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# Merchant Shipbuilding in Late-Colonial Brazil: The Evidence for a Substantial Private Industry<sup>1</sup>

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SHAWN W. MILLER

Like most Europeans who first touched American shores, Brazil's Portuguese discoverers had eyes that were keen for gold. But stumbling upon the Brazilian coast in 1500—a fortuitous accident en route to India—they could see little more than a thick curtain of coastal forest. The forest's extent and density were so overwhelming that it required some effort on the part of the seafarers to see the trees for the forest. But as gold was not found lying about, nor even adorning the natives, subsequent Portuguese arrivals were forced to focus more closely on what was obtainable. Brazilwood, one conspicuous tree valued as a dyewood, became the region's first exportable commodity, giving the colony economic birth and christening it Brazil.

Over the course of the sixteenth century, the Portuguese colonized these forested lands, in large measure to defend brazilwood from foreign interlopers. As they cleared the forests for their initial experiments in New World tropical agriculture, they considered individual trees more closely, and through native instruction and frequent experimentation, they discovered among Brazil's timbers those superbly suited for building ships. The region's timbers grew larger than those in temperate forests, an advantageous property for building large vessels. In quantity, Brazil's forests exceeded Europe's combined reserves, and, in quality, the wood was unsurpassed—even, according to many reports, by teak.<sup>2</sup>

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<sup>1</sup> I thank the John Carter Brown Library, the Tinker Foundation, and Brigham Young University for their support during the research and writing of this article. Original orthography in colonial titles and quotations has been maintained.

<sup>2</sup> Charles R. Boxer notes three Portuguese viceroys in India in the early-eighteenth century who preferred Brazilian ships in the India trade due to their fine timbers and longevity. Charles R. Boxer, *The Portuguese Seaborne Empire, 1415-1825* (London: Hutchinson, 1969), 210. Studies examining Brazil's timber include F.W.O. Morton, "The Royal Timber in Late Colonial Bahia," *Hispanic American Historical Review* 58



From the middle of the seventeenth century, royal colonial shipyards utilized Brazil's timbers in the construction of some of the largest ships of the period (see Figure 1). As one early example, under royal contract, Governor Salvador Correia de Sá e Benavides launched the galleon *Padre Eterno* in 1663 at Rio de Janeiro, which was described at the time as the ocean's greatest marvel.<sup>3</sup> Until the end of the colonial era, the Crown continued to build *naus* and frigates, as well as a few cargo *charruas* and smaller coastal guards.<sup>4</sup>

This article proposes that shipbuilding in colonial Brazil was not limited solely to royal enterprises. The private construction of large merchant vessels was common by the end of the eighteenth century and indicative of the colony's potential for self-sustained economic development. Just like the royal yards, Brazil's private shipyards, which were found even in the colony's minor ports, built some of the Atlantic's largest and most durable vessels. It is probable that Brazilians were the primary builders of Portugal's merchant fleets by the end of the eighteenth century, if not earlier. Brazil's shipbuilders made an important contribution to the colony's total

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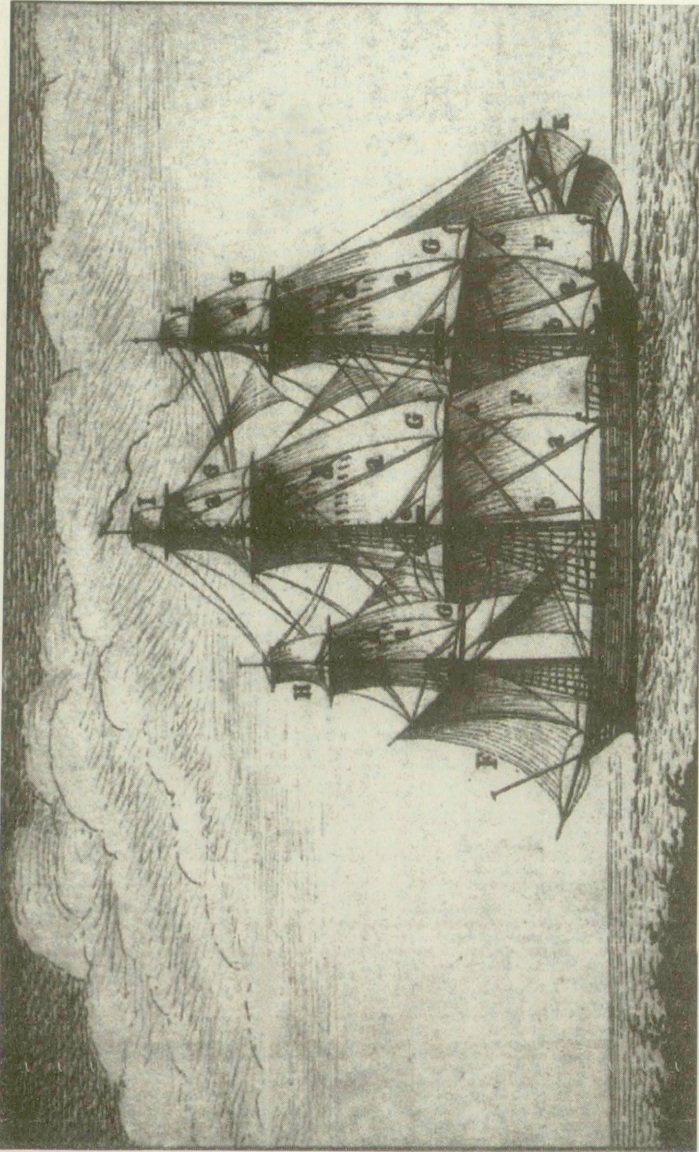
(1978):41-61; Lucy Maffei Hutter, "A madeira do Brasil na construção e reparos de embarcações," *Revista do Instituto de Estudos Brasileiros* 26 (1986):47-64; and Shawn William Miller, *Fruitless Trees: Portuguese Conservation and Brazil's Colonial Timber* (Stanford: Stanford University Press, 2000). On deforestation, see Warren Dean, *With Broadax and Firebrand: The Destruction of the Brazilian Atlantic Forest* (Berkeley: University of California Press, 1995); Roberta M. Delson and John Dickenson, "Conservation Tendencies in Colonial and Imperial Brazil: An Alternative Perspective on Human Relationships to the Land," *Environmental Review* 8 (1984):271-83; and Larissa V. Brown, "Urban Growth, Economic Expansion, and Deforestation in Late-Colonial Rio de Janeiro," in *Changing Tropical Forests: Historical Perspectives on Today's Challenges in Central and South America*, ed. Harold K. Steen and Richard P. Tucker (Durham: Forest History Society, 1992), 165-75.

