Zeitschrift: Entretiens sur l'Antiquité classique
Herausgeber: Fondation Hardt pour l'étude de l'Antiquité classique
Band: 63 (2017)

Artikel: Money exchange and the economics of inequality in the ancient Greek and Roman world
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DOI: https://doi.org/10.5169/seals-696947

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MONEY EXCHANGE AND THE ECONOMICS OF INEQUALITY IN THE ANCIENT GREEK AND ROMAN WORLD*

Exchanging money is still an activity entirely familiar to us. However, at first glance, it certainly would not be ranked among the serious factors in the social and economic inequality of today's world. But this should not conceal the fact that money is indeed a social and economic barrier not only because the amount of money possessed by individuals is a measure of social standing but because it also creates a separation between the 'haves' and the 'have-nots'. National currencies create as many separate social and economic pockets. The differences in value between national currencies create an obstacle to migrations, insofar as the people living in countries with a currency of little value have no possibility of traveling abroad, at least legally. This tends to limit travels or migrations to the nationals of countries of similar currency value, and under the condition that the currency is convertible. Also in the world of today, there is in general in each individual country only one currency that is legal tender and that serves for all forms of sales or payments, from the smallest to the largest ones.

Yet, this is not the whole picture. For international trade and payments, only a handful of major currencies are acceptable. This makes money exchange into a major question of management for firms connected to the international market, which need to have a portfolio of these major international currencies

in their daily business operations. These currencies, or the financial institutions that are in charge of their management, are also in open competition with one another.[1] Besides, in countries with lower value currency, some major foreign currency may also circulate, officially or non-officially, in parallel to the national currency and may be used by both individuals and the state. The international currency plays the role of reserve currency (as trust in the local currency is limited given that it experiences frequent devaluations), and may also circulate for major payments. This currency of little value is also frequently nonconvertible. In that case the exchange rate with foreign currencies is set at a rate that is quite favorable to the local currency, which often creates an illegal market, where the local currency is sold at a rate much lower than the official rate.[2] In some countries, there may be a second official national currency, of restricted access and limited circulation, which is pegged to some international currency and of much higher value than the other, domestic currency, and which most locals cannot have access to.[3] This creates a two-tier society in which money becomes a factor directly contributing to social stratification and inequality, for instance depending on whether one will be paid in the domestic or 'second' currency (pegged one way or another to an international currency).

The monetary regime of the ancient world was less sophisticated than that of todays' world. Despite crucial differences in the form taken by money and money management, some common features can however be observed in this regard between the two worlds. This is the case for instance with the difference between international and local or domestic currencies.

* I would like to extend my thanks to S. von Reden, C. Lorber, P. Iossif, B. Muhs and T. Keith for their generous help in the preparation of this article.

[1] KIRSHNER (1995) and ANDREWS (2006).

[2] KNOOP (2013).

[3] This is for instance the case in Cuba. See DE LA TORRE / IZE (2013) 9: "The Cuban dual exchange rate system overlaps with a dual currency system. The latter consists of the Convertible Peso (CUC) — a fully convertible currency that exchanges at one to one against the dollar — and the Cuban Peso (CUP) — that exchanges at 24 to one dollar".

The role of the state and its use of its sovereign power in monetary matters is also a feature common to the two worlds, which helps to explain some similarities. But traits exist that are specific to the ancient world, and that greatly contributed to social inequality. This paper will emphasize the second aspect in particular.

1. Money exchange and the sovereignty of the state

1.1. *Definitions*

Around 650 BCE, in the Greek cities of Asia Minor and in Lydia, a crucial innovation took place: the minting of precious metal coins.[4] The reasons for this innovation are still much debated and the point is not to reopen the debate here.[5] Precious metal had already been an instrument of state power for a long time, as its accumulation gave states a tool to achieve their goals when they wished to (for instance mobilizing an army). But by minting coins, states transformed what was previously only a private commodity into a public institution. Henceforth, by the mediation of coinage and the form it gave to currency, the state would be present in all processes of exchange between individuals. This meant also that beyond the technical process of minting coins, something much more significant was at stake: the implementation of a series of laws, decrees and other forms of regulations that provided the framework for the minting of coins as well as for their circulation and exchange. Together these measures formed a true policy of currency management.

The first phase of Greek coinage, that of electrum, may not seem to have needed currency exchange. Indeed, the coins were

[4] On the development of electrum coinage in Asia Minor and on the later phases of coinage in this region, it will suffice here to refer to KONUK (2012). For more recent developments on electrum coinage, see VAN ALFEN *et al.* (forthcoming).

[5] On the overall context, BRESSON (2006).

all of electrum, which meant that there was no necessity to implement a process of exchange between metals, specifically between gold and silver, because it was precisely these two metals that were alloyed in the form of electrum. This was the *raison d'être* of electrum: alloying gold and silver into electrum made it possible to bypass the difficulties of maintaining a bimetallist system.[6] If a fixed parity had been defined between the two metals, in a bimetallist system the constant fluctuations of their value would inevitably have left a wide gap for speculation. This would have threatened the very existence of the coin supply. As proved by the experience of other historical periods, coins in the metal that is temporarily undervalued at the official rate are melted down and quickly disappear.[7] In theory, electrum coinage was the 'perfect monetary system'. Not only was electrum used by all the minting states of Asia Minor, but most of them also used the same standard, the so-called "Milesian standard".[8] From the heaviest coin, the stater, to the lightest, the 1/192, users had at their disposal a system that was perfectly consistent. This was in fact the only period in the ancient history of coinage in which this was the case.

Does this mean that in this first phase money exchange remained unknown? So far, we have no information on money exchange for the period between ca. 650-560 BCE, corresponding to the phase of early electrum coinage. However, the existence of the two separate standards of Phokaia and Samos makes it indisputable that there must have already been moneychangers at the time. Besides, the differences in the gold/silver ratio between the coins of the various electrum mints could be evidenced by resorting to the touchstone. This also makes it inevitable that, even though their weights were in general very well calibrated, the differences in value between the coins presupposed

[6] BRESSON (2009).

[7] BRESSON (forthcoming).

[8] On the Milesian standard and the other standards in use in western Asia Minor, see BRESSON (2009) 72-73.

resorting to money exchange in order to make payments of the required value. At the Artemision of Ephesos, coins from many different mints were mixed together.[9] This testifies to the presence at the sanctuary of devotees and pilgrims from various cities but does not mean that in the exchange processes the coins of the various mints would be estimated at the same value. In fact, the striking (and seemingly puzzling) precision of the weights of the electrum coins as compared to the variations in alloy that can be observed between the various mints makes perfect sense. It then remained only to determine the proportion of gold and silver in two coins of the same weight to establish their relative value. This means also that although the existence of moneychangers in the early electrum period of Greek coinage is not yet attested, it is nevertheless absolutely certain.

Starting with the Lydian Croesids, minting coins in two separate precious metals, gold and silver, marked a new phase in the history of money. At their mint of Sardis, the Great Kings kept on minting Croesids in gold and silver. Then Darius inaugurated the parallel minting of the gold darics and the silver shekels. Meanwhile, in a form of exponential development that started in the second half of the 6th century, a large number of Greek cities began to mint coins, but in silver only. For the Classical period, the exceptions, like the minting of gold coins at Cyrene or Pantikapaion, are very rare and are linked to the privileged access of these cities to sources of gold. In the 4th century, the king of Macedon Philip II, who was to be followed by Alexander, inaugurated a gold coinage, illustrating the new imperial ambitions of Macedon. However, electrum was still minted by Phokaia and Mytilene, on the basis of an agreement to mint coins using the same composition of their alloy, and with the same subdivisions of the full unit.[10] Kyzikos also maintained an extensive electrum coinage from the end of the Archaic period

[9] See the analyses in VAN ALFEN *et al.* (forthcoming).
[10] See below on the monetary alliance between Phokaia and Mytilene.

to the end of the Classical period.[11] But apart from these cases, the Greek cities minted almost exclusively in silver.[12]

In the late Archaic and early Classical period, well over one hundred Greek cities minted a silver coinage. However, they did not use the same weight standards. In Asia Minor (in addition to the Persian standard), the old Milesian, Phokian and Samian standards were still in use. In mainland Greece, the Aeginetic, Attic-Euboic, Corinthian and Thraco-Macedonian standards were used. In the west, the cities of Italy, and separately those of Sicily, used standards of their own. Moreover, even if they minted on definite standards (with their characteristic subdivisions), cities often reduced it slightly. This allowed them to save a certain quantity of metal at the mint, and also probably to keep the coins in the area where they had been minted, as their slight underweight was a disincentive to export them. Thus this period of extreme fragmentation was also certainly when the money changers were the most wanted. Indeed, from the Classical period onwards, we have comparatively many references to money exchange by various cities.

In 1968, R. Bogaert gathered the evidence then available on money exchange in the ancient Greek world, and provided a detailed commentary on it.[13] His work can be supplemented by that of J.R. Melville Jones.[14] Bogaert focused on the vocabulary applying to money exchange and on the techniques used in exchange. He showed that many words were used in the Classical and Hellenistic periods to designate the moneychanger: ἀργυραμοιβός, ἀργυρογνώμων, ἀργυροσκόπος, δοκιμαστής, κερματιστής, κολλυβιστής, νομισματοπώλης and χρυσαμοιβός.[15]

[11] See below on the circulation of the coins of Kyzikos.

[12] See VAN ALFEN (2012), SHEEDY (2012) and RUTTER (2012) respectively for Athens, Aegina and the islands of the Aegean and Italy. The rule is almost universal for Greek cities of the Classical period.

[13] BOGAERT (1968) 42-50, 308-331 and 397-398, and (1976b).

