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THE ROMAN EMPIRE DURING THE SEVERAN DYNASTY: CASE STUDIES IN HISTORY, ART, ARCHITECTURE, ECONOMY AND LITERATURE

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ECONOMIC GROWTH IN THE EARLY AND MIDDLE IMPERIAL PERIODS, PRE-200 AD: AN ECONOMIC APPROACH FROM A PERIPHERAL HISPANIC PROVINCE, *LUSITANIA*

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INTRODUCTION

In the last 20 years some important studies (Panella 1993; Carandini 1993; Wilson 2009; Bauman, Wilson 2009; Jongman 2007; Scheidel 2009; 2010) has resumed an old scientific debate concerning the evolution of the Roman economy and especially the changes occurred in the Antonine period. This debate has discussed the archaeological data and not only the historical sources information, on the opposite of the former proposal published by Gibbon (1776), in the 18th century and Rostovtzeff (1926), in the first half of the 20th century.

A time of urban and economic development, 2nd century (its first half) presents also other complex evolutions which characterize it as a transitional period where one can see the progress of the 1st century, but also the first lines of the major changes which will characterize the Low Empire. In the words of P. Bang (2008), are we facing a return to Ros-

tovtzeff, or according to Jongman (2007), a return to Gibbon? Or are we rather facing a period of transformation and change? And what is the geographic scale of these phenomena? Does several similarities point to the *connectivity* of the Roman economy, as the modernist theories propose?

By applying line graphics, a methodology introduced by Fentress and Perkins (1987) to the African *terra sigillata*, on the total *terra sigillata* amount consumed in Chãos Salgados and other published peninsular sites, showed an extreme coincidence with the issues raised by the evolution of other items throughout the 2nd century. Unfortunately we have no other Roman sites where the total amount of *terra sigillata* has been calculated, except for London (Marsh 1981) and Poitiers (Tilhard 2004), whose imports of the 1st and 2nd century are published. This is the more original contribution from this paper and this lack of data for other regions of the Empire makes automatically impossible to compare this Hispanic and Atlantic (?) evolution to the central or the eastern Mediterranean's one. Nevertheless, the importance of the *terra sigillata* as the main table fineware, its industrial production framework, and its statistic value when we try to draw economic evolutions in long-distance trade, are reinforced by the strong similarity of the line produced in all the graphics, which show drops in consumption over the 2nd century, making this century pivotal in explaining the transformation of Roman economy, a kind of precursor to Low Empire.

This article is therefore an attempt to explain this century from *Lusitania*, a peripheral provincial of *Hispania*, where surprisingly we find the major amount of sites whose total *terra sigillata* imports were quantified, but trying also to establish the similarities and contradictions of the archaeological and historical sources, which led us to a wider view of the Roman economy. A question rises easily from the graphs we have drawn on *terra sigillata* consumption: why does consumption in the 1st century is several times stronger than in the next centuries? We may put a second one: why does this change occur in these Hispanic, Gallic and Britannic consumption sites, when their *terra sigillata* regional productions decrease strongly and move to a new strategic region, the North Africa? Finally, what can we conclude from the similarity of different patterns concerning the Roman economy, already stressed during the last 20 years, with regard to the *terra sigillata* pattern?

THE ROMAN ECONOMY OF THE 2ND CENTURY AD: THEORETICAL FRAMEWORK

The *primitivist* theories, headed by Finley (1973), and *modernist*, headed by M. Rostovtzeff (1926) marked the historiographic debate of Roman Economy, since the 20th century and they are crucial to the understanding of the role of the 2nd century AD, somewhat balancing what is proposed by H. Pirenne (1937), who proposed a major transformation related to the Arabic expansion.

Embedded with a more pessimistic view of Ancient Economy, L. Blois, H. Pleket and J. Rich (2002, xiii) point out clear constraints, supported by *primitivism*: "The Roman Empire may have been nothing else than a conglomerate of different cultural and economic entities, which were kept together by the Roman imperial administration, the armed forces, and—to a lesser extent—Graeco-Roman elite culture, but certainly not by economic integration". In the words of P. Temin or of J. Paterson we speak in the first instance of regional interdependent markets, but coordinated in an imperfect way, and in the second case, of a network of regional micro-economies that in certain periods had an increased range and dynamics, becoming wider markets (*apud* Blois, Pleket, Rich 2002, xiv). This intermediate level of debate, which has been the focus of many authors over the last decades, reaches not only this tendency closer to Finley, but also an important series of authors that we may perceive as closer to the modernist theory. "Returning to Rostovtzeff?" is actually the title of a book chapter by P. Bang (2008, 26–30), *The Roman Bazaar*, that focuses on this historiographic debate and reminds us that Rostovtzeff (1926) himself said that the limitations to Roman economy and technology were the lack of capital and production, still insufficient for industrial development.

Ph. Kenrick (Ettlinger *et Al*. 1993, 36) or R. Marichal (1988) proposed that Italian and South-Gaulish *terra sigillata* productions (namely La Graufesenque) are *modernist*, taking into account the empirical epigraphic basis (potter stamps and pre-firing graffiti), workshop structures, branches and inter-potter or hierarchical relationships (Bang 2008, 30). Production of *terra sigillata* is viewed as an anti *minimalist* proof by P. Horden and N. Purcell (2000, 123, 250): if this ceramic was capable of reaching such vast areas and places of different hierarchy, from the most important cities to the smallest settlements, it would need to have a mas-

sive production. It is thus a fundamental element of "connectivity of micro-regions".

This intermediate criticism has two nuclear authors for the construction of an economical paradigm.

For R. Duncan-Jones (1974), a strong commercial inter-regional growth had occurred, generated by the great cities, but with strong limitations to the private world due to the role of the Estate and mainly because of the tax load. For K. Hopkins (1980, 101–116), taxes in money had certainly stimulated commerce by creating complex networks, mainly until 200 AD, and the taxed provinces had to generate wealth to pay those taxes. He points out the growth in coin minting to finance that commercial activity in an integrated fashion as shown in the similar graphics resulting from the monetary volume circulating in several areas of the Empire (*fig. 2*). K. Hopkins however, stresses the influence of climate on trade volume, the existence of many taxes as supplies and the maintenance of an essentially subsistence economy, calculating the autarchy as around 80 to 90% of the gross domestic product of the imperial space.

According to P. Horden and N. Purcell (2000, 153), "it is the seventh century rather than the second in which aggregate demand was small, merchants were lowly, and only luxuries could profitably be moved over long distances. For all that, the early medieval depression is of course inextricably associated with neither Jones nor Finley, but rather with Henri Pirenne (…)". "Gibbon's problem" (1776) is by and large the view of Rostovtzeff (1926, LV) who establishes two great phases in his *Economic and Social History of the Roman Empire*: the first one, of development, between the end of the Republic and the beginning of the principality of *Augustus*, prolonging until the 2nd century; the second one, of regression and decline, in the 3rd century. The turning point between them would be around the end of the 2nd century, when the political and economical decline had been the result of a large, social, upraise of the poorest classes, mainly agricultural, against the urban elite.

The Marxist vision of the slavic author, searching for essentially socio-economic explanations, is today somewhat limited, when considering the amount of diverse information collected, and the new historiographic perspectives. However, it was the empirical basis currently known that actually led to the reprise of this period's study and to many authors considering this century, or its ending, a turning point. W. Jongman (2007, 183, 195, 199) ironically entitles one of his articles with the following words: "Gibbon was right: the decline and fall of the Roman economy"

and accepts a strong economical growth in the 1st and 2nd centuries, but replaces the notions of *decline* and *fall* by *transformation*. However, Jongman finishes his text with a hyperbolic expression of his concept of the 2nd century: "The age of Antoninus Pius was indeed probably the best age to live in pre-industrial history" and places the rupture somewhere at the end of the 2nd century AD. We will find the same conception in the recent work of A. Bowman and A. Wilson (2009, 47), *Quantifying the Roman economy*, with the date of c.200 AD for the end of economical growth. A. Wilson (2009, 224) poses the question: "the marked drop between the first and the second centuries AD appears surprising, and is not easily explained. The numbers are fairly constant throughout the second century, and the drop occurs too early to be a result of the Antonine Plague".

The late 1st century/early 2nd century seems to have been the beginning of a turning period, with a slower growth in the economy and a likely slower inflationary process, in the principalities of Trajan and Adrian, possibly with underlying deflationary processes.

This is illustrated by the price of the donkey, an important terrestrial means of transportation, according to an Egyptian source, when compared with the evolution of coin circulation (*figs. 1 and 2*). There is a clear inflationary process until the end of the 1st century and a deflection, not abrupt, but that is more marked at the time of Adrian. The monetary circulation seems to confirm that situation: the high minting of *Claudius* supports the transactions over several decades and the monetary circulation only increased again, albeit mildly, with Adrian or *Marcus Aurelius* (*figs. 1 and 2*).

The shipwrecks curve in the Mediterranean, published by Parker, in 1990 (*fig. 3*), and recurrently used by Roman Economy Archaeologists and Historians (Scheidel 2009; Wilson 2009) demonstrates a trade peak in the second half of the 1st century AD, that decreases in the 2nd century, despite still having high levels during Trajan and Adrian phases. Such a low curve from the 2nd century onwards is questioned by several authors. Scheidel (2009, 16) states pertinently that, at least the 4th century curve should be higher, even knowing about the more frequent use of leather bags and barrels in relation to amphorae, from the 2nd century on. Horden and Purcell (2000, 160) also raise this question and believe that something radical was occurring to the economy. Wilson (2009, 220, 224–226) elaborates on this question: on one hand, inter-provincial trade is contrary to an exaggerated growth of the autarchy; on the other hand,

the hypothesis of an increased use of barrels (despite important for italic wine from the 3rd century onwards) does not match the important trade of Hispanic and African salted fish, a question also debated by Harris (2009, 259). The known predominance of the African trade, in foodstuffs such as olive oil, as well as in table ceramics, constitutes a problem in relation with the shipwrecks results. Because of that, Wilson questions if part of the result can be caused by the lack of underwater archaeology along the African coasts.

