand for their services would have existed outside of Egypt.

The expertise of the zygostatēs was undoubtedly a key mechanism for this type of system to be operational. Since they were principally responsible for accurately weighing solidi, it would be very reasonable that these individuals would be sought out for this service. The relationship between this public office and producing sealed purses of gold coins is clearly shown in P. Oxy. XVI 1886. This document has already been investigated as an example of a zygostatēs weighing out solidi, but it also demonstrates the active role of these officials in the circulation of sealed coinage. The writer, Aurelios Joseph, claims that he gave a sum of gold to Anastasios, a zygostatēs, which was returned in a sealed purse that showed a deficit of 52 carats.

The first striking feature of this letter is its author, Aurelios Joseph. Aurelios Joseph is neither a banker nor tax collector, but the resident of a small Egyptian town. The fact that originates from a relatively obscure provincial settlement reveals how profoundly the use of sealed purses of gold coins had penetrated into local Egyptian markets. It further shows that sealed coinage was no longer restricted to a specialized banking context or for the transportation of large volumes of coinage, but it was even adopted by villagers from rural Egypt. This is related to the second noteworthy aspect of this letter, which is the persistence displayed by Aurelios Joseph in recovering the full weight of his gold. His efforts to secure the missing 52 carats — he not only pursued the zygostatēs, but also his assistant and son — relate the significance attached by the general public to these sealed units of gold coins as a means of preserving the weight of their contents.

The concerns expressed by Aurelios Joseph were shared by the illustrious as well as the ordinary. In fact, Justinian’s Edict XI (559 CE) was issued directly to address this type of activity in Egypt. The emperor not only mentions the zygostatēs by name as the agent responsible for producing sealed bags of solidi, but also condemns the apparent corruption exhibited by these individuals in the provision of this service. It is obviously an important document for the study of the zygostatēs, which is immediately clear from its preamble:

So that in the future the zygostatai and chrysōnai amongst the Egyptians shall have no license to demand anything under the name of obryza, but that coined gold in that place [τὸ χαραττόμενον ἐκέει ἵππις] shall exactly resemble that in this
Great City [i.e. Constantinople], they shall place their seals [σφραγίδα] on it according to the weight preserved in the coined money ...  

As has been previously noted, this document has been subjected to a variety of creative interpretations, but its meaning is actually very straightforward. The underlying message is simply that each sealed bag of gold solidi be marked by their actual weight. This is intended to put an end to the practice of marking these objects according to the discounts imposed on them for the coins being worn or having been circulated previously as "loose coinage" (ἀπόλυτον χάραγμα).

The behavior admonished by Justinian could plausibly explain the events recounted earlier by Aurelios Joseph in P. Oxy. XVI 1886. The missing 52 carats of gold might easily have been a discount or charge deducted from the original sum by the zygostates without the knowledge of Aurelios Joseph. It was only once the seal had been loosened by Aurelios Joseph and the contents revealed that he eventually discovered the discrepancy. This scenario could possibly fall under the category of payments (i.e., obryza) scornfully described by Justinian — the zygostates had levied these in return for his service without informing the other party. Taken together, these two documents tell a great deal about the conditions surrounding the circulation of sealed gold in Egypt at this time. That this custom had attracted the attention of the emperor plainly indicates it was both common enough to be problematic and also deemed important enough to necessitate regulation.

Additionally, papyrus texts like P. Oxy. XVI 1886 reveal that the use of sealed purses of gold occurred not only in Alexandria as it is stated in Justinian’s Edict, but also that it took place in rural parts of Egypt. In both contexts, the abilities of the zygostatai as public weighers were instrumental in the production and management of sealed units of solidi.

5. The Zygostates and Taxation

As state officials and public weighers of gold coinage, it is hardly surprising that holders of the public office of the zygostates were heavily involved in taxation, especially those forms that were exacted in gold. This is confirmed in the Egyptian papyri, where a

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161 The text stipulates that if it is necessary at some time for them to seal gold, they only inscribe the true weight of the gold they seal: "εἰ γε καὶ σφραγίσαι δέοι ποτέ τοιούτου ἐπιγράψαι μόνον ὅσον ταῖς ἀληθείαις ἐστιν ο τού ταῖς σφραγίσεως ἐμβληθέντος χρυσίου σταθμός".

162 In the closing section of Edict XI, the emperor orders that his proclamations be enforced by the Augustalios (Ἀὐγοστάλιος) in Alexandria and that offenders be stripped of their property and subjected to capital punishment, which is a rather convincing display of his sincerity.
significant portion of the regular duties of these individuals seems to have been the collection or management of taxes in smaller villages and estates. The number of texts in which zygostatai exhibit this function actually exceeds all other identifiable categories of their activities. Nearly a third of the corpus of papyrus documents featuring zygostatai (at least 24 out of 78) is related in some way to taxation. This numerical discrepancy signifies a deliberate purpose assigned to this public official over a broad period of time and location. Although it was not formally linked to this activity in Julian’s original constitution, the zygostatēs undoubtedly had a close and lasting connection to taxation in Egypt.

There are several explanations for this role, all of which are related to a tax system in which the preferred medium of payment was gold. In practical terms, a local official who regularly handled transactions and other responsibilities related to the circulation of the solidus was a sensible choice to administer large sums of gold in lieu of formal tax collectors. Since they were agents of the state, they were also professionally accountable for any irregularities or shortfalls that might arise in the execution of these duties. For this reason, the office of the zygostatēs could be reasonably characterized as one part of the larger mechanism responsible for the assessment and physical collection of taxes in Late Roman Egypt. This is clear from the abundance of papyrus texts in which they take part.

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163 Other activities the zygostatai are found participating in that were not strictly part of their directive included moneylending (e.g., P. Michael. 35; SB XII 10810), being witnesses to loan agreements (BGU XII 2186), and making collective payments to a stable near Oxyrhynchus (P. Oxy. XVI 2028).

164 Modern accounts of taxation and its organization in Later Roman Egypt (especially as it relates to the development of large estates) are far too numerous to list them all, but the most influential are in the following: Hickey 2012; Sarris 2006; Wickham 2005, 62-80; Banaji 2001, 51-60; Delmaire 1989; Gascou 1985, 1-90; Johnson-West 1949; Hardy 1931; Rouillard 1928.


166 The ascendancy of those whom Peter Heather named the ‘New Constantinians’ — representatives of the army and state bureaucracy — created powerful new interest groups whose ascendancy at the expense of the old curial classes was equaled by their considerable appetite for accumulating gold. On the ‘New Constantinians’, see P. Heather, “New men for New Constantines? Creating an Imperial Elite in the Eastern Mediterranean,” in P. Magdalino, New Constantines: The Rhythm of Imperial Renewal in Byzantium, 4th-13th Centuries, (Variorum Publishing, 1994), 11-33; cf. Sarris 2004; Banaji 2001, ch.5. This behavior was largely manifested by two distinct practices. The first was the systematic monetization of the civic bureaucracy, which created a service culture in which fees and charges were rendered in gold for virtually every transaction: Kelly 2004, 138-185. The second was the increasing demand by these new interest groups to commute taxes in kind into gold, which was a far more profitable medium and vulnerable to abuse: Banaji 2001, 51-60. As officials of the state, the zygostatai were certainly part of this new bureaucratic class in which the use of gold was pervasive and with whom their private interests aligned. Naturally, they could benefit immensely from this new arrangement and their position within it, which was strengthened by their skills as public weighers of gold. This explains why a zygostatēs is recorded paying the considerable sum of 100 solidi in order to enter office in P. Oxy. LV 3805.30 (556 CE or later). This type of payment upon entering office was a regular feature of the Late Roman administration that even seems to have been regulated by the state (although not publicly condoned): Zeno prescribed that a consul entering office should pay the kingly sum of 100 lbs. of gold and elsewhere it cost as much as 20 lbs. of gold (to the Church) in
in this type of activity as well as the broad continuity of these texts over several centuries. These texts accordingly range in date from very early in the history of this public office to long after the Muslim conquests of Egypt.

It did not require much time after its formal establishment as a public office for the zygosstatēs to become active in the collection of taxes. In fact, its impact was virtually immediate. Two early examples worth noting in this respect are *P. Cair. Cat.* 10432 (4th CE) and *SB* XIV 12005 (4th CE), both of which appear to be from the same account of payments made by the village of Andromachis to two zygostatai, Eleias and Romanos.

The list of daily payments, which were disbursed in both gold and base metal currencies, signifies that these officials were already routinely called upon to gather taxes from the local population by the late fourth century CE. Although it had formally existed for only a few decades at this time, the zygostatēs had not only been swiftly appropriated for this purpose, but also there were more than one working together in the same village. That it was so quickly adopted in this way and that it demanded more than one of these individuals working together in a village setting shows that the influence of the zygostatēs on this type of activity was substantial. This is underscored by a third papyrus from 385-6 CE, which reports a deposit made by a chrysōnēs and zygostatēs for the "aurum tironicum" (χρυσοῦ τιρώνων) in Hermopolis and amounts to twenty pounds of gold.

In contrast, the latest papyrus text of this kind is *P. Bal.* II 287 and dates to 725 CE, which is long after Egypt had fallen to the Rashidun Caliphate. It is a list of details (κλάσματα) of orders for payment (πιττάκια) to a tax account called a "διαγραφῆς ἀληθείνεν" (ἐπί συναντησίας), which was evidently set by this zygostatēs for several pagarchies and cities.

Although the details of this text are not particularly distinctive, *P. Bal.* II 287 is notable because it is from a larger group of tax accounts and receipts in the period after 639-40...
CE. All of these documents — many of which are from rural settlements and estates in Egypt — make up a group of papyri that seem to feature zygostatai assuming a more formalized role in the collection of taxes. In this way, it has been theorized that the use of "ζυγοστάτης" in Greek and Coptic texts from Early Arab Egypt came to mean purely a kind of local tax collector. Since all of these taxes were exacted in gold and the zygostatēs had long been handling taxes paid in gold, this would be a natural progression of their duties.

If this was the case, some of the established skills and expertise of the zygostatēs were certainly transferable to this kind of activity. One of the most vital of these talents has already been investigated at length, which is that the zygostatēs possessed both the capability and authority to package and seal sums of coinage. Since zygostatai were public officials, it is very conceivable that this service also applied to coins that had been amassed by the state in the course of taxing local citizens. Even after the Muslim conquest of Egypt, this is clearly shown to be the case in SB XXVI 16354 (643-4 CE), which is a letter penned concerning the shipment of taxes from the village of Prechthis. The main subject of this correspondence, which was mistakenly overlooked by Marc de Groote in 2002, is apparently a wooden box (a "σάρπος" or "σαρπίον") reportedly containing gold solidi that had been gathered as taxes. The sum of 82 "counted" (ἀρίθμια) solidi was consigned to the wooden box and "sealed with the seal of the public zygostatēs" (βεβουλλώμενον τῆς βούλλας τοῦ ζυγοστάτου / τοῦ δημοσίου). Following this procedure, the number of coins was inscribed (ἐπιγεγράμμένον) on the box by the same zygostatēs and then it was returned for shipment.

The use of the seal of the zygostatēs in this way can be viewed as a natural corollary of the production of sealed purses in Egypt. As in the sealed purses of solidi created by zygostatai, this process involved depositing coins into a container and fastening the personal seal of the individual in command. The act of sealing the coins was both a security measure and it also made the presiding officials accountable for any deficiencies that might be found later in the contents. However, in the context of gathering and

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171 This hypothesis was proposed originally by H. I. Bell in his commentary on the Coptic texts P. Lond. IV 1508 and P. Lond IV 1509, p. xiii.
172 "ζαρπίον ἠμεγκέν μοι Πεσόου ὁ προτοκωμίτης Πρέχθεως βεβουλλομένον τῆς βούλλας τοῦ ζυγοστάτου / τοῦ δημοσίου": SB XXVI 16354.1-2. For a full translation of this text, see Appendix 5.8.
173 This is based on the alternative reading of the Greek "ζαρπίου" rather than "πάνινου" on line 1: H. Harrawer, "Neue Protokometen-Papyri: Mit einer Dokumentation der Protokometen," Aegyptus 81 (2001), 112-113.
174 This custom is not unlike the descriptions in juristic literature of cash deposits being made by means of sealed bags: e.g. a "sealed purse" (sacculum signatum) in Dig. XVI.3.1.36 and "sealed money" (pecuniam
shipping taxes on behalf of the state, this practice was not strictly limited to the zygostatês, but it seems to have been used by other officials in the same service. For example, a pronoêtes writes in P. Oxy. XVI 1855 (6th-7th CE) about gold solidi collected from a village that have been put "under our seal ... for the headman" (ὑπὸ σφραγίδι ... τῷ μειζόνου) of the same village. The author of the letter further states how he has gone to another village, Pinyris, in order that he collect the tax arrears and "might affix the seal" (σφραγίσωμεν). Likewise in P. Apoll. 2 (648 CE), which is unfortunately incomplete, the writer specifies how a sum of gold (τὸ χρυσίον) was sent (ἐπεμψα) to the receiver of the letter 'under the seal of our master' (ὑπὸ τὴν σφραγίδα τοῦ δεσπότου ἰμήων).

