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## *HISPANIA AND THE ATLANTIC ROUTE IN ROMAN TIMES: NEW APPROACHES TO PORTS AND TRADE*<sup>1</sup>

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*Summary. This paper explores the role of Hispania in the Atlantic route in Roman times. We analyse the different Atlantic Iberian territories along this route, based on recent archaeological advances and discoveries related to trade as well as the shipping infrastructure. The aim is to explain the origin and evolution of a new maritime area that was completely integrated with the political and commercial structure of the Empire, with trade routes that followed the coastal areas of the Iberian Peninsula all the way to the Mediterranean.*

### THE ATLANTIC OCEAN AS A MARGINAL AREA FOR ROMAN NAVIGATION

Limited mention of the Atlantic Ocean (Outer Sea) in the ancient written sources led investigation during most of the twentieth century to relegate navigation in these waters as a limited and local issue (Grenier 1934, 520; Dion 1954; Lewis 1958). Reddé (1979) was the first author to assert the importance of Roman navigation on the Atlantic Ocean. His work has allowed us to incorporate the existence of different shipping routes, some clearly dating back to pre-Roman times, and navigation along the coasts of Atlantic Europe into the scientific debate. In recent decades, we have witnessed this renewed research perspective on both shores of the English Channel (Cunliffe 1991; 2001; Urteaga and Noain 2005; Sánchez 2008; Morris 2010; Hugot and Tranoy 2010).

Both the Spanish and Portuguese scientific traditions maintained this negative view of Atlantic Roman navigation. An exception that marked a shift in this perspective was A. Balil's research, which shed light on the importance of Atlantic trade in the process of Roman expansion to northern regions such as Galicia and Cantabria (Balil 1971; 1974).

It was not until the late 1980s that attitudes towards the relevance of commercial trade on the Atlantic Ocean, and its influence in terms of the inclusion of these regions in the Roman world, changed in Spanish archaeology. In Spain, works by Remesal (1986), Naveiro (1991), Fernández Ochoa and Morillo (1994; 2013), Iglesias Gil (1994), Chic García (1995), Fernández Ochoa (1996), Carreras and Funari (1998), Millán León (1998), Carreras (2000), Fernández Ochoa (2003), Morillo (2003; 2012), Urteaga and Noain (2005), González Ruibal (2006/7) and Carreras and Morais (2010; 2012) set the framework for research in this field. The same occurred in Portugal,

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with scholars such as Mantas (2004), Cunliffe (2001), Blot (2003; 2011), Fabião (2009) and Viegas (2011), along with the above-mentioned works by Carreras and Morais (2010; 2012). The western façade of *Hispania* has thus been integrated in a new, more balanced, framework of Roman trade, based on archaeological evidence.

#### PORTS AND NAVIGATION INFRASTRUCTURE ON THE ATLANTIC FAÇADE OF *HISPANIA*

One of the subjects that has recently been revisited in Spain and Portugal is the archaeological evidence of ports and wharfs on the Roman Atlantic façade. The ports of intermediate reloading were support points along the navigation routes where cargo was loaded, unloaded and submitted to fiscal controls. Well-protected coves must have been used at the beginning, where the ships would dock and unload via shallow-draught barges or run aground on the beach. Later on, the growing requirements of navigation and trade made it necessary to increase the area of water protected from the winds and currents, by building constructions and even new ports in locations where less favourable conditions existed.<sup>2</sup> Unlike the Empire's great commercial hubs such as Ostia and Alexandria that had a powerful port infrastructure, most Roman ports had only basic navigation support facilities including docks, sea-walls, platforms, shipyards and warehouses.

The problems faced by port engineers were made worse by the weather conditions in the Atlantic, namely huge waves and strong winds. Moreover, it must have been very difficult to deal with waves and ever-changing tides, and with extreme variations in the water-level that could strand a ship and break its hull – something that was not a problem in the Mediterranean. The solution was to take advantage of protected harbours that possessed sufficient draught for ships. Consequently, estuaries were often used as ports in the Atlantic because they were protected from storms, and the river course somewhat regulated the tide. This topography made it possible to develop a more complex infrastructure, including docks, loading platforms, shops, warehouses and salt mines, spread out along the bay, estuary or sea inlet where the land, sea and river all met.

Geomorphological and eustatic dynamics of the sea-level were especially felt in areas of the lower Atlantic river courses, which pushed the coastline back some kilometres in comparison to the Roman era, blocking off entire sections of sea inlets and estuaries and probably covering up old port infrastructure. Actual examples of this were recently found on the Portuguese coast (Silva and Rocha Pereira 2010; Granja and Morais 2010).

Today, the most well-known Roman Atlantic harbours are *Burdigala* (Bordeaux) (Barraud 2003; Gerber 2005; 2010) and *Londinium* (London) (Milne 1985; 1986; Marsden 1994). Other ports of secondary importance such as Biganos in Arcachon Bay (Wozny 2008, 102–3) and Velsen (*Castellum Flevum*) on the Frisian coast (Morel 1986) feature port structures such as docks and sea-walls similar to those found in the principal ports.

In terms of *Hispania*'s Atlantic coast, until recently archaeologists had only found this type of evidence at *Oiasso* (Irún, Guipúzcoa). Excavations at the site revealed the remains of a huge port infrastructure with docks built from wooden beams and supported by vertical levees (Fig. 1). Apart from the docks, there were also a stone sea-wall that was 4 m wide and 1 m tall and a raised *horreum* that served for storage. In Tadeo Murgía Street, archaeologists found four terraces at different levels

<sup>2</sup>Vitruvius (5, 13) gave the most complete description of natural conditions and infrastructure projects that accompanied the construction of a port in the early Empire period in a comprehensive architectural treatise.



Figure 1

Roman dock area of Irún (Guipúzcoa), ancient port of *Oiasso* (Arkeolan, Urteaga 2003).

with a stone base and a wooden platform used to unload cargo at different phases of the tidal cycle. The docks at *Oiasso* were probably built between AD 70 and 120 (Urteaga 2003, 196–202; 2005), even though the material evidence dates the beginning of sea trade back to the late Augustan period.

Other peninsular ports such as *Gades* (Cádiz), *Olissipo* (Lisbon) and *Portus Victoriae Iuliobrigensium* (Santander), located in large bays or estuaries, must have featured a similar infrastructure (Fernández Ochoa and Morillo 2003). In recent years, archaeologists have acquired a considerable amount of data on the Roman port complex of *Gades*. In Cádiz' old town, archaeologists have identified the area where the old port used to be, in the canal that separated two ancient islands that were home to a Phoenician settlement (Arteaga and Roos 2002). Despite the fact that the palaeochannel is blocked off and the topography has changed completely, archaeologists found evidence of potential modifications on the shores (Bernal Casasola 2013, 230–5). There is a growing amount of archaeological evidence that points to the existence of a dense network of loading platforms and different types of secondary facilities spread across the shores of the Bay of Cádiz, directly related to the region's productive activities. An interesting Roman dock from the Flavian period made up of rows of amphorae and vertical wooden posts was found in Los Cargaderos, i.e. in Caño de Sancti Petri (Bernal Casasola *et al.* 2005) (Fig. 2).