Jongman (2007) presents two other graphics highly suggestive of the falling results in the 2nd century: a decrease in the consumption of animals is seen in Italy as in the provinces; a fall which is even more notable in the length of the human femur, denouncing small statures, consequence of less quality of life (*figs. 4–5*). This author (Jongman 2007, fig.2) presents still another graphic, suggestive but more questionable concerning its causes: also in the 2nd century, lead levels in Greenland drop, indicating lower levels of global environmental pollution.

Another factor recurrently debated as a cause for the 2nd century decreases is the so-called Antonine Plague, occurring in 165–180 AD, originated in the Eastern part of the Empire and brought to the West by the imperial army on the Partic campaigns of Lucius Verus (161–166 AD). According to Ammianus Marcellinus it would have expanded through *Gallia* and the Rhine legions; Dio Cassius and Eutropius mention high levels of deaths in the Empire, particularly in Rome (*apud* Bruun 2007). However, the true reach of this phenomenon is far from being known and is questioned by Rostovtzeff (1926, 269) or Scheidel (2010, 9).

Two sentences by A. Wilson and W. Harris synthesize how hard it is to explain the 2nd century juncture. On one hand, as we referred before, "the marked drop between the first and the second centuries AD appears surprising, and is not easily explained. The numbers are fairly constant throughout the second century, and *the drop occurs too early to be a result of the Antonine Plague*" (Wilson 2009, 224); on the other hand, according to Harris (2009, 259), "neither the textual nor the material evidence from sites on land would lend us to suspect that there was a decline in maritime trade in the Western Mediterranean after AD 50 and especially after 100, as the shipwreck evidence suggests".

FINANCIAL DATA

From the Trajan period we know new political attitudes for famine control, such as performing a feeding scheme for the rural children in Italy. These *alimenta*, brought to us by Plinius (*Ep*. VII, 31, 4. *Apud* Garnsey, Saller 1987, 60), started, according to Rostovtzeff (1926, 260), in Italy, and were progressively widened to other provinces, in an apparent indication of an increase in poverty. Silver coin debasement occurring in the principality, with a decrease in precious metal from 90 to 85%, is probably not the result of a new inflation increase, rather a correction of *denarius* value on the *aureus*, which had lost some value due to the high quantities of gold available after the conquest of Dacia (Jones 1953, 191).

On a financial level, the middle 2nd century, with Antoninus Pius, is a moment of stability on the wake of the policy started by Adrian, for pacification, therefore contrary to the aggressive policy of Trajan (Rostovtzeff 1926, 261–266). Peace allows for government treasury to accumulate around 675 million of *denarius* according to the sources (Jones 1953, 189–190). It is during *Marcus Aurelius* that, once the peace ended, public finance met with serious problems.

To face the *deficit*, Trajan had already resorted to selling real estate in public sale. *Marcus Aurelius* adds to these goods, jewellery and luxurious clothes, to face spending of the Marcomanic War (Dio, LXXIII. 8. 3; Plinius, *Paneg*. 50; *S.H.A*., *Marc*. 17. *Apud* Jones 1953, 189–190; Rostovtzeff 1926, 268).

Highly suggestive of the public finance, the state of the economy and the need for control of food supplies in Italian area, is the *Oratio de pretiis gladiatorum minuendis*, found at *Italica* and in *Lidia* and published in 177–178 AD (Rodriguez de Berlanga 1891; Ceballos Hornero 2004, 162–178). Despite being requested by *Gallia* priests, this law, aiming at decreasing the prices of *circus* shows, intended to target the whole Empire. The Hispanic document mentions some interesting subjects, which are interesting to understand how far the State had the perception of the general economic context, safeguarding a possible excessive rhetoric. According to the text, this one was made after examining public accounts for the previous 10 years and taking into account the growing ruin of private fortunes. Most of all it was a measure to defend the imperial treasury and urban structures, whose finances were also going through serious problems. According to the text, public revenue was expected to recover 20 to 30 million of *sestercii* per year with this law. The final aspect to point out

is related to law observance: it is attributed to provincial administration, except in Italy, where it should be supervised by the *Praefectus Aliment*[*orum,* which seems a pressing necessity to preserve food distribution in that central area.

In that sense, a 2nd century law clears from other tax obligations those who build ships and those who use them to supply wheat to Rome, as long as they have at least 330 tonnes of capacity or if they own enough boats to fulfil that capacity, just as long as each one was not below 65 tonnes in capacity (*Dig*. 50. 5. 3; *vide* Hopkins 1983, 98). The growing state interventionism shows itself in other legislative points. If during Trajan there had been an increase in the use of *collegia* of *navicularii*, *mercatores* of cereal and olive oil, and bakers, which would have higher privileges if they preferably served the *Annona* and *Munus Publicum,* the middle of the century sees a different juridical activity to strengthen the number of *navicularii*, as opposed to the number of *mercatores* (*Dig*. 27. 1. 17. 6; *Dig*. 50.6. 6. 3; *Dig*. 60. 6. 6.6; *vide* Rickman 1980, 271–272).

The Bingen 77 papyrus (Rathbone 2003, 223) proves the existence of mixed cargoes in the second half of the 2nd century, thus showing the maintenance of public-private trade efforts. This document, related to ships arriving at a port, probably that of Alexandria, reveals that one of them, a 7000 artaba *akatos* (210 tons), was coming from Side (*Pamphylia*), led by G. Ulpius Iasôn, with a cargo of pine logs and wine, owned by the Emperor and a private trader, Noumênios al. Kallistratos.

It is likely that these market control measures are linked with the new debasement of the silver coin, which content in precious metal decreases from 85% (Trajanus) to 75%, with Marcus Aurelius (García Vargas 1998, 242). The Comodus principality seems to affect the whole West, namely some measures related with state commerce, such as the construction of a state-owned merchant fleet with its headquarters in Carthage (Reynolds 1995, 107), probably related to the lack of 300 ton ships to supply wheat to Rome, mentioned by Ulpianus, in the beginning of the 3rd century (*vide* Hopkins 1983, 98: *Dig*. 3. 6).

The monetary fluxes increase again during Septimius Severus, who debased the silver coin, now to 50% of that metal, and increased the soldiers' salaries to 400 *denarii*, a rise followed by that of Caracala, to 600 *denarii*, revealing somehow inflation was progressing (Jones 1953, 194). Donkey's price in Egypt (*fig. 1*) shows exactly a strong increase in the end of the 2nd century, as well as other prices in this region (Wilson 2009, 292).

At the fiduciary circulation level, the 2nd century confirms the transition of the primacy of the Northern part of the Empire (*Hispania*, Italy, and militarised areas of *Britannia* and *Germania*), to the new director-area, North Africa: a certain stabilisation in the number of circulating coins in the more militarised areas of the North, in Italy and *Hispania* and an increase in North Africa (*fig. 2*).

CONSUMPTION IN *HISPANIA:* *HISPANIA*'S GEO-ECONOMIC POSITION

Plinius and Aelius *Aristides* tell us about the development of the Atlantic route and the role of *Gades* and *Olisipo* in that economic axe, during the High-Empire (*apud* Mantas 2004, 433–435). The peninsula's situation, especially the Atlantic side remained however peripheral in the Empire.

K. Hopkins (1980, 101) presents a model with three levels of provincial hierarchy: an external ring of border provinces with great military presence, an Italian core and an intermediate ring with *tax-exporting* provinces, composed by *Hispania*, *Gallia*, North Africa, Asia Minor, Syria and Egypt. Ph. Leveau (2007, 651–652, 668–669), in his contribution to *The Cambridge Economic History of the Greco-Roman World*, distinguishes between a Mediterranean and a later-evolved continental and Atlantic area and highlights that in *Hispania*, most cities have not over than 1000/2000 inhabitants and that a fourth of those cities paid *stipendium.* The same author recalls Friedman's proposals for the hierarchy of western provinces. For this author, on the first level, the core region, we find not only Italy but also the Carthage area; he names the third level, *resources frontier regions* and the fourth, *downward-transition regions;* the Hispanic provinces, such as *Gallia*, would be the second level, the *upward-transition regions.* According to this author, "regions which experienced their first phase of development at the end of the Republic and in the early Empire are also those where the first withdrawals, which took place from the second century AD onward, signaled the crisis of the third" (*apud* Leveau 2007, 668).

The same Ph. Leveau (2007, 669) warns: "this is the subject of a debate connected with the interpretation of the archaeological data (…) *Hence the impression of a crisis could simply be an effect of the scale of observation*". It is this frame that we will seek to demonstrate in this chapter: in the West what seems to happen is the transition from an economic primacy of the provinces of the northern shores of the Mediterra-

nean (*Italia*, *Gallia* and *Hispania*) to a new North African primacy, mainly in *Proconsularis* and *Byzacena*. *Terra sigillata's* consumption curves for the Iberian Peninsula show, however, that the fall in South Gaulish and Hispanic productions precedes in several decades the noteworthy growth of African *terra sigillata.*

THE HISPANIC EMPIRICAL BASIS: *OPERA PUBLICI*, METAL PRODUCTION AND *MAURI* INCURSIONS

In *Hispania*, the level of evergetism at the *opera publici* seems also to have a more fruitful period between Augustus and Trajanus, despite maximum levels being reached at the Julian-Claudian and Flavian periods (Andreu Pintado 2001; Melchior 1999, 252). The urban expansionism, stimulated by the Flavian emperors, extends trough Trajanus and Hadrianus, in areas such as the Northwest (Morais 2005, 2), but also in cities of the southern *Lusitania*, such as *Italica* or Chãos Salgados (Quaresma 2009, 9)[1]. However, in the imperial space, the marble consumption levels seem to be high for the two first centuries (Jongman 2007, 186; Fant 1993). Also in this domain one can observe a certain transition to the African space: with Trajan many colonies in Africa are founded and the urban development also reaches the near Orient in detriment of the areas that were earlier developed, including *Gallia* or *Hispania*, in Rostovtzeff's opinion (1926, 157).

