

Weighing up the coinage reform of Ptolemy Philadelphus

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Within ten days from that on which they take up the contract, let the collectors in the market be announced in the customs-house, writing the law of the [contract] in Greek and in Egyptian script.²

The drafters of the first document in the famous ‘Revenue Laws’ papyrus took care in in the late 260s BC that the procedures governing the letting of a tax-collection contract should be published in the Greek and native scripts. Very specifically, this was the contract for the collecting of taxes paid in money, not in kind.³ When it came to fiscal matters there should be no room for confusion between the State, its Greek-speaking agents and the local officials and tax-payers who implement and are subject to the State’s impositions. In this paper I will argue that a similar concern for transparency on both sides of the cultural divide can be seen in the contemporary reform of the bronze coinage by Ptolemy Philadelphus.

Although the focus will be on the reform of Philadelphus, it is necessary to set this in context by taking a look first at the monetary reforms of Ptolemy Soter. As is well known, Soter closed the currency circulation area of the core of his kingdom to foreign silver coin. The processes by which he did this, their chronology, and the results observable in the hoard evidence have been the subject of three recent articles by Catharine Lorber,⁴ and I need only summarise her conclusions here.

Ptolemy I maintained the production of Attic weight silver coinage until very shortly before he took the royal title in 305 BC. By this time he had already altered the designs from the Herakles head/seated Zeus types used by Alexander the Great to a depiction of Alexander in an elephant-scalp on the obverse and Athena Promachos on the reverse. In 305 he seems to have reduced his silver weight standard by removing 2 Attic obols from the tetradrachm to bring it down to c. 15.70g. Roughly a decade later, c. 295/4 BC, a combined reform of typology and weight standard saw the introduction of the familiar portrait-type tetradrachms and a new weight standard of c.14.25g. The hoard evidence suggests, as Lorber notes, that the ban on import of foreign coin probably coincided with the first reform and reduction of standard in 305 BC. It is less clear, however, how quickly Attic weight coinage was removed from circulation thereafter. There is some evidence for Attic and reduced weight coins being hoarded together, but we do not have sufficient to determine for how long significant quantities of Attic weight coinage remained in the hands of private individuals. Needless to say, it was in the state’s interest to restrike it all as quickly as it could get its hands on it.

That is the picture for the precious metal. But what of the bronze? The first series of bronze struck by Ptolemy Soter bore the name of Alexander, and consisted of two denominations with identical types: the head of Alexander wearing a *mitra* on the obverse and an eagle with open wings on the reverse (Series 1). In an important metrological study, to which I shall refer repeatedly, Daniel Wolf has shown that these two denominations exist in a tight metrological relationship of 1:4, with mean weights of 0.936g and 3.984g respectively.⁵ This seems to support what had long been assumed about these denominations, that they represent the *chalkous* and the *tetrachalkon* (or hemiobol). Since these coins

¹ My thanks are due to Gilles Gorre and Andrew Monson for their comments and for sending me drafts of their own work in advance of publication, as well as to Cathy Lorber for the privilege of being able to see her forthcoming corpus of Ptolemaic Coinage before its much anticipated appearance. I am also very grateful to Dan Wolf for permission to reproduce his charts 000. References to Ptolemaic bronze coinage throughout this paper follow the system established by Lorber, Picard and Faucher: see most recently PICARD and FAUCHER 2012.

² *TM* 8859 = *P. Rev.* 9. 1-5: ἀφ’ ἧς δ’ ἂν ἡμέρας τὴν ὄνην παραλάβωσιν, | οἱ ἐν τῷ ἐμπορίῳ λ[ο]γεύονται [ἐκ]τιθέτωσαν | ἐ[ν] τ[ῷ] τελωνίῳ ἐν ἡμέρα[ις] δέκ[α] / τὸν τ[ῆ]ς | [ὄνη]ς νό[μον] γράψαντες γράμμασιν ἑλλη[νικοῖς τε] | [καὶ ἐγχ]ωρίοις.

³ On the nature and context of this text see the discussion of BINGEN 2007, pp. 157-188, esp. 163-5.

⁴ LORBER 2005b, 2012a and 2012b.

⁵ WOLF 2013, p. 87, Table 1.

were struck in Alexander's name they probably predate Ptolemy's assumption of the diadem in 306/5 BC. A *terminus post quem* is perhaps provided by the choice of reverse type which echoes the badge that began to appear on the silver on Zervos (1967)'s series XII of the silver coinage, probably to be dated c. 315 BC.⁶ A range of c. 315-306/5 BC thus ensues for this first Ptolemaic bronze coinage.

A reform of this bronze took place, probably c. 305 BC, when the coinage shifted to being signed in Ptolemy's own name. As Lorber has pointed out, this new coinage, Series 2, shares control marks with some of the earliest reduced weight tetradrachms of the Alexander/Athena Promachos type. It thus seems likely that this reform of the bronze to new types in the name of Ptolemy coincided with the reduction of the weight standard of the silver and the closing of the core Ptolemaic territories to foreign coinage, and that this occurred around 305 BC.⁷

Here we may inject a new observation which can now be made on the basis of excavation finds from Alexandria and Herakleion.⁸ These have shown that there seems to be a period after the arrival of Alexander in Egypt when foreign Greek bronze circulated freely, and quite probably in significant quantities. But at some point late in the 4th century this free circulation stopped. It cannot currently be proved, but it seems highly likely that when he closed his kingdom to precious metal coinage, Ptolemy Soter also closed it to foreign bronze. Bronze Series 2 would thus be the new coinage that accompanied this reform.

Nonetheless, the coinage of Series 2 initially (Series 2, Groups A-C) shows little change from its predecessors. As Wolf has shown, the two existing denominations (*chalkous* and *tetrachalkon*) continued to be struck at the same weights. The only difference, apart from the legend, is that Alexander is shown with longer hair. However, these two denominations were joined by what appears to be a third denomination. Previously undetected (it's types are identical to the *chalkous* and *tetrachalkon*), its existence has been inferred by Wolf (2013: 56-7) from metrological analysis. Just as the *chalkous* and *tetrachalkon* exist in a strict relationship in the first groups of Series 2, so a third population corresponding precisely to a *pentachalkon* can also be observed.

