TIMBER SUPPLYING IN THE SOUTH SPANISH DOCKYARDS DURING THE 18TH CENTURY*

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The mountains of Segura, as an inland area and far away from dockyards and large populations, remained in the best conditions, even wild. However, other forests closer to those and which can be easily harvested were used to provide the shipbuilding industry, hydraulic and civil architectures with timber. Once those located in the Department of Cartagena […] *and Cádiz were completely deforested. Thus, the government and timber dealers started cutting down abundantly forests from Seville to Segura, through Jaén, Córdoba, etc., and wrongly thinking that they were exhaustible they took all the pieces of wood required to provide naval dockyards in Cádiz and Cartagena and Andalusia, Mancha, Murcia and some regions of Castile with timber*[1].

INTRODUCTION

The arrival of the Bourbons to the Spanish Crown in the 18th century meant a great development for the maritime industry.

Therefore, different naval dockyards, as Puntales or La Carraca, were established in the South of Spain, near Cádiz, which became a key location for the maritime trading during this century, after the moving of the *Casa de la Contratación*, from Seville, in 1717.

* This study is integrated within our researches of the excellence project HUM-1469 *Identidad e imagen de Andalucía en la Edad Moderna*, and the research group HUM-155, both funded by the Regional Government of Andalusia (Spain). It was carried out during a research stay in the Institute of History of the Consejo Superior de Investigaciones Científicas (Spain), from June to July 2014.

[1] AMNM — *Sección Maderas*, ms. 436, fl. 109v.

The deforestation of areas located around these dockyards and the increased wood demand led managers of the maritime department of Cádiz to explore the possibilities of harvesting the forests of some inland areas, as those of Segura de la Sierra and its surrounding lands, located at the source of the River Guadalquivir.

After being cut down, the pieces of wood from the forests of Segura were floated down the River Guadalquivir and were received by the dockyards located in Cádiz, some months later.

I shall study these complex processes of timber supplying for the naval construction, which were associated with the creation of a maritime province in the interior of the Iberian Peninsula.

1. THE BOOM OF THE MARITIME INDUSTRY IN THE SPAIN OF THE 18TH CENTURY

The main consequence of the events arising from the War of the Spanish Succession (1700-1714) and the arrival of the Bourbons to the Spanish Crown was to pay more attention to the maritime industry[2].

It was not a new action since some weaknesses related to the Spanish Navy were identified and sought to address in the previous centuries.

In fact, several attempts to reform the Spanish Navy had been made since the 16th century. The first attempt was during the reign of Philip II, which was aimed at acquiring an own royal navy to put an end to the hiring of ships or the use of ships that had previously been seized.

However, the success was limited, mainly because the Monarchy gave priority to the army.

Similarly, important changes were not achieved in the 17th century, even though some actions were taken to promote shipbuilding industry through that century[3], such as the promotion of seats to individuals at the beginning of the century or the establishment, since 1626, of the Superintendences of Shipbuilding and Promotion in Guipúzcoa[4].

The evolution of the war in the early 18th century evidenced the significant weaknesses of the Spanish Navy and highlighted the need of taking more decisive actions on a wide range of aspects such as the shipbuilding industry, in favour of promoting the exaltation of the Navy and the commercial shipping industry. To do so, it was required to develop previous infrastructures like the construction and improvement of ports, like the port in Barcelona, and dockyards[5]. It was also sought to promote the shipbuilding

[2] CRESPO SOLANA, 2004; IBÁÑEZ DE IBERO, 1943: 184-215; O'DOGHERTY, 1989; O'DONNELL, 2001; RIBOT, 2006.
[3] See VARELA MARCOS, 1988.
[4] GOODMAN, 1997.
[5] DIEGO GARCÍA, 2002.

techniques[6]. A good example of this was the edition of the treatise by Antonio de Gaztañeta, titled *Proporciones de las medidas más esenciales para la fábrica de navíos y fragatas de guerra*, published in 1720[7].

2. CÁDIZ, THE HUB OF THE SPANISH SHIPBUILDING INDUSTRY

During those years, Cádiz became a key point for shipbuilding due to different facts. Some of the main ones were the construction of the dockyards of La Carraca and Puntales[8] and the move of the *Casa de la Contratación* from Seville into Cádiz in 1717. In addition, the General Directorate of the Navy was placed in this city and Cádiz was one of the three maritime departments in which the Iberian Peninsula was organised in 1726.

In fact, the 18th century meant the decline of the dockyards that were the most important until that moment for the Monarchy: those located in Guarnizo[9], Vizcaya and Guipúzcoa[10]. However, it also meant the promotion of those which became the main shipbuilding cores in this century: in the North of Spain, the dockyard of El Ferrol, set up in 1726[11], and in the South, those located in the surrounding areas of Cádiz: La Carraca dockyard, mainly used to repair and careen ships but not so much to build new ships[12], to which was added a new one in 1728, Puntales dockyard. From the following year, 1729, both were operating at full capacity.

A new naval dockyard was opened in the 1730s. It was located in Cartagena, on the Mediterranean coast[13].

The dockyards located near Cádiz went through various difficult times in the 18th century[14]. For instance, after José Patiño[15], the promoter of the creation of La Carraca dockyard[16], died in 1736, this premise was pushed into the background due to the frantic pace of working in the dockyards located in El Ferrol and Cartagena. However, the activity of the naval dockyard of Cádiz experienced a second period of splendour in the 1750s thanks to the drive undertaken by the Marquis of Ensenada. Although shipbuilding was not its main activity, as pointed out above, nearly 23% of the total of vessels and frigates

[6] TORREJÓN CHAVES, 2002.
[7] CERVERA PERY, 1986: 128-130.
[8] DIEGO GARCÍA, 2002.
[9] CASTANEDO GALÁN, 2001.
[10] ODRIOZOLA OYARBIDE, 1994.
[11] ANCA ALAMILLO, 2003.
[12] QUINTERO GONZÁLEZ, 2000: 133-134.
[13] PÉREZ-CRESPO, 1992.
[14] In the case of La Carraca dockyard, Sánchez-Baena, Chaín-Navarro and Martínez-Solís mentioned two clear periods: one from 1721 to 1751 and another from 1752 to 1796 (SÁNCHEZ-BAENA *et al.*, 2001: 85).
[15] On this person, PULIDO BUENO, 1998.
[16] CRESPO SOLANA, 1994-1995.

built in Spain were built in this dockyard between 1751 and 1765[17]. Its shipbuilding production declined from said year to 1779. It was reactivated again in the 1780s but this time the production was focused on building ships of smaller size. Throughout the 18th century, thirty five vessels were launched from La Carraca dockyard.

3. THE MARITIME PROVINCE OF SEGURA DE LA SIERRA AND TIMBER SUPPLY FOR DOCKYARDS IN CÁDIZ

3.1. Timber in Shipbuilding Industry

Wood was the main raw material used in the shipbuilding industry of the Former Regime. The need for supplying dockyards in Cádiz, in the North of Spain and in Cartagena with huge amounts of wood was a priority for the State, responsible for regulating the supply and shipbuilding processes in dockyards. The Crown promoted visits to mountains since 1717 in order to recognise the forestry potential of certain areas for the development plans for the Navy. We cannot forget the clear image included in the map of the maritime department of Cádiz by Espelius, dated from 1765, where the coat of arms of King Charles III leads the long process from the timber harvesting in forests to the launching of new ships and their floating, through the shipbuilding process[18].

