# Chapter 9
# Supplying Timber for his Majesty's Fleets: Forest Resources and Maritime Struggle in Portugal (1621–1634)

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**Abstract** It is noteworthy that there were various trade routes by which timber was imported from Northern Europe to Portugal. This chapter however focuses on the forests in Portugal belonging to the Crown and some others located in Portugal that were exploited for the King, although they were owned privately. This does not mean that there were no other territories and forests within Portugal devoted to this purpose, as indeed they were. For that reason, this contribution is restricted to both ships used in the King's fleets and the *Carreira da India*. The maritime and military conflicts of the Spanish Monarchy led to the development of an intensive and spectacular shipbuilding industry, and Portuguese forests did not have the capacity to effectively supply the entire demand of timber for shipbuilding.

## 1 Introduction: Timber Competition in Portugal

As John Richards has pointed out, throughout the seventeenth century shipbuilding and ship repairs became the largest industrial establishment in Europe (Richards 2001, pp. 203–204, 224–227). This explains why sovereigns strove to maintain a supply of timber and why the use of timber in England, Scotland, and Ireland decreased sharply throughout the seventeenth century. This led to the proliferation of laws, orders, and regulations aimed at protecting home-grown trees. Portugal was most likely one of the maritime powers that might have faced similar challenges during the time period examined. Timber requirements forced sovereigns to take measures to protect such valuable raw material. Furthermore, during this period, European "societies rely on colonization, diplomacy, and military ventures" to ensure the ongoing flow of timber (Perlin 2005).

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Unlike Spain, which has been widely studied, there is little research on seventeenth-century Portuguese forested areas in relation to maritime struggle (Martínez González 2015, pp. 78–114; Wing 2015, pp. 122–164). Carla Rahn Philips has studied the contract signed between Martín de Arana and the Spanish Monarchy for which the former built six galleons during Philip IV's kingship. Her study encompasses the whole construction process, including the ship's lifetime, and the supply of materials and components, including timbers (Phillips 1991 for timber pp. 127–130).

In relation to Portugal, Leonor Freire Costa has studied the shipbuilding industry in Lisbon throughout the sixteenth century (Costa 1997). Nicole Devy-Vareta has mainly focused her interests on an earlier time period, providing some interesting insights into the Monarchy's timber legislation for shipbuilding throughout the sixteenth and seventeenth centuries (Devy-Vareta and Alves 2007, pp. 63–68). Cristina Joanaz de Melo has examined the forested areas belonging to the Crown at the end of the eighteenth century and beginning of the nineteenth, known as *matas* and *coutadas* in Portuguese (Hespanha 1989, p. 173; de Melo 2015). Felix Labrador Arroyo has correctly asserted that *matas* and *coutadas* were administered and safeguarded by the *monteiro-mor* and local *monteiros* and *couteiros*. The *monteiro-mor* was theoretically in charge of any matters related to hunting activities arranged for the royal family since at least the fourteenth century (Labrador Arroyo 2009, pp. 222–241). There are other scholars who have studied the Portuguese maritime industry in terms of environmental and political history, but a systematic study that focuses on these forested areas used for shipbuilding has yet to be conducted (Duffy 1955, pp. 50–52; Boxer 1969, p. 56). Timber and trees are indeed two of the main focal points of this paper.

In terms of the protection of forests and the shipbuilding industry, is it possible to differentiate between forest and tree, wood and timber? Although it is not possible to answer this question with the sources we have, we seek to add some knowledge about this issue by examining primary sources stored in Portuguese and Spanish Archives that have not been used as much as they could have been.

The term "forest" or "woodland" is understood here as a group of trees—sometimes perhaps a stand of trees—that comprise a forested area. Once the tree is cut it is referred to as "wood", whereas timber refers to the wood once it has been prepared, seasoned, and transformed into timber devoted to shipbuilding purposes. We do not attempt to make a clear distinction between wood and timber, as the documentation did not clearly state when or where the wood was "transformed" into timber, but rather to focus on the circuit of transport from forest to shipyard.

It is certainly highly challenging to assess the extent of the forested areas of Portugal prior to the twentieth century. The amount of timber and wood that was consumed in Portugal throughout early modern age cannot readily be determined. However, some scholars have sought to analyse the evolution of forest cover in Portugal providing a handful of insights on the early modern age. Throughout the early modern period in Portugal there was a shortage of timber; therefore, the kingdom was forced to import it from Europe and other regions (Reboredo and Pais 2014, pp. 11–14). Such circumstances led to a competition encompassing the whole

society: from the King to local peasants of areas such as Santarém. Each person and institution defended their own interests, which theoretically were the King—and the Crown—the idealized institution committed to guaranteeing the common good. As access to timber became more difficult, so conflicts arose over access to and the use of this valuable raw material leading to "stiff timber competition" between inhabitants and institutions of Portugal.

In terms of shipbuilding, the Baltic region had been a supplier since the thirteenth century, probably the largest one worldwide. Portuguese kings extended several charters and privileges to Northern traders to make timber importation easier, especially for some ship components that were lacking in Portugal (de Oliveira Marques 1959, pp. 77–79, 145–151, 155–160). At this point several doubts arose about what the common good meant for Philip III and Philip IV regarding the forested areas of Portugal. Did it mean ensuring that everybody had access to indispensable resources such as wood? Or, on the contrary, did it mean conserving the heritage and bequeathing it to the future generations without any loss of territory? In terms of the latter question, we have some idea of what kind of heritage[1] was of interest to the Crown or, otherwise, to the nobility, or local farmers. This article focuses in particular on the territories of the Portuguese Crown—which are understood as a personal and familial heritage belonging to the Spanish Habsburgs—which the sovereigns did make a strong attempt to conserve in order to pass them on to their heirs. This concern is connected to military conflict and therefore to the concern of preserving forested areas for shipbuilding above the daily life necessities of local inhabitants.

In terms of the time period of this study, 1621 has been selected in this article as a starting point because it was the year in which Philip IV succeeded Philip III on the throne and the truce signed in 1609 with the Dutch Republic expired. The importance of 1634, however, requires a longer explanation. In 1634, the Trade Company that had been set up in Lisbon in 1628 to strengthen the Portuguese presence in Asia was disbanded. That year, the Spanish ministers who had settled in Lisbon claimed that the Portuguese forests were unable to carry on providing quality timber to build seaworthy vessels. Lisbon's shipyards were also criticized because of the high costs of construction, in part due to the poor quality of the timber. They proposed both deploying Galician oak instead of local species and decreasing shipbuilding activity in Lisbon. Moreover, in 1634 Olivares and Philip IV appointed a member of the royal family—Margaret of Saboy—as viceroy of Portugal after more than 40 years of government upheld by ecclesiastics and nobles. Thus, social, environmental, political, and economical factors come together to make 1634 significant as the closing year for the time period studied in this article.

By 1621 the Portuguese Monarchy had already been involved for almost two centuries in overseas expeditions in Africa, Asia, and South America. Ongoing shipbuilding activity had, thus, taken place in Portugal that affected the Portuguese forested areas. According to shipbuilding treatises in Portugal, especially in the area

[1] For heritage we mean the Spanish Monarchy, including overseas territories.

of the Tagus River, Cork oaks, stone, and maritime pines were mainly used for shipbuilding, because these were the main species available in Portugal (Domingues 2004, Chaps. 2, 3, and 4).

The stone pine is a fast-growing tree with a great reproductive capacity that can grow up to 40 m high, which makes it ideal for the construction of large ship components (Correia et al. 2007, pp. 18–24). The maritime pine, on the contrary, grows in poor soils all over Portugal: from Coimbra to the areas beyond the Tagus River, including Leiria, Azambuja, or Alcácer do Sal (currently known as *Mata de Valverde*). It was highly valued for shipbuilding because it absorbs little water and is resistant to several insects (Costa 2007, pp. 109–114). The cork oak is a slow-growing tree that has been very common in Portugal since at least the modern period (Costa and Pereira 2007, pp. 18–27). Nowadays, 23% of the forested areas of Portugal still consist of maritime pine and cork oaks (Silva 2016, pp. 15–16).

Consequently, the long-lasting overseas navigation tradition in Portugal steadily depleted its forested areas. Furthermore, as the years went on there was less quality timber suitable for shipbuilding because the trees that were in demand required more time to grow than the Portuguese shipbuilding activity could afford to wait. This led to a "wood-deficit", as Portugal consumed more wood and timber that it produced. The Portuguese did not give the trees time to become straight, thick, and tall enough before felling, which inevitably had negatives consequences, as we will point out afterwards.

The research conducted by Francisco Alves, Filipe Castro, and other nautical archaeologists in Portugal shows the poor quality of the timber used in Portugal for construction of the Cape shipping carrack *Nossa Senhora dos Martires*, which was shipwrecked in Cascais in September 1606. The excavations revealed a wooden structure that survived over an area of 7 by 12 metres (Castro 2003, pp. 11–12). At the time of the carrack's construction, there were not enough straight and tall cork oaks and pines available, so irregular wood was used for the frames (Castro 2003, pp. 12–14, 2005, pp. 105–118). Archaeological evidence matches the information revealed throughout this article; thus it can be stated that during the years studied here, the timbers used to build ships in Lisbon were not very sturdy. This was perhaps, or in part, due to the poor quality of the wood used for the construction of the vessels.

This disadvantage was pointed out by several people from very diverse fields of expertise. In 1621 Philip III passed away, and soon after the merchant Duarte Gomes Solis wrote one of his most renowned essays: *Discursos sobre los comercios de las dos Indias* (discourse regarding the trade of both Indies). The essay, which was addressed and dedicated to the Count-Duke of Olivares, at the time the favourite of Philip IV, sought to replenish the "reputation" ("greatness", "*reputación"*) of both the Spanish and Portuguese Empires by fostering commerce with the East and West Indies. Although he praised the merchant-class, Duarte Gomes also endeavoured to boost the maritime strength of the Portuguese Empire. He realized that the fleets from Lisbon were a key factor in the conservation of trade and of the Portuguese Eastern Empire. He intelligently recovered the leading figure of Francisco de

Manuel[2] who had assured King Manuel I that the key assets for defence of the Indies were the fleets and not strongholds (Gomes Solis 1622, p. 74). Consequently, the sea and not dryland was the field in which European countries would compete for world domination.

