SOME REMARKS ABOUT MONETARY POLICY IN THE REIGN OF BYZANTINE EMPERORS PHOCAS (602–610) AND HERACLIUS (610–641)

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Abstract: *Conclusions about the duration of participation in the circulation of the coins from the 6th–7th centuries are presented by analysing the coin composition of the collective finds from the studied period. The results show that the life span of specimens from this period is 60–80 years, even up to 100 years, as other researchers have also concluded. However, it was established that the coins minted between 527 and 602 AD circulated for half this time (i.e. 30–60 years) and dropped out of circulation within the same period (ca. 602 to ca. 629 AD). This time coincides with some administrative reforms in the organisation of the production of coins, but also with the production and distribution of an extremely large number of newly minted coins of gold, silver and bronze. These observations allow us to argue that, after 602 AD, a new monetary policy was formed in Byzantium, which had two main goals. Firstly, to increase the revenues from the production of coins and their subsequent distribution (by increasing the volume of coins produced and putting them in circulation, which necessitated the withdrawal from circulation of the 'old' coins). And, secondly, to optimise the production costs (by overstriking old coins, reducing the volume of bronze coinage, closing of mints and concentrating the production in Constantinople).*

Rezumat: *În articol sunt prezentate observații referitoare la durata circulației monedelor din sec. VI-VII, bazate pe analiza componenței tezaurelor din perioada cercetată. Rezultatele analizei arată că durata utilizării exemplarelor din această epocă a fost între 60 și 80 de ani, chiar până la 100 de ani. Concluzii asemănătoare au fost formulate și de alți autori. Pe de altă parte, s-a constatat că monedele bătute între anii 527 și 602 au avut o prezență de două ori mai scurtă (între 30 și 60 de ani) și au ieșit din circulație în aceeași perioadă, c. 602-c. 629. Perioada respectivă coincide atât cu reformele administrative privind organizarea baterii monedelor, cât și cu producția și răspândirea unui număr deosebit de mare de monede noi din aur, argint și bronz. Pe baza acestor observații s-ar putea trage concluzia că, după anul 602, în Imperiul Bizantin s-a format o politică monetară nouă, care a avut două scopuri principale. Primul a fost creșterea veniturilor din producția monetară și din răspândirea monedelor (prin creșterea volumului monedelor emise intrarea în circulație a exemplarelor noi impunea retragerea din utilizare*

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a celor „vechi”). Al doilea scop a fost optimizarea cheltuielilor de producție (prin surfraparea monedelor vechi, reducerea volumului de monede din bronz, închiderea unor monetării și concentrarea producției la Constantinopol).

In modern countries, research has been done on the duration of the participation in circulation of various coins in terms of metal and value. In most cases, the results show that the circulation time varies for the different denominations. In the absence of actions for forced withdrawal from circulation, with coins from the second half of the 19th century and the first half of the 20th century, this time is generally in the range of 50–100 years, and the average levels of coins dropping from circulation on an annual basis range from 0.67% to 2.2%[1].

When studying the early Byzantine coin complex from the fortress near the village of Odartsi (Dobrich Region), S. Torbatov focused on the problem of the duration of coin use. The author suggests, based on the situation at the village of Odartsi, that early Byzantine coins from the reigns of Justin I (518–527) and Justinian I (527–565) were in circulation until the second decade of the 7th century[2], i.e. their use lasted for 60–90 years.

Information on the duration of participation in the circulation of coins from the Early Byzantine period (6th–7th century) can be found in the collective finds from that age[3]. Each one of them is a small element of the real monetary circulation that has dropped out of use at a certain point in time. This point can be determined most generally by the latest coin from the finds, which serves as the *terminus post quem* for dropping the specific amount from circulation. Therefore, if a large number of collective finds from the Early Byzantine period are reviewed, conclusions can be drawn about the duration of circulation of the various coin issues.

The largest, in terms of volume, published database of collections from the Early Byzantine period to date is the edition *Trésors monétaires byzantins des Balkans et d'Asie Mineure (491–713)*[4]. The information on more than 360 coin hoards is summarized therein. From the observations of the monetary composition of these finds, it is possible to deduce what the duration of circulation of the individual coin issues was (**Table 1**).