The final bronze reform of Ptolemy I, can be seen on the basis of shared control marks to have coincided with the introduction of the portrait silver c. 294 BC.⁹ This reform (Series 2, Groups D-H) saw a widening of denominational ranges to include as an early, though apparently quickly discontinued experiment, a *dichalkon* (with the familiar long-haired Alexander/eagle types), and then the introduction of three larger denominations with new obverse types: an *obol* (Alexander in elephant scalp), a *diobol* (Zeus laureate) and a *triobol* (portrait of Ptolemy). Once more, the metrological work of Wolf has demonstrated that the mean weights of the two of these denominations with sufficiently large samples to say are in direct proportion to their value in *chalkoi*: the *obol* has a mean weight of 8.28g (165 specimens, implied *chalkous* 1.03g); the *diobol* 15.43g (558 specimens, implied *chalkous* 0.96g).¹⁰

These new, larger denominations in fact supplanted the production of smaller denominations at the mint. The last years of Ptolemy Soter's reign, and the first twenty or so years of Philadelphus' saw only the production of *obols*, *diobols* and *triobols*. We may thus characterize this final reform of Soter initially as an expansion of the denominational system, but ultimately as a shift upwards in denominational value. For whatever reason, the state ceased to need to issue small change in the *chalkous* range, and focused instead on higher denominations in multiples of the obol. As Thomas Faucher has demonstrated, this movement to larger denominations and flan sizes brought with it new technological challenges to the

⁶ So PICARD and FAUCHER 2012, p. 23. For a slightly later starting date of c. 313/2 BC see LORBER 2005, p. 63.

⁷ LORBER 2005b, pp. 49ff, followed by PICARD and FAUCHER 2012, p. 25.

⁸ For the general point see FAUCHER 2010b p. 438. For the excavation material, MEADOWS 2014b, pp. 231-2.

⁹ For the date see LORBER (2012a)

¹⁰ WOLF (2013) 58-59 for discussion, with 89-93, Table 1. The *dichalkon* may in fact be a *trichalkon* (26 specimens with a mean weight of 2.63g); the weight of the *triobol* remains elusive, due to small sample size, though 4 specimens yield a mean weigh weight of 21.5, with an implied *chalkous* of 0.9g, which is close enough to be suggestive that this also fits the pattern.

mint, requiring the development of new techniques of production.¹¹ From an economic, administrative and practical point of view, this reform was no trivial matter.

But in the late 260s this entire system was swept aside. A radical reform of the coinage took place with the introduction of Series 3 that again changed its appearance, fabric, denominational structure and, as Wolf has now clearly shown, metrology. The date of this reform can be determined with a reasonable degree of likelihood as falling between c. 263/2 and 261/0 BC.¹²

The matter has been debated, but there were probably seven denominations within this new Series 3 coinage, and prior to Wolf's analysis a consensus had been reached on the basis of the apparent metrological and modular relationships between them that these consisted of a series in the following ratios to one another 1, 2/3, 1/3, 1/6, 1/12, 1/8, 1/24, and that we may cash these in denominationally as *Drachm*, *Tetrobol*, *Diobol*, *Obol*, *Tritartemorion* (3/4 *obol* or *hexachalkon*), *Hemiobol* (*tetrachalkon*) and *Tetartemorion* (1/4 *obol* or *dichalkon*) (Table 1). Wolf's collection of the data shows once again that there is a strong correlation between the denominations and their weights. There is some variation, but we must bear in mind that sample sizes are low. Overall the regression plot for Series 3 has a slope of 1.446g per *chalkous* at Alexandria (see here Fig. 1), while that for the provincial mints is 1.428g.¹³

¹¹ FAUCHER (2013), 195-7.

¹² See the discussion of PICARD and FAUCHER 2012, p. 37. The absence of Series 3 coinage from the Ptolemaic camp at Koroni in Attica, abandoned in 263/2 provides an upper limit. Series 3 could have begun in this year, but probably not much earlier. 261/0 BC saw changes to the nature of Ptolemaic precious metal coinage in Phoenicia, which might be part of the same reform, or a slightly delayed provincial adjustment, and supplies the lower limit.

¹³ WOLF 2013, 64-67 with 98-102, Table 2.

Denomination	Diameter	Mean weight	Obverse	Reverse
Drachm	42mm	68.65	Zeus Ammon	2 eagles, wings closed
Tetrobol	36mm	45.38	Zeus Ammon	Eagle, wing open
Diobol	30mm	21.72	Zeus laureate	Eagle, wing closed
Obol	24mm	10.90	Alexander in elephant scalp	Eagle, wing open
Tritartemorion	20mm	6.92	Alexander in elephant scalp	Eagle, wing open
Hemiobol	18mm	4.81	Zeus Ammon	Eagle, wing open
Tetartemorion	16mm	3.20	Zeus Ammon	Eagle, wing open