[14] MELVILLE JONES (1993) 375-399, and (2007) 7-8 and 253-264. See also COHEN (1992) 18-22.

[15] BOGAERT (1968) 44-47, with references.

These words are not synonymous, although they belong to the same lexical field. The ἀργυραμοιβός and χρυσαμοιβός are respectively the "silver changer" (or moneychanger) and the "gold changer". The νομισματοπώλης is the one who sells coins. The ἀργυρογνώμων, ἀργυροσκόπος, and δοκιμαστής are involved in the control of the coins, which of course is the primary activity of a moneychanger. But one could be a δοκιμαστής and be confined to the task of verifying coins, rather than being a moneychanger properly so called, as proved by the law of Athens on coinage. The text refers to the δημόσιοι δοκιμασταί of Athens, public slaves in charge of testing the genuineness of the coins in circulation in the agora of Athens and at the *emporion* at Piraeus.[16] Finally, as stressed by Bogaert himself, it is clear that money exchange was one major activity taking place at the τράπεζαι, "the tables", and that the τραπεζῖται, the "bankers", were also, among other functions, money-changers. We will focus here on the economic and social dimension of money exchange. As already observed, the extraordinary diversity of the Greek world and the practical necessity to exchange money obviously mean that money changers must have been ubiquitous as early as the Classical period. The same remark applies to the Hellenistic world, then to the imperial Mediterranean.

1.2. *The activity of the moneychangers*

Defined as ἀργυραμοιβοί, ἀργυρογνώμωνες, and ἀργυροσκόποι, the money changers conducted exchanges between silver coins of various standards. The use of the word ἀργυραμοιβός was not confined to literary circles, as thought by Bogaert.[17] As proved by H. Duchêne's publication of the "stele of the port of Thasos" (l. 42), of c. 470-460 BCE, the word ἀργυραμοιβήϊον refers to the bureau de change.[18] This is the same period in

[16] STROUD (1974) ll. 4-18 and 49-56.

[17] PLAT. *Plt.* 289e and THEOC. *Id.* 12, 37.

[18] DUCHÊNE (1992), with *SEG* 42, 785, l. 41-43: ἀπὸ Χαρίτων ἱρῶ μέχρις τῶν οἰκ|ημάτων ἔνθα τὸ ἀργυραμοιβήϊον καὶ ἔν|θα τὸ συμπόσιον.

which the word χρυσαμοιβός is used metaphorically by Aeschylus in the *Agamemnon* (the play is dated to 458 BCE). This proves that at least by the early Classical period the words ἀργυραμοιβός and χρυσαμοιβός were already in common use.[19] The word ἀργυραμοιβός refers directly to an activity by a "silver changer", but it should be clear that it referred also to an activity by a "money changer", whatever the actual metal was. This is made clear in passing by Theocritus's *Idyll* 12, 36-37:

> Λυδίῃ ἶσον ἔχειν πέτρῃ στόμα, χρυσὸν ὁποίῃ
> πεύθονται, μὴ φαῦλος, ἐτήτυμον ἀργυραμοιβοί.
>
> "that his mouth should be like the Lydian stone with which money changers test real gold to make sure it is not false". (trans. Loeb)

The "Lydian stone" was the touchstone, used for testing gold alone. The ἀργυραμοιβοί in fact changed whatever form of currency was brought to them. Indeed, we know that even if silver coins were legal tender in most cities, the electrum coins of Phokaia, Mytilene and above all Kyzikos, as well as Persian darics, also circulated in 5th and 4th century Greece. They were present both in the states' reserves and in rich individuals' homes.[20]

This does not exclude the possibility of the existence of specialized χρυσαμοιβοί when there was enough gold to exchange. The word χρυσαμοιβός is reused, possibly as a fashionable archaism, in one of the apocryphal letters of Themistocles (which apparently were written in the 2nd century CE). It applies to the (real or imaginary?) very wealthy Corinthian banker Philostephanos, with whom Themistocles is reputed to be in business.[21] Philostephanos is first defined as one of the most successful bankers in Corinth and elsewhere.[22] The extent of the sums at

[19] See below on the use of χρυσαμοιβός by Aeschylus in the *Agamemnon* in 458 BCE.

[20] For the darics, see BASLEZ (1989) for Greece, and MANGANARO (1989) for Syracuse.

[21] THEMIST. *Ep.* 6, 56. See the comment of LENARDON (1978) *ad loc.*

[22] THEMIST. *Ep.* 6, 10-12: τῶν ἐν Κορίνθῳ ἀλλὰ καὶ τῶν ἄλλοθί που τῇ τοῦ τραπεζιτεύειν ἐργασίᾳ χρωμένων.

stake in the correspondence between Philostephanos and Themistocles, supposed to have been seventy talents, may explain why Philostephanos was also defined as a χρυσαμοιβός, if gold coins were supposed to have been at stake. In fact, there is no good reason to think that the word χρυσαμοιβός was an *ad hoc* invention of Aeschylus.[23] In his famous comparison in the *Agamemnon* (438-444), Aeschylus deplores:

ὁ χρυσαμοιβὸς δ' Ἄρης σωμάτων
καὶ ταλαντοῦχος ἐν μάχᾳ δορὸς
πυρωθὲν ἐξ Ἰλίου
φίλοισι πέμπει βαρὺ
ψῆγμα δυσδάκρυτον, ἀν-
τήνορος σποδοῦ γεμί-
ζων λέβητας εὐθέτους.

"Ares, the moneychanger of bodies,
holding his scales in the battle of spears,
sends back from Ilium to their dear ones
heavy dust that has been through the fire,
to be sadly wept over,
filling easily-stowed urns
with ash given in exchange for men." (trans. Loeb)

The scales and the furnace were appropriate in a gold changer's shop if he was also a χρυσοχόος, a goldsmith.[24]

This is possibly an indication, if a slight one, that the activity of a banker and money changer could involve receiving not only coined money but also uncoined precious metals. On this

[23] *Pace* DUCHÊNE (1992) 81-82.

[24] For the meaning of Aeschylus's image, see A.H. SOMMERSTEIN's comments *ad loc.* in the 2014 Loeb Classical Library edition. On the possible link between coinage minting and the goldsmiths, see an inscription from Dyme where a goldsmith (l. 9, [Κύλ]ι̣ν τὸν χρυσοχόον) ranks among those who have been condemned for counterfeiting (ll. 6-7, [νό]μισμα ἔκοπτον χάλ|[κεον]); see THÜR / STRUMPF (1989), THÜR (1991) and RIZAKIS (2008), who republishes the text (*SGDI* 1613 and *Syll.*³ 530). For the link between money exchange and goldsmiths in Ptolemaic Egypt, see BURKHALTER (2014) 69. With its scales and furnace, the fresco frieze of the Casa dei Vettii a Pompeii showing cupids at work in a jeweler's shop (see CLARKE [2003] 103, fig. 55) gives us also probably a fair idea of what a mint looked like.

point, our evidence is tenuous. Bogaert thought that there was a major difference between the ancient Greek city states and the medieval period.[25] For him, medieval money changers acted as brokers for individuals who brought their uncoined precious metal to the money changers. They received coins in return, which had been obtained from the mint. In so doing, the money changers were major auxiliaries of the mints, as they supplied a large proportion of the metal used by the mints. The situation would have been different in antiquity. In a decree of Pontic Olbia in the 3rd century BCE, we see that a creditor of the city who could not obtain the repayment of his loan is about to bring to the mint (strictly speaking, "to the die") the city's sacred gold vessels on which the loan had been secured.[26] For Bogaert, the fact that he does not bring the vessels to moneychangers but to the mint is a crucial difference.

In fact, this is a far-fetched conclusion. Given the sums at stake, the creditor had certainly no reason to use moneychangers as middlemen. In the Middle Ages, many individuals, like rich merchants with large quantities of raw gold or silver, could either sell the metal either to specialized brokers and or obtain their coins directly from the mint.[27] Going directly to the mint is also a situation observed in Ptolemaic Egypt in a papyrus of 258 BCE, although here we are concerned with merchants bringing gold coins in order to get the new coinage that was legal tender.[28] This does not mean that in more ordinary situations a

[25] BOGAERT (1984) 187-188.

[26] *IOSPE* I^2 32, ll. 17-18: ἐπὶ τὸν | χαρακτῆρα. On this document, see MÜLLER (2011).

[27] See STAHL (2000) 128-131, 134-139 and 254-255 for the various ways the merchants of various origins obtained their silver and gold coins at Venice.

[28] See *P.Cair.Zen.* 59021, with BRESSON (2015). See also KROLL (2011) 238-239, quoting a Athenian law dating to 354/3 BCE, to be published by M.B. Richardson, showing that the mint received raw silver and that (despite a gap on the stone at this point) there was a standard delay before the coins were minted and delivered to those who had brought the bullion. Regarding the question of a possible delay at the mint, see the papyrus of 258 (the two texts should be read in parallel).

person could not bring to a banker some precious metal, jewel, or plate and get the coins he needed for a payment. This is the case, for instance, in one of Alciphron's *Fishermen's Letters.*[29]

On the Roman side, it appears (if a statement of Cicero is correctly interpreted) that exchange of gold bullion against cash presupposed the payment of a *collybus*, an agio.[30] "Please see about Caelius and see that there is no gap in the gold. I know nothing about these matters. But surely there's enough lost on the exchange (*in collybo*). If the gold comes on the top of that …".[31] The *collybus* is the commission to be paid for the exchange of gold bullion for cash (although the identity of the changer is not specified). There should be no doubt that an agio had to be paid for the exchange, both on uncoined and coined precious metal.

