

Oil for Rome during the 2nd and 3rd century AD: a confrontation of archaeological records and the *Historia Augusta**

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Abstract

It is well known that, according to the *Historia Augusta*, Septimius Severus introduced regular and official oil distributions in Rome. It is argued that this decision should not be interpreted to be a major change in economic policies, but merely an administrative reform to ease the shipment of oil amphorae. The archaeological evidence, inscriptions and legal texts clearly indicate that the imports peaked during the reign of the Antonines, suggesting that Severus neither started nor intensified the imports, but levelled out the structural differences between grain and oil traffic.

Keywords

Septimius Severus, oil imports, *annona*, amphorae, economic policies

Body text

It is well known that the *annona* or Roman food supply system during the empire did more than provide the capital's inhabitants with regular rations of grain. Although there can definitely be no doubt that the import of grain, whether grown on the imperial estates, levied as a tax or simply bought on the market, was the first and continued to remain the major objective of the *praefectus annonae* and his staff, in time other foodstuffs were added to the distributions. By the end of the 3rd century, Aurelianus introduced wine and pork as parts of the *annona*.¹⁾ Almost a century before Aurelianus' reform, Septimius Severus is said to have organised the first oil distributions as a new official branch of the food supply: at least, the *Historia Augusta* clearly states that Severus was the first to institute a daily allowance of oil for all times.²⁾ This was of course not the first time a Roman emperor had organised an oil distribution: we are also informed about the generosity of Antoninus Pius, be it by a rather superficial remark in his biography.³⁾ Yet, the passage in Severus' biography depicts his reform as a totally new development in Rome's supply system: from then on, oil would be abundantly and daily available to the citizens.

Anyhow, to incorporate oil in the urban food supply must have been quite an undertaking, both financially and logistically. One may wonder in what way Severus was able to raise the necessary resources for this innovation and above all, obtain the amounts of oil required for the immense population of Rome entitled to the distributions. It is true that in 197, Severus,

after having put an end to Clodius Albinus' rebellion, confiscated the estates of Albinus' allies in Gaul and Spain and incorporated them in the *aerarium*, thus acquiring not only large sums of money, but also without doubt oil-producing farms, especially in Baetica, which for centuries had been one of the major oil exporting regions.⁴⁾ Although we lack any information about the actual size of these estates, their productive capacity and the specific details of the exploitation, we do know that only three of the *fundi* were kept by Severus as his private property. The names of the three estates, or at least of the pottery factories or *figlinae* on the domains where oil amphorae were produced, are reflected in the stamps on the famous Dr. 20 amphorae, in which the Baetican olive oil was transported. Before the name of the *figlina*, the stamps clearly read AVGGGNNN, a reference to Severus and his two sons.⁵⁾

However, one can doubt that the oil from the newly acquired properties was enough to provide Rome's demand, even if the oil distributions, just like the grain rations, were merely intended as a supplementary contribution to the daily needs of the Roman citizen. After all, the main purpose of the *annona* was not to provide Rome with all the food her citizens needed or replace the grain and oil market, but to ease the problems connected with the daily demand of food and to prevent shortages and the possibility of consequent riots. Yet, even then, the amounts of oil needed for Rome must have far exceeded the quantities Severus could have at his disposal through the production on his own domains.

Hence, the aim of this paper is threefold, viz. to examine how exactly the new demands were dealt with, to compare the Severan distributions to those under their predecessors and consequently to assess the phrase in the *Historia Augusta*, which clearly ascribes the first regular and official distributions to Severus.

First of all, we need to look at the measures Severus had to take to ensure that the necessary oil amphorae arrived in Rome on a regular basis. This implies that the emperor had to regulate two different stages in the production and commercialisation of oil.

First, he was obliged to guarantee that, at all times, enough oil would be available for the *annona*. It is obvious that introducing a new item to the food distributions, which had been functioning - on the whole - rather smoothly for nearly two centuries, and failing to ensure a steady supply, would have been a political risk no emperor was willing to take. Suetonius' famous description of the *plebs urbana* pelting Claudius with pieces of bread during a period of shortage and rising grain prices is definitely revealing.⁶⁾ However, the procurement of oil could hardly have been a major issue.⁷⁾ It can safely be assumed that the three ways in which grain was gathered for the *annona*, also applied, or at least could be applied, for oil. First, large amounts of oil were produced on imperial domains. We already mentioned the confiscated estates in Baetica, which came into Severus' possession. The emperors also owned vast farmlands in northern Africa. Although the imperial domains in Africa were indeed mainly concentrated on the production of grain, parts of them were undoubtedly used to grow other crops. Imperial regulations reveal that the cultivation of vines was stimulated and it should not be a far-fetched assumption that a certain amount of parcels were also used for olive trees.⁸⁾ Secondly, oil was regularly levied as a *tributum* to be paid in kind, both in Baetica and Africa.⁹⁾ Besides these two ways of procurement, which are more or less outside of the economic market system, the Roman state could always rely on the stock and yields of private producers. Baetica, as well as the African regions, are known to have exported huge quantities of oil to Rome from the age of Augustus onwards, so the emperor never really had to fear for the availability of enough reserves. As for the way in which the state was able to obtain these amounts, we are well informed on the systems of *frumentum emptum*, in which grain was sold to the government at a fixed price, and the *indictiones* or obligatory sales.¹⁰⁾ Both could certainly be used as a precedent and parallel for the purchase of oil, in case the other supplies proved to be insufficient.

A more difficult problem, however, was the second phase: after the necessary quantities of oil had been gathered or bought, the amphorae had to be shipped to Rome. Considering the size of Rome's needs, a considerable amount of ships must have been involved in the oil transport. To grasp the intensity and extent of the commercial traffic, one only need to visit Monte Testaccio in Rome, where the piling of potsherds created an artificial hill, rising nearly 50m above the ground level. Recently, the number of amphorae shattered has been estimated at 20-25 million specimens. With each Dr. 20 containing about 70 litres of oil, one arrives at a total import of 1.400.000.000-1.750.000.000 litres from the beginning of Monte Testaccio under Augustus till the end during the reign of Aurelianus. This implies that, annually, about 5.185.000-6.480.000 litres, or 74000-92600 amphorae were shipped to Rome.¹¹⁾ These figures must obviously be approached with the greatest caution, because, as we will discuss later on, the oil import during the 2nd half of the 2nd century and the 1st of the 3rd century were far more substantial than in other periods. Moreover, surely not all of the amphorae transported to Rome were deposited at Monte Testaccio. The numbers only give an idea of the minimum order of magnitude we need to take into account.

Yet, it would be interesting to compare these numbers with the average cargo capacity of Roman ships to have an idea about the minimum transport means needed for the import. Although this kind of calculation can never be more than a very rough estimate of the actual state of affairs, it may reveal the extent of commercial networks needed to ship all the oil to Rome.

However, with the current state of research, it is only possible to make a very hazardous assessment, based on very few sources.¹²⁾ Still, a few literary fragments inform us about the size of ships used for the transportation of grain cargoes for the *annona*: they may be used as a starting point.

In 51 AD, Claudius offered *negotiatores* and *domini navium* special privileges if they agreed to work for the *annona*.¹³⁾ The minimum cargo capacity for the transport ships was set at 10.000 *modii* or 68 ton.¹⁴⁾ During the 2nd century, a similar regulation was put forward, now stipulating that *navicularii* were to offer five ships of 10.000 *modii* or one ship of 50.000 *modii*, if they still wanted to enjoy the special advantages.¹⁵⁾ Although the last passage clearly indicates the emperors' preference for larger grain ships, it also proves that 68 ton was a far more common cargo capacity than 425 ton. I therefore assume that the average capacity for ships not engaged in the bulk transport of grain to be closer to, say, 50 to 100 ton than to a few 100 ton.

Now, an empty Dr. 20 weighs about 30 kg and can contain more or less 70 litres olive oil, resulting in an even 100 kg per amphora. This implies that a ship can easily take aboard 500-1000 oil amphorae. Compared to the figures above (74000-92600 amphorae), this means that it would take roughly 100 to 150 voyages a year to supply Rome.

However, the assumption that these ships had only oil amphorae on board, is definitely not always true. We know from excavated wrecks that ships, departing from Baetica, had mostly mixed cargoes, consisting of fish sauce amphorae, oil amphorae, grain, metal ingots and other, archeologically less visible wares.¹⁶⁾ Therefore, the number of ships involved in the oil import must have been considerably higher, maybe even twice as much. Yet, we must also take into account that a ship could make more than one trip a year to Rome. According to Plutarchus and Plinius, one could sail from Gades to Ostia in less than ten days.¹⁷⁾ Adding a few days or a week for loading and unloading the ship, making repairs and doing business in the harbour, a shipmaster should be able to deliver the oil and sail back to Baetica in roughly a month. With Vegetius defining the sailing season from April-May till November, a maximum of seven voyages seems possible.¹⁸⁾ The problem is of course, that too many factors in our estimations are unknown. Few shippers will have sailed exclusively on the Gades-Ostia route.

Most of them will have moored in the ports of Tarraconensis and southern France, in Arles, Narbonne or Marseilles to make some commercial profit, before sailing to Rome. This is bound to have prolonged the voyage to Italy.

All these considerations make it nearly impossible to tell how many transporters were involved in the oil trade. Anyhow, an exact figure is not really important for our investigation. The most important conclusion is that, if Severus wanted to make sure the oil arrived in Rome, he had to rely on at least a few dozens of merchants. The Roman government was in fact unable to take care of the transport itself, because, although in the past, several historians have claimed otherwise, one can now safely discard the idea that the Roman state ever owned or controlled a merchant fleet.¹⁹⁾ Hence, Severus had no other option than to address the oil merchants and skippers, who had been supplying Rome during the first two centuries on a voluntary basis, before the government became an important partner in the oil import.

