Monograms on Kibyra's coins: names or numbers?

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Abstract: The monograms carried on Kibyra's coins are actually quantitative indications about the volume of coin issues. In fact, if we remember that in Greek the numbers were expressed with the same letters of the alphabet, the inscriptions reported on those coins, instead of being monograms composed by letters indicating the name of the presumed monetary official (as generally interpreted), suddenly reveal to be figures indicating the issue's size, that means the number of coins minted within that certain monetary series. So here we find that the issues of tetradrachms minted in Kibyra were composed by 250,000 or 500,000 pieces while the issues of drachms were very often composed by a million pieces.

Keywords: Monograms, Greek numbers, Numbers on Greek coins, Size of the Greek issues

Kibyra (today Khorzum) was the chief city of the district Cibyratis, in the Cabalis region, on the southern border of Phrygia with Lycia. According to Strabo it was founded by Lydians but was then inhabited by Pisidians who moved its position. Strabo claims that it was the only place where the Lydian language was still spoken during the period he wrote (I century BC) together with other languages like Solymian, Pisidian and Greek which however, remained the most important language and the one used in the official documents and in the inscriptions. For a long time he constituted an independent state ruled by tyrants. During the 2nd century BC the three nearby cities of Oenoanda, Bubon and Balubura joined Kibyra, forming a Tetrapolis, which had a powerful army (only Kibyra was able to mobilize 30,000 infantrymen and 2,000 horsemen) but then it was dissolved by the Roman general Lucius Licinius Murena in the 84 BC during the First Mithridatic War. Later Kibyra was assigned to Phrygia, then incorporated into Karia under Diocletian.

In the Tetrapolis period to cope the army's cost Kibyra mints its own currency. Today we can affirm that the issues of tetradrachms minted in Kibyra were composed by 250,000 or 500,000 pieces while the issues of drachms were very often composed by a million pieces. Reading this statement you will surely ask where has this information ever been obtained, since there is no historical source that mentions the size of Kibyra's coin issues. But the answer is a disarming simplicity: the quantitative indications about the volume of Kibyra's coin issues are obtainable from the coins themselves. In fact, if we remember that in Greek the numbers were expressed with the same letters of the alphabet, the inscriptions reported on those coins, instead of being monograms composed by letters indicating the name of the presumed monetary official (as generally interpreted), suddenly reveal to be figures indicating the issue's size, that means the number of coins minted within that certain monetary series[1]. To understand better this statement, it is necessary to refresh our memory on the numbering systems through which the Greek expressed the numbers.

[1] Such reading about the monograms on the coins of various Greek mints has been done by me in DE LUCA F. (2015a), DE LUCA F. (2015b), DE LUCA F. (2016a), DE LUCA F. (2016b), DE LUCA F. (2017a) and DE LUCA F. (2017b).

The oldest Greek numeral system[2] was called "Attic" or even "Acrophonic" because they used as numerical symbols the initial letters of the words that indicated the main numbers (from *akron*, "the end", " the beginning", and from *phōnē*, "entry"). The basic signs were | = 1, Π = 5, Δ= 10, H = 100, X= 1,000, M = 10,000. Other signs were obtained with the addition or multiplication by merging two basic signs. For example, the number 50 was indicated with 𐅄 (5 times 10 = 5 x 10) etc.

The most recent numeral system was called "Ionic", or "Milesian" (because it had been created in Miletus), or even "Alphabetic" (see the layout of the Fig. 1) which used 27 alphabet letters: nine for the numbers lower than 10, nine for the multiples of 10 lower than 100 and nine for the multiples of 100 lower than 1,000. Because the classic Greek alphabet was only composed by 24 letters, three archaic letters were also used, falling into disuse: *digamma* (in the form Ϝ or in the most common form Ϛ) which indicated number 6, *koppa* (Ϙ) used to represent number 90 and *sampi* (ϡ) for the number 900. This circumstance suggests that the origins of the Ionic numeral system dates back at least to the 5th century BC, when these letters were still in use. Generally when the letters indicating the numbers were tiny, they were followed by an apex.

Α	α′	1	Ι	ι′	10	Ρ	ρ′	100
Β	β′	2	Κ	κ′	20	Σ	σ′	200
Γ	γ′	3	Λ	λ′	30	Τ	τ′	300
Δ	δ′	4	Μ	μ′	40	Υ	υ′	400
Ε	ε′	5	Ν	ν′	50	Φ	φ′	500
Ϛ	ς′	6	Ξ	ξ′	60	Χ	χ′	600
Ζ	ζ′	7	Ο	ο′	70	Ψ	ψ′	700
Η	η′	8	Π	π′	80	Ω	ω′	800
Θ	θ′	9	Ϙ		90	Ͳ	ϡ′	900

Fig. 1: The "Ionic" or "Alphabetic" numeral system.

Another Greek characteristic was that the numbers were expressed in tens (*dekades*), hundreds (*hekatontades*), thousands (*chiliades*), tens of thousands (*myriades*) and hundreds of thousands (*dekakismyriades*): in this way Plato (*Phaedrus* 257) used the expression "*ennea chiliades etōn*", that meant "nine thousands of years", to indicate 9,000 years. Often the numbers were expressed *in an understood method*, in tens, hundreds, thousands, etc., whereby only a detailed examination of the context can clear if it deals with a finished number or if it implies other decimal orders. Furthermore on the coins there was an extensive use of the multiplicative principle because often two or more numbers were combined and placed next to each other: in this way the two or more numbers must be multiplied between each other to obtain a figure (their product) that otherwise would be too long to write in the confined space on the coin.

[2] On the Greek numeral systems see HEATH T. (1981), pp.30-35; GUARDUCCI M. (2005), pp. 85-87.

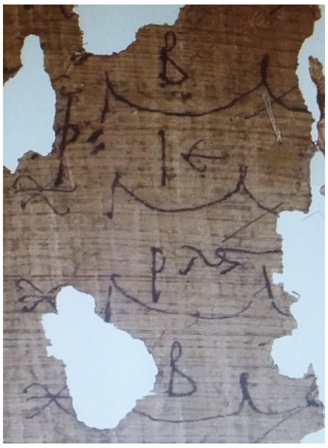

Fig. 2: Detail of a papyrus from 312 AD which reports the taxation list of the Province of Aegyptus Iovia. The figures shown are quite complex: to obtain the number that was intended to be assigned, it was necessary to multiply the number shown in the upper part (expressed according to the Ionic or Alphabetic numbering system) with the number placed in the lower part (the large M that corresponded to the number 10,000 of the Attic or Acrophonic system). The asterisk positioned in front of each number is the *denarius* symbol and indicates, in fact, that these are figures expressed in Roman *denarii*. In the first line we have the figure of 20,000 *denarii* (2 x 10,000 = 20,000), in the second line 150,000 *denarii* (15 x 10,000=150,000), in the third line 1,360,000 *denarii* (136 x 10,000) and finally in the fourth line the 20,000 *denarii* amount (2 x 10,000 = 20,000). On this papyrus see ROBERTS C.H., TURNER E.G.(1952), pp.108-110; it is the papyrus "Greek P 616" conserved at the John Rylands Library in the University of Manchester and available online: http://luna.manchester.ac.uk/luna/servlet/detail/ManchesterDev

Fig. 3: Example of admixture of figures expressed according to different numeral systems taken from an epigraph from the beginning of the 2nd century BC conserved in the Thebes Museum which contains a publicly owned land renters list from a Boeotian city which certainty can not be identified (ROESCH P., 1966, pp.77-82, n.15). Next to the renters' names we find the rent amount paid by each of them. The various canon amounts are expressed with ancient symbols from various monetary units such as the archaic sigma (**Ƨ**) that indicates the stater, the archaic delta (**▷**) that designates the drachms, the **T** that indicates the triobol and the **o** that indicates the obol. In line 13, reproduced above, next to these archaic symbols a digit from the Alphabetic or Ionic numeral system is used: so the 21 drachms canon and an obol paid by the renter Demetrius, son of Stroton, is expressed with **K▷o**, in which **K** is 20 from the Alphabetic or Ionic system and indicates the 20 drachms quantity, followed by **▷** (= 1 drachm) and **o** (=1 obol).

Both on coins and in other contexts it was not uncommon to use figures from the Attic or the Acrophonic numeral system next to figures from the Ionic or the Alphabetical numeral system[3]: the latter numerical system, in fact, never completely replaced the Attic one, but overlapped with it, for example, preserving the sign M denoting 10,000 (see fig.no.2) in concomitance with the identical sign M of the Ionic system denoting the number 40. In addition to the two main numeral systems

[3] The ancient sources attest in various cases the contextual use of numbers expressed according to various numeral systems. So, for example, in some Boeotian epigraphs of the II-I century BC we can find numbers taken from the Ionic numbering system used within the same figure next to numbers taken from an archaic numbering system (ROESCH P., 1966, pp.77-82, no.15 ; see fig.no.3) and figures taken from the Acrophonic numbering system used next to figures from the Ionic numbering system (CALVET M., ROESCH P., 1966, pp.297-332). Furthermore, the Attic and the Ionic numeral system are seen side by side in a number of Greek papyrus-rolls found at Herculaneum : these states are on the title page, after the author's name, the number of books according to the Ionic numeral system, and the number of lines according to the Attic numeral system, just like when we commonly use Roman figures to denote *Books* and Arabic figures for *sections* or *lines*; on this argument see HEATH T., 1981, p.35.

figures there were also other symbols that indicated a certain amount of money which, despite derived from secondary numeral systems used in specific *poleis*, they were used in far away geographical areas. Widespread all over the Greek world was, for example, the notation ⊙ (sometimes simplified with O) that in Argos indicates the amount of 10 drachms[4]. If then the numerical notation O (= 10 drachms) originally from Argos multiplies with Π (= 5 according to the Attic numbering system), we obtain the symbol ⊓O which indicates the amount of 50 drachms (in fact, 10 x 5 = 50; on this symbol see Fig. 4)[5]. Very recurring was also the notation Α, or Α, often simplified with A, used in Andania, city of Messenia, to indicate the amount of 10 minas, equal to 1,000 drachms[6] (in fact one mina is equal to 100 drachms, 10 minas are equal to 1,000 drachms). The notation A, therefore, could represent the number 1 (according to the Ionic numbering system) or a quantity of 10 minas equal to 1,000 drachms (according to Andania's numeral system).

To indicate the quantity of 10 minas, and therefore 1,000 drachms, also the numerical notation Α, originally from the numeral system used in Acarnania[7], was very widespread.

