

Diocletians monetary reform

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Introduction

For a better understanding of this article it is necessary to explain some of my views on the monetary system prior to Diocletians monetary reform. I have expressed these views in a series of short articles published at www.academia.edu.¹ I will summarize them here briefly;

- In my calculations I used a weight of 327.45g for the Roman pound as described by Böckh (1838) and the official theoretical weights for the aureus, argenteus and the nummus.
- The denarius was driven out of circulation by the antoninianus, the coin that was re-introduced by the emperors Pupienus and Balbinus.
- The denarii of good fineness, struck from the reign of the emperor Nero to the emperor Commodus, became known during the third century under the name argentei.
- The silver content in the antoninianus was getting lower and lower over time and the coin eventually became so debased that the copper asses and brass sestertii became superior in value.
- Because there existed antoniniani of different fineness there must have been different values for these coins also.
- I think the writer of the Historia Augusta was not inventing all the coin names mentioned in his work. Because he wrote his history in the 4th century AD he might not have fully understood what was going on in the 3rd century.
- After Aurelians reform the old antoniniani were tariffed at one denarius communis and aurelians new coin with the mark XXI or KA were valued at two denarii communes.
- The mark XXI and KA on Aurelians new coins mean 20 of these coins were equal to one argenteus.

Diocletian 284-305 AD

After the emperor Carus had died under suspicious circumstances in the east his sons Carinus and Numerian became joint emperors. In November 284 AD the young emperor Numerian was on his way to Emesa when he was found dead in his litter. In the consternation after the find his father in law, the praetorian prefect Aper, was accused of having something to do with his death and was killed by one of the imperial guards. This guard was Valerius Diocles who was elected emperor a few days later. As emperor Diocles assumed the name of Gaius Aurelius Valerius Diocletianus. In 285 AD he confronted Carinus, the brother of Numerian in battle. What exactly happened is not sure, Carinus was killed during the battle or after the battle by his own soldiers. Fact is that he died and Diocletian became sole ruler of the empire. Diocletian appointed his comrade in arms Marcus Aurelius Valerius Maximianus Caesar and soon after he made him co-emperor. Diocletian took control of the eastern part of the empire while Maximian ruled the west. In march 293 AD they both appointed a Caesar as backup and as future successor to the throne. Gaius Galerius Valerius Maximian became Diocletian's Caesar and Gaius Flavius Valerius Constantius, nicknamed Chlorus (the pale one) became Caesar of Maximian. This way of ruling the Roman empire is called the tetrarchic system.

¹ C.G.J. Pannekeet - A personal view on the introduction of a new coin in the reign of the emperor Caracalla – Slootdorp 2013.

C.G.J. Pannekeet - A theory on how the denarius disappeared and the debasement of the antoninianus – Slootdorp 2013.

C.G.J. Pannekeet - Yet another view on Aurelians monetary reform – Slootdorp 2013.

The monetary reform, some theories

The first eight years of Diocletian's rule the coin circulation remained as it was after Aurelian's reform in 274 AD. During the year 293 AD however Diocletian and Maximian began a monetary reform that went further than Aurelian's reform. For the first time after many years new high quality silver coins were minted. They were struck at the same standard as the Neronian denarii, $\frac{1}{96}$ to the pound of silver (ca. 3.411g) with a fineness of approximately 90 to 93 percent. The coin was named the argenteus. During the 3rd century AD this name was also given to the denarii struck in the reign of the emperor Nero to Commodus. The weight standard of the aureus was changed from 50 to 60 to the pound (ca. 5.4575g). There is some debate about how many silver argentei equalled one new gold aureus of $\frac{1}{60}$ to the pound. Sear (1988) and Harl (1996) mention 24 and Schulten (1974), Kankelfitz (1991) and Depeyrot (1992) are saying probably 25. A figure of 20 to the aureus is mentioned by Lafaurie (1975).