Duarte gave many reasons why the Portuguese fleets were not held in high repute, as they had been before. He pointed out that timber quality for shipbuilding was a key factor in the outcomes of naval conflicts and conservation of the Portuguese Empire (Gomes Solis 1622, p. 153). In addition, Duarte Gomes provided essays and memorials he had already addressed to the King and his ministers. In one of them, written around 1612, Duarte, along with Francisco Lopez Carrasco, committed himself to building six vessels in India in 6 years for the *Carreira da India*. Ten years afterwards the author added new comments to the essay asserting, "the Portuguese mountains are depleted, there is no suitable timber" (Gomes Solis 1622, p. 200). Although such an assertion was clearly shaped by the purposes and bestowed interests of the merchant, the research conducted here certainly leads to very similar conclusions.

Based on these assertions, the goal of this article is twofold. On the one hand, it intends to investigate the exploitation of Portuguese forests for the construction and repair of Royal fleets in Portugal, paying special attention to the Lisbon shipyards and the surrounding hinterland that provided timber. On the other hand, it seeks to shed light on how certain factors hindered the Portuguese in their maritime conflicts against their enemies. The reasons for this include the overexploitation of forests, the carelessness—or inattention—of the King's ministers, a lack of ships and the ambitious foreign police headed by the Spanish Monarchy during Count-Duke of Olivares *valimiento*, or struggle for world dominance (*Monarchia Universalis*).

## 2 The "Hectic" Shipbuilding Years (1617–1625)

In 1609, the Spanish Monarchy and the Dutch Republic signed a twelve-year truce. During this period, they did not go to war in Europe; however, Dutch fleets threatened and attacked overseas territories, focusing especially on Portugal's Eastern Asian and Brazilian territories (Boyajian 1993, p. 158). There was no suggestion of peace between both maritime empires, only a pause that masked an actual war.

In addition, the Spanish and Portuguese empires could not afford the luxury of disrupting or even decreasing shipbuilding activity, as their territories were scattered across the world. Fleets and ships were utterly necessary to keep the Empire connected and to exercise power in a time in which stiff competition from other European contenders had increased dramatically. The "peaceful" foreign policy of the Spanish Monarchy in Northern Europe from 1609 to 1617 was partly because it

[2] First viceroy of the Portuguese Indian State.

had turned its attention to the Mediterranean Sea, more specifically to the Muslims in Northern Africa.

Consequently, 1617 turned out to be a turning point in the Spanish Monarchy's foreign policy. The rise of Baltasar de Zúñiga within the court led to a shift in the values that would orient the Spanish Monarchy in their military conflicts (González Cuerva 2012, pp. 386–394, 401–449). The idea of "reputation" (*reputación*) became more important than in prior years, and it maintained its validity during the following years up to at least 1634, which is the final year studied in this article (Elliott 1990).

This foreign policy shaped shipbuilding activity, although it was also a reciprocal interconnected process. This explains the frantic shipbuilding activity of the Spanish Monarchy during Philip III's reign, especially from 1598 to 1609 and 1617 onwards (Thompson 1976, pp. 198–200). From 1619 to 1622, the Portuguese Treasury Council contracted private individuals to construct galleons for the Indian fleets of 1619, 1620, and 1621 (Boyajian 1993, pp. 186–187). In these years, the Marquis of Alenquer, who was viceroy of Portugal, made great efforts to display Portugal's naval power (Gaillard 1982, pp. 255–298; Dadson 1991; Trapaga Monchet 2015). It eventually affected the capacity of forested areas in Portugal to supply good quality timber for shipbuilding. It led to unsustainable timber exploitation, which was more acute in some areas such as Alcaçer do Sal where, according to the *monteiro-mor* in 1622, it was difficult to find stone pine.[3]

The timber shortage affected not only Portugal, but also spread to Spanish shipbuilding activity. In the following year, Don Fernando Albia de Castro stated that he could not provide masts nor lateral planks to the Portuguese Crown because the High Sea Fleet and the ships being constructed in Guipuzcoa and Biscay required them.[4] Furthermore, private individuals were closely involved in the construction process for His Majesty's fleets. In 1621, Cristóvão Machado reached an agreement with the Portuguese Treasury Council (*Conselho da Fazenda*) to construct two galleons in Peniche, which would be deployed within the Portuguese coastal fleet (*Armada do Consulado*). Although we do not know with certainty, it is very likely that the pine timber used for this fleet probably came from Leiria's pinewoods, as was usual (Pinto 1938). In March 1622, the Portuguese governor ordered the *monteiro-mor* to extend permission to Cristóvão, by which he was allowed to cut 500 cork oak trees in the Santarém area to finish construction of the *São João* galleon. The *monteiro-mor* passed the order to Antonio Dias Montalvo, *monteiro-mor* of Santarém.[5]

Some months afterwards the ship sailed to Telha, located near Lisbon, where the construction of the *cuberta* was taking place.[6] Cristóvão Machado stated that 502

[3] Arquivo Histórico Ultramarino (hereafter AHU), Conselho Ultramarino (hereafter CU), Reino, box 3 folder 91, September 271,622.

[4] AHU, CU, Reino, box 4, folder 6, January 121,623. Written probably from Lisbon.

[5] Biblioteca e Arquivo Histórico de Ministério de Obras Públicas (hereafter BAHMOP), Montaria-Mor do reino (hereafter MMR), nucleo 9, March 1622.

[6] AHU, CU, Reino, box 3, folder 77, August 1622.

cork oaks (*paos*) were necessary to finish the construction. Valentim Temudo confirmed the information Cristóvão Machado had pointed out and stated how the timber would be used: 250 trees for square knees (*curvas coadradas*), 150 for circular top timbers (*aposturas redondas*), 50 for beam shelves (*dormentes*), 50 for waterways (*trincanices*), and 2 trees to construct 2 *papoias*. According to the report made by the warehouse's purveyor, the *monteiro-mor* issued the order to André Dias Montalvo.[7]

The warehouse's purveyor, Francisco Rebello Rodovalho visited the ship constructed by Cristóvão along with Cristóvão Machado and officials from Lisbon's shipyard to confirm it was being built according to the terms they had agreed.[8] Workers from Lisbon shipyard checked that the keel, frames, top timbers, and internal timbers had been built according to the contract. However, some of the timber of the stern and stern planks were rotten. If there was enough material available, the construction would be finished within 2 months.

This construction activity was based on Philip IV's order that the Portuguese fleet must comprise eight galleons and two *pataches*.[9] In 1622, the construction of a galleon devoted to "Consulado" was carried out in Peniche, perhaps the aforementioned galleon *São João*.[10] Portuguese materials and ships' resources could not, however, satisfy the requirement for ships ordered by Philip IV; therefore, don Valentim Temudo was entrusted to acquire two galleons that had been constructed in Biscay.[11] This was not the first time the Portuguese Government purchased ships in the North of Spain as, in 1600, six were acquired (Salgado 2016, p. 48).

As usual, the Portuguese *Carreira da India* demanded ships. It was expected to deliver two ships to India in 1623, so the Portuguese Treasury Council together with Roque da Silveira, purveyor of the King's warehouses, determined the required timber. Stone and maritime pine were cut for planking, stern planks, and doublings. In addition, Roque da Silveira estimated that 657 cork oak trees were needed for fore and aft mast partners, tiller arms of rudders, big planks for fore top' dawnhauls, capstans, weatherdeck's and *reves* knees, deck-support knees, waterways and 100 trees for *apostarios* (perhaps *apostiças* or *aposturas*).[12] The Portuguese fleet would be composed of four galleons, two *urcas*, two *navios*, and two *pataches* amounting to around 3413 tonnes (Mauro 1983, p. 41).

In December 1622, Roque da Silveira listed in two reports the required timber from cork oaks and pines to construct two carracks for the 1624 Cape route. In all this comprised 3720 *madeiras mansas* (probably stone pines) for wales, two castles, deck beams (*meias latas*), and other ship components and 240 trees for stern planks. In addition, 4249 cork oaks were expected to be felled to construct a wide range of

[7] BAHMOP, MMR, nucleo 9, August 1622.

[8] AHU, CU, Reino, box 4, folder 21.

[9] AHU, CU, Reino, box 4, folder 51.

[10] AHU, CU, Reino, box 3, folder 63.

[11] AHU, CU, Reino, box 4, folder 69. December 1623.

[12] BAHMOP, MMR, nucleo 9, November 1622.

ship components. Among others, 700 trees for upper futtocks (*aposturas*), 820 for weather deck's knees, 280 for deck-support knees, 260 for clamps or beam shelves, 200 for lower clamps, 260 for waterways, 200 for channels.[13] Some weeks afterwards another 1000 stone pines were to be cut for repairs and wales for Indian-going ships.[14]

It should be noted that the wood was not only deployed to build new ships, but also to repair both those belonging to the Portuguese Crown fleet and those arriving from India, and sometimes even for Spanish ships based in Lisbon. In January 1623, the governors compelled the *monteiro-mor* to give permission to cut pine trees in the Ribatejo area to repair the ships of the Portuguese Crown. Roque da Silveira listed the necessary stone pine timber, which would be cut in Benavente and Alcacer do Sal during the waning moon of January.[15]

In 1623, Cristóvao Machado committed himself again to building two galleons in Peniche of 500 tons each. They were probably built using timbers from Leiria, Peniche, and the surrounding areas. The ships were constructed according to the measurements provided by Valentim Temudo and were fortified afterwards. The galleons *São João* and *São Antonio* eventually surpassed the agreed 500 tonnes.[16]

Once the military conflict of the summer of 1623 came to a halt, it was time to arrange and outfit fleets for the forthcoming campaign. The Indian shipping carracks had had issues reaching Lisbon safely, as pirates had looted the Portuguese coast. Both the courts of Lisbon and Madrid realized it was indispensable to reinforce the fleets to be able to successfully face the challenge of their enemies.