In the ancient sources, therefore, it happens to run into figures made up of numerical symbols deriving from different numeral systems. A significant case of admixture between numerical symbols of different origin is furnished, for example, by the "Greek P 660", a papyrus conserved at the John Rylands Library in the University of Manchester (see Fig. .5) where, next to figures that derive from the Alphabetical or Ionic numbering system, two symbols absolutely new are used to express the thousands. It is an accounting document from 338 AD in which the State is asked to pay a sum of money. The sum requested amounts to 29,137 *denarii* and is expressed in the original text on the third line with the figure ⳨ $\overset{\beta}{M}$ 2θρλζ that in Roberts and Turner transcription[8] becomes (δην.) (μυρ.) β2θρλζ, because the *denarius* symbol ⳨ is changed with (δην.) and the number $\overset{\beta}{M}$ (20,000 from the Attic system) is changed with (μυρ.) β. To this amount must be subtracted for advances already paid (ῥοπή) 1,900 *denarii*, sum indicated in the fourth line of the document with ͵ΑΤ, for which the State must pay the net amount of 27,237 *denarii* indicated in the original text on the fifth line with the number ⳨ $\overset{\beta}{M}$ βϥζσλζ, that in Roberts and Turner transcription becomes (δην.) (μυρ.) βϥζσλζ because, exactly as it happens with the figure in the third line, the denarius symbol ⳨ is changed with (δην.) and number $\overset{\beta}{M}$ (20,000 from the Attic system) is changed with (μυρ.) β. As we can see, therefore, the sign completely similar to our number 2 before the number 9 (θ) from the third line makes it become into 9,000, while the sign similar to a *coppa* (Ϙ) before the number 7 (ζ) from the fifth line turns it into 7,000. This is how the publishers, C.H. Roberts and E.G. Turner describe this particularity of the papyrus: "In line 4 a hook or curl is placed above and linked to the α, the normal method until about the middle of the fourth century (…); but in lines 3 and 5 its place is taken by independent and different symbols of letter size, the latter of which is practically indistinguishable from the symbol for 90; that their function is to indicate the thousand is proved by the arithmetic"[9]. The one just provided, therefore, is a further, important proof that the Greek numerical systems were not watertight compartments but in some cases they mixed numerical symbols coming from other systems or however from another nature[10].

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4 On this last sign see TOD M.N. (1979), p.5. For epigraphs in which there are numeric symbols from a minor numeral system used far away from their place of origin see ROESCH P. (1966), p.77–80, and GRANDJEAN C. (1995), pp.1–26.

5 On the notation ⊓O see GRANDJEAN C. (1995), pp.1–26, and DE LUCA F. (2017a).

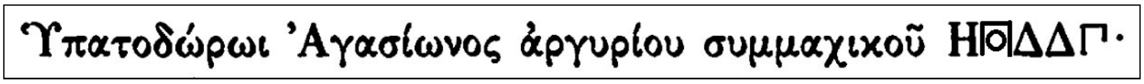
6 On this sign see TOD M.N. (1979), pp.47.

7 See TOD M.N. (1979), p.49.

8 ROBERTS C.H., TURNER E.G. (1952), pp.170-171.

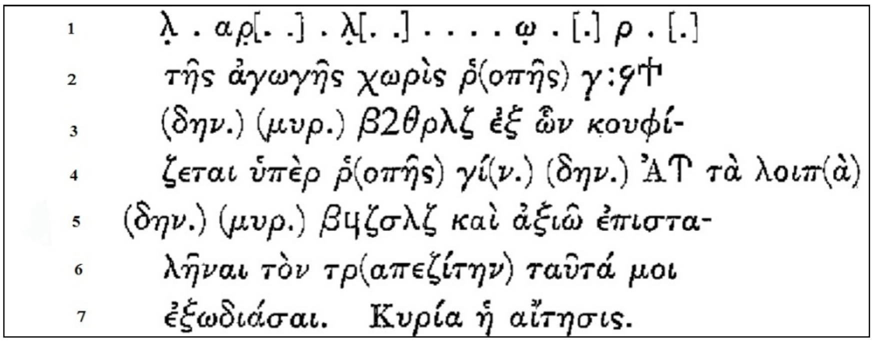
9 *Ibidem*.

10 Besides the numerical symbols just analyzed in the text there are also others reported at the end of the first line whose meaning remains however obscure to C.H. Roberts and E.G.Turner.



Ὑπατοδώρωι Ἀγασίωνος ἀργυρίου συμμαχικοῦ ΗΠΔΔΓ·

Fig. 4: The 11th line of an inscription from 170-150 BC (GRANDJEAN, 1995, pp.1-26) bearing the statement of the *hipparcus* (cavalry commander) Pompidas, that says: "To Hypadoros, son of Agasion, 175 silver symmachic drachms". As it can be seen, when a digit is expressed with figures taken from the Acrophonic or Attic numeral system, the number 50 is expressed with the symbol, composed by a Π that encloses the **O**, the 10 drachms simplified symbol, original from Argo: the fact that the two numbers are overlapped indicates that they should be multiplied with each other, giving the result of 50. But the text publishers of the *hipparcus* Pompidas inscription have preferred to "eliminate these particularisms" and replaced the symbol with the analogous and better known symbol from the Attic numerical system (which in the Pompidas inscription is also present but denotes the number 500) in order "to facilitate the reading of the text" ("les éditeurs du texte, de W.Dittenberger à J.R. Melville Jones, ont pris le parti de gommer ces particularismes afin de faciliter la lecture du texte", GRANDJEAN C., 1995, p. 3).



1 λ . αρ[. .] . λ[. .] . . . . ω . [.] ρ . [.]
2 τῆς ἀγωγῆς χωρὶς ῥ(οπῆς) γ:ϙ†
3 (δην.) (μυρ.) β2θρλζ ἐξ ὧν κουφί-
4 ζεται ὑπὲρ ῥ(οπῆς) γί(ν.) (δην.) Ἀϡ τὰ λοιπ(ὰ)
5 (δην.) (μυρ.) βϥζσλζ καὶ ἀξιῶ ἐπιστα-
6 λῆναι τὸν τρ(απεζίτην) ταῦτά μοι
7 ἐξωδιάσαι. Κυρία ἡ αἴτησις.

Fig. 5: Transcription of the papyrus "Greek P 660", an accounting document from 338 AD conserved at the John Rylands Library in the University of Manchester (ROBERTS C.H., TURNER E.G., 1952, pp.170-171).

Fig. 6: The Athenian Tribute List of the year 440–439 BC (particular).

Fig. 7: Alexander III 'the Great' (336–323 BC), silver tetradrachm (17.03 g, 26 mm), posthumous issue of Amphipolis (Macedonia), ca. 318–317 BC. Obv.: head of Heracles right wearing lion's scalp. Rev.: Zeus enthroned left holding scepter and eagle; numerical notation in left field and under the throne of Zeus; ΒΑΣΙΛΕΩΣ ΑΛΕΞΑΝΔΡΟΥ (Classical Numismatic Group, Auction no.25, London, March 2005, lot no.61986).

Also the monograms carried on the coins minted in Kibyra between the II and the I century BC were very well explained as numbers, even if the only idea that the monograms on the Greek coins were reported as figures and not like monograms was a completely new perspective which will arouse not a few perplexity. But such confirms in this sense arrived to us from epigraphic sources.

So, in the Athenian Tribute List[11] of the year 440-439 BC (figure no.6, third line) we can see that the Aphytis citizens conferred to the Athena treasury the amount of 50 drachms indicated with the 𐅄 symbol from the Attic or Acrophonic system. Well, the same number was carried even on some tetradrachms minted in Amphipolis in the name of Alexander the Great in 318-317 BC: it was indicated on the reverse, in the field between Zeus' knee and his right hand (figure no.7). While in the Athenian Tribute List no one doubted that what came after the word that indicated the Aphytis citizens was a number, because it was something already studied and ascertained, in the Alexander coin case, instead, many people were skeptical about the fact that the monogram could actually be the number 50 from the Attic or Acrophonic system just because it was affirmed for the first time. A fact, however, remains undeniable: the symbol carried on the Alexander's coin was absolutely identical to the one carried on the Athenian Tribute List of the year 440-439 BC.

1 2

Fig. 8: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; ΚΙΒΥΡΑΤΩΝ below; on the coin no.2, above the ethnic, ΜΟΑΓΕΤΗΣ, name of a monetary magistrate. No.1: Roma Numismatics Limited, London, Auction 12, 29 Sept.2016, lot 350, 3.40 g, 20 mm; no.2: IMHOOF-BLUMER F. (1974), s. 250, no. 1, Tav. VIII, no. 6, 3.44 g, 20 mm.

So let's come to the examination of the monograms on the drachms minted at Kibyra in the Tetrapolis period, exactly between the 166 and the 84 BC. These drachms bring on the obverse, a male head with a crested helmet and on the reverse an armed horseman, with a round shield on his shoulder and a long spear in his right hand, riding a galloping horse.

The helmet worn by the soldier on the obverse is a Boeotian helmet (coin no.1,fig.no.8), that means a light helmet used by the cavalry, particularly between the Thessaly and the Macedonians, during the Classical and Hellenistic period, despite its Boeotian origin (from which it gets its name). The Boeotian helmet was very practical and comfortable because it did not limit the visibility or the hearing (as the Corinthian helmet did) and, even though it did not have a nasal or cheekpiece protection, it was furnished with a back neck protection and a great visor. It was so suitable for the cavalry, that Philip II and Alexander the Great made it obligatory for the Macedonian Army's cavalry. On the obverse, in later Kibyra's drachms issues, the figure's Boeotian helmet gets more and more away from its original form until it becomes very rounded, almost without visor and back neck protection, it then looks more like a Second War World helmet (coin no.2, fig.no.8) or like a modern firefighter helmet (coin no.3, fig.no.15).

Apart from the earliest issues not characterized by any monograms (coin no.1, fig.no.8) and other later issues (for example the one which belongs to the coin no.2 in figure no.8) that on the reverse unequivocally shows the monetary magistrate's name (brought entirely above the city ethnic), there is a big group of issues, with a large quantity and variety of monograms, minted

[11] After the victories at Marathon and Salamis that moved the Persians away from Greece, Athens gathered around itself many allies who pledged to contribute each year to maintaining and increasing the fleet. A part of the sums paid by the allies (exactly one mina per talent, that means a sixteenth part) was taken for Athena's treasury. The Athenian Tribute Lists of every year was carved on the stone.

during the central period of Kibyra's mint activity[12]. These monograms were usually considered a set of letters indicating the monetary magistrates' names, who supervised the regular course of the mint activity and, in order to testify that they carried out their duty, they reported on the coins by them controlled the initial part of their names. But this solution does not explain why there are four different monograms on coins that certainly belong to the same issue and why some monograms come back to be identical on issues chronologically far from each other: it is not possible that the same monetary magistrate remained in service for almost a century!

1) MH = 10,000 (M) x 100 (H) = 1,000,000 dr.

2) MH = 10,000 (M) x 100 (H) = 1,000,000 dr.

3) OP = 10 (O) x 100 (P) = 1,000(,000) dr.

4) OP = 10 (O) x 100 (P) = 1,000(,000) dr.

5) IA =10 (I) x 1,000 (A)= 10,000 = 1,000,0(00) dr.

6) LA = 1,000 drachms = 1,000(,000) dr.

Fig. 9: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; numerical notations and ΚΙΒΥΡΑΤΩΝ below. No.1: http://munzeo.com/coin/dfg-kibyra-drachme-kopf-brockage-234674, 9 mar.2011, 2.49 g, 15 mm; no.2: SNG Copenhagen, Phrygien I, no. 265, 2.32 g, 16 mm; no.3: Numismatik Naumann, Auction 31,3 May 2015, lot 221, 2.76 g, 18 mm; no.4: Classical Numismatic Group, London, Auction 27, 29 Sept. 1993, lot 637, 2.93 g, 18 mm; no.5: Classical Numismatic Group, London, Electronic Auction 206, 11 Mar. 2009, lot 165, 2.84 g, 17 mm; no.6: Gorny & Mosch Giessener Münzhandlung, Munich, Auction 170, lot 1467, 3.03 g, 19 mm.