These apparent uses of sealed coinage more closely resemble the speculated function of the tesserae nummulariae employed in previous centuries than the purses of gold solidi produced by zygostatai. The purpose of this activity was to safeguard the transportation of coinage under the protection of an official seal, which was largely motivated by the fear of theft or accidental loss. This is entirely reasonable when it is considered that accounts of robbery are not uncommon in Egyptian papyri. These types of incidents have already been observed in documents like P. Oxy. XVI 1853, where apparently the villagers of Thmoinepsobthis staged a daring raid on a second village and stole the sum of 30 solidi while it was being weighed by the pronoêtes. Even the writer of SB XXVI 16354 states that he was withholding the sealed wooden box of solidi because he "feared to transport it and lose it" (φοβούμενος τοῦτο βαστάξαι καὶ ἀπελθεῖν). In light of these events, the act of sealing taxes by a zygostatês, such as in SB XXVI 16354, was probably a normal security measure. It had very little or no relation to the economic and fiscal motives that drove the other uses of sealed purses in Late Roman Egypt.

The connection between taxation and the office of the zygostatês is considerably more substantial when these two distinctive branches of administration are examined in

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174 ὅδει γάρ καὶ τὸ χρυσίον ἐπεμψα ὑμῖν διὰ τοῦ αὐτοῦ Μωαγαρίτου ὑπὸ τὴν σφραγίδα / τοῦ δεσπότου ἰμήων Ἄβελλα ("I sent to you the gold through Moagaritos under the seal of our master Abdella"). P. Apoll. 2.2-3. On this text, see Gascou-Worp 1982, 86-87. For a thorough discussion and translation into English of the letters of Abdella (i.e. 'Abd Allâh), see P. M. Sijpesteijn, Shaping a Muslim State: The World of a Mid-Eighth-Century Egyptian Official, (Oxford University Press, 2013), esp. 136-151.

175 The account of the alleged theft of gold (also taxes) from Flavios Isidoros has already been recounted from P. Lips. 1 61. An interesting comparison is that in the sixteenth volume of Papyri Oxyrhynchhi, alone, there are at least five texts documenting theft (P. Oxy. XVI 1831; 1832; 1853; 1866; 1867) and also the arbitration of a dispute over theft (P. Oxy. XVI 1839). For the most recent accounts of violence generally in Egypt in Late Antiquity: J.-U. Krause, Munchener Beiträge zur Papyrforschung Heft 108: Gewalt und Kriminalität in der Spätantike, (C. H. Beck, 2014); Bell 2013, 51-118; H. A. Drake (ed.), Violence in Late Antiquity: Perceptions and Practices, (Ashgate Publishing, 2006); C. Wolff, "Les brigands en Orient sous le Haut-Empire romain," Collection de l’Ecole française de Rome 308 (2003), 1-289.
terms of their cooperative effect on the use of the solidus. In this respect, they were both employed to counteract one of the main obstacles of the solidus as a form of commodity money — the potentially negative impact of weight loss on the circulation of gold coinage. This view is contingent on the argument that taxation in gold was not only utilized as a means of obtaining more profit from citizens, but also as a mechanism for the central minting authority to bring in worn coins to be melted down and restruck\(^{177}\). The benefit of this strategy was plainly that it maintained a constant supply of new soli for exchange while simultaneously removing substandard coins from circulation. This would hopefully negate the functional problems associated with weight loss in coins. It also corresponds neatly to the intended purpose of the office of the zygostatēs, which was to mitigate the effects of wear and to act as a form of surveillance on the local use of the solidus. They both consequently operated through different channels, but in ways that enhanced each respective function.

The necessity for such mechanisms was clearly intensified by a system in which the age or provenance of a gold coin was valued alongside its metric properties. In fact, this attitude is explicitly conveyed in some of the juristic texts previously investigated for their references to the problems caused by weight loss, such as Nov. Val. 16 and Nov. Maj. 7. They indicate how it was normal practice (even by state employees) to charge discounts on older solidi of full weight, which is termed "mutatura" in the latter document. The implicit meaning of this custom is that older soli had suffered more weight loss because they had circulated for longer. This psychological correlation between duration of use and diminished value is also undoubtedly related to the habit of keeping gold in sealed bags as a means of preserving it. This is shown by documents like Justinian’s Edict XI, which cite similar discounts to the mutatura (e.g., obryza) were imposed on a sum of gold coins characterized as "loose" (ἀπόλυτον) in the papyri. A further example is found in P. Oxy. I 144 (580 CE), which reports a discount of 6.25% on hundreds of solidi called "ἀπόλυτον Αἰγύπτων χάραγμα" in contrast to the gold coins described as "ἐν ὀβρύζῳ χαράγματι" in the same text\(^{178}\).

\(^{177}\) The argument is that taxation was continually pulling in older solidi, melting them down, and reminting them: G. Depeyrot, "La durée d’utilisation des solidi romains,” in P. Kos and Z. Demo (eds.), *Studia Numismatica Labacensia Alexandro Jelocnik Oblata*, (Ljubljana: 1988), 213-217; cf. R. Reece, "Coins and the Late Roman Economy,” *Late Antique Archaeology* 1 (2003), 139-168, esp. 142-143. In this respect, the increasing pressure to commute taxes in kind into gold was a central feature of its ongoing success: Banaji 2001, 51-60.

\(^{178}\) Michael Hendy calls the discount in *P. Oxy. I 144* a "restoration": Hendy 1985, 354-355; cf. Carla 2009, 230-231; Zuckerman 2004, 97; Banaji 2001, 75, n.212. The date of this document (580 CE) means that those charging these discounts (which seem to be a form of the *obryza* considering the latter soli were "ἐν ὀβρύζῳ χαράγματι") were doing so in flagrant disregard of the edict issued by Justinian in 559 CE.
In this monetary environment, managing the supply of newly minted solidi for circulation was essential. This explains why the modern descriptions of taxation as a way of overseeing the cycle of production and renewal of gold coins by the state are such practicable models. It was also valuable because it could be implemented to respond efficiently to acute crises in supply. This is shown by the documented actions of emperors like Valentinian I, who used this apparatus effectively to implement his program of melting down and reminting older solidi in the 360’s CE. However, this model is most useful when viewed as part of a larger network of technological and intellectual processes that regulated the solidus as a form of commodity money. Naturally, the office of the zygostratēs was another feature of this network. By assigning weight values and sealing sums of gold for citizens, zygos tatai were part of a system that utilized taxation in gold as a way of mitigating the effects of wear by melting down and reminting the solidi it collected. Additionally, they could be viewed as a form of surveillance, which monitored the use of the solidus and the general condition of coinage in a local setting. These skills were also closely related to the state’s ability to collect as well as properly account for the gold it received through the exacton of taxes from its citizens.

The interaction of these technological processes is actually illustrated most clearly in a papyrus text from Ptolemaic Egypt — over five hundreds year before the advent of the solidus. *P. Cair. Zen.* 59021 (258 BCE) is a famous letter from Demetrios, a supervisor of the mint at Alexandria, to Apollonius concerning the uncertainty caused by new fiscal policies enacted in Egypt at this time. One of the major complaints made by Demetrios in his letter is that the absence of trained assayers was discouraging the use of worn precious metal coinage, which meant that "the people in the city [i.e. Alexandria] ... are

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However, this activity is probably best viewed through the broader bureaucratic culture of the Later Roman Empire, in which a payment of gold was a standard feature of any public transaction: Kelly 2004, 138-152.  
179 *C. Th. XII.6.12* (366 CE) makes his purpose and methods clear: "There must be no argument but that, as We formerly decreed, when solidi are collected on any account, they must be reduced to a firm and solid mass of refined gold ... as We mentioned above, the tax payments of all shall be melted into a mass ... ".  
reluctant to use the worn gold coins. Moreover, it meant that local residents were unable to convert their worn gold into new coins because “none of them knows to whom he can refer and after adding a little get back fine gold or silver.” Since precious metal coinage was very much a form of commodity money in Ptolemaic Egypt, this situation is somewhat analogous to the problems faced by the use of the solidus in Egypt during Late Antiquity. The successful circulation of gold coinage, especially when it became increasingly worn, depended heavily on the availability of skilled assayers to attach a value to individual sums. Additionally, it necessitated an effective mechanism by which substandard coins could be periodically taken in and reminted.

The economic disruption brought about by the conditions described in *P. Cair. Zen.* 59021 further clarifies the expanded role of the zygostatēs in taxation after the Muslim conquest of Egypt. As it has previously been observed, this public official seems to have been more formally involved in the collection of taxes at this time. The papyrological record evidently confirms this trend because of a sudden increase in the number of papyri where zygostatai are found to be involved in this activity — no less than 15 out of 24 relevant texts are from the time after 639-40 CE. The increased presence of zygostatai in this context is not simply explained by the deliberate specialization of their duties as tax collectors. The need for public weighers was still a necessary feature of the circulation of the solidus locally.

Similar to *P. Cair. Zen.* 59021, this phenomenon could arguably represent a breakdown in one or more of these mechanisms meant to regulate the supply of new solidi against the constant effects of wear on circulation. An important factor in this respect is the sudden disruption of the Roman tax system in the first decades of the Early Arab Period in Egypt. The public “gold-taxes” (χρυσικά δημόσια) were still being frequently

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181 "καὶ οἱ κατὰ πόλιν δὲ πάντες τοῖς ἀποτερημένωι χρυσίω δύσχερος χρώνται": *P. Cair. Zen.* 59021, col. II.29-30. There are many translations of *P. Cair. Zen.* 59021 into English, but see most recently that given by M. Austin in *The Hellenistic World from Alexander to the Roman Conquest: A Selection of Ancient Sources in Translation*, (Cambridge University Press, 2006), 102.

182 “οὐδεὶς γὰρ τούτων ἔχει οὐ τὴν ἀναφορὰν ποιησάμενος καὶ προσθέοις τι κοιμεῖταί ἢ καλὸν χρυσίον ἢ ἀργύριον ἄντι αὐτοῦ": *P. Cair. Zen.* 59021, col. II.31-34.

183 It is worth noting that there are generally a great number of tax receipts from the seventh and eighth centuries CE, which is in part why there is a bias in favor of this period. The numbers are impressive: more than 300 from Deir el-Bala‘izah, 400 from Aphrodito, and 1000 from Jeme. Nevertheless, the extent of their participation was still broader in relative terms during the seventh century CE.

184 It would be unfair to characterize the transition in Egypt from tax system of the Byzantine Empire to the Rashidun Caliphate as a complete disruption. Apart from the addition of a poll-tax, the fiscal systems and basic structure of taxation in the conquered provinces only changed very gradually. In fact, the traditional taxes imposed on the citizens in the later history in Muslim Egypt, the *kharij* (land-tax) and *jizya* (poll-tax), do not become prominent features of documentary sources until the middle of the eighth century CE: Wickham 2005, 131. On the the taxation of Early Muslim Egypt, see especially the work of Hugh Kennedy: e.g., H. Kennedy, "Egypt as a Province in the Islamic Caliphate, 641-868," in C. F. Petry (ed.), *Cambridge
collected in gold solidi during the Rashidun (632-661 CE) and Ummayad (661-750 CE) Periods in Egypt, but there was no longer the same apparatus in place to efficiently take in the older coins and remint them. Consequently, the Roman gold coins that were not immediately melted down and restruck became increasingly worn as they changed hands for longer in the marketplace. This produced additional strain on what was already a delicate monetary system that relied on precise measurements of its coinage in order to circulate effectively.