The Portuguese forested areas were put under pressure as a result of the fact that Lisbon's shipyards required further trees to complete the construction of two vessels bound for India. In October, Vasco Fernandes Cesar listed the indispensable amount of cork timber, which reached 1218 trees, for the construction of capstans, intercostal beams, clamps, waterways, deck-support beans, beak knees, fore and aft mast partners, mast steps, and big planks for various purposes. In addition, the governors of Portugal delivered a decree to the *monteiro-mor*, by which he was committed to cutting down another 272 trees in Mugé for the two relief galleons.[17]

In September, the Portuguese government accepted Fernão Alvares and Baltasar da Maia's bid to construct the hull of two galleons and two small ships—perhaps *pataches*—in Porto. This information is highly valuable as it is one of the few contracts (*asientos*) we have found in Portuguese archives that includes orders by the Portuguese government for the construction of ships in Portugal (Mauro 1983, pp. 49–51).[18] The contract is divided into 16 clauses that specify the rights and duties of the contracting parties. The Portuguese government listed in detail the

[13] BAHMOP, MMR, nucleo 9, December 1622.

[14] BAHMOP, MMR, nucleo 9, January 1623.

[15] BAHMOP, MMR, nucleo 9, January 1623.

[16] AHU, CU, Reino, box 4a, folder 12, February 1624.

[17] BAHMOB, MMR, nucleo 9, October 1623.

[18] The following lines are based on AH, CU, Reino, box 4a, folder 12.

measurements of four ships, the delivery date, and the funding the contractors would receive in turn. The two galleons would weigh around 500–540 tonnes and the two light ships 150 tonnes, as the Royal Treasury was obliged to contribute 13,824,000 *reis* for both the galleons' hulk and 2.7 million for the lighter ships. The Crown would not only request that the Porto's bishopric allows trees to be cut but would also issue orders to fell one thousand maritime pines in Leiria and Mondego pinewoods for lateral planking and *latas* (half deck beams?). Torre de Moncorvo and the surrounding areas would supply 200 quintals of linen and hemp and 100 quintals of tow (*estopa*) for the construction. According to Fredéric Mauro, the Spanish government pointed out that unlike the Tagus area, this part of Portugal still had plenty of timber for shipbuilding (Mauro 1983, pp. 49–50).

In addition, Baltasar Gonzales and Valentim Temudo committed themselves to building a carrack each in Lisbon, with the condition that they would be helped in cutting the trees that would be deployed in the construction.[19] The trees would be chopped according to the measurements (*vitolas* in Portuguese); therefore, the trees were cut and the wood was used as timber according to the measurements stated by the builder.[20]

1624 was not a year of respite for Portuguese forests; on the contrary, "frenetic" timber exploitation continued to be the trend. During the waning moon of December 1623 and January 1624 at least 9500 trees were cut down in the areas of Santarém—cork oak, Coruche—stone pine, and Leiria—maritime pine. The timber was used for the construction of two ocean-bound three-deck ships and, to a lesser extent, for repairs.[21] Perhaps these were the two ships Gil Fernandes Aires had agreed to build.[22] The purveyor of the warehouses was ordered to construct two new ships, probably in Lisbon, with the measurements the King had ordered in another dispatch. Therefore, the Crown sought to monitor shipbuilding activity more closely, a pattern that spread throughout the Monarchy (Vasconcellos 1960, pp. 25–49; Varela Marcos 1988, pp. 121–136; Wing 2015, p. 152). The ships would measure 20 or 21 *rumos* instead of the traditional 19 they had measured before.[23] Castro (2003, p. 10, 2005, pp. 189–192) considers these measurement systems in detail.

However, in May there was not enough suitable timber in Lisbon shipyards to continue constructing the two carracks for Cape shipping, because the inhabitants of Pederneira were reluctant to carry the timber from Pederneira to Lisbon.[24] Furthermore, Lisbon's shipyard workers could not fulfil all of the required tasks, as

[19] BA, Ms. 51-VI-28, f. 57r-v.

[20] This document stated the purveyor of the King's warehouse had the task of watching personally the gauges (*bitolas*) for the 3-decks being constructed, as the timbers would be cut according to them, February 131,623.

[21] AHU, CU, Reino, box 4a, folder 10, BAHMOP, MMR, nucleo 9, January 1624.

[22] The accepted agreement was delivered from Madrid in December 1623, AHU, CU, Reino, box 4a, folder 68.

[23] Biblioteca de Ajuda (hereafter BA), Manuscripts (hereafter Ms.), 51-VI-28, f. 61v.

[24] AHU, CU, Reino, box 4a, folder 27.

it was necessary to gather carpenters and caulkers from Porto and Coimbra areas.[25] This would cause issues, as in Porto the construction of two *pataches* and some galleons was taking place under the supervision of the "Chancellor" of Porto.[26] Measurements were decided in Lisbon and delivered afterwards to Porto. In other document is asserted two small ships of 150 tonnes each were being constructed in Porto at 2,700,000 *reis* each. They might have been the above quoted *pataches*.[27] By March 1625 the construction of galleon *São Antonio*'s hull was nearly finished, whereas *Nossa Senhora de Batalha* was behind schedule due to a lack of timber.[28] Each galleon's hull would cost around seven million *reis*, weighing 500–540 tonnes.[29] To protect them, the Crown ordered that some galleons be transferred from Bizcay and escorted to Lisbon.[30] A milestone that was quite fundamental for finishing the ships was the construction of the beams deployed to launch them into the river. In August 1624, Vasco Fernandes Cesar stated that 450 cork oak (or Portuguese oak) trees were necessary, perhaps to launch the ships and to construct their stern grids.[31] This is one of the few references we found related to the use of oak in South Portugal, as cork trees along with stone and maritime pines were by far the most frequent tree species in Lisbon's shipyard.

Furthermore, the Crown reached an agreement with Feliciano Monteiro and Duarte Correa to build one ship to sail to India in 1626, which would require cork oaks and pines for its construction.[32] In 1625 a Spanish-Portuguese combined fleet conquered Bahía de Todos os Santos, a milestone in the maritime conflict against the Dutch Republic. This did not result in a decrease in timber use because, in the following years, the Spanish Monarchy's struggle to maintain maritime power took a tremendous toll on Portuguese forests.

Consequently, Portuguese shipyards demanded further timber to construct, in this particular case, two new carracks with three decks each. The amount of cork oak required amounted to 5403 trees, and possibly an additional 1250 trees for two *pataches* and 1000 trees to repair another ship.[33] Despite all these efforts, Portugal could not struggle alone against its competitors and often required the support of the Castilian Crown. In 1623 it appears that the Castilian Crown provided four galleons and a large amount of funding to the Portuguese crown.[34] In 1628 and 1629, the Castilian Crown lent numerous ships to the Portuguese fleets again (Salgado 2016, p. 49). The shortage of funds was

[25] AHU, CU, Reino, box 4a, folder 28. May 1624.

[26] AHU, CU, Reino, box 4a folder 29; box 5 folders 1 and 8.

[27] AHU, CU, Reino, box 5, folder 13.
. BA, Ms. 51-VI-28, f. 78v.

[28] AHU, CU, Reino, box 5, folder 11. February 1625, letter of Baltesar Gonçalves shipwright delivered from Lisbon to Porto.

[29] AHU, CU, Reino, box 5, folder 13.

[30] BNE, Ms. 2.846, f. 185r.

[31] BAHMOP, MMR, nucleo 9, August 1624.

[32] AHU, CU, Reino, box 5, folder 22. April 1625.

[33] BAHMOP, MMR, nucleo 9, December 1624.

[34] Biblioteca Nacional de España (hereafter BNE), Manuscritos (hereafter Ms.), 2.845, f. 27r-v.

a constant issue in the period studied here, and it hindered the construction of ships in Lisbon and Porto.[35] In 1625, Muslim pirates sailed to the Portuguese coast and plundered from Algarve to the Tagus River mouth without hardly any opposition from Portuguese fleets.[36] Sometimes the Castilian galleys based in Lisbon were deployed to escort Portuguese fleets that came from overseas territories, whereas others were required to defend the Spanish and Portuguese coasts.[37]

"Ship starvation", in other words a shortage of ships, affected private owners, who were sometimes forced to sell or lend their ships to the Crown. In 1624, for instance, Vasco Fernandes Cesar went to Setúbal to find out whether there were any private ships available for the Portuguese fleet. Although there were three seaworthy vessels, the Portuguese Crown could not use them because the Castilian Crown had already seized them. As a result, Fernandes Cesar was encouraged to deal with the owner of the *urca Leao Rosso* to reduce the agreed price of 3.6 million *reis*.[38] In the following year, the Portuguese Treasury Council enquired about the cost of repairing and outfitting the carrack *São Tomé*.[39] In 1625, Antonio Fernandes Paes travelled from Lisbon across Spain to purchase a galleon suitable for the Portuguese *Carreira da India*.[40]

Moreover, the Monarchy eventually gave permission to acquire Dutch ships as long they were purchased indirectly. Diogo Tristão de Mendoza was authorized to buy up to ten Dutch vessels to outfit the sixteen-ship squadron he had offered to relieve Brazil.[41] In the following years, military conflict enhanced pressures on the Spanish Monarchy, which again affected the forested areas of Portugal, as Portugal was overrun by the thriving Dutch fleets, an element that affected the trade between India and Portugal (Boyajian 1993, pp. 202–208). The following section examines how the maritime struggle affected the forests of Portugal.