Everything becomes clearer instead, if we consider the initials on the coins minted in Kibyra not like monograms composed of letters but like digit consisting of numbers indicating the issue's size: if we are willing to accept this new key to interpretation, our knowledge about Kibyra's coinage is going to increase.

Here, we then find out that Kibyra's drachms issues had the size of one million pieces. In fact, the figure of one million drachms is reported identically or with few variations on all the coins of

[12] I thank Dr Sukru Ozudoğru of the Mehmet Akif Ersoy University (Turkey), chief archeologist of the excavations of the ancient city of Kibyra, who provided me with photos of Kibyra coins presented in this article.

every issue. After minting the coins falling within a date issue they passed on minting another new issue of a million drachms characterized by a different numerical notation, that means a different designed figure but which always indicated the same amount of money. So on the coins no.1 and no.2 in figure no.9, belonging to the same issue, the million pieces edition was indicated with the MH notation in which the number 10,000 from the Attic or Acrophonic numbering system (M) multiplies with the number 100 from the same numbering system (H) giving an exact 1,000,000 drachms result.

On the coins no.3 and no.4 in figure no.9, instead, the numerical notation OP (reported on the reverse of the coin no.3 on the left and the right of the horseman's foot and on the coin no.4 between the horseman's foot and the horse's front leg) is the product of the simplified symbol of the 10 drachms original of Argo (O) x the number 100 of the Ionic or Alphabetical numbering system (P) the result was 1,000 of drachms that implies the thousands (*chiliades*) and therefore should be understood as "thousands of thousands of drachms" that were equivalent to 1,000,000 drachms, figure that we can write putting in parenthesis the implied decimal order, like in this way: 1,000(,000) drachms.

1) AΦ = 1.000 (A) x 500 (Φ) =5,000,00(0) dr.   2) LΦ = 500 drachms= 5,00(0,000) dr.

Fig. 10: Silver staters minted in Aspendos (Pamphylia) in 380–325 BC. Obv.: two nude wrestlers beginning to grapple with each other; between them numerical notation. Rev.: slinger striding right, preparing to launch sling–bolt; triskeles to right; ΕΣΤFΕΔΙΙΥΣ to left; all in dotted square within shallow incuse. No.1: eBay (CNG seller), Item # 1248393904 started 2 Jun.2001, 10.92 g, 23 mm; no.2: Classical Numismatic Group, London, Mail Bid Sale 66, 19 May 2004, lot 509, 10.88 g, 24 mm.

The same quantity of drachms is indicated with IA on the coin no.5, fig.no.9, where I is number 10 from the Ionic numbering system and A is the 1,000 Andania's drachm symbol: multiplying by each other these numbers obtain the 10,000 result that, expressed in hundreds in an understood way, should be understood as 10,000 hundreds of drachms or 1,000,0(00) drachms. The coin no. 6 in figure no.9 belongs to the same edition as the coin no.5 and has a slightly different numerical notation to indicate the size of a million drachms: this time the symbol for Andania's 1,000 drachms (A) is preceded by the symbol L that usually indicates the year (as for example, in the case of the coins minted in Alessandria) but which is also used to indicate the drachm's monetary unit[13]. The LA notation refers to the thousands and therefore should be understood as "1,000 thousands of drachms", quantity that can be written by us as 1,000(,000) drachms.

The use of the L symbol to indicate the drachm's monetary unit is not only seen on the coins minted in Kibyra but even on those coined in the near Aspendos, in Pamphylia. In this city during the IV and the III century BC various staters issues were minted having a 5,000,000 drachms edition (equal to 2,500,000 staters minted) variously reported on the different series. For example, on the obverse of the coin no.1 in fig.no.10, the 5 million drachms numerical threshold is indicated with the digit AΦ that is represented by the multiplication between the 1,000 drachms quantity

[13] On this symbol see KENYON F.G. (1893), Vol. II, p.122; KENYON (1974), p.129. See also http://std.dkuug.dk/JTC1/SC2/WG2/docs/n2612/n2612-2.pdf.

expressed with the A symbol attested in Andania and the number Φ (500) from the Ionic numbering system the result is 500,000 tens of drachms, that corresponds to 5,000,00(0) drachms, equal to 2,500,000 staters. This last amount of money is indicated on the coin no.2 in figure no.10, it belongs to another issue, where the drachms symbol L is put before the number Φ (500) expressed in tens of thousands of drachms so the numerical notation LΦ is equal to 5,00(0,000) *drachms*.

The three different issues from Kibyra in figure no.9, that are all characterized by the same one million drachms edition but by numerical notations differently assembled, and the two different Aspendos issues in figure no.10, both having the same five million drachms edition but indicated with different numerical combinations, are an example of the tendency found in many Greek mints to report on every issue (belonging to a homogeneous group of issues all having the same size) always a different notation so it could be clearly distinguished from the previous and the following.

As well as the notations that were uniformly reported (or with little variants) on all the coins of the same issue, there were even the notations we would call "progressive" because they indicated increasing amounts of coins within the same emission. The apposition of the progressive notations on the dies took place in this way: when both the obverse and reverse dies were made to produce coins, figures were then engraved to characterize all the coins minted from those dies. When the dies were damaged or needed to be substituted, the following dies were engraved by the same numbers, if they needed to complete that quantity of coins or even bigger numbers than the previous ones, if they passed on minting a further quantity of coins.

All these progressive numeral notations were reported because they helped to keep count of the pieces gradually minted since they made recognizable specific groups of coins that otherwise would be merged into an indistinguishable and single mass. Little by little the mint masters minted the coins, they divided them in numerical notations and wrote them on a proper memo: in case there was a mistake counting the pieces minted it was enough to recount the coins of one specific group and not all the coins minted. It is a method we follow unconsciously even nowadays: for example, when we have to count 10,000 euro we make ten piles of 1,000 euro because, if we make a mistake counting, we do not have to recount all 10,000 but only one single thousand pile of euro in which we have fallen into error; besides after counting a pile we can even stop for awhile without forgetting the whole amount already counted. In the coin's case, then, it might be confusing not only the counting of different subgroups from the same issue but even different issues minted in close manner.

Thanks to the progressive numerical notations reported on the coins, the authority officials could control the whole amount of precious rare metal received at the beginning before it was transformed in coins. Besides, dividing the same issue in many distinct groups, gave the officials a good advantage to check the work done in the mint, that once finished had to be handed over.

Considered as numbers, here then these monograms reveal to be an interesting numerical progressions that indicate the amounts of coins little by little minted.

A beautiful example of progressive numerical notation is provided by the two coins in figure no.7, both belonging to the same emission. The coins in the first part of the emission (coin no.1, fig.no.11) have on the reverse, below the horse (exactly between the horseman's foot and the horse's front right leg), the initials ΠΜ in which number 5 from the Attic number system (Π) multiplies with number 10,000 from the same number system: the result of 50,000 drachms implies the tens (*dekades*) so it is to be considered equal to 500,00(0) drachms. The notation reported on the coins from the second and last group of issues (coin no.2, fig.no.11), instead, do not imply any size order but expresses in a precise and accurate manner the final size of the issue that is 1 million drachms. In fact, the symbol $\overline{\mathrm{MK}}$ at the beginning appears very complex but actually it easily dissolves in the multiplication between number 5 from the Attic numbering system (Π) with number 10,000 from the same numbering system (M), which has been found on the previous coin: unlike what happened on this last coin, however, the figures Π and M are bound together and then multiplied with number 20 from the Ionic system (K) giving place to the exact 1,000,000 drachms result.

1) ΠM = 5(Π) x 10,000(M) = 500,00(0) dr.

2) ΠMK = ΠMK = 5 (Π) x 10,000(M) x 20(K) = 1,000,000 dr.

Fig. 11: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; numerical notations and KIBYPATΩN below. No.1: Savoca Numismatik, Munich, Live Online Auction 10, 16 Oct.2016, lot 208, 2.47 g, 14 mm; no.2: CGB.fr, Paris, Monnaies 59, 19 June 2013, lot 114, 2.84 g, 17 mm.

1

2

3) M = 10.000 = 1,000,0(00) dr.

4) IO =10(I) x 10(O)= 100 = 100(0,000) dr.

5) ΠMK = ΠMK = 5 (Π) x 10,000 (M) x 20 (K) = 1,000,000 dr.

Fig. 12: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; the symbol of the issue in left field; numerical notations and KIBYPATΩN below. No.1: Numismatik Naumann, Wien, Auction 42, 3 Apr.2016, lot 288, 2.88 g, 17 mm; no.2: International Coin Exchange Ltd, Dublin, Auction 2, 18 Feb.2011, lot 13, 3.05 g, 13 mm; no.3: Roma Numismatics Ltd, London, Auction 5, 23 Mar. 2013, lot 416, 2.87 g, 17 mm; no.4: Classical Numismatic Group, London, Electronic Auction 334, 3 Sept.2014, lot 138, 2.72 g, 16 mm; no.5: Gorny & Mosch Giessener Münzhandlung, Munich, Auction 170, 13 Oct. 2008, lot 1466, 3.03 g, 16 mm.

At a certain point even in Kibyra's coinage, like in many other Greek *poleis*, a symbol is introduced, but it does not represent the monetary magistrate's signature as generally it was believed, but an element that helps distinguish one issue from another, in the same way as the peculiar numerical notations for each issue (not the progressive notations, but those fixed). If, then, it is legitimate assume that the issue marked by the rose symbol (coin no.1, fig.no.12) and the one marked by the eagle symbol (coin no.2, fig.no.12) had the one million drachms edition, like the previous issues characterized by a fixed numerical notation, the assumption becomes certainty for the emission marked with the butterfly symbol (coin.no.3, fig.no.12) and the one marked by the palm branch (coin no.4, fig.no.12): on the first coin, in fact, we find number 10,000 from the Attic numbering system which stands for 1,000,0(00) drachms and on the second coin, instead, the IO notation is made up by the number 10 from the Ionic numeral system (I) with Argos' 10 drachms symbol which has the 100 tens of thousands of drachms result, that means 1,00(0,000) drachms. Clear is, then, the numerical notation reported on the issue marked with the caduceus symbol (coin no.5, Fig.12): it is the same ΜΚ notation that we have seen in the previous figure no.11 issue which gives place to the round one million drachms digit.

But the emission in which the Kibyra's minters overcome themselves planning an ingenious numerical notation, is the one marked by the anchor symbol (Fig.13). The distinctive numerical notation in this emission needs more space because it is particularly complex and most of all double: this is the reason why it is exceptionally placed in the symbol's place that, is consequently transferred under the horse (then for the first time, the issue symbol and the numerical notation exchange places). This tangled numerical notation indicates the amount of one million drachms in two different ways: the first with the A notation = Andania's 1,000 drachms (brought on the top of the complex figure) and equal to 1,000(,000) drachms; the second through three consecutive multiplications between four numbers bound in the lower part of the numerical notation: in fact, 5 Attic (Π) x 50 Ionic (N) x Argos' 10 drachms (O) x 400 Ionic (Y) = 1,000,000 drachms.