The consequences of this disruption are evident in papyrus texts like SB XX 15102 (709 CE), which appears to be a letter from the archive of the pagarch of Aphroditus, Basileos. Although its full meaning is slightly obscure due to its missing introductory clause, this letter seems to be a complaint by an employee of the treasury (τῆς σακέλλης) at Aphroditus to Basileos concerning the quality of the coins collected as taxes and

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186 Alongside its basic tax structure, the language of administration did not transform immediately in Early Muslim Egypt. For example, Roger Rémondon has demonstrated that the assessment and general format of tax registers was not radically altered in Aphroditus during the seventh century CE, which is reflected by the use of Greek in a majority of texts: Rémondon 1965, esp. 411-413 (on the διάγραφον); cf. Gascou 1983; N. Gonis, "Five Tax Receipts from Early Islamic Egypt," Zeitschrift für Papyrologie und Epigraphik 143 (2003), 149-157. This trend continued into the early parts of the eighth century CE, where it has been estimated that approximately 45 percent of texts were still written in Greek during the period between 698 and 722 CE in Aphroditus: Wickham 2005, 134 (35 percent were Coptic and 20 percent were Arabic).


188 Although it did produce some coinage, the Islamic state was slow to produce a robust gold coinage that could replace the solidus in its newly acquired territories. This was not achieved until the end of the seventh century, which began with the series of reforms by Abd al-Malik in 691-692 CE. The classic text on these reforms is still that by Phillip Grierson: "The Monetary Reforms of Abd al-Malik: Their Metrological Basis and their Financial Repercussions," Journal of the Economic and Social History of the Orient 3.3 (1960), 241-264; cf. G. Heck, "First Century Islamic Currency: Mastering the Message from the Money," in Haldon (ed.) 2010, 97-123.


deposited there. The author of the letter asks the individual responsible for the collection of taxes in his district why the individuals working on his behalf (οἱ περιφερείτες παρὰ σοῦ), who are described as the servants of trapezitai (ὑπουργοὶ ἐκ τῶν τραπεζιτῶν), collected what is referred to as "badly-marked gold" (κακοχάρακτον χρυσίον). Moreover, the writer demands to know what measures the recipient of the letter has taken to recover the apparent difference of this same sum of gold (ὑπὲρ καταλλαγῆς τοῦ αὐτοῦ χρυσίου).

The interpretation of this document rests on its reference to "κακοχάρακτον χρυσίον", which appears to be an expression that is unique to this text. Considering the demand that is made for the retrieval of the "difference" (καταλλαγῆς) of this type of gold, there is obviously a discrepancy between the nominal value of the gold that was collected and its actual weight value. Whether it signifies worn coinage or those that were "badly-minted", as Pintaudi and Sijpesteijn suggest, it is clear that the subject of the letter is the collection of substandard gold coins being used in Egypt at the time.

The remarks made by the mint employee in his letter exhibit the additional strain this arrangement put on the mechanisms that were intended to administer and mitigate these issues. They are also remarkably similar to the events described by Demetrios at the Alexandrian mint nearly a thousand years earlier in P. Cair. Zen. 59021.

In both Alexandria during the Ptolemaic Period and Aphroditto in the Early Arab Period, the circulation of gold currencies with competing standards and widely divergent weight measures seems to have caused a general failure of accountancy. In this way, the mint employee at Aphroditto expresses a heightened mistrust of the adequacy of the gold coins being exchanged in much the same way as Demetrios complains about the citizens of Alexandria being reluctant to use their worn gold coins. This uncertainty is so great that he (the mint employee at Aphroditto) explicitly charges the recipient of the letter, Basileos,

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190 SB XX 15102.8-9: "πῶς λαμβάνεις / ἐξ αὐτῶν τὸ τοιοῦτο κακοχάρακτον χρυσίον..." (Why did you take from them this badly-marked gold ...?). This word (i.e. κακοχάρακτον) is not attested anywhere else — it is found in neither the Liddell-Scott Lexicon nor the Greek Lexicon of the Roman and Byzantine Periods.

191 "monete cosi mal coniate": Pintaudi-Sijpesteijn 1991, 299. However, it is quite possible that what is meant by this is the so-called "Arab-Byzantine" or "Pseudo-Byzantine" coinage. These were imitative issues of Byzantine coins produced locally that did not adhere to the same strict weight standards as the solidi: Walmsley 2010, 24-29; H. Pottier et al., "Pseudo-Byzantine Coinage in Syria under Arab Rule (638–c. 670)", Revue belge de numismatique 154 (2008), 87-155; A. Oddo, "The Christian Coinage of Early Islamic Syria?" Aram 15 (2003), 185-196. That these separate issues (i.e. Byzantine and Arab-Byzantine) circulated in the same context can be seen from hoards where they are found together: C. Morrison, "La monnaie en Syrie byzantine," Archéologie et histoire de la Syrie 2 (1989), 191-204. Additionally, calculations for gold-taxes were done interchangeably as "dinar" or "nomisma" in the papyri, which could mean that the "κακοχάρακτον χρυσίον" refers to either type of gold coinage. Even if it is the case that these are imitations of Byzantine solidi, the effect on the circulation of gold coins would have been the same — a general uncertainty over weight standards and an increased demand for public weigers to assess individual sums of gold in every transaction.
with failing to account for the observable deficiencies in the coinage that had been gathered. These deficiencies are attributed to a failure to properly measure out the gold and assign its real weight value, which is the same grievance voiced by Demetrios regarding the lack of available assayers in Alexandria. The correspondence between these two documents even extends broadly to the way in which they articulate the perceived difficulties, since both writers make a parallel distinction between gold that they designate as "good" or "fine" (καλὸς) and "bad" (κακὸς). In P. Cair. Zen. 59021, this is expressed in terms of worn gold coinage that is exchanged for "good gold or silver" (καλὸν χρυσίου ἢ ἀργύριου), while in SB XX 15102 the contrast is between gold that is termed as "badly-marked" (κακοχάρακτον) and "well-marked" (καλοχάρακτον).

The increased circulation of substandard gold coinage in the Early Arab Period and the considerable problems of accountancy it generated were conspicuous and severe, particularly in the context of taxation. This is illustrated by a series of tax lists from the late seventh and early eighth centuries CE, which detail the collection of the chrysika dēmosia over several years or more. A notable and especially voluminous example is P. Lond. IV 1412 (698-705 CE), which reports deposits made in gold solidi to the treasury at Antaiopolis over a span of approximately seven years. It is over 500 lines in length and on each line is written the Indiction date and the name of the individuals responsible for collection with the total in solidi. This is followed by "ἐξώμενα" and a second figure that is slightly less than the previously stated amount. The simplest meaning of this formula is that the first sum is its nominal value and the second is its actual weight value computed after its collection. The discrepancy between these two values varies, but the mean of one sample of 41 entries (all featuring zygostatai) calculates to an average deficiency of .92

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192 SB XX 15102 is fragmentary, but on the first line are discerned the words "καλοχαρκτον και το μιν λει ... ", which is followed by a lacuna. Like "κακοχάρακτον", this appears to be the only attestation of this expression. Considering the context of the letter, it would not be unreasonable to assume this was a statement contrasting between "well-marked" and "badly-marked" gold. In fact, "ἐυχάρακτον", which has essentially the same meaning, appears only once in the papyri and is used to describe solidi (νομίσματα): P. Rein. II 105.1-2 (432 CE).

193 e.g., P. Lond. IV 1412 (723 CE); P. Lond. IV 1442 (8th CE); P. Lond. IV 1470 (8th CE); P. Apoll. 82 (693-6 CE); P. Apoll. 84 (651-700 CE).


195 e.g., "ὑποτίθηκαν τοις πληθυσμοις τα περιττα και τους νομισματα και τα ισακ τον το κυριοτατον νομισματα τη ἐξώμενα νομισματα σοφ" ("Phaiophil 10 of Indiction 13, through Theodòros, zygostatés, and Isaak, notarius, 503 solidi, having 279 solidi"); P. Lond. IV 1412.20.

196 At the head of each new folio (fols. 2-16b), the first amount of solidi is described as "ἀρίθμησα" ("counted"), which further suggests this reading: e.g., "ἀπὸ της ίδιας κώμης διὰ άριθμους νομισμάτων ΑΥς ἐξώμενα νομισματα ΑΤΚ κέρατα η" ("From the same village through counted solidi 1434, having 1324 solidi, 8 carats").
carats per solidus (0.16g), which fits remarkably well with those rates of wear observed elsewhere in the papyri.

The weighing and accounting duties performed in documents like *P. Lond.* IV 1412 were precisely those that were found to be lacking in Basileos by the writer of *SB* XX 15102. It also further emphasizes the necessity for trained assayers in this monetary environment. The expanded role of substandard solidi in Egypt due to factors such as the disintegration of the Late Roman tax system meant that the services of the zygostatai were in higher demand for activities like the exaction of taxes. This is shown by the sudden increase in their involvement in all stages of taxation in the papyri during the Early Arab Period. Additionally, documents like *P. Lond.* IV 1412 make it demonstrably clear that each deposit of gold required scrupulous measurements, which would have demanded the weighing expertise of an official like the zygostatēs. This explains why so many different zygostatai appear in the text of *P. Lond.* IV 1412.

The interrelated fortunes of the Late Roman tax system as an apparatus for regulating the supply of gold coinage in circulation and the office of the zygostatēs as a means of managing this supply locally are very telling. They not only help to clarify the fiscal breakdown in the Early Arab Period, but also conversely provide at least a partial explanation for how it operated successfully in previous centuries. They were both individual parts of a greater network of mechanisms that arose in response to some of the adverse characteristics of the solidus as a monetary technology. It would not be out of place to suggest a series of functional relations in which each process, which is in a way a separate kind of technology, both augmented the effects of other connected operations and was likewise affected by them. The disappearance or failure in one of these aspects could potentially disrupt the application and performance of other elements of this network.

6. "Who Was the Zygostatēs?"

It is evident that the broad availability of the technical skills possessed by individuals such as the zygostatai was an important mechanism for the easy movement of gold coinage, both in practice and in the minds of ordinary citizens\(^\text{197}\). Their specialized knowledge was organized and implemented in such a way as to offset some of the functional disadvantages of the solidus as a monetary technology, specifically managing

\(^{197}\) The vast majority of the evidence for this public office comes from Egypt and can only be applied to other provinces very cautiously. As Howgego has rightly asserted on numerous occasions, using economic data from Egyptian sources as a proxy for the rest of the Roman Empire (e.g., Rathbone 1996 and 1997) is almost a default strategy for modern historians: Howgego 2013; id., 1995, 121-122; id., 1992, 28-29.
the measurement and quality control of solidi in circulation. However, the outstanding feature of the zygostatēs as public weigher and assayer was not any intrinsic technological or technical advantage it might have brought with it, but the scale in the application of its expertise. In this respect, its function closely resembles the observation previously made by Sundbo that innovation can occur through behavioral modifications or changes to the organizational structure in which a technology is deployed. The mass diffusion of zygostatai, or rather their particular services, was therefore significant because it augmented the local use of the solidus as a monetary technology, and therefore its effect.

A potentially useful way of exploring this study of effect is Serafina Cuomo’s examination of technology-in-use and the crucial role of technical expertise in the administration of the Roman Empire. Although focused primarily on land surveying in the period from Trajan to Hadrian (98-138 CE), the fourth chapter of Cuomo’s Technology and Culture in Greek and Roman Antiquity offers a paradigm in which available technologies were employed by Roman officials in the settling of disputes. The primary insight offered by Cuomo is that technical knowledge — the surveying, division, and distribution of land — was an option frequently exploited by the state in order to solve human problems (i.e. boundary disputes). In this way, the wide provision of technology through skilled practitioners could affect positive social outcomes. However, the success of this arrangement was also contingent on the fluid interaction between these individuals endowed with specialized knowledge and other elements of their local cultural and physical context. The deployment of technical intervention in disputes was thus bound by the necessity to negotiate local customs or maintain continuities with the past as well as the interests of the Roman administration.