<sup>3</sup> Charles R. Boxer, *Salvador de Sá and the Struggle for Brazil and Angola, 1602-1686* (reprint; Westport, Conn.: Greenwood Press, 1975), 307-09, 329-32. Prior to this, Salvador de Sá had built at least one large ship, the *Candelaria*, on the island of Ilha Grande at a cost of 14,400 *mil-réis*. That event was used as evidence both for and against establishing a royal shipyard in Rio de Janeiro. See Virgínia Rau and Maria Fernanda Gomes da Silva, eds., *Os manuscritos do arquivo da casa de Cadaval respeitantes ao Brasil*, Acta Universitatis Conimbrigensis (Coimbra, Portugal: Atlântida, 1955), 1:424-29.

<sup>4</sup> A *nau* was a galleon or armed merchant ship. A *charrua* was a large, bluff-bowed cargo vessel, probably built on the pattern of the Dutch *fluit*, which has been anglicized as flyboat.



Figure 1



An eighteenth-century Brazilian frigate of thirty-six guns. This warship was of comparable size to many of Brazil's merchant ships. Biblioteca Nacional, Rio de Janeiro, Seção de Manuscritos, I-13, 1, 41.



economic production, although contemporary export statistics universally failed to include colonial-built ships in their accounting. This work contributes to the recent historiography that diversifies Brazil's colonial economy.<sup>5</sup> Extensive private shipbuilding in the colony challenges the long held "plantationist" perspective that maintains that any economic activity outside the estates of tropical agriculture must have been small and, hence, inconsequential.<sup>6</sup>

The historiography of shipbuilding in Brazil has, almost without exception, overlooked private efforts to build merchant ships in the colony.<sup>7</sup> Authors have either denied the enterprise any existence whatsoever or have written off the few references to private yards on the assumption that colonials did not build vessels intended for overseas trade but rather limited themselves to small coastal traders, like launches and schooners.<sup>8</sup>

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<sup>5</sup> Bert J. Barickman, *A Bahian Counterpoint: Sugar, Tobacco, Cassava, and Slavery in the Recôncavo, 1780-1860* (Stanford: Stanford University Press, 1998); Catherine Lugar, "The Merchant Community of Salvador, Bahia, 1780-1830" (Ph.D. diss., State University of New York at Stony Brook, 1980); João Luís Riibeiro Fragoso, *Homens de grossa aventura: acumulação e hierarquia na praça mercantil do Rio de Janeiro, 1790-1830* (Rio de Janeiro: Arquivo Nacional, Orgão da Ministério da Justiça, 1992); and Stuart B. Schwartz, *Slaves, Peasants and Rebels: Reconsidering Brazilian Slavery* (Urbana: University of Illinois Press, 1992), Chap. 3.

<sup>6</sup> See Barickman, *A Bahian Counterpoint*, 1-2.

<sup>7</sup> The exception is F.W.O. Morton, who briefly notes that private vessels were built in Bahia for both coastal and overseas trade in the eighteenth century. F.W.O. Morton, "The Conservative Revolution of Independence, Bahia, 1790-1840" (Ph.D. diss., Oxford University, 1974), 43-44.

<sup>8</sup> A number of authors have examined royal shipbuilding in Brazil. See José Roberto do Amaral Lapa, *A Bahia e a Carreira da Índia* (São Paulo: Companhia Editora Nacional, 1968), and the final chapter of his *Economia colonial* (São Paulo: Editora Perspectiva, 1973), 231-78, which documents the construction of the *Nossa Senhora da Caridade*, built by the Crown in Bahia in the 1750s. Luís Cláudio Pereira Leivas, Levy Scarvada, and Juvenal Greenhalgh examine the royal yard at Rio de Janeiro. See Luís Cláudio Pereira Leivas and Levy Scarvada, *História da Intendência da Marinha*, vol. 1 (Rio de Janeiro: Diretoria de Intendência da Marinha, 1972); and Juvenal Greenhalgh, *O arsenal de marinha do Rio de Janeiro na história: comentário do contra-almirante Alvaro Alberto* (Rio de Janeiro: n.p., 1951). Louis A. Bladgett takes a cursory look at that of Belém. See Louis A. Bladgett, "O desenvolvimento dos estaleiros no Brasil colonial: construção civil no Grão-Pará e Maranhão no século XVIII," *Anais do Museu Paulista* 29 (1979):159-81. Royal shipbuilding is also an important departure in the following works: Heitor Ferreira Lima, *Formação industrial do Brasil: período colonial* (Rio de Janeiro: Editora Fundo de Cultura, 1961); Frédéric Mauro, *Le Portugal et L'Atlantique au XVII siècle, 1570-1670: étude*



Private shipbuilding in the colony has been slighted for at least two notable reasons. First, unlike the better-documented royal yards, the private builders left little direct evidence regarding the nature of their operations.<sup>9</sup> José Roberto do Amaral Lapa, who has produced an extensive inquiry into the royal yard at Bahia, raises the question of the private yards' contributions to Portuguese shipping. He concludes that—other than a "vague" authorization in 1776 by the marquis of Pombal, Sebastião José de Carvalho e Mello, permitting the import of materials for the building of two private ships—"we have not turned up in our studies, regarding the construction of vessels destined for oceanic crossings, any notable constructions on the part of private initiative."<sup>10</sup> The scarcity of direct, institutional evidence that has created this historical blind spot has required considerable sifting through a broad variety of potential sources.