Late Roman gold coins minted before 491 AD continued to be part of the monetary circulation during the first half of the 6th century. The data from the finds allow us to assume that gold coins of Anastasius I (491–518)[5], Justin I (518–527) and Justinian I (527–565) were circulating up to ca. 602 AD. Unlike some coins of Anastasius I and Justin I, which, in the finds that had dropped from circulation in the period 582–602 AD, are represented by one or two pieces, the coins of Justinian I are in much greater numbers, which suggests that they must have had further chronological potential for participation in the monetary circulation; for the time being, however, there is no information on the latter. The gold coins of Justin II (565–578) are the predominant

[1] Paterson 1972, p. 207–212; Cole 1976, p. 207–211.
[2] Торбатов 2002, p. 91.
[3] Morrisson 2002, p. 938.
[4] Morrisson *et alii* 2006, p. 113-430.
[5] The latest participation in the circulation of a gold specimen of Anastasius I is from Anatolia, with coins from 613–629 AD; Morrisson *et alii* 2006, no. 274.

part of the collective finds that had dropped from circulation in the last two decades of the 6th century, but after the year 602 AD, they are no longer found in hoards. The information from the collective finds permits the interpretation that the gold coins of Tiberius II (578–582) and Maurice (582–602) had circulated until ca. 626 AD.

The number of collective monetary finds that had dropped from circulation in the 7th century and the beginning of the 8th century is significantly smaller than the previous century. And yet, they make it possible to think that the life span of gold specimens of Phocas (602–610) and of Heraclius (610–641) had been involved in the monetary circulation until at least ca. 695 AD.

The observations on the duration of participation in the monetary circulation of the bronze coins from the Early Byzantine period show the following results. The collective finds containing Late Roman coins from the 4th–5th century were part of the monetary circulation until the reign of Justin II (565–578)[6]. The small module reform issues of Anastasius I produced between 498 and 512 AD participated in the monetary market until ca. 578 AD. The coins minted between 512 and 550 AD took part in the circulation until ca. 602 AD, and the issues of the period 550–565 AD were involved in the monetary circulation until ca. 610 AD. The bronze specimens of Justin II (565–578)[7], as well as those of Tiberius II (578–582)[8], can be found in collective finds with the *terminus post quem* 615/6 AD. The available information allows to suggests that the bronze coins minted during the reign of Emperor Maurice (582–602) were in circulation up to ca. 629 AD[9]. The bronze issues of Phocas (602–610) were in circulation until ca. 668 AD. Base metal coins produced in the period 610–616 AD were in circulation until ca. 685 AD, and those of the second part of the rule of Heraclius (610–641) minted between 616 AD and 641 AD were in circulation until ca. 717 AD[10].

The specified duration of circulation actually refers to only a few percent of the original minted quantity of coins. Over time, losses of circulating coins occur over and over again on various occasions. In modern society, the annual loss of coins in circulation is estimated to be approx. 2%[11]. This means that, in 45 years, only one-third of the original quantity of coins of one issue will be left[12]. One can only assume that, in the Antiquity and the Middle Ages, the percentage of loss of circulating coins per annum

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[6] The latest ones, containing minimi, were discovered during archaeological excavations in Sardes, among which there are also coins of Phocas (602–610); Morrisson *et alii* 2006, no. 298, 299, 301, 307.

[7] Sofia-Lozenets (Божкова 2000, p. 18–28; Morrisson *et alii* 2006, no. 73, *t. p. q.* 614/5 AD), Sardes (Morrisson *et alii* 2006, no. 300, *t. p. q.* 615/6 AD), Politika (Morrisson *et alii* 2006, no. 180, *t. p. q.* 615/6 AD) and Solomos (Morrisson *et alii* 2006, no. 187, *t. p. q.* 619/20 AD).

[8] Reselets (Юрукова 2001, p. 214–222, Morrisson *et alii* 2006, no. 239, *t. p. q.* AD 595/6), Balgarevo (Morrisson *et alii* 2006, no. 34, *t. p. q.* 601/2 AD) and Movileni (Morrisson *et alii* 2006, no. 358, *t. p. q.* 613/4 AD). In Anatolia, the latest find is from Sardes; Morrisson *et alii* 2006, no. 300, *t. p. q.* 615/6 AD.

[9] There are hoards with *terminus post quem* after 629 AD containing coins of Maurice, but I assume them as some exceptions. For example, the hoard of Nikertai (Syria) (534 sp.) comprises 3 solidi of Maurice and they represent only 0,6% of the total money value of this Syrian hoard, see Morrisson 1972, p. 31. The coin-find Constantinople-Kalenderhane "T" dropped from circulation after 661/2 AD, contains a half follis of 595/6 AD, see: Hendy 2007, p. 274.

[10] The latest find containing a follis (635/6 AD) and a half follis (639/40 AD) of Heraclius is Constantinople-Kalenderhane "AA" (27 specimens), with the last coins of Anastasius II (713–715) and probably of Theodosius III (715–717), see: Hendy 2007, p. 275.