I have explained elsewhere how Severus tried to stimulate the transportation of oil amphorae, so I will only briefly recapitulate my previous conclusions.²⁰⁾ Severus' stimuli were essentially twofold. We know that several Roman emperors before Severus had bestowed legal and financial privileges on grain merchants and skippers who worked for the *annona*. Some of these advantages had also been given to *mercatores olearii* or oil merchants. I believe Severus merely extended these privileges for the transporters of the oil destined for Rome, so that they enjoyed the same benefits as the *navicularii* in charge of the grain import and now worked on the same level in the organisation of the supply system. Secondly, the emperor proved to be willing to take the legal responsibility for the oil cargoes during their voyage to the capital. This implied that if the ship was wrecked and the amphorae lost, the government would still reimburse the damage and accept full liability, a regulation which was of course extremely advantageous for the skippers. This second accommodation is by the way still visible in the evolution of the phrasing of the *tituli picti* or painted inscriptions on the Dr. 20 amphorae. Thus, the reform of Severus made sure that the Roman government could incorporate the oil merchants in the *annona* and therefore rely on a body of transporters, ensuring a regular and trustworthy oil import.

In order to assess the impact of Severus' decision as related in the *Historia Augusta*, and to what extent his reform was a novelty in the economic policies of the Roman emperors, we now need to compare the oil imports and distributions at the end of the 2nd and beginning of the 3rd century with those under Severus' predecessors, the Antonines. The literary sources we possess, however, don't allow us to shed any light on this problem. Apart from the short notice in Antoninus Pius' biography, mentioned above, oil distributions during the 2nd half of the 2nd century remain obscure. Therefore, we should turn to other than literary texts in order to evaluate the magnitude of the oil traffic and, if possible, the donations under the Antonines.

The first option is to look at the archaeological records at Monte Testaccio. Because the hill records more than 250 years trading activities, from Augustus to Aurelianus, it may present us an image of the evolution and extent of the oil import at various stages in Roman history. Before embarking on a statistical analysis of the deposits and composition of the hill, it may be useful to sketch briefly the nature of the amphorae Monte Testaccio is made of.²¹⁾

Almost 80% of the hill consists of sherds of Dr. 20 amphorae, in which the Baetican olive oil was transported all over the Roman world, from the *limes* in Germania to the port of Alexandria. Ideally, a Dr. 20 bears three different types of epigraphical information:

- **Stamps:** they usually inform us about the production of the amphorae in the *figlina*. A stamp may consist of a reference to the owner of the *figlina*, the name of the *figlina*, the person who produced the amphora, etc. Mostly, the information is restricted to an

abbreviation or the first letters of the *tria nomina*, which regularly hampers the interpretation of a stamp.

- *Tituli picti*: painted inscriptions which describe the various stages in the transport and commercialisation of the oil. Five different *tituli* are distinguished, indicated by α , β , γ , δ and ϵ . They give indications about the weight of the oil and the amphora, the skipper transporting the oil, the tax system etc.
- *Graffiti*: small signs or words scratched on the amphora *ante cocturam*, which are related to the production, or *post cocturam*, which refer to the owner of the oil or a secondary use of the amphora.

African amphorae on the other hand represent about 15-17% of the total amount. The epigraphy on these containers closely resembles the Baetican ones, with all three types recurring. Still, one has to be aware of the fact that African amphorae were less frequently stamped than Dr. 20, which makes them less 'visible' than their Spanish counterpart. Moreover, other features of the African amphorae make it likely they were reused after the delivery. Therefore, the extent of African imports might have been considerably higher than the percentages nowadays seem to imply.²²⁾

The remaining 5% includes wine and fish sauce amphorae from Spain and Gaul, which, for our further research, will not be taken into account.

According to the results of two decades of research on Monte Testaccio, the CEIPAC team has proposed the following models to understand the composition and growth over time of the famous hill (Fig. 1 and 2).²³⁾

A quick look on the drawing of the west side seems to indicate that, if we compare two periods of an approximately equal length, the combined amphorae layers of all the Severi may have been smaller than the combination of deposits of Marcus Aurelius and Commodus. The view from the east side on the other hand shows a major deposit from the first two centuries, with some smaller Post-Severan parts. From these graphs, it seems that in regard to the previous decennia, the innovation by Severus did not go hand in hand with an increase in amphorae import or oil trade. If before Severus the oil distributions only occurred on special occasions and Severus' initiative to incorporate oil in the *annona* was as original as the Historia Augusta claims, one would have expected at least a visible rise in the archaeological finds on Monte Testaccio. However, as impressions from drawings can be highly misleading, we should take a look at a statistical analysis of the findings on the hill.²⁴⁾

Before presenting the chronological distribution of oil amphorae, a few methodological remarks should be made.

In theory, the three types of epigraphy, briefly mentioned above, can be used as raw data. However, for the drawing of the graphs, I decided not to include the graffiti, because the graffiti *post cocturam* do not concern the commercialisation of oil and are more difficult to date than stamps and *tituli*. The stamps and *tituli* from the recent excavations on Monte Testaccio can easily be dated by their archaeological context. For the stamps published by Dressel in CIL XV, the conditions of the excavations are far less documented. I therefore combined the information of the stamps from Testaccio with samples of the same stamp, but from other excavations to get a rough indication about the date.²⁵⁾ *Tituli* can be dated more easily, as frequently, a consular dating is found. The name of the merchant bringing the oil to Rome can offer additional help, because sometimes they also appear in monumental epigraphy.²⁶⁾

The conclusions from the study of stamps and *tituli* can be seen in Figs. 3-8.

It should be obvious, however, that the numbers used to make up the graphs can hardly be taken at face value. Various methodological problems and distortions complicate the interpretation to such an extent that the results obtained must be carefully contextualised and compared with other kinds of evidence.

First of all, there are some major archaeological problems connected with the recent and ancient campaigns. Take the example of the pre-Antonine layers: due to the fact that these layers are covered with thousands of potsherds from the later periods, and the fact that excavations on the slopes or foot of the hill are nearly impossible from a merely practical point of view, we still possess very little archaeological evidence from Testaccio for oil imports during the Julio-Claudian or Flavian period. Next, little is known about the way in which the excavations during the 19th century were organised and conducted. What logic dictated the subsequent stages in Dressel's research at Testaccio? Were the results of his excavations representative at all for the composition of the hill? Which layers were studied in a more systematic way, which only superficially? Even the campaigns today can hardly give us a trustworthy image of the distribution of archaeological records. Due to financial restrictions, limited excavation time and the staggering amount of work to be done *in situ*, each campaign can only cover a few square meters of the surface of the hill. It is easy to understand that the results from one excavation will present the result of the very specific digging in one, maybe two layers of Testaccio. Therefore, although each year a little more of the hill's secrets are revealed with the utmost care and expertise, we only get small glimpses of the total picture. Yet, these problems are typical for the kind of archaeological research needed to open the economic archives hidden in the slopes of the hill and will most likely continue to aggravate the research in the decennia to come.

The second kind of complication is inherent to the records we are dealing with. As for the stamps, certain *figlinae* had been producing amphorae for several generations. A specific stamp and his alternative phrasings and typologies may well have existed for two centuries. Although I included different categories for these stamps in the graphs, it is possible that in the future, a stamp which was until now regarded as being produced under the Antonines, may have continued to exist during the reign of the Severi and vice versa. Thorough excavations in the Baetican region of the Guadalquivir may, to a certain level, solve this problem. Secondly, the amount of African stamps presented here is, as already noticed, likely to be too low.²⁷⁾

Tituli pose us yet for another problem. At Monte Testaccio, amphorae are only seldom recovered as a whole, but usually smashed to pieces. Trying to reconstruct the objects can be compared to making a jigsaw puzzle without knowing how many pieces you need nor if they are all available. This means that, when during a campaign, a *titulus* α is found, and the next week a δ , the fragments may belong to the same object, but are not recognised as such. This way painted inscriptions may, when used for statistical analysis, outweigh the actual amount of objects. Secondly, a mere matter of production and painting technique may cause the Dr. 20 *tituli* to be more visible than the African inscriptions: since the excavations during the nineties, only small collections of African *tituli* have been discovered. Archaeometric analysis has shown that due to the shape and texture of the amphora and the composition of the ink, *tituli* on African containers were more fragile and easier to dissolve than their Spanish counterparts.²⁸⁾

All these remarks oblige us to use the graphs above with the greatest caution. Nonetheless, it is striking that the finds during the reign of the Antonines by far outnumber the Severan oil imports. Even if we take into account a large margin of distortion, the differences are still remarkable. The graphs seem to confirm what we could at first sight gather from the reconstruction drawings (Fig. 1 and 2).

The overall distribution of the records becomes even more interesting if we try to assign the *tituli*, which, as already noted, can easily be dated by the consular phrase, to the reigns of the individual Antonines and Severi. The results can be seen in Fig. 9.

The number of *tituli* for the reign of Antoninus Pius is simply stunning. Again, I do not believe the figures as such give an adequate idea of the real amount of oil imports, yet the differences they present can be revealing. It is e.g. particularly interesting to see that at the beginning of the reign of Severus Alexander, the figures suddenly start to rise again. According to the *Historia Augusta*, it was exactly Severus Alexander who restored the oil distributions to their former size, after Elegabalus had diminished them.²⁹⁾ Although we should not be too optimistic, this fact may indicate that the graphs as we have them today, must not be completely discarded. Still, if we are to confront oil imports under both dynasties, we should compare the graphs with other sources, for which the contextualisation is less complex.

We already pointed out that the Roman government had to make contracts with dozens of oil traders, who shipped the amphorae from the coasts of southern Spain and Africa to Ostia. One can imagine that on these sea routes, ships with oil cargoes or oil as part of the cargo were regularly wrecked. These wrecks are usually first-rate archaeological contexts for the study of ancient ship building and various aspects of maritime trade. For the last three decades, underwater archaeology has made some major contributions to our knowledge about the organisation of sea-borne commerce: without the excavation of wrecks, studies on the composition of the cargoes, the wares transported, commercial relations and the people involved in the exchanges would have been virtually impossible.³⁰⁾

Therefore, it would be interesting to see if the study of Mediterranean wrecks can somehow enlighten the problem of the oil trade in the 2nd and 3rd century. The distribution of wrecks transporting oil amphorae can be seen in Fig. 10; the chronological division into single oil cargoes and mixed ones is represented in Fig. 11 and 12.³¹⁾

Again, the use of the graphs seems problematic: first, the numbers of wrecks excavated are low and one can therefore wonder if they are at all representative. Secondly, not all wrecks are thoroughly investigated. As remarked several times in Parker's catalogue, reports often mention what can be seen, without starting an excavation. The reasons for this are usually connected with a lack of financial means and the difficulties of an excavation at great depth. However, the graph presenting the total number of oil cargoes shows a striking similarity with the stamps and *tituli* distribution at Monte Testaccio. Again, after a steady increase, the peaks in the oil trade seem to coincide with the reigns of Antoninus Pius and Severus Alexander, just like we saw for Testaccio.