In the Tagus estuary, a privileged sea territory in terms of navigation, various ports undoubtedly existed during the Roman era (Strabo, *Geog.* 3, 4, 18). *Scallabis* (Santarém, Portugal), situated in the estuary, was one of the principal ports at that time. Another important port was *Olissipo* (Lisbon), also in the Tagus estuary. Another territory marked by intensive sea and river navigation was the Sado estuary, with *Salacia* (Alcácer do Sal) as its inland and *Caetobriga* (Setúbal) as its coastal ports. Despite the abundance of evidence in favour of intensive economic and commercial activity (salting plants, pottery workshops, Mediterranean products, etc.), none of the above-mentioned hubs have preserved their old port infrastructure that would undoubtedly have existed at some point (Arruda *et al.* 2002; Blot 2003, 235–69).

Last is the ancient *Portus Victoriae Iuliobrigensium*. Archaeological evidence confirms the development of intensive Roman sea traffic in the Bay of Santander, an area with the most optimal weather conditions for sailing along the Peninsula's entire northern coast (Fernández Ochoa and Morillo 1994, 107–12) Palaeotopographic reconstruction shows us the nuclear zone of *Portus*





Figure 2

Roman dock of Los Cargaderos, Caño de Sancti Petri (Cádiz) (Archivo Museo Histórico Municipal de San Fernando, Bernal Casasola *et al.* 2005).

*Victoriae Iuliobrigensium*, on a peninsula under the city of Santander at the bottom of a currently buried stream (Figs. 3A and 3B). A dock with wooden pilings found some years ago on the Magdalena Peninsula in Santander might have been part of a secondary Roman loading platform.

Other locations along the Atlantic coast of *Hispania* present less advantageous topographic conditions, like most of the Cantabrian Sea. Sailors thus had to take advantage of whatever hill or cove they could find that would protect them from strong winds and storms from the north-west along a coastline of high cliffs on a long and difficult journey, which is how ports were established. The construction of ports also resulted from the Roman administration's need for navigation support infrastructure. This was the case at Castro Urdiales (*Portus (S)Amanum-Flaviobriga*) (Iglesias Gil 2003), Gijón (Fernández Ochoa *et al.* 2003), La Coruña (*Flavium Brigantium*) (San Claudio 2003) and perhaps Porto (*Portus Cale*) (Blot 2003, 188; Silva 2010). Archaeological finds in all of these ports confirm the existence of intensive Roman trade, but no archaeological remains of the port infrastructure have yet been found.

Apart from these important harbours there was also a network of secondary settlements. On the southern coast, we should mention *Onoba* (Huelva), *Baesuris* (Castro Marim), *Balsa* (Luz de Tavira), *Ossonoba* (Faro), *Portus Hannibalis* (Portimão?), *Lacobriga* (Lagos), and the sea/river port of *Myrtillis* (Mértola) on the shores of the Guadiana (Blot 2003; Mantas 2004; Viegas 2011; Arruda 2012). Along the Atlantic coast, we find the island of Pessegueiro, and Sines (Da Silva and Soares

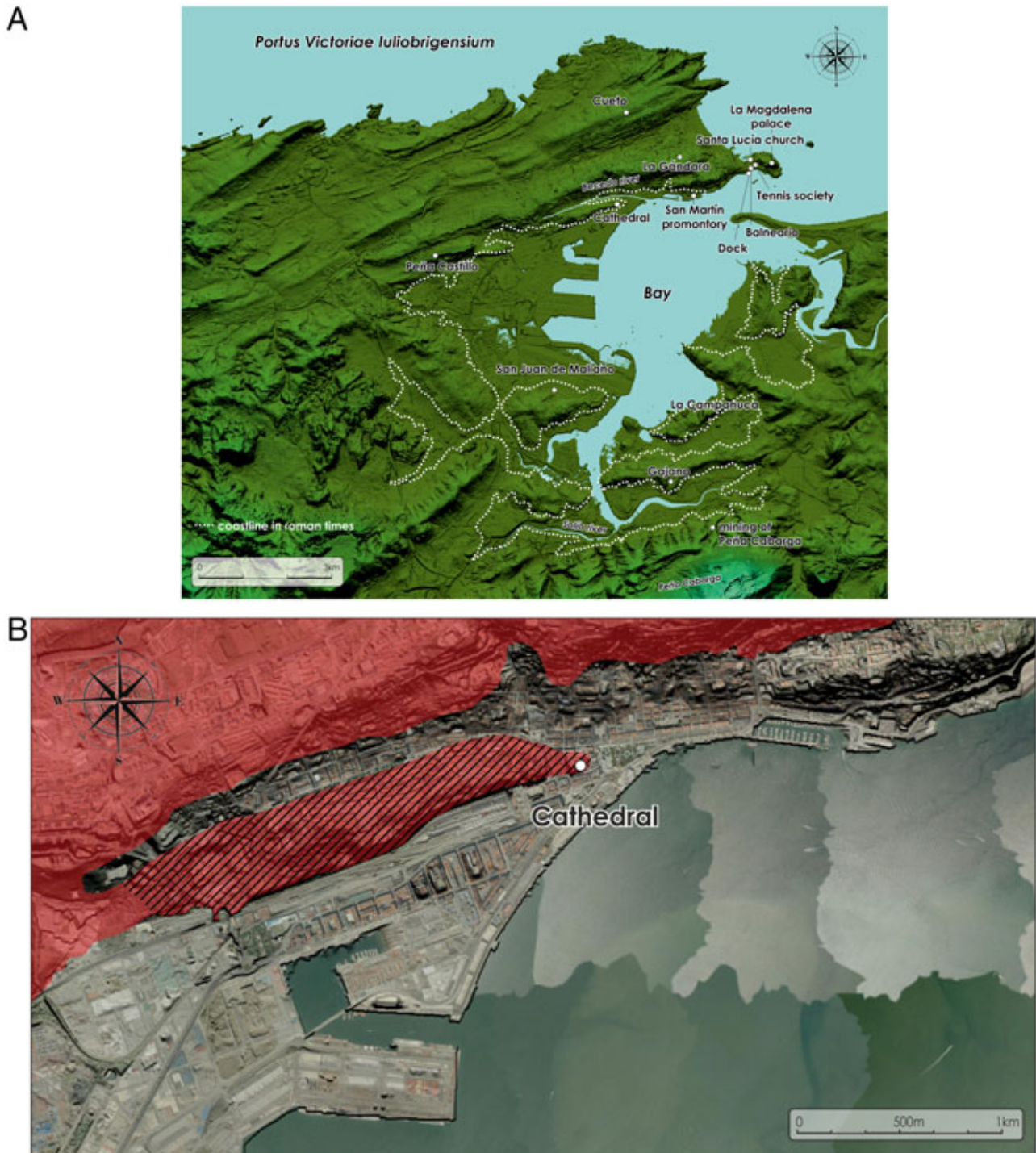


Figure 3

A. Bay of Santander, the ancient *Portus Victoriae Iuliobrigensium* with archaeological evidence of the Roman period (A. Morillo from Iglesias Gil 2003). B. Palaeotopography of the nuclear zone of *Portus Victoriae Iuliobrigensium*, on a peninsula at the bottom of a currently buried stream (A. Morillo).

1993), Nazaré, Peniche, Aveiro and *Aeminum* (Coimbra), on the Mondego River. The recent discovery of a Roman shipwreck in Esposende confirms the navigability of the Cávado River during that period as well as the importance of the port of *Bracara Augusta*, situated upstream of the river (Morais *et al.* 2013) (Fig. 4).



Figure 4

Roman ports and maritime routes of the Portuguese coast, with an indication of the Roman coastline (A. Morillo from Blot 2010).