Secondly, some have dismissed private shipbuilding in the colony on the assumption that such a sophisticated enterprise requiring significant capital outlays, a wide variety of imported materials, and scarce skilled labor could not have flourished in a dependent colony with little capital formation and where the Crown,

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*économique* (Paris: S.E.V.P.E.N., 1960), 38-49; António Marques Esparteiro's multi-volume, *Três séculos no mar, 1640-1910* (Lisbon: Ministério da Marinha, 1974-1987); Corcino Medeiros dos Santos, *Relações comerciais do Rio de Janeiro com Lisboa, 1763-1808* (Rio de Janeiro: Tempo Brasileiro, 1980), 102-13; Arthur Jaceguay, *Quatro séculos de actividade marítima Portugal e Brasil* (Rio de Janeiro: Imprensa Nacional, 1900); Marieta Alves, "O comércio marítimo e alguns armadores do século XVIII, na Bahia," *Revista de História* 31 (1965):133-42, and 34 (1967):91-98; and Prado Maia, *A marinha de guerra do Brasil na colônia e no império tentativa de reconstituição histórica* (Rio de Janeiro: José Olympio, 1965). For the variety and history of Brazil's smaller craft, see Admiral António Alves Câmara, *Ensaio sobre as construções navaes indígenas do Brasil*, 2d ed. (São Paulo: Companhia Editora Nacional, 1937).

<sup>9</sup> This researcher has not encountered a single document produced directly by the private shipbuilding industry until the third quarter of the nineteenth century. See Mapa of the Sete de Setembro shipyard at Itapagipe, Bahia, 16 April 1867, Arquivo Público do Estado da Bahia, vol. 4,603, fol. 140, which lists twenty employees, eleven of whom were slaves. As will be seen, however, Crown licenses to build private ships are extant for Bahia from 1791.

<sup>10</sup> The original wording is: "não se nos depararam, em nossas pesquisas, no tocante à construção naval de embarcações destinadas à travessia oceânica, realizações de vulto por parte da iniciativa particular." Amaral Lapa, *Economia colonial*, 235-36. Unless otherwise indicated, all translations are by the author.



after all, generally frowned on manufacturing of any kind.<sup>11</sup> Some have assumed that the Crown wanted to control shipbuilding as a strategic sector of the economy, which is why the king monopolized all ship timber resources. Others have cursorily asserted that Brazilians had no "cultural imperative" to build ships as did British Americans.<sup>12</sup> It has also been noted that planters, with whom the Crown's interests generally coincided, also opposed local shipbuilding as a competitor for timber resources. Some of these arguments have been proffered to explain the Crown's own poor record of building ships in the colony. Hence, when documents do refer to private yards, in which no indication of the nature or scale of the industry is generally provided, scholars have supposed them to be of little consequence.

Many of these assumptions, however, have proven incorrect. Regarding local capital, colonial merchants did buy shares in merchant ships, and Bahian merchants controlled the ships of the slave trade to the Mina Coast in the Gulf of Guinea from the beginning of the eighteenth century. Rae Flory notes that of the nineteen ships licensed to trade with the Mina Coast in 1705, all but three were owned by "men easily identified as Bahian merchants...whose residence and activities in Bahia can be traced over a relatively long period of time."<sup>13</sup> As early as 1697, Bahian merchants held shares in vessels trading with Lisbon as well. By the late-eighteenth century, colonial merchants had increased their participation in freighting merchandise to Europe. According to Catherine Lugar, in the last quarter of the eighteenth century Bahia's

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<sup>11</sup> Caio Prado, Jr., denies that any large shipbuilding was accomplished in Brazil, even by the Crown. See Caio Prado, Jr., *The Colonial Background of Modern Brazil*, trans. Suzette Macedo (Berkeley: University of California Press, 1967), 251-52.

<sup>12</sup> See Boxer, *The Portuguese Seaborne Empire*, 211; Amaral Lapa, *Bahia e a Carreira*, 235-36; Shawn W. Miller, "Fuelwood in Colonial Brazil: The Economic and Social Consequences of Fuel Depletion for the Bahian Recôncavo, 1549-1820," *Forest & Conservation History* 38 (1994):190; and David Bushnell and Neill Macaulay, *The Emergence of Latin America in the Nineteenth Century*, 2d ed. (New York: Oxford University Press, 1994), 146-47.