[11] Paterson 1972, p. 210–212; Cole 1976, p. 211.

[12] Metcalf 1981, p. 15.

was higher. A comparison of the results on the duration of circulation of gold and bronze coins shows that the specimens of one emperor's rule, regardless of their metal, have relatively equal participation in the monetary circulation. There is a tendency to decrease the life span of coins in the Byzantine provinces in the Balkans and in Western Asia Minor (**Table 1**). If the Late Roman coins produced before 491 AD and the issues of Anastasius I and Justin I were in circulation for about 80–100 years, the coins minted between 527 and 602 AD circulated for half this time (i.e. 30–60 years). The issues of Phocas and Heraclius minted in the first half of the 7th century again have a longer period of circulation (60–80 years at least). The specified life span of gold coins in the 7th century confirms C. Morrisson's conclusions that gold coins minted in Constantinople in the period 7th–14th century were circulating for 60–80 years[13]. From the observations made, it can be seen that the coin issues with a shorter period of use had dropped out of circulation within one and the same period in time. This is the time from ca. 602 to ca. 629 AD, (the reigns of Phocas (602–610) and Heraclius (610–641)), when nearly all coins minted before 602 AD were dropped from circulation.

This same period of time (602–629) is probably when an extremely large number of newly minted coins were produced and spread. A study by C. Morrisson and V. Ivanišević noted the presence in 7th century collective finds of a large number of gold solidi of Phocas and Heraclius cut in the period 602–629 AD[14], as well as a large number of bronze folles of Heraclius produced during the first decade of his reign[15]. An increase in the production of gold coins in the early 7th century has also been established through the study of the coin dies[16]. Ph. Grierson also suggests that the gold solidi were minted in very great quantities throughout the 7th century[17]. Therefore, the fact that a large number of coins from that period are present in the collective finds known today suggests that a significantly larger number of coins were produced during this period compared to the time before 602 AD, without absolutizing the specific numbers that may also be influenced by chance.

In my opinion, the two trends mentioned in the period 602–629 AD – the dropping from circulation of coins minted before 602 AD and the spread of a large number of newly minted coins on behalf of the emperors Phocas and Heraclius, are manifestations of the monetary policy pursued by the Byzantine authorities on the Balkan Peninsula and in Western Anatolia. This new monetary policy of Byzantium coincides in time with some administrative reforms in the organization of coin production. The office of Sacred Largesses, which had been responsible for the minting of coins until that time, disappeared ca. 610 AD, and its functions were distributed among other services[18].

The said monetary policy of Byzantium was probably necessitated partly by the political events that lead to large losses of monetary quantities. The Avar and Slavic invasions after 578 AD caused the dropping out of circulation of a significant amount of

[13] Morrisson 2002, p. 938.
[14] Morrisson, Ivanišević 2006, p. 46, fig. 2a and p. 47–48.
[15] Morrisson, Ivanišević 2006, p. 49–50, fig. 4.
[16] Morrisson 2002, p. 937.
[17] DOC II-1, p. 10.
[18] Hendy 1985, p. 409-414; Morrisson 2002, p. 913.

coins, as evidenced by numerous finds from that time from the territory of the Balkan Peninsula[19]. A part of the circulating coins was also taken away by the invaders as booty. The amount of gold coins paid by the Byzantine government to the Avars from 574 AD, at least up to 626 AD, was probably also significant. The known historical sources point out that, over time, these payments increased from 80,000 solidi to 120,000 solidi per annum[20].

In the collective finds from Asia Minor containing coins of Heraclius (i.e., the hoards that had dropped out of circulation after 610 AD), the 'old' coins produced before 602 AD are also rare (**Table 2-4**). In Asia Minor, the years of Maurice's (582–602) and Phocas's (602–610) reign were peaceful and with no military conflicts. Therefore, if for the lands of the Balkan Peninsula the explanation that the military conflict with the Avar Khaganate was the reason for the 'disappearance of the old coins', then another explanation should be sought for the dropping from circulation in the first decades of the 7th century of the coin issues produced before 602 AD in the Byzantine provinces in Western Anatolia.

One possible explanation is that, under the reign of Maurice (582–602), the financial authorities tried to compensate for the loss of money in the Balkans by redirecting a part of the circulating coins in Anatolia to the problematic region. Due to the fact that the political situation in the Balkans did not change, the loss of coins also continued, which, I suppose, led to a shortage of currency in Anatolia. At the end of Phocas's reign, in order to solve the problem thus created, the authorities repeatedly increased the production and circulation of gold coins, as shown by the study cited above by C. Morrisson and V. Ivanišević[21]. The fact that the first step undertaken was the minting of gold solidi indicates, in my view, that they were the most important segment of the monetary system, which, together with the other gold and silver denominations, made up approximately 98% of the monetary value of the circulating coins[22].