The situation is further complicated if we take into account that the shipbuilding industry required timber with specific characteristics. Firstly, not all tree species were useful for this process[19]. Pine and oak were the two most demanded species in this regard.

Pine was used to build small-size ships like frigates and in linings or interior works of large vessels and was the dominant raw material in the merchant navy[20]. Oak, which was attractive to the Navy because it was a strong and resistant[21] type of wood, was mainly used in the hulls of ships of the line and in frigates.

Mahogany, guaiacum, sabicu, holm oak, black mastic, cedar, black poplar, walnut, beech, cork oak or wild olive tree wood were also used but in lower proportions than those mentioned above[22].

Regarding the timber harvested, the interests of the Navy were very clear. It demanded large pieces of wood, exceeding eight *varas*[23] to avoid joints at all costs. In addition, it was essential to look for pieces of wood that met certain requirements of

[17] QUINTERO GONZÁLEZ, 2005: 74.
[18] *Mapa o carta corographica que comprehende todas las provincias de Marina, que componen el departamento de Cadiz, reducido de las que en escala mayor se han formado, con Real Orden, por Dn. Joseph Antonio Espelius, capitan del real cuerpo de yngenieros*. Año de 1765. Available at Biblioteca Nacional de España, MR/45 FACS. 24.
[19] In light of this, CABRERA DE AIZPURI, 2008: 16, 116; MELERO GUILLO, 1991: 148.
[20] CHAVES TORREJÓN, 2000: 168.
[21] CHAVES TORREJÓN, 2000: 169.
[22] CHAVES TORREJÓN, 2000: 168.
[23] MERINO NAVARRO, 1981.

shape in order to be used in the different parts of ships[24]. This was reflected by Juan José Navarro, the Marquis of La Victoria, in his work *Diccionario Marítimo*, which is preserved in the Naval Museum of Madrid where many illustrations show these issues in detail[25].

Likewise, wood had to be free from defects not only natural defects including knots, fibre deviation, shakes and parts of deadwood but also defects resulting from a wrong handling before logs got to dockyards, badly cured wood, existence of barks, among others[26].

3.2. Maritime Province of Segura de la Sierra, the Main Source of Timber Supply

> *The region of Segura de la Sierra* […] *located one league away from the River Guadalimar, with a large flow of water, by which the pieces of wood float to arrive in Seville for building vessels*[27].

The dockyards located near Cádiz had to face a big problem from the 1720s. This problem was the deforestation of the closest forests to them, mainly around Cádiz and Seville. This led to go beyond[28]. On the one hand, the idea of importing wood from Flanders and Baltic countries to Seville port had to be rejected due to the high price of the imported timber.

The high quality of wood from Segura de la Sierra was taken into consideration by authorities. Thus, in 1736 it was said about this wood that it was

> *of higher quality than wood from Flanders. Reducing the large amounts which leave Spain every year, it will remain among King's vassals who cut down, transport by road, float down rivers and carry out all tasks required to give to this wood the same perfection as wood from Flanders and even though both are sold at the same price, it is of higher quality and it provides benefits to the Royal Treasury. It also provides advantages for those who would purchase wood to build new factories for the Navy Service and should start to buy it to build ships because it is being cut down*[29].

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[24] CABRERA DE AIZPURU, 2008.
[25] MAESTRO CASTAÑEDA, 2002.
[26] CABRERA DE AIZPURU, 2008.
[27] ESPINALT Y GARCÍA, 1778.
[28] In fact, in 1784, «the declining state of the mountains of that maritime department — Cádiz», as written by Antonio Valdés to Alfonso Alburquerque, in El Pardo, on 17th February 1784, was stressed by maritime department of Cádiz (AMNM — *Colección Vargas Ponce*, tomo XXXVIII, ms. 69, document 112, fl. 113).
[29] AHPS — *Fábrica de Tabacos*, 115, letter from the bishop of Málaga, on 22th May 1736.

On the other hand, the regular purchase of wood mainly from Sierra de Segura and its surrounding areas for shipbuilding industry in the stores of the *Real Fábrica de Tabacos* of Seville as of 1736 led to think that the direct timber harvesting in those forests could be the most appropriate solution to face the high demand of this raw material from the dockyards near Cádiz. The *Real Negociado de Maderas*[30], an entity to govern the supply and sales of wood, was in charge of harvesting timber in said area and transporting it to Seville floating down the River Guadalquivir. In 1738, fifteen thousand one hundred and eighty two pieces of wood were purchased by the naval dockyard[31].

Taking into account these considerations and the fact that timber from Segura had been bought indirectly, i.e., it was purchased through an intermediary, which was the *Real Negociado de Maderas*, those in charge of the maritime department of Cádiz decided to consider the possibility to exploit directly the forests of Segura de la Sierra and its surrounding areas for its own purposes as the *Real Fábrica de Tabacos* of Seville had been doing since 1733.

As a result of this, the maritime department of Cádiz exploring the forests located in Segura de la Sierra in 1738 in order to know directly the conditions and then start felling the area. The results were positive and almost one year later, logs from these forests were being felled and floated down from the source and tributaries of the River Guadalquivir, such as the River Guadalimar, Madera or Trujala, to the dockyards near Cádiz.

Therefore, two different entities had been exploiting the same areas, the forest of Segura and its surrounding areas, since 1739. The two entities were the *Real Negociado de Maderas*, under the authority of the Spanish Secretariat of Treasury, and the maritime department of Cádiz, controlled by the Spanish Secretariat of the Navy.

The most demanded species of wood from the forests in Segura and its surroundings by the dockyards were black pine[32], because of its quality and excellence, and maritime and Aleppo pine that, according to Francisco Gener, one of the managers of the company[33], could be found mainly in the Mountains of Alcaraz, where it was highlighted

[30] An entity founded in 1733 by the Spanish Secretariat of Treasury. This entity was responsible for controlling the timber harvesting in Segura de la Sierra and its surroundings areas, where a branch office was set up to build the *Real Fábrica de Tabacos*. The *Real Negociado de Maderas* was in charge of controlling the process of felling, transporting and use or sales to third parties of timber harvested, even establishing the selling price. In this regard, refer to CRUZ AGUILAR, 1987; LÓPEZ PÉREZ, 2010.

[31] AGS — *Secretaría de Hacienda*, Superintendencia de Hacienda, Maderas de Segura, 849, letter by Francisco Gómez de Barreda to the Marquis of Torrenueva, in Seville, on 21st January 1738.

[32] One of the managers of the maritime province of Segura, Juan Pichardo, pointed out that black pine trees «which grow on the top of the mountains are of higher quality and hardness and they can be used in straight and curved pieces such as yokes, beams and bands», being very useful for the shipbuilding industry (AGS — *Secretaría de Marina*, 576, undated report written by Juan Pichardo).