As for daily exchange, it was performed in the agora for domestic trade and at the *emporion* (if there was one) for international exchange. The Thasian bureau de change was located in the agora of Thasos, or in an area immediately adjoining it.[32] The Athenian law on silver coinage of 375/4 mentions that in the city the coin examiner, the δοκιμαστής, will sit "among the tables", that is among the bankers, whose primary task was money exchange.[33] The coin examiner's activity is logically linked to that of the money-changers. Those who held foreign coins with Athenian types could thus exchange them for good Attic money without delay.

[29] ALCIPHR. 1, 13, 4: the (fictional) poor fisherman has to bring to the banker "Pasion" the gold necklace of his wife to free himself from a usurer from whom he has borrowed money he cannot reimburse. The still unpublished Athenian law of 354/353 on coinage might show that there was a collaboration between the money changers and the mint (see KROLL [2009] 203-204 and n. 33 p. 207).

[30] See below on the notion of *kollybos/collybus.*

[31] CIC. *Att.* 12, 6, 1 (306 ed. SHACKLETON BAILEY, who dates the letter to [May?] 45 BCE), with 11, 25, 3 (231 SB, where the point is to save silver plates or valuable textiles).

[32] DUCHÊNE (1992) 94, 101-102 and 106.

[33] STROUD (1974) ll. 5-6.

1.3. *Money exchange, agio and the state*

In Classical Greece, money exchange was thus a common practice. Apollodoros, the son of Pasion, claims that, when he was campaigning in northern Greece as a trierarch (he was then based in Thasos) and had to disburse money from his own pocket, he carefully recorded all his expenses, including the exchange fee (καταλλαγή) he had to pay to change money.[34] The note is all the more interesting given that in all likelihood Apollodoros is himself the author of the speech delivered before the court and that he was the son of the most famous banker of the time, and as such certainly well aware of what money exchange could mean.

In the 4th century, the poet Persinos, neglected by the tyrant Euboulos of Atarneus (in Aeolis, to the north of Phokaia), went to Mytilene and from this city "wrote to him that he could exchange (καταλλάττει) the Phokaian coins he had brought with him more easily at Mytilene than at Atarneus".[35] Phokaia and Mytilene were linked by a monetary agreement and produced electrum *hektai* on the same standard and of the same quality.[36] Beyond the ironic allusion by Persinos, we see that strategies could be elaborated to minimize the cost of money exchange.

The policies put in place by the Greek cities were not the same. From the Classical period to the Roman imperial period, establishing a monopoly of exchange was seemingly frequent. This was the case in Byzantion in the Classical period.[37] This was also the case much later in Mylasa between 209-211 CE.[38] Imperial Pergamon had a monopoly on exchange, and farmed

[34] Ps-Demosth. *Ad Polyclem* 50, 30. For the bureau de change of Thasos in the 5th century, see above.

[35] Poll. *Onom.* 9, 93 (= Callisthenes, *FGrHist* 124 F4); Melville Jones (1993) 454-455, no. 656, and (2007) 297.

[36] *IG* XII 2, 1. See Bresson (2009) 74-75.

[37] Ps.-Arist. *Econ.* 2, 2, 3, 1346b24-26.

[38] *IK* 34-*Mylasa* 605.

it out to several bankers.[39] If it was a state monopoly, exchange was a source of profit for the city. At Delphi, in the decree regulating the use of funds given by Attalos II to fund the education of the young Delphians, it was expected that the amount corresponding to the expenses and travel costs (of the ambassadors sent to the king?) would be taken "from the *kollybos*" (ἐκ τοῦ κολλύβου).[40] Thus in that case the *kollybos* was indeed a revenue of the city, and thus certainly the product of the fees on money exchange.[41]

In Classical Olbia and Hellenistic (independent) Delos, there was seemingly no such monopoly, and the exchange rate was freely negotiated between money changers and their clients.[42] In Independent Delos, local bankers were in charge of the cash operations for the sanctuary and the city.[43] No source mentions any reimbursement for their activities. The best explanation seems to be that this is because they were allowed to make their own profits on the large amounts of cash they handled, especially from the *kollyboi* on money exchange.[44] Delos experienced an exceptional diversity in terms of coinage circulation. The coins of the city, the *phoinikophoroi*, represented only a small minority of the coins in circulation. But the accounts of the sanctuary were kept according to the Attic standard. [45] In their daily business with their clients (their private clients or those who were in business with the sanctuary), bankers must have exacted agios on the cash they handled.

[39] *OGIS* 484 and add. II, p. 552; see below on this text.

[40] *Syll.*[3] 672; POUILLOUX, *Choix*, no. 13; JACQUEMIN *et al.* (2012) no. 168 (159/8 BCE), ll. 31-32.

[41] See also ROUSSET (2004) 112.

[42] Olbia: *IGDOlbia*, no 14; Delos: *IG* XII 5, 817, with BRESSON (2014).

[43] BOGAERT (1968) 170-187; MIGEOTTE (2014) 83.

[44] See already BOGAERT (1968) 175-176; BRESSON (2014) for the operations of the banker Timon of Syracuse.

[45] BRESSON (1993) 142-149; CHANKOWSKI-SABLÉ (1997); CHANKOWSKI (2005) and (2008).

2. Money exchange and social gap: from gold to silver and bronze

So far, money exchange has been examined in its technical aspect, as converting one currency into another, or bullion into coinage, which clearly necessitates resorting to the service of some specialist. But money exchange also exemplifies the social gap between the masses and the elite in the ancient world. The rich did their best to avoid exchanging money and thus having to pay agios on the very large sums they had in hand. From Cicero's correspondence with Atticus or with his brother Quintus, then *propraetor* in Asia, we know that he preferred to be paid in *denarii* rather than in "*cistophori* of Pompey", so that he did not have to pay an agio on the exchange.[46]

Roman magistrates in charge could exact agios to maximize their profits. Cicero denounced the way Verres had collected taxes that had no proper justification, including a *collybus* on the exchange of money he received from the state to buy Sicilian grain:

> "From the full sum that you should have paid to those farmers deductions, under this head or that, were regularly made. The first was for 'inspection and exchange,' the second for something called 'wax-money'. All these terms, gentlemen, are not names for real things: they are names for impudent pieces of theft. How can there be any exchange, where a single coinage is in universal use (*Nam collybus esse qui potest cum utuntur omnes uno genere nummorum*)?"[47]

The sums involved were substantial. The currency in question consisted of silver coins. The levy imposed by Verres was unfair, since unlike Asia, which used *cistophori* when the currency of the Roman state was the *denarius*, Sicily made use of the *denarius* only. In any case it is clear that in this passage Cicero was

[46] Cic. *Att.* 2, 6, 2 (26 SB); 2, 16, 4 (36 SB); 11, 1, 2 (211 SB); *Q. Fr.* 1, 3, 7 (59 BCE). See Andreau ([2]2015) 25 and 510; Burnett (2005) 175; Hollander (2007) 22.

[47] Cic. *Verr.* 2, 3, 181; see Andreau ([2]2015) 504 and 516, and the references in previous notes.

not thinking of a *kollybos* on an exchange between silver and bronze, but on an exchange between silver coins.

At the other end of the social spectrum, the case of bronze coinage perfectly illustrates the exploitation associated with the usage of this form of currency. Bronze coinage was introduced as a fiduciary coinage replacing the silver subdivision of the drachma shortly after 450 BCE in the Greek cities of southern Italy and Sicily.[48] Indeed, the very small size of the smallest silver coins made them quite inconvenient for daily exchange. It was probably easy to lose them, their attrition rate was higher than that of the bigger units (and all the more so given that the speed of their circulation was higher than that of the large denominations), and it was also easy to confuse one denomination with the other given that they were very similar in size. The introduction of bronze fiduciary small change solved the question elegantly. Unsurprisingly, the innovation was a quick success. Already at the end of the 5th century, bronze coinage had been adopted by many cities of mainland Greece and Asia Minor. Soon afterwards they replaced silver small change almost everywhere.

In Athens, however, it was not until the mid-4th century BCE (perhaps in the context of a financial crisis) that the city introduced its first bronze coinage; this was probably because the city traditionally produced large quantities of silver and was thus especially attached to silver coinage. But only a few years later after the introduction of bronze in Athens, Theophrastus could stage the case of the avaricious master, who exacted an agio on the rent that his slave paid him in bronze.[49] This proves that a form of distrust was already attached to fiduciary bronze coinage, which could be exploited in the private sphere by a master to exact more bronze money from his slave.

[48] RUTTER (2012).

[49] THEOPHR. *Char.* 30, 15: τοῦ χαλκοῦ τὴν ἐπικαταλλαγὴν προσαπαιτεῖν. See DIGGLE (2004) 518.

Under these circumstances, the apprehensions of the citizens of Gortyn that may be hinted at in a law of this city introduced in the 3rd century BCE become more understandable. Crete was always comparatively late in its institutional evolutions. This is why it is only at that date that bronze coinage was introduced at Gortyn. The law provides for the replacement of silver obols by bronze obols, and simultaneously forbids the levying of an agio from the users of the new bronze obols.[50] Obviously, the Gortynians had heard what had happened elsewhere with the introduction of bronze coinage. This justified the city's ban on levying charges in private exchange. But in other contexts, as in Ptolemaic Egypt, it was the state itself that played the role of Theophrastus' "sordid lover of gain" (αἰσχροκερδής). It made money exchange into a significant source of gain for itself and a daily burden for money users, especially for the poorer among them.