Table 1. The Series 3 coinage of Ptolemy Philadelphus¹⁴

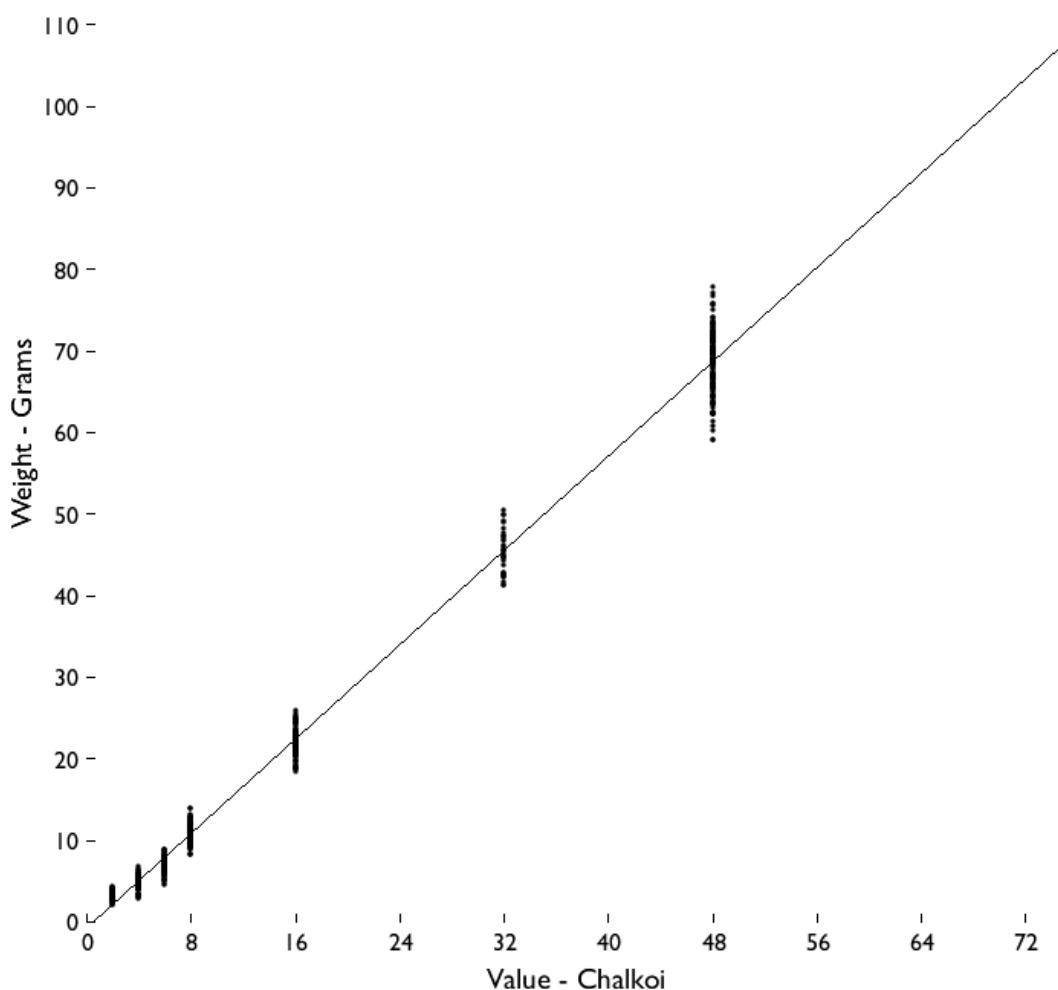


Fig. 1. Regression plot for Series 3 bronze of Alexandria (from WOLF 2013, p. 65)

Interestingly, although it takes us beyond the chronological scope of this paper, similar results appear for the next two series of heavy bronze, Series 4, struck between c. 240 and 220 and Series 5, struck from c. 220-c. 200 BC.¹⁵ Here the slopes of the regression plots are 1.436g per *chalkous* and 1.45g

¹⁴ Typological descriptions and diameters are based on LORBER 2018. Mean weights are from WOLF 2013.

¹⁵ For the identity and dates of these series see PICARD and FAUCHER 2012, pp. 43-52; for the metrology WOLF 2013, 67-80 and 102-112, Graphs 13 and 22 and Tables 3 and 4

respectively. For this last series, Wolf is also able to assemble sufficient data to plot the distributions at provincial mints in Tyre and Cyprus. For these the slopes are at 1.444g and 1.487g per *chalkous* respectively. So we have an approximate range of 1.43-1.49g for the post-reform *chalkous*. At 48 *chalkoi* per drachm, this suggests a range for the bronze drachm of roughly 69-69.5g at Alexandria and 69-71g in the provinces.

Before we examine the significance of this metrological reform, it is important to set it in the broader context of the reform of the coinage that took place at this time. We may characterize it in a number of ways. First, as we have noted, it marks a further move up the denominational scale. The *drachms* of Series 3 were the largest coins that had yet been produced. The lowest denomination, the *chalkous*, has completely disappeared. The smallest payment that the state was now interested in making or, perhaps, facilitating was at the level of the *dichalkon* or quarter *obol*. The *chalkous*, a unit that was of considerable significance and widely produced elsewhere in the Greek world, had thus been abandoned.

Second, we should note the change in iconography. Towards the end of Series 2 the *diobol* and the *obol* had come increasingly to the fore and, as excavation finds suggest, made up a substantial part of the circulating stock.¹⁶ The types of these two coins, as well as of the *chalkous*, were distinct. They shared the same reverse type of an eagle on thunderbolt with wing open, but differed in their obverse designs (Laureate Zeus, Alexander in elephant scalp, Alexander diademed), which visually clarified their identities. In series 3, things become more complex. There are differences in design that help to clarify the identity of denominations up to a point, but the decision was taken – perhaps curiously to our eyes – to give two adjacent pairs of denominations identical designs: the *obol* and *tritartemorion/hexachalkon* (Alexander in elephant scalp) and the *hemiobol* and *tetartemorion/dichalkon* (Zeus Ammon). This was not as helpful as it might have been, and perhaps suggests that users relied on more than designs in their identification of the value of coins in circulation.