<sup>13</sup> Rae Jean Dell Flory, "Bahian Society in the Mid-Colonial Period: The Sugar Planters, Tobacco Growers, Merchants, and Artisans of Salvador and the Recôncavo, 1680-1725" (Ph.D. diss., University of Texas at Austin, 1978), 247, 252.



merchants plausibly controlled more than half of the ships trading to Lisbon, owning a total of eighty-eight vessels.<sup>14</sup>

The situation was similar in Rio de Janeiro. Between 1800 and 1816, notaries registered the sale of 430 ships in the port of Rio. João Luis Ribeiro Fragoso demonstrates that some Rio merchants had fortunes in excess of 100,000 *mil-réis* and were on average considerably wealthier than planters in the region. A number of them owned ships. For example, Antônio dos Santos, who at his death had a fortune of 97,000 *mil-réis*, had invested 59 percent of his net worth in ships.<sup>15</sup> As elsewhere in the Atlantic, shipowners only bought shares in ships, sometimes as small as 1.5 percent. This not only permitted the less wealthy to invest but also diminished the financial risk.<sup>16</sup>

That merchants in Brazil had acquired enough capital to purchase large merchant ships, of course, does not prove that such ships were built in Brazil. To respond to the existing demand, local shipbuilders needed both the freedom to build and access to the *madeiras de lei*—the colony's superior ship timbers—which the Crown had monopolized on both public and private land in the middle of the seventeenth century. In reality, merchant builders had both. While placing its interests first, the Crown did not oppose private shipbuilding and occasionally even promoted it, particularly under Pombal. In 1757, Pombal granted merchant ships built in Rio de Janeiro, Bahia, and Pernambuco a *preferencia*, which was held indefinitely by Brazilian shipowners, and for a full year by those living in Portugal who had their ships built in these Brazilian ports. In 1776, the Crown permitted Brazil's shipbuilders to import—duty free—those goods which Brazil itself did not produce, including iron, cordage, copper, tar, pitch, oakum, sail cloth, and other necessities.<sup>17</sup>

<sup>14</sup> The breakdown is eight ships, thirty-seven corvettes, forty smacks, and three *galeras*. Lugar, "The Merchant Community of Salvador," 67-68.

<sup>15</sup> Fragoso, *Homens de grossa aventura*, 261, table 15:9, and 275, table 17:1.

<sup>16</sup> Ralph Davis, *The Rise of the English Shipping Industry in the Seventeenth and Eighteenth Centuries* (London: MacMillan, 1962), 82-84. Shares were fractions ranging from fourths to sixty-fourths.

<sup>17</sup> Alvará, 12 November 1757, catalogued as *Eu el rey, faço saber aos que este alvará com força de ley virem...* (Belém, Portugal: Impressor Miguel Rodrigues, 1757), John Carter Brown Library (hereinafter cited as JCB). The order does not state what the *preferencia* was, but it is likely that it was an exemption from port taxes. Provisão, 9 May 1776, Instituto Histórico e Geográfico Brasileiro, Rio de Janeiro, Arquivo, 2.3.1, fols. 55v-56. From internal evidence it appears that this law



José Joaquim de Azeredo Coutinho wanted the Crown to do more, such as pay bounties to those who would build large merchant vessels in Brazil, as was practiced in England for producers of naval stores.<sup>18</sup> Coutinho also wanted the *madeiras de lei* demonopolized entirely, as it was inefficient and wasteful. However, the Crown had set aside forests for the exclusive use of private merchant builders, most notably those forests between the São Francisco and São Miguel Rivers in Alagoas.<sup>19</sup> While royal support was inconsistent, lacked strong incentives, and the monopoly itself raised the price of timber artificially, the Crown put no official obstacles in the path of private shipbuilding.

Lastly, the planters did not oppose shipbuilding per se, by the Crown or by private interests. What they opposed was the Crown's cutting of monopolized ship timbers on their own lands and the official tendency to commandeer private oxen, oxcarts, and boats to haul timber to the royal yard during the sugar harvest. After 1715, when the Crown moved timber operations away from the sugar zones to the southern *comarca* of Ilhéus, engaging non-plantation sources of transportation, the numerous complaints about the royal yard in Salvador appear to cease.<sup>20</sup>

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originated in 1753—before Pombal—as the provision refers to a similar law in that year.

<sup>18</sup> José Joaquim de Azeredo Coutinho, *Ensaio economico sobre o commercio de Portugal e suas colonias offericido ao serenissimo principe da Beira o Senhor D. Pedro*, 2d ed. (Lisbon: Typografia da Academia Real de Sciencias, 1816), 124-25, Rare Books and Manuscripts, Nicholas Murray Butler Library, Columbia University, New York, N.Y.

<sup>19</sup> José da Mendonça de Mattos Moreira, "Relação das Mattas das Alagoas," *Revista do Instituto Archeológico e Geográfico Pernambucano* 13 (1908):371-72; this document was originally produced on 20 August 1809, in Alagoas. Even in the fifteenth century, the Crown promoted private building by allowing those who would build large vessels the right to cut timber on all *coutadas* (corporately owned forests) whether held by the Crown or the Church. See Título das liberdades, e franquezas qye ora o Rey da aos que daquy em certo tempo fezerem naaos em estes Reinnos, 4 November 1474, in *Livro vermelho do Senhor Rey D. Affonso V* [1443-1481], in *Collecção de livros ineditos de historia portugueza*, ed. José Corrêa da Serra (Lisbon: n.p., 1792), 3:504-05.