An interesting point of comparison in this respect is “Law, Agency and Growth in the Roman Economy”, which is a recent study published by Donald Kehoe investigating the relationship between the Roman application of law and its impact on local economies. This paper, which is part of a series of collected works, seeks to determine how the Roman legal authorities perceived the economic consequences of their policies. Kehoe proposes to do this by examining legislation concerning the formal management of

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198 Cuomo 2007, 103-130, esp. 105-113.
tutorship as well as the institutions developed around business agents employed by wealthy estates. Kehoe’s argument is that the legal formation and regulation of these institutions can be seen as "instrumental" in the way that they were purposely shaped by Roman administrators in order to produce deliberate outcomes. The author contends that the Roman legal authorities recognized the agency of such institutions as a means of broadly asserting the directive of the state whether it was economic or social. This way of viewing Roman legal institutions in terms of their intended agency corresponds neatly with Cuomo’s approach. Much like Kehoe, Cuomo is interested measuring how technologies and scientific knowledge were put to use by the state in order generate resolutions. In effect, the legal mechanisms termed "instrumental" by Kehoe are the same as Cuomo’s definition of "technology-in-use".

It is according to these models realized by Cuomo and Kehoe that the operations of the zygostatai might be the most productively investigated. The authority of the zygostatēs was correspondingly rooted in its abilities as "specialized personnel", but also the legal foundation for their existence provided by the emperor Julian. In this way, this office could be reasonably defined as an example of technology-in-use that has been applied in order to advance the directive of the Roman administration. Indeed, weighing and assaying solidi was not essentially different from settling boundary disputes, since each measurement of a sum of gold reflected a tacit, if not openly expressed, disagreement over the metrical standards of the coins.

More importantly, zygostatai were analogous to Roman land surveyors in the way they utilized their expertise alongside the need to navigate the specific exigencies of their local context. This can fortunately be established by reviewing passages linked to the actions of zygostatai in Egyptian papyri. The papyrological evidence shows that zygostatai acted in a number of different capacities related to their primary function and by utilizing their specialized knowledge of weighing and testing gold. These activities, which were performed either officially or as private citizens, seem to have observed both the demands of their regional settings and the broader interests of their original mandate. Consequently, the diffusion of zygostatai as a type of technology was contingent on their relationship to their context and the dynamic interplay between the particular needs of that context and the function of the zygostatēs.
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#### List of Papyrus Texts

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<td>Letopolite Nome</td>
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<td>361 CE</td>
<td><em>P. Oxy.</em> LXVII 4606</td>
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<td>Predates the official creation of the zygostatēs in 363 CE.</td>
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<td><em>P. Lips.</em> I 62</td>
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<td>4th CE</td>
<td><em>CPR</em> VIII 40</td>
<td>Hermopolis Nome</td>
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<td>4th CE</td>
<td><em>P. Cair. Cat.</em> 10432</td>
<td>Andromachis</td>
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<td>Part of the same series as <em>SB</em> XIV 12005. Two zygostatai reported collecting taxes.</td>
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<tr>
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<td><em>SB</em> XIV 12005</td>
<td>Andromachis</td>
<td>Review of payments made on behalf of the village of Andromachis by Melas.</td>
<td>Part of the same series as <em>P. Cair. Cat.</em> 10432. Two zygostatai reported collecting taxes.</td>
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<tr>
<td>Late 4th CE</td>
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<td>Settlement for loan disagreement between the Apions and a monastery.</td>
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<td><em>P. Oxy.</em> XVI 1926</td>
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<td>Written by a prospective zygostatēs and trapezitēs.</td>
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<td>Memnoneia (?)</td>
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<td>6th CE</td>
<td><em>Stud. Pal.</em> III 179</td>
<td>Arsinoite or Herakleopolite</td>
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<td>Late 6th CE</td>
<td><em>SB</em> VI 9285</td>
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<td><em>P. Oxy.</em> XVI 1897</td>
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<td>Arsinoite or Herakleopolite</td>
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<td><em>Stud. Pal.</em> III 66</td>
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<td>--------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>7th CE</td>
<td><em>P. Prag.</em> II 153</td>
<td>Arsinote</td>
<td>Receipt for a payment of taxes (<em>diaphragʰ</em>) by local embroiderers.</td>
<td>Tax receipt through the account of a <em>zygostatēs</em></td>
</tr>
<tr>
<td>648 or 663 CE</td>
<td><em>P. Rain. Cent.</em> 144</td>
<td>Arsinote</td>
<td>Receipt for a payment issued by Gerontis, a dyer.</td>
<td></td>
</tr>
<tr>
<td>618/9 or 633/4 CE</td>
<td><em>P. Sorb.</em> II 69</td>
<td>Hermopolis Magna</td>
<td>Generally described as a fiscal code concerning taxes payable in wheat.</td>
<td></td>
</tr>
<tr>
<td>647 or 662 CE</td>
<td><em>Stud. Pal.</em> III 592</td>
<td>Arsinote</td>
<td>A <em>zygostatēs</em> acknowledges the receipt of an unknown sum from wheat.</td>
<td>Many <em>zygostatai</em> representing different villages.</td>
</tr>
<tr>
<td>601 CE</td>
<td><em>SB XII</em> 11163</td>
<td>Oxyrhynchos</td>
<td>Letter concerning taxes owed by a farmer to a local official.</td>
<td>The same village of Pakerke as found in <em>P. Oxy.</em> XVI 1897.</td>
</tr>
<tr>
<td>7th-8th CE</td>
<td><em>BGU</em> XIX 2788</td>
<td>Hermopolis</td>
<td>Unknown.</td>
<td>Payment is made through several <em>zygostatai</em>.</td>
</tr>
<tr>
<td>647 or 662 CE</td>
<td><em>Stud. Pal.</em> III 592</td>
<td>Arsinote</td>
<td><em>Tax receipt.</em></td>
<td>Fragmentary.</td>
</tr>
<tr>
<td>7th CE</td>
<td><em>Stud. Pal.</em> III 690</td>
<td>Arsinote</td>
<td><em>Receipt for a payment of taxes</em> (<em>diaphragʰ</em>).*</td>
<td>Tax receipt through the account of a <em>zygostatēs</em>.</td>
</tr>
<tr>
<td>Mid-7th CE</td>
<td><em>Stud. Pal.</em> XX 231</td>
<td>Arsinote</td>
<td>List of accounts belonging to a <em>zygostatēs</em>.</td>
<td></td>
</tr>
<tr>
<td>650/1 CE</td>
<td><em>Stud. Pal.</em> VIII 1192b</td>
<td>Arsinote</td>
<td>Receipt for a payment of 68 <em>solidi</em> by Georgios on behalf of the village of Alexandrou.</td>
<td>Tax receipt through the account of a <em>zygostatēs</em>.</td>
</tr>
<tr>
<td>652/3 CE</td>
<td><em>Stud. Pal.</em> VIII 820</td>
<td>Arsinote</td>
<td>Receipt for a payment made by Neilammôn Mouleu.</td>
<td>Tax receipt through the account of a <em>zygostatēs</em>.</td>
</tr>
<tr>
<td>645 or 660 CE</td>
<td><em>Stud. Pal.</em> VIII 846</td>
<td>Arsinote</td>
<td>Receipt for a payment of taxes (<em>demosía</em>) by the village of Magais.</td>
<td>Tax receipt through the account of a <em>zygostatēs</em>.</td>
</tr>
<tr>
<td>7th-8th CE</td>
<td><em>Stud. Pal.</em> X 74</td>
<td>Arsinote</td>
<td><em>Account.</em></td>
<td>Fragmentary.</td>
</tr>
<tr>
<td>7th CE</td>
<td><em>Stud. Pal.</em> XX 268</td>
<td>Arsinoe (?)</td>
<td>*Recto - List of accounts, including one belonging to a <em>zygostatēs</em>.</td>
<td></td>
</tr>
<tr>
<td>7th-8th CE</td>
<td><em>SB</em> XX 14246</td>
<td>Hermopolis</td>
<td>*Verso - Account belonging to a <em>zygostatēs</em>.</td>
<td></td>
</tr>
<tr>
<td>7th CE</td>
<td><em>SB</em> XXII 15244</td>
<td>Unknown</td>
<td>*List of names with professions, including a <em>zygostatēs</em>.</td>
<td>Account belonging to a <em>zygostatēs</em>.</td>
</tr>
<tr>
<td>643/4 CE</td>
<td><em>SB</em> XXVI 16354</td>
<td>Hermopolis</td>
<td>Letter concerning the shipmenent of solidi sealed by a <em>zygostatēs</em> and the collection of taxes by a second <em>zygostatēs</em>.</td>
<td>Fragmentary.</td>
</tr>
<tr>
<td></td>
<td><em>BGU</em> II 695</td>
<td>Unknown</td>
<td><em>Payment order from a <em>zygostatēs</em> to an administrator of a village granary to deliver grain to Theodoros.</em></td>
<td>Zygostatēs scaling gold and collecting taxes.</td>
</tr>
<tr>
<td>712/3 CE</td>
<td><em>P. Apoll.</em> 83</td>
<td>Apollonopolis Magna</td>
<td><em>Account of money sent and received, including a deposit by a <em>zygostatēs</em> to the office of the pagarchy.</em></td>
<td>Zygostatēs reported collecting taxes.</td>
</tr>
<tr>
<td>725 CE</td>
<td><em>P. Bal.</em> II 287</td>
<td>Deir el-Bala‘izah</td>
<td>Register of tax orders sent out to several individuals, including <em>zygostatēs</em>.</td>
<td>Orders for payment (<em>klasmata</em>) given to zygostatai for the collection of taxes.</td>
</tr>
<tr>
<td>Arab Period</td>
<td><em>P. Cair. Masp.</em> III 67359</td>
<td>Antinoopolis</td>
<td>Account of tax payments through a <em>zygostatēs</em>.</td>
<td><em>Commutation</em> (<em>daeratio</em>) of taxes in kind into gold through a <em>zygostatēs</em>.</td>
</tr>
<tr>
<td>8th CE</td>
<td><em>P. Lond.</em> IV 1485</td>
<td>Aphroditο</td>
<td>Register containing the names of individuals, including a <em>zygostatēs</em>.</td>
<td>Fragmentary.</td>
</tr>
<tr>
<td>8th CE</td>
<td><em>P. Lond.</em> IV 1508</td>
<td>Aphroditο</td>
<td>Athenasios acknowledges a payment made towards his monthly money contributions to the pagarchy.</td>
<td>Coptic. Money contributions are deposited with a <em>zygostatēs</em> by the pagarchy.</td>
</tr>
<tr>
<td>8th CE</td>
<td><em>P. Lond.</em> IV 1509</td>
<td>Aphroditο</td>
<td>Kolouthos acknowledges a payment made to a <em>zygostatēs</em> in Hypsele.</td>
<td>Coptic. A similar receipt to <em>P. Lond.</em> IV 1508.</td>
</tr>
</tbody>
</table>
## Appendix 1.2
Published Translations of Papyrus Texts