Diocletian, aureus, 5.34g



Diocletian, argenteus, 3.65g

Next to the argenteus a new billion coin was introduced which became known as the follis. There is also some debate on how many of these coins equalled one argenteus. Depeyrot (1992) mentions four, Erim/Reynolds/Crawford (1971), Sear (1988) and Harl (1996) five, Lafaurie (1975) six and a quarter and Schulten and Kankelfitz mention eight. It is generally agreed that the name follis is incorrect but the name became settled amongst most coin collectors. The name follis however was used in antiquity but for a sealed bag containing a certain amount of coins, so collectors gave this name to the individual coin in the bag also. There are strong indications that the original name for the coin was 'nummus'. The argenteus is sometimes called the 'nummus argenteus' but there is also mentioning of a coin simply called the 'nummus'.



Constantian, nummus, 9.93g



Galerian, radiatus, 2.93g

Next to the nummus there were still coins being struck with the emperor wearing a radiate crown which Sear (1988) calls 'post-reform radiates'. They do not contain any silver and do not bear the mark XXI. So Diocletian's reform leaves some questions open on how the coins were related to each other and also what their value was stated in denarii communes. To give an answer to these questions it is also important to know what the price of one pound of gold and silver was during those days.

The theories

Sear (1988):

1 gold aureus \approx 24 silver argentei

1 silver argenteus \approx 5 folles

1 follis \approx 5 denarii

1 antoninianus \approx 1 post-reform radiate \approx 2 denarii communes

This means that one argenteus was valued at 25 denarii communes and one aureus was valued at 600 denarii communes. Sear calculated with an aureus of ca. 5.457g (60 to the pound) and an argenteus of ca. 3.411g (96 to the pound) containing ca. 3.189g of pure silver. He divided the aureus in 24 argentei so the gold:silver ratio comes to around 1:14.

Schulten (1974) and Kankelfitz (1991)

1 gold aureus \approx 25 silver argentei

1 silver argenteus \approx 8 folles (2-4% silver)

With these numbers the ratio gold:silver ends up at ca. 1:14,6. Schulten (1974) also gave the aureus a value of 1600 denarii communes. He came up with this value because according to him Bingen (1965) had proved sufficiently that according to Diocletian's edict of 301 AD the price for a pound of gold must have been 90.000 denarii communes.

Harl (1996) came up with the following table:

Denomination	293 – 300 AD	300 – 301 AD	301 – 307 AD
Aureus	600 dc	1200 dc	2400 dc
Argenteus	25 dc	50 dc	100 dc
Nummus	5 dc	12½ dc	25 dc
Radiatus	2 dc	2½ dc	5 dc
Denarius	1 dc	1 dc	1 dc

Harl states that Diocletian withdrew the price edict and doubled the value of all the coins above the denarius communis in the monetary edict of september 301 AD. The value of the nummus argenteus was doubled to 100 denarii communes and the nummus was tariffed at 25 denarii communes. Following his theory the argenteus was first divided into five nummi but after 301 this changed to four nummi. He further states that the nummus contained ca. 5% of silver while others speak of 3% and the RIC speaks of an average around 3.87%. The weight standard according to Harl was 32 to the pound giving the coin a weight of ca. 10.75 to 11.00 g. This is because he is calculating with a Roman pound of 322.5g. The marks K/V and XX/I on nummi struck in Antioch (RIC VI p.620) and Alexandria (RIC VI p.665) are explained by him as 20 sestertii \approx 5 denarii and 20 sestertii \approx 1 nummus. These marks do look like marks of value but his explanation does not seem logical to me. In his theory the ratio gold:silver comes to 1:14 because he values the aureus at 24 argentei.