Third, we can see that there was a fundamental change in production process. Series 3 and later series of Ptolemaic coinage are distinct from earlier coinages, and almost all other Greek coinages, in having a small round indentation in their flan, close to, but not always at the centre of the obverse and reverse faces. There has been much discussion of the nature and function of these holes, but Faucher has, to mind, summed up the most plausible explanation in recent book on Ptolemaic minting.¹⁷ The indentations are the result of a process that smoothed the face of flans that had been produced in moulds, before they were struck. On the one hand this innovation came at the end of an apparent period of change in production technique that saw a shift from cutting blanks from bars of bronze to, earlier in the reign of Philadelphus, the practice of casting individual flans and hammering them to remove traces of the moulds. On the other, it was probably also the result of the introduction of the new, much larger module bronze coins. A method was developed to provide a smooth surface for the striking of these technologically challenging new denominations, but, interestingly, was equally applied to the small denominations. It is important to stress this technological development. It can seem a curiosity, the sort of bizarre quirk that can only be of interest to the numismatist. But it reveals, in fact, a major innovation, serious experimentation, planning and implementation on the part of the Ptolemaic chancery and mint. These holes reveal to us an undertaking with a serious purpose. As Faucher (2013, pp. 257) has summarised it, “In the new monetary system, Philadelphus, the *Dioiketes* or the person in charge of the monetary aspect of the king’s reforms sent orders to the mint officials containing at the same time instructions on the weights, dimensions and alloy of the coins, as well as, perhaps, practical instructions for the creation of the objects that were required.”

This brings us back to the question of the weights of these new, post-reform coins. As we have seen, the *chalkous* on which this new system was based weighs within the range of 1.43-1.49g. As we have also seen, it seems absolutely clear that the pre-reform *chalkous* of Series 1 and 2 weighed around 0.96g. As Wolf (2013, pp. 80-81) has pointed out, this suggests that the weight standard of the *chalkous* increased as a result of Philadelphus’ reform by 50%. Such an increase of *chalkous* of 0.96g would give a new

¹⁶ PICARD and FAUCHER 2012, p. 26.

¹⁷ FAUCHER 2013, pp. 242-257

chalkous of 1.44g. The empirically observed figures are impressively close to this: 1.446g for Series 3 at Alexandria. But we should not let this neatness distract us from the fundamental oddity of this reform. To increase a weight standard by 50% goes against all financial common sense, and a considerable body of evidence for monetary practice in the ancient world. States tend to reduce weight standards, gradually over time, as a means of squeezing more liquid capital out of a lower outlay of resource. This is obvious, and can be seen in the behaviour of countless ancient states, including Ptolemaic Egypt in the reduction of its silver standard outlined above.

An increase of weight standard strongly suggests that this reform in the 260s was motivated not by a desire to create additional cash through manipulation of the coinage, but rather that the reform has another purpose, that was about facilitating fiscal and/or economic activity in different ways. Added resource was being provided to the production of the coinage through this increase in weight, and this goes hand in hand with additional care that was being taken in its manufacture. To try to offer an explanation for this concern, we must turn back to the structure of Series 3 (Table 1). The new coinage was provided with a long array of denominations. In fact, there is probably no similarly long series of bronze denominations in any other ancient coinage before this, or after. And the contrast should be made not just with other Greek and Roman coinages, but specifically with what had gone before in Ptolemaic Egypt, where a two denominational bronze system had, for the most part, sufficed.

It is difficult to resist the conclusion that this new system was intended to facilitate payments at a different range of levels than had previously been the case. In the first place, since these coins were issued by the state, these will have been state payments. But this will also have had a knock-on effect within the monetary economy, and we cannot ignore the possibility that this too was a deliberate, if secondary intention on the part of the reformers.

Before returning to this point, it is important first to focus on the actual weight standard chosen. At the upper level, the highest denomination appears to have been the *drachm* (an *octobol* did appear at some point, but the chronology of this remains obscure, and production was sporadic).¹⁸ This new bronze *drachm*, as we have seen, had a theoretical weight between c. 69g and 71g. This was a deliberate choice: what lay behind it? I suspect the answer to this question may lie in similar metrological and monetary reform on the Egyptian side of the Ptolemaic kingdom, and for this we need to turn to texts.

From at least the late 5th century onwards, it is now clear that there was an established relationship in Egypt between coinage and the native unit of weight, the *deben* (made up of 10 *kite*). Demotic ostraka from Ayn Manâwir published by Michel Chauveau (2000) contain contracts that include sums of money. Two of them include penalty clauses. One of these, signed by a sharecropper, provides that

“If I fail to meet the terms written above then I will give you five staters which equal one deben of silver which are worth 5 staters again.” (*O.Man.* 661).

Another, concerning a liturgy, appears to read

“if I withdraw from providing the described services I will give you 3(?) staters, [which equal 6 kite of silver], which make 3(?) staters again.” (*O.Man.* 733).

A loan of silver begins as follows

“You have on account with me one stater which equals 2 kite of silver which makes one stater again” (*O.Man.* 820).

The first two documents date to 410 and 400 BC respectively, the third to somewhere between 417 and 387 BC. As Chauveau has pointed out, these are the earliest references to staters in Egyptian texts, and as has been seen since their publication, the staters in question must be Attic weight.¹⁹ The equivalences are laid out in Table 2.

Egyptian Weights

Coins

¹⁸ See LORBER 2000, pp. 73-4. For further discussion of this denomination see PICARD and FAUCHER 2012, pp. 36-7.

¹⁹ Another *ostrakon* (*O. Man.* 7547), published since CHAUVEAU’s original article (2000), raises the possibility that the term ‘stater from the treasury of Ptah’ was being used in 412 BC to refer to imitation Attic tetradrachms of local production. See AGUT-LABORDERE 2014, p. 80.