<table>
<thead>
<tr>
<th>Publication</th>
<th>Published Translations</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. Oxy. LXVII 4606</td>
<td><em>P. Oxy. LXVII 4606</em> (English).</td>
</tr>
<tr>
<td>P. Oxy. LXIII 4395</td>
<td><em>P. Oxy. LXIII 4395</em> (English).</td>
</tr>
<tr>
<td>P. Oxy. XVI 1886</td>
<td><em>P. Oxy. XVI 1886</em> (English).</td>
</tr>
<tr>
<td>P. Oxy. LXIII 4397</td>
<td><em>P. Oxy. LXIII 4397</em> (English).</td>
</tr>
<tr>
<td>P. Oxy. LV 3805</td>
<td><em>P. Oxy. LV 3805</em> (English).</td>
</tr>
<tr>
<td>P. Oxy. XVI 1926</td>
<td><em>P. Oxy. XVI 1926</em> (English).</td>
</tr>
<tr>
<td>P. Oxy. XIX 2243a</td>
<td><em>P. Oxy. XIX 2243a</em> (English).</td>
</tr>
<tr>
<td>P. Oxy. XVI 1897</td>
<td><em>P. Oxy. XVI 1897</em> (English).</td>
</tr>
<tr>
<td>P. Lond. II 387</td>
<td><em>P. Lond. II 387</em> (English).</td>
</tr>
<tr>
<td>P. Lond. II 393</td>
<td><em>P. Lond. II 393</em> (English).</td>
</tr>
<tr>
<td>P. Michael. 35</td>
<td><em>P. Michael. 35</em> (English).</td>
</tr>
<tr>
<td>P. Lond. I 113.7</td>
<td><em>P. Lond. I 113.7</em> (English).</td>
</tr>
<tr>
<td>P. Lond. I 113.8a</td>
<td><em>P. Lond. I 113.8a</em> (English).</td>
</tr>
<tr>
<td>P. Sorb. II 69</td>
<td><em>P. Sorb. II 69</em> (French).</td>
</tr>
<tr>
<td>P. Apoll. 83</td>
<td><em>P. Apoll. 83</em> (French).</td>
</tr>
<tr>
<td>P. Lond. IV 1508</td>
<td><em>P. Lond. IV 1508</em> (English).</td>
</tr>
<tr>
<td>P. Lond. IV 1509</td>
<td><em>P. Lond. IV 1509</em> (English).</td>
</tr>
</tbody>
</table>
Appendix 2.1
Constantine’s Temple Confiscations

A significant feature of De Rebus Bellicis 2.1-2 is the author’s description of the origins of Constantine’s monetary reforms. Anonymous writes that the emperor used his confiscations of pagan religious property to finance the introduction of large quantities of gold coins into circulation. In fact, the author writes that it is only after Constantine recovered the precious metals from these sites that he was able to carry out his new fiscal policies. This detail is critical because it suggests that Constantine’s actions against pagan culture were motivated not only by religious zealotry, but also by secular and fiscal considerations. More importantly, it explains how the emperor could have obtained the metal reserves needed to support his massive injections of gold into the markets. Considering his anti-pagan rhetoric after the defeat of Licinius in 324 CE, the immense wealth deposited in shrines across the empire would have been an attractive target for the emperor.

The validity of this argument rests on the extent to which Constantine actually made these confiscations. In this respect, it is fairly certain that pagan religious sites were targeted during the reign of Constantine. This is evinced by a broad concordance of literary sources, which are typically Christian, but not exclusively. Among the most frequently cited passages for these events are those found in the works of Eusebius of Caesarea, especially Vita Constantini 3.54 and Oratio de Laudibus Constantini 8.2-4. In these two works, the author relishes in his vivid portrayals of men mocking statues, melting down those that were cast in precious metal, and desecrating others not worth the effort of recycling. Since Eusebius was also a Christian bishop, he naturally portrays the motive

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204 E.g., Eus. VC 3.54: “... whatever part of the material appeared valuable they scraped off and melted in the fire to prove its worth, after which they secured and set apart whatever they judged needful for their purpose, leaving to the superstitious worshipers that which was altogether useless, as a memorial of their shame”. English translation: Eusebius, Life of Constantine, Trans. A. Cameron, (New York: Oxford University Press, 1999).
behind Constantine’s attacks as one of religious fervor. Moreover, the author claims the work done by the emperor’s men was widespread and devastating to the pagan cause.

If the confiscations were as broad as Eusebius suggests, this evidence would certainly appear to vindicate the claims made by Anonymous in De Rebus Bellicis 2.1-2. However, the reliability of the accounts given by Eusebius and other ancient writers has attracted a considerable amount of doubt from modern readers. As Scott Bradbury has argued, Eusebius was an especially fervent apologist of Constantine. Moreover, he had very compelling reasons to advertise the actions of the emperor against paganism. In the mind of the bishop of Caesarea, the devastation of these sites was central to his symbolic view of history being propelled towards the universal triumph of Christianity. This is crucial because the bishop is only able to recount six examples where the emperor actually carried out this activity, three of which can be explained for reasons other than religious ideology. Omissions of this kind are uncharacteristic of Eusebius, who is generally eager to recite every detail of Constantine’s operations against paganism.

The shortage of evidence supporting this Eusebian vision of temple confiscations is less convincing in light of recent metrological studies of the solidus. Possibly the most important contribution in this regard is the project commenced in the 1980’s by Cécile Morrisson. This study showed that testing for certain trace elements found in the gold produced results that could directly challenge the timeline of events given by Anonymous and Eusebius. In particular, the levels of platinum in the solidus change dramatically


208 Bradbury 1994, 122-123.
209 Saradi-Mendelovici 1990, 48; cf. R. L. Fox, Pagans and Christians, (Suffolk: Viking, 1986), 671-672. Bradbury speculates that Constantine only acted on this policy when he was informed of pagan worship taking place at Christian sites, which was likely the case at Mamre. Bradbury 1994, 132. It is also worth noting that the most prominent and celebrated attacks by representatives of the state against pagan temple sites belong to the late fourth century CE. Among these are the series of destructive assaults by the Eastern Praetorian Prefect, Maternus Cynegius, on various sites in Eastern provinces (including the renowned oracular temple of Apollo at Didyma) and at Gaza. On the evidence for these destructions, see most recently J. Hahn, et al., “From Stones to Myth: Temple Destruction and Civic Identity in the Late Antique Roman East,” Journal of Late Antiquity 6 (2013): 325-346.

210 The potential for identifying the geographical sources of the metals found in coins through elemental analysis has long been recognized. For a recent overview of the uses of metrological data in numismatics, see M. Ponting, “The Substance of Coinage: The Role of Scientific Analysis in Ancient Numismatics,” in W. Metcalf (ed.), The Oxford Handbook of Greek and Roman Coinage, (Oxford: Oxford University Press, 2012), 12-30. Ancient gold coins are particularly suited to these procedures because each ore deposit has its own distinct chemical “fingerprint” of trace elements (especially the platinum group), which typically could not be eradicated through ancient refining techniques. This offers the possibility that the detection of these elements in gold could be used to establish the provenance of the ore: e.g., L. Dussubieux and L. Van Zelst, “LA-ICP-MS Analysis of Platinum-Group Elements and Other Elements of Interest in Ancient Gold,” Applied Physics A79 (2004): 353-356; M. F. Guerra and T. Calligaro, “Gold Traces to Trace Gold,” Journal of Archaeological Science 31 (2004): 1199-1208. Possibly the most exciting development in this respect is the discovery of a reliable means of testing Roman gold that is also non-destructive: M. W. Hinds, G. Bevan, and R. W. Burgess, “The Non-Destructive Determination of Pt. in Ancient Roman Gold Coins by XRF Spectrometry,” Journal of Analytical Atomic Spectrometry 29 (2014): 1799-1805; M. F. Guerra, “Role of Radiation Physics in the Study and Authentication of Ancient Gold Work,” Radiation Physics and Chemistry 95 (2014): 356-361.

211 Morrision et al., 1985.
during the fourth century CE, which suggests a substantial new source of gold had been introduced into the supply. Platinum suddenly rises from an average of 40 ppm (parts per million), which was the same as it had been in Roman gold coins for over three and a half centuries, to a relatively stable range of 300-400 ppm for the next three centuries. The irregularity of these statistics comes from the date of the transformation — it does not occur during the rule of Constantine as it might be expected, but in the latter years of the reign of his son, Constantius II.\footnote{The platinum content of the tested gold demonstrates a relatively sudden increase only after 346 CE: Morrison et al. 1985, 92. The historical importance of this observation has already been recognized in later publications: e.g., Howgego 2002, 26; Banaji 2001, 49.}

In addition to the objections raised by Morrison’s investigations, at no point in his writing does Eusebius openly declare that Constantine used the metals taken from these activities to strike coinage.\footnote{The closest description Eusebius gives is the “melting of their inanimate images [i.e., the statues of pagan gods] in the flames and their conversion from worthless forms into necessary uses” (Eus. LC 9.6).} It is an oversight that is shared by nearly all other sources on Constantine’s temple confiscations. This is rather surprising considering that these same authors frequently recall the many different ways in which the emperor spent the wealth taken from his confiscations or the defeat of his rivals.\footnote{The emperor’s lavish spending after his defeat of Licinius is the most thoroughly documented example of this behavior: e.g., Eus. Ecc. Hist. 1.6: 10.10; 33. His confiscation of pagan religious property are reported as being used as spoils for the enrichment of his allies (e.g., Lib. Or. 59.29), paying for large construction projects in Constantinople (e.g., Lib. Or. 30.6; Jer. Chron. 330; Anon. Orig. Const. 30), and the beautification of Constantinople (e.g., Eus. VC 3.54.3: 3.62.1).} However, a possible exception can be found in a line taken from the Epigrams of Palladas (AP 9.528-530), which describes the inglorious fate of many of the statues taken from pagan temples at this time:

Χριστανοὶ γεγαώτες Ὁλυμπα δώματ' ἐξοντες ἐνθάδε ναετάουιν ἄπήμονες: οὐδὲ γαρ αὐτοὺς χώνη φόλλιν ἄγουσα φερέσβιον ἐν πυρί θήσει.

The owners of Olympic palaces, having become Christian, dwell here unharmed; for the pot that produces the life-giving follis will not put them in the fire.

In these three lines of text, the poet sarcastically laments how these representations of pagan deities were “converted” to Christianity and set up for display in Constantinople. By doing so, they managed to escape the usual fate of these objects, which was to be melted down in order to produce the base metal coinage, the follis.

The historical context of this passage depends on the new chronology of the poet’s life recently established by Kevin Wilkinson. Wilkinson rejects the traditional date of the 390’s CE for these compositions and assigns a much earlier date of the 320’s-330’s CE. If this revised timeline is correct, then it coincides precisely with the supposed attacks on pagan temples by Constantine. In this way, Palladas is essentially stating the same thing as Anonymous — the emperor was using the metals that he procured from these sites to mint coins. However, a significant difference between the interpretations of these two passages is that Anonymous explicitly refers to gold coinage being struck from these confiscations while Palladas only mentions the base metal currency.\footnote{K. Wilkinson, “Some Neologisms in the Epigrams of Palladas,” Greek, Roman, and Byzantine Studies 50 (2010): 295-308, esp. 298 (with references); id., “Palladas and the Age of Constantine,” Journal of Roman Studies 99 (2009): 36-60, esp. 54-56.}
Even if Palladas is reckoned to be a credible source, the extremist version of Constantine’s temple confiscations promoted by Eusebius is difficult to sustain. The targeting of pagan cult sites by officials acting on the formal directive of the emperor appears to have been “never the intention of imperial policy.” It is more plausible to characterize the despoliation of pagan cult sites as opportunistic rather than systematic, which was acted upon when it was expedient for Constantine and his Christian successors. The benefit of this model is that if these acts were carried out sporadically over a period of several decades, this new source would only be expressed in the metrological data after it had accumulated over time. However, the elevated levels of platinum in the tested solidi do not exhibit this gradual behavior, but a dramatic rise after 346 CE. This would suggest a possible alternative source of gold that entered into the supply after the reign of Constantine.

**Appendix 2.2**

Gold Mining in the Later Roman Empire

As the main source of gold for the solidus, the precious metals taken from pagan temples and cult sites offer many uncertainties. Nevertheless, the metrological data produced by Morrison’s research suggests that a new source of gold was introduced to the traditional supply. It also indicates that this addition to the pre-existing stock of bullion must have been massive in order to permanently alter the values of trace elements in the gold. The obvious solution is to investigate the existence of an alternative supply. The most likely candidate for this other source is the exploitation of available ore deposits through mining, which is arguably supported by the Morrison’s study. However, this

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has been argued that this word choice fits generally with the rest of the passage, which is constructed using expressions meant to conjure images of metalworking. As a sort of bilingual homonym, Palladas could both be conveying that Constantine was minting coins from the metals accrued in his temple confiscations and at the same time extending the metallurgical imagery of the line. On this interpretation of the passage, see A. Pontani, “Ancora su Pallada, AP IX 528, ovvero il bilinguismo alla prova,” *Incontri triestini di filologia classica* 6 (2006/7): 175-210, esp. 194-197; cf. H. White, "Notes on Palladas," *Myrtia* 13 (1998): 229-230.