## 3 Timber and Shipbuilding for Maritime Struggle (1626–1634)

In January 1626 governors of Portugal, in accordance with Philip IV's dispatches,[42] ordered that pine and cork oak timber be carried to Seixal, where the construction of two galleons was going to take place.[43] As a result, tree felling spread across

[35] This issue is constantly emphasized in the archival sources, BNE, Ms. 2.845, ff. 145r-146r.

[36] BNE, Ms. 2.846, f. 180r, February 1625.

[37] BNE, Ms. 2.846, f. 183r.

[38] AHU, CU, Reino, box 4a, folder 27. May 1624, Portuguese Treasury Council.

[39] AHU, CU, Reino, box 5, folder 33. June 5, 1625.

[40] AHU, CU, Reino, box 5, folder 43.

[41] Archivo General de Simancas (hereafter AGS), Secretarías Provinciales (hereafter SSP), libro (hereafter lib.), 1.520, f. 122v or 123v, November 1626.

[42] AGS, SSP, lib. 1.520, f. 6r, Barbastro January 311,626. This year the King would deliver 200.000 *cruzados* to outfit the fleet based in Lisbon.

[43] AHU, CU, Reino, box 5a, folder 1,

Portugal to such a degree that even the Portuguese authorities began to be concerned, as that year they aimed to build at least two galleons for the Portuguese Crown and another two carracks for the *Carreira da India*. This boosted the demand for timber, because royal charters were issued to the *monteiro-mor* to permit the cutting of almost 10,000 cork oak trees in the Santarem area, 5480 of them to construct the India-bound vessels and 4000 for two galleons. This was an extraordinary quantity, especially taking into account the fact that pine trees were not listed yet, as they were estimated to be around 1500 trees. In addition, Portuguese ministers postponed the felling of another 1000 cork oak trees until August, which the government demanded in order to give some respite to the forests.[44] Altogether, more than 12,500 trees were required, an extraordinarily high quantity that clearly must have had an impact on the forested areas of Portugal.

In 1626 Agostinho Diaz was in charge of the so-called figure of the *feitor*, who was responsible for seasoning pine timber in Melides for the construction of two galleons for the 1627 *Carreira da India*. The Portuguese Treasury Council relied on someone to season the timber where the trees were felled. The following year, Manoel Gomes Pereira was appointed to cut and season a considerable number of pine trees for the construction of two galleons for the Consulado's fleet in the surrounding areas of Pederneira. Did the Portuguese Treasury Council set up a new "legal figure" to establish better monitoring over the timber supplying process during Philip IV's reign? This question should certainly be addressed in future research in this area.

Manoel Gomes Pereira faced uncooperative local inhabitants, whom he needed to employ to carry the wood to Pederneira, because the Crown owed them large sums of money from previous assignments. In addition, he was running out of funds to saw and curve (*lavrar* in Portuguese) the wood before loading in Pederneira to send out to Lisbon.[45] Meanwhile, Simão Alvares da Costa cut trees in Batalha during the February's waning moon to supply timber for shipbuilding.[46] This timber was probably destined for Porto, where the construction of at least two galleons was taking place, one of them to replace the carrack *Chagas* that had wrecked in Coruña in the *Carreira da India*.[47]

Furthermore, private lands were also used to supply resources for the Portuguese Empire, as Tristão de Mendoza Furtado requested permission to cut 200 cork oaks for shipbuilding.[48] The King's ministers based in Madrid were aware of the different procedures used to ensure the ongoing flow of timber, as Philip IV ordered that all of the wood be carried to Lisbon to construct the two carracks that would sail to

[44] BAHMOP, MMR 9, January 1626.

[45] AHU, CU, Reino, box 5a, folders 4, 6.

[46] AHU, CU, Reino, box 5a, folder 6. The trees were felled in February's waning moon.

[47] AGS, SSP, lib. 1.520, f. 27r, March 131,626, Monzón.

[48] AHU, CU, Reino, box 5a, folder 8.

India the following year.[49] Such frantic activity was the result of Philip IV's order that the Portuguese Crown fleet must comprise seven galleons.[50]

In Madrid, and perhaps even in Lisbon, the ministers of Philip IV sought to restrict private involvement in the construction of ships to some extent. The Portuguese Treasury was reluctant to accept a bid of Fructuoso João in which he proposed to fulfil the carpentry work for two ships for 6500 *cruzados* each, because orders had been issued from Madrid for a clearer breakdown of the construction cost.[51] A few years after he offered again, based on Gil Fernandes experience, to provide carpentry services for two carracks for 13,500 *cruzados*.[52]

After the intense activity of 1626 that put a strain on Portuguese forest resources, 1627 was a period of relief for them, as only one reference related to timber supply for shipbuilding or repairs has been found for this year. However, we still cannot be certain that both activities diminished.[53] In the same way, Tomás de Ibio Calderón asserted in June 1627: "there is littler timber left in this Kingdom for shipbuilding because they fell and do not plant replacements" (Goodman 1997, p. 83). Philip IV authorized the export of 30,000 cartloads of wood from Galicia to Portugal to construct houses. This was not a new procedure, as in 1564, 1567, and 1584 Philip II had allowed the Marquis of Astorga to withdraw up to 54,000 cartloads of chestnut wood from his County of Santa Marta and the surrounding areas to bring it to Portugal.[54] Similarly, from at least the mid-sixteenth century, timber was imported into Lisbon from Asturias (García Oro and Romaní Martínez 1990, p. 259 and 264).

In 1628, Tomás de Ibio Calderón assessed the state of the ships based in Lisbon. A ship was being built in its shipyard that would be the flagship of the Portuguese fleet.[55] The Portuguese government issued a series of charters specifying the timber required for constructing ships. Unlike in past years, the timber required amounted to less than 1500 trees, and in addition the government diverted its attention to Obidos, a place that had remained untouched in the "hectic" shipbuilding years. Did this mean the Portuguese Treasury Council was forced to look further afield for timber? Although it is not easy to give a clear response to this question because of a lack of sources, we consider that there was, at least during this year, a slight reduction in the demand for timber from Portuguese forest resources.[56] At this time, 300 cork oak beams were requested to launch the carrack *Santissimo Sacramento* into the Tagus River.

[49] AGS, SSP, lib. 1.520, f. 53v. In April Vasco Fernandes Cesar reported the construction state of both ships.

[50] AGS, SSP, lib. 1.520, f. 83v, July 1626.

[51] AHU, CU, Reino, box 4a, folder 27, May 291,624.

[52] AHU, CU, Reino, box 5a, folder 14, May 1626.

[53] BAHMOP, MMR, nucleo 9, January 1627.

[54] AGS, Guerra y Marina (hereafter GYM), legajo (hereafter leg.) 173, doc. 76.

[55] AGS, SSP, lib. 1.521, f. 6r, July 1628, order of Philip IV.

[56] BAHMOP, MMR, nucleo 9, October and November 1628.

In these years, a number of ministers informed Madrid that the forested areas of Portugal had been depleted so dangerously in the last few years, that if the demand for timber continued at similar rates, they would be unable to continue to provide timber sustainably. Despite such warnings, during the following years the Monarchy put its military interests above the protection of forested areas. For 1629, we only have references that indicate that the Portuguese government asked the *monteiro-mor* to permit the withdrawal of 400 beams (*vigas* in Portuguese) to construct a new carrack devoted to Cape shipping.[57]

Consequently, in order to balance out the "decline" of Lisbon's shipyards and the surrounding forested areas—although this cannot be ascertained with certainty—the Spanish Monarchy resorted to deploying other resources. In 1628, Gil de Afonseca was commissioned again to purchase as many galleons as he could to strengthen the Portuguese fleets. That year the *naveta Madre de Deus* arrived from Cochin, which had been built in India with "*angelim*" and teak timbers. It was assessed for around 8000 *cruzados*, half of the price of the ship that Gil da Fonseca had bought in Biscay.[58] It seemed he acquired a galleon in San Sebastián, located in the Basque province of Gipuzcoa, which was loaded with war equipment and delivered to Lisbon.[59] In addition, ship starvation increased during the following years and the Monarchy stretched the marketplace to Dunkirk (Flanders)[60] and even to Germany and England to protect the Brazilian territories (Cabral de Mello 2007, pp. 93–98).

In terms of naval conflict, in the decade between 1620 and 1629 in Lisbon, 67 vessels were arranged to be bound for India, an extraordinary effort that was nevertheless insufficient for catching up with the Dutch fleets. Outfitting a single carrack cost about 130,000 *cruzados*, whereas the galleons cost 74,000. James Bojayian has estimated that the overall expenditure of the decade must have surpassed 7,000,000 *cruzados* (Boyajian 1993, pp. 187–188).

However, in the ensuing year, timber starvation for maritime conflict affected Portuguese forests. The Portuguese government ordered that 8000 trees of cork oak, oak, and pine be cut for the *Carreira da India*, Portuguese and Castile fleets based in Lisbon. The new galleon that was being built in Lisbon required 4500 cork oak trees, possibly including additional pines and imported timber to have an idea of the amount of trees necessary to construct one ship. The remaining timber was used to repair ships. In 1631, the Portuguese government demanded less from the Portuguese forests (at least 3000 trees), but 1632 was a year where efforts in shipbuilding greatly increased, and it therefore deserves attention.

On November 23rd, 1632, the Portuguese government released an order to the *monteiro-mor* together with a report by Rui Correa detailing the timber required to

[57] BAHMOP, MMR, nucleo 9, Lisbon 1629.

[58] AGS, SSP, lib. 1.521, f. 6r, letter of Philip IV, Madrid 28 July 1628; f. 9v, October 1628.

[59] AGS, SSP, lib. 1.521, f. 21r-v.

[60] AGS, SSP, lib. 1.521, f. 21r, letter of Philip IV, June 11,630.