2.1. *Making money out of money usage in Ptolemaic Egypt*

Making money out of money usage was not new in the Greek world of the early Hellenistic period. But the Ptolemies made it a systematic policy, and on an unprecedented scale. They did so both in managing exchanges between Egypt and the outside world and in Egypt itself. Its natural configuration makes Egypt a territory easy to control. On this basis, the Ptolemies were able to implement solutions that other states would have had more difficulty putting into practice.[51]

The first move was the introduction of a new standard for gold and silver, which separated the Ptolemaic possessions from the rest of the Hellenistic world and allowed the Ptolemaic state

[50] *I.Cret.* IV 162.

[51] For recent literature on Ptolemaic coinage, see BURKHALTER / PICARD (2005); VON REDEN (2007) and (2016); PICARD / FAUCHER (2012); FAUCHER (2013); LORBER (2012b); PICARD (2014); WOLF (2013); BURKHALTER (2014).

to exploit the difference between international and domestic standards. As early as 305 BCE, following the crushing defeat at Salamis in 306 and facing the necessity of finding new financial resources, Ptolemaic authorities introduced a standard that was no longer aligned with the international Attic standard. The new standard was a drachma of c. 3.92-3.93 g, instead of 4.33 g for the full Attic standard drachma, with a new tetradrachm at c. 15.70 g, instead of c. 17.20-17.30 g for the Attic tetradrachm.[52] The Ptolemaic drachma stabilized at 3.57-3.58 g, with a reduced silver tetradrachm at c. 14.27-14.30 g. The difference with the Attic drachma was in theory 0.76 g, but was in fact somewhat less as the actual weight of the silver Attic tetradrachms in circulation was 4.20+ g in the late 4th century, and even less in the 3rd and early 2nd century BCE. There is good reason to believe (although this has not yet been proved by our documentary evidence) that when gold and silver Attic standard coins were imported to Egypt, one Attic drachma was exchanged for one Ptolemaic drachma, the difference (c. 21% of the value of the Ptolemaic drachma) benefitting the Ptolemaic treasury (Pl. 7.1-7.3).[53]

In addition to reducing the weight of the drachma under Ptolemy II, other innovations were made, triggered by the modifications of the gold-silver ratio and carried out to fit in with them. Under the Ptolemies, silver always provided the ultimate reference benchmark of monetary value, and thus the weight of silver coins minted on the 3.57-3.58 g value of the drachma remained unchanged (mainly the above-mentioned tetradrachms at c. 14.27-14.30 g).[54] Thus the innovation concerned gold coinage. New gold coins were introduced in (probably) 298, staters weighing 7.13 g, with a new gold-silver ratio of 1:11 (instead of the previous 1:10). A few years later, new and heavier gold coins were minted on the new standard of the drachma, the *trichrysa*,

[52] Lorber (2012b).
[53] Le Rider (1998) 792-798; Bresson (2015), with previous bibliography.
[54] See below on this point.

weighing 17.90 g (five gold drachmas). Each *trichryson* was seemingly the equivalent of 60 silver drachms, with a gold-silver ratio of 1:12. In August 272 at the latest (the precise date remains unknown for now), Ptolemy II introduced a new gold coinage, the full denomination of which was the *mnaieion*, of ca. 27.80 g. As implied by its name, the new coin was worth one hundred silver drachms. The reform corresponded to a new gold-silver ratio of 1:12.8.[55] The introduction of a new standard and a new currency implied the demonetization of the former currency and its replacement by the new one. Thus, we know that in 258 the old *trichrysa* (and other gold coins on various foreign standards) brought to the kingdom by merchants were systematically melted down and exchanged for *mnaieia*.[56] Yet another new development took place under Ptolemy III, the minting of gold coins of 43 g and of silver coins of c. 52.70 g, possibly to accommodate a new gold-silver ratio of 1:13, but the attempt was short lived.[57] From then on, although in smaller quantities after 200, the *mnaieia* were the standard gold coins in the Ptolemaic kingdom.[58]

In practice, gold was used for large scale payments, by senior administrators or by large-scale merchants. For major transactions, it obviously played a more significant role than in other Hellenistic kingdoms.[59] Besides, even if silver always remained the standard of accounting, payments in gold meant receiving a bonus in terms of silver, which in 258 BCE was 4%.[60] In the Ptolemaic kingdom, positive or negative exchange rates thus applied to the conversion between various metal coinages, positive for the conversion from gold to silver or bronze and silver

[55] See Lorber (2013) 65-78.

[56] *P.Cair.Zen.* 59021, with Bresson (2015).

[57] Le Rider / Callataÿ (2006) 37.

[58] Le Rider / Callataÿ (2006) 52; Duyrat / Olivier (2010).

[59] According to the estimates of Iossif (2015), gold represented 71% in value of the total of the Ptolemaic gold and silver coinage production.

[60] *P.Cair.Zen.* 59022. See Le Rider / Callataÿ (2006) 153 for the correct analysis of the document, and *pace* Orrieux (1983) 32-33.

to bronze, negative the other way around. The systematic exploitation of the conversion from bronze to silver or gold was based on the new role given to bronze money in Ptolemaic Egypt.

Like everywhere else in the Hellenistic world under the control of Greek elites, bronze was initially conceived only as small change and a subdivision of the precious metal coinage, in the traditional system of the Greek coinage. Like almost everywhere else, the drachma was subdivided into 6 obols, each obol subdivided into 8 *chalkoi* (whether or not the *chalkous* existed as a coin), and the subdivisions of the drachma were bronze fiduciary coins. The coins were initially of light weight, in two denominations only. In c. 294, however, following the financial crisis in this period, the first change occurred, with the introduction of heavier coins in four denominations.[61] But the decisive modification took place in 261, with the introduction of heavy bronze coinage in six denominations. The heaviest coins were clearly intended to replace the former silver drachmas and other silver units of lower value. The weights of the heaviest coins of c. 90-100 g might have been aimed to fit the weight of the traditional Egyptian unit of measure, the *deben*, a weight unit of c. 91 g.[62] If this was the case, it was nevertheless for purely opportunistic reasons, for the true objective was to replace the drachma, traditionally minted in silver, with a system that was now entirely based on fiduciary bronze coinage.

Remarkably, and as proved by the hoards, over the course of the 3rd century silver coinage tended to disappear from the *chôra* of Egypt.[63] Bronze currency became the ordinary means of exchange for most of the population of Egypt. An original feature of the bronze currency system of the Ptolemaic state was the unusual frequency of the processes of demonetization and replacement by a new series. With ten different bronze series

[61] Farhi / Lorber (2012).

[62] Le Rider / Callataÿ (2006) 54-55; Gorre (2012) on the relation between the *deben* and Ptolemaic monetary units.

[63] Lorber (2013).

over less than three hundred years, a new bronze series was introduced on average of less than every thirty years.

Series/ Spec.	Begins	Ends	Denominations	Heaviest	Lightest	System
Series 1	315/12	301	2	4,30-5	1	Non-decimal
Series 2	305	261	4	20-21	1,5-3	Non-decimal
Series 3	261	240	6	90-100	2,5-5.5	Non-decimal
Series 4	240	220	7	80-90	2,5-5.5	Non-decimal
Series 5	220	(197)	8	72	1.5	Non-decimal
Series 6	(197)	150	8	38-40	2-3	Decimal
Series 7	150	115	6	22-23	4.5	Decimal
Series 8	115/4	114/3	2	16	c. 8	Decimal
Series 9	130	37?	2	1-10	c. 0.5 - c. 2	Decimal
Series 10	37	30	2	c. 12-17	c. 5-9	Decimal

Table 1 — The Bronze Ptolemaic Coinage, after Picard (2012) 17-108.

At the turn of the century, a new major innovation took place.[64] The traditional system of subdivisions of the drachma was abandoned, and a new decimal system was introduced. This may have reflected a desire to simplify accounting. But the turn of the third to the 2nd century BCE was also a time of severe crisis for the Ptolemaic kingdom, marked between 206 and 186 by the revolt of indigenous pharaohs in Upper Egypt and widespread trouble all over the country.[65] Dated to 196, the famous Memphis Decree shows that Ptolemy V had to make major concessions to the Egyptian priests to be able to re-conquer his

[64] The date of 197 proposed by PICARD / FAUCHER (2012) 68-69 is not universally accepted. See FISCHER-BOVET / CLARYSSE (2012), who prefer to keep Reekman's date of 211/210, and a new study in preparation by C. Lorber and G. Gorre, who argue for a date c. 207/6.

[65] VEÏSSE (2004) 5-26.

kingdom.[66] But once again this was probably only an opportunistic measure, which did not change the nature of bronze coinage in Ptolemaic Egypt.

Often when a new series was introduced, all the coins of the previous series were recalled and exchanged for the new coinage. From series 7 onwards, a considerable adjunction of lead can be observed, which was a way to save money on minting, even though admittedly the overall actual cost of bronze money was comparatively very low.[67] Coin production was also faster. Many coins were now cast, not struck, in order to lower the cost of production. At the same time, beginning in the last two decades of the 3rd century, a considerable increase in prices can be observed. This is the famous question of the 'Ptolemaic inflation'. If it is now admitted that a major aspect was a modification of the accounting system rather than a massive increase in the quantity of coinage in circulation, the origins of the crisis are still far from clear.[68] What can be observed in any case is a depreciation even of the new bronze unit in terms of the silver drachma. On the basis of the number of bronze drachms per stater, the silver/bronze ratio which was 1:125 in 171 (500 drachms per stater) increased over the second century and was at 1:450 after 115 (1800-1900 drachmas per stater).[69] The higher exchange rate (the manipulation of which was facilitated by the new decimal system) and the parallel introduction of new bronze series (see above table 1) increased the gap between gold and silver on the one hand, and bronze on the other, to the disadvantage of those who lived in the universe of bronze coinage.