[33] Francisco Gener was the responsible for monitoring logging and timber floating down the River Guadalquivir under the control of the *Real Negociado de Maderas*. Thanks to his knowledge about shipbuilding, acknowledged by those in charge of the *Real Negociado*, he played a key role in overseeing the timber harvesting for naval dockyards in the years before the harvesting for the *Real Negociado* and the maritime departments was carried out separately. Despite his knowledge and capacity to differentiate pieces of wood for the *Real Fábrica de Tabacos* and for shipbuilding, his

«the large size and the high quality of these species»[34] and that they grew close to the source of the River Guadalquivir, in the district of Cazorla[35].

Ordenanzas para la conservación y aumento de los montes de Marina (Regulations for the preservation and enhancement of mountains of the Navy), known as *Ordenanzas de Montes* (hereinafter Mountain Regulations), were enacted in 1748. This enactment marked a decisive step forward towards the organisation of forests to harvest.

These regulations established the creation of maritime provinces, which were districts controlled by the Secretariat of the Navy, at a lower level than the maritime departments. It was set that maritime provinces were expanded to the mountains located twenty-five leagues away from the coast, although including as well insular mountains and those located inside the Peninsula with navigable rivers[36].

As a direct consequence of this, the Maritime Province of Segura de la Sierra was created. It was one of the inland provinces of Spain because the sources of the River Guadalimar, Guadalquivir y Segura were in this area. It had been found that said rivers were navigable and, therefore, they could be used to transport timber, as it was since 1734 and as it had been even more remotely since the Middle Ages[37].

According to these regulations and due to the interest shown by the shipbuilding industry, the municipal districts of Santisteban del Puerto, Cazorla, Alcaraz and Villanueva del Arzobispo[38] were also added to the area demarcated by the mountains of Segura between 1751 and 1752.

Specially, the maritime province of Segura de la Sierra was an area of almost 9000 km^2, including territories of several legal schemes[39]. It was a particular maritime province in comparison to the other ones not only because it was an inland area but also because it was controlled by two different maritime departments. It was determined

behaviour and perfomance were challenged by the administration. In fact, he was charged with attempting to fraud the Secretariat of Treasury, by claiming that the administration had to pay his son independently, who had been employed in the task of timber harvesting by Gener.

[34] AHPS — *Fábrica de Tabacos*, 115, letter written by Gregorio de la Cruz y Tirado to Sebastián Caballero, in Orcera, on 16th December 1736.

[35] AHPS — *Fábrica de Tabacos*, 115, letter written by Gregorio de la Cruz y Tirado to Sebastián Caballero, in Orcera, on 16th December 1736.

[36] *Los códigos españoles concordados y anotados. Tomo Octavo. Novísima Recopilación de las Leyes de España, tomo II, que contiene los libros quinto, sexto y séptimo*, 1872: book VII, title XXIV, ley XXII, article I, 546.

[37] Some notes in this regard in CÓRDOBA DE LA LLAVE, 1996; 1997; GONZÁLEZ JIMÉNEZ, 2008: 219-221; LAGUNA RAMÍREZ, 1997: 31-32; LINDO MARTÍNEZ, 2008: 79.

[38] AGS — *Secretaría de Marina*, 576.

[39] This demarcation included a small part of territories of the Crown and ecclesiastical seigneuries — territories belonging to the so-called Adelantamiento de Cazorla, dependent on the Archbishop of Toledo, such as Cazorla, La Iruela, Iznatoraf or Villacarrillo, for example. It also included a great number of core areas belonging to the Order of Santiago: Segura de la Sierra, Orcera, Santiago de la Espada, Yeste, Beas, Génave… up to the twenty-one towns — under jurisdictional control until 1748. Finally, these boundaries included localities dependent on secular seigneuries, with territories belonging to the Count of Paredes, such as Villaverde, Riópar, Cotillas, Bienservida and Villapalacios; to the Counts of Balazote — Balazote —; to the House of Santisteban del Puerto, of the well-known lineage of the Benavides, case of Santisteban and Castellar; or belonging to the Count of Arenales, in that of Hinojares. In this regard, LÓPEZ ARANDIA, 2017.

that the mountains with slopes towards the Atlantic Ocean would be integrated in the maritime department of Cádiz and those with slope towards the Mediterranean Sea would depend on the maritime department of Cartagena[40], becoming a special and unique case in the Peninsula[41].

The maritime province of Segura de la Sierra would be delimited as follows: «bordered to the East by the Kingdom of Murcia, to the South by Granada, the East of the Kingdom of Jaén and to the North by the province of La Mancha»[42].

The wealth of the forests located in the maritime province of Segura was undeniable. In fact, the people in charge of the Navy who visited said area highlighted the quality of them. A detailed report released in 1764 outlined the best areas as follows:

> *The mountains of Segura and its surrounding areas are rich in foliage but particularly Calar del Mundo, running to the East, Calar de Naval Peral, Naval Caballero, Collado de las Espumaderas y Oyas de Alva y Díaz, Cintos de Borosa, Royo, Andrés, Fuente del Río, Naval Arna, Naval Espino, Coyado de Gontar, Cuesta del Magano, Cerro del Puerto, Loma del Pelotar, Herrerías, Peñarrubia, Cerro Mirandantre, stream Trapero, las Tres Aguas Expinares; Caídas de la Toba, Garganta Lóbrega, Macegosos, María Asnal; Fuente de la Puerca, el Rico, stream Torno; stream Magullo; stream Canales, hollow of Madera River, from one side to the another one; Poyo de los Caracoles among others which will be extensive to name them*[43].

The estimation performed by the Navy was quite explanatory when it referred to areas like the surroundings of Villamanrique, with more than one million of useful trees for shipbuilding[44]. Similar praises were dedicated to other areas such as Alcaraz by the Secretariat, saying that there were «many millions of pine trees that can be used for shipbuilding and easily transported».

As mentioned above, the most demanded species from the forests of Sierra de Segura and its surroundings was pine. Up to four different species of pine trees grew

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[40] This decision particularly affected the areas of Segura de la Sierra, Alcaraz and El Ballestero, whose surface was distributed between the two slopes and therefore, between the two maritime departments.

[41] For the maritime province of Segura, refer to CRUZ AGUILAR, 1981; LÓPEZ ARANDIA, 2009; RODRÍGUEZ TAUSTE, 2011.

[42] AGS — *Secretaría de Marina*, 576, letter written by Francisco Bruna to the Marquis of Esquilache, in Orcera, on 26th April 1764. An almost exactly the same description in COBO DE GUZMÁN Y LECHUGA, 1994.

[43] AGS — *Secretaría de Marina*, 576, record of mountains of Segura and the Real Negociado of Seville, approved by Order of King Charles III, on 28th May 1764.

[44] AGS — *Secretaría de Marina*, 576, undated document, record of 1778. By contrast, the council of the town, which was opposed to the obligation to be subject to the mountain regulations of 1748 and the rules set forth by the Secretariat of the Navy, claimed that the forests located in this area could not be used for shipbuilding and «may not be certified that logs from here had been sent to this destination or other to defend the kingdom» (AGS — *Secretaría de Marina*, Isla de León, on 16th January 1778). A few months later, this matter was stressed, claiming that in Villamanrique and its surroundings «there was not useful wood for the Royal Service and any tree was cut down to be sent to factories of naval dockyards» (AGS — *Secretaría de Marina*, 576, letter from Antonio de Prado, on the 12th May 1778).

in these mountains: black pine, maritime pine, Aleppo pine and stone pine. The Navy preferences were black pine trees, because timber from this species was the most suitable for manufacturing certain parts of ships such as yokes, beams and bands, and maritime pine trees, because this particular species was lightweight and can float easily on water[45]. Black pine trees grew on the summits of mountains and they can height more than forty *varas*[46], while maritime pine trees, which were smaller, grew on valleys[47] and could reach up to thirty meters in height. By contrast, the Navy rejected felling Aleppo pine[48] and stone pine trees[49].