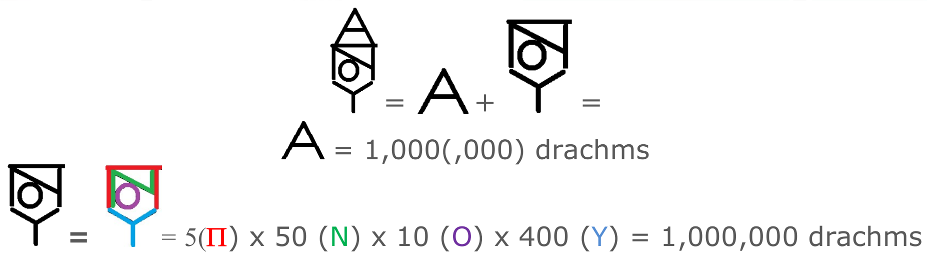


Fig. 13: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; numerical notations in left field; the symbol of the issue (anchor) and ΚΙΒΥΡΑΤΩΝ below. No.1: Gorny & Mosch Giessener Münzhandlung, Munich, Auction 225, 14 Oct. 2014, lot 225, 2.71 g, 16 mm; no.2: SNG Berlin, Phrygien, no. 3706, 2.48 g, 16 mm.

1) II = 2(00,000) dr.

2) = = 80(Π) x 400(Y) x 10(O)= 320,000 dr.

3) = = 10,000(M) x 100(P) = 1,000,000 dr.

4) = = 10,000 (M) x 100 (P) = 1,000,000 dr.

5) = = 10 (O) x 10 (I) x 1,000 (A) = 1,000,00(0) dr.

Fig. 14: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; the symbol of the issue (ear of corn) in left field; numerical notations and KIBYPATΩN below. No.1: SNG Berlin, Phrygien, no. 3711, 2.78 g, 17 mm; no.2: SNG Berlin, Phrygien, no. 3710, 2.76 g, 20 mm; no.3: Classical Numismatic Group, London, Electronic Auction 306, 10 July 2013, lot 138, 2.90 g, 20 mm; no.4: SNG Fitzwilliam, no. 4952, 2.84 g,17 mm; no.5: Roma Numismatics Ltd, E-Sale 42, 6 Jan. 2018, lot 193, 2.76 g, 15 mm.

Even in this group of issues marked by symbols we can find interesting progressive notations. Like on the first pieces of the issue bearing the ear of corn symbol (coin no.1, fig.no.14), we find on the reverse, under the horse, the II notation, in which the I sign, used in the Attic numbering system to indicate the units, is repeated twice to indicate the two hundred of thousands (*dekakismyriades*) of drachms numerical threshold, equal to 2(00,000) drachms. The two lines found on top and under the II notation are diacritical signs[11] which help us understand that these are numbers and not letters, making this number 2, expressed according the Attic numbering system, quite similar to the number 2 expressed according the Latin numbering system. The next numeral threshold is expressed on the coin no.2 in fig.n.14 with the notation in which number 80 from the Ionic system (Π), number 400 from the Ionic system (Y) and the Argos' 10 drachms symbol (O) are bounded: multiplying consecutively these figures we get the 320,000 drachms result.

1) ΚΑΛ = 20 (K) x 1,000(A) x 30(Λ) = 600,000 dr.

2) OP = 10 (O) x 100 (P) = 1,000 = 1,000(,000) dr.

3) OPO = 10 (O) x 100 (P) x 10 (O) = 1,000,0(00) dr

4) ΚΕΔ = 25 (ΚΕ) x 4 (Δ) = 100(0,000) dr.

Fig. 15: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; the symbol of the issue (bunch of grapes) in left field; numerical notations and ΚΙΒΥΡΑΤΩΝ below. No.1: www.harvardartmuseums.org, object no. 1.1965.2433, 2.94 g, 18 mm; no.2: Numismatik Naumann, Wien, Auction 14, 2 Mar. 2014, lot 361, 3.1 g, 18 mm; no.3: SNG Berlin, Phrygien, no. 3717, 2.73 g, 17 mm; no.4: SNG Berlin, Phrygien, no. 3718, 2.98 g, 17 mm.

From the 320,000 drachms numeric threshold we go directly (perhaps due to the incompleteness of the reconstruction here proposed) to the end of the 1 million drachms emission, indicated in a precise and concise way and without any simplifications: in fact, on the coins no.3 and no.4 in fig.no.14, the ΜΡ notation, always reported under the horse, is dissolved in number 10,000 from the Attic numbering system (M) x number 100 from the Ionic numbering system (P) which result is exactly 1,000,000 drachms. The identity of the obverse die from which the first coin no.1 and then the coin no.3 were obtained confirms that the numerical notation reported on the second coin is bigger than the one reported on the first coin. The quantity of one million drachms is indicated alternatively on coin no.5 of fig.no.14 by means of a notation in which they are reported in tying the Argive symbol of the 10 drachms (O), the number 10 of the ionic system (I) and, rotated 90° to the left, the notation A = 1,000 drachms of Andania (or simply the figure ,A = 1,000 of the Ionic system without the sloping stroke lower left): these three figures, multiplied consecutively, give rise to the result of 100,000 tens of drachms, equal to one million drachms.

Full of different numerical notations, is also the issue marked by a bunch of grapes. The first coins from the issue (coin no.1, fig.15) give information about the 600,000 drachms unit: to this number refers the ΚΑΛ notation where number 20 from the Ionic system (K) multiplies with Andania's 1,000 drachms symbol (A) and number 20,000 thus obtained is multiplied by number 30 from the Ionic system (Λ) giving a 600,000 drachms result. The remaining numbers reported on other groups of coins from the same issue are not progressive numerical notations but, numerical combinations that all indicate, even in different ways, the issue's numerical limit that, as usual, is one million drachms. On the coin no.2 in fig.no.15, the OP notation is given by Argos' original 10 drachms symbol x number 100 from the Ionic numbering system (P) the result is 1,000 thousands of drachms, equal to 1,000(,000) drachms. On the coin no.3, fig.no.15, we find the same figures reported on the coin no.2, the only difference is the adding of another Argos' 10 drachms symbol, so the final digit indicated is the 10,000 hundreds of drachms, equal to 1,000,0(00) drachms. Finally, on the coin no.4, the ΚΕΔ notation is dissolved by number 25 expressed according to the Ionic numbering system (ΚΕ) which multiplies by number 4 from the same numbering system (Δ) the result is 100 tens of thousands of drachms, that means 100(0,000) drachms. The three last numerical notations, therefore, assume the function to distinguish different groups of coins in order to count them better not by means of different progressive figures, but by means of figures designed differently but always indicating the same number.

Let's stop again on the numerical notations reported on the coins from the issue marked by the grape bunch symbol (fig.no.15) to understand its function better. It has been said that the different numerical notations found in this issue made it possible to divide in different groups the coins that belong to it which otherwise would have merged into a single and indistinguishable mass. Identifying the different groups of coins thanks to the specific numerical notation that characterized them, it was easier to divide them into separate lots; the separation in separate batches allowed then a safer counting of the coins in each lot. Here then is what was he main function of these numerical notations: to allow the mint officers to separate the coins from the same issue into groups easily distinguishable from each other so then they could be counted better. The numerical notations OP and OPO are slightly different from each other but only the O added to the first notation was sufficient to identify a specific coin lot from the one identified by OP. The function of the distinguishing element in the numerical notations also explains the reason why the one million drachms quantity that was on Kibyra's normal size issues were always indicated in different ways in the issues characterized by a single numerical notation: the three different issues of the fig. no.9, for example, since they did not have no symbols, they were distinguishable from one another only by the numerical notation that indicates in three different ways the same one million drachms quantity. Without this numerical notation, put each time in a different way, the three issues would have been confused, especially if they were minted in sequence.

The apposition of the different numerical notations on the coins within the issue distinguished by the bunch of grapes symbol must have happened in this way. They started making coins using reverse dies with the first numerical notation, that means ΚΑΛ. When these reverse dies were broken and had to be replaced, all the coins minted bearing the ΚΑΛ numerical notation were counted and set aside in appropriate containers and probably the number was written in a proper register. After that they passed on minting coins using a reverse die on which was engraved the issue's second numerical notation, the OP notation. When also these reverse dies were damaged, the coins obtained were then counted and stored in other containers separated from the coins with the first numerical notation (ΚΑΛ) after having noted the total on the register. Afterwards, they proceeded using reverse dies with the OPO numerical notation and after that the last numerical notation of the series, ΚΕΔ. Adding up the number of coins within each lot they known exactly how many coins had been minted up to that moment and how many more had to be minted to reach the programmed total of pieces in that issue. Let's make an example of how this reminder could appear at the end of the issue's of the figure no.15:

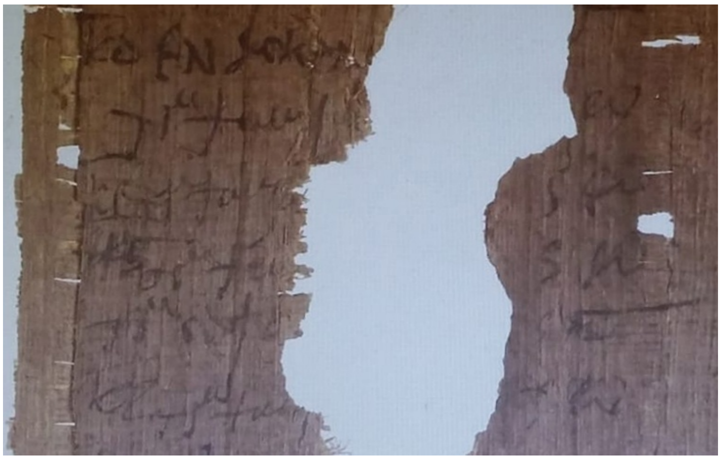
Reverse dies with **ΚΑΛ** notation: 263,000 drachms	+
Reverse dies with **OP** notation: 280,467 drachms	+
Reverse dies with **OPO** notation: 158,000 drachms	+
Reverse dies with **ΚΕΔ** notation: 298,533 drachms	=
TOTAL 1,000,000 drachms	

Fig. 16: The different batches of drachms with the grape bunch symbol divided into separate containers according to the numerical notation that distinguishes them: hypothesis of the issue end.

After they were divided, carefully counted and verified, the coins from the issue indicated with the grape bunch symbol put in separate groups, surely facilitated the mint officers who were charged to coin the issue, and had to report their work to the Kibyra city authorities. The mint officers, in fact, handed over at the end of their work the whole emission of coins characterized by the same numerical notation divided in homogeneous groups, perhaps collected in separate containers identified according to different notations as assumed in figure 16. In this way it was sufficient to add up the number of coins that were in each lot which had a distinct numerical notation (number recorded on the mint register) to obtain the total amount of coins programmed within the issue. After presenting the completed issue so neatly divided in groups, maybe it was not even necessary to count again all the coins from the "grape bunch issue" in front of the Kibyira's authorities but it was enough to check the accuracy of the reports on the mint register by sampling the coins contained in a single container and therefore only the coins marked by a specific notation.