Jongman (2007, 196) points to a crisis in Hispanic silver as a possible cause to successive coin debasements. Bustamante, Pérez Macias and Martins (2008) place the steep production decline at *Vispasca* (Southern *Lusitania*), around 150 AD, considering the imported ceramics, and point out to the 173 AD *Tabula*, dedicated by the colonists to the *procurator Berylus*, *restitutor metallorum*, epithet which confirms a previous fall of richness. The same crisis chronology is known in the Baetican metal extraction areas, that is, a *floruit* until Antoninus Pius. Bustamante, Pérez Macias and Martins (2008, 169) however, point the beginning of the mining activity in *Britannia*, starting with Hadrianus, as a possible cause to

[1] One may note that recently it has taken place an international meeting organized in Spain by Casa de Velasquez, with this title "Crisis urbana a finales del Alto Imperio".

this decline. After the end of the 2nd century, we find few data concerning mining in *Hispania* and they are concentrated mainly in the South (Domergue 1990, 217).

The first Mauri incursions occur in the principality of Marcus Aurelius, according to the *Historia Augusta*, which describes them in *omnes Hispanias*, an exaggerated manifesto. The *Life of* Septimius Severus describes the *Baetica* as a target in 171 AD and a second raid occurred in 177 AD, according to the *Tabula Banasitana.* Other epigraphic documents, such as in Antequera, reveal city sieges, but it seems not to be present in the epigraphy of important Baetican cities, such as *Italica*, which reveals the difficulties to draw the real geographic extension of these incursions (*apud* Arce 2005, 343). Their chronology as well as Antonine Plague's one is nevertheless interesting, when compared with those of the decline in Lusitanian production of salted fish (see *infra*), despite being impossible to demonstrate causality.

TERRA SIGILLATA CONSUMPTION: THE FIRST ECONOMIC INDICATOR OF A SLOWER JUNCTURE?

The high sales of *terra sigillata*, in particular of La Graufesenque, throughout the second half of the 1st century, as observed by the import curves of Chãos Salgados and other peninsular sites, integrated a process of continuous general economic growth (*fig. 7*; Quaresma 2009). *Terra sigillata* consumption curve at Chãos Salgados has a similar development to the one observed in the consumption centres in the peninsula and in London (*fig. 8*), as well as in Poitiers, in the western *Gallia* (Tilhard 2004). Ceramic data prove that there was a certain level of commercial dynamics and regional interdependence and that the falling levels of *terra sigillata* are part of a possible recession.

Results obtained at Chãos Salgados, where South Gaulish and Hispanic *terra sigillata* present a noteworthy progression in lesser quality manufacture throughout the chrono-typology and stratigrafy (Quaresma 2009), lead us to propose that there was, for South Gaulish and Hispanic *terra sigillata*, a Flavian overproduction phenomenon, with a noteworthy drop in sales, in the first half of the 2nd century, due to a possible excessive offer in relation to demand. That was not due to the competition by African *terra sigillata*, whose trade is only well settled from the middle of the 2nd century onwards (*fig. 7*).

In the Italian peninsula, stratigraphy at the Nuotatore's baths in *Ostia*, shows that between 70 and 100 AD, the Italian *sigillata* predominates with c.80%, followed by the South Gaulish with c.10%, while the African is below 5%, and that between 100 and 120 AD the situation is similar. The turnaround starts slowly between 120 and 140 AD, when Italian *sigillata* represents c.70%, South Gaulish c.10%, Hispanic less than 5% and African c.20%. The definitive reversal occurs in the second half of the 2nd century: between 160 and 190 AD, Italian decreases to 10–20%, South Gaulish is below 5%, as well as Hispanic, and the African dominates for the first time, in a hegemonic way, with 70% (Martin 2006, tables 1–4). In Benghazi, Libya, the deposit n.73, dated from the first half of the 2nd century, shows the supremacy of Italian and oriental imports (Kenrick 1985, 422).

The main role of Italian *sigillata* in the Italian peninsula, as well as the Italian and *Eastern sigillata* in the eastern half of North Africa, seems to parallel in the Iberian Peninsula, where Hispanic *sigillata* continues to lead the market throughout the first half of the 2nd century, in the southern part, as concluded by the quantities from Andújar (*Baetica*) at Chãos Salgados and at Ilha do Pessegueiro, on the Lusitanian western coast (Quaresma 2009; Silva, Soares 1993).

In the first site, between 100 and 150 AD, there is a Hayes 9A specimen, whereas at Ilha do Pessegueiro, the first specimen, Hayes 8A, belongs to Flavian layers. Conversely, the A trench on this island is revealing of the importance of Andújar until the middle of the 2nd century, when African *sigillata* A is still incipient and presents the same type as Chãos Salgados, Hayes 9A (Silva, Soares 1993). On the abandoning level (layer 4) of the first phase (50–200 AD) of Sines tanks nr. 1 and 2, at the Praça João de Deus, Hispanic *terra sigillata* from Andújar totalises the existing *sigillata* (Silva, Coelho-Soares 2006, 110). In *Salacia*, just as in Ilha do Pessegueiro, the African Hayes 8A starts in Flavian levels with 3 specimens, together with another specimen of decorated Hayes 3B (Silva, *et Al*. 1980, 192).

The first stratigraphic fragments at *Cordoba* (*Baetica*) are from the end of the 1st century or first half of the 2nd century (Vaquerizo, Garriguet, Vargas 2005), maybe at the same time as in the capital of *Lusitania*, *Augusta Emerita*, where African *terra sigillata* occurs in the Domitian levels of *Suburbio Norte* (types Hayes 3 and 8. Bustamante 2010, 153–170).

The beginning of the imports at the southern coast of *Lusitania* was more diverse, even though it also shows continuity problems: in Monte Molião-Lagos, African *terra sigillata* A appears through types Hayes 7, 8 and 9, at the SUs of the end of the 1st century/beginning of the 2nd century, but is absent at the SU 29, between 125–150 AD (Arruda *et Al*. 2008, 158–161). In Lagos, in the industrial area of Rua Silva Lopes, the levels of c.50–150 AD have Hayes 3A, 8 and 20 (Ramos, Almeida, Laço 2006, 91).

In the Northeast of the Iberian Peninsula (*Tarraconensis*), the oldest levels with African *terra sigillata* A belong to Domitian, at Ampurias, *Baetulo* and *Tarraco*, but their indices are still very poor. In the last city, between 90 and 110 AD, the imports rise mildly; between 100–125 and 125–150 AD, the African *terra sigillata* A becomes important, but the dominance still belongs to Hispanic *terra sigillata* whose numbers usually are twice or sometimes five times higher than the ones for African *terra sigillata*. In *Baetulo*, slightly further North of *Tarraco*, therefore slightly more distant from the Ebro river, where Hispanic *terra sigillata* from La Rioja was produced, African *terra sigillata* dominates the 125–150 AD deposits, with more specimens than the total amount of South Gaulish and Hispanic *terra sigillata*. Importing African *terra sigillata* is equally important in Ampurias, in the first half of the 2nd century, but here, South Gaulish *terra sigillata* still predominates, with more than the double of African *sigillata* specimens (Aquilué Abadias *et Al*. 2005; Comas *et Al*. 1994; Madrid Fernández 1999; Aquilué Abadias 1987; 1992b; García Noguera *et Al*. 1997; *apud* Quaresma 2009, annex 2, tables 51–54).

According to the stratigraphic data from *Valentia*, African *terra sigillata* A never heads the deposits: it starts during the Flavian time and only increases its trade notably from the second half of the 2nd century, but even at the 3rd century levels Hispanic *terra sigillata* always predominates (Escrivà Torres, 1989; *apud* Quaresma 2009, annex 2, table 55). In this very city, in the second half of the 2nd century deposit, at Plaça del Negret, some African *terra sigillata* was found, but 90% of fine ceramic is Hispanic *terra sigillata* from La Rioja (Huguet Enguita 2005, 185).

The shapes that are found chrono–typologically until 150 AD, especially Hayes 3A, 3B, 6A, 8A, or 9A, are well represented on the southern and eastern parts of the Peninsula: at *Baelo* (Bourgeois, Mayet 1991, 228), Carteia (Roldán Gómez *et Al*. 2006, 476), Almeria (Garcia López, Cara Barrionuevo 1995, 138), *Portus illicitanus* (González Prats 1984,

125) and *Tarraco*, where, in 100–125 AD, types Hayes 3A, 8A and 9A are present (*apud* Quaresma 2009, annex 2, table 54).

This trade, with a tendency for the coastal line, also reached the western shores at *Olisipo* (Lisbon), in the first half of the 2nd century, with some natural means of penetration described, at Alto do Cidreira (Nolen 1988, 61) and we have data for this phase in *Britannia* – in particular at the Southeast, with a few points in the Centre and North, where types Hayes 2, 3B, 3C, 5C, 6A, 8A and 9A were traded (Bird 1977).

From the 2nd century onwards, African *terra sigillata* exports are strengthened, as shown by the curves at sites such as *Tarraco*, Alicante, or Almeria. *Figure 10* shows curves with a fast increase from the beginning of the 2nd century because on these calculations, authors did not separate quantities of African cooking ware that had important sales in the South and East of *Hispania*, just as in Italy, as Reynolds (1995, 12) has already stressed.

From c.150 AD on, African *terra sigillata* reaches new inland points of southern *Lusitania*, as in what seems to be the case in the Monte Novo do Castelinho (Hayes 14B and 27: Fabião *et Al*. 1998, fig.29, n. 9 and fig.30, n. 6) and in *Ammaia* (Hayes 5C and 6B: Pereira 2006, 58). The import quantities of Hayes 14 and 27, at *Baelo*, with 450 and 362 vessels (Bourgeois, Mayet 1991, 228), show that, just like in Chãos Salgados (Quaresma 2009), the indices at the Strait and Atlantic areas increase in two stages: the middle and the end of the 2nd century.

It is at this stage, from the middle or end of the 2nd century, that African A *terra sigillata* reaches new Lusitanian sites North from the Tagus, in *hinterland* positions: Parreitas (Hayes 9B, 14, 16 and 27: Dias 2008, 96); *Conimbriga* (Hayes 15, 16 and 27: Delgado, Mayet, Alarcão 1975, 251); it appears scarcely at *Brigantium* (López Pérez 2004), in the Northwest, and at Alava, in Bask Country (Filloy Nieva, Gil Zubillaga 1997, 335), but does not reach *Britannia*, where this African trade is interrupted between c.150 and c.200+ AD (Bird 1977).