Alternatively, the Minho River and the so-called Rías Bajas in Galicia represent a privileged sea territory for coastal trade, with extensive evidence of Roman commercial traffic, featuring ports such as *Portus Elanei* (Vigo), *Turoqua* (Pontevedra) and *Iria Flavia* (Padrón) (Pérez Losada 2002; González Ruibal 2006/7). As for the Cantabrian Sea, worthy of mention are Bares, on the northern Galician coast (San Claudio 2003, 132), Rodiles, La Isla in Asturias (Fernández Ochoa and Morillo 1994, 97–8), San Vicente de la Barquera, Suances, Ajo, Santoña (Fernández Ochoa and Morillo 2003, 146–8), Forua, Zarauz/Guetaria and San Sebastián (Martínez Salcedo and Unzueta 2003, 170–1; Esteban 2003, 184–7; Esteban and Izquierdo 2005/6).

Lighthouses were tightly linked to the Roman navigation system as a solution to visibility issues during the night or in foggy weather. Consequently, these were built in visible positions next to the port or estuary entrance, indicating a safe haven.





Figure 5

Re-creation of the lighthouse of *Brigantium* in Roman times (E. and P. Cabarcos, Factoría Gráfica).

Lighthouses were just as necessary in the Atlantic as they were in the Mediterranean, if not more. Their remains have been found at *Brigantium* (La Coruña) (Latorre and Caballero 2009; Bello 2009, 60–4) (Fig. 5) and at *Dubris* (Dover), in the River Dour estuary (*Dubras*), on England's south-east coast (Booth 2007). Even though no traces of it remain today, the oldest lighthouse in the Atlantic according to the Classical sources was at *Gesoriacum* (Boulogne-sur-Mer), commissioned by Caligula between AD 39 and 40 (Reddé 1979, 868).

A couple of years ago, another Roman lighthouse was added to the list of the oldest examples. It was located in the pre-Roman and Roman settlement at Campa Torres (Fernández



Figure 6

Graffiti that reproduce an image of a lighthouse at Cádiz Museum (Bernal Casasola 2009).



Ochoa *et al.* 2005a) and marked the access to the Roman port of Gijón, the ancient *oppidum* of *Noega* in the Classical sources (Mela, *Chor.* III, 13) (Fernández Ochoa *et al.* 2005a). A new analysis of medieval sources and the discovery of graffiti that reproduce an image of a lighthouse have led some archaeologists to argue that there was a Roman lighthouse at *Gades* (Bernal Casasola 2009) (Fig. 6).

There was perhaps a similar structure on top of a hill that overlooks the entrance to the Bidasoa estuary, on the border between Spain and France, signalling access to the port of *Oiasso* (Irún) (Fernández Ochoa and Morillo 2010, 114–15). Archaeologists also found potential evidence of what might have been other Roman lighthouses on the Portuguese coast, namely in Outão, at the entrance to the Sado estuary, or in Espigão das Ruivas (Cascais) (de Alarcão 2009; Fabião 2009, 66).

One of the most important pieces of evidence of the Roman Atlantic trade is the shipwrecks. Unfortunately, these are much scarcer in the Atlantic than in the Mediterranean due to the former's characteristics. However, some were found in shallow waters or river courses. Recently, various shipwrecks have been found along the Atlantic coast of *Hispania*, at Cala de Asturiaga, close to Irún, in the Basque Country (Urteaga 2003, 202–4) or near Cortegada Island



Figure 7

Distribution map of Roman shipwrecks in the Atlantic Ocean: 1. St Peter Port (Guernsey); 2. Beachy Head (East Sussex, England); 3. Blackfriars, County Hall (London); 4. Bermondsey (London); 5. Barlands Farm (Magor, Gwent, Wales); 6. Zwammerdam (Netherlands); 7. Woerden (Belgium); 8. De Meem (Belgium); 9. Bruges (Belgium); 10. Bruges (Belgium), off the coast of Zeebrugge; 11. Bruges (Belgium); 12. Nieuwpoort (Belgium); 13. Nieuwpoort (Belgium); 14. Hondarribia (Basque Country, Spain); 15. Cortegada (Galicia, Spain); 16. Cabo de Mar (Galicia, Spain); 17. Punta Udra (Galicia, Spain); 18. Esposende (Portugal); 19. Cortiçais (Peniche, Portugal).

and in Cabo de Mar and Punta Udra, in Galicia (Naveiro 1991, 63–7, fig. 14; Carreras and Morais, 2012, 425–6). Only two shipwrecks from the Augustan period have been found in Portugal, one of which is located at Cortiçais (Peniche) (Carreras and Morais 2012, 426–7). Recently, another shipwreck was found in Esposende, northern Portugal (Morais *et al.* 2013) (Fig. 7).

EVIDENCE OF PRE-ROMAN AND LATE REPUBLICAN TRADE ON THE ATLANTIC FAÇADE (SIXTH–FIRST CENTURIES BC)

Phoenician and Punic objects dating back to the sixth century BC, and increasing in number from the fourth century BC, have been discovered along the Atlantic shores of Iberia. These items confirm the existence of Mediterranean trade in that area, from *Gadir* (Cádiz) and southern Portugal (Arruda 1999/2000; Sousa and Arruda 2010; Viegas 2011; Arruda 2012) to the territory of the *Galaici* tribes, in Galicia and north of Portugal (Naveiro 1991, 130–1; González Ruibal 2006/7, 262–9, 512–23). However, this evidence becomes scarce until it almost disappears east of Cape Estaca de Bares, which separates the Atlantic from the Cantabrian Sea. The Mediterranean trade route did not continue to the Bay of Biscay in the pre-Roman period.

More abundant archaeological evidence from the fourth century BC onwards found along the Peninsula's western façade confirms the intensification of Mediterranean trade during that period. In 206 BC, *Gadir* (Cádiz) entered the Roman sphere, which gave the Republic control over the commercial interests of this ancient coastal Phoenician city. Rome's conquest had no direct impact on Atlantic commerce judging by the available evidence from the following century, the most interesting of which was the introduction of Black Glazed Roman pottery as one of the products traded by *Gadir*'s sailors.

Slowly but surely, the geographical outline of Europe's Atlantic façade was being increasingly defined until it became a frontier of the Roman State. Rome's zeal to extend its political dominion to the Hispanic regions first and *Gallia*, *Germania* and *Britannia* later on manifested itself in various journeys of exploration. The first of those was that undertaken by Polybius, in the mid-second century BC.

Years later, in 61 BC, Caesar expanded Rome's political dominion as far as the Gulf of Ártabro, in Galicia. Cassius Dio specifically mentions *Brigantium* (La Coruña) as the place of the Roman landing even though he was probably referring to the La Coruña Bay, next to the pre-Roman settlement of the *Artabri* tribes known as Elviña (Bello and González Afuera 2008). In this military expedition, the fleet of *Gades* (Cádiz), led by L. Cornelius Balbus, played a significant role by putting their ancient knowledge of the Atlantic route to good use (Chic García 1995, 62).