**Table 9.1** Timber required for an ocean-going ship

| Required timber | Ship components |
|---|---|
| 3200 cork trees | Stem posts, doublings (*coisses*, here understood as *calçês*), keels, frames, first futtocks, *aposturas*, clamps or beam shelves, breasthooks, waterways, weatherdeck knees, *curvas de reves*, bilge stringers, deck-support knees, and other necessary things not detailed |
| Stone pine from Ribatejo area | |
| 1000 stone pine trees | Wales, filler timbers, and *meas latas* (half deck beams) |
| 400 trees | Stanchions |
| 80 dozens | Lateral planks |
| 40 dozens | *Dalcaza* planking |
| 140 | Stern planks |
| 2 | *Madres de Leme* (rudders) |
| 4 | *Asafroes* |
| 2 | Doublings |
| 10 | *Pinçoes* (here understood as *pinção*, whipstaff) |
| 8 | Doublings of top mast (*mastareo*) |
| 200 maritime pine trees | *Armações* |
| Maritime pine from Pederneira area | |
| 140 dozen | Deck planks |
| 140 dozen | Ceiling planks |
| 1.000 trees | Deck beams, bilge stringers, carling |
| 6 | *Asafroes* |
| 12 tabuas | Channels |
| 24 | *Apostiças* (*aposturas*?, if so top timbers) |
| 6 trees | Pumps |
| 6 | *Asafrões mansos* |

Source: BAHMOP, MMR, nucleo 9, November 191,632

construct a new galleon.[61] Unfortunately there is no mention either of the measurements of the ship nor the decks; therefore, it is not possible to figure out how much timber was required for each tonne. Table 9.1 shows that cork trees, maritime, and stone pines were needed to construct it. Cork timber and stone pine were obtained from the Ribatejo area close to the Tagus River, whereas maritime pine would come from Pederneira area (perhaps Leiria).

[61] In 1633, Bartolomeu Alvares, master carpenter of Lisbon shipyards, constructed the carrack *Nossa Senhora da Oliveira* that sailed to India in the next year. Perhaps it was the ship aforementioned. In 1634, he was constructing the carrack *Santa Catherina*. AHU, CU, Reino, box 6, folder 34.

Consequently, the construction of a single galleon, probably in Lisbon, in theory required that 6000 trees be cut. António Arala Pinto stated that in order to build 1200 tonnes of ship around 6250 trees were required (Pinto 1938, vol. 1, p. 147). According to John Richards throughout the early modern age the English Royal Navy consumed around 4200 to 5600 cubic metres of timber for the construction of a great warship with a capacity of 2000 tons, which required "several thousand mature trees" (Richards 2001, 224). Similarly, it has been estimated that a Spanish eighteenth-century warship consumed at least 4000 trees (Crespo Solana 2016, p. 7).

It is interesting that the Portuguese government emphasized that trees had to be felled close to the Tagus River. This point was again stressed in 1634,[62] but trees were in fact cut far from the rivers, which was a common way for timber to be transported affordably. This was another environmental footprint of the hectic shipbuilding activity that the Portuguese Monarchy had carried out since at least the onset of the seventeenth century. Timber shortages were not only caused by "ordinary" or common constructions and repairs, but also by unexpected or "extraordinary" commissions that arose because of maritime conflict.

## 4 Extraordinary Commissions to Keep the Monarchy Afloat

In this section, we aim to examine the way the Spanish Monarchy handled unforeseen situations that arose as a result of maritime conflict. We provide some insights into the actions of the Monarchy in 1628 and 1631 to ensure Philip IV's dominance in Eastern India and Brazil, territories that belonged to the Portuguese Crown.

In 1628, the Marquis of Castel-Rodrigo was acknowledged co-governor of the King and given the power of rejecting any interference by ministers in this role, including the governors themselves. He would count on the support of Simão Suares de Carvalho and Diogo Suares, clerk of the Portuguese's Treasury. His stay in Lisbon was extended to 1630, as he was in charge of outfitting the fleets that would sail to India and Brazil.[63] Consequently, throughout this period, Portuguese ministers were not entrusted to handle all of the demands coming from the King's fleets. Furthermore, workers in Lisbon were often overworked, so carpenters and caulkers were brought in from Porto to repair the galleons that would be delivered to India the ensuing year.[64]

In 1630 the King assigned Rui Correa Silva to acquire ships and war components in the North of Spain for the Portuguese fleets. He would ratify Domingo Gil da Fonseca's actions according to the instructions he had received, whereas anything done separate to these instructions would be declared void.[65] He was allowed to

[62] BAHMOP, MMR, nucleo 9, November 1634.

[63] AGS, SSP, lib. 1.521, ff. 7r-8r, 19v, 20v. Madrid, August 1628.

[64] AGS, SSP, lib. 1.521, f. 63r.

[65] Gil Fernandes da Fonseca acquired one galleon according to the King's orders to sail to Bahia.

check and buy any ships being constructed in Biscay. The galleons would reach more than 500 tonnes and would be delivered from Biscay with all the components (including the rigging). Because he was not a specialist in shipbuilding matters, Manuel Fernandes, who at that time was a carpenter and shipwright in Lisbon, would go along with.[66]

The maritime conflict against the Dutch Republic concerned Philip IV and Count-Duke of Olivares to such extent that Philip IV ordered Olivares in 1631 to head up a Committee. He would gather together the Duke of Villahermosa, Manuel de Vasconcelos, and Malaga's bishop with the purpose of outfitting a fleet to expel the Dutch from Brazil (AGS, SSP, book 1477, f. 1r).[67] In the sessions that followed, the Committee sought to establish a Committee of Treasury and Fleets in Lisbon to handle funding and all matters related to the fleet. The Count of Castelnovo was entrusted to perform this with the aid of Tomás de Ibio Calderón.[68]

In addition, the King ordered him to arrange a fleet of six ships to escort the *Carreira da India* carracks. Once the Count reached Lisbon, he realized the difficulty of conducting the task assigned by the King; therefore, he requested broader powers to fulfil his commitment as the Marquis of Castel-Rodrigo had done.[69] Furthermore, Rui Correa da Silva was appointed purveyor of the King's warehouses in Lisbon, despite the fact that this office was already held by someone else.[70] They arrived in Lisbon and began to outfit the fleet soon after.

However, the understanding of the situation in Madrid was very different from in Lisbon. In Madrid, the Ministers believed it was plausible to gather a squadron of six seaworthy galleons within 2 months. In Lisbon, the reality was slightly different. Castelnovo was forced to use all his skills and abilities to gather together the galleons. The fleet would be composed of galleons and carracks belonging to the Portuguese Crown, either acquired abroad or constructed in Portugal, two galleons purchased from Gaspar Brito Freire, and a galleon purchased by Rui Correa Lucas.[71]

To recover Brazil from the Dutch, the galleons *Santo António*, *Nossa Senhora da Batalha,* and *São João Bautista* were repaired in Lisbon. Lastly, four galleons were sent from Biscay to Lisbon, which demonstrated the inability of the Portuguese Crown to continue struggling without the aid of the Castilian Crown.[72] It seemed that the relief fleet would be eventually composed of 40 ships, as don Fernando Albia de Castro was committed to importing a range of war-materials to outfit 40

[66] AGS, SSP, lib. 1.521, ff. 124r-127r, Lisbon June 61,630, instruction issued by Marquis of Castel-Rodrigo.

[67] AGS, SSP, lib. 1.477, f. 1r.

[68] AGS, SSP, lib. 1.477, ff. 8r-12v, Madrid, June 1631.

[69] AGS, SSP, lib. 1.477, ff. 15v-17v.

[70] AGS, SSP, lib. 1.477, f. 31v.

[71] AGS, SSP, lib. 1.477 ff. 22r-29r, deliveries of the Committee based in Lisbon, July 12, 21, and 31. Some days afterwards Domingo Gil replaced Rui Correa, *Ibídem*, ff. 35v-36r.

[72] AGS, SSP, lib. 1.477, ff. 44v-45r.

galleons from wherever was necessary. Amidst other items, 7500 lateral planks of Flanders pine and 300 masts (*entenas*) were listed.[73]

But timber did not only come from abroad, but Portuguese forested areas were also put under pressure to cover growing demand. The Marquis of Castel-Rodrigo gave Francisco Coutinho the authority to seize whatever trolleys and carts he needed to carry timber from the forests to the Tagus River, through which it would be transported to the shipyards in Lisbon.[74]

However, this was not the greatest effort made by Count-Duke of Olivares to face the Dutch threat in Portuguese overseas territories. The establishment of the General Trade Company in Lisbon deserves particular attention here, both as a form of opposition to the Dutch in Lisbon and as a way to strengthen trade between Portugal and Portuguese India (Disney 1978, 71–135). Olivares sought to engage private merchants, although he did not manage to do so. The Monarchy handed over some carracks and materials to the Company, some of which were constructed in Portugal using Portuguese species. When the Company was established, only two of the five ships given were based in Portuguese waters: *Nossa Senora de Bom Despacho* and *São Gonzalo*. The remaining ships were already sailing to and from India: *Bom Jesus de Monte Calvário*, *Nossa Senhora de Rosário,* and the aforementioned galleon *Batalha* (Disney 1978, p. 85). The Committee's board members were bound to the Crown. The Count of Linhares was appointed as the new viceroy of India; therefore, the Monarchy did try to turn the situation around. In his instructions, Linhares received the order of setting up the Committee in India to which was entrusted, amidst other tasks, the construction, repairing, and outfitting of the vessels (Disney 1978, 85–94; Boyajian 1993, p. 192–194).