Another much-debated question is the nature of the Ptolemaic monetary system, some seeing it as deeply unitary, with the predominance of a silver standard until the end of the monarchy,

[66] *OGIS* 90.
[67] FAUCHER (2013) 54-62.
[68] See recently FISHER-BOVET / CLARYSSE (2012) and GORRE (2012).
[69] LORBER (forthcoming), who discusses the previous hypotheses.

while others see it as a tri-metal system. As already observed for gold, the remark being also true for bronze (see below), it was always against silver that the other metal currencies were measured. Thus the Ptolemaic monetary system was fundamentally unitary.[70] However, one should not conclude that gold and bronze coinages were merely multiples or subdivisions of silver coinage. In terms of monetary currency, the reality was that of the 'full autonomy' of each metal, which was only connected to the others by the common unity of accounting provided by the silver coinage. A specific policy prevailed for each metal (for example, the many changes to the bronze coinage are not paralleled by similar changes to the gold or silver coinages), although within the framework of a deeply united monetary system. These policies were fully consistent on the one hand with the nature of the currency (commodity money for gold and silver, fiat money for bronze) and with its market value (for gold and silver), and on the other with the constraints of the financial policy of the Ptolemaic state.

During the 3rd and 2nd centuries, silver became ever rarer. It began to be minted again on a large scale in the period of Ptolemy VI (before 170 BCE). In the countryside, the currency that people saw circulating and had in their hands was bronze money. This does not mean that silver, as a currency of account, was out of the picture. The numerous cash taxes to which the people were liable were defined either in terms of either silver or bronze.[71] Other documents show that silver and bronze currencies (when they were actual money) were accounted for separately.[72] Nevertheless, the principle of an agio applying to the conversion of bronze into silver or gold money remained fully valid.

From what we know of monetary manipulations in Greece, as for instance that of Hippias as told by Ps-Aristotle (*Econ.* 2,

[70] See GORRE (2012) 110-111, with previous literature.
[71] VON REDEN (2007) 84-117; BURKHALTER (2014) 63.
[72] BURKHALTER (2014) 65.

2, 4, 1347a9-11), the state made a profit in the process: this was indeed one of the aims of the operation. Individuals received in purchasing power less than what they had brought to the mint. This was probably also the case in Ptolemaic Egypt, although we have no specific detail on this point. Besides, the switch to a new bronze currency inevitably had a further cost for the public.

First, as is inevitable in similar operations, for various reasons a certain quantity of bronze coinage could not be brought back to the authorities in what was certainly the appointed time. The number of homogeneous bronze coin hoards in Ptolemaic Egypt (a total of 47) is enough to verify this situation.[73] The corresponding profit on this 'lost money' was for the state. Then, even if some 'old' bronze coins still in circulation were at some point, but too late, brought before a banker, the control to which they were submitted meant that a good share of them was not accepted. In a monthly account of daily expenses and income in the Zenon archive dated to 255 BCE, that is, six years after the reform of 261 and the introduction of the new heavy bronze coinage, out of one hundred "drachmas" (no doubt bronze ones) brought to Zenon, the banker Python accepted 49, but rejected 51 as being ἀδόκιμον, in all likelihood because they were no longer legal tender. This does not mean that one hundred coins of one drachma were brought to the banker, but that a sum of one hundred drachmas in various coins was brought to him and that he accepted them for an amount of 51 drachmas only.[74] The loss was for the individual who still retained the 'old' coins, and the final profit was once again for the state. Naturally, the profit made from the exchange was certainly marginal as compared to the main goal of the exchange, which was to play on the difference between the metal currencies.

[73] LORBER (2000) for the 3rd century and (2013), with table 4 pp. 152-153, with also FAUCHER / LORBER (2010) app. 1 p. 60 specifically for series 6-7. See also now FAUCHER / MEADOWS / LORBER (2017) 1-16, for the total of 47 homogeneous bronze hoards.

[74] *P.Lond.* 2167, ll. 61-64.

In the 3rd century, a majority of taxes (13 *vs.* 7) were defined in terms of silver.[75] The *P.Rev.Laws* of 259/8 BCE defines the taxes to be paid in bronze money at par, χαλκὸς ἰσόνομος, and those that were to be paid with an agio, χαλκὸς οὗ ἀλλαγή. The *P.Paris* 62, r5 ll. 16-17 of 204 BCE defines the exchange rate of bronze against silver: it was ten drachmas 2 1/2 obols per mina, or 10.416%. This rate can be found in a long series of documents of the 3rd century and one of the 2nd century, which however is sufficient proof that the agio did not disappear in 197 with the great reform of bronze coinage and the introduction of the decimal system.[76]

However, another exchange rate is mentioned in our documentation. Up to now it has been interpreted as a 'reduced rate' corresponding to payments made by the state, when the money came from the state treasury, but also for private payments.[77] The documents are the following:

– *P.Lond.* 1934, ll. 9-10 (Oct. 258). 25 dr. 1/2 for 1 stater, or 6.25%, for the payment of Apollonios's pension: one talent in gold, one in silver, one in bronze, an agio being applied to bronze only.
– *P.Lond.* 2167, ll. 181-182 (255). In a Zenon account, a purchase of bricks for a value of 8 silver drachmas is mentioned as the equivalent of 8 bronze drachmas and one triobol, that is a rate of 6.25%. The payment is not made by the *basilikon* (the royal treasury).
– *P.Hib.* 51, ll. 5-6 (245/244). In official correspondence regarding payment for garments from the *basilikon*, a cashier receives the instruction to process the payment ἐπαλλαγῆς τοῦ ἡμίσους τῶν δ' (δραχμῶν) (ὀβολὸν) α, "with an exchange rate of one half, for 4 drachmas one obol and a half", or 6.25%.

[75] Von Reden (2007), table p. 116.
[76] Burkhalter / Picard (2005) 66-67.
[77] Burkhalter / Picard (2005) 66-67; Burkhalter (2014) 62.

– *P.Hib.* 67, ll. 15 and 22 (228). In an official letter, Asklepiades asks the banker Kleitarchos to pay separately for 448 and 64 drachmas in textiles delivered to the royal treasury by weavers. The rate of conversion of bronze for silver is 3.125% (respectively 14 drachmas, for a total of 462 drachmas, and 2, for a total of 66 drachmas).
– *O.Bodl.* I 314 (190-150).[78] The exact purpose of the text remains unclear, but there is no proof that this was an official payment. In the account, 17 silver staters are subtracted from a sum of 6 talents 1,400 drachmas (= 37,400 drachmas) in bronze at a rate of 2,200. The agio is first defined at 2,400 bronze drachmas. It corresponds to a rate of exactly 6% of 40,000 bronze drachmas. Then, implicitly and probably erroneously, the agio is recalculated at 2040; the rate would be 5.45%. In fact, one may suspect that the number should have been 2,244, or exactly 6% of the sum of 37,400 bronze drachmas, but that a mistake was made in the calculation.[79]

Whether 'public' or 'private', all five cases have in common payments in bronze for sums defined in silver. For four cases out of 5, we have conversions from silver to bronze at a rate of exactly 6.25%, or 6% (or around 6%) in the 2nd century. This is the "exchange rate of one half" defined by *P.Hib.* 51, not arithmetically one half of 10.41%, but probably a vestige of a

[78] See BURKHALTER (2014) 71.

[79] C. Lorber (*per litteras*) suggests the following solution for this difficult case: "I assume that *O. Bodl.* I 314 is an account by someone who received bronze for silver, either in an actual monetary exchange or in a payment in which bronze was substituted for silver. Otherwise the writer would not 'have' a total including the agio paid. I doubt that the 17 staters are literally subtracted from a sum in bronze; the text just indicates what part of the total was made up by 17 staters evaluated in bronze and what part was the agio. I also doubt that the *allagê* was lowered. I think what happened is that the payer fell a bit short for some reason. Instead of the correct total of 40,800 drachms, he/she paid only 39,440 drachms (6 T 3440 dr.), and that's why a difference of 560 drachms is specified". We would be in a case where a payment in bronze was substituted for (stipulated) silver, which would fit well with our own argument.

previous and higher rate (see below).[80] Remarkably, the payment of the agio to the weavers of *P.Hib.* 67 is exactly one half of the expected rate, 3.125% instead of 6.25%, which obviously brutally translates a balance of power between the two partners: 6.25% of bonus for the pension of Apollonios when paid in bronze, but only 3.125% for the weavers working for the state.

In addition, *P.Cair.Zen.* 59327, ll. 13-14, of 249 BCE, provides a 12.5% exchange rate for bronze to silver. This must be the original rate, which at some later point was slightly reduced by the Ptolemaic authorities, perhaps because they realized that it was too high for the population. This is a decisive indication that the 6.25% rate of exchange from silver to bronze is not a reduced rate for official payments, but the rate applying to the conversion from silver to bronze established at one half the rate for converting bronze to silver. Interestingly (see below) in 2nd century CE Asia Minor, the agio for conversion from silver to bronze, or 6.25%, was half that for conversion from bronze to silver, or 12.5% (although here the same rate was pure coincidence).[81] The reduction of the rate of exchange from 12.5% to 10.41% can at the same time be paralleled with the evolution of the salt tax (*halikê* or *halika*), which was in fact a poll tax. It is attested in Egypt between 263 and 217 BCE and went through two successive reductions: originally (263-254), male rate 1.5 drachmas and female rate 1 drachma; then (254-231), 1 drachma and 0.5 drachmas; then again (243-217), 4 obols and 1.5 obols.[82]

Finally, one case deserves special attention. The rate of 8.33% for the calculation of interest in bronze for a sum loaned in silver (*P.Cair.Zen.* 59355, col. I, ll. 8-11, of 244 BCE): 8.33 (8 drachmas and two obols) is exactly the median value between 10.41

[80] See BRESSON (2012), especially p. 80, for the discussion of the volume of amphoras as defined at the customs of Pelousion (*P.Cair.Zen.* 59012, 259 BCE). The ἡμικάδιον is not always the equivalent of one half of a κάδιον.