4. FROM THE MOUNTAINS IN SEGURA TO THE DOCKYARDS IN CÁDIZ

4.1. Works Prior to Floating

Transporting the timber demanded by the dockyards in Cádiz was a difficult task. Those in charge of the process had to deal with various challenges related to it.

Firstly, the large size of logs, exceeding most of the times nineteen or twenty *varas*, and a rough terrain[50] made difficult to transport logs from the place where they had been felled, which were narrow places with lack of space to use a pair of oxen, the means normally used to carry out this activity, to the log ponds located in the headwaters of the Rivers Madera, Trujala, Guadalimar or Guadalquivir. These difficulties often caused

[45] «maritime pine trees are well-proportioned and suitable for any purpose because, although its wood is lighter to float and darker than black pine and stone pine wood, they have much heartwood and they are cut down to make boards, balks and for many other purposes» (AHPS — *Fábrica de Tabacos*, 115, letter from Gregorio de la Cruz y Tirado to Sebastián Caballero in Orcera, on 16th December 1736). In further document, Juan Pichardo stated «they are of high quality, floating and normally smaller than black pine trees» (AGS — *Secretaría de Marina*, 576, undated report written by Juan Pichardo).

[46] A *vara* is an old Spanish unit of length used in the old Castilian system of units. It varied in size at various places, ranging from 768mm (Alicante) to 912mm (Teruel), although the most used was the *vara* from Burgos (836mm). According to the people in charge of the Secretariat of the Navy, the largest volume of black pine trees grew in the area controlled by the maritime department of Cartagena, on the slopes of the River Segura (AGS — *Secretaría de Marina*, 576, undated report by Juan Pichardo). It is a tree species also located in Cuenca, Teruel and Pyrenees foothills (cf. PIQUERAS HABA & SANCHÍS DEUSA, 2001).

[47] AGS — *Secretaría de Marina*, 576, record by Juan Pichardo, undated documents. In the Iberian Peninsula, this tree species can be also found in Albarracín, Cuenca and Guadalajara (cf. PIQUERAS HABA & SANCHÍS DEUSA, 2001).

[48] Aleppo pine trees were not considered to be useful for the people in charge of the Real Negociado de Maderas. Gregorio de la Cruz y Tirado stated «Aleppo pine trees have a limited usefulness because they are not very tall and they have imperfections on logs, their wood is of such a low quality that it can only be used to build structures of wagons and similar items and they do not float due to its hardness». Gregorio de la Cruz y Tirado to D. Sebastián Caballero, in Orcera, on 16th December 1736 (AHPS — *Fábrica de Tabacos*, 115). In a similar description about these trees, the Navy said that «they are useless because they are small and have branches from the bottom» (AGS — *Secretaría de Marina*, 576, undated report by Juan Pichardo).

[49] According to Juan Pichardo, stone pine trees «produce cones and the wood is aimed at smaller-timber» AGS — *Secretaría de Marina*, 576, undated report by Juan Pichardo.

[50] «I really would like you to visit those mountains and areas where the bigger logs grow because they are tangled and rough and notice how hard and expensive is to fell and transport them. They require additional effort by oxen and by people in charge of moving logs, causing fainting to many of them» (AHPS — *Fábrica de Tabacos*, 115, letter written by Gregorio de la Cruz y Tirado to Sebastián Caballero, in Segura, on 21st July 1736).

the refusal of those in charge of transporting to carry out this work. The problem was very obvious when it was needed to transport larger logs, corresponding to topmasts, yardarms and foremasts[51], to log ponds. In fact, those in charge of performed this task considered the works related to timber for dockyards to be «the hardest work»[52].

Likewise, other descriptions we have of the year 1736 are also meaningful in this regard:

> *Last week they started to move* […] *the pieces of wood for the Navy using a wagon and royal wagons and, although the beginnings are always hard, they reached the deepest area of the forests, unloaded there and came back with others belonging to don Gabriel Zorrilla y Nicolás Martínez to be loaded for the dockyard, and I expect that they reach the river today or tomorrow to float timber because although many difficulties have been overcome, the way is not easy and can raise others where logs usually get stuck*[53].

Although those responsible for timber tried to deal with problems when they arose, these incidents emerged as a constant. It was not an easy task.

Some years later, in the visit held in 1764, two new problems were identified. On the one hand, ways from the mountains to the bank of rivers (the River Madera and the River Trujala or directly the River Guadalquivir and the River Guadalimar), where they proceeded to float logs, were in a terrible state of neglect. This meant that people in charge of logging had to go into deeper mountain areas when they considered that there was potential for doing so. On the other hand, certain misuses related to logging and floating processes that had to be improved:

> *ways to drive logs which do not reach the deepest areas of forests were neglected, leaving much useless land with a poor management of the carriage of logs for their floating. It is also identified that much wood is wasted in the pine forest because it is often floated after cutting logs in square shape but if they keep their round shape and only the bark removed, the tasks of cutting will be less hard and faster and there will be more beams to be sold here* […][54].

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[51] AHPS — *Fábrica de Tabacos*, 115, letter written by Gregorio de la Cruz y Tirado to Sebastián Caballero, in Segura, on 10th September 1736. In this case, the situation concerned one hundred and fifty logs which it seemed to be impossible to transport to the log ponds.

[52] AHPS — *Fábrica de Tabacos*, 115, letter written by Gregorio de la Cruz y Tirado to Sebastián Caballero, in Segura, on 19th August 1736.

[53] AHPS — *Fábrica de Tabacos*, 115, letter from Gregorio de la Cruz y Tirado to Mr. Sebastián Caballero, in Segura, on 1st September 1736.

[54] AGS — *Secretaría de Hacienda*, Superintendencia de Hacienda, Maderas de Segura, 849, letter from Mr. Francisco de Bruna to Marquis of Esquilache, in Seville, on 1st February 1764.

As noted above, the interests of the two entities exploiting the area — *Real Negociado de Maderas* bound for the *Real Fábrica de Tabacos* and the Secretariat of the Navy — were completely different. The *Real Negociado* demanded short logs but, on the contrary, the dockyards needed large logs.

The first result of the lack of expertise by individuals responsible for felling and transporting timber, particularly until 1764 when it was determined that the logging of this area was conducted alternatively and annually by the Real Negociado or the naval dockyards located near Cádiz[55] but not both at the same time, was their inability to identify *in situ* the most suitable pieces for the shipbuilding industry. The complaints in this regard were remarkable:

> *regarding the pieces of wood for the Navy, I can assure that it was difficult to match the estimation to the plans given initially by Gener — Francisco Gener*[56] *—, because now, at the moment of floating logs down the river, it is even more difficult to distinguish them. As we cannot differentiate what a bergamesana, foremast or bowsprit is, I have to go back to the log ponds and ask for someone who could indicate the name of the different pieces of wood in order to classify them*[57].