In 1629, the Company launched the carracks *São Gonçalo*, the *Nossa Senhora de Bom Despacho*, and the *Santissísimo Sacramento,* which served as *capitana* (flag ship). They sailed alongside six galleons outfitted to escort them and transport the new viceroy, Linhares. The three carracks and four of six galleons reached Goa safely in October 1629. This accomplishment was not followed by equal or similar efforts, as the following year only the carracks *Santo Ignácio de Loyola* and the *Bom Jesús de Monte Calvário* were arranged and delivered to India (Boyajian 1993, 197–198; Disney 1978, p. 112). In December 1631, the King ordered that the following year the fleet would be composed of four ships, instead of the three he had initially stated.[75] The King handed over some ships to the General Trade Company, such as the carrack *Rosario*.[76] Around the summer of 1632 the construction of a four-deck galleon was taking place in Lisbon that would be included within the General Trade Company.[77] From 1631 to 1633, less ships sailed to India than had been ordered in Madrid, despite the fact that the Committee purchased some ships,

[73] AGS, SSP, lib. 1.521, ff. 25r-26r.

[74] AGS, SSP, lib. 1.521, f. 40r.

[75] AGS, SSP, lib. 1.526, f. 1r, Madrid, December 51,631.

[76] AGS, SSP, lib. 1.526, f. 2r, February 181,632.

[77] AGS, SSP, lib. 1.526, ff. 7v-8r, August 291,632.

such as *São Felipe* for 10,000 *cruzados* (Disney 1978, pp. 112–118).[78] The 1630s' turned out to be a decade of disasters for the Portuguese Empire in India. In a similar way, Magdalena de Pazzis Corrales points out that 1631 was a tipping point for the Catholic Monarchy's maritime conflict, as it was unable to sustain its military effort at such a level (Pazzis Corrales 2001, 48–51).

In addition, in 1632, Philip IV asked the Portuguese government to devise a way for the Portuguese Crown to sustain 30 ships that would amount to 10,400 tonnes.[79] Clearly, he desired to go a step beyond the efforts the Kingdom had made ceaselessly since at least 1617. The relief fleet that was delivered to Brazil in 1632 was composed of 12 galleons, 12 *navios*, and six *pataches*. A total of 10,440 tonnes, which might have been the fleet mentioned above by Philip IV (Mauro 1983, p. 41). However, the Portuguese Crown did not have the capacity to fulfil this petition, and the Trade Company was disbanded. Clearly, the Monarchy's commitments were exhausting the Portuguese forests, shipyards, and funding possibilities; otherwise, the continuous need to make commissions to buy warships and ship components abroad, which are mentioned previously, cannot be explained.

Having outlined the maritime conflict and associated shipbuilding efforts, the following section focuses on the legislation issued in Madrid and Lisbon to protect the forests from 1621 to 1634, a period in which the Monarchy turned its attention towards conserving and developing Portuguese forested areas.

## 5 Protecting Forests, Wood, and Timber

The conservation of forests was essential to ensuring the flow of timber to Portuguese shipyards to carry on shipbuilding activity. However, this was not the only encouragement that the kings had in mind, as the forests were, among other many things, indispensable for hunting activities, covering the daily needs of their vassals, and keeping the forges in operation, where artillery and weapons were constructed.

Subsequently, the legislation issued by the Monarchy focused on timbers for shipbuilding purposes as well. Between 1621 and 1634 the concern about the conservation of forests is reflected in the spectacular increase of ordinances,[80] regulations, laws,[81] royal charters, etc. issued both in Madrid and Lisbon. This did not necessarily mean that previously they had been less concerned, because they did not deal exclusively with forests. For instance, we might ask: What happened once a tree was cut down? At this point the aim is to show the concern of the King's

[78] BA, Ms. 51-VI-28, f. 78v.

[79] BA, Ms. 51-II-25, ff. 172r-173v.

[80] For instance, AGS, SSP, lib. 1.520, f. 125r-v, Order of Philip IV, November 61,626 attached to Leiria's pinewood ordinance.

[81] For instance, in 1624 the Portuguese Government ordered the *monteiro-mor* to gather information about anyone known for cutting and burning trees without permission. BAHMOP, MMR, 8.

ministers about avoiding the loss of wood and timber during transportation, as this was likely regarded as one of the key factors that contributed further to deforestation. It is difficult to define such a controversial word. It is understood here as was defined by Andrew Goudie: "the temporary or permanent clearance of forest for agriculture or other purposes". According to this definition, if clearance does not take place, then deforestation does not occur (Goudie 2000, p. 52).

In 1628 another essay by Duarte Gomes Solis was published, which he dedicated to the Count-Duke of Olivares. On this occasion, the author applauded Olivares's decision to set up the Committee for Trade (*Junta de Comercio*) in Lisbon, which served to channel trade between Portugal and the Eastern Empire. The merchant expanded on the arguments he had already noted in the *Discurso sobre los comercios de las dos Indias*. Lisbon, its shipyards, and the King's ministers in charge of handling matters related to the management of the empire were blamed for leading the *Estado da Índia* to its "wreck". He went on to emphasize that the Portuguese forests were being depleted because of frequent wrecks, and therefore endorsed the idea of building ships in India instead of Lisbon (Gomes Solis 1628, ff. 5v-6r).

Did this mean that the Monarchy did not attempt to handle the situation efficiently? At this point another question arises related to the prior question: What was the "administrative procedure" for supplying timber for shipbuilding from Portuguese forested areas? There probably was no single approach that the Spanish Monarchy took to ensure timber flow from forests to shipyards in Portugal. However, regarding the Lisbon area, its approach can be described as follows. The King extended a decree, order, or charter through the Council of Portugal ordering that timber be provided for the construction of an undetermined number of ships.[82] The Viceroy or governors of the Kingdom passed this request through the Portuguese Treasury Council, which soon after passed it on to the Purveyor of the King's warehouses. The Purveyor oversaw obtaining information about timber required for construction and repairs. To do so he spoke to the master carpenters of Lisbon, who had first-hand knowledge. The information he collected was subsequently delivered to the Portuguese Treasury Council, which in turn delivered the information—or the dispatch—to the viceroy to be signed. The purveyor's report was attached to the Royal Decree and delivered to the *monteiro-mor*, who extended another order to local *monteiros* and *couteiros* (forest keepers). Sometimes he specified the areas where tree felling would take place, whereas other times this information was not specified.[83]

Consequently, timber conservation began with the head of the Monarchy, the King, or at least with his *alter ego* or, if not, with high-reputed ministers. Several orders and royal charters were issued through the Council of Portugal, and probably from the Council of War, which showed the efforts displayed by the whole

[82] AGS, SSP, lib. 1.520, f. 124r, November 61,626, Madrid.

[83] Many examples can be seen in BAHMOP, MMR, nucleo 9, or AHU, CU, Reino, box 5, folder 8, January 1625.

administrative system to protect forests and use them responsibly, even after the trees had been felled.

Although Duarte Gomes Solis' concerns about forests exploitation have already been mentioned, he was not the only person at the time who was aware of the importance of forestry in conserving the Empire. The King's ministers shared this concern, as did the *monteiro-mor*, who was at that time the person in charge of conserving and developing forested areas belonging to the Crown in Portugal. In 1626, he recognized that the maintenance of the Empire depended largely on caring for and maintaining trees, wood, and timber. This letter is particularly worthwhile because he had seen first-hand the condition of the Portuguese forests, as he spent large periods of time near the forests instead of in Lisbon. In this case, he was opposed to the permission given by the Council of Justice (*Desembargo do Paço*) to Vicente Freire, an inhabitant of Abrantes, to withdraw 50 or 60 beams from the Crato Priory, because there were not enough cork oak trees for shipbuilding. His rejection was based on the argument that in recent years a large amount of timber had been wasted because of carelessness and mismanagement by the ministers. In 1622, 3000 trees had been cut to construct two galleys, but they ended up being anchored in the harbours. In 1623 and 1624, he ordered to that 5000 trees be felled each year, of which 600 were left in the forests. In 1625 around 500 trees were left and lastly, in 1626, 700 trees.[84] In addition, the *monteiro-mor* did not extend the permission to Bras Telles, who intended to cultivate his lands in Lamarosa Valley, close to Santarém. Although the *monteiro-mor* argued they were necessary to supply timber for shipbuilding, the Portuguese government ordered him to extend the requested permit.[85]

The loss of timber continued to occur during subsequent years, because timber remained on Pederneira's beach during the winter without any protection against the effects of weather. What were the reasons behind this? Obviously, there was no single reason, but rather various factors. In addition to the reckless behaviour of officers, sometimes the cause was a lack of ships for transport, the constant presence of enemies on the Portuguese coast, or weather conditions that restricted the transport of timber in Pederneira to the summer months. According to master Alvaro Dias, an inhabitant of Pederneira, the forests surrounding Pederneira-Leiria were considerably depleted because a large amount of timber was lost every year.[86]

The Portuguese Treasury Council interfered in this matter, as they sought to protect and develop forested areas in Portugal, although not always with good outcomes. Several ministers were assigned to this task during the years studied here. In 1626, Agostino da Cunha delivered a letter assessing the damages António Mascarenas and others had caused to Virtudes pinewood.[87] The owners of lands within ten leagues of the Tagus River required a dispatch allowing them to cut, to

[84] AHU, CU, Reino, box 5A, folder 20, Almeirim, June 181,626.

[85] AHU, CU, Reino, box 5a, folder 35.

[86] AHU, CU, Reino, box 6, folder 33, April 1634.