The distribution of single and mixed cargoes over time is also interesting to note: during the 1st century, the majority of ships transported mixed cargoes, mainly a combination of oil, wine and fish sauce. It is exactly during the 1st century that the Spanish agricultural production found its way to the Italian markets. The traders' decision to opt for mixed cargoes is indeed very understandable: Baetican wine, olive oil and *garum* were relatively new on the market and by offering a variety of these products, the merchant was guaranteed to find customers and make a considerable profit. However, during the 2nd century and mainly the reign of Antoninus Pius, and again in the 3rd under Severus Alexander, we see an increase in single oil cargoes. These may very well reflect a change in the government's economic policies: we already know from the passage in Severus Alexander's biography, that he restored oil distributions to a higher level than under the reign of Elegabalus. This decision must of course

have stimulated traders to ship oil to Rome, which can possibly be reflected in an increase of wrecks.

Combining the graphs from the stamps, *tituli* and wrecks may suggest that oil imports already started to increase with the beginning of the Antonine period, which, in turn, can indicate that Severus' reform of adding oil to the *annona* might not have been such a radical novelty after all. It seems that huge distributions were already characteristic for the Antonine period. However, the discussed archaeological records are not the only indications to assume an increasing oil traffic for the government during the 2nd half of the 2nd century.

A few inscriptions indicate that already under the Antonines, oil was very likely to have been part of the *annona*, as the text of the documents hint at the import from Baetica and Africa being organised by the *praefectus annonae* and his administration and the existence of close ties with traders and skippers.

The first, and undoubtedly most famous inscription is the one set up for Sex. Iulius Possessor by the *scapharii Hispalenses*.³²⁾ The part of Possessor's career which is of particular interest to our research is the phrase *adiutori Ulpii Saturnini praefecti annonae ad oleum Afrum et Hispanum recensendum item solamina transferenda item vecturas naviculariis exsolvendas*. Little is known about Ulpius Saturninus, the *praefectus annonae* during whose office Possessor was an *adiutor*.³³⁾ He held office at the beginning of the reign of Marcus Aurelius, as the inscription mentioning *Imp(eratoribus) Antonino et Vero Augg(ustis)* points out. The position of Possessor, on the other hand, is less clear, although his responsibilities are explicitly stated: his duties included the gathering and inspecting of the oil (*recensendum*), the organising of the import (*transferenda*) and the payment of the transportation charges to the skippers (*exsolvendas*).³⁴⁾ However, it is less clear whether the function of *adiutor ad oleum* (...) was an integral part of the administrative *cursus*, or merely an exceptional and temporary office. We also know Possessor from two inscriptions found in Mactar.³⁵⁾ In one of them, the phrasing of his office is slightly different but undoubtedly means the same: *adiutor praefecti annonae ad horrea Ostiensia et Portuensia*. Before trying to determine the exact nature of this office, it may be interesting to discuss in a brief overview the former interpretations given to the inscription.

According to Pflaum, Possessor's *adiutor* office must have been a temporary ad hoc creation to facilitate the *annona* after the war against the Parthians (162-166): he connected the office with the final victory in the Parthian war, when the Roman emperor was likely to have held major food distributions.³⁶⁾ Some fifteen years later, Pavis d'Escurac followed the interpretation put forward by Pflaum, but also considered a shortage and the plague as possible causes for Possessor's task.³⁷⁾ Remesal Rodríguez rightly pointed to the fact that, if Possessor was assigned to his office as part of the celebration of a Roman victory, it would be odd that neither of the two inscriptions remembering Possessor's career refer to this particular occasion, as other texts did not fail to mention.³⁸⁾ He proposes to see Possessor's office in connection with the first war against the Marcomanni (165-175) and the *annona militaris*: according to Remesal, the oil Possessor had shipped was destined for the Roman troops.³⁹⁾ However, the phrasing in the inscription from Mactaris reads *ad horrea Ostiensia et Portuensia*. Thus, the text indicates that the oil's destination was Ostia and Portus, the harbours where all the products for the *annona* of Rome arrived. There is on the other hand no indication that the oil was going to be redistributed to supply the Roman troops. We can use Remesal's own line of thinking, applied to refute Pflaum's and Pavis d'Escurac's suggestions, to ask why no reference was then made to the particular destination of the oil, if it was indeed meant for military supply. As a matter of fact, other inscriptions commemorating the supply

of Roman troops regularly add the specific context in which the food stuffs were going to be used.⁴⁰⁾

Considering the phrasing of the inscription, I suggest the oil was destined for the distributions in the city of Rome, like Pflaum and Pavis d'Escurac have done, but I agree with Remesal that there is no need to connect Possessor's office to the Parthian war. In fact, I see no need to link the inscription with any particular occasion, as indeed no reference is made to a specific context. Therefore, in my opinion, this inscription may be considered as a testimony to the fact that during the reign of Marcus Aurelius, oil imports in Rome were already organised by the central *annona* administration. Possessor's function consisted in organising the collecting and transportation of oil in Baetica and Africa and to make sure the skippers responsible for the voyage to Rome received the *vecturae*. We already know from the graphs of stamps and *tituli picti* that during the Antonine period, oil from both regions reached Rome as a part of the *annona*. Yet, Baetican imports far outnumbered the use of African oil. From this point of view, it is revealing that Possessor's next office was *procurator ad ripam Baetis*. In this function, he was responsible for the maintenance of the canals of the Guadalquivir and, more in general, the navigability of the river.⁴¹⁾ It does not come as a surprise that exactly at this stage of his career, an inscription was dedicated to him by the barge skippers from Hispalis.

Secondly, in an inscription found in Ostia, the oil traders from Baetica honour their patron, M. Petronius Honoratus, who, as a *praefectus annonae* in 144-146 and *praefectus Aegypti* in 147-148, was highly involved in the urban food supply.⁴²⁾ This inscription proves beyond doubt that in the middle of the 2nd century, there were close connections between the *annona* administration and the Baetican oil merchants. Moreover, the fact that Honoratus was patron of the *negotiatores olearii* allows us to make two important conclusions: first, the merchants must have been organised in a professional association, although the inscription fails to mention the exact term.⁴³⁾ Because the oil traders were apparently operating as an association, this would ease their incorporation in the *annona* system, as we know that the organisations of skippers, the *corporata naviculariorum*, had been cooperating with the supply system from the beginning of the 2nd century onwards.⁴⁴⁾ It would have been convenient for the Roman government to use the same manner of making contracts and offering similar stimuli and privileges to an association of *olearii* as was already done for the *navicularii*. Secondly, because the oil merchants co-opt a *praefectus annonae* as their patron, the collaboration can hardly have been non-recurring: it is instead likely that the traders took care of oil imports for the *annona* on a regular basis.

Moreover, the *curators* mentioned in the inscription, Cassius Faustus and Caecilius Hospitalis, can also be connected to the oil trade via the *tituli picti* β , which generally mention the trader's name. Caecilius Hospitalis belonged to one of the most important families involved in shipping oil to Rome, the Baetican DD. Caecilii. From the end of the 1st till the middle of the 2nd century, both monumental epigraphy from Rome and Spain and the *tituli* bear witness of the commercial interests of this family. Hospitalis is attested several times as an oil trader.⁴⁵⁾ Although the second *curator*, Cassius Faustus has until now not been encountered on the *tituli*, his family was undoubtedly engaged in oil commerce: *tituli* document an association of Cassii and an inscription from Sevilla mentions a certain M. Cassius Sempronianus as *diffusor olearius*.⁴⁶⁾

Thirdly, there is also evidence that African oil traders worked for the *annona*, in exactly the same way their Baetican colleagues did. In Rome, an inscription was found, dedicated by the African grain and oil merchants in honour of C. Iunius Flavianus, who was most likely *praefectus annonae* at the end of the reign of Hadrianus or the beginning of Antoninus Pius.⁴⁷⁾ Again, we encounter oil merchants in a close connection to the urban supply system.

Moreover, the *mercatores olearii* act together with the grain traders, who without doubt entered into contract with the *annona*. The fact that the inscription was found in the capital and that both groups of traders joined to set up the inscription is a clear indication that African oil was destined for the Roman people and that amphorae transport was arranged and stimulated by the central government.

One last observation should be made concerning the monumental epigraphy. Up till now, the names of five individual *diffusores olearii* have come down to us.⁴⁸⁾ Three of them are remembered in inscriptions found in Rome. Four *diffusores* can, with relative certainty, be assumed to be working for the *annona* during the years 130-165. Only one of them, Hermesianus, is thought to have been active in the oil trade under the Severi.⁴⁹⁾ Both the chronological and spatial distribution of the inscriptions seems to suggest that in the Antonine age, several families of oil merchants were already working for the *annona*. The fact that most of them are attested in the monumental epigraphy of Rome also indicates that, at one time or another, they must have resided in the capital, most likely for commercial reasons. Once again, we are confronted with several indications that oil imports during the reign of the Antonines must have been higher than previously assumed.