1 deben	10 kite	5 staters
0.8 deben	8 kite	4 staters
0.6 deben	6 kite	3 staters
0.4 deben	4 kite	2 staters
0.2 deben	2 kite	1 stater

Table 2. *The relationship between deben, kite and staters in the demotic documents*

In ideal terms the Attic stater weighs around 17.4g, so the deben here is being equated to around 87g, somewhat less than the weight that is otherwise attested for this of around 91g. As Chauveau notes, this may be a sign that coined silver passed at a premium over raw silver.²⁰

What matters for our purposes is that we find for the first time in these documents, an equivalence established between staters and deben of silver. And we also find the beginning of the use a formula that will become standard, down into the early Ptolemaic period: ‘ x staters of silver which makes $5x$ deben of silver which equals x staters again’.²¹ Throughout the 4th century the Athenian stater or tetradrachm will have been a common, no doubt the most common coin in Egypt. Dies found in the Delta prove that they were produced there, hoards show that they circulated there, and countermarking, particularly the intriguing use of the hieroglyphic ‘*nefer*’ may suggest that they achieved official recognition.²²

But, as we have seen, around 305 BC Ptolemy I closed his currency system and lowered the weight of the stater. Obviously this reduction in standard should have affected convertibility with the *deben*, since 5 silver staters no longer weighed 87g. Interestingly, however, the formula expressing this equivalence continues in use unchanged. To cite just one example, a sale of land from 1 *Tybi* of the 24th year of Ptolemy III (15th February 223 BC) contains penalty clauses reading:

“If I fail to act for you in conformity with every word aforementioned, I shall give to you 10 (*deben*) of silver, that is 50 staters, making 10 (*deben*) of silver again.”

“If you yourself fail to act for you in conformity with every word aforementioned, you shall give to me 10 (*deben*) of silver, that is 50 staters, making 10 (*deben*) of silver again.”²³

There are, broadly speaking, two ways to explain this curiosity. Brian Muhs, who also noticed this problem, suggested that “for most of the early Ptolemaic period the Demotic units no longer had any relation to their theoretical weights and simply were units of accounting”.²⁴ In other words the *deben* of the demotic texts post 305 BC is just a theoretical unit of account with no correspondence to a weight standard in use, or any physical form of monetary unit. This is possible, but an obvious alternative is that the weight of the deben was decreased in line with the weight of the stater. Since the stater of the final Ptolemaic silver standard introduced c. 294 BC weighed c. 14.20-14.24g, this would imply a reduced-weight *deben* after that date of 71-71.25g.

With this in mind, we may return to the Series 3 coinage. As we saw from Wolf’s metrological analysis, the implied weight of the bronze drachm, on the basis of his empirical analysis of surviving specimens is between 69 and 71 grams. These numbers look sufficiently close to suggest that that new bronze drachm created by Philadelphus’ reform of the 260s was tariffed at the new deben created by the reform of c. 294 that established the silver standard of 14.25g. This in turn would suggest that Philadelphus sought to make his bronze coinage conform to an Egyptian weight, and would help to explain why

²⁰ CHAUVEAU 2000, p. 142 n. 14. Cf. AGUT-LABORDERE 2014, pp. 82-3.

²¹ For an overview see MARESCH 1996, 34-6. The formula is confined to demotic documents. The Jewish community at Elephantine, in documents broadly contemporary with the Manâwir ostraka, expressed an equivalence between Greek staters, Babylonian shekels and the Persian *karš*. See GRELOT (1972) nos, 6, 7 and 53 (TM 89475, 89476, 89464), of 407, 400 and 402 BC.

²² Dies: MEADOWS 2011. Hoards: DUVRAT and AGUT-LABORDERE (this volume). Countermarks: VAN ALFEN 2002b.

²³ P. BM 10388 = P. BM Andrews 2 = TM 2730, 7-8

²⁴ MUHS 2005a, p. 24.

Philadelphus raised the weight standard of his bronze *chalkous* by 50%. This is a bold reconstruction, but it may help us to make sense of the other real oddity of the Series 3 coinage, which is the precise ratio of denominations to weight.

If a bronze coinage is truly fiduciary, as we assume most Greek coinages to have been, there is no need for the weights of its denominations to be in precise proportion to their relative values. We can see this fairly clearly by taking a look at the mean weights of the bronze coinage of Alexander the Great. Figs. 2 and 3 show the metrology of the three main denominations recorded in the catalogue of the British Museum collection (PRICE 1991). Precise identification of ratios of value is not ascertainable, and the identification of denominations is resisted by Price. This, of course, is already a sign that the value of these coins cannot be calculated straightforwardly from their weight. For the sake of demonstration we might posit two possible sets of identifications: *chalkous*, *dichalkon* and *tetrachalkon* (Fig. 2); *chalkous*, *trichalkon* and *tetrachalkon* (Fig. 3). It is quite clear from the charts that the mean weights of the coins are not proportionately adjusted and so are unlikely to be related to their tariffed value.

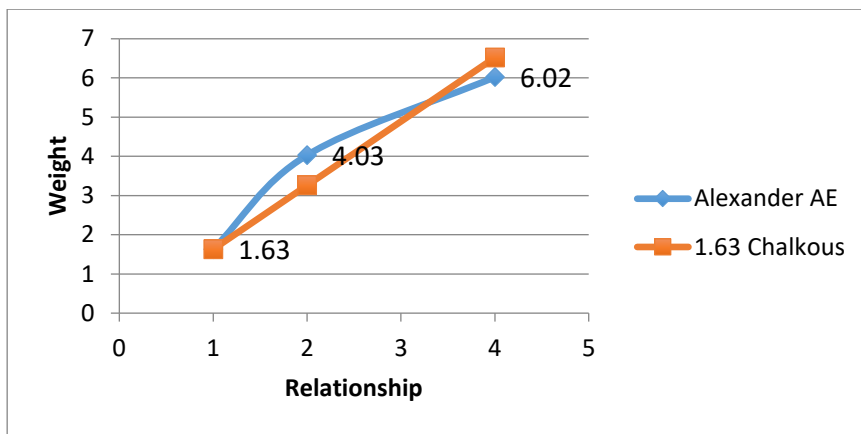


Fig. 2. Mean weight of three bronze denominations of Alexander coinage (assuming 1:2:4 relationship)