[87] AHU, CU, Reino, box 5a, folder 28.

cultivate, etc. their own lands, as the Portuguese kings had priority over these areas for shipbuilding. In 1629, Rui Vaz de la Cerca, an inhabitant of Portoalegre, requested permission to cut some cork oak trees because they were so wide that they were useless and did not allow for growth.[88]

In 1634 Diogo Borges Bandera, an agent appointed by the Monarchy to cut cork oak trees in Coruche, warned that a large part of the cork oak trees devoted to the *Consulado* fleet were burnt. The cork oak trees had been cut in Coruche and other areas of the Santarem district. The Portuguese Treasury Council could not stand such activities because they went against "His Majesty interests" and Afonso Botelho, who had been purveyor in Elvas, was appointed to convey an investigation to clarify the matter.[89] The Councillors intended to find the culprits to punish them in an exemplary manner to avoid similar events. It seems this was not the first time such an event took place in Portugal.[90]

Another practice put in place by the Monarchy to protect and develop the forested areas of Portugal was to reduce lands belonging to the Crown and sell them as arable lands to private individuals with the condition that they must plant and safeguard trees for shipbuilding. These policies were conducted at least from 1627 to 1632, during which time the Crown properties were reduced, partly to fund the military conflict.[91] The "new lands" were called "*sesmarias"*, and the "*sesmeiros"* were those in charge of safeguarding them. Their importance to forestry and timber supply for shipbuilding increased in the following years, reaching a point at which the Crown entrusted the conservation of the forests to them. A Committee—*Junta dos Pãos*—was set up, made up of Jerónimo de Souto and other ministers that gathered the required information. In September 1631, the King ordered the reduction of his forested areas accordingly to the information provided by doctor Jerónimo de Souto and the Portuguese Treasury Council based in Lisbon.[92] The Portuguese government was somewhat sceptical of implementing such a measure, thus the King confirmed it twice some months afterwards.[93]

Moreover, the sovereign requested information about the forested areas of Almeirim because he was interested in transferring them to private owners.[94] The *monteiro-mor* described the flatlands (*chans* or *chãos* in Portuguese) of Almeirin and the surrounding areas. The area had a width of two leagues and Philip IV's predecessors had reserved it as a *coutada*, because it was located close to the Tagus River. However, not all the lands belonged to the Crown and the King reached an agreement with local inhabitants by which they could use them for their livestock. In the north of the sierra of Sintra there was plenty of stone pine that Jeronimo Soto

[88] AHU, CU, Reino, box 6, folder 17.

[89] AHU, CU, Reino, box 6, folder 35, September 1634.

[90] AHU, CU, Reino, box 7, folder 32, January 1635.

[91] On August 101,628, the Marquis of Castel-Rodrigo was permitted to sell these properties belonging to the Crown to sustain the military conflict in India. AGS, SSP, lib. 1.521, ff. 6v-7r, 11r-v; BA, Ms. 51-X-3, ff. 27r-29r.

[92] BA, Ms. 51-X-3, f. 27v.

[93] BA, Ms. 51-X-3, ff. 27v-29r. It was repeated again in July 1632, f. 30r-v.

[94] BA, Ms. 51-X-3, ff. 23v-24r, July 111,632.

had planted.[95] The Crown argued that this action was performed because there was a lack of timber for shipbuilding, and the wood was easy to transport due to its proximity to the Tagus River. To strengthen his letter the *monteiro-mor* attached a map illustrating all the information he had provided. He was utterly opposed to transforming these lands into *sesmeria*.

This decision was resisted by other officers, who claimed that the *couteiros* and *monteiros* looked after the Kings' interests better than the municipalities and *sesmeiros*. The latter were regarded as enemies of the Crown, at the same level as farmers and fires. During 1632 and 1633 fires had spread through the forested areas due to the carelessness of the municipal authorities; therefore, it was necessary to recover jurisdiction over the forested areas for the *couteiros* and *monteiros*.[96]

Consequently, the Crown shifted the jurisdiction of the forested areas to other Ministers to maintain better control. The decision was probably taken in both the Madrid and Lisbon courts, although the former had the last word. This measure significantly disrupted the traditional order that had been upheld in Portuguese forestry for a long time. Multiple explanations can be given that reflected the incapacity of the Monarchy to both ensure timber supply for shipbuilding and halt growing deforestation in Portugal. The latter was caused by various factors, such as shipbuilding activity, the carelessness of ministers, particular interests, or an insufficient number of people in charge of protecting forested areas. The Monarchy was concerned not only with the quantity of the forests, but also with the quality of the timbers used in shipbuilding.

## 6 Assessing Portuguese Timber Quality for Shipbuilding

In 1624–1625, Madrid was concerned about the quality and measurements of timber used in Portugal for shipbuilding. The use of high-quality timber was essential because it made a huge difference in Portugal's performance in military conflicts. The research conducted by Filipe Castro concludes that the ships constructed in Portugal at the beginning of the seventeenth century for Cape shipping were made of small and thin timbers. The local tree species seemed to be less competitive than foreign species, especially those of Northern Europe, so the Monarchy sought to reverse this situation.

In 1624, mule drivers came from La Sierra de Cuenca carrying pinecones to be planted in Portugal, in the forested areas (*coutadas*) belonging to the Crown. In April, the *monteiro-mor*, along with the local *monteiros* and local inhabitants with expertise in trees, planted 10 *sacas* (sacks/bags?) in Salvaterra. In Leiria, the chief magister, along with Manoel de Brito e Meneses, planted pinecones in the King's pinewoods. In Almeirim, Jerónimo de Souto oversaw planting, whereas Agostinho da Cunha de Vilasboas was responsible for the pinewoods of Azambuja and Virtudes.

[95] See below for further information about this process.

[96] BA, Ms. 51-VI-3, ff. 297r-300r, May 1634.

Even in Sintra, a place where forested areas were not devoted to shipbuilding, the chief magister Gaspar Cardoso carried out similar measures.[97]

Furthermore, trees cut down in Leiria and Pederneira were cut afterwards into smaller pieces, because they were larger than the vessels that would transport them from Pederneira to Lisbon. The King ordered the Portuguese Treasury Council to determine whether it was convenient to construct larger caravels to ease the transportation of trees in a single piece (Mauro 1983, p. 50).[98] The ensuing year, Manuel Gomes de Pederneira, at that time timber factor for the King, reached an agreement with two shipmasters of Pederneira. They would construct two caravels to carry timber for four years from the surrounding areas of Pederneira.[99] It seemed they were constructed because the Spanish officer Tomás Ibio Calderón seized two caravels that came from Pederneira that carried timber for shipbuilding to deploy them for Castile's fleet based in Lisbon.[100]

This is perhaps why the research conducted in the field of nautical archaeology showed that there was such a shortage of timber deployed at the beginning of the seventeenth century—that it had been necessary to assemble some of the pieces to make the larger ship components. In addition, in 1634 Tomás Ibio Calderon added another reason, which in our opinion seems to be more relevant in terms of explaining one of the disadvantages of Portuguese forests in comparison with, for instance, the north of Spain. It was connected with the aforementioned overexploitation, which did not allow trees to grow large enough to be suitable for shipbuilding, as Manuel Galego, a shipwright in Lisbon, pointed out in 1628: "the cork oak timbers that are felled today are not long enough to be fastened and connected together as they were in the past…and what is available today is so little that in a few years there will be no more timber to build *naus*" (Castro 2005, p. 155). In the years after, Spanish and Portuguese Ministers carried on cutting trees in Portugal without respecting their natural cycle of growth.

In 1634 the Dutch conquered Paraiba, which reflected the inability of the Spanish Monarchy to continue fighting successfully against the Dutch fleets. This year could be seen as a tipping point for Lisbon shipyards and Portuguese forests. As was done every year around December, the purveyor of the King's warehouses in Lisbon, Vasco Fernándes Cesar, recalled the importance of cutting trees both for constructing and repairing ships. Most of Philip IV's ministers endorsed Vasco Fernandez Cesar's opinion, but not all of them. Tomás de Ibio Calderón, who was probably Olivares' most trusted minister in Lisbon regarding maritime matters, highlighted the inconvenience of constructing ships in Lisbon.

He argued that there were two reasons to not construct *naos* in the shipyards of Lisbon. Firstly, the caulkers and carpenters of the shipyard were not hard workers.

[97] BA, Ms. 51-VI-28, f. 62r-v.

[98] AHU, CU, Reino, box 5 folder 31.

[99] AHU, CU, Reino, box 5a, folder 10. The masters were Cristóvão de Almeida o'Velho, Pedro Ruiz, João Domingues, Cristóvão Dalela, Pêro Fernandes Cascão, Fernão Martins, Pêro do Ruis Machado, António Machado, March 291,626.

[100] AHU, CU, Reino, box 5a, folder 21.

Secondly, the quality of Portuguese timber was not good enough, as it was very short, and it demanded a huge investment to assemble the pieces.

As a result, he proposed the construction of smaller vessels for the Cape shipping using Galician oak (*roble gallego*), as this timber was sturdier and the construction would be more economic.

We cannot be sure if the policymakers followed his recommendation. However, there are two things we know for sure. Firstly, the Count of Miranda (at that time the right hand-man of the governor of Portugal) ordered trees to be cut in Portugal for the construction of two galleons and the repair of one. This order was changed, and he ordered to timbers cut to build one carrack (*nao*), to repair another and to build galleons. For this, there would be selected pines from the pinewoods of Virtudes. Secondly, and for this essay most importantly, it is very likely that the shipyards of Lisbon were not as predominant as before. This was partly due to the quality of timber, which was better in the North of the Iberian Peninsula, and Porto was better connected to Galicia, from where Galician oak could be imported for shipbuilding purposes. The ministers argued over and considered this possibility just some weeks afterwards. They recommended that the two caravels that had been constructed to carry timber from Leiria—Pederneira—be deployed to fetch Galician oak because its timber was more suitable than pine for shipbuilding. The timber was larger and thicker; therefore, it was more appropriate for planks than Portuguese pine planks because these were shorter and narrower, forcing the king to spend time and funds for fastenings and carpenter and caulker works. In addition, the Ministers put forward another argument about Portuguese forests. It would be convenient to import timber to give respite to the King's forested areas.[101]

Consequently, the Portuguese forests were seemingly less competitive than the forests of Northern Spain for shipbuilding purposes. This led to doubts about Portuguese shipyards that caused some ministers to support the idea of moving the production centre to other shipyards like Porto or, at least, to reduce the importance of Lisbon shipyards within the overall shipbuilding effort.