<sup>20</sup> Salvador (Brazil), Diretoria do Arquivo, Divulgação e Estatística, *Cartas do senado* (Salvador, Brazil: Prefeitura do Município, 1951-1962), 3:4-5, 38-39, 42-43, and 5:98-101; Ordem, 5 July 1713, in *Documentos históricos da Biblioteca Nacional do Rio de Janeiro* (Rio de Janeiro: Biblioteca Nacional do Rio de Janeiro, 1929-1955), 53:240; Portaria, 4 October 1714, in *Documentos históricos*, 53:295; Portaria,



Before marshaling the evidence for the private shipbuilding sector, it may be useful for comparative purposes to briefly look at efforts by the Crown to build ships of war in the colony—an endeavor about which historians have provided some detail. Brazil's three royal shipyards at Bahia, Rio de Janeiro, and Belém provided warships and commerce for the seaborne empire, for, unlike the British who feared the potential consequences of building ships of war in America, the Portuguese had no such qualms.<sup>21</sup> According to Heitor Ferreira Lima, however, the colony's most prolific royal yard at Bahia, established in 1655, built no more than forty-six naval vessels destined for service on the high seas: eight *naus*, nine frigates, one corvette, thirteen brigs and schooners, twelve artillery boats (which were probably coastal guards only), and three mail packets. José Roberto do Amaral Lapa includes another eighteen *naus* and frigates in that list. Recent research indicates that at least one more should be added, for a grand total of sixty-five vessels.<sup>22</sup> Bahia's royal yard may have built more large vessels than the documentation permits counting, but because royal ships often took four or more years to complete, few could have been built without a surviving reference. Of course, the raw numbers do not give credit to the important role that the king's yards, especially that of Bahia, played in the maintenance and repair of Portugal's merchant and naval fleets, nor to the contribution Brazil's timber exports made to the royal shipyard in Lisbon.<sup>23</sup>

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8 October 1714, in *Documentos históricos*, 53:301; and Marquis de Angeja to Capitão-mor Teotónio Teixeira de Magalhães, Bahia, 24 July 1715, in *Documentos históricos*, 54:29. It is possible that Portugal's shipbuilders opposed colonial shipbuilding, just as English builders did not like American competition, but this researcher has found no evidence. If such opposition existed, the Crown did not back it with legislation.

<sup>21</sup> Robert Greenhalgh Albion, *Forests and Sea Power: The Timber Problem of the Royal Navy, 1652-1862* (Cambridge: Harvard University Press, 1926), 244-45.

<sup>22</sup> Heitor Ferreira Lima, *História político-econômica e industrial do Brasil* (São Paulo: Companhia Editora Nacional, 1973), 71; and Amaral Lapa, *A Bahia e a Carreira da Índia*, Appendix 1. Amaral Lapa credits much of the data to the then unpublished work of António Marques Esparteiro. Included also is the *São Marçal*, built before 1713, which is noted in Papel do Marquis de Fronteira sobre a necessidade de uma reforma na marinha, Lisbon, 4 November 1713, abstracted in Rau and Gomes da Silva, *Os manuscritos do arquivo da casa de cadaval*, 2:120-21.

<sup>23</sup> It is difficult to quantify timber exports to Lisbon's royal shipyard, but from 1715, with the establishment of royal *feitorias* (timbering operations) in Bahia, it became increasingly important, and by the second quarter of the eighteenth century



Elsewhere in the colony, the royal yards' contribution to shipping is minor. The Crown established Rio's royal shipyard, the *fábrica das fragatas*, in 1666 on a new site at the foot of the Benedictine monastery. Construction began on the royal shipyard's first vessel, the frigate *Madre de Deus*, but both the ship and the yard were abandoned by 1673. The carcass sold for less than half its value, and private builders moved into the facilities.<sup>24</sup> The private yards were still there in 1763 when the viceroy, the marquis of Lavradio, had to remove them in order to reestablish the royal yard as part of the change in Rio's status as the new colonial capital. Despite considerable expenses and improvements, the royal shipyard built only one large vessel, the famed sixty-four gun *São Sebastião*, in 1767. Although not abandoned, the royal shipyard declined thereafter.<sup>25</sup> At Belém in the north, the Crown exploited Amazonian timber for royal ships only after 1761. The yard there, the former Casa de Canoas, fared better than Rio's. It reportedly constructed fourteen large vessels, including one *nau*, five frigates, and four *charruas*, the latter to carry timber to Lisbon's royal shipyard.<sup>26</sup>

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amounted to at least 1 percent of the royal shipyard's timbers, most of it *tapinhoã* plank. See Núcleos extraviados do Conselho da Fazenda e Real Erário, Armazém de Guiné e Índia, Armazém da Ribeira das Naus, Receita do Consulado, 21 February 1722-1731, March 1726, and 1734-1737, Arquivo Nacional da Torre do Tombo, Lisbon, vol. 67, fol. 130 and fol. 136. Between 1796 and 1819, Brazil contributed more than 10 percent of Portugal's timber imports, compared to Portugal's two largest suppliers: Sweden at 25 percent and the United States at 15 percent. However, there is an important error in these figures, as the value of foreign timber imports included the purchase of foreign ships, whereas those for Brazil do not include colonial-built vessels. Eliminating the value of foreign ships places Brazil at or near the forefront of timber imports in the period. See Balança geral do comércio do Reino de Portugal com os seus domínios e nações estrangeiras, 1796-1819, Biblioteca Nacional do Rio de Janeiro (hereinafter cited as BNRJ), Seção de Manuscritos.

<sup>24</sup> Carta régia, 2 January 1666, in Baltasar da Silva Lisboa, *Annaes do Rio de Janeiro* (Rio de Janeiro: Seignot-Plancher, 1835), 4:150-52; and Letter from Conselho Ultramarino to Pedro II, Lisbon, 21 July 1673, in *Documentos históricos*, 87:237-38. Ferreira Lima notes that the *Madre de Deus* was launched, but if so, it was by private builders who purchased it at a bargain price. Ferreira Lima, *História político-econômica*, 76. See also Ferreira Lima, *Formação industrial*, 194.

<sup>25</sup> Greenhalgh, *O arsenal de marinha do Rio de Janeiro*, 22.