The reform, a new theory

After reading many articles, interpretations and theories the reform could have been as follows. The weight standard of the gold aureus was changed from 50 to 60 to the pound (ca. 5.4575g). This gives the new aureus approximately the weight of $\frac{5}{6}$ old aureus of 50 to the pound (ca. 6.549g). At the time of Diocletian's reform (293/294 AD) the value of one pound of gold had risen to 60.000 denarii communes. This value was mentioned in an Egyptian papyrus dated around the year 300 AD as the official price for gold, 40 talents \approx 60.000 denarii communes (Skeat 1964). This gave the aureus a value of 1.000 denarii communes. I agree with Lafaurie (1975) that the aureus was not divided in 25 silver coins as before but in 20 silver coins struck at a standard of $\frac{1}{96}$ to the pound. This pound was not a pound of pure silver but a pound of silver with a fineness of about 90 to 93 percent. Out of each pound of pure silver valued at 5.000 denarii communes the mint could strike ca. 100 argentei.

The argenteus was thus valued at 50 denarii communes or $\frac{1}{20}$ of an aureus. The gold:silver ratio was 1:12 just as it was the case in Diocletian's price edict of 301 AD. The new billion coin (nummus) that was introduced around 294 AD was the successor of the sestertius. Five of these coins equalled one argenteus and each had a value of 10 denarii communes. Thus one aureus equalled 100 sestertii just as it had been before. In the reign of Diocletian the sestertius was still used to describe a certain amount of money and it seems that both sestertius and nummus were used to describe the value of $\frac{1}{100}$ of an aureus. The magister memoriae Eumenius stated in a speech held in 296 AD that his salary was raised to 'sexcentis millibus nummum (600.000 nummi \approx 600 aurei) and that his old salary of 'trecenta milia sestertia' (300.000 sestertii \approx 300 aurei) was therefore doubled by the emperors.² The coin is often named follis (plural folles) after the bag or pouch containing a certain amount of money. The individual coin from that bag of coins was given the name follis by collectors. I think the coin was there first and the habit of producing sealed bags containing probably 1.000 of these coins started later. If the name follis was ever used for the individual coin it could have been during the time that the coin did not have a fixed value any more opposite to the argenteus until the introduction of the centenionalis. The name centenionalis, a reference to the number 100, shows up during the mid fourth century, sometimes with the addition communis. In this article I will refer to the follies as the nummus. In more recent publications this also seems to be happening more often. It is further interesting to mention how certain types of coins were written down in Egyptian papyri. Solidi were written down as a capital letter N with between the legs of the N a small omikron, the Greek letter o. Denarii were written down as N° and researchers think that the symbol N° was used as a notation for the nummus (Sijpestein and Worp 1990).

The old aurelianus was still in circulation as $\frac{1}{20}$ of an argenteus and was integrated in the series at a value of 2.5 denarius communis. The much older antoniniani that were still circulating kept their value of one denarius communis. Because there was no longer a coin with a value of two denarii communes a new coin was introduced. The intention was probably to demonetise over time the aurelianus and the antoninianus and on beforehand a new radiate coin was introduced. These radiates do not bear the mark XXI and probably contain no silver. The standard seems to have been ca. 110 to the pound (ca. 2.97g). I know of one analysis done by the laboratory of the British Museum (RIC V part II, 206). This piece contained 88.84% copper, 1.0% tin, 2.28% lead and 7.88% of oxides etc. The name of this coin is unknown but to differentiate the coin from the antoninianus and the aurelianus I will refer to the coin as the radiatus. The smallest denomination in the series was the denarius communis and this coin was struck only on a small scale. The standard was ca. 220 to the pound (ca. 1.49g). On these coins the emperor is depicted with a laurel wreath and the reverse bears the legend VTILITAS PVBLICA, for public use. Incidentally some fractions of the nummus were struck, mainly during the years with festivities such as the decennialia of the emperors and the Caesars and during the time of the abdication of Diocletian and Maximian. The $\frac{1}{2}$ nummus coin can be seen as a dupondius and the $\frac{1}{4}$ nummus as an as. The smallest fraction was probably not an $\frac{1}{8}$ nummus but a denarius communis. These small fractions were often handed out to the public during the festivities.