Whether or not a mint register really existed on which were noted the numbers of coins within each lot, one fact seems certain: the progressive numerical notations remind us the memoranda and accounts reported on many Greek papyri. For example, on a papyrus preserved in the John Rylands Library of Manchester, which is shown in detail in figure 17, a certain Theophanes, who was an advocate and legal adviser of some high official (probably was on the staff of the Prefect of Egypt), notes all the expenses sustained during a journey taken between 317 and 323 AD that from Egypt led him first to Babylon, then to Ascalon, Gaza, Caesarea and other cities in Palestine and in Syria[14]. The expenses are diligently noted through numbered registrations in progressive order: there is a number that indicates the item's expenditure, the description and the relative amount. As we can see, it is a criterion of accounting that may have been very well adopted also for the numerical notations that mark the different parts of the same issue: each numerical notation identifies a certain number of coins within a given issue of which it will be taken note in some way.

[14] On this papyrus see ROBERTS C.H., TURNER E.G. (1952), p.117-122.



κδ̄ ἐν Ἀσκάλω[ν]
τιμ(ῆς) ψωμίω̣[ν] (δρ.) ω
κε τιμ(ῆς) ψωμίω[ν] (δρ.) ω
κς̄ τιμ(ῆς) ψω[μίων] (δρ.) ω
τιμ(ῆς) σαφω[νίου] (δρ.) σ
κζ̄ τιμ(ῆς) ψωμί[ων] (δρ.) ω

Fig. 17: Detail of a papyrus from 317 and 323 AD: which reports the travel expenses maintained by a certain Theophanes in the city of Ascalon, in Palestine (transcription on the right). On the left there are the progressive numbers from 24 to 27 that identify the various shopping items; follows the shopping description and then the relative amount preceded by a symbol very similar to our s that identifies the drachms monetary unit. Except for the expense of 6 (σ) drachms for the purchase of a soap (registered in the second line in the item n.26), all the other expenses about the food purchase, cost each time 800 (ω) drachms. It is the payrus "Greek P 627" conserved at the John Rylands Library in the University of Manchester and available online: http://luna.manchester.ac.uk/luna/servlet/detail/ManchesterDev

The progressive numerical notations like those observed on the coin issue bearing the symbol of the grape bunch were not something that only concerned Kibyra's coinage but they were also found in many other Greek coinages. An example of their diffusion can be drawn from a tetradrachms issue marked by the thunderbolt symbol that Ptolemy I Soter minted in Memphis in 321-317 as satrap of Egypt (Fig. no 18). These tetradrachms have on the obverse Alexander's image glorified with Zeus Ammon's horn and an elephant's skin on his head in memory of his conquest of India, while on the reverse, typical of the tetradrachms minted by Alexander, the image of Zeus sitting on the throne holding a scepter in his left hand and an eagle in his right. On the reverse, under Zeus's throne, there are numerical notations that mark the advanced minting progress. The PY notation on the reverse of the coin no.1 in fig.no.18, is dissolved in 100 from the Ionic system (P) x number 400 from the same numeral system (Y) the result is 40,000 tens of drachms, equal to 400,00(0) drachms: because the tetradrachm is a coin with has a value of 4 drachms, to issue coins with a total value of 400,000 drachms it was sufficient to mint 100,000 tetradrachms. So after minting the first 100,000 tetradrachms, on the reverse dies used to mint the following 100,000 tetradrachms, the OP notation is reported, in which Argos' 10 drachms symbol (O) multiplies with number 100 from the Ionic numeral system (P) giving the 1,000(,000) drachms result that is the final size of the emission (OP is the same identical notation we find in Kibyra on the coins no.3 and no.4 in fig.no.9 and on the coin no.2, in fig.no.15). Now, the 100,000 tetradrachms marked with the OP numerical notation (coin no.2, fig.no.18) is added to the first 100,000 tetradrachms minted and marked with the PY notation which makes a total of 200,000 tetradrachms that corresponds to 800,000 drachms: to reach the announced OP=1,000,000 to mint other 50,000 tetradrachms that correspond to the missing 200,000 drachms. Here, then this last portion of 50,000 tetradrachms (coin no.3, Fig. .18) is marked with the HΔI notation which indicates the actual achievement of one million drachms minted: in it, in fact, number 100 from the Attic system (H) consecutively multiplies with number 10 from the Attic system (Δ) and number 10 from the Ionic system (I) the result is 10,000 hundreds of drachms, equal to 1,000,0(00) drachms.

1) PY = 100 (P) x 400 (Y) = 400,00(0) dr.

2) OP = 10 (O) x 100 (P) = 1.000 = 1,000(,000) dr.

3)  =  = 100 (H) x 10 (Δ) x 10 (I) = 1,000,0(00) drachms

Fig. 18: Silver tetradrachms minted in 321-317 BC by Ptolemy I Soter as satrap of Alexander III. Memphis mint. Obv: diademed head of the deified Alexander right, wearing elephant's skin. Rev: Zeus Aëtophoros enthroned to left, holding an eagle in his outstretched right hand and a scepter in his left, his feet resting on a foot-stool; thunderbolt on left, numerical notation below throne and ΑΛΕΞΑΝΔΡΟΥon right. No.1: Classical Numismatic Group, London, Auction 100, 7 Oct. 2015, lot 1603, 17.08 g, 26.5 mm; no.2: Roma Numismatics Ltd, London, E-Sale 28, 2 July 2016, lot 244, 17.03 g, 24 mm; no.3: Classical Numismatic Group, London, Auction 99, 13 May 2015, lot 387, 16.32 g, 28.5 mm.

From Velia's coinage (city founded in Lucania from settlers from Phocaea, in Ionia, region not far away from Kibyra) arrives then the evidence of the widespread use in the Greek world of Andania's original numerical notation A, which made it possible to indicate in an extremely brief way the amount of 1,000 drachms.

In an issue of didrachms minted in Velia in 300-290 BC, distinguished by the ear of corn symbol, on some pieces (coin no.1, fig.no.19) we can notice that the edition is reported on the obverse behind the goddess neckroll by means of two figures in ligature, A (1,000 drachms from the Andania numeral system) that multiplies with H (100 from the Attic system) the result is 1,000,00(0) drachms, while the Φ (= 500 from the Ionic system), on the bottom right, does not indicate the edition in drachms but in didrachms so it should be understood as 500 thousands of didrachms, that means 500(,000) didrachms (since a didrachm coin's value is 2 drachms, 500,000 didrachms are equal to a million drachms). On other coins from the same issue (coin no.2, fig.no.19) we find inside the notation behind Athena's neckroll the same previous numerical notations but with only one difference: the simplification of A in A without the dot. This demonstrates the accuracy of the hypothesis that in many cases the number A is not equal to 1 but to 1,000 drachms since it is an A simplified form of the figure A. The didrachms edition is repeated on the reverse with the figure ΦI (brought on the sides of the issue symbol, the ear of corn) that corresponds to Φ (500) for I (10) the result is 5,000 hundreds (*hekatontades*) that then corresponds to 500,0(00) didrachms. To dispel any possible doubts on the issue's edition even a third numerical notation is given: under the lion's belly, in fact, we find the Π, number 5 from the Attic system that stands for 5(00,000) didrachms.

1) Obv.: AA = 1,000 (A) x 100(H)=1,000,00(0) dr. 2) Obv.: AH = 1,000(A) x 100(H) = 1,000,00(0) dr.
Rev.: ΦΙ = 500,0(00) didr.; Π = 5(00,000) didr. Rev.: ΦΙ = 500,0(00) didr.; Π = 5(00,000) didr.

Fig. 19: Silver didrachms minted in Velia (Lucania) in 300–290 BC. Obv.: head of Athena right, wearing crested Attic helmet decorated with a wing on olive branch; numerical notations behind the neckroll of Athena and in the bottom right field. Rev.: lion stalking right; ear of corn above between two numbers; number even under the belly of the lion; ΥΕΛΗΤΩΝ. No.1: Classical Numismatic Group, Mail Bid Sale 84, 5 May 2010, lot 90 (7.51 g, 22 mm); no.2: Ancient Coins, Edward J. Waddell, Ltd, lot 40053, Apr. 1998 (7.32 g, 21 mm).

As you can see, therefore, without the first coin of the fig.no. 19 the A shown on the obverse of the second coin would have seemed a simple alpha or at most as a number 1 from the Attic system (A) but never an A indicating the amount of 1,000 drachms according to the numeral system of Andania[15].

At this point, it is necessary to explain another point. In the reconstruction of the Kibyra's issues so far shown (and in the reconstruction of the issues that will be shown later), often some numbers were interpreted by the writer *in an understood way* in hundreds, thousands or other decimals. Is this a legitimate supposition?

The answer is that the use of implying several decimal orders for a given number was very common in both the Greek and in the Roman world where it was positively attested. An accurate attestation of the existence of such use in the Roman world comes from a *Compendio delle antichità romane, ossia leggi, costumi, usanze e cerimonie dei Romani compilato per l'istruzione della gioventù* (Compendium of Roman antiquities, or rather laws, customs, habits and Romans ceremonies written for young people's education). The consulted edition is the one printed in G. Miglio's typography in Novara (Italy) in 1817 where in the introduction, the editor wrote that the Compendium was published in France by an anonymous literature professor and adopted by the University of Paris already for a century[1616]. In this Compendium on the pages 199–200 you can read: "When you count with an adverb, and the adverb is *millia sestertium*; sometimes we find only the adverb, being omitted or implied the word *sestertium*, or *millia sestertium*. For example, *debet mihi decies*, to say *decies sestertium*, or *decies centena milia sestertium*. *Quadragintorum milia res* implies *sestertium*. *Vespasianus rhetoribus annua centena constituit*, or rather *centena milia sestertium*. Like when you say *mille munitium*, *mille talentum*, it is a construction of the adjective and of the substantive with the genitive governed by *res*, which was implied".

In Latin, then, exactly as it was in the reconstruction of the numerical sequences on the Kibyra's coins, to understand the order of sizes of which we are talking about, we must contextualize every single number: *decies sestertium* or *decies centena milia sestertium*? A thousand of drachms or a thousand of thousands of drachms?

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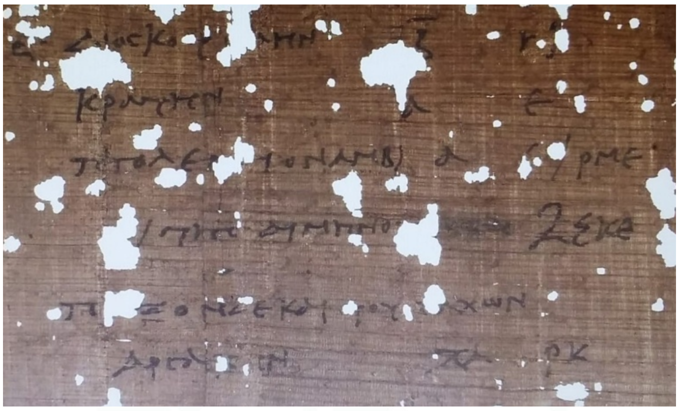
[15] The interpretation shown in the text about the letters and the monograms reported on Velia's two coins in figure n.13 was developed by DE LUCA F. (2015a), pp.146-150. WILLIAMS R.T. (1992), pp.100-02, pls.XXXVI-XXXVII, believes that the monograms reported on these Velia didrachms identify the engravers or the monetary magistrates.