<sup>26</sup> Ferreira Lima, *Formação industrial*, 193. The Companhia Geral de Grão-Pará e Maranhão reportedly possessed 124 ships during its lifetime (1755-1777) and had been granted the right to build ships in both Lisbon and Pará, but, except in a few cases, it is not known where they were built. The first two vessels purchased, both



The Crown's colonial yards probably built fewer than one hundred ships. To Portugal's eighteenth-century naval fleets this was a significant figure, as it far exceeded the total of three ships built by the British Crown in America.<sup>27</sup> But from the perspective of the three centuries of the colony's commercial history, it is a small number, and the Crown itself had demanded more.

But what about the efforts by private individuals in Brazil to build ships for overseas trade? In a land of thick forests and antagonistic natives, overland travel was difficult early in the colonial period. Nearly all transport was by sea. In the 1580s, with sugar having surpassed brazilwood in importance, Gabriel Soares de Sousa was able to number the craft negotiating the Todos os Santos Bay at more than 1,400, one hundred of which had keels from ten to sixteen meters. It seems likely that most of them had been built by private initiative in Brazil, as many were too small to make the Atlantic crossing. The Crown had also offered tax exemptions and prizes to those who would build vessels exceeding 130 tons.<sup>28</sup>

Some early colonists thought the construction of large vessels was unfeasible in Brazil, even by the Crown, because of the need to import everything but wood and because of the predominance of the sugar culture, which destroyed shipbuilding timber by clearing forests and consuming firewood. It also appears that the Crown built no large vessels until the 1650s.<sup>29</sup> In his 1612 description of Bahia, colonist

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*galeras*, had their origins in John Bristow's English yards. By 1773, the company began building four vessels in Belém, apparently at the royal yard. See Manuel Nunes Dias, *Fomento e mercantilismo: a Companhia Geral do Grão Pará e Maranhão, 1755-1778* (Belém: Universidade Federal do Pará, 1970), 1:300-03; and Colin M. MacLacklan, "The Indian Labor Structure in the Portuguese Amazon, 1700-1800," in *The Colonial Roots of Modern Brazil*, ed. Dauril Alden (Berkeley: University of California Press, 1973), 220-21.

<sup>27</sup> Albion, *Forests and Sea Power*, 244-45.

<sup>28</sup> Gabriel Soares de Sousa, *Tratado descritivo do Brasil em 1587*, ed. Francisco Adolfo de Varnhagen, 4th ed. (São Paulo: Companhia Editora Nacional, 1971), 163; and Maia, *A marinha de guerra do Brasil*, 14.

<sup>29</sup> Fernão Cardim opposed colonial shipbuilding in the late-sixteenth century on the grounds that it was twice as costly as having ships built in Porto, Biscay, or Germany; cited in Serafim Leite, *História da Companhia de Jesus no Brasil* (Rio de Janeiro: Instituto Nacional do Livro, 1938-1952), 4:163. Brandão claimed in 1618 that he had formerly opposed shipbuilding in the colony but changed his mind when he considered the possibilities of the Amazon where sugar was not grown. Ambrósio



Diogo de Campos Moreno mentioned the galleon *Spirito Sancto*, but it appears that it was actually built in Lisbon. The figures that accompany the description are not what it cost to build the ship but rather an estimate given to the governor of Brazil, Diego de Meneses, of how much it would have cost to build a 400-ton galleon, like the *Spirito Sancto*, in Brazil. This at least demonstrates royal interest in possibly having ships built in Brazil.<sup>30</sup> In the 1630s, the Spanish Crown, which remained sovereign over Portugal until 1640, also expressed its interest by estimating how many galleons could be built annually in each colonial port, but nothing came of it.<sup>31</sup>

During this first half of the seventeenth century, however, private yards were making significant advances. The fact that an estimate could be made at all on a 400-ton galleon suggests that suitable ship timbers, which were enumerated extensively in the estimate, were already in commerce. Portuguese ships were already importing quantities of those shipbuilding materials unavailable in the colony, like iron goods, "very strong sail cloth for ship sails," oakum, tar, and pitch.<sup>32</sup>

During the Portuguese empire's captivity of the Philippines (1580-1640), not only had the Spanish kings (Philip I, Philip II, and Philip III) neglected to maintain the fighting readiness of the Portuguese navy, but the Dutch had been exceptionally successful at capturing Portuguese prizes thereafter—more than 80 percent of Portugal's ships between the years 1647-1648.<sup>33</sup> In response, the Portuguese Crown organized the fleet system in 1649 to defend commerce and ships, and the following year ordered that the colony build His Majesty one galleon of 700-800 tons annually. For the first

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Fernandes Brandão, *Diálogos das grandezas do Brasil*, 2d. ed. J.A. Gonçalves de Mello (Recife: Imprensa Universitária, 1966), 109.

<sup>30</sup> Diogo de Campos Moreno, *Livro que dá razão do Estado do Brasil*, facsimile edition (Rio de Janeiro: Instituto Nacional do Livro, 1968), 43-44. The total figure was estimated at 4,483 *mil-réis*, although we remain unaware of its actual cost in Lisbon.

<sup>31</sup> Papel q̃ se remetio a la junta del padre confessor sobre la fábrica de los nauios del Brasil, in Ministério de Relações Exteriores, *Livro primeiro do govêrno do Brasil, 1607-1633* (Rio de Janeiro: Seção de Publicações do Serviço de Documentação, 1958), 44-48.

<sup>32</sup> The original wording is: "peças de lona muito forte para velas de navio." Ministério de Relações Exteriores, *Livro primeiro do govêrno do Brasil*, 191-92.