So Diocletian's coins series was intended as follows:

- 1 aureus \approx 20 argentei \approx 1000 denarii communes
- 1 argenteus \approx 5 nummi \approx 50 denarii communes
- 1 nummus \approx 5 radiati \approx 10 denarii communes
- 1 radiatus \approx 2 denarii communes
- 1 denarius communis

² Eumenius was the magister memoriae (some sort of private secretary) of the Caesar Constantius. He was appointed in 296 AD to restore the destroyed rhetoric school of Autun (in Gaul, France). The text of the speech he held because of his appointment is translated and published in French by Landriot and Rochet (1854) with next to it the original text. The book is free from copyright and can be read on Google books.

The old aurelianus was integrated in the series at a value of 2.5 denarii communes and the old antoninianus was maintained at a value of 1 denarius communis.

Some calculations

Around the year 293/294 AD the ratio gold:silver was ca. 1:12 with a price of gold of ca. 60.000 denarii communes and a price of silver of ca. 5.000 denarii communes. With these numbers the approximate value of the nummus at its introduction can be calculated. With these prices one gram of gold had a value of ca. 183.23 denarii communes and one gram of silver a value of ca. 15.27 denarii communes. The nummus consisted mainly out of an alloy of copper, zinc and silver with some traces of tin and lead. The coin weighed ca. 10.233g (32 to the pound) and contained ca. 4.0% of silver. This means a silver weight of ca. 0.409g and 9.824g of copper, zinc, tin and lead. The value of the silver was 0.409g x 15.27 denarii communes = 6.245 denarii communes. The rest of the metal had a value of ca. 2.50 denarii communes bringing the total up to ca. 8.75 denarii communes. This is with a silver:copper ratio of 1:120 and a silver:brass ratio of 1:60. The coin was placed in the series slightly overvalued at 10 denarii communes at an exchange rate of five to the argenteus. Just as Aurelian's reform the reform of Diocletian did not restore the ancient monetary system completely but he did re-introduce the sestertius in the form of the nummus. This time the coin was not entirely made out of brass, making it a large heavy coin, but was kept much lighter by adding some silver to the alloy giving the coin its value. An aureus was worth 100 of these coins just as the value of the old sestertius had been. The coin was slightly overvalued and owed its success to the assurance that everybody had to accept the coins at its fixed value. By putting him slightly overvalued into the series there was no immediate danger that the metallic value would surpass its value in the monetary system if the price of silver would go up. However over a time span of seven years the price of silver did rise to such a level that it became necessary to reevaluate the value of the coins in circulation. Around the year 300 AD folles are mentioned with a value of 12.500 denarii communes (10 aurei). These must have been bags of money containing 1.000 nummi valued at 12.5 denarii communes or 200 argentei valued at 62.5 denarii communes. This means that by the year 300 AD the price of gold had risen to 75.000 denarii communes and the price of silver to 6.250 denarii communes a pound.

Diocletians edict of maximum prices

In the spring of the year 301 AD Diocletian's and Maximian's edict of maximum prices was proclaimed. The edict prescribed fixed maximum prices for all kinds of products and services such as food, clothing and salaries for certain types of professions. The prices are stated in denarii communes. In the period before the proclamation of the edict the price level must have risen to such an extent that the emperors tried to put a stop to this inflation by regulating the market prices for almost everything. In the edict they blame the inflation on the ever growing greed of the merchants and profiteers. They were also worried about the purchasing power of the soldiers which they wanted to protect. It is highly probable that market prices were already higher than was prescribed in the edict. The intention of the emperors must have been to restore the price level as it was some seven years before. This however turned out to be a fiction so the prices in the edict were probably higher than the price level of 293 AD but also somewhat lower than the recent market prices. According to the ancient writer Lactantius the edict soon became obsolete because it was hard to maintain due to lack of control. It seems the edict caused unrest and even higher prices because nobody wanted to sell or trade against the new prices.