[81] See below for the agio in Roman imperial Asia Minor. BOGAERT (1984) does not separate clearly between the conversion silver-bronze and bronze-silver and supposes that the exchange rate (ἀλλαγή) was constantly fluctuating, especially in the 2nd century.

[82] CLARYSSE (2012).

and 6.25%, and this can hardly be just a coincidence. Other rates are, however, attested in our documentation that would deserve closer attention. Nonetheless, it seems that despite the apparent discrepancies in our sources, some general principles can be observed.

We are here at the heart of the fiscal system of the Ptolemies, and some general conclusions can, in any case, be reached. Each of the three coinages (gold, silver, bronze) was defined as separate from the others, and an exchange fee was exacted for converting an amount of money from one currency to another. But commodity money coinages were privileged in their relationship to flat coinage. Buying silver with gold meant receiving a bonus of 4%. Buying bronze with silver meant usually (at least for the privileged) receiving a bonus of 6.25%. But buying silver with bronze in the 3rd century ordinarily meant paying a premium originally of 12.5%, which quickly dropped to 10.41% in the 3rd century and to 10% in the decimal system of the 2nd century. The system benefited those who had access to precious metal, for instance those who received recompense in precious metal coinage. The loss was for all the others, especially for the most of the population, which lived in the universe of bronze currency. As it was up to the state to define the metal in which individual taxes were to be paid, if the tax was defined in terms of silver, the payer had to pay an agio to the royal bank, on top of which were added fees for levying the tax of 5% before 129 BCE, and 10% after that date, i.e. extra payments respectively of 15 and 20% of the official amount of the tax.[83]

In this sense, it is the parallel with VAT that comes to mind, although of course the parallel should not be pushed too far. In the ancient world, it was technically impossible to levy value added taxes, the way modern states do. One way to tax daily trade was to levy taxes on the exchange between bronze and silver: this was the best way to tax petty trade, salary payments, etc. In post-Ptolemaic Egypt, when Augustus reestablished a monetary system

[83] Milne (1925) 276, nicely confirmed by Agut-Labordère / Gorre / Kossmann (2014) 214.

based on the difference between a silver currency and a bronze currency that was once again divided along the traditional subdivisions of obols and *chalkoi*, the practice of paying an agio on exchange was universal in imperial Roman Egypt.[84]

2.2. *Money exchange in Roman Asia Minor*

We have every reason to believe that the levying of an agio on bronze was universal in the Roman world. Beyond Egypt, inscriptions from Asia Minor provide the best dossier for this period. At Pergamon, in a rescript (possibly Hadrianic) of the beginning of the 2nd century CE, the bankers operating under a city contract levied an agio on the exchange between silver and bronze. The *denarius* was officially the equivalent of 16 asses. When exchanged against bronze, the official rate of a *denarius* was 18 asses at purchase, or 12.5%, and 17 asses at sale, or 6.25%.[85]

The levying of an agio is also mentioned in an inscription from Magnesia on the Maeander at the time of Hadrian.[86] As the subsidy paid by the city was not enough to pay for the oil of the gymnasium, the *presbyteroi* decided to contribute by making withdrawals from the income of the *gerousia*, either in cash (on the cash income of the *gerousia*) or in kind (on the in-kind income from the estates). These revenues were normally intended to serve as emoluments of the *gerontes*. The *kollyboi* mentioned certainly corresponded to the product of an additional exchange tax on payments made in bronze or silver corresponding to the payments of the various taxes by users of the gymnasium: the hundredth for heating the bath; the hundredth for the loan of towels; the hundredths on the income from the inn, on catering, sale of salt foods, and of the cellar (the wine

[84] BURKHALTER / PICARD (2005) 61-62, on the reform; BOGAERT (1983) on the *kollybistikai trapezai*.

[85] *OGIS* 484 and add. II, p. 552; BOGAERT (1968) 231-234, and 1976a, no. 28; OLIVER (1989) 209-215, no. 84. See BRESSON (2014).

[86] *I.Magnesia* 116 (with p. 296) l. 36: κόλλυβοι οἱ γεινόμενοι.

reserve).[87] It is a system similar to that which can be observed in Egypt at the same period: for instance, an exchange tax (paid in bronze) on a small payment of tax money is mentioned in a tax receipt from 106 CE from the Fayum.[88]

The foundation of Caius Vibius Salutaris in Ephesos during the reign of Trajan (104 CE) also refers to a *kollybos*. [89] In addition to manufacturing twenty-nine statuettes, one in gold, the others in silver, the donor also planned to create a fund of 20,000 *denarii*. Invested at an annual interest rate of nine percent, the fund was to bring in 1,800 *denarii* annually.[90] Every year, for the anniversary of the goddess, a distribution was to be organized to a series of nine categories of beneficiaries, the first three being: 1) the council members; 2) the members of the *gerousia*, a category whose name is lost, and the former Asiarchs; 3) and the citizens, for a number of 250 per tribe. Three times it is stated: "If the *kollybos* is higher, so that more funds are available for more beneficiaries…". (ll. 229-230, [ἐὰν δὲ μείζω]ν γεί[νηται ὁ κόλλυβος, ὥστε | εἰς πλείονας χωρεῖν] for distribution to the council members; ll. 235-237, [ἐὰν | δὲ μείζων ᾖ ὁ γενόμενος κόλλυβος,] ὥστε εἰς πλείο̣[νας | χωρεῖν], for distribution to the members of the gerousia; l. 251, [ἐὰν δὲ μείζων ᾖ ὁ γεν]ό̣μενος κόλλυβος (without further indication), for distribution to citizens.

J.H. Oliver has proposed a clever explanation, which so far has received universal approval. "The drachma contained twelve silver asses, and the denarius sixteen silver asses. The adjectives indicate a reference to the silver as distinct from the ordinary provincial bronze as, which had depreciated to a rate of eighteen

[87] *I.Magnesia* 116, l. 34-36. For the meaning of "cellar" as a wine reserve for πιθών, see GINOUVÈS / MARTIN (1998) 170. For this inscription and the income from the estates of the *gerousia*, see THONEMANN (2011) 253-254.

[88] *P.Fay.* 56, l. 7: κολ(λύβου) χα(λκοῦ) ιδ'. The tax in silver is the ναύβιον κατοίκων, the tax paid as an equivalent for the maintenance of dykes and canals.

[89] OLIVER (1941) no. 82 (*IK* 12-*Ephesos* 27). See also ROGERS (1991) 42. On the sixteen *assaria* of the *denarius*, see MELVILLE-JONES (1971).

[90] See briefly DEBORD (1982) 206-206.

to the denarius and was in danger of depreciating even further. A variation in the exchange had been foreseen and provisions were made for the division of a surplus". [91] Oliver's hypothesis is also interesting in that it accounts for the sudden appearance of a *kollybos* defined as μείζων, "larger", when no reference has so far been made to such a source of revenue. For Oliver, the increase of the amount allotted to each category would be related purely to a variation in the exchange rate between silver and bronze. Indeed, for the payment to 6 × 250 = 1,500 citizens is provided a total annual interest of 750 *denarii*, equivalent to ½ silver *denarius* per citizen. Now, every citizen was to receive a donation of 9 asses, not 8: the *denarius* was thus indeed valued at 18 asses. While the total sum in silver coins remained unchanged, we would be dealing with a simple depreciation of the value of the local bronze currency, with, for example, a *denarius* rated at 19 asses instead of 18. But according to this hypothesis, each beneficiary would be receiving 9 devalued asses and thus would be deprived of a fraction of what was originally owed to him. There would be more beneficiaries, but each of them would receive a sum of money that was devalued. Is this really what the issue is about?

The close parallel (even down to details) with the inscription of Magnesia on the Maeander, where the income from the *kollybos* helps finance the oil for the gymnasium, paves the way for a different interpretation. Instead of an unlikely and strangely 'favorable' devaluation, it seems simpler to think that it would be an increase in the overall volume of the *kollybos* on the financial operations of the foundation, but based on the income of the agio and on the same rate of exchange, which would justify the increased funding. How could this be achieved? This could be the case if those in charge of the farming of the *kollybos* were also those who were responsible for the investment of the foundation's funds

[91] OLIVER (1941) 82. Same view in VERBOVEN (2009) 10, on the basis of Newton's comment ad *IBM* III 481, and pp. 138 and 141.

and the benefit thereof.[92] If the tax revenue was higher than the sum due to the city, then the extra profit would not go into the pocket of the farmers, as would normally be the case, but would be used by the managers of the fund, who would perform their work for non-profit, to increase the sums to be shared between the beneficiaries. It has been shown independently that the *gerousia* "was an institution operating almost like an independent bank".[93] Besides, the reason why the *kollybos* was not previously mentioned is also perfectly clear. Paying a *kollybos* on money usage was so common, and the logic of the system so well known, that no specific mention was necessary.