218 The destruction of pagan religious sites seems to have been more the initiative of bishops and local clerics: e.g., M. Kahlos, “Pacifiers and Instigators — Bishops and Interreligious Conflicts in Late Antiquity,” in A. Fear, et al. (eds.), *The Role of the Bishop in Late Antiquity: Conflict and Compromise*, (London: Bloomsbury, 2013), 63-82; J. Hahn, et al. (eds.) *From Temple to Church: Destruction and Renewal of Local Cultic Topography in Late Antiquity*, (Brill Publishing, 2008); A. R. Brown, “Hellenic Heritage and Christian Challenge: Conflict over Panhellenic Sanctuaries in Late Antiquity,” in *Drake* 2006, 309-320.

219 It is worth noting that the addition of new reserves of metal did not always mean that they were instantly struck into currency: Howgego 1992, 8-12; Wilson, 2007, 109-110.

220 The relative magnitude of this increase could be made evident by tracking previous acquisitions of new mineral reserves in Roman history, such as Trajan’s conquests of Dacia. In fact, the influx of bullion from the Dacian Wars has been indicated through observable shifts in the elemental profile of silver coins minted from this metal: K. Butcher, and M. Ponting, “The Atomic Absorption Analyses of Roman Silver Coins,” in A. Oddy and M. Cowell (eds.), *Metallurgy in Numismatics*, Volume 4, (London: Royal Numismatic Society, 1998), 313. Unfortunately, the platinum levels in aurei are not reported in Morrison, so a similar comparison cannot be made at this time.

221 The elevated level of platinum (and the platinum group of elements) found in Roman gold beginning in the middle of the fourth century CE is characteristic of ore exploited from secondary sources, especially alluvial mining. This was demonstrated in two “classic” texts by J. M. Ogden in 1977 and Meek-Tite in 1980; J. M. Ogden, “Platinum Group Metal Inclusions in Ancient Gold Artefacts,” *Journal of the Historical Group*.
option is not without its own considerable limitations, namely the shortage of literary and archaeological evidence for the existence of mining operations in Late Antiquity. The most significant development in terms of problematizing the use of mining in Late Antiquity is J. C. Edmondson’s “Mining in the Later Roman Empire and Beyond: Continuity or Disruption?” Although published in 1989, many of the theoretical concerns identified by the author have not been resolved. The value of Edmondson’s work is its comparative study of the documented histories of other mining operations. The author employs this evidence to offer a list of potential factors that contributed to the decline of the vast state-run mining projects in the Later Roman Empire. Among the most important of these are the economic burdens imposed by the shrinking outputs from established mining districts and the growing demand for permanent defensive measures in the metal-producing regions. The author concludes that these types of social and economic obstacles forced the administration to restructure the ownership of metalliferous land into a mixed system of public and private enterprises.

According to Edmondson, this format encouraged the provincial aristocracy to bid on the rights to exploit these districts instead of the government as well as permitting small independent ventures. In this way, the state could transfer the responsibility and financial risk to its citizens while at the same time allocating its resources to other projects. In terms of supplying the solidus, a major objection to this model is that it seems unlikely that the state would entrust the provision of a vital commodity like gold to such an irregular and potentially erratic system. In fact, the alleged decentralization of mining in the Later Roman Empire has led Enrico Giannichedda to declare that gold and other precious metals must not have been “strategic goods”, which is profoundly misguided. It hardly seems credible that the central administration would leave the supply of gold to ordinary citizens, especially considering the many legislative efforts aimed at regulating gold mining and protecting the circulation of the solidus.

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E. Giannichedda, “Metal Production in Late Antiquity: From Continuity of Knowledge to Changes in Consumption,” Late Antique Archaeology 4 (2008): 192. This opinion is contrary to nearly every other consideration of this topic. For example, Afanas’eva- Ivanov write, “the need for gold especially soared when the solidus was introduced at the beginning of the fourth century”: T. Afanas’eva and S. Ivanov 2013, 138. See also: Carla 2010, 49-52; Wilson 2004, 144-145.

The existence and continued importance of the Comes Sacrarum Largitionum, who was in control of all revenues and expenditures in precious metals, is an excellent example of this concern: Edmondson 1989, 85. For the most exhaustive surveys of the history of this official, see Delmaire 1989; C. E. King, “The Sacrae Largitiones: Revenues, Expenditure, and the Production of Coin,” in C. E. King (ed.), Imperial Revenue, Expenditure and Monetary Policy in the Fourth Century AD, (British Archaeological Reports International Series 76, 1980): 141-173. On the legislative attempts to force individuals employed in gold mines not to be allowed to leave the mines at this time, see especially Afanas’eva- Ivanov 2013; Edmondson 1989, 86.

Bransbourg suggests that these laws indicate the presence of gold mining in the Balkans: Bransbourg 2015, 271, n.62.
At least until the opening of the fifth century CE, the state left the collection of gold mainly in the hands of its prisoners. This is shown by evidence recently uncovered in four Old Russian manuscripts of St. Basil’s liturgy. Alongside the traditional intercession on behalf of those “in the mines and in prison and in hard labor” is an interpolation: “those who move the gold ore because of Caesar’s wrath”. According to Tatyana Afanas’eva and Sergey Ivanov, this interpolation is the only type of hard labor identified in the liturgy and so has a very specific meaning. Since the original manuscript from which these four were copied was likely from the late fourth or early fifth century CE, the authors claim that this is a direct reference to the use of convicts in state-run gold mining operations at this time. In order to effectively profit from this type of labor, the state would need to develop a sizable amount of infrastructure. If this were the case, it would suggest that the government was still financing large projects dedicated to the extraction of gold.

Since there is a shortage of archaeological evidence, the feasibility that this kind of activity was initiated on a large scale is dependent on the view of the government’s role in the Late Roman economy. An especially pertinent query is the willingness of the central administration to invest in costly projects aimed at improving regional economic production. In this respect, there is emerging proof of a substantial “imperial initiative” to expand cultivation through terracing and water management in the desert environments of Southern Levant and North Africa. The scale and obvious expense of these programs, which peaked between the fifth and eighth centuries CE, heavily favor the likelihood of government involvement in developing these remote settings. However, possibly the most important addition to the debate over gold supply is an abandoned Byzantine settlement in Egypt, Bir Umm Fawakhir.

Although it was originally thought to be a caravan station on the route from Coptos to the Red Sea, Bir Umm Fawakhir was identified in the 1990’s as a fifth-sixth century CE gold mining town. This fact alone is significant because it is the first gold mine identified as being in operation during this period. For this reason, it has the potential to revise many established conceptions of mining in Late Antiquity. In fact, the reports

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228 Afanas’eva-Ivanov 2013.


230 E.g., “Towards the middle of the Roman Empire, the already flawed gold mining industry apparently fell into further decline and just barely survived until the Early Arab Period on a much reduced scale at Bir Umm el-Fawakhir”: R. Klemm and D. Klemm, Gold and Gold Mining in Ancient Egypt and Nubia, (Springer Science and Business Media, 2012), 616. Enrico Gianniche lda does not even mention Bir Umm Fawakhir when he discusses the general features of gold extraction in Late Antiquity (although his stated focus is mostly Italy and the West); Gianniche lda 2008, 192. Elsewhere, it has been recognized for its
published by the Oriental Institute of the University of Chicago in many ways contradict the traditional model of Late Roman mining. The information collected through surveys of the site outline the surprisingly broad scale of the settlement at Bir Umm Fawakhir, which was a sprawling village dedicated solely to the exploitation of the auriferous deposits in the area surrounding the site. In this way, Bir Umm Fawakhir was far from the localized extractive operations envisioned by Edmondson, but a grander and more permanent facility.

It is worth emphasizing that Bir Umm Fawakhir was not the new source of gold projected from the findings of Morrisson et al. Its foundation is over a century too late. More importantly, the yields of gold were far too low — almost impossibly low by ancient standards — to be responsible for the colossal injections of gold into the supply. In this respect, it is seems improbable that anything more than a marginal profit could ever be obtained from this site. The ore-bearing lodes found at Bir Umm Fawakhir do not fit Pliny the Elder’s descriptions of the vast and accessible wealth found in the alluvial terraces of the Iberian Peninsula. They were primary deposits, which meant that the ore was literally hacked out of the hard quartz rock. This was followed by the almost equally laborious methods needed to extract and refine the gold. Additionally, if the archaeological reports are correct in their assertion that the gold was not refined on site, there would have been the additional cost of transporting the pulverized gold-bearing dust to the Nile for processing.

These expenses were exacerbated by the burden of supporting an estimated population of 1000 inhabitants living in a remote desert environment. An operation such as this required a constant stream of resources to maintain its population. These exigencies are most clearly demonstrated by the recent publication in 2014 of the archaeological reports from the final seasons of excavations at the site. They attest to the huge costs

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231 Final estimates of its population place the figure as high as 1000 inhabitants spread out into a number of smaller nucleated settlements. However, there are no signs of administrative buildings, a fort, or other defensive measures signifying a permanent military or government presence at the site. The survey team has concluded that administrative buildings must have existed, but they were likely in the parts of the site that were damaged by the periodic flooding that occurs there. For a general survey of the architectural remains present at the site, see especially C. Meyer, et al., Bir Umm Fawakhir, Volume 2: Report on the 1996-1997 Survey Seasons, (Oriental Institute Communications 30, 2011).

232 The results of experiments done at the site show that yields would have been far below average rates of extraction in earlier Roman mining sites, even at nearby Wadi el-Sid. Modern analyses of yields at Bir Umm Fawakhir report numbers as low as 1.73 grams per ton, which is considerably lower than the minimal 4 grams per ton at Wadi el-Sid: Meyer, Carol, et al. “Ancient Gold Extraction at Bir Umm Fawakhir,” Journal of the American Research Center in Egypt 40 (2003): 13-53, esp. 19-35. With only a work force of no more than 1000 individuals (and many of these workers would be employed in secondary roles, ranging from the provision of water to the maintenance of tools), this site could not provide the huge quantities of gold on its own. Additionally, since the ores at Bir Umm Fawakhir were primary deposits (i.e. excavated directly from the rock), it is very unlikely that gold from the site would exhibit the high levels of platinum group elements observed by Morrisson et al., which is almost universally a characteristic of secondary alluvial deposits.

233 e.g., “It is hard to see who apart from the government could have capitalized the mining operations, and, given the urgent need for gold, even the marginally productive mines at Bir Umm Fawakhir would at times have seemed worthwhile”: C. Meyer, et al., Bir Umm Fawakhir 3: Excavations 1999-2001, (Chicago: Oriental Institute Publications 141, 2014), 130.

234 See Meyer et al. 2003 for a complete description of this process as well as modern experiments done to recreate these techniques.

235 The reports note that the team made efforts to locate evidence for smelting at Bir Umm Fawakhir, but that it was not present. This led them to conclude that it was pulverized into a fine dust (which is confirmed by the many “dimple stones” found at the site) and shipped to the Nile for refinement: Meyer et al. 2003, 26.
associated with maintaining a site of this scale, including the provision of food, water, fuel, and other basic supplies necessary to support production\textsuperscript{236}. Moreover, security was always an underlying concern at a site like Bir Umm Fawakhir, which has not yet produced any indication of permanent defensive fortifications or a military presence\textsuperscript{237}. However, it should be noted that all previous mining and quarrying developments in Roman Egypt were supported by the state and it seems improbable that Bir Umm Fawakhir was the only exception.

\textsuperscript{236} e.g., “Life at Ancient Bir Umm Fawakhir,” in Meyer et al. 2014, 129-140. The authors make a number of significant observations about the general administration of the mine, including their contention that the workers were paid miners and the burden of feeding the inhabitants (which was apparently done very well at Bir Umm Fawakhir: Meyer et al., 2014, 94-96). These findings are supplemented by earlier studies of mining and quarrying sites in Roman Egypt, which demonstrate the infrastructural demands of operating in the Egyptian desert: e.g., D. Peacock and V. Maxfield, \textit{The Roman Imperial Quarries: Survey and Excavation at Mons Porphyrites 1994-1998. The Excavations, Volume 2}, (London: Egypt Exploration Society, 2007); M. Van der Veen, “The Food and Fodder Supply to Roman Quarry Settlements in the Eastern Desert of Egypt,” in M. Van der Veen (ed.), \textit{The Exploitation of Plant Resources in Ancient Africa}, (Springer Science and Business Media, 1999), 171-183; M. Van der Veen and S. Hamilton-Dyer, “A Life of Luxury in the Desert? The Food and Fodder Supply to Mons Claudianus,” \textit{Journal of Roman Archaeology} 11 (1998): 101-116.