In the reign of Heraclius, up to ca. 629 AD, the intensified minting of gold issues continued, but during his first regning years (610–616), the most significant (average annual) production of bronze coins for the 6th–7th centuries was organized[23]. These issues were spread in large quantities in some settlements of Moesia Secunda until 613/4 AD[24], in Scythia until 614/5 AD[25], and in Constantinople (**Table 5-6**) and other major cities in Western Anatolia until 615/6 AD (**Tables 7-9**). After the 6th regning year of Heraclius, the mass minting of bronze coins ceased, as did the supply of them by the Byzantine authorities to the imperial territories controlled at that time. The lack of specimens minted after 616 AD in the Balkans, in Western Asia Minor[26] and even in Constantinople, is, in my opinion, a result of the reduced production of bronze coins. In 615 AD, the minting of

[19] Based on the data used in *Les trésors monétaires byzantins des Balkans et d'Asie Mineure*, it is established that about 40% of all collective finds included in the dropped out of circulation during the period 565–602 AD and ca. 20% in the reigns of Phocas and Heraclius.
[20] Hendy 1985, p. 262-264.
[21] Morrisson, Ivanišević 2006, p. 46, fig. 2a–b.
[22] Михайлов 2018, p. 133, table 5.
[23] Morrisson, Ivanišević 2006, p. 50, fig. 4.
[24] Лазаренко 2003, p. 151-164; Михайлов 2010, p. 119.
[25] Gândilă 2008, p. 311-313.
[26] Morrisson, Ivanišević 2006, p. 50, fig. 4.

a new silver denomination, called *hexagram*, was commenced in comparatively large quantities[27]. With its intermediate position as monetary value between gold denominations, on the one hand, and the bronze ones, on the other, the *hexagram* replaced the need for a large volume of bronze folles in circulation[28]. It can be assumed that, in some settlements where a significant number of Heraclius coins minted during his first regning years were found, the monetary circulation continued after 616 AD as well. The accidental 'loss' of a considerable amount of coins implies that their issues had been in circulation for a long time, not just for several years.

Another way of withdrawing the 'old coins' from the monetary circulation of the Byzantine Empire in the period 602–629 AD was their mass overstriking during the reigns of Phocas and Heraclius[29]. The activities for coin overstriking began with the administrative organization of the recall of the selected coins from circulation and their delivery to the respective mint[30]. Apparently, judging by the particular result, in the period 602–615 AD, despite the probably constant military clashes with the Avars and Slavs in the Balkans, the war with the Sasanian Empire in the Middle East and the civil war between the supporters of Emperor Phocas and the rebels led by Heraclius the Elder (Exarch of Africa), the Byzantine administrative and financial authorities were able to carry out the necessary actions to collect the 'old' coins, transport them to a mint, overstrike, re-transport and put into circulation the already 'renovated' bronze coins.

It should be noted that the monetary policy presented to this point, which aimed to replace, where possible, most of the gold and bronze coins produced before 602 AD, was started under the rule of Phocas (602–610), an evidence of which is the abundant production of solidi in the period 608–610 AD and the mass overstriking of coins of previous Byzantine emperors[31] that was commenced. In most of the historical sources that have reached us, the rule of Phocas is described as catastrophic, 'leading to an almost complete ruin of the Roman state'; whereas Heraclius, who rebelled against him, was his political opponent and antipode, and after seizing power, he had to deal with the harm caused by the previous political regime[32]. In the case of monetary policy, the opposite is true. The actions commenced under Phocas's rule continued unchanged under Heraclius. If any change can be sought, it is that after 610 AD, there is rather an intensification in the activities started under the earlier Byzantine emperor.

As a result, the monetary policy started under the reign of Phocas and continued and partly modified[33] under the rule of Heraclius achieved the desired goals. According to