If we analyse the import curves for *terra sigillata* from Chãos Salgados, other sites in *Hispania* and London (*fig. 8*), we find an almost generalised fall in trade values of this fine ceramic in the first half of the 2nd century. In Chãos Salgados, *Baelo*, *Valentia*, *Conimbriga*, São Cucufate, Represas and Tróia, this fall is likely.

Even quantities of stratigraphy in Rome seem to point to a drop in consumption. The quantities published by G. Rizzo (2003, 201) are of 251 specimens in Neron, 272 at the Flavian, and only 108 at the Antonine

period. This lack of imports seems to match with the similar stratigraphic behaviour in ambiente XXV of *Ostia*, where we find a gap in the second half of the 2nd century (Carandini, Panella 1977).

The second century is thus of clear trade contraction: in *Londinum*, the deposits of the 1st century have between 10 and 25% of *terra sigillata*, whereas on the 2nd century, this ceramic rarely goes over 10% of the remains (Fulford 1987, 65). Despite *terra sigillata* import curve apparently recover some ground in the third quarter of the 2nd century (not by imports of African A *terra sigillata*, but through the one from the centre of *Gallia*), it drops sharply from this stage onwards (*fig. 8*).

On the other hand, if growing sales of African *terra sigillata* work in counter-cycle, it is necessary to relativize some excessively high import curves of this ceramic in the 2nd century, in several sites of the Eastern *Hispania* as previously mentioned (Reynolds 1995, 12), because this often includes the quantities of some African cooking ware forms such as Hayes types 23, 181 and 197, sold in great quantities at that time in the South and East of *Hispania* and in Italy (Quaresma 2009). The several sites calculated by Hawthorne (1987) and especially by Fentress and Perkins (1987) have therefore an incorrectly high curve of *terra sigillata* in the 2nd and 3rd centuries (*fig. 10*).

Lastly, even in the Lusitanian capital, *Augusta Emerita*, the stratigraphy of the *Suburbio Norte* (*fig. 9*) shows that the consumption of Hispanic *terra sigillata* (almost exclusively from La Rioja) decreases markedly in the first half of the 2nd century, reinforcing the idea of general decline in the consumption of this table ware, before the clear predomination of the African production.

OLIVE OIL AND SALTED FISH PRODUCTION: THE CONFIRMATION OF THIS JUNCTURE?

Around half a century after the drop in consumption of *terra sigillata*, the middle of the 2nd century sees crisis clearly affecting the food sector.

On the Guadalquivir valley, there is a drawback of the harbour and handycraft areas, such as Calle San Fernando or Encarnación, in *Hispalis*, which were converted to residential areas. This picture, that according to García Vargas (2007, 353) may go as far back as the second quarter of the 2nd century, is to this author, a result of a downturn in private trade, in particular of salted fish, while the trade in olive oil is maintained at acceptable levels (García Vargas 1998, 247). In *Britannia*, the distribu-

tion of olive oil in Dressel 20 amphorae stays stable throughout the 1st and 2nd centuries, and actually increases from the middle of the 2nd century. In York, Dressel 20 has 8 specimens in 120 AD, 65 in 90–150 AD, 97 in 150–200 AD and 398 in 140–255 AD (Reynolds 2005).

In *Lusitania*, the stratigraphy of the fish-salting factory at Ilha do Pessegueiro, with a particular interest in trenches A, C and D' demonstrates the advent of crisis even in the third quarter of the 2nd century, maintained in a steady-state until the middle of the 3rd century (Tavares, Soares 1993, 47–59). In the amphorae centre of Pinheiro, at the lower Sado, the transition from the end of the 2nd century to the beginning of the 3rd century may however belong to an "indeterminate phase in the second half of the 2nd century" (Mayet, Silva 1998, 114). In the Strait area, the Tahadartz, *Thamusida* and *Banassa* centres go into recession at the Severan time (Reynolds 2005, 389).

The graphics published by A. Wilson (*fig. 11*), both for *Hispania* and for other areas of the Empire, demonstrate a generalised decline around 150 AD and, just as in the *terra sigillata* consumption, after the 1st and 2nd c. *floruit*, the Low-Empire levels are much lower. On the other hand, as mentioned above, the drop in production values for salted fish seems to be later in several decades to the ones for *terra sigillata* consumption.

Thus we have a phenomenon lasting around 100 years, a crisis juncture in the salted fish sector, occurring widely, from *Lusitania* to the western coast of North Africa, not limited simply to the turning from the 2nd to the 3rd century, a time of change in Lusitanian centres such as Tróia or Abul, Praça do Bocage and Travessa de Frei Gaspar (Setúbal), in the Sado area, or the Casa dos Bicos, in *Olisipo* (Mayet 2001, 288; Fabião, Carvalho 1990, 49; Quaresma 1999, 176–177), and structuring itself, as Reynolds sees it (1995, 388), in the evolution of new smaller containers, in the reduction in the number of sites producing to export and in the increased numbers of small factories for local markets.

CONCLUSION[2]

The main problem in the 2nd century is to know what is the geographical scale and sector range involved. It is a juncture that affected the whole Empire, so how can it indicate the shipwrecks fluctuations (*fig. 3*), monetary circulation (*fig. 2*), or meat consumption (*fig. 4*)? Other phenomena have a more questionable dispersion: what is the real impact of the so called Antonine Plague and of the imperial financial crisis, expressed in a gradual money debasement and in central measures to fight *deficit*, particularly sensitive in *Marcus Aurelius* principality?

Data from *Hispania*, a more peripheral region especially on the Atlantic side, but more connected to the Mediterranean in the eastern and southern coast, are compatible in terms of chronology. The *opera publici* in *Hispania* seem to stay stable until Trajan, as does the urban development in the Lusitanian areas and in the *Tarraconensis*.

On what concerns the decline in metal extraction, the plausible chronology is c.150 AD in *Lusitania* and in *Baetica* (Bustamante *et Al.* 2008). Lusitanian production of salted fish also declines in the third quarter of the 2nd century (Quaresma 2009), a time when the South of the Iberian Peninsula is affected by Mauri incursions, a phenomenon which effect is not easy to understand (Arce 2005).

We have thus several phenomena occurring from around c.150 AD, probably more contemporary to the possible demographic crisis induced by the Antonine Plague (Bruun 2007), but occurring after the prolonged decline in money circulation in several areas of the empire (*fig. 2*), which started clearly around c.100 AD, and also after the apparent decline of trade in the Mediterranean, with a beginning that could be situated on the first half of the 2nd century (*fig. 3*).

We therefore speak of at least two periods for this conjuncture: c.100–150 AD and c.150–200 AD.

[2] This text has been adapted from part of a PhD thesis (Quaresma 2009) on the *terra sigillata* from Chãos Salgados (*Mirobriga*?), on the southwest Atlantic coast of *Lusitania*. On that work we had performed an extensive commercial analysis, comparing not only statistical and contextual data of the consumption of this fine ceramic throughout *Hispania*, but also other kinds of economic information.

Consumption data for *terra sigillata* in *Hispania*, quantifiable in several Lusitanian sites (cities of Chãos Salgados: *Mirobriga*? and *Conimbriga*; *villae* of Represas and São Cucufate; salted fish production centre at Tróia), in *Baetica* (*Baelo*) and in *Tarraconensis* (*Valentia*) match the slowing down in financial circulation as proposed by Hopkins (1980) and demonstrate, by their wide diachrony, that the consumption up to the beginning of the 2nd century was never matched again (even though the São Cucufate *villa* has excellent levels in the 4th century and Troia *floruit* is linked to a greater production dynamic of Lusitanian salted fish in the Lower Empire). More surprising still are the *terra sigillata* consumption levels in the 1st century, several times higher than in the rest of the Roman period (*fig. 8*).

Unfortunately we have no other total quantifications of *terra sigillata* in other consumption areas of the Empire. Despite Rome apparently also experienced a decrease in the consumption of this ceramic in the first half of the 2nd century (Rizzo 2003), it is impossible to determine the scale of the phenomenon. Nevertheless, this evolution seems to occur also in the Atlantic area, since the consumption in London (*Britannia*) and in Poitiers (western *Gallia*. See Tilhard 2004) has the same behaviour.

We have demonstrated that the production of the South Gaulish and Hispanic *terra sigillata* is not immediately replaced by the African one, in the first half of the 2nd century, not only in the Hispanic area (Quaresma 2009), but also in the Italian area (Martin 2006) or in Libya (Kenrick 1985), concerning Italian *terra sigillata*. The stratigraphy at *Augusta Emerita*, *Lusitania*'s capital, despite Hispanic *terra sigillata* is the single production quantified (*fig. 9*), demonstrates that this typology falls dramatically in the first half of the 2nd century, while a series of other Lusitanian, Baetican and *Tarraconensis* sites, show that African *sigillata* only imposes itself on the market from the second half of the 2nd century onwards (Quaresma 2009), despite the importance of African cooking ware in the eastern Hispanic coast and in other sites of the western Mediterranean, even in the first half of the 2nd century, a factor often not separated from African quantifications (such is the case of *fig. 10*).

Africa's importance, already pointed out by Rostovtzeff (1926–1988) at an urban level, since Trajan, and discernible through the monetary circulation from the 2nd century (*fig. 2*), is well expressed by the domination of African *terra sigillata* A from c.150 AD onwards (Quaresma 2009 – *Hispania*; Martin 2006 – *Ostia*; Kenrick 1985 – Benghazi). It is quite possible that the receding (?) economy of the 2nd century is by and

large a transition of the economic primacy of the North Mediterranean area in favour of this new director area, the North Africa, in particular *Proconsularis* and *Byzacena*.

As Jongman (2007) put it, more than *crisis* or *decline*, we should talk about *transformation*, but the High-Empire *floruit* concerning several items also takes this author to remind us Gibbon's problem (1776). *Terra sigillata* consumed in *Hispania*, London and Poitiers *(*and maybe in Rome) also confirms the ideas of Bauman and Wilson (2009): we can talk about growth until c. 200 AD, but the data for a economy in crisis are clearly earlier in several sectors, one being that of *terra sigillata*, the most important table fineware produced in large-scale and certainly one of the main economic indices of the Roman period.

REFERENCES

Alarcão, J., Etienne, R., Mayet, F., *Les villas romaines de S. Cucufate (Portugal)* (1990).