[16] This Compendium of Roman antiquities can be consulted in its entirety online here: https://books.google.it/books?id=bdGLDI0M0ukC&printsec=frontcover&hl=it&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.



ζ(ητῆσον) Διοσκουρ̣[ί]δην β̄ (δρ.) ι
Κράτην α ϵ
Πτολεμαῖον Ἀμβ(ιλάου) α ϵ̣ (γίνονται) ρμϵ
(γίνονται) τῆς διμήνου Ἀυκθ
πρ[â]ξον δὲ καὶ τοῦ Παχών
Ἀρσάκην (ταλ.) α ρκ

Fig. 20: Details of a papyrus from 180 BC containing money account due for recovery; transcription in the lower part of the figure. This is the papyrus "Greek P 589" preserved at the John Rylands Library in the University of Manchester; available online: http://luna.manchester.ac.uk/luna/servlet/detail/ManchesterDev

But even for the Greek world there is evidence of the use of implying different sizes with figures indicated in writing. For example, on a papyrus from the 180 BC coming from Philadelphia[17], in Egypt, containing an account of money due for recovery there are figures that only apparently seem simple but which are actually expressed in talents, monetary unit corresponding 6,000 drachms. Thus in the detail of this papyrus reproduced in Fig. no.20 it is noted that Arsaces (a man's name with Persian probable origin, written on the left in the last line) is in debt for the sum of a talent (the figure A preceded by the talent symbol[18] $\overline{\wedge}$, shown in the central parte of the last line) and another 120 drachms (the figure ρκ reported at the end of the last line). The debtor mentioned on the first line, Dioscourides (left side of the first line), owes the amount of B=2 (central parte of the first line) to which another 10 drachms are added (the ι on the right side preceded by the drachms symbol, similar to our s): even if the B is not preceded by any symbols it is clear that it is not the 2 drachms amount (because if that were the case, it would have been added to the following sum of 10 drachms indicated with ι reaching the 12 drachms amount) but 2 talents, equal to 12,000 drachms. Even the amount indicated in the first line, therefore, like the one indicated in the fourth line, is expressed in talents for which B is not equal to 2 drachms but to 2 talents, that means 12,000 drachms. The same goes for the amount owed by the debtor Cratetes from the second line (the beginning of the second line) that is not α=1 drachms, but α=1 talent (the central part of the second line) and 5 drachms (the ε reported in the final part of the second line); in the same way Ptolemy (the name indicated in the beginning of the third line) is the debtor of α=1 talent (the central parte of the third line) plus 5 more drachms (the ε reported more to the right in third line) that become 145 with interests (the figure ρμε at the end of the third line). As seen, therefore, on the papyrus in fig.no.20 a written number implies different orders of sizes, exactly as hypothesized for the numerical notations reported on Kibyra's coins. Nor would it be possible to object that the example of the newly brought papyrus is not relevant because it is taken from an individual's private notes and therefore not intended to be read by others because this, at the end, was also the nature of the

[17] On this papyrus see ROBERTS C.H., TURNER E.G.(1952), pp.56-62.

[18] On the talent's symbol written on some Egyptian papyri of the I century BC see BAGNALL R.S., BOGAERT R. (1975),p p. 84-88; BILABEL F. (1923) 2307. It is possible to consult online many sites like, for example, +.

numerical notations: according to my hypothesis in fact, the numerical notations were not destined to the coin’s final users but they were destined to the mint staff like, we have seen, they facilitated the task of counting the coins gradually minted and helped report to the city authorities the correct fulfillment of the task received. The nature of “the notes inside the mint” of the numerical notations explain why they were often not immediately comprehensible: it was not necessary that they had to be understood by the coin’s final users because they were not intended for them but *only* for the mint staff that was aware of issue’s final edition and, therefore, of the decimal order implied by the numerical notation (for example OP = 1,000[,000] drachms) as well as the numeral system from which the different figures were composed. The inspiring criterion of numerical notations, therefore, was not their intelligibility by most, but their functionality and economy: this is why assembling them some figures could be left out, some others supposed or, with greater ease respect to other contexts, some were expressed using a numeral system and others using another numeral system in order to obtain a brief final figure, suitable for the coin’s limited space. The numerical notations reported on the coins were ultimately services notes like the ones we find today on our shopping lists where, for example, we write:

bread
sugar
3 water

In this shopping list for “3 water” we actually mean “3 water boxes with 6 bottles for each box for a total of 18 bottles”: as it appears evident, rather than writing such a long expression it is much more practical to write “3 water” on a piece of paper where you write in a hurry without paying much attention to the form. Another thing would have been if the numerical notation would have indicated the coin’s facial value, like the figures brought on modern banknotes: in that case it would not have been conceivable simplifications, approximations or understood decimal orders but we know well that the Greek coin value was represented by its weight and was not indicated by the legend on it.

If, then, the use of implying different sizes like it was used in a written text on a papyrus, let's just imagine if the Kibyra's minters did not take advantage of carrying such big numbers on a little coin with only a 12-13 mm diameter...

As for what concerns the contemporary use of figures from different numbering systems within the same numerical notation, we must take in consideration what is carefully observed by T. Heath: “surely we do not ‘reckon with’ the numeral *signs* at all, but with the *words* for the numbers which they represent. For instance, (…), we do not conclude that the *figure* 3 and the *figure* 4 added together make the *figure* 7; what we do is to say ‘three and four are seven’. Similarly the Greek would not say to himself ‘γ and δ=ζ’ but τρεῖς καὶ τέσσαρες ἑπτά; and (…) this *would* indicate the corresponding addition ‘three hundred and four hundred are seven hundred’, τριακόσιοι καί τετρακόσιοι ἑπτακόσιοι, and similarly with multiples of ten or of 1000 or 10000. Again, in using the multiplication table, we say ‘three times four is twelve’, or ‘three multiplied by four = twelve’; the Greek would say τρὶς τέσσαρες, or τρεῖς ἐπὶ τέσσαρας, δώδεκα, and this would equally indicate that ‘*thirty* times *forty* is *twelve* hundred or one thousand two hundred’, or that ‘*thirty* times *four* hundred is *twelve* thousand or a myriad and two thousand’ (τριακοντάκις τεσσαράκοντα χίλιοι καὶ διακόσιοι, or τριακοντάκις τετρακόσιοι μύριοι καί δισχίλιοι). The truth is that in mental calculation (whether the operation is addition, subtraction, multiplication, or division), we reckon with the corresponding *words*, not with the symbols, and it does not matter a jot to the calculation how we choose to write the figures down”[19].

[19] HEATH T. (1981), pp.38-39.

Kibyra's mint officers, therefore, in creating numerical notations, made mental calculations using the words that denoted the numbers and did not pay too much attention to the symbols they used to express those amounts, especially since the numerical notations were notes for the mint internal use and could therefore, be designed in a way that was not always orthodox, according to methods immediately known only by the mint workers. As regards, in particular, the use of numbers drawn from the Acrophonic numbering system within figures expressed on the basis of the Alphabetical numbering system, let us not forget that the numerical symbols of the Acrophonic system were none other than the initial letters of the words indicating the numbers used by the mint officers in the mental calculation made to devise the notations themselves.

About the solution of the numerical notations reported on the Kibyra's coins, the author of this article makes an extensive use of the multiplicative principle. But is it really certain that the numbers placed side by side must be multiplied between each other? The confirmation of the correctness on this supposition derives from exercises done by a schoolboy on a wax tablet[20] in the VI-VII century AD, transcribed in fig.no.21. On this wax tablet, for example, the simple combination of the number ξ (60) to the number β (2) indicates that they are multiplied between each other giving the ρκ (120) result, reported immediately later; the juxtaposition of the number ξ (60) to the number γ (3) indicates that they multiply together with the ρπ (180) result, diligently annotated on the side, and so on.

The principle, has remained unchanged even in today's mathematical writing, according to which two juxtaposed numbers are multiplied together, concisely allowing to report on the coins even higher numbers: in fact, the high number that was wanted to be indicated was expressed indirectly and with a multiplication between two lower numbers.

That the resulting numbers from these multiplications are sums expressed in drachms is then confirmed by the fact that in common parlance the large digits used without any specification were implicitly referred to amounts in drachms. Thus in *The Knights* (829) of Aristophanes, Paphlagon threats to denounce the Sausage-seller because he stole "*treis myriades*", that means thirty thousand (3 x 10,000) drachms: in fact, the expression "*treis myriades*" implies "*drachmōn*" that means "of drachms". The same does Plutarch in *Marius* (34) using the expression "*myriadōn epta ēmisuos priasthai*" ("buy for 7 myriads and a half") that implies "*drachmōn*" ("of drachms").

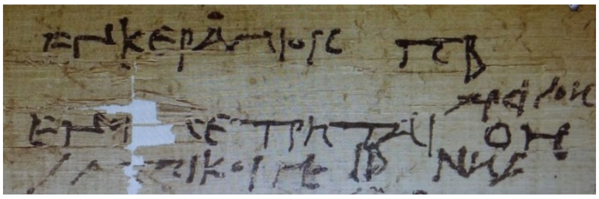
ξ α ξ	60, 1, 60
ξ β ρκ	60, 2, 120
ξ γ ρπ	60, 3, 180
ξ δ Σμ	60, 4, 240
ξ ϵ τ	60, 5, 300
ξ ς τξ	60, 6, 360

Fig. 21: Exercises with multiplications done by a schoolboy in the VI–VII century AD on a wax tablet; on the side transcription in Arabic numerals: the first number multiplies with the second giving the result on the right (the third number).

[20] The mentioned wax tablet is the Würzburg inv. K 1014, carried in BRASHEAR W. (1986), p.19.

ἀπὸ κερ(αμίων) ξβ
Θηβαίων ι
ἡμικαδίων ϛ

Fig. 22: Wine account on a Ptolemaic papyrus from 250 BC (transcription on the right). In the figure the detail of lines 4-6 of the papyrus "Greek P 564" conserved at the John Rylands Library in the University of Manchester. The papyrus is available online: http://luna.manchester.ac.uk/luna/servlet/detail/ManchesterDev



ἐν κεραμίοις πβ
ἐν οἷ[ς] μετρηταὶ Ἀρσινόης (ἑξάχοοι) οη
/ Ἀττικοὶ μετρηταὶ (δωδεκάχοοι) νη∠

Fig. 23: Lines 15-17 from the papyrus containing the wine account. Translation: "82 jars (first line) containing 78 six-chous metretae of Arsinoe (second line), equal to 58½ twelve-chous Attic metretae (third line)". The metreta was a capacity measurement unit used for liquids that corresponds to 38,88 liters and the chous (in Greek *choos* or *chous*) was one of its submultiples that corresponded to 3,24 liters. At the end of the third line the sign similar to L stands for ½ (papyrus "Greek P 564" conserved at the John Rylands Library in the University of Manchester; ROBERTS C.H., TURNER E.G., 1952, pp.11-12).