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[27] DOC II-1, p. 17-18; Morrisson 2002, p. 928.
[28] Михайлов 2017, p. 587–589.
[29] DOC II-1, p. 218–219.
[30] DOC II-1, p. 22.
[31] According to the chart presented by C. Morrisson and V. Ivanišević (Morrisson, Ivanišević 2006, p. 46, fig. 2a–b), the amount of bronze folles of Phocas in the collective finds known to modern science is relatively small, but given that a considerable part of the folles of Heraclius, minted 610–616 AD, were overstruck on specimens of the former (DOC II-1, p. 218–219), it can be argued that the folles produced in the period 602–610 AD were significantly more than the formal statistical result presents.
[32] For instance, M. Hendy also traditionally refers the beginning of administrative reforms related to the production of coins to a date after 610 AD, see Hendy 1985, p. 409.
[33] The innovations in the monetary policy under Heraclius were the introduction into the monetary system of the silver denomination hexagram in 615 AD, of which, at least initially, a significant amount of coins

the compositions of the collective finds known today (with *terminus post quem* 610–629 AD), in the segment of precious metal coins, mostly coins minted on behalf of Heraclius (approx. 55%) were in circulation at that time, the issues of Phocas account for a smaller share – about 38%, and all older issuers in total account for no more than 7%. For the bronze coins, the dominance of Heraclius's issues is more pronounced (approx. 84%), at the expense of Phocas's issues (approx. 9%), and the earlier coins have a similar presence (approx. 7%).

What assessment can be given to the monetary policy carried out by the Byzantine authorities in the Balkans and in Western Anatolia in the reign of Phocas and Heraclius, as presented above?

By 629 AD, with the gold coinage, there is no drastic change other than the renewal of the circulating coins. The denominations established as early as the 5th century were preserved. The weight standard, the quality of the metal (i.e. the high purity of gold) and the technical and artistic merits of the coins produced were maintained. Consequently, the part of the monetary system that carried over 90% of the monetary value[34] of circulation coins remained stable and of high liquidity.

In 615 AD, the monetary system developed in a positive direction with the introduction in circulation of coins made of silver (*hexagrams*)[35], thus adding to the monetary system a new value resource that was little used in the 5th–6th century. Thus, a large gap in the system of denominations between the gold tremis and the bronze follis was successfully filled.

For the bronze coins sector, replacement of the available composition with newly minted issues was also carried out initially, as was the case with the gold denominations, without changing the quality and monetary value of the produced (and overstruck) coins. However, after 616 AD, decline of the weight, the money value, the production quality and quantity of the minted bronze coins began. Some traditional mints (such as Cyzicus and Nicomedia) were also closed. The production of coins became concentrated almost entirely in Constantinople[36]. This development of the bronze coinage, which is generally regarded as a collapse[37], impaired the quality of monetary operations to a certain extent, but, on the other hand, it should be noted that even in its best periods, the monetary value of circulating bronze coins was several percent, whereas in the period considered it was about 1%[38].

The most important question is, what the meaning of the monetary policy pursued was, why it was good from the point of view of the rulers and why it was implemented by emperors who were political opponents; and when viewed on a more global scale, it can be argued that this policy was maintained almost unchanged over the next several centuries of the history of Byzantium.

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was produced, and the devaluation of the weight standard and money value and the reduction in the quantity of bronze coins.

[34] Михайлов 2018, table 2-5.

[35] Hendy 1985, p. 494-495.

[36] Constantinople became the centre of production of all types of coins that would spread in the Balkans and in Asia Minor – gold, silver and bronze, see: Hendy 1985, p. 417-420; Morrisson 2002, p. 913-914.

[37] DOC II-1, p. 6; Hendy 1985, p. 498.

[38] Михайлов 2018, table 2-5.

The production of coins as an activity is, in general, a profitable undertaking and provides added value to the organization implementing it[39]. In this particular case, the production of gold coins, and of solidi, first and foremost, was clearly well organized and providing sufficient revenues for the state, since the solidus remained virtually unchanged from the 4th to the middle of the 11th century. In my view, what was implemented through the particular actions after 602 AD, was that the production of solidi, which generated good revenues, was increased in volume, and this means that the state increased its revenue from this activity in this way. One of the key methods for putting newly minted coins into circulation in 602–629 AD was to have them replace the old issues. The production of silver hexagrams that was commenced must also have brought additional revenue to the fiscus[40]. With the bronze coinage, this approach was also used initially – the volume of a likely profitable production was increased[41]. The possible reason for the decline of bronze coinage after 616 AD is that it brought less total revenue compared to the production of precious metal coins, and its share in terms of monetary value was only 1–2% of the total value of the currency in circulation. Therefore, the financial authorities decided to limit it in volume, and with the closure of the mints that implemented it, the costs of maintaining it were reduced[42]. Probably the workers who carried it out were not left unemployed but were relocated to Constantinople to work for increasing the quantity of gold solidi and silver hexagrams.

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[39] The so-called Seigniorage in the modern sense of the term.