Over time to monitor the logging, the maritime department of Cádiz set up a committee of timber harvesting for building ships for the Navy which remained operational until 1816[58]. In this year, there was a discussion on whether this committee had to be the only entity responsible for harvesting, felling and transporting the required wood to Seville and the naval dockyards[59].

Likewise, the difficulties followed one another when timber had to be driven through watercourses, a situation which depended, to a large extent, on the weather conditions. In fact, timber floating was hampered, even prevented, due to the lack of water some years and due to the excess of water or heavy rainfalls other years. Regarding this, in 1788 those in charge of felling pointed out that the timber shipments for the *Real Negociado de Maderas* and for La Carraca naval dockyard had to be cancelled two

[55] In 1816, there was a discussion on suspending this provision in force as of 1764, establishing that each entity shall cut down, on an annual basis, the half of trees consisting of the pine forest, in favor of one of the two institutions which had been damaged because it could not fell trees in the corresponding year (AMNM — *Sección Maderas*, ms. 436, 1816, report on maintaining the Committee for felling timber for the Royal Navy, fls. 108 v-109 r).

[56] AHPS — *Fábrica de Tabacos*, 117, letter from Gregorio de la Cruz y Tirado to Mr. Francisco Gómez de Barreda, in Orcera, on 31th August 1737.

[57] AHPS — *Fábrica de Tabacos*, 115, letter from Gregorio de la Cruz y Tirado to Mr. Sebastián Caballero, in Orcera, on 16th December 1736.

[58] AMNM — *Sección Maderas*, ms. 436, fl. 107 r.

[59] AMNM — *Sección Maderas*, ms. 436, fl. 108 r.

years and three years respectively, due to the lack of water in the Rivers Guadalimar and Guadalquivir[60].

People in charge of transporting logs, therefore, had often to look out for the appropriate weather conditions to float logs down the river. This is shown in the words said in 1737 by those responsible for transporting wood, who

> *are worry about these pine trees, particularly the logs for the Navy* […] *because (according to the locals) they are the biggest pieces that have gone down the River Guadalimar* […] *it is hope that God sends enough water to make bigger logs float because it is estimated that the biggest ones require ¾ or more water to go downstream and the higher amount of water the river has, safer the floating of wood is. As the main difficulties, problems and hassle can arise from the log ponds to the entrance of the River Guadalquivir, we hope that His Majesty desires that the river has enough water to get there and we can overcome other obstacles we may find*[61].

The challenging process from timber felling to floating lasted several months. Trees used to be cut down in March, once the coldest winter months had passed, being particularly hard in this maritime province due to the frequent snowfalls. However, at the end of the 18th century, felling was moved to January and August because they were considered the most suitable months to cut down trees because there was no circulation of sap in them[62].

Indeed, in the 1730s there was a discussion on the best season to cut down trees. It was considered that trees were at their best for felling at the end of August or September:

> *felling in August is a good idea because the sap starts going down and keeps on lowering until January and February. Thus, the best felling will be the one carried out in this month (September) and in the following months and felling made in winter where trees get frozen due to the cold, rainfalls and snowfalls and do not get rid of rain and be heavy for navigation are shared only*[63].

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[60] AGMAB — *Arsenales*, 3785, letter from Juan Pichardo to Manuel Bernia, in Orcera, on 30th April 1788. Some months later, Manuel Bernia kept on insisting on this issue: five floats had to be cancelled, two of them were for the *Real Negociado* and the other three ones were for La Carraca. *Ibidem*, letter written by Manuel Bernia to Juan Pichardo, on 16th May 1788.

[61] AHPS — *Fábrica de Tabacos*, 116, letter from Gregorio de la Cruz y Tirado to Mr. Francisco Gómez de Barreda, in Orcera, on 7th September 1737.

[62] DUHAMEL DU MONCEAU, 2009 and MUÑOZ, 1825.

[63] AHPS — *Fábrica de Tabacos*, 115, letter written by Gregorio de la Cruz y Tirado to Sebastián Caballero, in Segura, on 10th September 1736.

After felling, the pieces of wood used to remain outdoors, placed on rollers or boards, allowing ventilation and drying to lose resin[64], a key process to facilitate timber floating.

Then, between September and October, the pieces of wood were transported to log ponds. Finally, in November and December, when the rainy season came, floating wood on watercourses started[65].

Timber harvesting for the *Real Negociado de Maderas* and the naval dockyards located in the South of Spain was the main source of income for those who lived around this area because, as pointed out by the maritime department of Cádiz in 1816, over two thousand of men were employed directly or indirectly in this activity[66].

4.2. Floating Logs Down the River Guadalquivir to Cádiz

From Segura and its surrounding areas, pine timber was floated down the Rivers Trujala, Madera, Guadalimar or Guadalquivir to be driven through the latter river to Seville. From Seville, this timber was transported by light carriage or cart to the naval dockyards located near Cádiz[67].

According to Merino Navarro, an amount between three thousand and six thousand logs was driven through the River Guadalquivir every year[68]. Nevertheless, the exact amount of pieces of wood from the maritime province of Segura de la Sierra received by the dockyards located in Cádiz is unknown due to the lack of information in this regard. It must be noted that in most of the cases, the documents preserved refer to figures of pieces of wood shared by the *Real Negociado* and the Navy so not all the pieces were for naval dockyards. Furthermore, although there is data available from 1764, year in which timber harvesting started being carried out alternatively and independently, we do not know which entity managed the felling each year.

[64] ÁLVAREZ NOVER & FERNÁNDEZ-GOLFÍN SECO, 1992.
[65] AGS — *Secretaría de Marina*, 576. Some very general notes about the timing of the process in MARTÍNEZ RUIZ, 1996: 33-34.
[66] AMNM — *Sección Maderas*, ms. 436, fl. 111 v.
[67] General references in ARAQUE JIMÉNEZ, 2008: 17-18; VIGUERAS GONZÁLEZ, 2002; YDÁÑEZ DE AGUILAR, 1999. Although in this study we focus on log driving through the River Guadalquivir, we should not forget that at the same time, logs were being floated down the River Mundo and Segura to supply the dockyard in Cartagena with timber. Refer to LÓPEZ ARANDIA, 2012.
[68] MERINO NAVARRO, 1981: 203.

Table 5.1. Timber driven through the River Guadalquivir (18th century)

Year	Number of pieces
1734	8,000
1738	15,182
1751	14,000
1760	9,000
1763	3,697
1764	6,017
1765	9,319
1766	6,750
1769	4,960
1776	2,024
1780	7,000
1783	3,431
1786	7,110
1796	3,927

Source: Table by the author

Among the limited data available, we know that managers of the pine forests stated that a «large amount» of logs were cut down in 1737 and over one thousand five hundred of the total pieces were received by the Navy[69]. However, the exact amount is unknown; this is why it was not included in the table. We also know that in 1783, three thousand seven hundred and ninety four of pine trees were cut down by the Navy and driven through the River Guadalquivir. However, due to heavy rainfalls two thousand one hundred and twenty one pieces only reached the naval dockyard[70]. The figures of these two distant years lead us to believe that the pieces of wood for the naval dockyards in Cádiz may never be less than at least a thousand.