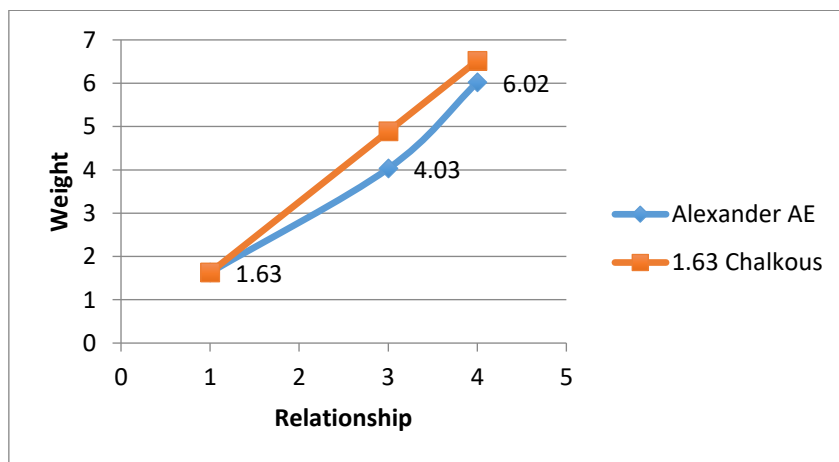


Fig. 3. Mean weight of three bronze denominations of Alexander coinage (assuming 1:2:4 relationship)

A similar result emerges if we turn to another well-attested coinage and plot the period 2 bronze issues of the city of Athens against a theoretical weight (Figs. 4-5), using the data published from the Athenian Agora (KROLL 1993), and assume the most likely tariffed ratios of either 1:2:4:6 (Fig. 4) or 1:2:4:8 (Fig. 5).

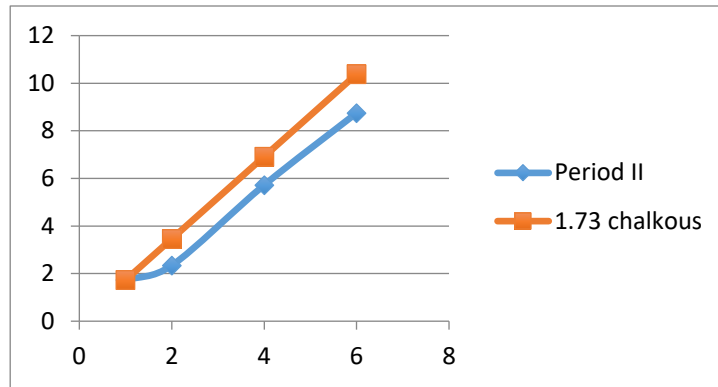


Fig. 4. Mean weight of Athens period 2 bronzes (assuming 1:2:4:6 relationship)

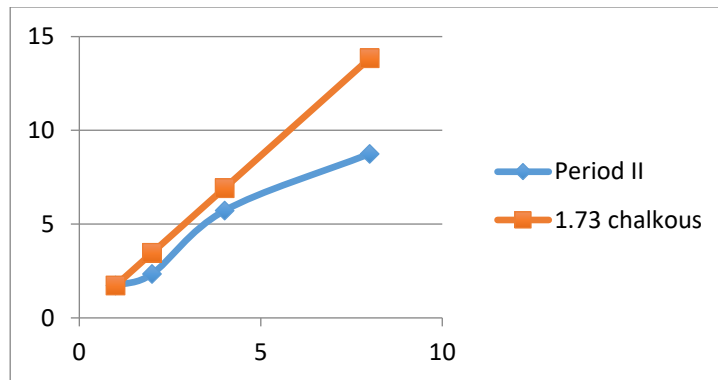


Fig. 5. Mean weight of Athens period 2 bronzes (assuming 1:2:4:8 relationship)

Once more, there is no neat, straight line as we see with the Series 3 Ptolemaic bronze (Fig. 1). The weights of Alexander's and Athens' bronze coins may be *indicative* of their value, but they do not precisely *correspond* to it in the way that the Ptolemaic coinage does.

Thus, the attempt of the Ptolemaic authorities to make all their bronze coins 'weigh what they should' within the denominational system, looks as if it was designed to make it possible for these coins to function in a system where weighing coins (whatever their metal) was desirable as a means of determining value. If so, this declaration of value by weight is combined with a decision to adjust this weight to coincide with the *deben* now implied in demotic documents. The reform that led to the creation of the series 3 bronze coinage, on this reconstruction, would mark an attempt to marry the Greek institution of coinage with the Egyptian habit of expressing value by weight.

That this might be desirable is arguably proven by the survival of the peculiar formula we have already drawn attention to. Still in 223 BC, a scribe in Thebes was writing '10 (*deben*) of silver, that is 50 staters, making 10 (*deben*) of silver again'. Behind this bizarre tautology lies a concern to marry together two fundamentally different ways of describing value: counting and weighing. And yet, as we have seen, the scribes of Egypt had figured out a way to account for this in the late 5th century BC. Why was the Ptolemaic administration making such a concession in its coin-production at this point in time to Egyptian practice? This is much too large a question to be addressed in detail in this paper, but some basic lines of inquiry may be laid out.

To begin, we must ask how this new bronze coinage entered circulation in the first place. This can only have occurred through state fiscal activity. On the one hand there may have been a demonetization of the earlier bronze coinage. No hoards survive that contain coins of type 2 and type 3.²⁵ We have no evidence for such a recall in the documentary record, and even if we had, we would still need to explain

²⁵ For a table of all recorded hoards see *EH* 1, pp. 9-14. For the withdrawal of earlier coinage, LORBER 2005a, p. 138; CAVAGNA 2010, p. 125; PICARD and FAUCHER 2012, pp. 33-4.

why the Ptolemaic state took this step. On the other hand, the State may simply have changed its means of making payments. Or, of course, both may have happened, and, in fact, this surely is the most likely scenario. The bronze coinage of Series 2 was not recalled in response to a fiscal crisis: the metal-value of the new coinage went up, not down. The demonetisation of the old coinage and its replacement with a new, heavier coinage is likely to be a response to a need to make payments into a new environment, or of a different nature.