Andreu Pintado, J., *La participación de las elites en la mejora urbanística y el equipamiento ornamental de sus ciudades entre Tibério e Trajano: el ejemplo de la província Lusitania*, in C. Castillo, F. Navarro, R. Martínez, *De Augusto a Trajano. Un siglo en la Historia de Hispania*, Mundo Antiguo, Nova Série, n. 6, Pamplona, Ediciones Universidad de Navarra (2001) 239–264.

Aquilué Abadias, J., *Las cerámicas africanas de la ciudad romana de Baetulo (Hispania Tarraconensis*). BAR International Series 337 (1987).

Aquilué Abadias, J., *Relaciones económicas, sociales e ideológicas entre el Norte de África y la Tarraconense en época romana. Las cerámicas de producción africana procedentes de la Colonia Urbs Triumphalis Tarraco*, Collecció de tesis doctorals microfitxades, n.1275, Universidad de Barcelona (1992a).

Aquilué Abadias, J., *Comentaris entorn a la presència de la cerámiques de producció africana a Tàrraco*, in X. Duprè i Raventos (coord.), *Miscelània Arqueològica a Josep M. Recasens* (1992b) 25–33.

Aquilué Abadias, J. *et al*., Presencia de producciones sigillatas sudgálicas en las excavaciones realizadas en el foro de la ciudad romana de Empúries (L'Escala, Alt Empordà) in Nieto, X. *et Al*., eds., *La difusió de la terra sigillata sudgàl.lica al nord d'Hispania*.Museu d'Arqueologia de Catalunya. Monografies, n. 6 (2005) 199–239.

Arce, J., *Spain and the African provinces in Late Antiquity*, in K. Bowes, M. Kulikowski (eds.), *Hispania in Late Antiquity. Current perspectives* (2005) 341–368.

Arruda, A. M. *et al., Monte Molião (Lagos) : resultados de um projecto em curso. Actas do 5º encontro de Arqueologia do Algarve (Silves, 25 a 27 de Outubro de 2007)*, " Xelb", n. 8 (2008) 137–168.

Bang, P., *The Roman bazaar. A comparative study of trade and markets in a tributary empire* (2008).

Bauman, A., Wilson, A. (eds), *Quantifying the Roman economy. Methods and problems* (2009).

Bird, J., *African red slip ware in roman Britain*, in J. Dore, K. Greene (eds.), *Roman pottery studies in Britain and Beyond*, BAR Suppl. Series, n. 30 (1977) 269–77.

Blois, L., Pleket, H., Rich, J., *Introduction*, in L. Blois, J. Rich (eds.), *The transformation of economic life under the Roman empire. Proceedings of the second workshop of the international network Impact of Empire (Roman empire, c.200 B.C. – AD 476). Nottingham, July, 4–7, 2001* (2002) ix–xx.

Bost, J.-P. *et al., Belo IV (Les Monnaies)*, Série Archeologie, n. VI (1987).

Bourgeois, A., Mayet, F., *Fouilles de Belo*. VI (Les sigillées), Collection de la Casa de Velásquez, n. 34, Archéologie, n. XIV (1991).

Bruun, Ch., *The Antonine Plague and the "third-century crisis*", in O. Hekster, G. de Kleijn, D. Sloutkes (eds.), *Crises and the Roman Empire. Proceedings of the seventh workshop of the International Network Impact of Empire. Nijmegen. June 20–24, 2006*, Impact of Empire, n. 7 (2007), 201–218.

Bustamante Alvarez, M., *et al., Sigillatas claras de Aljustrel: a crise do século II nas minas do Sudoeste Ibérico*, "Revista Portuguesa de Arqueologia*",* n. 11.1 (2008) 163–181.

Carandini, A., *L'ultima civiltà sepolta o del massimo oggetto desueto, secondo un archeologo*, in A. Momigliano, A. Schiavoni (eds.), *Storia di Roma*. III (*L'éta tardoantica*), 2 (*I luoghi e le culture*) (1993) 11–40.

Carandini, A., Panella, C. (eds.), *Ostia IV (Le terme del nuotatore. Scavo dell'ambiente XVI e dell'area XXV)*, Studi Miscellanei, n. 23 (1977).

Carbonell, C.-O., *Historiografia*, Teorema (1981–1992).

Ceballos Hornero, A., *Los espectáculos en la Hispania romana: la documentación epigráfica*, Cuadernos emeritenses, n. 26, MNAR (2004).

Comas, M. *et al*., Observations sur les sigillées du Sud de la Gaule à Baetulo (Badalogne, Espagne), in *Actes du Congrès de Millau. 12–15 Mai 1994*. S.F.E.C.A.G. (1994) 83–94.

Delgado, M., Mayet, F., Alarcão, A.M., *Fouilles de Conimbriga. IV (Les sigillées)* (1975).

Dias, M.A., *A terra sigillata africana de Parreitas (Bárrio, Alcobaça*), in P. G. Barbosa (coord.), *A região de Alcobaça na época romana. A estação arqueológica de Parreitas (Bárrio*) (2008) 94–113.

Domergue, C., *Les mines de la Péninsule Ibérique dans l'Antiquité Romaine*, Collection de l'École Française à Rome, 127 (1990).

Duncan-Jones, R., *The economy of the Roman Empire. Quantitative studies* (1974).

Duncan-Jones, R., *Money and government in the Roman Empire* (1994).

Escrivá Torres, V., *La cerámica romana de Valentia. La Terra Sigillata hispánica*, Ajuntament de València, Série Arqueológica Municipal, 8 (1989).

Étienne, R., Makaroun, Y., Mayet, F., *Un grand complexe industriel a Tróia (Portugal)* (1994).

Ettlinger, E., *et al*., *Conspectus formarum terrae sigillatae italico modo confectae*, Materialen zur römisch-germanischen Keramik, Heft 10 (1990–2002).

Fabião, C., *O azeite da Baetica na Lusitania*, "Conimbriga*",* XXXII–XXXIII (1993–1994) 219–245.

Fabião, C., Carvalho, A., *Ânforas da Lusitânia: uma perspectiva*, in J. Alarcão, F. Mayet, F. (eds.), *Les amphores lusitaniennes. Typologie, production, commerce. Actes des journées d'études tenues à Conimbriga les 13 et 14 Octobre 1988* (1990) 37–64.

Fabião, C., *et al*., *Necrópole romana do Monte Novo do Castelinho, Almodôvar, "* Revista Portuguesa de Arqueologia", 1.1 (1998) 199–220.

Fant, J., *Ideology, gift and trade: a distribution model for thr Roman imperial marbles*, in W.V. Harris (ed.), *The inscribed economy. Production and distribution in the roman empire in the light of instrumentum domesticum*, "Journal of Roman Studies", Supplementary Series, n. 6 (1993) 145–170.

Fentress, E., Perkins, Ph., *Counting african red slip ware*, in A. Mastino, A., *L'Africa romana. Atti del V convegno di studio. Sassari. 11–13 dicembre 1987* (1987) 205–214.

Filloy Nieva, I., Gil Zubillaga, E., *Importaciones galicas tardías en Alava (Espagne*), *SFECAG. Actes du Congrès du Mans* (1997) 335–344.

Finley, M., *A economia antiga* (1973).
Fulford, M., *Economic interdependence among urban communities of the Roman Mediterranean*, "World Archaeology", 19.1 (1987) 58–75.
Fulford, M., *Approaches to quantifying Roman trade. Response*, in A. Bauman, A. Wilson (eds.), *Quantifying the Roman economy. Methods and problems* (2009) 250–258.
García Lopez, J.L., Cara Barrionuevo, L., *Un ejemplo de fondeadero en la costa meridional. Analisis de distribucion espacial de los hallazgos romanos en la ciudad de Almeria, Actas del XXI congreso nacional de Arqueologia*, I, Colección Actas, n. 28 (1995) 127–141.
García Noguera, M. *et al*., Un context ceràmic d'inicis del segle II d.C. a Tàrraco (Hispania Tarraconensis), « Pyrenae » 28 (1997) 179–209.
García Vargas E., *La Producción de ánforas en la bahía de Cádiz en época romana (siglos II a.C. – IV d.C.)* (1998).
García Vargas, E., *Hispalis como centro de consumo desde época tardorrepublicana a la Antigüedad Tardía. El testimonio de las ánforas*, "Anales de Arqueología Cordobesa*", n.* 18 (2007) 317–360.
Garnsey, P., Saller, R., *The Roman Empire. Economy, society and culture* (1987).
Gibbon, E., *The decline and fall of the Roman empire* (1776).
González Prats, A., *Aportaciones al conocimiento del Portus Illicitanus: Reseña de los trabajos de urgencia de 1976. La terra sigillata*, "Lucentum*"*, n. 3 (1984) 101–34.
Harris, W.J., *A comment on A. Wilson: Approaches to quantifying Roman trade*, in A. Bauman, A. Wilson (eds.), *Quantifying the Roman economy. Methods and problems* (2009) 259–267.
Hawthorne, J.W.J., *Post processual economics: the role of African Red Slip Ware vessel volume in Mediterranean demography*, in *Preceedings of the Sixth Annual Theoretical Roman Archaeology Conference* (1987).
Hopkins, K., *Taxes and trade in the Roman Empire (200 B.C. – A.D. 400)*, "Journal of Roman Studies", 70 (1980) 101–125.
Hopkins, K., *Models, ships and staples*, in P. Garnsey, C. R. Whittaker (eds.), *Trade end famine in Classical Antiquity* (1983) 84–109.
Horden, P., Purcell, N., *The corrupting sea. A study of Mediterranean History* (2000).
Howgego, Ch., *Some numismatic approaches to Quantifying the Roman Economy*, in A. Bowman, A. Wilson (eds.), *Quantifying the roman economy. Methods and problems* (2009) 287–295.

Huguet Enguita, E., *Segells de Sigillata Hispànica de labocador de la Placa del Negret*, "Saguntum (*P.L.A.V.*)", 37 (2005) 181–198.

Jones, A.H.M., *Inflation under the Roman Empire*, "Economic History Review", 5, in P. A. Brunt (ed.), *The Roman economy. Studies in ancient economic and administrative History* (1953) 187–227.