Given the irregular flow of rivers, the floating method used was to float logs separately. This method required specific conditions to transport timber. Therefore, smaller pieces of wood were used when bigger pieces of wood were driven through rivers. These smaller pieces were used in the course of floating to facilitate the transport of the biggest ones. The amount of smaller pieces used increased, reaching a considerable number:

[69] AHPS — *Fábrica de Tabacos*, 116, Juan Gallego to Sebastián Caballero, in Úbeda, on 12th February 1737.
[70] AGMAB — *Maderas*, 3767, letter written by Juan Antonio Enríquez to Antonio Valdés, in Seville, on 3rd January 1784. Enríquez stated that a thousand twenty three pieces had been lost. A few days later, he increased the figure of lost pieces up to a thousand eighty three, being «very good pieces of wood of 20-24 inches and 20-24 cubits in length and due to they are pieces suitable for big vessels and frigates, I consider they can cost around two millions of *reales* each». *Ibidem*, Juan Antonio Enríquez to Francisco de Banzes, in Seville, on 10th January 1784.

To drive down the river, beams of 10-16 cubits in length were cut and, although they are not very useful for the Navy, they facilitate the transport. This leads to increase the number of them, but luckily the last shipment required less than 1500 beams[71].

Although the smaller pieces of wood had not a clear use in dockyards, they were used in other activities or even sold to third parties.

Logs were driven by people known as *pineros* (log drivers) or *gente de gancho*. Organised in crews, they were responsible for accompanying logs along the banks of the River Guadalquivir, preventing logs from get stranded on riverbanks and helping to overcome stretches of the river such as dams, bridges and mills.

Log drivers were often organised in big groups over fifty men[72]. These men came from towns near Segura de la Sierra and some of them from Córdoba. They used to work for long months, averaging between six or seven months, although they sometimes had to work nine months[73] in log driving. Besides log drivers, crews also counted with the collaboration of other workers who performed equally important tasks to ensure the survival of the group, including muleteers, cattle herds, stewards and stewards' assistants and servants, experts in rivers and even priests[74].

Table 5.2. Number of log drivers who worked through the River Guadalquivir

From	Year			
	1739	1740	1742	1743
Beas de Segura	9	1	4	8
Benatae	—	1	—	
Benttarique	—	—	—	1
Córdoba	17	13	13	22
Hornos	—	—	—	3
Quesada	—	1	—	—
Orcera	6	3	2	13
Puerta de Segura	—		1	2
Santo Tomé	—	—	—	1
Segura	—	2	—	2

[71] AGS — *Secretaría de Marina*, 576.
[72] It is well above the dozen of members of crews pointed out by Ydáñez de Aguilar. Refer to YDÁÑEZ DE AGUILAR, 1999: 318.
[73] AHPS — *Fábrica de Tabacos*, 96, record book of log drivers, 1743.
[74] AGS — *Secretaría de Marina*, 576.

From	Year			
	1739	1740	1742	1743
Úbeda	41	28	19	19
Villahermosa	1		—	
Villanueva del Arzobispo	68	11	33	35
Yeste	—	—	—	1
N/A	6	—	—	1
Total	148	50	72	108

Source: AHPS — *Fábrica de Tabacos*, 94 and 96; table by the author

Driving logs by the River Guadalquivir was not an easy work, particularly when the destination of timber was the dockyards in Cádiz. The big size of the pieces of wood required and, therefore, their heaviness were obstacles for log drivers' work because logs were at risk of sinking in the river[75] and delayed the navigation when it was necessary to go through stretches. Thus, sometimes, when big logs led to many problems due to their big size and heaviness, they were taken out of rivers and left on the banks of rivers[76].

Weather events impacted adversely in log driving in previous moments of floating logs. These events could be years of drought, when the lack of water prevented from floating, or flooding that often caused the dispersion of logs floating[77]. Thus, heavy rainfalls in 1784, for instance, resulted in the dispersion of logs for La Carraca dockyard once they got to Seville. The first logs were found in Dos Hermanas, Las Cabezas[78] and even close to Sanlúcar de Barrameda[79] and over one thousand of logs could not be found, in

[75] AHPS — *Fábrica de Tabacos*, 96, letter written by Francisco Gómez de Barreda, in Seville, on 31st May 1743.
[76] AHPS — *Fábrica de Tabacos*, 94, Libro en que ban las quentas de los pineros… 1739. Likewise, AHPS — *Fábrica de Tabacos*, 96, document written by Gregorio de la Cruz y Tirado, in Andújar, on 15th May 1739, reporting that one hundred and seventy one pieces were taken out of the river because they were very heavy; document by Andrés García de Rojas y Juan González Galán, in Andújar, on 14th July 1740.
[77] AGS — *Secretaría de Marina*, 576. We found a clear description of this situation in 1776. The governor of the maritime department of Cádiz was informed on the need of specific conditions to float logs down the river and how the lack or excess of water impact on it: «in the first case, the navigation is stopped and in the last case, flooding causes the dispersion of logs and at the expense of great efforts, costs and waste of time, they have to be returned to the centre of the river to continue». It was written to the governor of Cádiz to inform him on the state of logs from Segura, in San Lorenzo, on 15th November 1776.
[78] AGMAB — *Maderas*, 3767, information written by the commissioner Juan Antonio Enríquez to Antonio Valdés, in Seville, on 17th January 1784.
[79] *Ibidem*, document by the governor Juan de Ulloa to Antonio Valdés, in Isla de León, on 23rd January 1784.

particular one thousand twenty three[80] of a group of three thousand seventy hundred and ninety four pieces at the beginning[81].

After arriving in Seville, logs were unloaded in an area near the current bridge of Isabel II, known as Bridge of Triana, and from that point they were transported by light carriage[82] or by cart to the naval dockyards of La Carraca and Puntales.

Timber from the maritime province of Segura de la Sierra was essential and vital for the Navy, as pointed out by the managers of the department of Cádiz in 1816, when they held that the Navy «does not have other forests to supply La Carraca with such a high quality pine timber»[83].

CONCLUSIONS

The arrival of the Bourbons to the Spanish Crown meant the promotion of important reforms in the Navy that led to a boom in shipbuilding industry for merchant vessels and warships.

Some of these centres were located in the South of Spain, particularly in the naval dockyards of La Carraca and Puntales, which became two of the main centres for building and repairing ships in the 18th century, an activity that reached its peak in the second half of the century.

Thus, the demand of timber, the main raw material for the shipbuilding industry, increased significantly.

However, the lack of timber in areas surrounding the naval dockyards located near Cádiz required looking for wood from inland areas and where there had already been a tradition of timber harvesting for uses like civil building industry and that had been used occasionally to provide the naval dockyards. One of these areas was the mountains of Segura de la Sierra.

The enactment in 1748 of the Regulations of Mountains granted certain areas, such as Segura, the maritime province status. Therefore, its jurisdiction started depending on the Spanish Secretary of the Navy. This fact strengthened the relationship between this space and naval dockyards like La Carraca.