We can also understand why the *denarius* was valued at 18 asses for the distributions: if this had not been the case, and if they had not received 9 asses but only eight, the council members would not have received a "real half-*denarius*", but only a fraction of the amount due. Indeed, when they had to make a payment denominated in the official currency, the *denarius*, but payable in bronze coins, they would have had to pay a premium corresponding to the lesser value of the bronze coin. This is also a reminder that a *kollybos* was levied on each financial operation involving payments in bronze money instead of silver money. The system was that of a common payment currency, bronze money, and an official currency that was both a money of account and real money, the silver *denarii*. What is at stake is not a pure accounting process.[94] We have, instead, an exchange fee on all conversions from bronze to silver and conversely, as shown eloquently in the inscription of Pergamon, the other inscriptions of Asia Minor, and in very many contemporary Egyptian papyri.

The final proof comes with a decree of Mylasa of 209-211 CE. The text relates to fraud in money exchange and shows

[92] For a parallel from Ptolemaic Egypt, see *P.Eleph.Gr.* 8 (Edfu ?, 224-223 BCE), with the commentary of MUHS (2003) 87-88: it is a ταριχεύτης (mummifier) who contracts for the farming of the tax on mummification (ταριχεία).

[93] DIGNAS (2002) 198-199.

[94] *Pace* MARCHETTI (2014) 83-84.

how money exchange was part of the daily life of the inhabitants of the city. But it also proves that the revenue from the monopoly on money exchange was a major source of income for the city.[95] The notables in charge had to recall that even the payment of the taxes due to the emperors was delayed (ll. 52-53: καὶ διὰ τοῦτο καὶ ἡ εὐπ̣[ορία ἡ | πρὸς τοὺς κυρίους αὐ]τοκράτορας τῶν φόρων βραδύνει). Given that they were held personally responsible before the governor for the levy of these taxes, they exacted the harshest penalty against fraudsters, as their own liability was at stake.

3. Conclusion

In the ancient Greek world, coinage as a standard form of money was introduced in the second half of the Archaic period. Later, in the Classical and above all in the Hellenistic and Roman periods, it became the standard form of money. On the one hand, coinage initially helped to unify civic societies. But on the other, it soon also contributed to social stratification. Given the various forms taken by coinage (gold, silver and bronze respectively for high-, medium- and low-value payments), states were quick to realize that they could exploit not only the conversion from foreign currency into the local one, but also the transfer of value from one level of coinage to the other (bronze to silver and silver to gold or conversely). For a state, money exchange was a source of profit that it could exploit to its own benefit. In doing so, however, it also contributed to widening the gap between social strata. Money exchange is thus directly linked to the economy of inequality in the ancient world.

The rich lived in the world of gold or silver. They were on the right side. Notwithstanding the question of the super-privileged who had access to gold, those who traded in silver paid only the

[95] *IK* 34-*Mylasa* 605. I am presently preparing a new edition of this text, with new restorations.

moderate agios to convert their monies into gold. They even received a bonus when they converted their precious metal coins into bronze. The common people, who lived in the world of bronze money, were on the wrong side. They were constantly forced either to pay high premiums for silver coinage or to pay with bronze amounts defined in silver. A famous debate among economists on the nature of money concerns the question of whether or not money is a veil of exchange. Be that as it may, the image that comes to mind for the usage of money in the ancient world is rather that of a trawler that sucked money out of the pockets of the taxpayers, especially the poorest of them.

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DISCUSSION

S. Fachard: Lors d'une phase initiale du monnayage grec, les Athéniens, Samiens et Corinthiens auraient adopté le standard euboïque, dont Hérodote nous dit qu'il fut employé lors du versement du tribut en or au roi perse Darius (3, 89). Il semble dès lors que le standard euboïque a été utile, voire recherché pour des échanges de valeurs à large échelle, tout au moins dans une phase précédant la multiplication des divers standards. Est-il raisonnable d'imaginer l'existence d'une taxe de change entre monnaies (et poids) de différents standards dans la seconde moitié du VI^{e} siècle ? Les Eubéens auraient-ils bénéficié de l'attrait de 'leur' standard ?

A. Bresson: L'existence de zones d'étalon est un fait caractéristique de la fin de l'archaïsme et du début de l'époque classique, avant que, dans le cours du V^{e} siècle, l'usage de l'étalon attique ne vienne en quelque sorte "simplifier les choses". Sur cette base, peut-on observer une circulation privilégiée des monnaies d'un même étalon à l'intérieur d'une même zone ? Pour pouvoir avancer une réponse, il faudra consacrer une étude spéciale à cette question. Mais d'ores et déjà on possède plusieurs indices que les monnaies émises sur un même étalon dans plusieurs cités de la même région géographique pouvaient être utilisées indifféremment dans l'une ou l'autre de ces cités, ce qui pouvait procurer des économies sur le change. Quant aux monnaies d'étalons différents (de métal précieux exclusivement à l'époque archaïque), elles devaient certainement faire l'objet d'un change si la cité avait établi un monopole de circulation pour sa propre monnaie, si elle en émettait une — ou, à défaut si elle avait reconnu ce monopole à telle monnaie étrangère. À mon sens, c'est dès la phase du monnayage d'électrum (pour simplifier, à

partir de c. 650 av. J.-C. et jusqu'à l'introduction des créséides par Crésus, même si après cette date des monnaies d'électrum continuèrent à circuler) que la question du change dut commencer à se poser. Il n'est donc nullement surprenant de trouver un bureau de change à Thasos dans les premières décennies du V^e^ siècle (donc bien plus tard).

Pour ce qui est de l'étalon euboïque, avec son didrachme à 8.64 g, J.H. Kroll[1] a proposé d'y voir une légère augmentation du shekel babylonien à 8.40 g. Tel est en effet très exactement l'étalon des poids du IX^e^ siècle retrouvés sur le site de Toumba, près de la future Érétrie. Il paraît donc hautement vraisemblable que les Eubéens adoptèrent le système d'unité de poids des Babyloniens. Ils auraient ensuite légèrement augmenté le poids de leurs didrachmes à 8.64 g. C'est ce qui aurait permis la parfaite équivalence, relevée par Hérodote (3, 95), entre le talent babylonien et soixante-dix mines euboïques. L'hypothèse est séduisante. On notera qu'elle suppose des choix délibérés dans la définition des unités pondérales, choix fondés sur la simplicité des équivalences. J.H. Kroll suppose en outre que la recherche de compatibilité avec l'étalon babylonien devait être fondée avant tout sur la facilité de manipulation des métaux précieux. S'il en ainsi, on peut penser que, *a contrario*, l'échange des monnaies d'étalon euboïque avec les monnaies d'un autre étalon, par exemple, l'étalon éginétique, devait avoir un coût, et que particuliers et États étaient susceptibles de faire un bénéfice sur l'opération. Situées sur un axe privilégié de circulation maritime, les cités d'Eubée étaient idéalement placées pour faire des bénéfices sur de telles opérations. Cependant, pour le moment, il ne semble pas qu'on ait des informations sur la question.

G. Reger: Can you give a sense of the degree to which ordinary people who operated mostly in the bronze economy would have been affected by the agio imposed on silver-bronze exchanges?

[1] "Early Iron Age Balance Weights at Lefkandi, Euboea", *OJA* 27 (2008), 37-48.

A. Bresson: C'est là une question fondamentale. Tout d'abord, seuls les membres des catégories aisées pouvaient accumuler des pièces d'or et d'argent en quantités conséquentes. Les gens ordinaires (l'immense majorité de la population) vivaient dans le monde de la petite monnaie, c'est-à-dire du bronze à partir du tournant du V^e^ au IV^e^ siècle av. J.-C. Cela ne veut pas dire que les petites gens n'avaient aucun accès aux pièces d'argent, voire aux pièces d'or. Mais ils ne pouvaient en accumuler qu'en faibles quantités, et en outre, pour les plus pauvres d'entre eux, seulement de manière intermittente. La monnaie qu'ils manipulaient couramment était la monnaie de bronze, celle qui, pour les périodes à partir du IV^e^ siècle avant notre ère, constitue aujourd'hui la quasi-totalité des découvertes dans les fouilles ou les trouvailles fortuites.[2]

Au-delà de la question de la forme du paiement des taxes à l'État (comme c'est le cas avec les taxes dont le paiement était libellé en argent dans le monde ptolémaïque), la question fondamentale est celle de la nature des monnaies qui étaient manipulées par les différents acteurs. Dans le monde politiquement très fragmenté qu'était la Grèce, producteurs, marchands, et hommes d'affaires pouvaient être amenés à changer des pièces étrangères contre des pièces locales. Mais même le petit commerce devait sans cesse avoir recours au change. Changer des monnaies n'était pas, comme cela serait le cas aujourd'hui, un acte relativement peu fréquent pour l'utilisateur ordinaire. C'est l'inverse qui semble avoir été la règle : pas de marché ou autre lieu de vente sans changeur. C'est la raison pour laquelle les banquiers-changeurs (*trapezitai*) installaient leurs tables (*trapezai*) sur les agoras, et pas seulement à l'*emporion*, pour le commerce de gros. Les *Évangiles* (Matthieu 21:12 ; Marc 11:15 ; Jean 2:15) ne manquent pas de souligner que, au côté des marchand installés sur le parvis

[2] Pour la part des monnaies de bronze dans les fouilles archéologiques, à l'agora d'Athènes et ailleurs, cf. CALLATAŸ, F. DE, "Greek Coins from Archaeological Excavations: A Conspectus of Conspectuses and a Call for Chronological Tables", in P.G. VAN ALFEN (éd.) (2006), *Agoranomia. Studies in Money and Exchange Presented to John H. Kroll* (New York), 177-200.

du Temple, se trouvaient des changeurs. Deux séries de raisons expliquent ce recours permanent aux changeurs.