Jongman, W., *Gibbon was right : the decline and fall of the Roman economy*, in O. Hekster, G. Kleijn, D. Slootjes (eds.), *Crises and the Roman Empire. Proceedings of the Seventh Workshop of the International Network Impact of the Roman Empire (Nijmegen, June 20–24, 2006)* (2007) 183–200.

Kenrick, Ph.M., *Excavations at Sidi Khrebish Benghazi (Berenice)*, III. Part I (The fine pottery) (1985).

Leveau, Ph., *The western provinces*, in W. Scheidel, W., I. Morris, R. Saller, *The Cambridge economic History of the Graeco-Roman world* (2007) 651–670.

Lopes, C., *A Sigillata de Represas. Tratamento informático* (1994).

López Pérez, M.C., *El comercio de Terra Sigillata en la provincia de A Coruña*, "Brigantium", 16 (2004).

Madrid Fernández, M., Primers resultats de l'estudi de la ceràmica *terra sigillata* de Baetulo: Circulació ceràmica i aportacions cronològiques a la ciutat, « Pyrenae » 30 (1999) 147–172.

Mantas, V., *Vias e portos na Lusitânia romana*, in J. G. Gorges, E. Cerillo, T. Nogales Trinidad (eds.), *V mesa redonda internacional sobre Lusitania romana. Las comunicacione. Cáceres. Faculdad de Filosofia y Letras. 7, 8 y 9 de noviembre de 2002* (2004) 427–454.

Marichal, R., *Les graffites de La Graufesenque*, « Suplement à Gallia", 47 (1988).

Marsh, O., *London´s samian supply and its relationship to the development of the gallic samian industry*, in A. C. Anderson, A. S. Anderson, *Roman pottery research in Britain and North West Europe*, BAR, n.13 (1981) 173–238.

Martin, A., *Sigillata and red-slip ware to Ostia. The supply to a consumption center*, in S. Menchelli, M. Pasquinucci (eds.), *Territorio e produzioni ceramiche. Paesaggi, economia e società in età romana. Atti del convegno internazionale. Pisa 20–22 ottobre 2005*, Instrumenta 2 (2006) 381–388.

Mayet, F., Les amphores lusitaniennes, in *Céramiques hellénistiques et romaines*, III (2001) 277–293.

Mayet, F., Silva, C.T., *L'atelier d'amphores de Pinheiro (Portugal)* (1998).

Melchior, E., *Elites municipales y mecenazgo cívico en la Hispania*, in J. F. Rodríguez Neila, F. J. Navarro Santana (eds.), *Elites y promoción social en la Hispania Romana*, Mundo Antiguo, Nova série, 5, Ediciones Universidad de Navarra (1999) 219–264.

Morais, R., *Autarcia e comércio em Bracara Augusta. Contributo para o estudo económico da cidade no período Alto-Imperial*, Escavações Arqueológicas, 2, U.A.U.M. (2005).

Nolen, J. S., A *villa* romana do Alto de Cidreira (Cascais) – os materiais, "Conimbriga", 27 (1988) 61–140.

Panella, C., *Merci e scambi nel Mediterraneo tardoantico*, in A. Momigliano, A. (eds.), *Storia di Roma*, III (*L'éta tardoantica*), 2 (*I luoghi e le culture*) (1993) 613–697.

Parker, A., The pattern of commerce as evidenced by shipwreck, in T. Hackens, T., M. Miró (eds.), *Le commerce maritime romain en Méditerranée occidentale*, PACT, 27 (1990) 147–167.

Pereira, V., *Terra sigillata em três locais da Lusitânia : Ammaia, Idanha, Mileu*, PhD thesis, Faculdade de Letras da Universidade de Coimbra (2006).

Pirenne, H., *Maomé e Carlos Magno* (1937 [1992]).

Quaresma, J.C., *Terra sigillata africana, hispânica, foceense tardia e cerâmica africana de cozinha de Mirobriga (Chãos Salgados, Santiago do Cacém*), "Conimbriga", 38 (1999) 137–200.

Quaresma, J.C., *Economia antiga a partir de um centro de consumo lusitano. Terra sigillata e cerâmica africana de cozinha em Chãos Salgados* (*Mirobriga*?), PhD thesis. Faculdade de Letras da Universidade de Lisboa (2009).

Ramos, A.C., Almeida, R., Laço, T., *O complexo industrial da Rua Silva Lopes (Lagos). Uma primeira leitura do sítio e análise das suas principais problemáticas no quadro da indústria conserveira da Lusitânia meridional*, in *Simpósio internacional. Produção e comércio de preparados piscícolas durante a Proto-História e a Época Romana no Ocidente da Península Ibérica. Homenagem a Françoise Mayet*, "Setúbal Arqueológica", 13 (2006) 83–100.

Rathbone, D., The financing of maritime commerce in the Roman empire, I–II AD., in E. Lo cascio (ed.), *Credito e moneta nel mondo romano. Atti degli incontri capresi di storia dell'economia antica (Capri 12–14 Ottobre 2000)* (2003) 197–230.

Reynolds, P., *Trade in the Western Mediterranean. A.D. 400–700*: the ceramic evidence, TEMPVS REPARATVUM / BAR IS, n. 604 (1995).

Reynolds, P., *Baetican, lusitanian and tarraconensian amphorae in classical Beirut: some preliminary observations on trends in amphora imports from the western Mediterranean in the anglo-lebanese excavations in Beirut (BEY 006, 007 and 045), Actas congreso internacional Ex Baetica Amphorae. Conservas, aceite y vino de la Bética en el Império Romano (Écija y sevilla, 17 al 20 de Deciembre de 1998)*, III (2000) 1035–1060.

Reynolds, P., *Hispania in the Later Roman Mediterranean: ceramics and trade*, in K. Bowes, M. Kulikowski (eds.), *Hispania in Late Antiquity. Current perspectives* (2005) 369–486.

Rickman, G.E., *The grain trade under the Roman Empire*, in J. H. d'Arms, E. C. Kopff (eds.), *The seaborne commerce of the Ancient Rome. Studies in Archaeology and History*, Memoirs of the American Academy in Rome 36 (1980) 261–275.

Rizzo, G., *Instrumenta urbis I. Ceramiche fini da mensa, lucerne ed anfore a Roma nei primi due secoli dell'Impero,* Colléction de l'EFR 307 (2003).

Rodríguez de Berlanga, M., *El nuevo bronce de Italica que publica de real orden Manuel Rodríguez de Berlanga* (1891).

Roldán Gómez, L., *et al*. (eds.), *Estudio historico-arqueologico de la ciudad de Carteia (San Roque, Cádiz). 1994–1999*, I (2006).

Rostovtzeff, M., *Histoire économique et sociale de l'Empire Romain* (1926 [1988]).

Ruivo, J., *Circulação monetrária na Estremadura portuguesa até aos inícios do século III*, "Nummus", 2ª série 16–20 (1993–1997) 7–177.

Scheidel, W., *A comparative perspective on the determinants of the scale and productivity of maritime trade in the Roman Mediterranean. Version 1.0, Princeton/Stanford working papers in Classics* (forthcoming)

Scheidel, W., *Approaching the Roman economy. Version 1.0, Princeton/Stanford working papers in Classics* (forthcoming).

Silva, C.T., Coelho-Soares, A., *Produção de preparados piscícolas na Sines romana,* in *Simpósio internacional. Produção e comércio de preparados piscícolas durante a Proto-História e a Época Romana no Ocidente da Península Ibérica. Homenagem a Françoise Mayet*, "Setúbal Arqueológica" 13 (2006) 101–122.

Silva, C.T. *et al*., *Escavações arqueológicas no castelo de Alcácer do Sal (campanha de 1979)*, "Setúbal Arqueológica" 6–7 (1980–1) 149–218.

Silva, C.T., Soares, J., *Ilha do Pessegueiro. Porto Romano da Costa Alentejana*, Instituto da Conservação da Natureza (1993).

Tilhard, J.-L., *Les céramiques sigillées du Haut-Empire à Poitiers d'après les estampilles et les décors moulés*. SFECAG Supplément 2 (2004).

Vaquerizo, D., Garriguet, J.A., Vargas, S., *"La Constancia". Una contribución al conocimiento de la topografia y los usos funerarios en la Colonia Patricia de los siglos iniciales del Imperio,* Arqueología Cordobesa, 11, Servicio de Publicaciones/ Universidad de Córdoba (2005).

Wilson, A., *Approaches to quantifying Roman trade*, A. Bauman, A. Wilson (eds.), *Quantifying the Roman economy. Methods and problems* (2009) 213–249.

Young, G.K., *Rome's eastern trade. International commerce and imperial policy, 31 BC – AD 305* (2001).

FIGURES

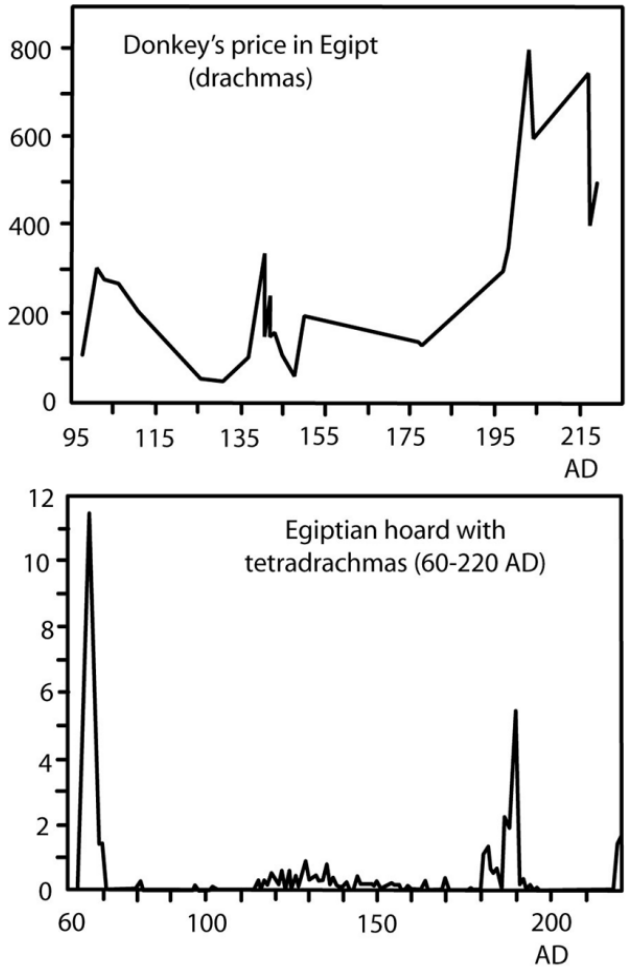

Fig.1: Donkey's price and monetary circulation in Egypt (Duncan-Jones 1994).