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[80] It was also written that the total amount of logs lost due to a flash flood was of one thousand eighty three logs of «high quality, between twenty and twenty four inches and between twenty and twenty four cubits of length that are very appreciated to be used for beams of the wheelhouse thanks to their natural features. I estimate that the costs are around two thousand million of *reales*». *Ibidem*, written by Juan Antonio Enríquez to Francisco de Banzes, in Seville, on 10th January 1784.

[81] «However, before dawn on the first day of this month, when the bridge (Bridge of Triana) was already broken, it was such the strength of the water that breaking noisily the chains and hawsers of it, it swept away by in the flood, with nine of its ten ships, which have no anchors, and these and other ships crashed into the thousands of them». *Ibidem*, document sent by Juan Antonio Enríquez to Antonio Valdés, in Seville, on 3rd January 1784.

[82] AGMAB — *Arsenales*, 3785.

[83] AMNM — *Sección Maderas*, ms. 436, fl. 111 r.

As a result, the River Guadalquivir became a decisive way for driving big logs from the forests of inland areas to the South of Spain through a challenging and hard process full of difficulties.

PRIMARY SOURCES

Archivo del Museo Naval de Madrid
AMNM — *Sección Maderas*, ms. 436.
AMNM — *Colección Vargas Ponce*, t. XXXVIII, ms. 69, d. 112.

Archivo General de la Marina Álvaro de Bazán
AGMAB — *Arsenales*, 3785.
AGMAB — *Maderas*, 3767.

Archivo General de Simancas
AGS — *Secretaría de Hacienda*, Superintendencia de Hacienda, Maderas de Segura, 849.
AGS — *Secretaría de Marina*, 576.

Archivo Histórico Provincial de Sevilla
AHPS — *Fábrica de Tabacos*, 94.
AHPS — *Fábrica de Tabacos*, 96.
AHPS — *Fábrica de Tabacos*, 115.
AHPS — *Fábrica de Tabacos*, 116.
AHPS — *Fábrica de Tabacos*, 117.

LOS CÓDIGOS ESPAÑOLES concordados y anotados. Tomo Octavo. Novíssima Recopilación de las Leyes de España, tomo II, que contiene los libros quinto, sexto y séptimo. Madrid: [s.n.], 1872.

MAPA O CARTA corographica que comprehende todas las províncias de Marina, que componem el departamento de Cadiz, reducido de las que en escala mayor se han formado, con Real Orden, por Dn. Joseph Antonio Espelius, capitan del real cuerpo de yngenieros, año de 1765. Available at Biblioteca Nacional de España, MR/45 FACS. 24.

EDITED SOURCES

ÁLVAREZ NOVER, Humberto; FERNÁNDEZ-GOLFÍN SECO, Juan Ignacio (1992) — *Fundamentos teóricos del secado de la madera*. Madrid: Ministerio de Agricultura, Pesca y Alimentación.

ANCA ALAMILLO, Alejandro (2003) — *Jorge Juan y el Arsenal de El Ferrol*. Madrid: Fundación Jorge Juan.

ARAQUE JIMÉNEZ, Eduardo (2008) — *El río primero: de sus orígenes a Montoro*. In RUBIALES TORREJÓN, Javier, *ed*. — *El río Guadalquivir*. Sevilla: Junta de Andalucía – Ministerio de Medio Ambiente, p. 17-18.

CABRERA DE AIZPURU, Fernando (2008) — *Arquitectura naval europea en el siglo XVIII*. La Coruña: Universidad de La Coruña.

CASTANEDO GALÁN, Juan M. (1993) — *Guarnizo, un astillero de la Corona*. Madrid: Editorial Naval.

CERVERA PERY, José (1986) — *La Marina de la Ilustración*. Madrid: Editorial San Martín.

CHAVES TORREJÓN, Juan (2000) — *La madera báltica, Suecia y España (Siglo XVIII)*. In RAMOS SANTANA, Alberto — *III Encuentro Histórico Suecia-España. Comercio y navegación entre España y Suecia (Siglos X-XX)*. Cádiz: Universidad de Cádiz, p. 163-222.

COBO DE GUZMÁN Y LECHUGA, Jesús (1994) — *Estudio sobre las ordenanzas de montes del año de 1748 y del expediente sobre el régimen de administración de los montes de Segura de la Sierra y de su Provincia Marítima, 1811*. Jaén: Caja de Jaén.

CÓRDOBA DE LA LLAVE, Ricardo (1996) — *La red hidrográfica y su incidencia sobre las comunicaciones por el término de Córdoba durante el siglo XV*. In CRIADO DE VAL, Manuel, *dir*. — *Caminería hispánica. Actas del II Congreso Internacional de Caminería Hispánica*. Madrid: Patronato Arcipreste de Hita — Asociación Técnica de Carreteras, tomo II, p. 227-231.

_____ (1997) — *Navegación y transporte fluvial en la Península Ibérica a fines de la Edad Media*. In CRIADO DE VAL, Manuel, *dir*. — *Caminería hispánica. Actas del III Congreso Internacional de Caminería Hispánica*. Madrid: AACHE Ediciones, p. 215-233.

CRESPO SOLANA, Ana (1994-1995) — *La acción de José Patiño en Cádiz y los proyectos navales de la Corona del siglo XVIII*. «Trocadero», vol. 6-7, p. 35-49.

_____ (2004) — *La reforma de la Marina española en tiempos de Felipe V: luces y sombras de un debate historiográfico*. «Revista Universitaria Mágina», vol. 12, p. 11-24.

CRUZ AGUILAR, Emilio de la (1981) — *La Provincia Marítima de Segura de la Sierra.* «Boletín del Instituto de Estudios Giennenses», n.º 107, p. 51-82.

_____ (1987) — *El Negociado de Maderas de Segura en Sevilla*. «Historia, Instituciones y Documentos», n.º 14, p. 51-82.

DIEGO GARCÍA, Emilio de (2002) — *Estructuras de la organización naval: departamentos y arsenales peninsulares*. In *XXVI Jornadas de Historia Marítima. Arsenales y construcción naval en el siglo de la Ilustración*. Madrid: Instituto de Historia y Cultura Naval, p. 15-39.

DUHAMEL DU MONCEAU, Henri Louis (2009) — *Tratado del cuidado y aprovechamiento de los montes y bosques, corta, poda, beneficio y uso de sus maderas y leñas*. Maxtor: Valladolid.

ESPINALT Y GARCÍA, Bernardo *et al*. (1778) — *Atlante español o descripcion general de todo el reyno de España*. Madrid: Imp. de Pantaleon Aznar, tomo 1, p. 213-214.

GONZÁLEZ JIMÉNEZ, Manuel (2008) — *El Guadalquivir medieval*. In RUBIALES TORREJÓN, Javier, *ed*. — *El río Guadalquivir*. Sevilla: Junta de Andalucía – Ministerio de Medio Ambiente, p. 213-221.

GOODMAN, David (1997) — *Spanish naval power, 1598-1665. Reconstruction and defeat*. Cambridge: Cambridge University Press.

IBÁÑEZ DE IBERO, Carlos (1943) — *Historia de la Marina de Guerra española. Desde el siglo XIII hasta nuestros días*. Madrid: Espasa-Calpe.