These journeys of exploration reflect Rome's growing interest in the natural resources along the Atlantic shore and in the opening of new markets and trade routes in this area for the *negotiatores* and Roman traders who would eventually replace the sailors from Cádiz. During the first century BC, apart from Baetican products (imitations of Black Glazed Roman pottery, Kuass pottery, amphora type Lomba do Canho 67 and Phoenician amphora type Mañá C2c containing fish-sauce products) that had been introduced in the earlier period as a result of commerce in Cádiz, there was an increase in imports from Italy (amphorae of types Dressel 1A and 1B, Adriatic Lamboglia 2 and the first Haltern 70 and Black Glazed Pottery of Campaniense B type) (Naveiro 1991; González Ruibal 2006/7). This type of evidence always appears in coastal sites of the *Galaici*, especially in northern Portugal, the so-called Rías Bajas and the area of the Gulf of Ártabro (Naveiro 1991, 236, map 5). Imported products are rarely found north of La Coruña. The hillfort of Campa

Torres (Gijón, Asturias) is the furthest easterly point where materials from the late Republican period were discovered (Maya and Cuesta 2001, 154–9). It seems surprising that we lack similar information about the exploration of the Cantabrian coast (Fernández Ochoa and Morillo 1994, 52). The only reference we have to navigation of the Cantabrian façade during this period is the allusion to the landing of the *Classis Aquitana* during the Cantabrian Wars.

The continuation of the imperialist policy under Augustus and his immediate successors resulted in the expansion of the *oikouménē* to the north and west, including regions such as *Aquitania*, *Germania* and *Britannia*, along with the consequent exploration of the Baltic and North Sea coastal territories, until a new but perfectly structured maritime area was configured (Morillo 2003, 20–1).

#### THE CONSOLIDATION OF ROMAN TRADE ON THE IBERIAN ATLANTIC FAÇADE (FIRST AND SECOND CENTURIES AD)

The sea trade in the Atlantic was never as developed as that in the Mediterranean owing to certain navigation issues such as strong winds and currents, violent storms, high and jagged coastlines, cliffs with few berths and natural shelters, oscillating tides, etc. These rough conditions complicated and slowed down navigation and trade. They have also made it difficult for archaeologists to find and analyse the shipwrecks.

In the case of *Hispania*'s Atlantic and Cantabrian coastlines, the evidence confirms the existence of an important sea trade. Contemporary discussion is centred on the role of *Hispania* in the Roman Atlantic route. Ultimately, the question is whether the route that went north from the Mediterranean via the Strait of Gibraltar and along the Iberian Peninsula had a fundamental role in the Atlantic sea trade network during the Roman period, or if it was simply a secondary course in comparison to alternative internal routes in Gaul via river valleys such as the Rhine, Garonne or Loire. We thus need to determine whether Mediterranean products were transported to the Empire's northern regions (Fernández Ochoa and Morillo 2013, 78).

Bearing in mind the scarcity of underwater remains, the materials carried as cargo on Roman ships that ploughed through the Atlantic are the main archaeological resource for the reconstruction of the commercial trade and supply networks that extended throughout this great maritime territory. The main cargo of every ship allows us to identify the port or region of origin with a degree of precision, but not the ship's final destination. The little information we can obtain about a ship's destination and the stops it made *en route* comes from product distribution, which can only be determined from maps indicating the locations of different remains, whereby we can trace a particular sea route. However, it is not always easy to assess a product's origin, given the existence of redistribution ports and cargos containing essential goods such as grain (Salido Domínguez 2013), which did not need to be sold in containers, or products such as wine and oil that could be transported in wineskins and barrels, leaving behind little archaeological trace (Morillo 2012, 420).

The final conquest of the *Cantabri* and *Astures* tribes in 19 BC ensured Rome's complete control over the Atlantic coast of *Hispania*. Within this new Atlantic dominion, the Cantabrian Sea was of great importance since it constituted a link between two sea territories: on the one hand, there was the Portuguese coast beyond which lay Galicia, while, on the other hand, there was the western coast of *Gallia* and its connections on the other side of the English Channel, focusing on the narrow Strait of Dover. Both regions had been familiar with Roman products and commercial interests since the time of Caesar. Rome's control over *Hispania*'s northern coast allowed the creation of a route that connected the new territories of *Gallia* with the Mediterranean via the Strait of Gibraltar. The annexation of new territories in the north and the configuration of the German *Limes* resulted in



the extension of this route all the way to the Rhine and to the new military and civilian enclaves that sprang up along this primary river axis. Later on, the conquest of *Britannia* would ensure new markets for Roman trade. However, it remains to be determined when precisely this route began to be used.

Despite the conquest of the northern Spanish shore, archaeological discoveries (or lack thereof) confirm that the regional shipping of the earlier period was maintained during the Augustan period (Naveiro 1991, 91–128). In north-eastern Galicia, in the Gulf of Ártabro, La Coruña was the entrance point for the Mediterranean trade route that followed the Atlantic façade. On the other side, the Atlantic shores of Gaul, around the estuaries of great rivers such as the Loire and Garonne, saw an exponential growth in trade linked to the intensification of the trans-Aquitainian axis via the Gallic isthmus. Good maritime connections between the Roman port of *Burdigala* (Bordeaux) and the northern Spanish shore must have extended the trade southwards, as proved by the materials excavated at *Oiasso* (Irún, Guipúzcoa) (Alkaín 2009/10).

Recently, Carreras and Morais suggested that the link between the commercial branch that followed *Hispania's* western coast and the North Atlantic routes was established in the Augustan period. They also argue that this link resulted in the inclusion of the Cantabrian shore in the complex structure of the Roman sea trade. Both authors base their hypotheses on the Haltern 70 Augustan amphora, found in abundance along the Lusitanian façade, and in northern Galicia, central and northern *Gallia*, *Britannia* and *Germania Inferior* (Carreras and Morais 2012, 431). However, when looking carefully at the distribution of these amphorae, we notice a remarkable void around the Bay of Biscay, including both the Cantabrian and the Landes coasts, which contradicts their hypothesis (Fig. 8). In fact, the abundance of Haltern 70 amphorae in central *Gallia* clearly illustrates the use of inland river routes for their transportation to the north and their later distribution via maritime routes that connected both sides of the English Channel. The importance of inland transportation via passages such as the Gallic isthmus is confirmed by the distribution of the Pascual 1 wine amphora

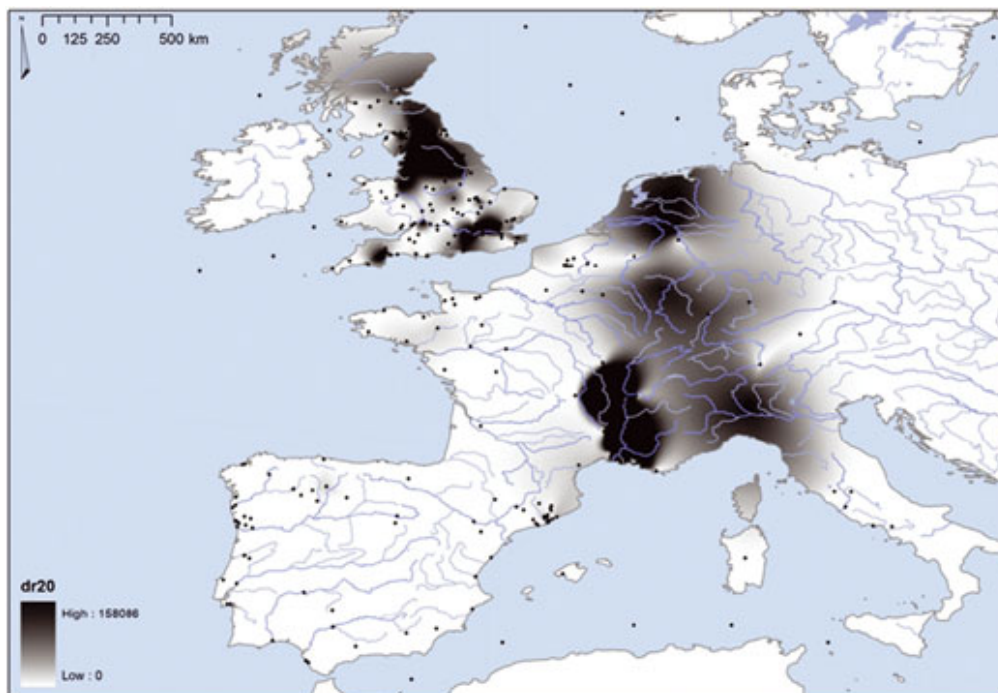


Figure 8  
Distribution of Haltern 70 amphorae (densities  $\text{kg/m}^2$ ) (Carreras and Morais 2012).



from north-east Spain in the Atlantic region (Tchernia 1971, 47–55, fig. 14; Olmer 2013). As in the case of Haltern 70, the Italic wine amphora Dressel 1 is conspicuous by its absence in the Gulf of Biscay.