D'une part, la diversité des monnaies qui parvenaient dans une cité nécessitait d'avoir recours à des changeurs pour établir la valeur des diverses espèces. Une étude menée sur la petite cité d'Iasos, au sud-ouest de l'Asie Mineure, illustre cette diversité de manière éloquente.[3] De même, les bronzes trouvés à Priène, dont un tiers étaient d'origine étrangère, montrent bien l'ampleur du problème.[4] Les petites monnaies étrangères pouvaient-elles circuler dans les cités, éventuellement avec une décote, en parallèle à la monnaie de la cité ? La réponse à apporter n'est sans doute pas partout la même, mais c'est une hypothèse à envisager sérieusement, surtout (mais pas seulement) pour l'époque impériale.

D'autre part, et de manière générale, les détaillants, qui achetaient leurs denrées auprès des producteurs ou autres intermédiaires, devaient inévitablement le faire en payant avec des monnaies d'argent de valeur élevée. Pour les obtenir, ils devaient changer contre de grosses unités les grandes quantités de petite monnaie que leurs clients leur avaient laissées pour payer leurs achats. Aussi longtemps que cette petite monnaie fut en argent, on peut supposer que l'agio de change fut modeste. Les choses changèrent avec l'introduction d'une petite monnaie de bronze (à partir de la deuxième moitié du V^e^ siècle mais à des dates variables selon les cités). L'introduction de la monnaie de bronze et la diminution de valeur qui était liée à son caractère purement fiduciaire eurent certainement pour conséquence une élévation importante de l'agio de change (on a vu qu'en Égypte ptolémaïque il était autour de 10%). Réciproquement, les acheteurs devaient eux aussi disposer de petite monnaie pour payer leurs achats sur l'agora. S'ils n'avaient pas de pièces de bronze, par

[3] Voir DELRIEUX, F. (2016), "La circulation monétaire à Iasos dans l'Antiquité d'après les monnaies grecques et provinciales romaines trouvées dans la cité depuis 1960 : introduction et catalogue", *Bollettino dell'Associazione Iasos di Caria* 22, 6-15.

[4] Voir THONEMANN, P. (2015), *The Hellenistic World. Using Coins as Sources* (Cambridge), 134-138.

exemple parce que leur paie avait été versée sous forme de pièces d'argent de valeur plus importante, c'était peut-être leur intérêt de passer par un changeur plutôt que d'échanger leurs pièces d'argent au moment de faire leurs achats auprès de divers revendeurs. L'inscription de Pergame *OGIS* 484 (ll. 16-22) avec le cas des marchands de poisson, montre même que les acheteurs de petit poisson au poids, ou ceux qui voulaient acheter en plus grosses quantités pour ensuite se répartir les parts de l'achat, n'avaient pas l'autorisation de payer en pièces d'argent mais avaient obligation de passer par un changeur pour payer en pièces de bronze, en l'occurrence pour que le montant de la taxe de change prélevée par la cité soit préservé.[5]

S. von Reden: I would like to ask you about your explanations of the Ptolemaic monetary policy at the end of the 3rd century BCE. You suggest that the introduction of a decimal system in the Bronze coinage facilitated the new exchange rates between silver and bronze (p. 16 of the draft paper) and you imply a little that this was its motivation. But I am surprised that you do not consider the interests of the local Egyptian population in your explanation of the monetary reforms of 197 BCE. I am not talking about the poor Egyptians who paid rents and small taxes, but rather the powerful temple elites who by the end of the 3rd century BCE were fully involved in the monetary economy of the Ptolemies (through their receipt of *syntaxeis*, the monetized *apomoira*, their own agrarian and commercial activities, and so on). We know from demotic papyri that they continued to calculate in *deben* and *kite,* which was a monetary system based on decimal units. Is not possibly the new way of calculating the value of bronze coins (some would call it the Bronze standard) a concession to local Egyptian monetary traditions? Or would you explain the Ptolemaic monetary policy entirely in 'Greek' 'colonial' terms?

[5] Voir MACRO, A.D. (1976), "Imperial provisions for Pergamum: *OGIS* 484", *GRBS* 17, 169-179, et mon article *BCH* (2014), p. 531.

A. Bresson: Je retiens pleinement cette suggestion, qui est très heureuse. Le système décimal étant traditionnellement celui des Égyptiens, il faut voir là plus qu'une simple commodité de la part des autorités ptolémaïques. Mais j'irai même plus loin. En effet, on peut se demander si, outre son intérêt pratique pour la comptabilité, puisque les Égyptiens utilisaient traditionnellement le système décimal, le nouveau système (décimal donc) ne fut pas également une concession politique faite aux Égyptiens, dans une période où le royaume se trouvait en grande difficulté. Le décret de Memphis de 196 (la pierre de Rosette, *OGIS* 90) n'est rien d'autre qu'une longue liste de libéralités (dons aux temples, remises de dettes, remises de taxes, etc.) faites aux Égyptiens et en fait tout particulièrement aux prêtres (*inter alia*, par exemple, ll. 16-17, la fin de l'obligation annuelle faite aux prêtres de se rendre à Alexandrie). Le tournant du III^e^ au II^e^ siècle fut une période de crise par le royaume ptolémaïque, où l'on finit par se battre non seulement en Haute Égypte mais aussi dans le Delta, presque aux portes d'Alexandrie. Il est alors bien possible que le passage au système décimal ait été l'une de ces concessions que Ptolémée V ait dû faire pour se rallier les élites indigènes. En revanche, pour les raisons évoquées plus haut, je préférerais éviter de parler de 'Bronze standard'.

N. Purcell: I have two questions about what ancient political agents thought they were doing in these areas. Do you think that ancient political agents were conscious of the disadvantage to the urban poor of the penal exchange system which you outlined? How generally understood was the relationship between exchange regulation and inter-regional movement? The special arrangements advertised, for instance, by the Olbians seem to suggest that the link was indeed perceptible, in which case many other cities appear to have been much less concerned about encouraging mobility.

A. Bresson: Certainement l'anecdote rapportée par Théophraste dans les *Caractères* ou bien le décret de Gortyne ne laissent aucun doute sur le fait que les gens ordinaires avaient

pleinement conscience de ce que l'existence d'un monnayage fiduciaire de bronze représentait un désavantage pour ses utilisateurs. Pour le second point, celui de l'impact de l'utilisation des monnaies de bronze sur les échanges inter-régionaux, c'est là une question qui en elle-même mériterait une étude spécifique, en particulier sur la base des nombreux travaux récents sur la circulation des monnaies de bronze, par exemple dans l'Asie Mineure hellénistique et impériale. Le décret d'Olbia du IV^{e} siècle enjoint en effet à tous les utilisateurs, y compris donc aux commerçants et autres étrangers de passage, d'utiliser non seulement l'argent mais aussi le bronze de la cité. Mais en allait-il toujours ainsi ? Et peut-on dire que la règle était d'emploi universel ? Encore une fois seule une étude synthétique sur la base des monnaies de fouille permettra d'apporter une réponse ferme, comme je l'ai suggéré plus haut. Mais il est probable que la situation monétaire était souvent plus complexe qu'on ne pourrait le penser au premier abord. Quant à un impact négatif de l'existence d'un numéraire de bronze sur le commerce inter-régional, je ne pense pas que cela ait pu être le cas car ce commerce s'effectuait sur la base d'un numéraire d'or ou d'argent.

R. Veal: I have three questions. First, were bankers metallurgists? Then — is it possible to estimate how much money was raised from manipulation of currency, vs overt tax and rent collection? Meaning — how important was debasement as a sort of fund raiser, and if it was important, wouldn't a lot of resources have been put into making it work each time — labour materials, and *fuel?* And, on a related issue — you mentioned casting was 'more efficient' — is it possible to qualify this? I can understand that it was a one-step process (so perhaps quicker than making metal blank sheets, then striking (two steps), although this process I am sure would have been efficient too. Would it be economically advantageous? I surmise that casting, which requires melting, may require more fuel (and time to reach the temperature) than recycling heated (to malleable) copper alloy, which is then struck?

A. Bresson: Les banques du monde grec pratiquaient pour leurs clients le change des monnaies, la garde des dépôts qui leur étaient confiés ainsi que des opérations financières de diverse nature, en particulier les paiements par virement d'un compte à un autre. Ils ne travaillaient pas les métaux, à la différence des orfèvres ou des sculpteurs sur bronze.

Estimer le coût final de chacune des manipulations monétaires effectuées par les Ptolémées est probablement pour le moment hors de notre portée. À la différence de ce qu'il en est pour l'époque médiévale, nous ne disposons d'aucune archive d'un atelier monétaire qui nous permettrait de faire les calculs nécessaires. Il est vrai que le retrait des pièces existantes puis la frappe et la mise en circulation des nouvelles espèces avaient un coût. En termes de métal, cependant, si une grande partie des monnaies précédemment en circulation revenait dans les caisses de l'État, le métal n'était pas perdu et pouvait être refondu. Restait le coût de la fonte du métal, celui de la fabrication des flans et celui de la fabrication des flans proprement dite. Mais même s'il s'agissait en l'occurrence de monétaire de bronze, c'est-à-dire de monnaie de faible valeur, il reste probable que l'opération restait bénéficiaire sinon pour les particuliers, mais pour l'État, puisque c'est lui fixait le cours du change de l'ancienne monnaie contre la nouvelle.

Quant aux monnaies moulées, pour ce qui est de l'Égypte la technique fut employée par les Ptolémées au I^er^ siècle av. J.-C. et par l'État romain à l'époque tardo-impériale. La qualité des monnaies produites s'en ressentait fortement. Mais le recours à cette technique dans ces deux périodes laisse penser que le coût cumulé était largement inférieur à la valeur des monnaies frappées. Sur ces questions, on renverra aux ouvrages de Duyrat et Picard (2005) et Faucher (2013), cités dans la bibliographie.