LAGUNA RAMÍREZ, María (1997) — *El Guadalquivir y Córdoba en el Antiguo Régimen. Navegación, conflictos sociales e infraestructura económica*. Córdoba: Universidad de Córdoba.

LINDO MARTÍNEZ, José Luis (2008) — *Castilla — La Mancha. Maderadas y gancheros*. Toledo: Junta de Comunidades de Castilla – La Mancha.

LÓPEZ ARANDIA, Maria Amparo (2009) — *El mar en el interior. La provincia marítima de Segura de la Sierra*. In DUBERT, Isidro; SOBRADO CORREA, Hortensio, *eds*. — *El mar en los siglos modernos*. Santiago de Compostela: Xunta de Galicia, vol. I, p. 437-450.

_____ (2012) — *Maderas del rey. Aprovechamientos madereros en la provincia marítima de Segura de la Sierra*. In ARAQUE JIMÉNEZ, Eduardo; MOYA GARCÍA, Egidio, *eds*. — *Aprovechamientos madereros en los montes jiennenses (siglos XVIII-XX)*. Jaén: Universidad de Jaén, p. 13-78.

_____ (2017) — *Territorio vs. Estado. Nuevas fronteras y conflictos en la España del siglo XVIII*. In FAVARÒ, Valentina; MERLUZZI, Manfredi; SABATINI, Gaetano — *Fronteras: procesos y prácticas de integración y conflictos entre Europa y América (siglos XVI-XX)*. Madrid: Fondo de Cultura Económica, p. 265-285.

LÓPEZ PÉREZ, Elena (2010) — *Dos documentos sobre el Real Negociado de Maderas y la Provincia Marítima de Segura, conservados en el Archivo Histórico Provincial de Jaén*. «Arch-e. Revista Andaluza de Archivos», n.º 3, p. 133-142.

LOS CÓDIGOS españoles concordados y anotados. Tomo Octavo. Novísima Recopilación de las Leyes de España, tomo II, que contiene los libros quinto, sexto y séptimo. (1872) Madrid: Antonio de San Martín editor.

MAESTRO CASTAÑEDA, Juan Carlos (2002) — *D. Juan José Navarro, marqués de La Victoria: entre reformista y resentido*. «Brocar», n.º 26, pp. 177-190.

MARTÍNEZ RUIZ, Enrique (1996) — *Tres sierras, tres culturas. Acabemos con los incendios forestales en España*. Madrid: Ministerio de Agricultura.

MARURI VILLANUEVA, Ramón (2001) — *Ensenada y el Real Astillero de Guarnizo*. «Brocar», vol. 25, p. 123-136.

MELERO GUILLO, Maria Jesús (1991) — *«A la mar madera»: la madera en la arquitectura naval española.* In RAMÍREZ, Bibiano Torres, *coord*. — *Andalucía América y el mar: Actas de las IX Jornadas de Andalucía y América*. Sevilla: Diputación de Huelva.

MERINO NAVARRO, José (1981) — *La armada española en el siglo XVIII*. Madrid: Fundación Universitaria Española.

MUÑOZ, Tomás (1825) — *Expediente sobre el régimen y administración de los montes de Segura de la Sierra y su provincia*. Madrid: Miguel de Burgos.

O'DOGHERTY, Pascual (1989) — *La construcción naval en la Península*. In PALACIO ATARD, Vicente, *coord*. — *España y el mar en el siglo de Carlos III*. Madrid: Marinves, p. 93-94.

O'DONNELL, Hugo (2001) — *La Marina durante el primer reinado de Felipe V (1700-1724).* In CASTAÑEDA DELGADO, Paulino; GÓMEZ PIÑOL, Emilio, *coord*. — *La Guerra de Sucesión en España y América. Actas X Jornadas Nacionales de Historia Militar*. Seville: Deimos, p. 439-449.

ODRIOZOLA OYARBIDE, María (1994) — *La industria naval guipuzcoana (1650-1730): ¿crisis o auge del sector?*. In GÁRATE, Monserrat; MARTÍN ACEÑA, Pablo, *eds*. — *Economía y empresa en el Norte de España. (Una aproximación histórica)*. San Sebastián: Universidad del País Vasco.

PÉREZ-CRESPO, María Teresa (1992) — *El arsenal de Cartagena en el siglo XVIII*. Madrid: Editorial Naval.

PIQUERAS HABA, Juan; SANCHÍS DEUSA, Maria del Carmen (2001) — *El transporte fluvial de madera en España*. Geografía histórica. «Cuadernos de Geografía», n.º 69-70, p. 127-161.

PULIDO BUENO, Ildefonso (1998) — *José Patiño: el inicio del gobierno político-económico ilustrado en España*. Huelva: Artes Gráf. Andaluzas.

QUINTERO GONZÁLEZ, José (2000) — *El arsenal de La Carraca (1717-1736).* Madrid: Ministerio de Defensa.

_____ (2005) — *El arsenal de La Carraca en Cádiz durante el siglo XVIII*. «Andalucía en la Historia», vol. 8, p. 69-75.

RIBOT, Luis (2006) — *Las reformas militares y navales en tiempos de Felipe V*. In MAZA ZORRILLA, Elena; DEL OLMO MARCOS, María, *coords*. — *Estudios de Historia. Homenaje al profesor Jesús María Palomares*. Valladolid: Universidad de Valladolid, p. 129-161.

RODRÍGUEZ TAUSTE, Sergio (2011) — *La Provincia Marítima de Segura de la Sierra. Siglos XVIII-XIX*. In ARAQUE JIMÉNEZ, Eduardo; MOYA GARCÍA, Egidio, *eds*. (2012) — *Aprovechamientos madereros en los montes jiennenses (siglos XVIII-XX).* Jaén: Universidad de Jaén, p. 79-124.

SÁNCHEZ BAENA, Juan; CHAÍN NAVARRO, Celia; MARTÍNEZ-SOLÍS, Lorena, *coords*. (2001) — *Estudios de Historia Naval. Actitudes y medios en la Real Armada del s. XVIII*. Murcia: Ministerio de Defensa — Universidad de Murcia.

TORREJÓN CHAVES, Juan (2002) — *La construcción naval militar española en el siglo XVIII: tendencias, programas y constructores*. In *XXVI Jornadas de Historia Marítima. Arsenales y construcción naval en el siglo de la Ilustración*. Madrid: Instituto de Historia y Cultura Naval, p. 131-180.

VARELA MARCOS, Jesús (1988) — *La pretendida reforma naval de Felipe III: La política de protección de bosques, saca y elaboración de maderas para la construcción naval.* «Revista da Universidade de Coimbra, Centro de Estudos de História e Cartografia Antiga», vol. 34, Offprint.

VIGUERAS GONZÁLEZ, Modesto (2002) — *El transporte de madera por flotación y carretería, desde los bosques de Sierra de Segura hasta Sevilla y los arsenales de La Carraca (Cádiz) y Cartagena, durante los siglos XVIII y XIX (1734-1833).* Madrid: Puertos del Estado.

YDÁÑEZ DE AGUILAR, Alejandro Faustino (1999) — *El transporte fluvial de la madera de los montes de Jaén*. «El Toro de Caña», n.º 4, p. 305-325.