As we have seen, the interpretation of the monograms, the understanding of their real nature (letters or numbers?) is not always easy. An example of such interpretative difficulties is provided by a Greek papyrus from Ptolemaic Egypt and datable to 250 BC in which are indicated the wine quantities contained in various listed containers. A part of this containers list is shown in fig.no.23: "contents of 62 jars (first line), 10 Theban jars (second line), 6 half-jars (third line)". Now is observed the first monogram of the group of signs reported at the end of the first line: they are the letters KEP, initials of the word *keramiōn* ("vases"), written in ligature to summarize as much as possible the word, while the last two letters are actually numbers (precisely the number 62).

In the subsequent line on the same papyrus containing the measurement of some wine quantities, a total is indicated first in a capacity measure for liquids used in the Ptolemaic kingdom (78 six-chous metretae of Arsinoe) and then in the capacity measure in use in Attica (58½ twelve-chous Attic metretae).

This papyrus containing the wine account reminds us that not all the monograms refer to people's names, as we would be tempted to believe, but also names of things and that some monograms are actually not composed by letters but by numbers, like I am trying to prove; it also reminds us that in the ancient world there was much more elasticity than what we imagine today in dissolving monograms, in understanding if they were referred to words, names or numbers and in carrying out equivalences between various unit measurements. It then does not seem strange to assume that in the numerical notations reported on the coins, other decimal orders were implied and figures taken from different numeral systems were used.

Returning to Kibyra's coinage it must be said that a bigger edition than the usual one million drachms is attested in other drachms issues like, for example, in the two distinct issues where the two coins in figure no.24 belong to the IC notation, dissolve in 10 from the Ionic system (I) x 200 from the same numbering system (expressed instead of with Σ with C, the lunate sigma symbol) = 2,000 thousands (implied decimal order) of drachms and, therefore, 2,000(,000) drachms.

1) IC = 10 (I) x 200 (C) = 2,000(,000) dr. 2) IC = 10 (I) x 200 (C) = 2,000(,000) dr.

Fig. 24: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; the symbol of the issue (club on no.1 and laurel crown on no.2) in left field; numerical notations and KIBYPATΩN below. No.1: Classical Numismatic Group, London, Mail Bid Sale 61, 25 Sept. 2002, lot 756, 2.48 g, 11 mm; no.2: Gorny & Mosch Giessener Münzhandlung, Munich, Auction 212, 5 Mar.2013, lot 2094, 2.67 g, 13 mm.

Even the reproduced drachms in figure no.25 belonged to the issue composed by two million pieces. While the coin no.1, fig.no.25, belongs to the first million drachms issue because it has the NC notation in which number 50 from the Ionic numeral system (N) multiplies with number 200 from the numeral system (indicated with the lunate sigma C, instead of with Σ) giving the 1,000,0(00) drachms result, the other coins, instead, belong to the second million drachms. In fact, on the coin no.2, fig.no.25, the OKA numerical notation dissolves in Argos' (O) 10 drachms x Ionic 20 (K) x Andania's (A) 1.000 drachms = 2,000,00(0) drachms. Even the numbers OCΔI reported afterwards on the coins no.3, fig.no.25, once multiplied by each other, gave the 200,000 tens of drachms amount that corresponds to two million drachms: in fact, Argo's (O) 10 drachms x Ionic 200 (indicated with the lunate sigma C, instead of with Σ) x Attic 10 (Δ) x Ionic 10 (I) = 2,000,00(0) drachms.

A dimension larger than one million drachmas (precisely 1,200,000 drachms) also had the emission to which the coins of fig. no.26 belong. This information comes from the notation reported on the reverse of the coin no.1 in fig.no.26, in the left field (behind the horse's rear legs), it is composed by number 30 from the Ionic numbering system (Λ) that multiplies with number 400 from the same system (Y) the result is 12,000 hundreds of drachms, equal to 1,200,0(00) drachms. This last digit is reaffirmed by the ΛY notation reported on the right under the horse's belly (exactly between the horseman's foot and the horse's front right leg): in fact, ΛY=400 x 30 = 12,000 hundreds of drachms. Instead, the T digit reported on the left under the horse's belly (between the animal's rear legs and the horseman's foot) indicate the part of the issue that is going to be minted that's T= 300 thousands of drachms, equal to 300(,000) drachms. The novelties do not finish here because above the ethnic for the first time a person's name appears: MOYCAIOC (Mousaios), the monetary magistrate called to supervise this specific part of the issue.

1) NC = 50 (N) x 200 (C) = 1,000,0(00) dr.

2) OKA = 10 (O) x 20 (K) x 1,000 (A) = 2,000,00(0) dr.

3) **OCΔI** = 10 (O) x 200 (C) x 10 (Δ) x 10 (I) = 2,000,00(0) dr.

Fig. 25: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; the symbol of the issue (caps of the Dioskouroi) in left field; numerical notations and KIBYPATΩN below. No.1: SNG Berlin, Phrygien, no. 3714, 3.29 g, 18 mm; no.2: SNG Berlin, Phrygien, no. 3713, 2.77, 18 mm g; no.3: Classical Numismatic Group, London, Mail Bid Sale 67, 22 Sept. 2005, lot 762, 2.93 g, 13 mm.

1) = =ΛΥ= 30(Λ)x 400(Υ)= 1,200,0(00) dr.
T = 300(,000) drachms
ΛΥ = 30 (Λ) x 400 (Υ) = 1,200,0(00) dr.

2) = = ΛΥ = 30(Λ) x 400(Υ) = 1,200,0(00) dr.
M = 1,000,0(00) drachms
EME = 5 (E) x 40 (M) x 5 (E) = 1,000(,000) dr.

Fig. .26: Silver drachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; numerical notations, magistrate's name and KIBYPATΩN below. No.1: Classical Numismatic Group, London, Electronic Auction 352, 3 June 2015, lot 141, 2.62 g, 16 mm; no.2: SNG Berlin, Phrygien, no. 3705, 3.09 g, 18 mm.

The coin no.2, fig.no.26, instead, is minted close to the 1,200,000 drachms final threshold achievement. While the notation reported behind the horse's rear legs (and indicating the issue's final threshold), remains unvaried, the notation reported on the left under the horse's belly (between the horse's rear legs and the horseman's foot), it is not T anymore but M that corresponds to number 10,000 from the Attic numbering system and means 1,000,0(00) drachms. The same one million drachms amount also refers to the other numerical notation, the one carried on the right under the horse's belly, between the horseman's foot and the horse's front legs: it's EME that is composted by number 5 from the Ionic system (E) that multiplies with 40 from the same system (M) the result is 200 which multiplies this time with the Ionic 5 (E) giving the final result that is 1,000 thousands of drachms, equal to 1,000(,000) drachms. To treat of this part of issue is the monetary magistrate IEPΩN that brings his name above the ethnic.

The issue's reconstruction appears incomplete because probably the issue was divided not only in two but in four parts: the first part from 1 to 300,000 drachms (coin no.1, fig. no. 26), the second part from 300,000 to 600,000-700,000 drachms, the third part from 600,00-700,000 to 1,000,000 of drachms (coin no.2, fig.no.26) and the fourth from 1,000,001 to 1,200,000 drachms. Obviously both the second and the fourth part of the issue, not represented in our reconstruction, have on the reverse, under the horse, specific numerical notations indicating the quantitative limit of that issue section and the magistrate's name who oversaw it.

The control system adopted in the issue just examined (a different monetary magistrate for each part of the issue) reminds us a lot about the one adopted in Athens during the New Style tetradrachms coinage period (196-86 BC), chronologically close to the ones that are minted in Kibyra and are in this study (166-84 BC). The Athenian New Style tetradrachms issues are divided in parts, they are distinguished on the reverse by letters in alphabetical order reported above the Panathenaic amphora[21], and handled by a different monetary magistrate that is supported by two other regular officials that follow the entire issue. Under the amphora, instead, a progressive number is reported that indicates the coins minting progress. To understand better this elaborated symbol system lets observe figure no.27 which reproduces some tetradrachms from the 166-165 BC. issue distinguished by the symbol with an anchor alongside a star. The letter Γ on the amphora on the reverse of the coins no.1 and no.2 indicates the third part of the issue with a series of 11 parts indicated with progressive letters from A to Λ. Reconstructing the whole emission with the anchor and the star symbol it is noted that within each part of the emission, distinguished by a different alphabetical letter reported on the amphora, a part of the coins have under the amphora the initials ME (coin no.1, fig.no.18), while the remaining part of the coins have the ΣΦ sign (coin no.2, fig.no.27). These two signs, interpreted as compound numbers and not like letters, reveal to be a numerical progression formed by two products: ME that is (5) x M (10,000)= 50,000 drachms (equal to 12,500 tetradrachms)[22], while ΣΦ is 200 (Σ) x 500 (Φ) = 100,000 drachms (equal to 25,000 tetradrachms). This meant that in each part of the issue there had to be 100,000 drachms and so, in reality, 25,000 tetradrachms. The coins on and on minted, then, contained a kind of "counter", which meant that the progressive notation informed what point the mint's production had reached, at the moment of their minting: they started with minting the first 50,000 drachms (indicated on the ME coins) and, once minted that quantity of coins, they aimed towards the 100,000 drachms amount (indicated on the ΣΦ coins). Once actually the amount of 100,000 drachms was minted (and so, practically 25,000 tetradrachms) they reset the "counter" and restarted minting a new series of 100,000 drachms (reported first with ME and then with ΣΦ under the amphora) indicated in a new part of the issue, above the amphora with the following alphabetical letter. For this reason, the parts of the issue were indicated with an alphabetical numbering (the letters on the amphora) and the quantity of coins falling into each issue's portion were indicated with the numerical progression (the numbers under the amphora)[23].

Once minted all the coins falling within a given portion of the issue, then, as well as restarting the numbering of the pieces minted, even the third magistrate was replaced (the third name on the reverse in the bottom right field) it was set aside the two regular magistrate that followed the whole

[21] The Panathenaic amphora were amphora full of oil obtained by the olive trees owned by the Temple of Athena that were awarded to the winners of the sporting competitions, celebrated every four years in Athens between all the Greeks with Ionic origin held during the Panathenaic Festival (*Panathenaia*).

[22] In fact, 50,000 drachms : 4 (value of each tetradrachm in drachms) = 12,5000 tetradrachms.

[23] So if the edition of every issue's portion is 100,000 drachms it is very easy to determine the issue's global edition: we will only have to multiply the amount of 100,000 drachms with the 11 parts of the issue and the result is 1,100,0000 drachms; since it deals with a tetradrachm's issue, 1,100,000 drachms correspond to 275,000 pieces minted. In fact 1,100,000 (issue edition in drachms) : 4 (value in drachms of each tetradrachm) = 275,000 tetradrachms minted during the issue.

issue: in the specific case the magistrate ΑΜΦΙΚΡΑΤΙ (coin no.1 and no.2, fig.no.27), that had supervised the coinage of the coins in the Γ series adding his name to the other two regular magistrates ΤΙΜΑΡΧΟΥ and ΝΙΚΑΓΟ, it was replaced by ΣΩΣΙΓΕ called to help the Δ series coinage (coin no.3, fig.no.27)[24].