Some years ago, we spoke of the lack of archaeological evidence from the Augustan period on the shores of Cantabria (Fernández Ochoa and Morillo 1994, 183–4). Twenty years later and after numerous excavations in Spain's northern coastal sites, the situation remains the same. This lack of evidence from the Augustan period is also reflected in the absence of Italic *terra sigillata* in the central area of the Cantabrian Sea. Moreover, Italic imports were not found in the area until the late Augustan or Tiberian period. These points confirm that this coastal passage was not yet established as a regular trade route at that time.

Once the first Roman settlements were established along *Hispania's* northern coast in the late Augustan or Tiberian period, there was a surge of coastal settlements during the Julio-Claudian period, as confirmed by the discovery of *terra sigillata* vessels fabricated in the Gallic pottery centre of Montans (Fernández Ochoa and Morillo 1994, 184–5). A minor concentration of materials from this pottery centre along the coasts of the Bay of Biscay seems to imply the existence of a maritime trade route in the mid-first century AD, starting at the distribution port of *Burdigala* (Bordeaux) (Fernández Ochoa and Morillo 1994, 184–5; Fernández Ochoa *et al.* 2005b). Similarly, we could also deduce from this evidence that this period saw the beginning of the exploitation of coastal mineral resources (Fernández Ochoa and Morillo 2011) (Fig. 9).

We can deduce (Morillo 2010, 168–70) that the export of Aquitanian wine in perishable containers such as wineskins, barrels and smaller flat-based amphorae (such as types Dressel 28, Gauloise or *Urceus*) triggered the maritime distribution of South Gallic *terra sigillata* from Montans. All of these were adequate for short- and mid-haul transportation in riverboats or ships, but have been largely neglected in research until recently.

If archaeological evidence based on coastal trade increased exponentially during the reigns of Tiberius and Claudius along the coasts of the Bay of Biscay, administrative and military offshore navigation is much more difficult to analyse. This is because evidence is less easy to trace in this case since the cargo was not traded in ports along the way but simply unloaded at the final destination.

Supplying Roman troops stationed along the Empire's northern borders became an important objective realized through the *annona militaris* tax and navigation routes through which



Figure 9  
The northern shore of *Hispania* (Fernández Ochoa and Morillo 2003).

grain, wine and oil reached the troops. Baetica's role was to provide Rome as well as the frontier troops with the necessary supply of oil. The first Baetican oil amphora (Oberaden 83) appeared in the Augustan period, later giving way to Dressel 20 during the Tiberian or Claudian period. These early containers quickly reached the Rhine frontier (Remesal 1986), where they tend to appear along with other Baetican amphora types such as Dressel 7–11 or Beltran IIA, containing fish-sauce products. Nevertheless, it is difficult to determine the precise route used to transport the Baetican oil to the north since the conquest of *Raetia* and *Germania* opened up a new communication route that began in the Mediterranean, extended up the Rhône to *Lugdunum* (Lyon) and then descended via the Saône and Rhine Valleys. The abundance of lids found from Baetican oil amphorae (Desbat and Martin Kilcher 1989) confirms the use of this route to supply the Rhine troops (Berni 1998, 69). Remesal (1986, 77–8), on the other hand, argues that the Roman military supply was organized through the Atlantic route, which was shorter and less expensive but undoubtedly more dangerous.

In *Britannia*, more important than the commercial exchange between the two sides of the English Channel, proved by the presence of Augustan amphorae (Oberaden 83), was Claudius' conquest of the southern part of the island in AD 43, which paved the way for a massive import of oil amphora type Dressel 20 (Carreras and Funari 1998, 5, 66). Various shipwrecks recently found on the Belgian coast containing Baetican Dressel 20 amphorae from the second half of the first century AD constitute some of the first archaeological evidence directly linked to this Atlantic route (Pieters *et al.* 2011, 192). At that time, these containers also started to flood the Rhine markets (Remesal 1986), which clearly signalled the opening of the circum-Atlantic route. However, the distribution of products used for military supply must have been accompanied by civilian commerce, which would have followed the same routes.

Recently analysed archaeological records in north-western *Gallia* also confirm the exponential increase of the Dressel 20 amphora in this region from the mid-first century AD onwards, growing even greater in numbers during the Flavian period (Laubenheimer and Marlière 2010). The cargo in these types of containers found in shipwrecks at Nieuwpoort and Westhinderbank reveals a similar chronology (Fig. 10).

During the second century AD, the volume of products transported through the coastal and offshore Atlantic routes grew exponentially owing to the business opportunities offered by a growing market. However, with the exception of standardized products such as the Baetican Dressel 20 amphora, route consolidation and commercial globalization prevent us from tracing the origin of these products and the exact route through which they were transported.

One of the most difficult questions to answer is whether or not grain was transported via the Atlantic. We need to bear in mind that the weather conditions in the Atlantic are different from those found in the Mediterranean, as mentioned above, with much fiercer storms even in the summer. Even though archaeological evidence of grain transportation in the Atlantic is very scarce, some shipwrecks like that at St Peter Port from the third century AD confirm that grain was traded in the Atlantic (Green 1993, 108–12). However, transportation on the Ocean must have been slower than in the Mediterranean, since the ships would often have had to dock in various ports along the Euro-Atlantic route owing to frequent and violent storms. Such prolonged journeys would then severely limit the transportation of goods that were difficult to conserve aboard, such as grain since the humidity would cause infestation of the stored cereal, which undoubtedly affected the length of commercial routes (Salido Domínguez 2013, 170). Consequently, we ought to assume that the transportation of grain by sea was limited to shorter routes that connected the Atlantic regions, especially the route that connected the British Isles to Europe via the English Channel and the North



Figure 10

Trade routes connecting the Mediterranean Sea and the Atlantic Ocean (Fernández Ochoa and Morillo 2003).

Sea. In this context, it would seem unlikely that grain was regularly transported by sea along *Hispania*'s Atlantic coastline to the **Empire's northern provinces**.

#### HISPANIC COASTS AS PART OF THE ATLANTIC TRADE ROUTE: FINAL CONSIDERATIONS

There is no doubt that the Atlantic presented certain obstacles to navigation in antiquity, but none of these was insuperable for sailors and traders in Roman times. The characteristic features of bays, sea inlets and estuaries in the Atlantic, protected from the harsh weather conditions and ensuring land access, made these locations the best choice for the construction of anchorages, ports, loading platforms and piers.