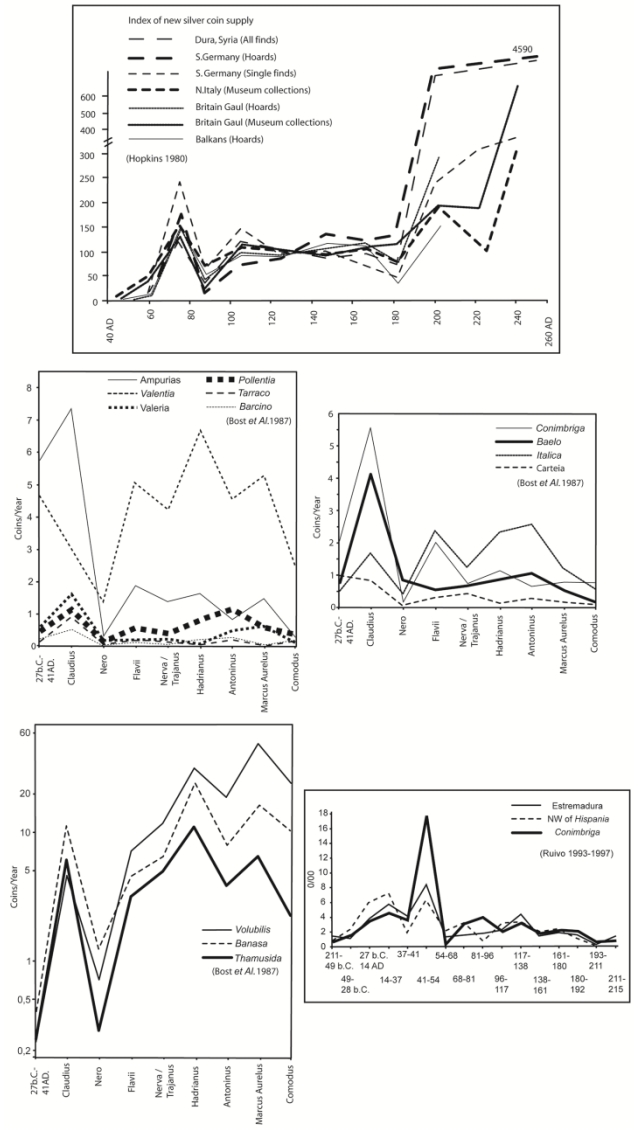

Fig.2: Monetary circulation in several sites or regions of the Roman Empire.

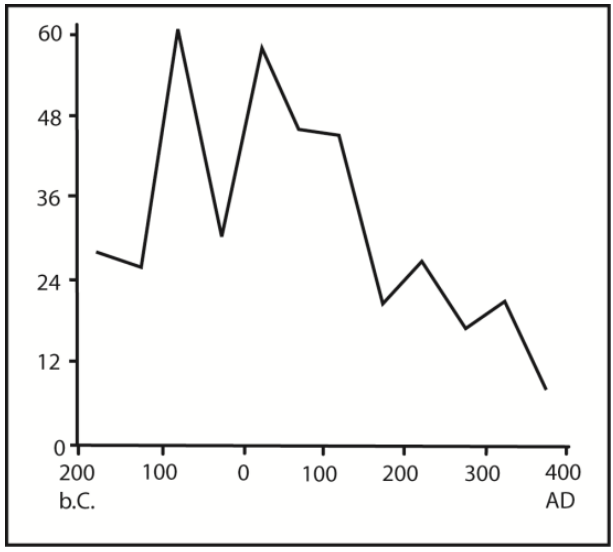

Fig. 3: Roman shipwrecks in the Mediterranean Sea (Parker 1990).

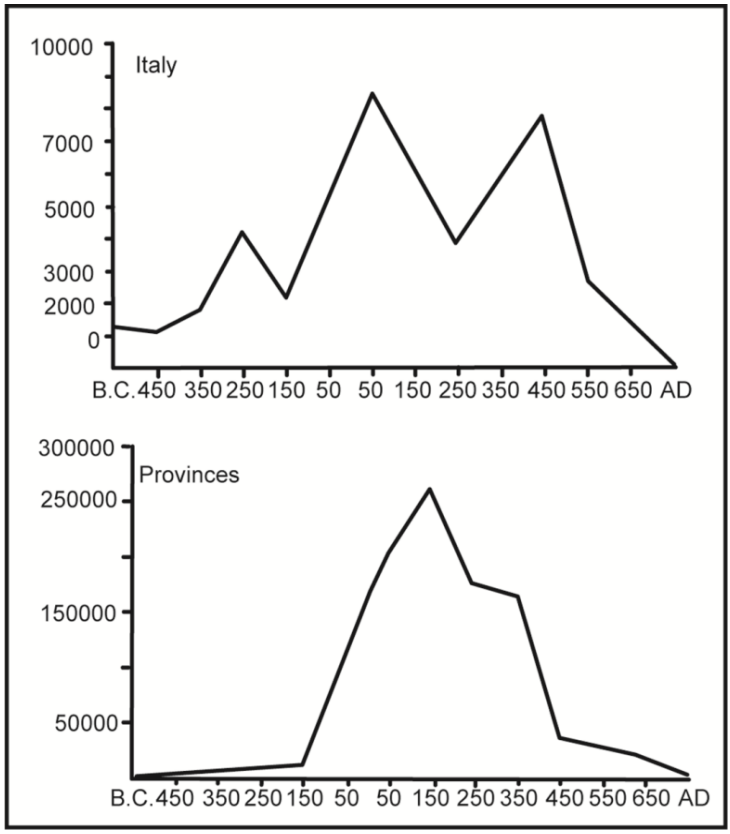

Fig. 4: Animal bone amounts in Italy and in the provinces (Jongman 2007).

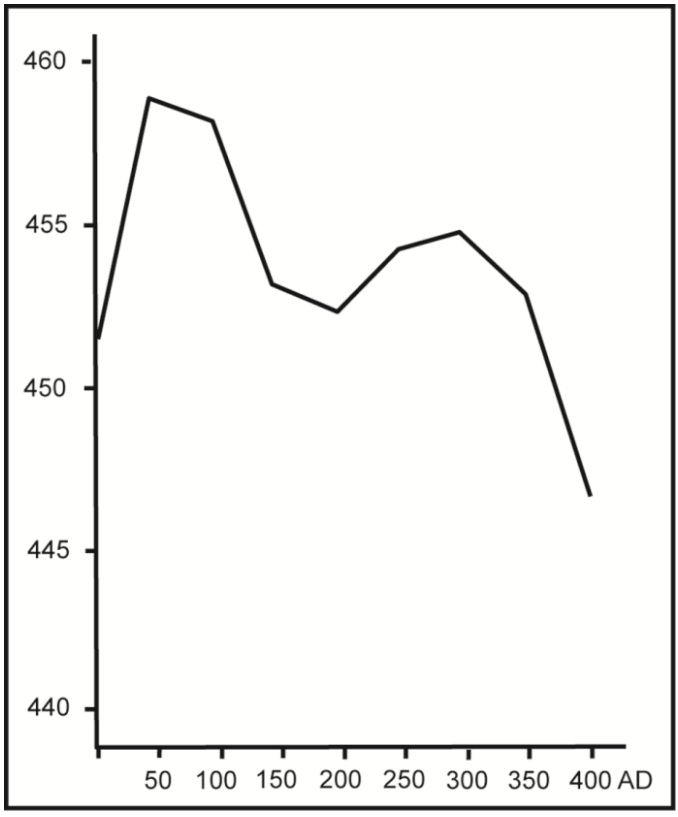

Fig. 5: Femur length evolution (Jongman 2007).

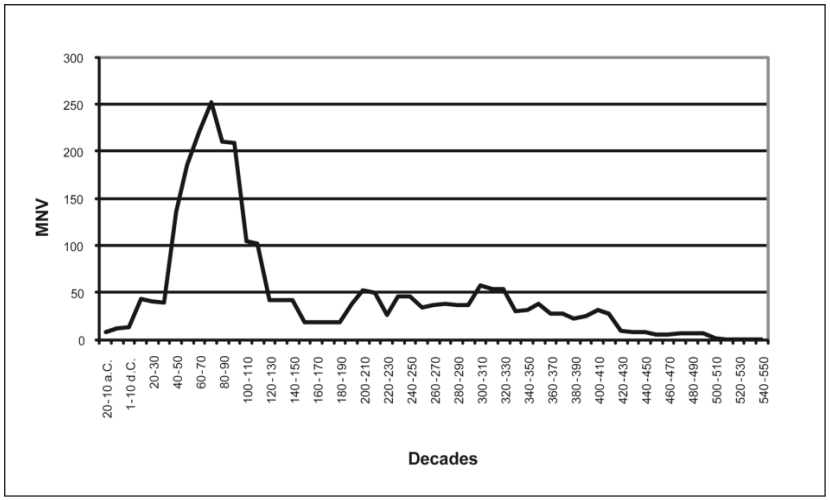

Fig. 6: Chãos Salgados (*Mirobriga*?): *terra sigillata* evolution (Quaresma 2009).