[40] In contemporary research, it has been accepted that there is no major difference between the nominal value of the hexagram and its metallic value, see Hendy 1985, 494; Morrisson 2002, p. 928. But the very fact that the production of silver hexagrams began in the years when there was a greater need for new sources of revenue (for instance, the seizure of precious metal from the churches in 621 AD) and for a reduction in government spending (such as a temporary reduction of the imperial rogai by half) rather indicates, in my opinion, that the minting of hexagrams produced more revenue than were the costs of implementing it.

[41] And yet, the state determined what their monetary value was when supplying them to the users, it determined their value during their circulation and also determined their value when withdrawing them from circulation or replacing them with new issues. Therefore, the monetary value of bronze coins always exceeds their intrinsic value. See: Morrisson 2002, p. 919-920.

[42] The intention to reduce the cost of bronze coinage can also explain the poorer quality of the coins produced.

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Table 1. Circulation duration of the Late Roman coins (used in 6th century) and the Early Byzantine coins (498-641 AD)

Bronze coins			Gold coins		
Minting period	Circulation duration (years)	End of circulation (probable date)	End of circulation (probable date)	Circulation duration (years)	Minting period
before 498	70 years. after 498	565	578	100-120	before 491
498-512	70-80	578	**602**	90-110	491-518
512-518	80-90	**602**			
518-527	70-80	**602**	**602**	70-80	518-527
527-538	60-70	**602**	**602**	40-70	527-565
538-542	60	**602**			
542-550	50-60	**602**			
550-565	40-60	**610**			
565-578	30-40	**610**	**602**	25-40	565-578
578-582	30	**610**	**626**	40-50	578-582
582-602	30-50	**629**	**626**	30-50	582-602
602-610	50-60	668	695	80-90	602-610
610-616	60-70	685	695	50-80	610-641
616-641	80-90	717			

Table 2. Hoards containing gold and silver coins of Heraclius (610-641)

No.	Finding place	last coin	491-518	518-527	527-565	565-578	578-582	582-602	602-610	610-641	641-668	668-685	685-695
365	**Udeşti**	613-616							1s	2s			
45	**Gorna Oryahovitsa**	629-632								10s			
95	**Sane**	613-616					3s	2s	4s	2s			
186	**Solomos**	616-625							3s	3s			
2	**Akalan**	615-638						1t	4s	12s 1h			
3	**Bakirköy**	610-613						1s	36s 2sem 7t	1s			
4	**Çatalca**	613-629					1s	4s	26s	121s			
338	**Mecitözü**	610-613					1s		1s 1x22	3s			
317	**Lesbos**	616-625							4s	28s			
318	**Lesbos**	616-625								17s			
324	**Lesbos**	616-625						4s 1sem 3t	139s 5t	136s 2sem 10t			
274	**Aidin I**	613-629	1t						1s	57s			
275	**Aidin II**	613-629					2s	2s	111s	101s			
133	**Athens**	668							1t	37s 4sem 15t	140s 16sem 21t		
314	**Antalya**	681-685								1s	3s	55s	
344	**Asia Minor?**	692-695			1s			3s	41s	142s	96s	61s	16s

Table 3. Collective coin-finds containing bronze coins of Heraclius (610-641)

No.	Finding place	Last coin	bef. 498	498-512	512-518	518-527	527-538	538-542	542-550	550-565	565-578	578-582	582-592	592-602	602-610	610-616	616-641	641-651	651-668	668-685
ad[43]	**Varna - Thermae**	613-614											1M		4M 10K	8M				
358	**Movileni**	613-614								1K		4M	12M 4K 3I			2M				
218	**Cari. grad**	613													2K	4M				
229a	**Sofia - Lozenets**	614-615					2M, 1K, 1E?	4IS	3IS 1IS?		5K		1M, 1K, 1 trem	2K	13M, 2K	5M, 1K				
115	**N. Anchialos**	615-616														21M				
180	**Politika**	615-616									1K					7M 8K				
320	**Samos**	612-613													1M	2M				
321	**Samos**	613-614														3M				
322	**Samos**	613-614														2M 2K				
323	**Samos**	613	1													5M				
100	**Thasos**	617-618														17M 2K	2M 1K			
101	**Thasos**	618-619														19M	3M 1K			
343	**?**	616-617														16M	1M 1M?			
187	**Solomos**	619-620									1K				1M	286M 9K	39M 3K			
148	**Delos**	624-629											1M		1M	18M	2M			
ad[44]	**NE Bulgaria**	624-629															10M 1?			

[43] Лазаренко 2003, p. 151-156.
[44] Михайлов 2017, p. 589.