On *Hispania*'s coasts, this is why places like the Guadalquivir, Sado and Tajo estuaries, the Rías Bajas, the Gulf of Ártabro, Santander Bay and the Lower Bidasoa River were utilized. In addition, *Gades* (Cádiz), *Olissipo* (Lisboa), *Brigantium* (La Coruña), *Portus Victoriae* (Santander) and *Oiaso* (Irún) functioned as the Peninsula's principal ports. In cases of high and rugged



coastlines and harsher weather conditions, such as the coasts in Cantabria and south-west Portugal, it was necessary to build other port enclaves that required significant engineering effort. Places like Gijón, Castro Urdiales, Sines and perhaps Porto fall into this category.

Archaeological evidence points to the existence of intensive commercial traffic, regional as well as inter-regional, between various Mediterranean ports. The trade mostly depended on a navigation route that extended from the Strait of Gibraltar, along *Hispania*'s Atlantic coast, to the ports of *Gallia*, *Germania* and *Britannia*. This route was not developed equally, as a whole. Each area functioned as a separate dominion defined by its location, topographic conditions, period in which it was conquered and Rome's commercial interests in that area. Based on the material evidence, the Peninsula's southern and Atlantic coasts became part of the Roman commercial sphere some time between the second and first centuries BC, while the Cantabrian Sea, a transit point between the Mediterranean and the North Atlantic, was not part of a long-distance route until the mid-first century AD. Under Caesar and Augustus, the great rivers of western Europe, such as the Rhine, Rhône and Garonne, were converted into alternative passages that would complement the Atlantic route, through which Roman goods also reached the Ocean shores. One of the questions that need to be answered is if the offshore commercial route that went around *Hispania* played a significant role in Atlantic trade or whether, as the archaeological evidence seems to indicate, it was only a secondary route, an alternative to the sea and river routes that extended across Europe and across the English Channel.

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#### REFERENCES

- ALARCÃO, J. DE 2009: Portos e faróis romanos do Atlântico português. In ARIAS, F., FERNÁNDEZ OCHOA, C. and MORILLO, A. (eds.), *Torre de Hércules. Finis Terrae Lux. Simposio sobre os Faros Romanos e a Navegação Occidental na Antigüidade* (A Coruña, Brigantium 20), 109–14.
- ALKAÍN, P. 2009/10: Aportaciones al conocimiento de las primeras etapas de ocupación de la aglomeración urbana romana de *Oiasso*, siglos I a. C. y I d. C. Los materiales itálicos de la excavación de Bidasoa-Santiago, Irún (Guipúzcoa). *Arkeolan* 16, 29–37.
- ARRUDA, A.M. 1999/2000: *Los Fenicios en Portugal. Fenicios y mundo indígena en el centro y sur de Portugal* (Barcelona).
- ARRUDA, A.M. 2012: O Algarve na rota atlântica do comercio romano. In MORA, B. and CRUZ ANDREOTTI, G. (eds.), *La etapa neopúnica en Hispania y el Mediterráneo centro-oriental: identidades compartidas* (Sevilla), 413–24.
- ARRUDA, A.M., VIEGAS, C. and DE ALMEIDA, M.J. (eds.) 2002: *De Scallabis a Santarém* (Santarém).
- ARTEAGA, O. and ROOS, A.M. 2002: El puerto fenicio-púnico de *Gadir*. Una nueva visión desde la Geología urbana de Cádiz. *Spal* 11, 21–39.
- BALIL, A. 1971: Galicia y el comercio atlántico en época romana. *II CNA* (Zaragoza), 341–6.



- BALIL, A. 1974: De nuevo sobre Galicia y sus relaciones marítimas durante la época imperial romana. *III CNA* (Zaragoza), 211–21.
- BARRAUD, D. 2003: *Burdigala* y su puerto. In FERNÁNDEZ OCHOA, C. (ed.), *Gijón, puerto romano. Navegación y comercio en el Cantábrico durante la Antigüedad* (Gijón), 213–21.
- BELLO, J.M. 2009: *Brigantium* y su faro. Contextos arqueológicos en la ciudad de A Coruña. In ARIAS, F., FERNÁNDEZ OCHOA, C. and MORILLO, A. (eds.), *Torre de Hércules. Finis Terrae Lux. Simposio sobre os Faros Romanos e a Navegación Occidental na Antigüidade* (A Coruña, Brigantium 20), 41–66.
- BELLO, J.M. and GONZÁLEZ AFUERA, B. 2008: Elvira, yacimiento abierto. Investigación e intervenciones arqueológicas en el castro de Elvira (A Coruña): estado de la cuestión. *Fervedes* 5, 229–38.
- BERNAL CASASOLA, D. 2009: El faro romano de Gades y el papel de los Thynnoskopeia en el *Fretum Gaditanum*. In ARIAS, F., FERNÁNDEZ OCHOA, C. and MORILLO, A. (eds.), *Torre de Hércules. Finis Terrae Lux. Simposio sobre os Faros Romanos e a Navegación Occidental na Antigüidade* (A Coruña, Brigantium 20), 85–108.
- BERNAL CASASOLA, D. 2013: El puerto romano de *Gades*. Novedades arqueológicas. In KEAY, S. (ed.), *Port Networks in the Roman Mediterranean* (Rome, Archaeological Monographs of the British School at Rome), 225–44.
- BERNAL CASASOLA, D., SÁEZ, A.M., MONTERO, R., DÍAZ, J.J., SÁEZ, A., MORENO, D. and TOBOSO, E. 2005: Instalaciones fluviomarítimas de drenaje con ánforas romanas. A propósito del embarcadero flavio del caño de Sancti Petri (San Fernando, Cádiz). *Spal* 14, 179–230.
- BERNI, P. 1998: *Las ánforas de aceite de la Bética y su presencia en la Cataluña romana* (Barcelona, Col.lecció Instrumenta 4).
- BLOT, M.L.B.H.P. 2003: *Os portos na origem dos centros urbanos. Contributo para a arqueología das cidades marítimas e flúvio-marítimas em Portugal* (Lisboa, Trabalhos de Arqueologia 28).
- BLOT, M.L.B.H.P. 2010: Ports et points d'abordage au Portugal. Les options portuaires dans un paysage nautique en évolution. In HUGOT, L. and TRANOY, L. (eds.), *Les structures portuaires de l'arc atlantique dans l'antiquité* (Bordeaux, Aquitania Suppl. 18), 39–59.
- BOOTH, K. 2007: The Roman pharos at Dover Castle. *English Heritage Historical Review* 2, 7–21.
- CARRERAS, C. 2000: *Economía de la Britannia romana: la importación de alimentos* (Barcelona).
- CARRERAS, C. and FUNARI, P.P.A. 1998: *Britannia y el Mediterráneo: estudios sobre el abastecimiento de aceite bético y africano en Britannia* (Barcelona, Col.lecció Instrumenta 5).
- CARRERAS, C. and MORAIS, R. (eds.) 2010: *The Western Roman Atlantic Façade. A Study of the Economy and Trade in the Mar Exterior from the Republic to the Principate* (Oxford, BAR Int. Series 2162).
- CARRERAS, C. and MORAIS, R. 2012: The Atlantic Roman trade during the Principate: new evidence from the western façade. *Oxford Journal of Archaeology* 31(4), 419–41.
- CHIC GARCÍA, G. 1995: Roma y el mar: del Mediterráneo al Atlántico. In Alonso Troncoso, V. (coord.), *Guerra, exploraciones y navegación: del mundo antiguo a la Edad Moderna* (A Coruña), 55–90.
- CUNLIFFE, B. 1991: Il traffico marittimo fra il Continente e la Britannia. In Moscati, S. (coord.), *I Celti* (Milano), 573–8.
- CUNLIFFE, B. 2001: *Facing the Ocean. The Atlantic and its Peoples 8000 BC–AD 1500* (Oxford).
- DA SILVA, C.T. and SOARES, J. 1993: *Ilha do Pessegueiro. Porto romano da costa Alentejana* (Lisboa).
- DESBAT, A. and MARTIN KILCHER, S. 1989: Les amphores sur l'axe Rhône-Rin à l'époque d'Auguste. *Amphores romaines et Histoire économique: dix ans de recherches* (Roma), 311–37.
- DION, R. 1954: Itinéraires maritimes occidentaux dans l'antiquité. *Bulletin de l'Association de Géographes Français* 243–4, 128–35.
- ESTEBAN, M. 2003: La vía marítima en época antigua, agente de transformación en las tierras costeras entre *Oiasso* y el *Divae*. *Itsas Memoria. Revista de Estudios Marítimos del País Vasco* 4, 13–40.
- ESTEBAN, M. and IZQUIERDO, M.T. 2005/6: Acerca de la costa cantábrica, el bajo Urumea en época antigua y el *Morogi* pliniano. *Munibe* 57(2), 389–404.
- FABIÃO, C. 2009: A dimensão atlântica da Lusitânia: periferia o charneira no ímperio romano? In GORGES, J.-G., DE ENCARNACÃO, J., NOGALES, T. and CARVALHO, A. (eds.), *Lusitânia romana entre o mito e a realidade. Actas de la VI Mesa Redonda Internacional sobre A Lusitânia Romana* (Cascais), 53–74.
- FERNÁNDEZ OCHOA, C. (ed.) 1996: *Los Finisterres Atlánticos en la Antigüedad. Época Prerromana y Romana* (Gijón).
- FERNÁNDEZ OCHOA, C. (ed.) 2003: *Gijón, puerto romano. Navegación y comercio en el Cantábrico durante la Antigüedad* (Gijón).
- FERNÁNDEZ OCHOA, C. and MORILLO, A. 1994: *De Brigantium a Oiasso. Una aproximación al estudio de los enclaves marítimos cantábricos en época romana* (Madrid).