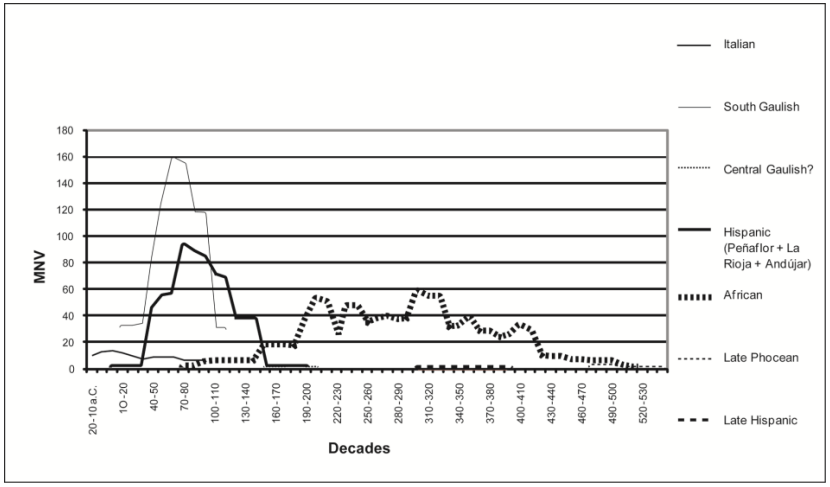

Fig. 7: Chãos Salgados (*Mirobriga*?): *terra sigillata* evolution according to the regions of production (Quaresma 2009).

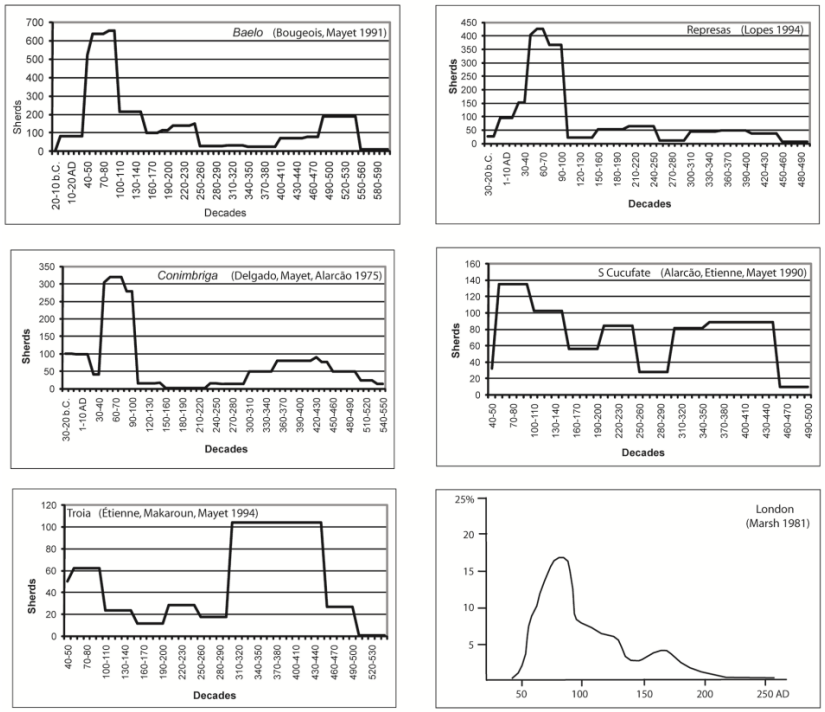

Fig. 8: *Terra sigillata* in several sites of *Hispania* and London.

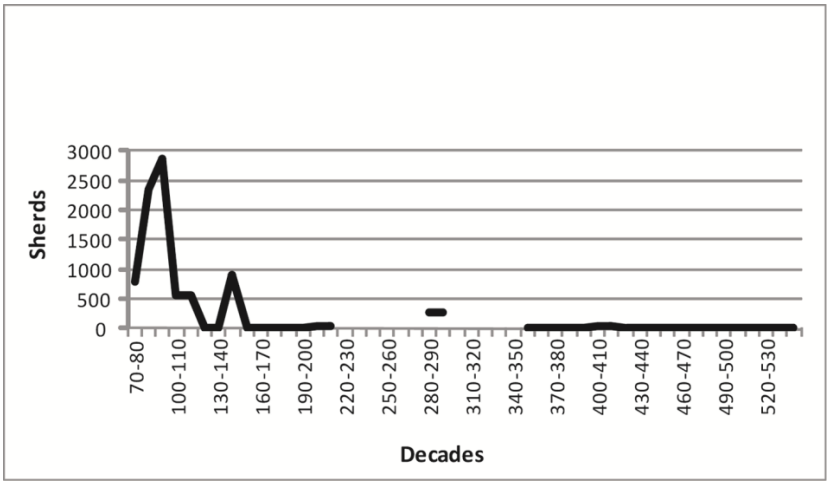

Fig. 9: Hispanic *terra sigillata* in *Augusta Emerita* (stratigraphic amounts from the sector *suburbio norte*) (Bustamante 2010).

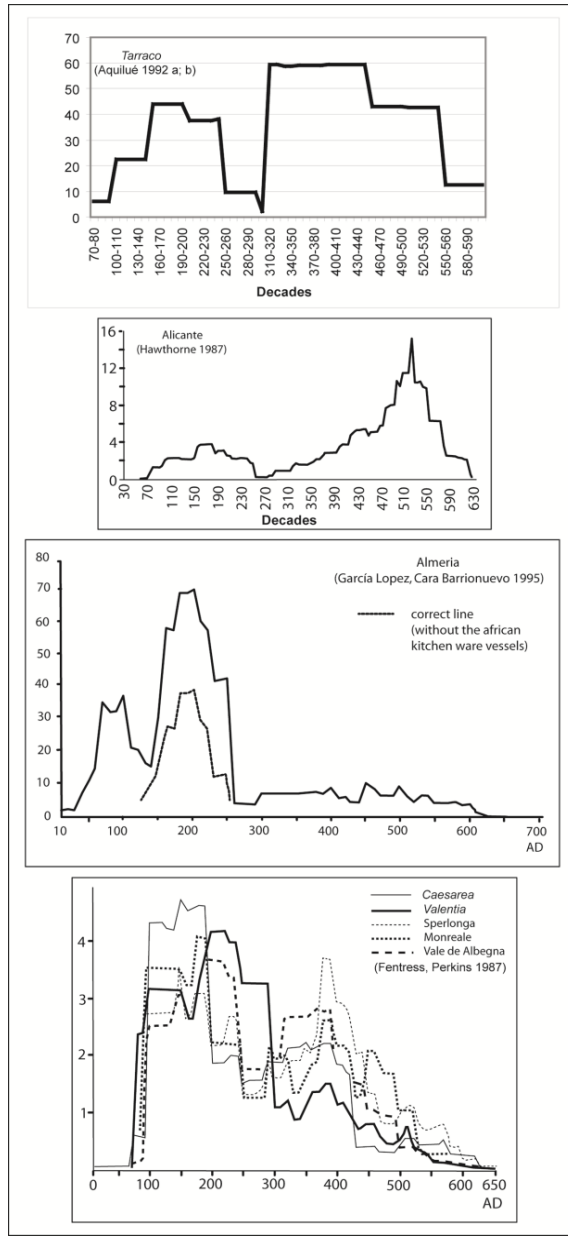

Fig. 10: African *terra sigillata* in several western sites.

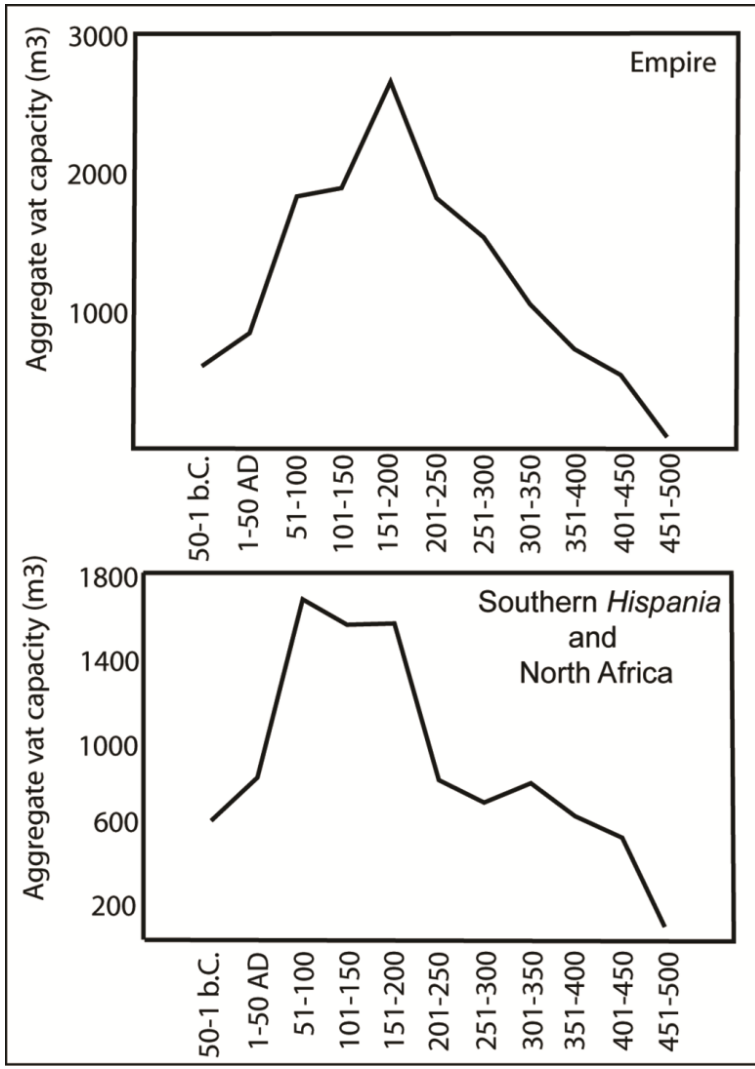

Fig. 11: Fish-salting vat capacities (Wilson 2009).

1	Brigantium	17	Monte Novo do Castelinho
2	Braga / Bracara Augusta	18	Monte Molião-Lagos / Lacobriga
3	Conimbriga	19	Cordoba
4	Parreitas	20	Munigua / Mulva
5	Ammaia	21	Sevilla / Hispalis
6	Alto do Cidreira	22	Italica
7	Lisboa / Olisipo	23	Baelo
8	Setúbal	24	Carteia
9	Tróia	25	Almeria
10	Alcácer do Sal / Salacia	26	Portus Illicitanus
11	S. Cucufate	27	Valentia
12	Represas	28	Tarraco
13	Chãos Salgados / Mirobriga?	29	Badalona / Baetulo
14	Sines	30	Ampurias
15	Ilha do Pessegueiro	31	Merida / Augusta Emerita
16	Aljustrel / Vipasca		

Fig. 12: Iberian sites mentioned in the text