359	**Obarseni**	655-658													3M 2Л 2K	6M	2M ne 3M 3K 6IB	2M 1K	2M 2K	
ad[45]	**Kalenderhane T**	661-662		1A 1E 3min? 12E?					3E		5E		1K		1K 2I 1E	1K			1M	
316	**Kalymnos**	669-674														1M	1M 1K	1M		1M

Table 4. Coin-finds from Sardes with bronze coins of Maurice (582-602), Phocas (602-610) and Heraclius (610-641)

No	Collective find	Last coin	ante 498	498-512	512-518	518-527	527-538	538-542	542-550	550-565	565-578	578-582	582-592	592-602	602-610	610-616	616-641	641-651	651-668
297	**Sardes AA, 1967**	591-592	9										3M						
290	**Sardes O, 1963**	602	51				1E						1E						
292	**Sardes BB, 1966**	602	2				1E?												
293	**Sardes R, 1966**	602	38				1A				1I? 1E?								
298	**Sardes Z, 1968**	602-604	2								1E			1M 1K	1K				
299	**Sardes DD, 1968**	606-607	2												1M				
301	**Sardes F, 1968**	606-607	158		1E		1E				2K 2E	1M	1K		1M 1E?				
307	**Sardes G, 1958**	608-609	1			1M	1E?								4M				
305	**Sardes HH, 1968**	613-614														4M			
300	**Sardes, 1913**	614-615									5M		2M	4M	2M	201M 2K			
302	**Sardes EE, 1968**	614-615													1M	12M			
304	**Sardes CC, 1968**	615-616													1K	5M			
306	**Sardes GG, 1968**	615-616														3M			
308	**Sardes FF, 1958**	615-616														10M			
309	**Sardes A, 1961**	653-654		1E			1B								1K				1M 12?
310	**Sardes II, 1966**	651-656																6M	3M

[45] Hendy 2007, p. 195-239.

Table 5. Constantinople – Kalenderhane. Ratio solidi per regnal year (in per cents)[46]

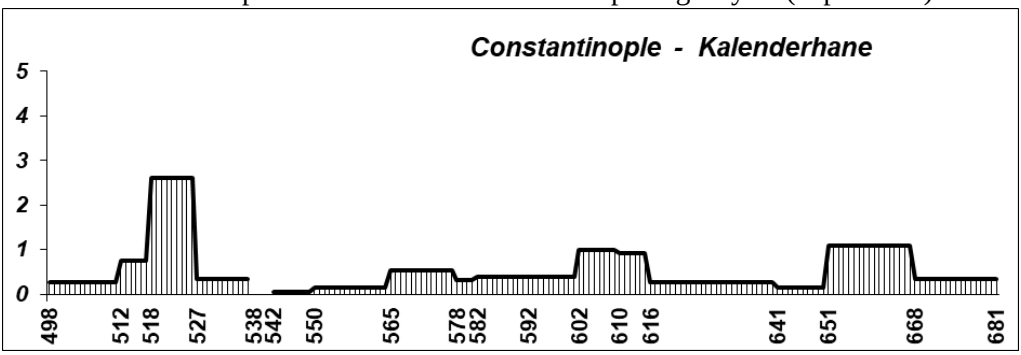


Table 6. Constantinople – Sarachane. Ratio solidi per regnal year (in per cents)[47]

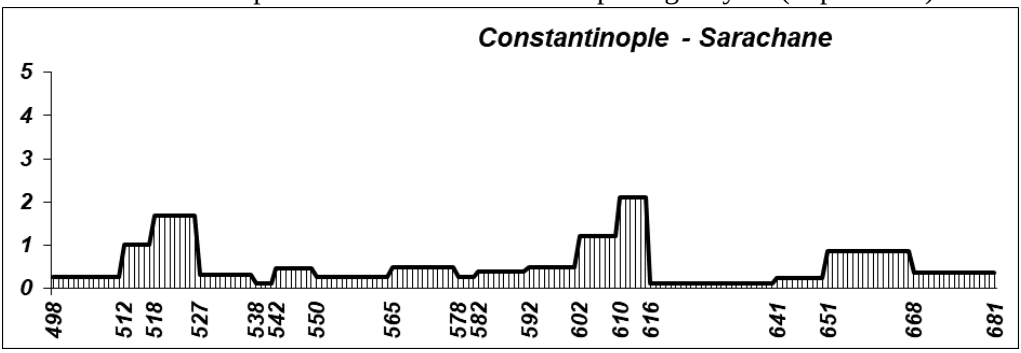
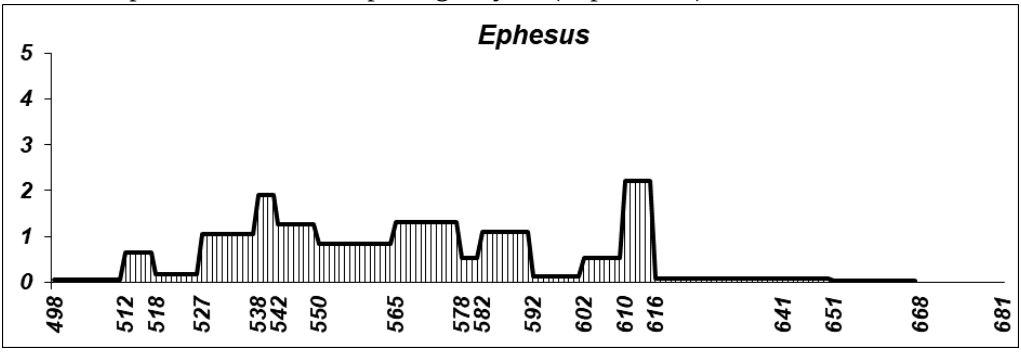