- FERNÁNDEZ OCHOA, C. and MORILLO, A. 2003: El puerto de Santander y otros enclaves marítimos de la Cantabria romana. In FERNÁNDEZ OCHOA, C. (ed.), *Gijón, puerto romano. Navegación y comercio en el Cantábrico durante la Antigüedad* (Gijón), 134–51.
- FERNÁNDEZ OCHOA, C. and MORILLO, A. 2010: Roman lighthouses on the Atlantic coast. In CARRERAS, C. and MORAIS, R. (eds.), *The Western Roman Atlantic Façade. A Study of the Economy and Trade in the Mar Exterior from the Republic to the Principate* (Oxford, BAR Int. Ser. 2162), 109–15.
- FERNÁNDEZ OCHOA, C. and MORILLO, A. 2011: Explotación minera y poblamiento romano a orillas del Cantábrico. In BRAZ MARTINS, C.M., BETTENCOURT, A.M., MARTINS, J.I.F.P. and CARVALHO, J. (coord.), *Povoamento e exploração dos recursos mineiros na Europa atlântica ocidental* (Braga), 133–54.
- FERNÁNDEZ OCHOA, C. and MORILLO, A. 2013: *Oceanus Hispanus*: Navegación y comercio a orillas del Atlántico en época romana. In CARRERAS, C. and MORAIS, R. (eds.), *The Western Roman Atlantic Façade. A Study of the Economy and Trade in the Mar Exterior from the Republic to the Principate* (Oxford, BAR Int. Ser. 2162), 57–97.
- FERNÁNDEZ OCHOA, C., GARCÍA DÍAZ, P. and GIL SENDINO, F. 2003: Gijón, enclave marítimo en la ruta comercial cantábrica. Evidencias arqueológicas e hipótesis sobre el puerto romano y los embarcaderos antiguos. In FERNÁNDEZ OCHOA, C. (ed.), *Gijón, puerto romano. Navegación y comercio en el Cantábrico durante la Antigüedad* (Gijón), 96–117.
- FERNÁNDEZ OCHOA, C., MORILLO, A. and VILLA VALDÉS, A. 2005a: La torre de Augusto en la Campa Torres (Gijón, Asturias). Las antiguas excavaciones y el epígrafe de Calpurnio Pisón. *AEspA* 78, 129–46.
- FERNÁNDEZ OCHOA, C., ZARZALEJOS PRIETO, M., GARCÍA ENTERO, V., GARCÍA MARCOS, V., MENÉNDEZ GRANDA, A., SÁNCHEZ HIDALGO, E. and FOUCHER, V. 2005b: La difusión de los talleres de la Graufesenque y Montans en el cuadrante noroccidental de *Hispania*: materiales para un corpus de marcas de alfarero. In NIETO, X. (coord.), *La difusió de la Terra Sigillata sudgàl-lica al nord d'Hispania* (Barcelona, Monografies 6), 79–102.
- GERBER, F. 2005: Les aménagements de berge antiques à Bordeaux (France). Les fouilles de Bordeaux-Parkins 2002–2003: premières approches. In URTEAGA, M. and NOAIN, M<sup>a</sup> J. (eds.), *Actas del Congreso Internacional Mar Exterior. El Occidente Atlántico en época romana* (Roma), 77–83.
- GERBER, F. 2010: Bordeaux. Port d'Estey, port de Garonne. In HUGOT, L. and TRANOY, L. (eds.), *Les structures portuaires de l'arc atlantique dans l'antiquité* (Bordeaux, Aquitania Suppl. 18), 83–93.
- GONZÁLEZ RUIBAL, A. 2006/7: *Galaicos. Poder y comunidad en el Noroeste de la Península Ibérica (1200 a. C.–50 d. C.)* (A Coruña, Brigantium 18).
- GRANJA, H. and MORAIS, R. 2010: Diálogo entre ciencias: estudo preliminar em torno dos estuários dos ríos Cávado e Ave. In BETTENCOURT, A.M.S., CAETANO ALVES, M.I. and MONTEIRO-RODRIGUES, S. (eds.), *Variacões paleoambientais e evolução antrópica no Quaternário do Ocidente Peninsular* (Braga), 61–70.
- GREEN, F.J. 1993: Plant remains. In RULE, M. and MONAGHAN, J. (eds.), *A Gallo-Roman Trading Vessel from Guernsey: The Excavation and Recovery of a Third Century Shipwreck* (Guernsey), 108–15.
- GRENIER, A. 1934: *Manuel d'archéologie gallo-romaine II* (Paris).
- HUGOT, L. and TRANOY, L. (eds.) 2010: *Les structures portuaires de l'arc atlantique dans l'antiquité* (Bordeaux, Aquitania Suppl. 18).
- IGLESIAS GIL, J.M. 1994: *Intercambio de bienes en el Cantábrico oriental en el Alto Imperio Romano* (Santander).
- IGLESIAS GIL, J.M. 2003: Flaviobriga. In FERNÁNDEZ OCHOA, C. (ed.), *Gijón, puerto romano. Navegación y comercio en el Cantábrico durante la Antigüedad* (Gijón), 152–61.
- LATORRE, P. and CABALLERO, L. 2009: Metodología e investigación del faro romano en la restauración de la Torre de Hércules de A Coruña (1900–1992). In ARIAS, F., FERNÁNDEZ OCHOA, C. and MORILLO, A. (eds.), *Torre de Hércules. Finis Terrae Lux. Simposio sobre os Faros Romanos e a Navegación Occidental na Antigüidade* (A Coruña, Brigantium 20), 193–227.
- LAUBENHEIMER, F. and MARLIÈRE, E. 2010: *Échanges et vie économique dans le Nord-Ouest des Gaules (Nord/Pas de Calais, Picardie, Haute Normandie). Le témoignage des amphores du IIe s. av. J.-C. au IVe s. ap. J.-C. I* (Besançon).
- LEWIS, A.R. 1958: *The Northern Seas: Shipping and Commerce in Northern Europe A.D. 300–1100* (Princeton).
- MANTAS, V.G.S. 2004: Vías e portos na Lusitânia romana. In GORGES, J.-G., CERRILLO, E. and NOGALES, T. (eds.), *V Mesa Redonda Internacional sobre Lusitania romana. Las Comunicaciones* (Madrid), 427–53.
- MARSDEN, P. 1994: *Ships of the Port of London* (London).
- MARTÍNEZ SALCEDO, A. and UNZUETA, M. 2003: La *via maris* y el poblamiento costero romano en Vizcaya. In FERNÁNDEZ OCHOA, C. (ed.), *Gijón, puerto romano. Navegación y comercio en el Cantábrico durante la Antigüedad* (Gijón), 163–77.