<sup>33</sup> Frédéric Mauro, "Political and Economic Structures of Empire," in *Colonial Brazil*, ed. Leslie Bethell (Cambridge: Cambridge University Press, 1987), 51.



time, due to the war with the Dutch, the Crown looked to Brazil to build Portuguese warships. In 1652, it also considered the timber resources necessary for colonial construction and declared monopoly rights over Brazil's exceptional naval timbers.<sup>34</sup> But the count of Castelo Melhor, governor-general in Bahia, did not impose this burden upon an unprepared Bahia, which did not yet have the *Ribeira das Naus* (royal shipyard). Instead, he turned to little São Vicente in the south. Here, he stated, private builders had already launched *naus*—Portugal's famed "Great Ships" that navigated the *Carreira da Índia*. And while São Vicente did not have the tax base to support royal building, which required the governor to channel funds from Rio de Janeiro, private interests at this early date did have the financial wherewithal to build.<sup>35</sup>

As Bahian merchants began to control the slave trade with the Mina Coast by the end of the seventeenth century, private shipbuilders in the Recôncavo provided at least some of the ships engaged in this trade. Licenses to ship tobacco to Africa in exchange for slaves, which are extant for the period 1680 to 1810, confirm more than 1,800 voyages out of Bahia for West Africa. Of these, one can conservatively identify more than six hundred distinct vessels. Although the licenses do not record tonnage, they do record the rig. A considerable number are ships, that is, vessels carrying three square-rigged masts, namely *navios mercantes* (merchant ships, 5 percent), *corvetas* (corvettes, 23 percent), and *galeras*<sup>36</sup> (perhaps a galliot, 7 percent). The remainder consist largely of two-masted *sumacas* (smacks, 25 percent), *brigues* (brigs, 5 percent), *bergantims* (brigantines, 18 percent), *patachos* (pinnaces, 11 percent), and other

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<sup>34</sup> There have been some wild guesses concerning the inception of timber monopolization, but the most likely origin is the *regimento* of 12 September 1652, which appears to be no longer extant. See Ignacio Accioli de Cerqueira e Silva, "Dissertação histórica, etnográfica e política," *Revista do Instituto Histórico e Geográfico Brasileiro* 12 (1849):175. For an examination of other claims see Miller, *Fruitless Trees*, 49-50.

<sup>35</sup> These financial sources certainly came from outside the little captaincy. Conde de Castelo Melhor to Capitão-mor de São Vicente, Bahia, 26 April 1651, in *Documentos históricos*, 1:104. Whether or not São Vicente actually began building for the Crown during this period is unknown.

<sup>36</sup> The galliot, of Dutch derivation, was long and narrow, as the *galera* is often described.



miscellaneous vessels that were smaller than merchant ships but, nonetheless, intended for ocean voyages.<sup>37</sup>

Evidence that some of these were Bahian built is found in an anonymous essay, written about 1790, that describes Bahia's economic history. The author states that "in the earliest times, this African expedition amounted to about twenty vessels annually," and that while these twenty were on the Atlantic, other ships had to be built and fitted out in order to maintain the fleet, something the author chided Bahia for failing to do in recent years.<sup>38</sup> The tonnage of the vessels was probably not great, as slavers tended to be smaller than the average merchant ship.<sup>39</sup> But it is probable that any significant private construction of ocean-going vessels got its start in the colony through the construction of slave ships for the African trade.

Some Brazilian vessels had found markets in Portugal by the end of the seventeenth century. In fact, they held a tax advantage, although an illegal one, as buyers found it possible to evade the duties imposed on ship sales. The 1699 contract for Lisbon's *Passo da Madeira*, or timber customs house, emphasized the contractor's right to collect duties when a Portuguese interest bought a Brazilian ship.<sup>40</sup> It accused those who purchased ships in Brazil, where title was transferred, of celebrating their good fortune "clandestinely" in

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<sup>37</sup> Data concerning the number, types, and names of ships in the Africa trade are taken from the *Alvarás*, *portarias*, and *ordens* found in the APB, Seção Colonial e Provincial, vols. 439 (1680-1702), 440 (1703-1714), 443 (1726-1739), 447 (1740-1767), 449 (1768-1787), and 456 (1789-1810). The years 1715-1725 and 1788 are missing.

<sup>38</sup> The original wording is: "Em os primeiros tempos esta expedição Africana em cada ano andava por vinte navios." Anonymous, "Discurso preliminar, histórico, introdutivo, com natureza de descrição econômica da Comarca, e Cidade do Salvador" [c. 1790], in *Aspectos da economia colonial*, ed. Pinto de Aguiar (Salvador, Brazil: Aguiar & Souza, Livraria Progresso, 1957), 137. The author stated that each ship in the period carried about five hundred slaves, importing collectively about ten thousand slaves annually.

<sup>39</sup> Herbert S. Klein, *The Atlantic Slave Trade* (Cambridge: Cambridge University Press, 1999), 84, 143.

<sup>40</sup> Although often written as *paço* in documents and translated as "palace," *passo* is a more correct rendering. In its most common usage, *passo* means footstep or stride, but it can also mean a narrow passage or entry. It also refers to a timber customs house or a warehouse for timber; colonial warehouses for brazilwood were known as *passos*. See Bernardino José de Sousa, *O pau-brasil na história nacional: com um capítulo de Artur Neiva e parecer de Oliveira Viana*, 2d ed. (São Paulo: Companhia Editora Nacional, 1978), 99.