In this context, it is worth drawing attention to another apparent effect of this reform, identified by Faucher.²⁶ Finds of the pre-reform bronze coinage (Series 1 and 2) are attested at 17 sites within Egypt. The post-reform coinage (Series 3, 4 and 5) has been noted at almost twice as many (32 sites). The post-reform coinage seems thus to have been more widely dispersed. Is this because it was paid out by the state into a wider range of locations? Or is it because the new coinage was better suited for transactions across a wider part of the country once in circulation? Once more, these two propositions are not mutually exclusive. Both the issue of the coinage and its subsequent use may have contributed to this change in pattern.

What might these payments have been? Numismatists have in recent years tended to view the function of coinage to be overwhelmingly military, certainly in the case of silver, but also, when it has been considered, for bronze too.²⁷ One possibility that we must consider, therefore, is that this change in form of payment reflected a change in the nature of military payments in the 260s. We have little evidence for the nature of the Ptolemaic military in Egypt during this period. Fischer-Bovet has estimated that there may have been as many as 11,000 troops of various statuses stationed in Egypt at any given time in the 3rd century BC.²⁸ If these were paid, on average, 1 drachma per day, then the annual outlay will have been in the order of 4 million drachmas. If this was paid in new drachma coin, this would have required 400 obverse dies at 10,000 coins per die, which is perhaps not implausible. But in practice, rates of pay varied, as did the amount of time worked, and we cannot be certain that all pay was made in coin, so these figures almost certainly need to be reduced, bringing them further into the range of plausibility.²⁹ In fact, as we can see from a survey of the evidence for military payments from the third century after the date of Philadelphus' reform, there was, unsurprisingly, significant variation in sums that had to be paid out by the state.³⁰ If these were being paid *ad hoc*, then a significant range of denominations will have been required.

However, while we may be able to accept that this new bronze coinage was designed in part at least to pay the military in Egypt, we are still left with the problem of the reform. Why did coinage change when it did? There appears to be no identifiable shift in the nature of the Ptolemaic military in Egypt in the late 260s. The standard reconstruction of Ptolemaic military reform places this a decade or so later, and posits a large-scale settlement of soldiery in cleruchies in the Fayoum in the late 250s BC, perhaps as a means of reducing financial outlay.³¹ To explain the nature of the change in the 260s we must perhaps focus on the fact that this was a reform of the bronze coinage. Is it possible that this reform reflects a decision to shift the payment medium to troops in Egypt away from silver and towards bronze? Such an explanation might account for the post-reform geographic spread of the bronze noted above.

As von Reden has noted, however, there are other categories of state expenditure that might also account for an increased, or at least different need for coinage on the part of the Ptolemaic administration from the late 260s BC. These years saw significant efforts to reclaim land in the Fayoum. The expense of this was considerable. As a report of 259 BC in the Zenon archive informs us, Apollonios the *dioiketes*' estate of 10,000 arouras required 8,600 *drachmai* (1.43T) just for the labour of reclamation. A much

²⁶ FAUCHER 2010b, pp. 439 and 442 with figs. 5 and 6.

²⁷ See, for example, CALLATAÿ 2000 and 2011; BRESSON 2005; MEADOWS 2014a, pp. 180-1.

²⁸ FISCHER-BOVET 2014, p. 74 with n. 96.

²⁹ For rates of pay see CLARYSSE and LANCIERS 1989.

³⁰ See and CLARYSSE and LANCIERS 1989, p. 130, Table 6, where the lowest sum recorded is 0.2 obols *per diem* for ἔφοδος. If paid on a monthly basis, this could have been paid with a drachma coin, but if more often, smaller denominations would clearly have been necessary.

³¹ CLARYSSE 1980 on the date; FISCHER-BOVET 2014, pp. 61-2 on the motivation.

larger proposition described in another contemporary text suggests the use of 15,000 men (perhaps 64% of the adult male population of the Arsinoite nome) at a total cost for labour, materials and tools of 96,000 drachmai (16T). In this latter case it is envisaged that Emmer wheat will be sold to raise the necessary cash. Coinage would clearly have been needed to facilitate these transactions, and it was presumably the state that was purchasing the grain in such a case.³²

There were thus pressing and changing demands on the Ptolemaic exchequer that may have required a reform of the coinage in order to facilitate much larger payments into a broader sector of the Egyptian economy than before. But part of the answer may also lie in the series of fiscal and administrative reforms that were being undertaken by the Ptolemaic chancery in the 260s. There is a difficulty in proceeding from effect to cause and, as we have noted, there must have been a need for payment that injected the new coinage into circulation, but it is certainly possible that the Ptolemaic state also had the secondary use of this new coinage in mind when it took the decision to invest in its production. Since the coins were being paid into a closed-currency system, the king could reasonably assume that he would receive them back. Of course, the obvious vehicle for the return of this coinage to the state coffers was taxation. So it may well not be coincidental that this reform of the coinage coincided with a major overhaul of the tax regime that saw the introduction of a tax payable in money levied across the entire population of Egypt.

This tax, the Salt Tax, was introduced in 264/3 BC, almost contemporaneously with the reform of the coinage (above n. 12). At the same time, an earlier tax, the Yoke Tax was phased out, and it has been suggested that this reform was the replacement of one sort of capitation tax with another.³³ The Salt Tax differed from the preceding Yoke Tax in at least two important respects. First, it was levied on the entire population, male and female, thereby greatly expanding the tax base and administrative burden. Second, it appears to have been assessed at a different level than the Yoke Tax, and in fact underwent observable change in the course of the third century. From 263-254 BC (Rate A) it was assessed at 1 dr. 3 ob. for males and 1 dr. for females. From 254-231 BC (Rate B) this was reduced to 1 dr. for males and 3 ob. for females. From 231-217 BC (Rate C) this was further reduced to 4 ob. for males and 1.5 ob. for females.³⁴

Surviving receipts demonstrate that payments could be made in installments, and these receipts in fact provide us with an important window into the payment regimes before and after the introduction of the Salt Tax, since we have now a series from Thebes published by MUHS (2005), which span this period of change. If one works through the figures given in the receipts for the Yoke tax before year 22 of Philadelphus, and the Salt tax thereafter, the pattern is fairly clear.