The edict did mention prices for gold and silver but for a long time this part of the edict was not yet found. Because of this lack of information many researchers from before the '70s who studied the monetary reform did not know the exact prices for gold and silver. Some stated that the price of one pound of gold was ca. 50.000 denarii communes. In my opinion this was the price level around the year 265/270 AD. Bingen (1965) stated that the price must have been 90.000 denarii communes but this was too high. Luckily some new parts of the edict were found and even some fragments of an unknown edict which is called the monetary edict. On a copy of the price edict found at Aezanis, Asia Minor, the official prices for gold and silver are preserved as refined at the mints. The price was 72.000 denarii communes for a pound of gold and 6.000 denarii communes for a pound of silver.

The prices of gold are given in three different forms, pure refined gold (aurum obruza) in the form of certified ingots (in regulis). Gold in the form of coins (solidis pondum unum) and woven gold (auri neti). With this find it is quite sure that these were the correct prices for gold and silver. The prices show that the ratio between gold and silver was 1:12. The word solidis used here for gold coins is also very interesting because it is an indication that the gold aureus during the time of the edict was already described with the word solidus because of his fineness and reliability.

With an aureus of 60 to the pound and divided into 20 argentei you will get the following results: 72.000 denarii communes / 60 = 1.200 denarii communes. The value of the aureus/solidus appears to have had the same value as raw gold ingots. The silver usually was as pure as the Romans could refine it and was described as argentum pusulatum, pure silver. If you produce 96 argentei from one pound of pure silver the value of one argenteus will be 62.5 denarii communes. Out of one pound of pure silver you can however produce more pieces because the argentei were not made of pure silver. If you make them with a fineness of ca. 935/1000 you can produce 102.68 pieces out of one pound of pure silver giving the coin a value of 58.48 denarii communes. By producing 100 pieces out of one pound of pure silver the value of the coin is ca. 60 denarii communes and is equal to $\frac{1}{20}$ of an aureus.

The monetary edict

Diocletian's price edict gives us a view on price levels as desired by the emperors. They wished to see these price levels for various goods and services. These prices are with some certainty higher than they were around the year of the monetary reform (293/294 AD) but lower than the market prices in the months before the edict. Because the edict did not resort to the desired effect another drastic measure was taken by the emperors: by edict the coins in circulation were re-tariffed. In the former Roman town of Aphrodisias in the Caria region, modern Turkey, some parts of Diocletian's price edict were found but also some parts of another edict which is called the monetary edict. This edict dates from 1 September 301 AD (Erim, Reynolds and Crawford 1971). The edict gives new, higher values to coins in circulation during that time period. Some parts of the edict that are still visible read: (...) *argenteus centum denariis* and (...) *ti quinqva den(...)orum potentia*. The argenteus was re-tariffed at 100 denarii communes and another coin was raised in value to 25 or 5 denarii communes. The researchers are not sure if the original text was (*vigin*) *ti quinqva* or (*radia*) *ti quinqva*. They assume the original text was (*sed ut Nummi radia*) *ti quinqva den(ari)orum p(ote)ntia vige(ant)*. So a coin valued at 5 denarii communes kept his value. They don't think that the coin in question was the nummus who was re-tariffed at 25 denarii communes because specimens from the Alexandrian mint do exist with the mark XXI and specimens from the Siscia mint with the mark KV. This means that the nummus must have been valued at 20 denarii communes at that time and not 25. I think the second passage could be talking about the aurelianus who was re-tariffed at five denarii communes and I do agree that the nummus was valued at 20 denarii communes ($\frac{1}{5}$ argenteus). The part with the new value for the nummus and the other coins are however lost. The edict mentions new values for existing coins and one of those coins is called the bicharacta. The name was puzzling to the researchers who translated it as double coined or restruck coins. An explanation could be that the name referred to the double character of the coin in question (partly copper and partly silver). Each part of the coin was then stamped according to its own proper metal value. It is also stated that the name refers to the two persons (two characters) on the reverse of the coin. A lot of coins from the eastern mints had the depiction of two persons on the reverse but not all of them so I think this explanation can be ruled out. Personally I think the name refers to the two characters in the exergue of the aureliani, the mark XX on coins from the Latin speaking part of the empire and KA on the coins from the Greek speaking part of the empire. The partly preserved second passage than could have been as follows: (*nummi bicharac*) *ti quinqva den(...)orum potentia*, the coin with the two characters is re-tariffed at five denarii communes.