Table 7. Ephesus. Ratio solidi per regnal year (in per cents)[48]



[46] The histogram is made by using of data in Hendy 2007, p. 195-239.
[47] The histogram is made by using of data in Hendy 1986, p. 285-321.
[48] The histogram is made by using of data in Milne 1925, p. 389-390; Karwiese 1977, p. 262-266; Karwiese 1980, p. 131-132; Karwiese 1982, p. 154-155, 158-168; Karwiese 1983, p. 86-87, 91-96; Karwiese 1984, p. 123, 135-157; Karwiese 1987, p. 111-139, 149-155; Karwiese 1989, p. 106-107, 114-122; Karwiese 2003, p. 352-353; Schindel 2009, p. 225-230.

Table 8. Sardes. Ratio solidi per regnal year (in per cents)[49]

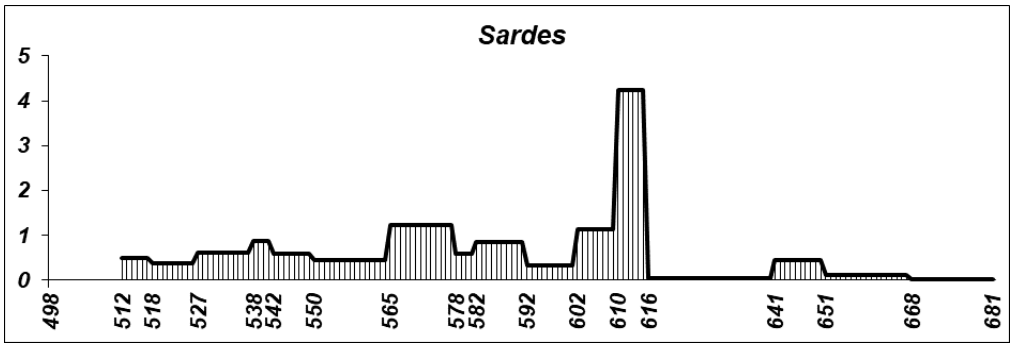
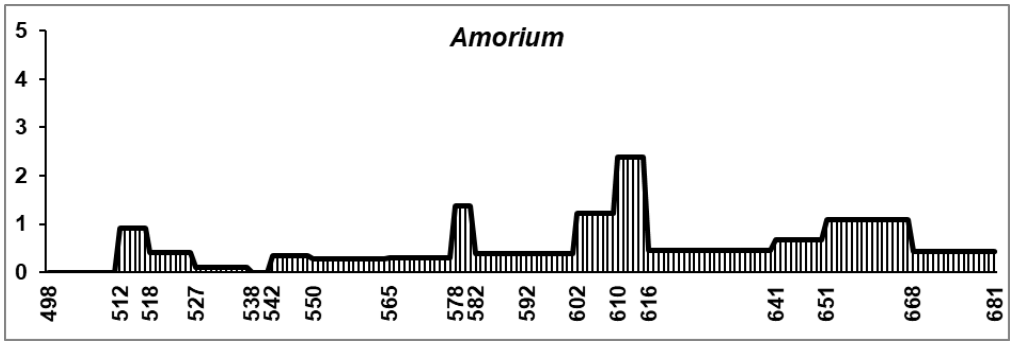


Table 9. Amorium. Ratio solidi per regnal year (in per cents)[50]



[49] The histogram is made by using of data in Bell 1916, p. 76-95; Bates 1971, p. 19-120; Buttrey 1981, p. 211-219.
[50] The histogram is made by using of data in Katsari et al. 2012, p. 129-136.