- MAYA, J.L. and CUESTA, F. (eds.) 2001: *El castro de la Campa Torres. Periodo prerromano* (Gijón).
- MILLÁN LEÓN, J. 1998: *Gades y las navegaciones oceánicas en la Antigüedad (1000 a. C.–500 d. C.)* (Sevilla).
- MILNE, G. 1985: *The Port of Roman London* (London).
- MILNE, G. 1986: *The Roman Quay at St. Magnus House* (London).
- MORAIS, R., GRANJA, H. and MORILLO, A. (eds.) 2013: *O Irado Mar Atlantico. O naufrágio bético augustano de Esposende (Norte de Portugal)* (Braga).
- MOREL, J.M.A.W. 1986: The early-Roman defended harbours at Velsen, north-Holland. In UNZE, C. (ed.), *Studien zu den Militärgrenzen Roms III. 13. Internationaler Limeskongress* (Stuttgart), 200–12.
- MORILLO, A. 2003: La navegación oceánica durante la época romana: de la imagen legendaria a la vertebración de un espacio marítimo atlántico. In FERNÁNDEZ OCHOA, C. (ed.), *Gijón, puerto romano. Navegación y comercio en el Cantábrico durante la Antigüedad* (Gijón), 14–41.
- MORILLO, A. 2010: Demand and military supply in the northwest of *Hispania* throughout the Early Empire. In CARRERAS, C. and MORAIS, R. (eds.), *The Western Roman Atlantic Façade. A Study of the Economy and Trade in the Mar Exterior from the Republic to the Principate* (Oxford, BAR Int. Ser. 2162), 157–72.
- MORILLO, A. 2012: El Atlántico norte en época romana: de frontera a *via maris*. In PRADOS, F., BERNARD, G. and GARCÍA JIMÉNEZ, I. (eds.), *Confines. Los extremos del mundo durante la Antigüedad* (Alicante), 397–437.
- MORRIS, F. 2010: *North Sea and Channel Connectivity during the Late Iron Age and Roman Period (175/250 BC–AD 409)* (Oxford, BAR Int. Ser. 2157).
- NAVEIRO, J.L. 1991: *El comercio antiguo en el Noroeste peninsular* (La Coruña, Monografías Urxentes do Museo 5).
- OLMER, F. (ed.) 2013: *Itinéraires des vins romaines en Gaule. IIIe siècles avant J.-C. Confrontation de facies* (Lattes).
- PÉREZ LOSADA, F. 2002: *Entre a cidade e a aldea. Estudio arqueohistórico dos “aglomerados secundarios” romanos en Galicia* (A Coruña, Brigantium 13).
- PIETERS, M., DEMERRE, I., LENAERTS, T., ZEEBROEK, I., DE BIE, M., DECLERCQ, W., DICKINSON, B. and MONSIEURS, P. 2011: De Noordzee: een waardevol archief onder water Meer dan 100 jaar onderzoek van strandvondsten en vondsten uit zee in België: een overzicht. *Relicta* 6, 117–88.
- REDDÉ, M. 1979: La navigation au large des côtes atlantiques de la Gaule à l'époque romaine. *Mélanges Ecole Française de Rome. Antiquité* 91, 481–9.
- REMESAL, J. 1986: *La annona militaris y la exportación de aceite bético a Germania* (Madrid).
- SALIDO DOMÍNGUEZ, J. 2013: El transporte marítimo de grano en época romana. Problemática arqueológica. In MORAIS, R., GRANJA, H. and MORILLO, A. (eds.), *O Irado Mar Atlantico. O naufrágio bético augustano de Esposende (Norte de Portugal)* (Braga), 139–78.
- SAN CLAUDIO, M. 2003: El puerto de *Brigantium* (A Coruña) y la navegación romana en el Atlántico norte. In FERNÁNDEZ OCHOA, C. (ed.), *Gijón, puerto romano. Navegación y comercio en el Cantábrico durante la Antigüedad* (Gijón), 121–33.
- SÁNCHEZ, C. (ed.) 2008: *La voie de Rome entre Méditerranée et Atlantique* (Bordeaux).
- SILVA, A.M.S.P. 2010: Ocupação da época romana na cidade do Porto. Ponto de situação e perspectivas de pesquisa. *Gallaecia* 29, 213–62.
- SILVA, A.M.S.P. and ROCHA PEREIRA, G. 2010: Povoamento Proto-Histórico na fachada atlántica do Entre Douro e Vouga. Paleoambientes e dinâmica cultural. In BETTENCOURT, A.M.S., CAETANO ALVES, M.I. and MONTEIRO-RODRIGUES, S. (eds.), *Variacões paleoambientais e evolução antrópica no Quaternario do Ocidente Peninsular* (Braga), 189–203.
- SOUSA, E. and ARRUDA, A.M. 2010: A gaditanização do Algarve. *Mainake* XXXII(II), 951–74.
- TCHERNIA, A. 1971: Les amphores vinaires de Tarraconaise et leur exportation au début de l'Empire. *AEspA* 44, 38–83.
- URTEAGA, M. 2003: El puerto romano de *Oiasso* (Irún) y la desembocadura del río Bidasoa. In FERNÁNDEZ OCHOA, C. (ed.), *Gijón, puerto romano. Navegación y comercio en el Cantábrico durante la Antigüedad* (Gijón), 192–211.
- URTEAGA, M. 2005: El puerto romano de Irún (Gipuzkoa). In URTEAGA, M. and NOAIN, M<sup>a</sup> J. (eds.), *Actas del Congreso Internacional Mar Exterior. El Occidente Atlántico en época romana* (Roma), 85–106.
- URTEAGA, M. and NOAIN, M<sup>a</sup> J. (eds.) 2005: *Actas del Congreso Internacional Mar Exterior. El Occidente Atlántico en época romana* (Roma).
- VIEGAS, C. 2011: *A ocupação romana do Algarve – estudo do povoamento e economia do Algarve central e oriental no período romano* (Lisboa, Série estudos e Memórias, Uniarq 3).
- WOZNY, L. 2008: Biganos, Bois de Lamothe. In SÁNCHEZ, C. (ed.), *La voie de Rome entre Méditerranée et Atlantique* (Bordeaux), 102–3.