Table 2: overview of the different denominations and their value in denarii communes during certain periods in time.

Denomination	293 - 300 (official)	300 - spring 301 (market)	Spring 301 - 1 September 301 (official)	Since 1 September 301 (official)
Aureus	1000 dc	1250 dc	1200 dc	2000 dc
Argenteus	50 dc	62½ dc	60 dc	100 dc
Nummus	10 dc	12½ dc	12 dc	20 dc
Aurelianus	2½ dc	3 dc	3 dc	5 dc
Radiatus	2 dc	2 dc	2 dc	2 dc
Denarius	1 dc	1 dc	1 dc	1 dc

The table shows that in 293/294 AD the aurelianus became a coin that did not fit into Diocletian's coin series at a value of two denarii communes. The new aureus/solidus of $\frac{1}{60}$ to the pound was not divided into 25 but into 20 silver argentei. Because the aureus/solidus was still equal to 100 sestertii one sestertius did not equal five aureliani but four so it had to be re-tariffed at 2½ denarius communis. In the years thereafter the aurelianus had to be re-tariffed every time because of its silver content. With a price for silver in 301 AD of 6000 denarii communes a pound the metal value of the coin can be calculated. With this price 1 gram of silver costs ca. 18.35 denarii communes.

At a weight of ca. 3.898g ($\frac{1}{84}$ to the pound) and an average fineness of 4% the silver content of the aurelianus is ca. 0.156g with a value of 2.86 denarii communes and the copper weight also adds some value. If the tariff of the coin was not changed to three denarii communes the coins would have disappeared from circulation to melt them down. They were probably already getting scarce through wear and loss in circulation. It is also possible that the cashiers also were holding them back. Because there was no double denomination any more another double was created without any silver content and without the mark XXI, the radiatus. When the value of the coins in circulation was raised by the edict the price of gold became 120.000 denarii communes a pound and the price of silver at 10.000 denarii communes a pound. In the years there after the price of precious metals lowered a little only to rise again around the year 306/307 AD, see table 23.

The coins from Siscia with the mark XXI in the exergue (RIC part VI nrs. 110-125), the coins struck in Alexandria with the mark XXI in the field (RIC part VI nrs. 30-33) and the coins struck in Siscia with the Greek mark K V (RIC part VI page 665) are datable after the monetary edict of 1 September 301 AD. In these mints they wanted to make it clear that the value of the nummus had changed to 20 denarii communes. The mark XX I on these coins thus mean: 'this coin (I) is worth 20 denarii communes (XX)' and the mark K V is also stating that the value of the coin was 20 denarii communes (K) and that five pieces (V) were one argenteus'. The marks were only used in these two mints and over a short period of time. The mark was placed in the field but in Siscia also in the exergue what could have caused confusion because the aureliani also bore the mark XXI. Marking the coins with their value turned out to be not such a smart move because the value of the nummus would change again later.

In despite of some degree of inflation the coin series did remain in tact for quite some years. However it seems that Gresham's law started to become true over the years. The argenteus was not struck in great numbers and the ones that did come into circulation were probably hoarded soon after. It was more profitable to use the slightly overvalued nummus for all kinds of payments. The coin seems to have been widely accepted and was struck for a very long time during the reign of Diocletian and Maximian. The coins are still very common so they must have been struck in large quantities. This was probably the reason that the prices were rising causing some degree of inflation. The state however did not restrict the coinage of nummi probably because they also profited from the production.

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Images

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