Yet, there is more. In the *Digesta*, two small chapters refer to oil merchants working for the *annona*. The first one was compiled from the works of Scaevola, who is known to be a member of Marcus Aurelius' *consilium principis* and possibly a teacher of Septimius Severus.⁵⁰⁾ The short fragment reveals that, in order to enjoy the special privileges the Roman government offered to skippers for the food supply, both the *navicularii* and the *mercatores olearii* were to invest half of their fortune in the transport business. The text, which was probably written in the last quarter of the 2nd century, thus indicates that the same rules applied to the skippers, who were definitely engaged in supplying Rome with grain, and the oil merchants. More important, the law stipulates that if the oil merchants fulfilled the conditions of the contract, they would be freed from *munera publica* for no less than five years. This implies that the privilege offered here did not respond to an exceptional occasion or a specific shortage, but that oil imports continued on a regular basis. Moreover, a period of five years was typical for contracts with the Roman government, so we can safely conclude that at this point, the *annona* dealt with the oil merchants and the grain skippers in a very similar way.⁵¹⁾

In the second text, which can easily be dated because it includes a rescript from Marcus Aurelius and Verus, the grain and oil merchants supplying the Roman market (*οἱ σῖτον καὶ ἔλαιον ἐμπορευόμενοι εἰς τὴν ἀγορὰν τοῦ δήμου τοῦ Ρωμαικοῦ*), are once again mentioned together with the *corpora naviculariorum*.⁵²⁾ As in the previous fragment, the compensations for the transport seems to have been exactly the same for both professional organisations.

These two laws indeed confirm that during the Antonine period, regular contracts with oil merchants assuring the supply of Rome were made. Whatever the reform was Septimius Severus is said to have made in the oil distributions, he could surely rely on the network of relationships his predecessors had left him.

Finally, the last kind of circumstantial evidence to point out the large oil traffic under the Antonines is to be found in Ostia. In one of the small rooms from the Piazzale delle Corporazioni, viz. *stationes* 51-52, a well-known mosaic depicts a ship with a cargo of amphorae (Fig. 13).⁵³⁾ The type of the amphora can easily be determined by the globular shape: the ship is transporting the famous Dr. 20 oil amphorae. After several excavations in the 1980's, it can now be generally accepted that most mosaics date from the period between

Hadrianus and Commodus. A number of other mosaics on the Piazzale present small texts referring to *navicularii*, mostly originating from African towns, from where grain for the *annona* was shipped to Rome.⁵⁴⁾ Hence, again we encounter people responsible for oil imports in a context closely linked with the organisation of grain trade and the *annona*.

Although some of the evidence put forward in the above paragraphs is certainly debatable and should not be used without solid contextualisation to put figures in perspective, nevertheless, one conclusion seems to emerge from the various discussions: the reform introduced by Septimius Severus, as described in the *Historia Augusta*, was not a complete innovation. His predecessors already supplied Rome with oil through a network of constant and trustworthy commercial organisations which, just like the grain merchants, were contractual partners working for the *annona*. How then are we to interpret the sentence in Severus' biography? In my opinion, the answer can be found in the phrasing of the *tituli picti* on Dr. 20 amphorae, which I have analysed elsewhere:⁵⁵⁾ what Severus did was not a new concept of including oil in the supply system (because oil distributions were organised by the *annona* under the Antonines), nor intensifying oil imports (because most of our evidence for oil traffic related to the supply system points to Antoninus Pius' reign as a peak), but reorganising the transport system and offering new stimuli to the merchants shipping the oil to Rome. Through this reform, he levelled out the differences between grain and oil traffic for the *annona*, thus fully incorporating the oil distributions in the supply system. If interpreted in the light of the evidence cited above, the *Historia Augusta* was right in calling Severus the initiator of the official oil distributions, as he created a single system to regulate all food imports for the *annona*. This was however an administrative accomplishment, not a change of economic policies.

Notes

* This paper was written during a stay in Barcelona at CEIPAC, one of the foremost research centres for Roman amphorae and oil containers in particular. At the excellent site <http://ceipac.gh.ub.es/>, one can find the outlines of the current archaeological excavations and dozens of publications in PDF. I would like to thank Prof. J. Remesal and his team for the invitation and the warm welcome I received. The numerous discussions and refreshing ideas of several members of CEIPAC deeply influenced my thoughts on the Roman oil import and have found their way to the present text. All errors are of course mine.

(1) SHA, *Aur.*, XXXV, 2: *Nam idem Aurelianus et porcinam carnem populo Romano distribuit, quae hodieque dividitur*. For more details of the meat distributions, see Herz 1988, 162-169 and 277-294; Gräber 1983, 90-97. For wine in the *annona*, see Chastagnol 1950, 166-183; Gräber 1984, 59-68; Tchernia 1986, 27-28.

(2) SHA, *Sev.*, XVIII, 3: (...) *ac populo Romano diurnum oleum gratuitum et fecundissimum in aeternum donavit*.

(3) SHA, *Ant. P.* VIII, 11: *vini olei et tritici penuriam per aerarii sui damnum emendo et gratis populo dando sedavit*. Nothing is known about the frequency or the extent of the distributions under the Antonines, though I will come back to this question later on. As the excavations on Mount Testaccio have not yet arrived at the Julio-Claudian and Flavian layers, very little information about oil distributions at the beginning of the empire is available. Hence, this paper will concentrate on the 2nd century.

(4) SHA, *Sev.*, XII: *Interfectis innumeris Albinii partium viris, inter quos multi principes civitatis, multae feminae inlustres fuerunt, omnium bona publicata sunt aerariumque auxerunt; tum et Hispanorum et Gallorum proceres multi occisi sunt. denique militibus*

tantum stipendiorum quantum nemo principum dedit. filiis etiam suis ex hac proscriptione tantum reliquit quantum nullus imperatorum, cum magnam partem auri per Gallias, per Hispanias, per Italiam, imperatoriam fecisset.

(5) The basic readings of the stamps in question are AVGGGNNN FIGVL BARBA, AVGGGNNN FIGVL CEPA and AVGGGNNN COL EARI F GRV, though many varieties have been found. For the study of these stamps, see Remesal Rodríguez 1980, 131-153; id. 1983, 91-111; Mayet 1986, 285-305, and in particular Berni Millet 2008. The one aspect of the exploitation of the estates which is certain, is the use of *coloni*, a situation comparable to the African imperial domains. The exact organisation though is still heavily debated on. Cf. Sáez Fernández, Chic García 1983, 193-210; Remesal Rodríguez, 2005.

(6) Suet. *Cl.* XVIII, 2: *Artiore autem annona ob assiduas sterilitates detentus quondam medio foro a turba conviciisque et simul fragminibus panis ita infestatus, ut aegre nec nisi postico euadere in Palatium valuerit, nihil non excogitavit ad invehendos etiam tempore hiberno commeatus.*

(7) Mattingly 1988, 33-56, offers a convincing analysis of the high yields the Mediterranean olive trees were capable of. See also Ramírez Sádaba 1980 and id. 1983; Brun 2003 and id. 2005.

(8) The *lex Manciana*, issued during the reign of Vespasianus to arrange the leases of imperial estates, provided special benefits for those who planted vines on fallow land. See Kehoe 1984. For the production and export of African olive oil, cf. Mrabet, Remesal Rodríguez 2007. The fact that Monte Testaccio, the famous hill of pot-sherds in Rome where amphorae destined for the *annona* were deposited, consists for nearly 20% of African amphorae, bears witness to the oil import from this region. In the 2nd, but especially during the 3rd century, the monopoly position of Baetican oil crumbled and we see a constant increase in the amount of African fragments (Fig. 3).

(9) De Salvo 1988. E.g., the town of Leptis paid a *tributum* in oil from Caesar to Severus (*B. Afr.* 97; *Dig.* L, 15, 8, 11).

(10) Plin., *Pan.* XXIX, 4-5; *Dig.*, VII, 1, 27, 3 and XXXIII, 2, 28.

(11) The calculations of amphorae density by Rodríguez-Almeida 1984 estimated the hill to contain 20 million amphorae. More recent excavations however arrived at a total amount of nearly 25 million. For more details, see http://ceipac.gh.ub.es/MOSTRA/u_expo.htm.

(12) For the cargo capacity of ancient ships and the various methodological problems connected with this question, see Wallinga 1964; Pomey, Tchernia 1978. Underwater archaeologists have excavated wrecks with cargoes ranging from a few tons to more than 450. Moreover, these wrecks are too dispersed in time and too small in numbers to be used as actual, trustworthy indicators.

(13) Suet., *Cl.* XVIII, 2-XIX, 1.

(14) Gaius, *Inst.* I, 32c; *Tituli ex corpore Ulpiani*, III, 6. For the weight of a *modius* grain, see Duncan-Jones 1976.

(15) *Dig.* L, 5, 3.

(16) Famous wrecks with this kind of mixed cargoes are Lavezzi A, Port-Vendres B, Chiessi, Sud-Lavezzi B, Ponte d'Oro, Sud-Perduto B, Arles IV and Saint-Gervais C.

(17) Plut., *Galba* 7; Plin., *Nat.* XIX, 1. See also Arnaud 2005.

(18) *Epit.*, IV, 39.

(19) Pavis d'Escurac 1974, 397-408, refutes the idea that Commodus organised a grain fleet, a thesis that was put forward based on an anachronistic fragment in the *Historia Augusta* (*Comm.*, XVII, 7-8).

(20) See Broekaert 2008a, 197-219, for a more detailed analysis.

(21) Rodríguez-Almeida 1980, 103-130; Aguilera Martín 2002; Remesal Rodríguez 2005.

(22) Mattingly 1988, 55 makes some interesting remarks about the destination of amphorae after their arrival in Rome. The fact that Dr. 20 was a type of amphora which was difficult to reuse due to the globular form, combined with the observation that African amphorae on the other hand were indeed recycled as a container, construction or burial material, can very well distort the present image of the oil import from both regions. Further research in this area is definitely called for.

(23) Both reconstructions are taken from http://ceipac.gh.ub.es/MOSTRA/u_expo.htm.