\textsuperscript{237} It is worth noting that some of the forts along the route from Coptos to Bir Umm Fawakhir, which are generally considered to have been abandoned after the third century CE, exhibit signs of continued use during the fifth and sixth centuries CE; J.-P. Brun, “Chronologie de l’équipement de la route à l’époque greco-romaine,” in H. Cuvigny (ed.), \textit{La route de Myos Hormos}, (Cairo: Institut Français d’Archéologie orientale, 2003), 187-205, esp. 203-204. These certainly could have been used to provide security for the region. Additionally, evidence of trade activity during the sixth century CE at sites like Berenike, which is a southern terminus port of the route from Coptos, suggests that these roads were still heavily used (and therefore reasonably safe and well-guarded). On the desert route to Berenike, see especially S. Sidebotham, \textit{Berenike and the Ancient Maritime Spice Route}, (University of California Press, 2011), 87-123.
Appendix 3
List of Geographical References in Papyrus Texts

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<td>Review of payments made by Andromachis.</td>
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<td>Zygostatēs is described as being from Hypsele.</td>
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Appendix 4.1
Translation — P. Oxy. XVI 1853
(6th – 7th CE)
Oxyrhynchos

This letter is part of the archive of correspondeces between Victor, antigeouchos (ἀντιγεοῦχος) of the Apion estate, and several other administrators concerning the daily operations and management of the territory around Oxyrhynchus. The present papyrus is related to a recent incident between two villages that resulted in 30 solidi of gold being stolen from a pronoētēs (προνοητής), who was a type of estate manager, in the village of Pinyris. According to the writer of the letter, it was perpetrated during a raid by the villagers of Thmoinepsobthis and the gold was taken as it was being weighed on a scale. This was an especially daring act since it occurred during either a public festival or feast (ξενία) and in the presence of the pronoētēs of Pinyris. Although the text does not strictly involve the presence of zygostatai, it is nevertheless an important example of solidi being tested in the rural districts of Late Roman Egypt. That the weighing was performed by a pronoētēs is hardly surprising because this official was an active part of the circulation of gold in the Egyptian countryside, notably through the collection of taxes.

Greek Text

Recto
† εὑρίσκω ὅτι μετὰ μιρίων κύκλων οἱ ἀπὸ Πινύρεως ἔχουσί φυλακὴν [v] δι[...] τοὺς ἀπὸ Θμοινεπσοβθῆς καὶ τῶν παραφυλάκων αὐτῶν. ἔβαλον γὰρ εἰς κ[όμην]

εἰς τὴν ξενίαν καὶ ἔλεψαν τὸ ξύγιν τοῦ προνοητοῦ αὐτῶν ἐχων κάτω καὶ τριάκοντα νομίσματα([α]τα)

καὶ ἔδωκαν αὐτὸν τὸν βοηθὸν ἐπεμψα αὐτῇ καὶ ἱερότερος λεγομένου Ἀλεξάνδρου

ς ἔνα παρενέγκη αὐτοῖς κατὰ Κεφαλᾶ καὶ ἐπισφραγίσωσιν τὸν προνοητήν. ἐπεμψαν γὰρ καὶ ὁ δεσποτικός τινα τὸν ὀφείλοντα παρενέγκαι τοὺς μείζονας Θμοινεπσοβθῆς ἐως οὗ ζητηθῇ τὸ ὅλον τὸ πράγμα. καὶ ἕαν ἔχει πέμψαι ἐκείσε τὸν τριβοῦν ἡ τὸν μειζότερον ἢ δι᾽ ἐσαυτοῦ παραμένητε, οὐκ ἐνδέχετε μὴ εὑρεθῆναι τὸ χρυσίον. †

Verso

Translation

Recto

"I find that after countless years [?] those from Pinyris have a guard thanks to those from Thmoinesobthis and their guards. For they struck into [i.e. attacked] the village during the feast and stole the scale of the pronoētēs of those (from Pinyris), which had underneath it 30 solidi. See there, I have sent you an assistant himself with also the younger Alexander, as he is called, so that he may confront them with Cephalas and
validate (the accusation of) the pronoētēs. For, also, an imperial (official) sent someone ordered to bring forward the meizōn of Thmoinepsobthis until the whole affair may be examined. Also, if you have the power to send the tribune or meizoterōs or be present yourself, the gold is liable to be found.”

**Verso**

“To the most illustrious and honorable true friend and brother, George, chartularios and dioikētēs, from Victor, D. V., illustrious antigeouchos.”

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**Appendix 4.2**

Translation — *P. Brem. 83* (4th CE)

Hermopolis Magna

This document appears to be an account of expenditures and payments made to several individuals or groups. The sums of gold range from a single solidus to as much as 37 pounds of “unmarked” (ἀσήμος) gold. Since the first half of the text is significantly obscured, the identity of its author and their profession is unknown. However, it still provides a valuable insight into the condition of gold coins circulating in Egypt at this time. In the cases where the total expenditure is recorded in solidi (col. III.4-5; col. IV.1-2; 3-4; 5-6), the amount is followed by a second figure converting it into its weight in “pure” (καθαρός) gold. Invariably, the real weight is less than the theoretical weight of the coins, which is generally presumed to indicate some form of weight loss through either wear or clipping. The difference in weight ranges from an average of 0.5 carats per solidus to 0.84 carats per solidus. In this respect, the importance of *P. Brem. 83* was recognized as early as 1941 by Louis C. West, who was the first to perform these calculations.

**Greek Text**

*Col. III*

τούτων ἀναλώματος: Ἀπὸ πιανῷ [ὁ] ζητεὶ ισιδόρου ἠράκος ὑπὲρ τοῦ πάγου αὐτοῦ χρυσοῦ λίτρας α (οὐγκία) γ' Θεόδωρῳ χρυσώμῃ νομίσματα πικ.

5 διὰ Μακαρίου βοηθοῦ χρυσοῦ καθαροῦ λίτρας α (οὐγκία) γ' γράμματα και τῷ αὐτῷ χρυσωμῇ διὰ(α) τοῦ αὐτοῦ Μακαρίου ἀσήμου καθαροῦ λίτρας λίπους (οὐγκία) β' γράμματα . α 2 λ'

*Col. IV*

τῷ αὐτῷ Ἀππιανῷ ὑπὲρ παροχ(χῶν) δοθεὶσῶν τοῖς ἑρικάρται[5] διὰ(α) Γενάτος Κύρου βοηθοῦ(οῦ) νόμισμα α, αἱ χρυσοῦ καθ(αροῦ) γράμματα γ 2 γ' β'

5 τῷ αὐτῷ εἰς χίρας τὰ δοθέντα τοῖς στατιοναρίοις ἱπρίων καὶ Γενναδίων νομίσματα(α) ι., αἱ καθ(αροῦ) χρυσοῦ (οὐγκία) α γράμματα εἰ.
Translation

Col. III

“From these, as an expense:
To Appianos for Isidōros, (son of) Hierax, on behalf of the same pagus, 1 pound, 3 ounces of gold.
To Theodōros, chrysōnēs, 111 solidi through Makarios, boethos, (which is) 1 pound, 3 ounces, 20 grams of pure gold.
To the same chrysōnēs through the same Makarios, 37 pounds, 2 ounces, 1.5 grams of pure, unmarked gold.”

Col. IV

“To the same Appianos for payments given to the shearers through Genas, (son of) Cyros, 1 solidus, which is 3.86 grams of pure gold.
To the same, hand-to-hand, (for payments) given to the stationarioi, Hōriōn and Gennadios, 10 solidi, which is 1 ounce, 15 grams of pure gold.
To the same for the payment of Polytimos, cake-maker [?], 1 solidus, which is 3.86 grams of pure gold.”

Appendix 4.3

Translation — P. Laur. III 110
(600 or 615 CE)
Hermopolis

The contents of P. Laur. III 110 relate to the collection and delivery of the “public taxes” (δηµόσια) by Magistōr, a public cashier (διαστολεύς), to the accounts of Leōn, a dux (δοὺς). It records the payment of three sums of gold, which were deposited by Magistōr through an unknown agent (the name is obscured by a lacuna) in either 600 or 615 CE. Following the entry of each disbursement (all in different hands) is a subscription written by Phoibammōn, who declares, “I have made” (πεποίηµαι) the listed quantities of solidi “full weight” (εὐσταθµῶν). These declarations indicate that this individual, who is probably a zygostatēs, had not just weighed out the solidi, but rather he had calculated the real weight value of each payment net of any depreciations due to wear.

Greek Text

1 Ἑρµ(οῦν) [π(ὸ)δλεως] [...] δετετ[-] [...] τρ[ι]τ[ησ] [η](δικτίονος) ὡς [πρόκειται] [...] (Hand 2) [†] δέδωκεν M[i]γ[α]γιστωρ διαστολε[ὺς µερίδος Διοσκουρίδου διὰ [...] 

5 ἀ(πό) δηµ(οσίων) τ[ρ]ίτης ἵνδ(ικτίονος) χρυ[οῦν νοµίσµατα δεκαεννέα εὐσταθµα καὶ κεράτα δεκαστοµῶν,] γι(νεται) χρυ(οῦν νοµίσµατα) ιθ κ(εράτια) ἵν, τὰ καὶ [ἐ]ἰς [λόγον τοῦ ἐνδοξ(οτάτου) λέωντος τού πανευφήµου δουκ(ός).] ἐγρ(αφή) Tύβη η ἵνδ(ικτίονος) γ [H(αντι) τ] Φοιβάµµ[ῳν ἀπὸ τῆς Ἐρµ(οῦ)] π[ὸδεως] πεποίηµαι τὸ εὐστ(αθµον) τῶν] νοµ(ισµάτων) δεκαεννέα (καὶ) κερ(ατίων) δεκαστοµῶν ἀπὸ δηµο[σίων τρίτης ἵνδ(ικτίονος) ὡς πρόκειται.] [...]
Hermopolis made the praiseworthy from the third Indiction. Written Tybi 18, third Indiction.

(Diastoleus) Magistor Diascoridou Meris through … from the dēmosia of the third Indiction, gave nineteen gold solidi of full weight and eighteen carats, totaling 19 solidi, 18 carats, to the account of the most well-honored Leôn, the all-praiseworthy dux. Written Tybi in the third Indiction as above."

(Diastoleus) Magistor Diascoridou Meris through … from the dēmosia of the third Indiction gave fifteen gold solidi of full weight and two carats, totaling 15 solidi, 2 carats, to the account of the most well-honored Leôn, the all-praiseworthy dux. Written Tybi in the third Indiction as above."

Translation

“Hermopolis … third Indiction as above …”

(Diastoleus) Magistor Diascoridou Meris through … from the dēmosia of the third Indiction, gave nineteen gold solidi of full weight and eighteen carats, totaling 19 solidi, 18 carats, to the account of the most well-honored Leôn, the all-praiseworthy dux. Written Tybi in the third Indiction as above."

(Diastoleus) Magistor Diascoridou Meris through … from the dēmosia of the third Indiction gave fifteen gold solidi of full weight and two carats, totaling 15 solidi, 2 carats, to the account of the most well-honored Leôn, the all-praiseworthy dux. Written Tybi in the third Indiction as above."

(Diastoleus) Magistor Diascoridou Meris through … from the dēmosia of the third Indiction gave … gold solidi of full weight and eighteen carats, totaling … solidi, 18 carats, to the account of the most well-honored Leôn, the all-praiseworthy dux. Written Tybi in the third Indiction as above."