## 7 Where Did the Timber Come From? In Which Fleets Was This Timber Used?

This chapter has highlighted several times the question of timber provenance and which fleets it was used for. Despite the wealth of the primary sources gathered here, it is not possible to accurately provide an amount of timber that was used because there are no reports—or at least I did not find any reports—for after the ships were constructed. On other occasions, the sources consist of reports and orders detailing the required timber, but these do not specify whether the trees were eventually cut or not. Therefore, Table 9.2 must be read carefully because often the collected data provide details for *before* the vessels were launched at sea.

[101] AHU, CU, Reino, box 7, folder 4, January 1635.

**Table 9.2** Timber used for shipbuilding, 1621–1634

| Who cut the tree/ merchant | Constructor | Year | Quantity | Tree species | Provenance | Purpose |
|---|---|---|---|---|---|---|
| Unknown, although the report was done by Roque da Silveira | | 1621 | 6146 trees, 4546 to construct 2 ships, 1600 for repairs | Cork oak | Santarém, Abrantes | To construct two ships in Lisbon and to repair the carrack *Conceição* |
| André Dias Montalvo, *Monteiro-mor* of Santarem | Cristóvão Machado | 1622 | 502 trees | Cork oak | Santarén area | To finish construction of the galleon *São João* in Peniche, and afterwards in Telha (Lisbon) |
| | | End of 1622 (December), | 1100 trees | Cork oak and pine | Ribatejo area and other undetermined areas | Ship components to construct two ships to sail to India |
| | | December 1622 or January 1623 | 3960 trees | "*Madeiras mansas*" (here understood as stone pine) | | Ship components to construct two ships of three decks for *Carreira da India* of 1624 |
| | | December 1622 or January 1623 | 4249 trees | Cork oak (perhaps pine as well, although it is difficult to state due to the document's bad condition) | | To construct two three-deck ships in Lisbon for *Carreira da India* of 1624 |
| | | January 1623 | 450 trees | Stone pine | Benavente and Alcacer do Sal | To repair ships of the Portuguese fleet<br>150 trees for wales, 300 for wales and repairs |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | January 1623 | 1000 trees | Stone pine | Alcacer do Sal and other areas | To construct and repair two ships to sail to India |
| | | 1623 | 460 trees | Cork oak | | To construct a galley in Lisbon, finally used to construct the galleons *Santiago* and *São Filipe* that in 1624 went to India |
| | | 1623 | 1218 trees | Cork oak | | To construct two ships of three decks that would sail to India next year |
| | | 1623 | 262 trees | Cork oak | In Ribatejo area in private lands | To repair the two galleons of Indian's relief |
| João Monteiro was the "feitor", with at least 80 lumberjacks | | End of 1623, beginning 1624 | 6050 trees | Cork oak | Santarem | 5200 to construct two three-deck galleons for 1624 or 1625 *Carreira da India*; 850 for repairs |
| | | December 1623–January 1624 | Around 3400 trees | Pine, probably maritime pine | Leiria municipality | For several components such as "*apostiças*" (*apostura*, top timbers) and "*mesas de guarnição*" (¿channel?) |
| | | January 1624 | Undetermined | | Santarém area and other places | To construct two ships to sail in 1625 to India |
| Agostinho Diaz committed to construct 2 carracks | | January 1624 | 500 trees | Stone pine | Coruche | To construct two ships to sail to India in 1625 |

(continued)

**Table 9.2** (continued)

| Who cut the tree/ merchant | Constructor | Year | Quantity | Tree species | Provenance | Purpose |
|---|---|---|---|---|---|---|
| It is difficult to assert that this one was not within the above timber | | 1624 | | | Around Leiria | In 1624 Manoel Luis transported timber from Pederneira to Lisbon. 39 dozen planks (pine), 77 beams, three pumps, two channels? (*mesas de guarnição*) |
| | | 1624 | 450 trees | Cork oak or oak | Muge | To launch the ships and stern grids |
| | Baltasar de Maia and Fernão Alvares (*asentistas*) | 1624 | Around 1000 pine trees | Pine | | To construct the hull of two galleons in Porto |
| | | December 1624 or January 1625 | 5403 trees | Cork oak | | To construct components for two ships of 3 decks |
| | | 1625 | More than 1000 trees | Probably cork oak | | To repair a ship |
| | The Portuguese government agreed the construction of two ships devoted to sail to India with Feliciano Monteiro and Duarte Correa | 1625 | | Cork oak and pine | Leiria pinewood | Shipbuilding |
| Pedro de Viera carried tree | | | | | Probably Santarem area | He carried timber to construct "*uma barcasa*" (small ship) |
| | | 1625 and previous years | Undetermined | | Coutos de Alcobaça | It seemed that during early 1620s, every year it was transported timber from the forests (coutos) de Alcobaça to Pederneira |

| | | | | | | |
|---|---|---|---|---|---|---|
| Agostinho Diaz was in charge of the construction of pine in Melides | | 1626 | | Cork oak and pine | Some pine from Melides | It was deployed to construct two galleons above 500 tonnes in Seixal for the *Carreira da India* of 1627 |
| Agostinho Diaz | | 1626 | Up to 1500 trees | Pine | Alcacer do Sal's pinewood | To construct wales and stern planks for two new ships |
| | | 1626 | 4000 trees | Cork oak | Santarem | To construct two galleons of Portuguese fleet |
| Agostinho Diaz in charge of constructing two Indian-going ships | | 1626 | 5480 trees | Cork oak | | To construct two ships that would sail ensuing year to India |
| | | 1626 | 1000 trees | Cork oak | | To repair two ships |
| Manoel Gomes Pereira | | 1626 | | Pine | Surrounding area of Pederneira | Trees were cut during February Wanning moon for Consulado's fleet. In addition, there were constructed 2.200 deck beams (*latas de repartição*) for both Indian and Portuguese fleets |
| Simão Alvares da Costa | | 1626, February waning moon | | | Batalha | |
| Pedro Leieira was factor of cork timber | | 1626 | | Cork oak | Santarém, or surrounding areas | Trees were cut to construct two carracks for India |

(continued)

**Table 9.2** (continued)

| Who cut the tree/ merchant | Constructor | Year | Quantity | Tree species | Provenance | Purpose |
|---|---|---|---|---|---|---|
| Agostinho Diaz, factor of pine trees | | 1626 | 80 trees | Stone pine | Priorato do Crato | For lateral planks |
| Agostinho Da Cunha | | 1626 | | Cork oak | Surrounding areas of Santarém | To construct two carracks for India |
| Francisco Coutinho, master of King's woods | | End of 1626, beginning of 1627 | | Cork oak | Santarém, in Saint Francis monastery lands | To construct galleons in Seixal |
| | | 1628 | | | Obidos | To repair Indian-going ships and the Portuguese fleet |
| | | 1628 | | Stone pine | Coruche | To construct wales and lateral planks for carracks and galleons |
| | | 1628 | 300 trees | Cork oak | Muge | To launch the carrack *Santissimo Sacramento* into Tagus river |
| Manoel Gomes Pereira | | 1628 | | Probably pine | Leiria's area | King's fleets |
| | | 1629 | 400 beams (vigas) | ¿oak? | Santarem area | To construct in Lisbon the new carrack next year that would sail to India |
| | | 1630 | 120 trees | Cork | | To finish the construction of galleon *Nossa Senhora da Batalha* next year that will sail as flagship in the Portuguese fleet |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 1630 | 120 oaks trees, undetermined pine | Pine and oak | Muge and Almeirim | To construct and repair ships of *Carreira da India* |
| | | 1630 | 500 trees | Cork oak | | To repair two ships belonged to the castile fleet |
| | | 1630 | 390 trees and undetermined for ship components | Cork oak | | For the ships of *Carreira da India* |
| | | 1630 | 6590 trees | Cork oak | | 4500 to construct a four-deck carrack, 2090 to repair two carracks of three decks |
| | | 1631 | 3000 trees | Cork oak | | To construct the carrack *Nossa Senhora da Saude* and to repair another of the *Carreira da India* |
| | | 1631 | Undetermined | Cork oak | | To repair the galleons of the Portuguese fleet |
| | | 1632 | 3200 trees | Cork oak | Areas closed to Tagus River | Ship components of the new galleon |
| | | 1632 | 1400 trees and undetermined for ship components | Stone pine | Ribatejo area | To construct the new galleon |

(continued)

**Table 9.2** (continued)

| Who cut the tree/ merchant | Constructor | Year | Quantity | Tree species | Provenance | Purpose |
|---|---|---|---|---|---|---|
| | | 1632 | 1000 trees and undetermined for ship components | Maritime pine | Pederneira area | To construct the new galleon |
| | | 1633 | | Cork oak | Santarém | |
| | | 1633 | Around 1000 trees | Stone pine | Alcacer do Sal | To construct two carracks |
| | | 1634 | | Cork oak | Benavente and surrounding areas of Muge river | To construct two ships for *Carreira da India* and to repair those of the Portuguese fleet |

Sources: AGS, SSP, lib. 1.521, f. 63r, AHU, CU, Reino, box 3, folder 77; box 4a, folders 10, 12; box 5, folders 8, 53, 69; box 5a, folders 1, 4, 11, 14; box 6, folder 33; BAHMOP, MMR, nucleo 9

The table shows orders issued by the Portuguese government to the *monteiro-mor*, which gave him permission to cut the trees detailed in the attached report by the purveyor general of the warehouses. Sometimes we found the report, in other occasions we could not locate it. The table also includes other less significant references stored in the Arquivo Histórico Ultramarino and Archivo General de Simancas (orders, reports, royal decrees).

In addition, this does not include all the information quoted throughout the text because often the ships were constructed in Porto, Peniche, or other shipyards apart from Lisbon. Besides, we cannot ensure in absolute terms that all the timber described below was used only in the Lisbon shipyards. Perhaps some of it—particularly the pine from Leiria exported through Pederneira—was transported to Peniche or Porto.

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