(24) To gather all the relevant data, I made use of the excellent database of amphorae epigraphy at the CEIPAC's website, mentioned above. Although the database is not freely available, it suffices to contact the webmaster to gain access. You can search for objects, stamps, *tituli* and graffiti with various possible combinations and restrictions. For the majority of the stamps and some of the *tituli*, drawings and pictures are included. For the stamps, I added the information from Blázquez Martínez et alii 2007, which, at the time of writing, was not yet included in the database. The available *tituli* were completed with the recently found *tituli* during the various CEIPAC campaigns on Testaccio. Not yet available in the database were the *tituli* published in Blázquez Martínez et alii 2001; id. 2003; id. 2007. I consulted the database a last time before concluding my text on the 21th of April, 2009.

(25) I would like to thank dr. P. Berni Millet for his very useful remarks on the spread and dating of *figlinae* in Baetica.

(26) See Eich [2004, 58-72](#), for a complete list of merchants know from both *tituli* and monumental epigraphy.

(27) See n. 22.

(28) Aguilera Martín 2007, 257-268 (in particular 259).

(29) For the evolution of oil distributions after Severus, see Broekaert 2008a.

(30) For a comprehensive, though a bit outdated introduction to nautical archaeology, see Gianfrotta, Pomey 1981.

(31) The graphs were compiled using the data collected in Parker 1992; the volumes of IJNA published after Parker's catalogue and the online database of wrecks available at the website of OxREP, the Oxford Roman Economy Project (http://oxrep.class.ox.ac.uk/index.php?option=com_ships&Itemid=121).

(32) CIL II, 1180: *Sex(to) Iulio Sex(ti) filio Quir(ina) Possessori / praef(ecto) coh(ortis) III Gallor(um) praeposito nume/ri Syror(um) sagittarior(um) item alae primae Hispanorum curatorii civitatis Romulensium Malvensium tribuno mi[l(itum) leg(ionis)] XII Fulminat[ae] / curatorii coloniae Arcensium adlecto / in decurias ab Optimis Maximisque / Imp(eratoribus) Antonino et Vero Augg(ustis) adiu/tori Ulp(ii) Saturnini praef(ecti) annon(ae) / ad oleum Afrum et Hispanum recen/sendum item solamina transfe/renda item vecturas navicula/riis exsolvendas proc(uratori) Augg(ustorum) ad / ripam Baetis scapharii Hispanen/ses ob innocentiam iustitiam/que eius singularem.*

(33) Pavis d'Escurac 1976, 348.

(34) Herz 1988, 138 believes *transferenda* refers to the shipment from Ostia to Rome. Although the *codicarii navicularii* are indeed one of Ostia's organisations of skippers working on the Tiber (e.g. CIL XIV, 170; CIL XIV, 185), it seems more likely that after the *recensenda* the transport to Italy is meant. Moreover, the word *navicularius* generally refers to skippers on the Mediterranean instead of to skippers on rivers.

(35) AE 1983, 976: *Apollini Patrio Aug(usto) / Sex(tus) Iulius Possessor praef(ectus) coh(ortis) Gall(orum) cura/tor numeri Syrorum sagittariorum item / alae primae Hispanorum trib(unus) mil(itum) leg(ionis) XII Fulminatae) / adlectus in decurias ab Optimis Maximisq(ue) / Imp(eratoribus) Antonino et Vero Augg(ustis) adiu/tor / praef(ecti) annonae ad horrea Ostiensia et / Portuensia proc(urator) Aug(usti) ad ripam Baetis / proc(urator) Aug(usti) Ostis ad annonam proc(urator) Aug(usti) / Alexandriae ad Mercurium / statuum*

aheneam transmare advectam d(onum) d(edit) ; CIL VIII, 620 mentions a dedication to Diana and is less important for this study. Cf. Picard 1968, 297-314. It is worth noticing that Possessor continues to work for the *annona* as a *procurator*.

(36) Pflaum 1960, 504-507.

(37) Pavis d'Escurac 1976, 127-128 and 190-191. This interpretation was also put forward by Le Roux 1986, 247-271, especially p. 254 and n. 45.

(38) Remesal Rodríguez 1991, 281-297; id. 1997, 74-75. Remesal refers to T. Flavius Germanus, *curatori triumphifelicissimi Germanici secundi* (CIL XIV, 2922).

(39) Although his interpretation of the inscription must definitely be seen in the light of Remesal's claim that the *praefectus annonae* was also responsible for the distribution of oil to the troops stationed at the Roman frontiers, this is not the place to discuss the limitations of the competence of the *praefectus annonae*. However, his reconstruction has been vigorously attacked by Wierschowski 2001, 37-61. Remesal (2002) tried to reaffirm his conclusions. For a comprehensive survey of the discussion, see Tchernia 2002, 319-324. Recently, W. Eck (2006, 49-57) has sided with Wierschowski.

(40) E.g. AE 1972, 626, an honorary inscription for Aurelius Mandrianus Longinus, who took care of the transport of the food during the Parthian wars under Gordianus III (παραπέμψων τὰ ἱερὰς ἀννώννας εἰς τὸ Σύρων ἔθνος τρίς). Other examples can be found in AE 1972, 628; CIL VIII, 822; CIL IX, 1582; CIL XI, 3104; CIL XIII, 1807; ILTun 1248.

(41) Remesal Rodríguez 1991, 289-295.

(42) CIL XIV, 4458: *M(arco) Petroni[o M(arci) f(ilio)] / Quir(ina) Honorat[o] / praef(ecto) coh(ortis) I Raet[orum] / trib(uno) mil(itum) leg(ionis) I Miner[viae] / P(iae) F(idelis) praef(ecto) alae Aug(ustae) P(iae) F(idelis) [Thrac(um)] / proc(uratori) monet(ae) proc(uratori) XX hered(itatum) / proc(uratori) prov(inciae) Belg(icae) et duar(um) / Germaniar(um) proc(uratori) a ratio[n(ibus)] / Aug(usti) praef(ecto) annon(ae) praef(ecto) / Aegypti pontif(ici) minor[i] / negotiatores ole[ari(i)] / ex Baetica patron[o] / curatoribu[s] / Cassio Faus[to] / Caecilio Ho[spitale]*. For the dating of Honoratus' career, see Pavis d'Escurac 1976, 343-344; Tchernia 1980, 155-160.

(43) Because all the associations connected with the *annona* are attested as *corpus*, we can assume the same could well apply for the oil merchants. In CIL VI, 29722, a *curator* of a *corpus diffusorum oleariorum ex Baetica* is known. Although the exact meaning of *diffusor* is still debated on, they were surely connected to the oil imports for the *annona*. Cf. Rodríguez-Almeida 1987-1988, 299-306; Chic García et alii 2001, 353-374; Rico 2003, 413-433; Canto 2004, 141-152 and most recently, Remesal Rodríguez 2008, 349-374.

(44) For the origin of the associations of skippers for the *annona*, see Broekaert 2008b, 692-706.

(45) All the sources are gathered and studied in Remesal Rodríguez 2004, 125-136 (especially p. 130-134). See also Tchernia 1980, 155-160; Granino Cecere 1994, 705-719.

(46) Loyzancé 1986, 273-284; Remesal Rodríguez 2004, 129.

(47) CIL VI, 1620: *C(aio) Iunio C(ai) f(ilio) Quir(ina) / Flaviano / praefecto annonae / proc(uratori) a rationibus proc(uratori) / provinciarum Lugdunensis / et Aquitanicae proc(uratori) hereditat(ium) / proc(uratori) Hispaniae citerioris / per Asturicam et Callaeciam / proc(uratori) Alpium maritimarum / pro magistro XX hereditatium / trib(uno) mil(itum) leg(ionis) VII Gem(inae) pontif(ici) minori / mercatores frumentari(i) / et oleari(i) Afrari*. For the date of Flavianus' career, see Pavis d'Escurac 1976, 340.

(48) D. Caecilius Abascanthus (CIL VI, 1885); D. Caecilius Onesimus (AE 1980, 98; Rome); C. Sentius Regulianus (CIL VI, 29722); M. Cassius Sempronianus (AE 1984, 526; Tocina); M. Iulius Hermesianus (AE 2001, 1186; Sevilla). For the literature concerning the *diffusores*, see n. 43.

- (49) Until recently, the activity of all the *diffusores* had been placed under the Antonines. J. Remesal Rodríguez (2008) has argued that, because a *titulus* of Hermesianus' son, M. Iulius Hermes Frontinianus, was found on an amphora bearing the post-Severian variant of the stamp PNNF, Hermesianus is likely to have lived during the reign of the Severi. However, in my remarks commenting the graphs of stamps, I have pointed out the methodological difficulties in dating stamps with a wide distribution. See also Ehmig 1998, 237-248.
- (50) *Dig. L, 4, 5: Nauicularii et mercatores olearii, qui magnam partem patrimonii ei rei contulerunt, intra quinquennium muneris publici uacationem habent.* For the background of Q. Cervidius Scaevola, see Kunkel 1967², 217.
- (51) For the duration of state contracts, see Sirks 1984, 108-109.
- (52) *Dig. L, 6, 6, 6 : Licet in corpore nauiculariorum quis sit, nauem tamen uel naues non habeat nec omnia ei congruant, quae principalibus constitutionibus ca<ut>a sunt, non poterit priuilegio nauiculariis indulto uti. idque et diui fratres rescripserunt in haec uerba: Ἡσαν καὶ ἄλλοι τινὲς ἐπὶ προφάσει τῶν ναυκλήρων καὶ τὸν σῖτον καὶ ἔλαιον ἐμπορευομένων εἰς τὴν ἀγορὰν τοῦ δήμου τοῦ Ῥωμαικοῦ ὄντων ἀτελῶν ἀξιῶντες τὰς λειτουργίας διαδιδράσκειν, μήτε ἐπιπλέοντες μήτε τὸ πλέον μέρος τῆς οὐσίας ἐν ταῖς ναυκληρίαις καὶ ταῖς ἐμπορίαις ἔχοντες. Αἰρεθῆτω τῶν τοιοῦτων ἡ ἀτέλεια.*
- (53) Picture taken from <http://www.ostia-antica.org/piazzale/corp51-2.jpg>.
- (54) An excellent, scholarly overview of the Piazza with pictures of the mosaics and details of the texts are available at <http://www.ostia-antica.org/piazzale/corp.htm>.
- (55) Broekaert 2008a.