³² VON REDEN 2007, pp. 64-5. For Apollonios' estate and the calculations see THOMPSON 1999 on *TM* 2490. For the larger estate, CLARYSSE 1988 and THOMPSON *ibid.* on *TM* 5710.

³³ So MUHS 2005, pp. 6-8; cf. CLARYSSE and THOMPSON 2006, p. 39. The question of whether the Yoke Tax was indeed a capitation tax has been disputed: see MONSON, forthcoming.

³⁴ For an overview of the Salt Tax and its development see CLARYSSE and THOMPSON 2006, pp. 36-74.

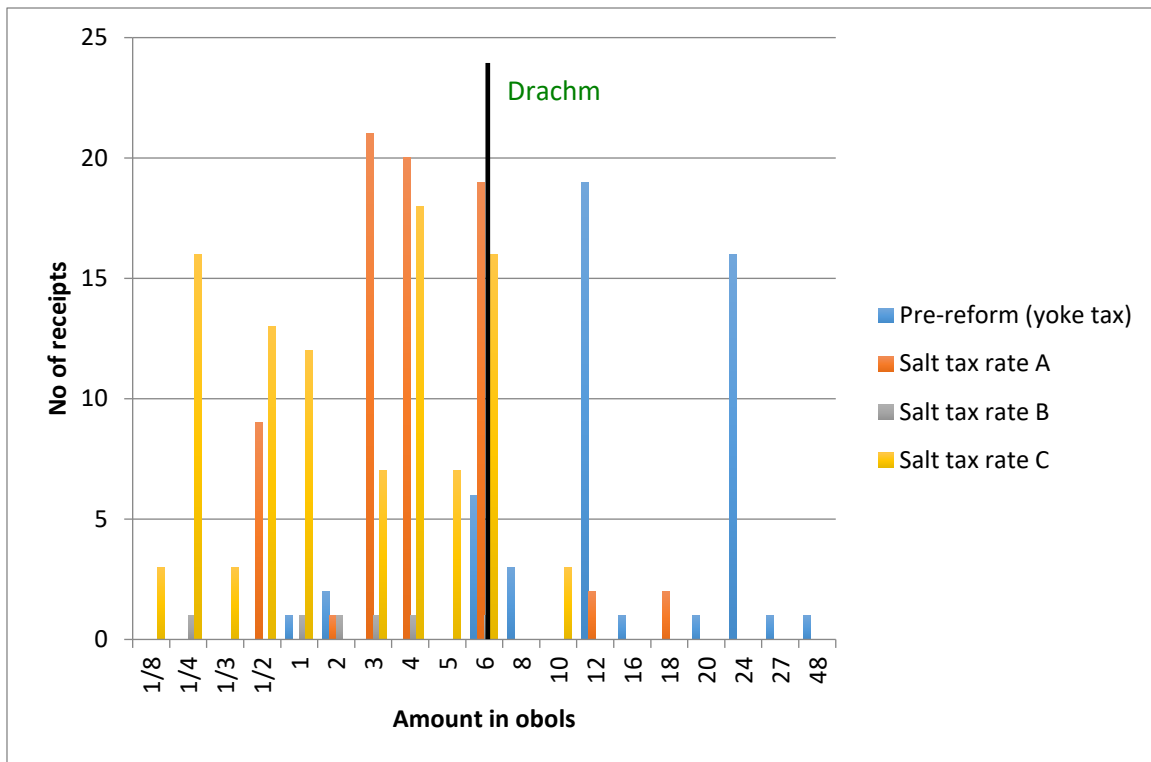


Fig. 6. Amounts documented in individual receipts for the Yoke and Salt Taxes at Thebes (from MUHS 2005a)

In Fig. 6, I summarise the amounts of individual payment. To facilitate comparison all sums mentioned have been converted to *obols*. We can see that before the reform and the introduction of Series 3 bronze, the amounts being accounted for tend to be large, in multiples of drachms, and the second largest spike in this period is at the 24 obol, or tetradrachm mark. After the introduction of the Salt tax, the amounts being accounted for are much smaller. Almost all are at the level of the drachm or lower. If these sums match actual payments, then there was no prospect of paying them with anything other than bronze, and our conclusion would have to be that bronze coinage became much more widely used after 264/3 than before. In any case, the coinage being used to make payments of the new Salt Tax must have been that which the Ptolemaic chancery had so carefully created in 7 denominations, with new production techniques, and adjusted to be weighed and accounted for equally in terms of drachmas, obols and deben.

As we noted above in the case of the large land reclamation project, the proposer of this vast undertaking envisaged selling 10 Talents worth of wheat to provide the cash with which to pay for the labour of 15,000 men. In such a system, coinage becomes, essentially, the means for the state to convert agricultural product into labour. Moreover by simultaneously imposing a capitation tax on the entire population, a tax essentially on existence, the State also created the mechanism for recovering substantial quantities of that coinage for the royal coffers at little cost to itself. In essence, the State was generating free labour. The problem faced by the architects of this redistributive machine in the 260s was that bronze coinage was not a widespread or familiar medium to the many Egyptians into whose lives it would now enter. Sitta von Reden has dubbed the process of bronze reform the ‘monetising the countryside’.³⁵ An important element in the introduction of this new monetary medium to a broader, non-Greek audience, was the adaptation of it to an Egyptian mode of thought. By increasing its weight standard, tying it to the *deben*, and making its weight correspond to its value they were, like the drafters of the Revenue Papyrus, providing an Egyptian translation of a Greek concept.

³⁵ VON REDEN 2007, p. 65.