1 2 3

Fig. 27: Silver tetradrachms minted in Athens in 166-165 BC. Obv: helmeted head of Athena *Parthenos* right. Rev: owl standing right, head facing, on amphora; letter on amphora, numerical notation below; ΑΘΕ above, anchor and star to left , the initial part of the monetary magistrate's name on the right; all within wreath. No.1: Classical Numismatic Group, London, Triton X, 9 Jan.2007, lot 241, 16.89 g, 29 mm; no.2: Classical Numismatic Group, London, Triton XVI Sessions 1 & 2, 8 Jan.2013, lot 391, 16.86 g, 30 mm; no.3: Ira & Larry Goldberg Coins & Collectibles, Auction 53, 24 May 2009, lot 1668, 16.9 g, 28 mm.

1)MK= 10,000 (M) x 20 (K) = 2,000,00(0) drachms
⊡ = 50(0,000) tetradrachms

2) B= B= 2(B) x 10(I) x 10(I)=200(0,000) drachms
⊡IA =50(⊡)x 10(I)x1,000(A)=500,000 tetradrachms

Fig. 28: Silver tetradrachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; in left field the symbol of the issue (panther holding a thyrsus on no.1 and cornucopia on no.2); numerical notations and ΚΙΒΥΡΑΤΩΝ below.
No.1: Fritz Rudolf Künker GmbH & Co. KG, Osnabrück (Germany), Auction 236, 7 Oct. 2013, lot 103, 12.75 g, 27 mm; No.2: Jean Elsen & ses Fils S.A., Bruxelles, Auction 132, 11 March 2017, lot 35, 11.75 g, 28 mm.

As well as the drachms also the tetradrachms minted in Kibyra have numerical notations: on these coins, in fact, the information is even more detailed because the issue size is indicated both in

[24] The interpretation of the monograms and the letters reported on the Athenian tetradrachms summarized in the text, have been accomplished by me in DE LUCA F. (2015a), pp.53-86, and in DE LUCA F. (2015b). Previously THOMPSON M. (1961), see for example pp.143-147, had proposed to interpret the letters on the amphora on the reverse of the Athenian New Style tetradrachms like elements that indicated the months of the year in which the coins would have been minted and as "control marks" the acronyms under the amphora which are followed without a precise order.

drachms and in tetradrachms. So on the coin no.1 in figure no.28 the MK notation corresponds to number 10,000 from the Attic system (M) x number 20 from the Ionic system (K) the result is 200,000 tens of drachms, equal to 2,000,00(0) drachms. To actually know how many tetradrachms were minted within this issue marked by the symbol of the panther holding a thyrsus it will be necessary to divide the edition in drachms by 4 (value of each tetradrachm in drachms). Here then that 2,000,000 drachms: 4 = 500,000 tetradrachms. This last quantity is indicated with the notation, always reported between the first notation under the horse's belly and its front legs, where the simplified Argos' original 10 drachms symbol (O) multiplies with Π (=5 according to the Attic numbering system) the result is 50 tens of thousands (*dekakismyriades*), that means 50(0,000) tetradrachms (and not drachms).

On the coin no.2, fig.no.28, the quantity of tetradrachms minted during the new issue distinguished by the cornucopia symbol, it was expressed in a way to not leave room for any doubts: the number = 50 consecutively multiplies with number 10 from the Ionic system (I) and with Andania's 1,000 drachms quantity (A) giving the precise 500,000 tetradrachms result. So much precision may have been motivated by the somewhat cryptic tenor of the numerical notation indicating the corresponding value in drachms of the issue: it was indicated with the notation, reported between the horse's rear legs and the horseman's foot, in which number B (2 in the Ionic system) consecutively multiplies with the two 10 numbers from the Ionic system (I) inserted so it looks like horns above the B giving a 200 tens of thousands of drachms, equal to 2,00(0,000) drachms. Probably the awareness that the notation could have been exchanged for BY, instead of BII, led the Kibyra's minters to indicate in an extremely clear way the correspondent edition in tetradrachms.

Also the double indication in drachms and in tetradrachms of minted coin volumes, used on the tetradrachms minted in Kibyra, remind us of Athenian New Style tetradrachms and in particular the first 28 issues of these coins from the total 114. In fact, the complex control system previously described (emission divided in portions, three magistrates for every emission of which one varied with the issue's portion variation) is only affirmed after the twenty-ninth emission onwards, while the coins belonging to the first 28 emissions reported on the reverse complex signs, explained by Margaret Thompson[25] like monetary magistrates' monograms, but that really are nothing more than ingenious and elaborated numerical notations indicating the issue's edition. On the reverse of the coin represented in figure no.29, for example, the issue's total edition is reported express both in drachms that in tetradrachms through two ingenious numerical notations that summarize very high digits in a very small space.

= = = 5(Π) x 800 (ω) = 400,0(00) tetradrachms

= = = 5 (ε) x 400 (Y) x 800 (ω) = 1,600,000 drachms

Fig. 29: Silver tetradrachm minted in Athens in 191-190 BC. Obv.: Helmeted head of Athena *Parthenos* right. Rev.: owl standing right, head facing, on amphora; AΘE above, numerical notation and the symbol of the issue (club) below;all within wreath. THOMPSON M. (1961), 19a, 16.97 g, 30 mm.

[25] THOMPSON M. (1961), pp.32-132.

The fact that the control and guarantee system adopted in Athens for its famous tetradrachms has been taken as a mould in Kibyra, is another confirmation that in this city, even though other languages were spoken as well as Greek, it was well-rooted in the Greek culture.

Particularly interesting are the numerical notations on the issue to which belong the two tetradrachms of figure no.30, marked by the symbol of the fly and characterized by halved size compared to the two previous issues. The edition in tetradrachms is reported between the horseman's foot and the horse's front legs: ΚΕΔ, in fact, it corresponds to number 25 expressed according to the Ionic numbering system (ΚΕ) x number 10 from the Attic numbering system (Δ) that gives a 250 thousands (*chiliades*) of tetradrachms result, equal to 250(,000) tetradrachms. The edition in drachms, instead, is fully reported without any simplification because the numbers ΟΑΔΙ, reported on the coin no.1 in fig.no.21 on two lines between the horse's rear legs and the horseman's foot, give place to the amount of one million drachms. In fact: Argos' 10 drachms amount (Ο) x Andania's 1,000 drachms amount (Α) x number 10 from the Attic system (Δ) x number 10 from the Ionic system (Ι) = 1,000,000 drachms.

1)ΟΑΔΙ =10(Ο)x1,000(Α)x10(Δ)x10(Ι)=1,000,000 dr. 2)Ο ΛΔΙ =10(Ο)x1,000(Λ)x 10(Δ)x10(Ι)=1,000,000 dr.
ΚΕΔ = 25 (ΚΕ) x 10 (Δ) = 250(,000) tetradrachms ΚΕΔ = 25 (ΚΕ) x 10 (Δ) = 250(,000) tetradrachms

Fig. 30: Silver tetradrachms minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: helmeted and cuirassed horseman galloping right, wielding spear and shield; the symbol of the issue (fly) in left field; numerical notations and ΚΙΒΥΡΑΤΩΝ below. No.1: Gerhard Hirsch Nachfolger, Munich, Auction 275, 22 Sept. 2011, lot 3920; 12.54 g, 28 mm, no.2: British Museum Catalog of Greek Coins (London), Phrygia, 131, n. 4; 12.45 g, 27 mm.

On the coin no.2 in figure no.30 the numerical notation indicating the edition in tetradrachms is absolutely identical (ΚΕΔ) while the notation indicating the edition in drachms is very similar to the one on coin no.1 with the only variant that the figures on it are not all gathered between the horse's rear legs and the horseman's foot (the numbers ΔΙ shifted near the horse's front legs) and that the symbol with which the 1,000 drachms amount is assigned is not the usual A but the Λ symbol (see the detail on the right in fig.no.30) which is a simplification of the another A symbol used in Andania's original numeric system to indicate that amount of money.

1 2

Fig. 31: Gold staters minted in Amphipolis in 330-320 BC. Obv.: head of Athena right wearing crested Corinthian helmet decorated with a serpent, and a pearl necklace. Rev.: Nike standing left holding a wreath and *stylis*; in left field, downward trident and numerical notation below wing; in right field ΑΛΕΞΑΝΔΡΟΥ. No.1: Gorny & Mosch Giessener Münzhandlung, Munich, Auction 146, 6 Mar.2006, lot 166, 8.58 g, 19 mm; no.2: Classical Numismatic Group, London, Triton VIII, 10 Jan.2005, lot 165, 8.63 g, 18,5 mm.

The use of the Λ symbol in Kibyra to indicate the 1,000 drachms quantity is not an isolated case, but there are traces of such use in other Greek coinages. For example, in the gold staters' issue coined in the name of Alexander the Great in Amphipolis (Macedonia) in 330-320 BC., distinguished by the trident symbol, on some coins (coin no.1,fig.no.31) the issue's edition is indicated with the Δ notation that was the symbol of 10 minas (equal to 1.000 drachms) in use at Acarnania (Δ) -it was reported in a more schematic way- and indicated the quantity of 1,000(,000) gold drachms. On other staters belonging to the same issue (coin no.2, fig.no.31), instead, the numerical notation indicating the 10 minas was reported in a different way with the same Λ symbol that we found on Kibyra's tetradrachm (coin no.2, fig.no.31). The identity of the obverse die from which the two coins came from allows us to understand that the notations reported on the reverse of the two coins have equal value and therefore, if Δ was equal to 1,000 drachms even the Λ symbol was equal to 1,000 drachms, so it appears confirmed the identification of the use of a simplified form of the Α sign from the Andania's numeral system to represent the 1,000 drachms amount.

 =  =  = 8(**H**) x 50(**N**) x 5(Π)=2,000 drachms

 = **HK** = 100(H) x 20 (K) = 2,000 drachms

Fig. 32: Bronze coin minted in Kibyra (Phrygia) in 166-84 BC. Obv.: young male head right, wearing crested helmet. Rev.: forepart of horse prancing right; numerical notations above in left field and in right field; ΚΙΒΥΡΑΤΩΝ from above left, down and circular (SNG Deutschland, Berlin, n. 8394; 8.53 g, 27 mm).

Numerical notations, after all, were found even on Kibyra's bronze coin issues. On the reverse of the coin in figure no.32, for example, the notation shown on the top left field corresponds to the product of number 8 from the Ionic system (H) x number 50 from the same numeral system (N) x number 5 from the Attic numbering system (Π): the final result of this multiplication chain is 2,000. This same figure is obtained multiplying among them the numbers in the field to the right, in front of the forepart of horse: in fact, 100 from the Attic numbering system (H) x 20 from the Ionic numbering system (K) have a 2,000 result that obviously is the value in drachms of this bronze issue. In fact, in Kibyra's coinage like in many other Greek coinages, when the editions were reported even on the bronze coin issues they were always expressed in drachms. In the case of an obol issue, for example, an edition of 2,000 drachms corresponded to 12,000 obols: if, in fact, an obol was the sixth part of a drachms, 6 obols (the ones contained in each drachms) x 2,000 (the issue's edition in drachms) = 12,000 obols minted.

As it has thus become apparent from this brief *excursus*, the monograms reported on the coins minted in Kibyra, like those that were found in many other Greek coinages, were not at all acronyms with an obscure and impenetrable meaning but efficient accounting annotations that helped manage the production of large quantities of fungible objects such as coin's issues.

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