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Illustrations and graphs

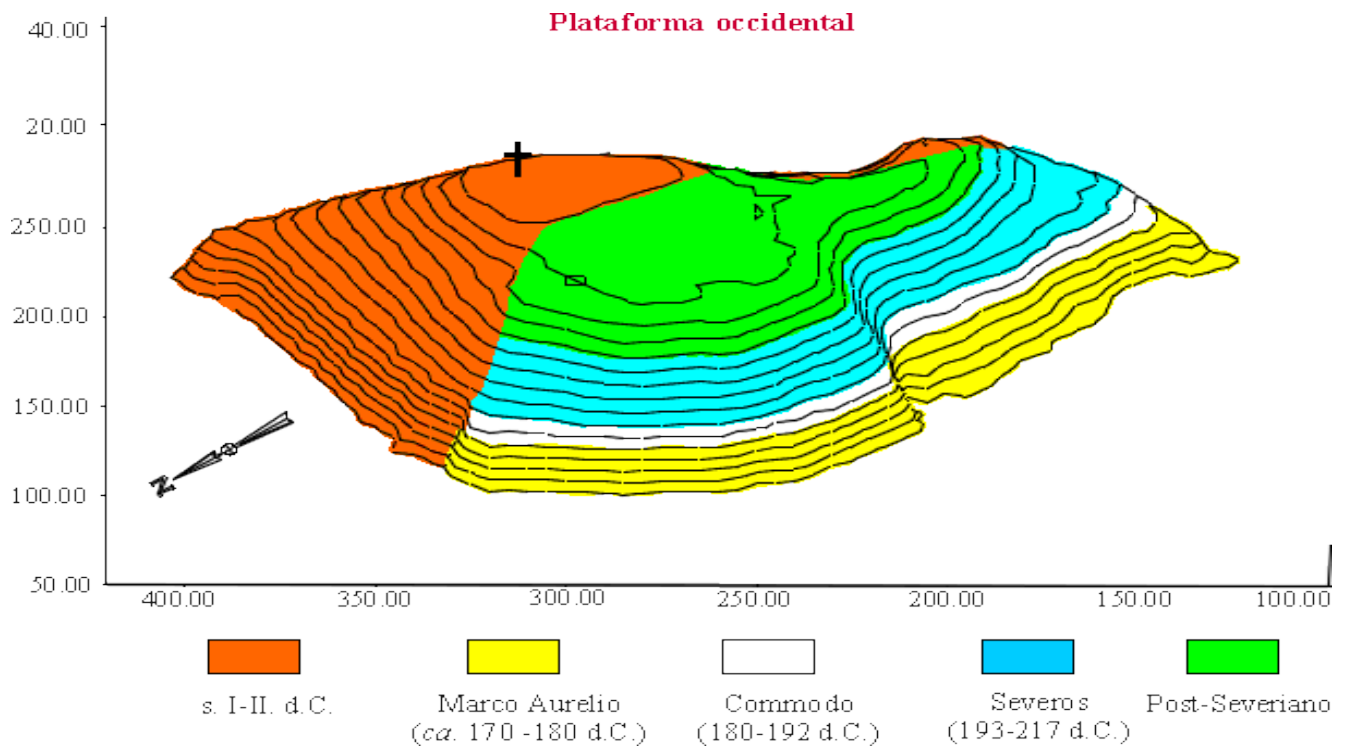


Fig. 1: West side of the hill

Plataforma oriental

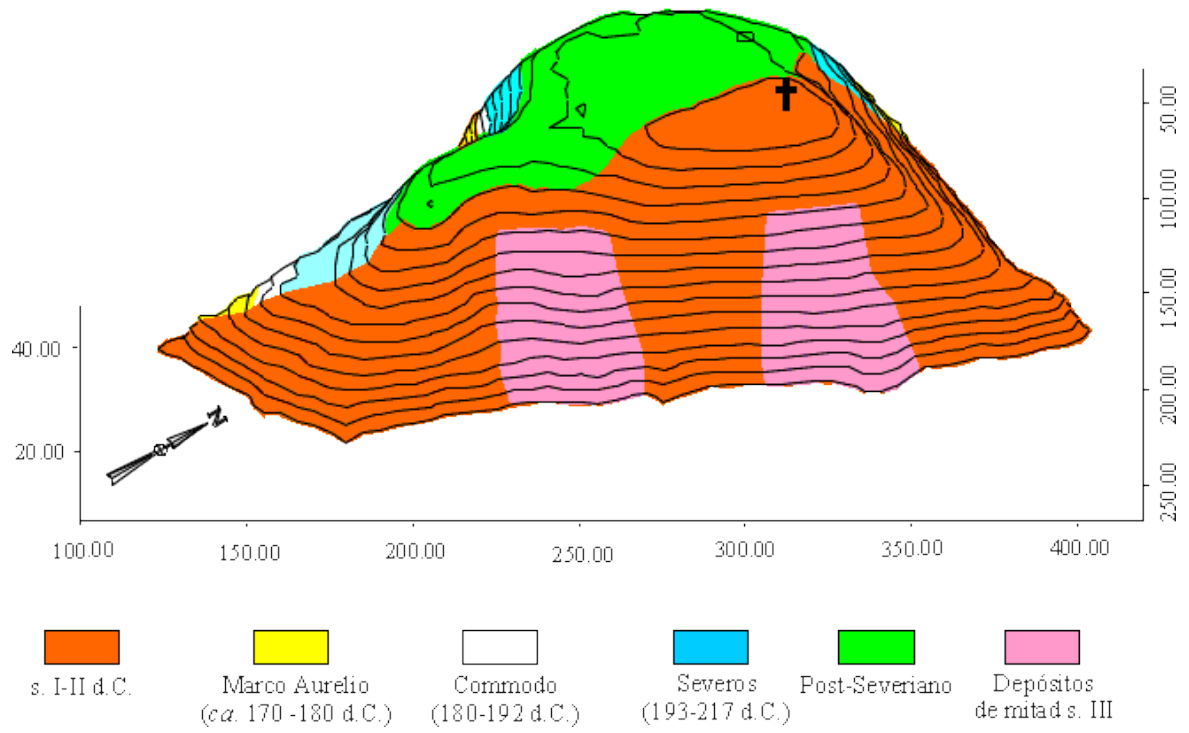


Fig. 2: East side of the hill

Stamps from Africa

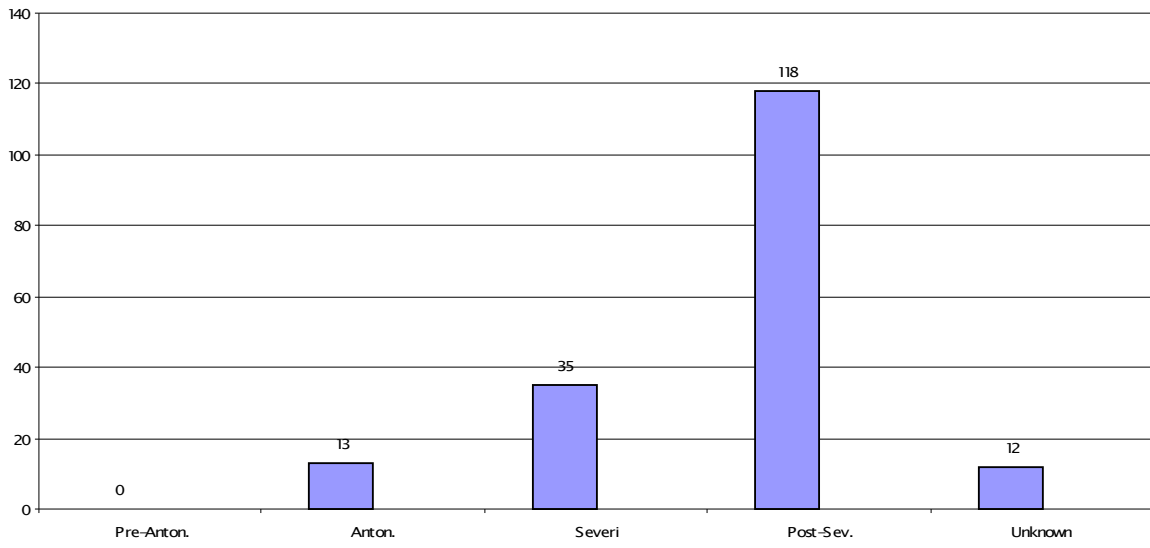


Fig. 3

Stamps from Baetica