(Diastoleus) Magistor Diascoridou Meris through … from the dēmosia of the third Indiction gave … solidi and eighteen carats full weight from the dēmosia of the third Indiction as above."
Appendix 4.4
Translation — SB VI 9400
(525-575 CE)
Arsinoite (Fayyum)

This text is a report written by Hēras to his superior, Hēródēs, concerning the resistance he faced from the villagers of an unnamed settlement in the Fayyum. The cause of these difficulties is the accusation that Hēras was manipulating the weight of the scale (ζύγιον) that he was using to measure the gold collected from the village. The villagers claim that he was using a weight that was too heavy (βαρύτερον) for the gold and weights that were too light (ελαφρότερων) for what are termed “keratia”, which are probably the base metal coins. The argument is that he was intentionally defrauding the villagers of their gold by exacting more than they owed. Considering the context and the duties performed by Hēras, it would not be implausible that he was a zygostatēs, who was both a public weigher and heavily involved in taxation. It is additionally revealing that the author of the letter notes that he used the weights belonging to the grammateus (scribe) of the village, which would suggest that many or all Egyptian communities used their own weighing implements. This would at least partly explain the perplexing variety of local standards and measures represented in the Egyptian papyri.

Greek Text

Recto

τὸ δεσπότη μου διὰ πάντα θαυμασιωτάτω προστάτη Ἦρωδη Ἠρᾶς.
ἐμιθυν, ὡς οἱ ἀπὸ τῆς κώμης ἐλθόντες πρὸς τὴν σήμερα χαιρισιότητα ἐμέμψαστο με

5 ὡς βαρύτερον όντος τοῦ ζυγίον[υ], ὡ υποδέχομαι το χρυσίων τῆς ἀπαίτησεως καὶ τῶν δε κερατίων ἐλαφρότερων όντων[υ]. [κ]αι βουλήθης ἀνελθεῖν καὶ ἀναδίδασιν τοινυν, ὡς οὔτε ζύγιοι ἐλαβοῦν μεθ' ἐμαυτοῦ ἀπὸ τῆς πόλεως οὐ[τε ἄλλο τι], ἀλλὰ το ζυγίον ἑδεξάμην Διονυσίου τοῦ γραμματέως τῆς κώμης, ἐν ν ὑπέχετο πρὸ τούτου τὴν ἀπαίτησιν, καὶ ἔπι αὐτῶ ἑστηκα καὶ ὑπεδέχασιν τὸ χρυσίον. Εἰ οὖν

10 δ[ο]κεῖ τῇ οῇ ἄρετῇ, ἐπειδὴ χωρίς γυνώμης αὐτῆς οὐδὲν δύναμαι πράξαι, λαβεῖν με πρόγραφ[ε]
παρ' ἐκαστοῦ κεφαλαίωτον τοῦ χρυσίου τοῦ αἱροῦντος τῶν μέρει αὐτοῦ ἑγών ποίησαι Διονυσίου τῶν χρυ-

15 ματέα πάλιν ὑπο[δέ]ξασθαι. Καὶ προέγραψον π[α]ρα-

19 (Hand 2) ἔρρωσθαι οἱ εὐχομαι πολλοῖς

20 χρόνοις, δέσποτα. [ὁ]ρα Ἵμ奔波.
Translation

Recto

“To my lord through all, the most admirable prostatēs, Hérōdēs, (from) Hēras. I learned that those from the village having come to your Excellency have complained (about) me that the scale is too heavy on which I put the gold under (the scale) for the tax and those for the keratia are too light. And I wished to go up and to inform your nobleness, but I was unable without your command. And so I write that I have not taken a scale with me from the city or some other (place), but I received the scale of the grammateus, Dionysios, on which I put under the gold before this, and weighed on this and put the gold under (it). So thus if it is pleasing to your virtue, because without their recognition I am no longer able to exact (the taxes), proclaim that I took from each kephalaiōtēs [i.e. a tax collector] the gold obtained from their region or make that Dionysios, the grammateus, take back (what he said previously). And I wrote before to address the present circumstances to your virtue. May you deign to write to me (and) I will follow those orders given to me, master.” (Hand 2) “I pray you fare well for many years … … (?) 10 Tybi.”

Appendix 4.5
Translation — P. Oxy. XVI 1886
(Late 5th CE)
Oxyrhynchos

This papyrus is a formal petition (λίβελλον) from Aurelios Joseph to Flavios Apion, a defensor civitatis (εὐκαθυστής), concerning a sum of gold owed by a deceased zygostatēs. The original introduction in Papyri Oxyrhynchi XVI characterizes it as an "unpaid debt", but it has since been viewed differently. Aurelios Joseph reports that a zygostatēs named Anastasios weighed and deposited the gold into a sealed bag (σφραγῖς). However, once the seal had been loosened, it showed a difference of 52 carats less than the original amount. Unfortunately for Aurelios Joseph, the zygostatēs from the original transaction died before it could be repaid. The liability was subsequently acknowledged by his son who and assistant (μοισθιός). Aurelios Joseph appeals to the defensor civitatis that the son be incarcerated until he repays the sum.

Greek Text

Ἀναστάσιος ὁ δημόσιος ζυγοστάτης περιῶν ὑπεδέχατο π[α][ρ]έμοι φανερ[ό]ν χρυσίου ἐπὶ τῷ τα ... . . . . [.] . . . [.] καὶ τοῦτο π[α][ρ]αδου[ίς] ἐδεξά-
κεράτια πεντηκόντα δύο, ὡς καὶ μαρτυροῦσιν ὁ τοῦτον υἱός καὶ μ[ι][θήσις] περὶ τοῦτον. καὶ ὑπομην-
παρακαλῶ [ἰ]Α[νάγκην] [ἐκδεχομένου, λέγω δὴ [τὸν] τοῦτον υἱὸν [- ca.10 - κε] λεύσαι ἐν τῷ ἀσφ[αλεί]
Translation

“To Flavios Apion, the most notable distinguished defensor (civitatis) of (the city of) the Oxyrhynchites, from Joseph of the same (city).

Anastasios, the public zygostatēs, while still living collected from me a sum of gold for (the purpose of) ... and having handed this over I received his seal [i.e. sealed bag] and the above zygostatēs having unfastened it showed less (a difference) of 52 carats by weight, as his son and assistant have attested concerning this affair. And having been reminded by me, he told me he would pay it back, but all of a sudden his life ended before the payment of these things [i.e. the gold]. I, therefore, awaiting constraint submit this libellus to your erudition (and) make a request, namely to order the son ... to be brought into safekeeping until he be willing to make a return to me of the same 52 carats, most learned defensor (civitatis) (and) lord.

I, Aurelios Joseph, submitted this during the consulship of Flavios ...”

Appendix 4.6
Translation — SB XXVI 16354
(643-644 CE)
Hermopolite Nome

SB XXVI 16354 (formerly P. Vindob. G 22741) is a correspondence written by Hypatios to his superior, Zacharia, about the shipment of taxes taken from the village of Prechthis. The purpose of this correspondence is to inform Zacharia that the sum of money, which amounted to 82 “counted” (ἀρίθμια) solidi, had been transferred by an individual named Pesoou to the care of Hypatios. This was delivered to Hypatios in a “wooden-box” (σαρπίον) that had been sealed by a public zygostatēs with the value of its contents inscribed on it. This reading of the letter, which dates to the time after the Muslim conquest of Egypt, is based primarily on the updated transcription of the text by Hermann Harrauer in 2001. In this respect, several passages in Harrauer’s version diverge significantly from those in SB XXVI. These discrepancies certainly do alter some of the details featured in the respective publications, but they do not influence its general meaning. Possibly the most notable alteration is Harrauer’s restoration of “[Σ]άρπιν” in place of “[Π]άννιν” on the first line of text. Considering the obvious monetary context of the passage, it seems that the later reading of a “wooden-box” sealed by a zygostatēs is far more likely.

Greek Text

Recto
† [Σ]άρπιν ἠγεγέν μοι Πεσόου ὁ προτοκωμίτης Πρέχθεως βεβουλλομένον τῆς βουλλα[ς] τοῦ ζυγοστάτου [τοῦ] δημοσίου καὶ ἐπιγεγραμμένον νο(μίσματα) ἀρ(ίθμια) πβ. φοβούμενος τοῦτο βαστᾶξαι καὶ ἀπελθεῖν. τοῦτο οὖν ἰδοῦ
is part of the archive of letters between the govern-

41.22.1). Finally, unevenly struck, which is a p

the Byzantine solidus, which were inferior in quality. Even so, it was not unusual for Late

the gold he coll

further inquires what actions

under him to

of Egypt from 709-

τοῦ αὐτοῦ

χωρίου) ὑπέτασα

… οὗτος (Hand 2) ἐπίης(ἡ)τ(ούκενα) νο(μίσματα) φξζ κ(εράτια) ἣβ

νο(μίσματων) πβ νο(μίσματα) οζ, δία τ(ῆς) ἐπιστολ(ῆς) Ιοιδῶ(ρου) ἦς ἐχε

δ(ία) ἄρ(ι)θ(μίων) νο(μίσματων) 5 νο(μίσματα) ῥην κ(εράτια) η, δ(ία) Πεισοῦ νο(μίσματα) θ

… λ(οί)π(α) δία τ(ού) χωρίου νο(μίσματα) σφη κ(εράτια) δ. (Hand 1) καὶ

ἔχω βεβαιώσω ὡς ταῦτα ἡδι ἡλυσάς. †

Verso

(Hand 2) + τῶ τὰ π(άντα) λα(μπροτάτῳ) τῷ κυρίῳ … Ζαχαρ(ία) Ἄναι(ου)

ἀνω Σκό(ρ)δ(ων) † Ὕπὶ(άτιος.)

Translation

Recto

“Peou, protocomētēs of Prechthis, brought to me a surpion [i.e. wooden-box] (that) had been sealed with the seal of the public zygostatēs and labeled (as) 82 counted solidi, (he) fearing to transport it and lose it. And so, your Excellency should find it with me, having departed by your order. But, see that I have assigned the whole account of this chōrion [i.e. district] …” (Hand 2) “Under the care of (the zygostatai) solidi (totaling) 567 solidi, 12 carats; through Pannios, (son of) Cosmas, zygostatēs, 82 counted solidi, 77 solidi; through the written-order of Isidōros you also have 6 counted solidi, 187 solidi, 6 carats; 9 solidi were paid … remaining for the chōrion 298 solidi, 4 carats.” (Hand 1) “I have confirmation that you have done these things.”

Verso

(Hand 2) “To the all-illustrious lord … Zacharia, son of Aanios, of the village of Anō Skōrdōn. (from) Hypatios.”

Appendix

Appendix 4.7

Translation — SB XX 15102

(709 CE)

Aphrodito

Although fragmentary, the surviving portion of SB XX 15102 (formerly P. Lond. IV 1405) records a complaint about the quality of gold being collected and deposited at the treasury (σάκελλα) in Aphrodito. The writer of the text, who has been identified as either an employee of the treasury or possibly Qurra ibn-Sharik (the Umayyad governor of Egypt from 709-714 CE), criticizes the recipient of the letter for allowing those working under him to receive what he terms “badly-marked gold” (κακοχάρακτον χρυσίον). He further inquires what actions he has taken to reclaim the “difference” (καταλλαγῆ) from the gold he collected. The exact nature of the “badly-marked gold” is obscure because κακοχάρακτον is not attested elsewhere, but it is probably referring to local imitations of the Byzantine solidus, which were inferior in quality. Even so, it was not unusual for Late Roman officials to impose discounts on gold coins because they were misshapen or unevenly struck, which is a practice that goes back to the reign of Constantine (e.g., C.Th. IX.22.1). Finally, if the author of the text was Qurra ibn-Sharik, it is quite probable that it is part of the archive of letters between the governor and Basileos, who was in charge of Aphrodito.
... well-marked and ... Those from the treasury having taken the weight and by making the scale heavy [i.e. measuring (?)] the remaining portion ... defective and poorly-made with which the assistants sent by you from the trapezitai paid. And in this (respect), we do not know why you acted (this way) or why you did not take once again [i.e. more] from those (belonging to) your dioikēs on account of the difference of this gold.

Receiving the present letter, tell us through your letter why you are taking from them ... this badly-marked gold and what you decided to give to him who collected (?) ... these gold-taxes for that exacted ... Do not write anything but the whole truth, and the situation as it is, because if we find that you have lied and reported otherwise, you will receive from us a harmful reprisal and, D. V., you are not able avoid us for what happened is important. Written in the month of Mecheir 25, Indiction 7."
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