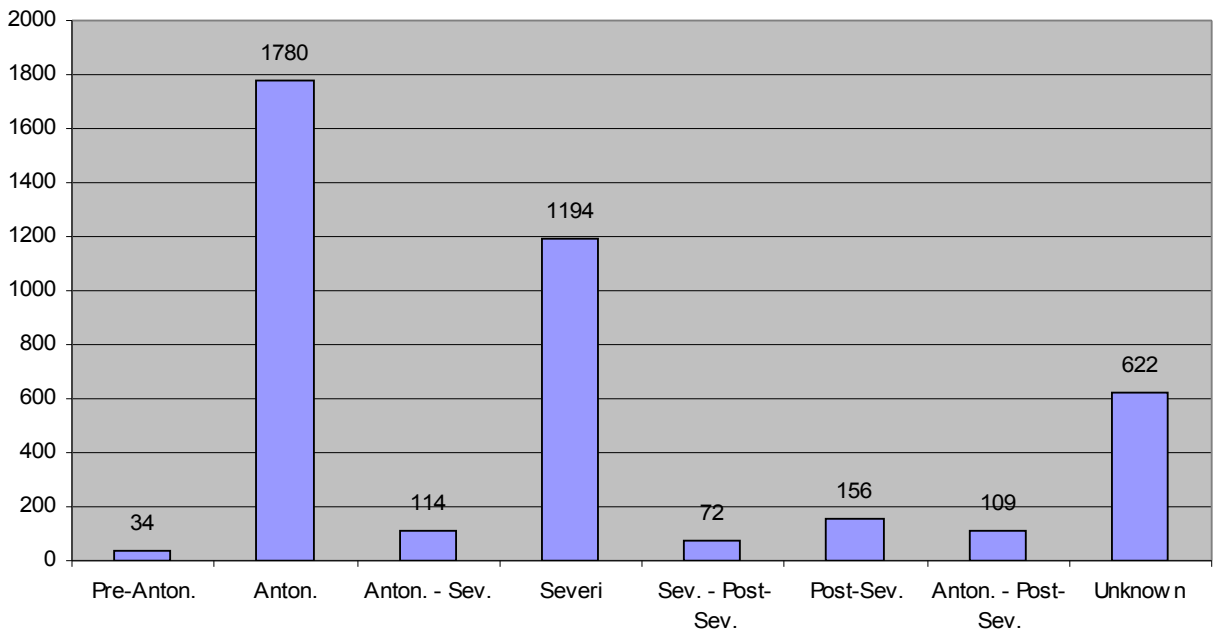


Fig. 4

Total amount of stamps from both regions

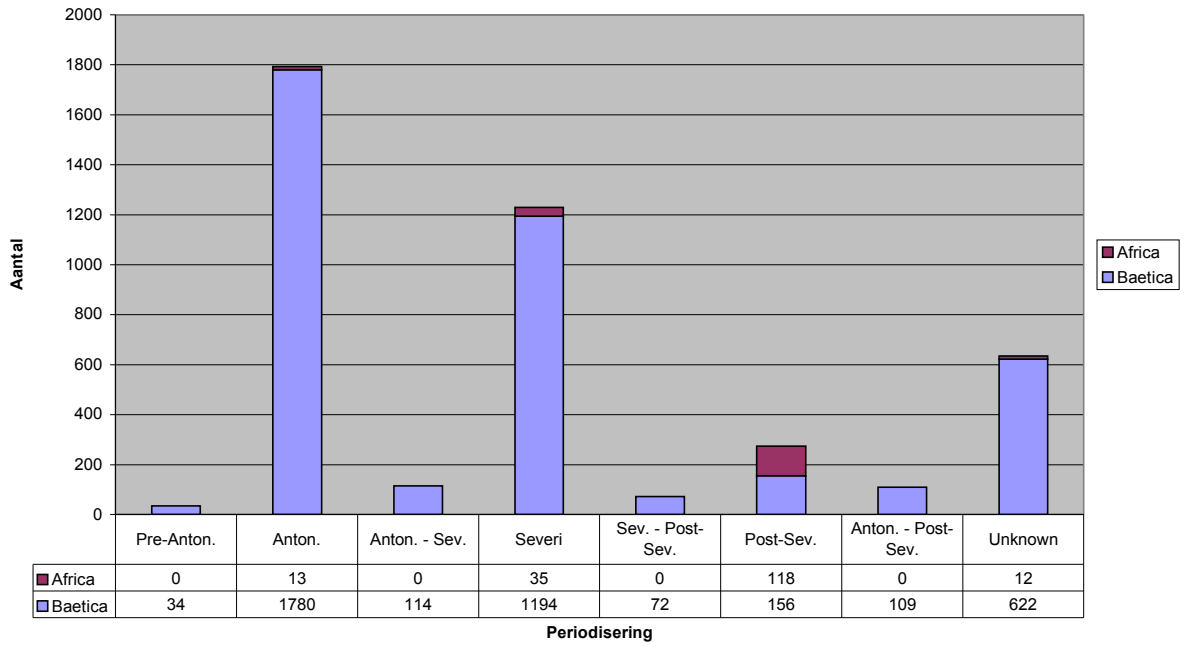


Fig. 5

Tituli from Africa

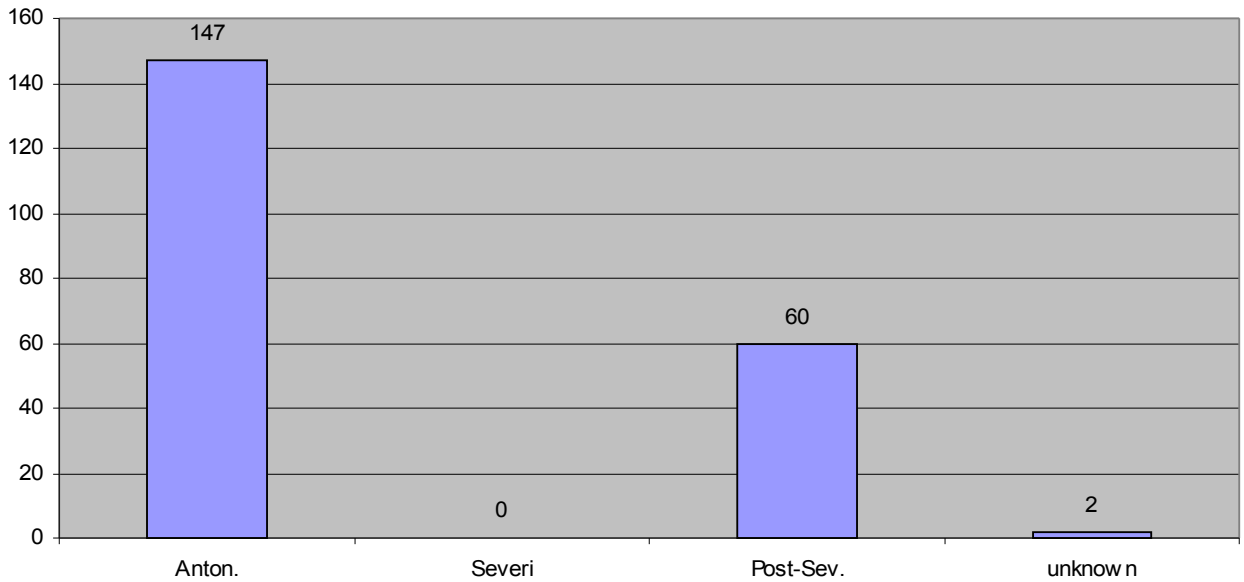


Fig. 6

Tituli from Baetica

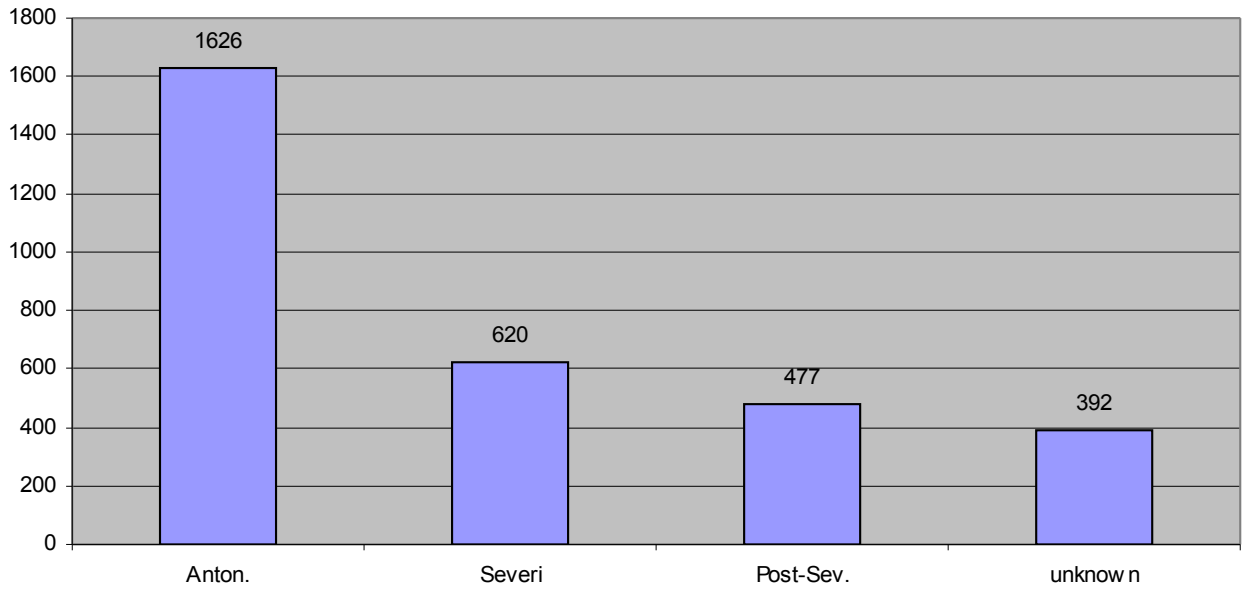


Fig. 7

Combined tituli from both regions

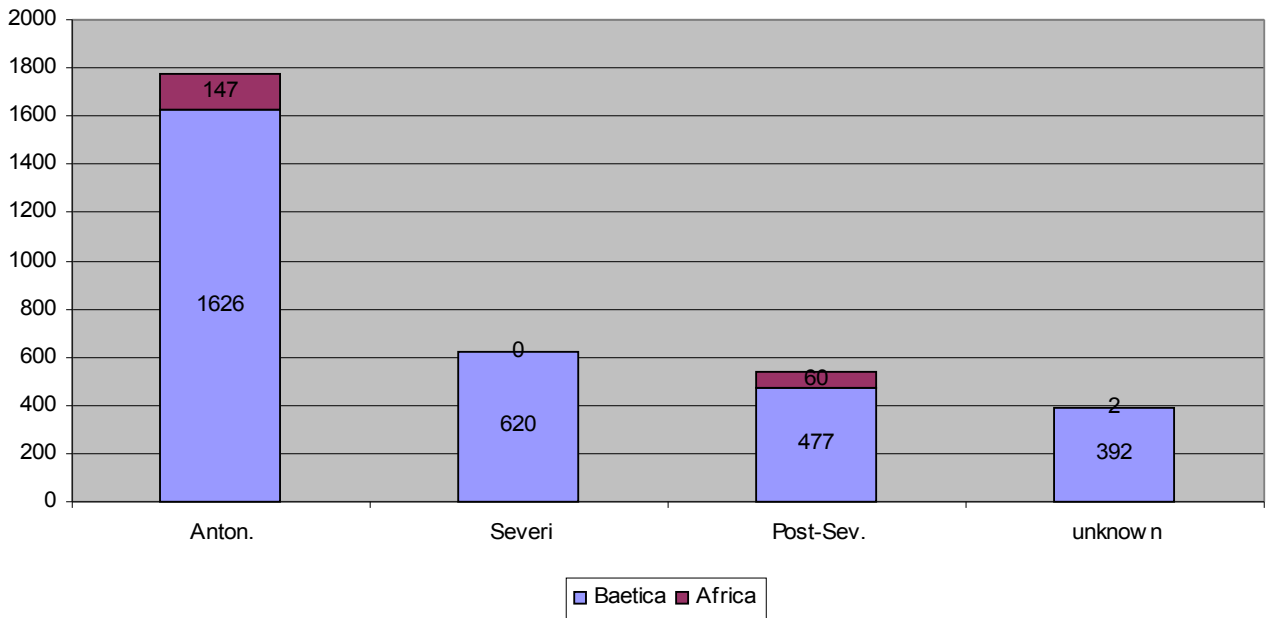


Fig. 8

Tituli distribution by emperor

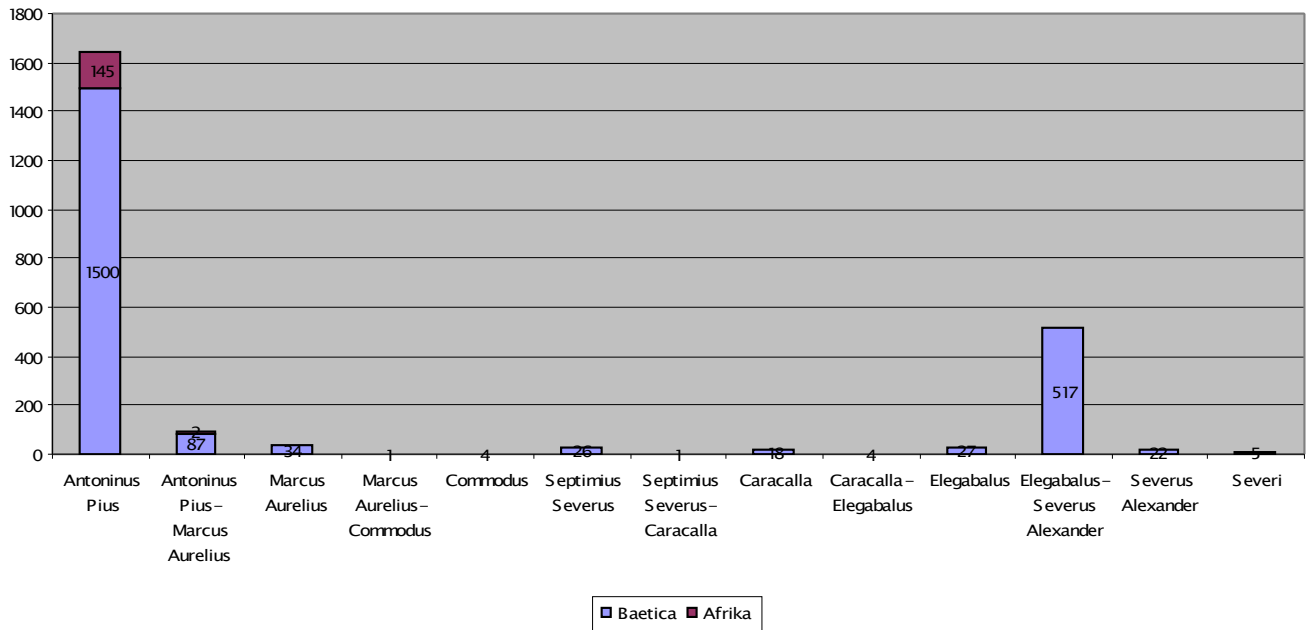


Fig. 9

Amount of cargoes containing oil amphorae

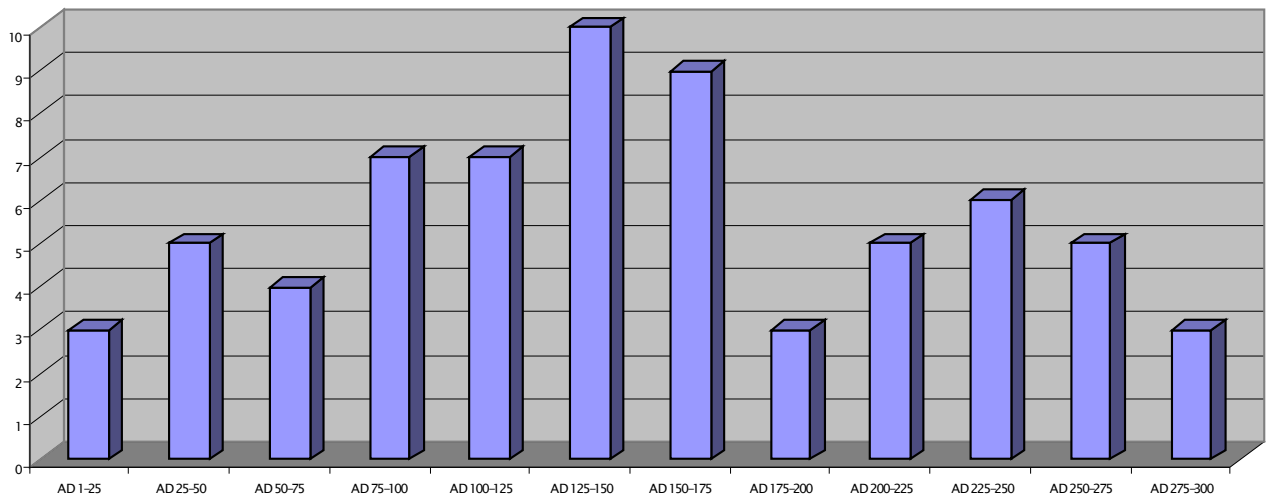


Fig. 10

Single oil cargoes

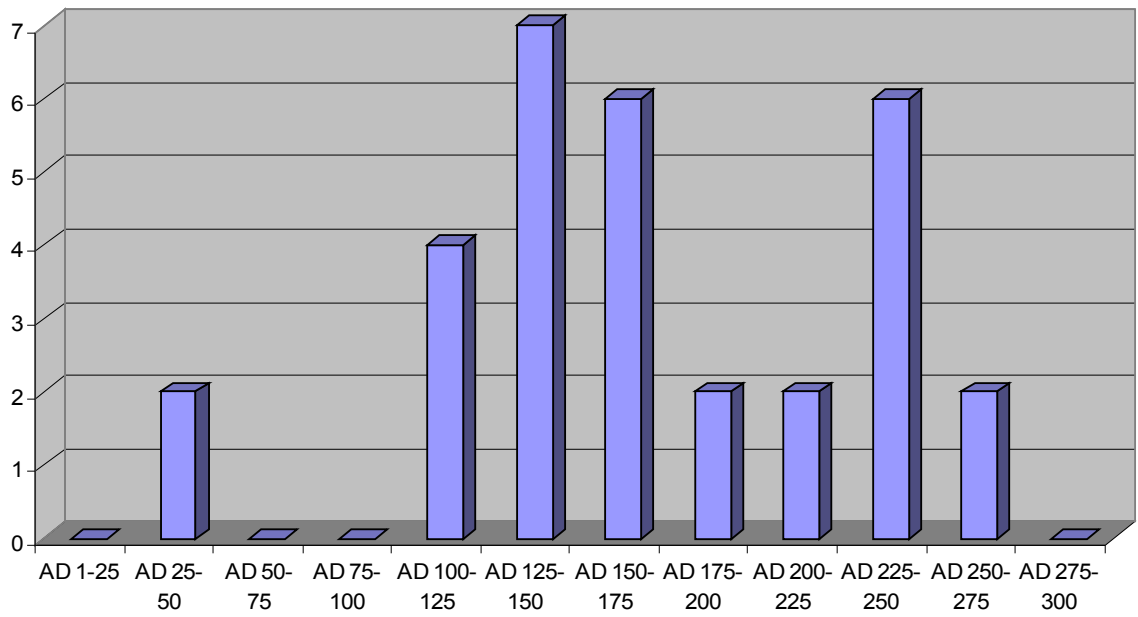


Fig. 11

Oil in mixed cargoes

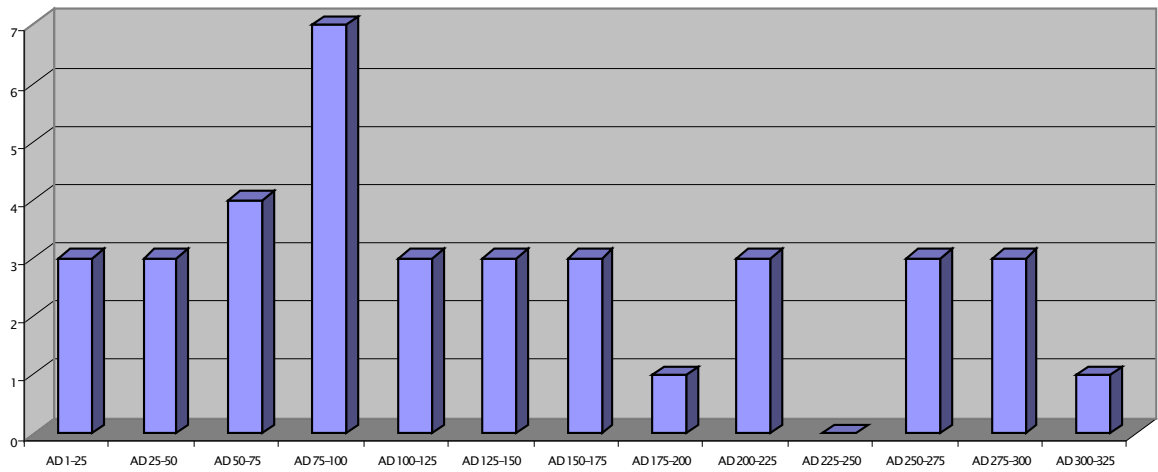


Fig. 12



Fig. 13