Lisbon on the ship's arrival, and claimed that the resulting loss in revenue to the king was "very considerable."<sup>41</sup>

Much of the indirect evidence for private building arises out of the competition between the private yards and the Crown for both skilled labor and timber resources. The royal yards built ships inconsistently, and during stoppages their skilled workers, who had often been recruited in Lisbon, slipped away into the private yards to keep themselves in wages. Officials frequently complained. In 1667, not many years after the Bahian yard had been established, Bahia's governor, the count of Atouguia, forced Antônio de Couros Carneiro to return the nine carpenters and caulkers who were engaged in building Carneiro's private vessel in Cairu. Noncompliance must have already been a common problem, as the governor started legal proceedings against Carneiro before he had any evidence that they would not be returned.<sup>42</sup> Again in 1718, the count of Vimieiro ordered back all the *carpinteiros da ribeira* (royal carpenters) who were now found in the private facilities of Passé and on the Ilha do Maré, with the threat that those who did not return within eight days would be imprisoned. But often they did not come, despite threats.<sup>43</sup> When it came to labor, the private yards held a distinct attraction over royal service: high wages, promptly paid. The Crown had a notorious reputation as a delinquent paymaster, and royal wages were lower than in the private sector. Manuel Joaquim José da Cruz warned the Crown that the going wage of 1,200 *mil-réis* per diem offered to administrators of royal cutting operations would have to be doubled if one hoped to attract and keep competent officials in the face of private competition.<sup>44</sup>

Both royal and private yards used slaves for the hazardous drudgery of material handling. Slaves were described carrying

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<sup>41</sup> See the broadside, "Contrato do Paço da Madeira" (Lisbon: n.p., 1699), section 21, JCB.

<sup>42</sup> Ordem, Governor Alexandre de Sousa Freire to Antônio de Couros Carneiro in Cairu, Bahia, 28 June 1667, in *Documentos históricos*, 5:310.

<sup>43</sup> Portaria, Conde de Vimieiro to Capitão Pedro Barbosa de Sousa, Bahia, 10 November 1718, in *Documentos históricos*, 55:131; and José Francisco de Perné to Rodrigo de Sousa Coutinho, Bahia, 23 June 1798, Arquivo Histórico Ultramarino, Lisbon (hereinafter AHU), Bahia, doc. 18,370.

<sup>44</sup> Manuel Joaquim José da Cruz, "Sobre o Regimento para o Corte das Madeiras, [Bahia, 3 October 1818]," in *Legislação florestal*, ed. Paulo Ferreira de Souza (Rio de Janeiro: Directoria de Estatística da Produção de Publicidade, 1934), 80.



massive timbers on their heads and shoulders while chained together.<sup>45</sup> But only the private builders engaged slaves in skilled tasks. The governor of Bahia, Francisco da Cunha Meneses, noted in 1802 that while the king's yard was a bastion of white, skilled labor, the private builders had long trained slaves as carpenters and caulkers. He favored this practice in the king's royal shipyard and recommended purchasing the labor on the Mina Coast. It should not be surprising to find slaves in private shipbuilding, as they were engaged in nearly every kind of skilled art in urban Brazil, but the use of slaves as skilled labor, and the reality of higher free wages for non-slaves, are suggestive of the established character of private shipbuilding and its profitability.<sup>46</sup>

Crown officials also complained that the merchant shipbuilders took the largest trees, which were needed for the king's massive frigates and *naus*, and resawed them for the merchant ships and even smaller coastal vessels. Francisco Nunes da Costa, the inspector of the Royal *Cortes*, protested that

each fells [timber] wherever he likes, which has resulted in the squandering of infinite timbers on merchant ships that ought to have been reserved as pieces of the largest order.<sup>47</sup>

In the 1770s, Luis Caetano de Simões, the previous inspector, noted that private loggers were preparing timbers for five merchant ships under construction at Bahia, which he claimed did no harm to the interest of the king or to royal logging operations. But to assuage the

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<sup>45</sup> They were also portrayed in drawings. See Jean Baptiste Debret, *Voyage pittoresque et historique au Brésil*, 3 vols. (Paris: Firmin Didot Frères, 1834, 1835, 1839), JCB.

<sup>46</sup> Governor Francisco da Cunha Meneses to Visconde de Anadia, Bahia, 10 July 1802, published in *Anais do Arquivo Público do Estado da Bahia* 20 (1932):33.

<sup>47</sup> The original wording is: "Cada um corta por onde quer, e por isso se tem desperdiçado infinitas paus em navios mercantes, que deverao ser reservadas para se empregarem em peças da primeira ordem e grandeza." Francisco Nunes da Costa, Inspetor dos Reais Cortes, to Martinho de Mello e Castro, Ilhéus, 15 October 1785, AHU, Bahia, doc. 11,919; and Marquis de Lavradio to Pombal, 20 July 1773, Arquivo Nacional do Rio de Janeiro (hereinafter ANRJ), codex 69, vol. 2, fols. 86-87.



Crown's concern, he recommended setting aside forests of smaller timbers for use in the private yards.<sup>48</sup>

The identities of private competitors are elusive, but in Bahia their names appear scattered among petitions made to the Intendência da Marinha. Although not always observed, the Crown required private builders to acquire a license. Between 1791 and 1817 the naval intendant granted 122 such licenses to more than ten separate builders, most of whom built at Itapagipe, to Bahia's north, and at Preguiça, just to the south of the royal shipyard. Both locations had "several" yards. Others built at Prainha and Itaparica. Luís dos Santos Vilhena, a significant source for the Bahian economy at the turn of the century, noted in 1802 that there were so many private shipyards around the bay that their enumeration was difficult.<sup>49</sup> The vessels consisted of forty-five smacks, twenty-nine brigantines, nine schooners, sixteen brigs, seven *galeras*, one corvette, and ten others simply listed as ships or *navios*, in addition to a handful of smaller boats. Only six merchant builders built consistently. Among them were José, João, and Jacinto da Costa de Carvalho, obvious relatives who built forty-five, thirteen, and thirteen vessels respectively, and did so on their own accounts and in separate yards. Jacinto Ribeiro de Carvalho (with twenty-four vessels), António Martins de Oliveira (six vessels), and Manoel da Silva Bastos (three vessels) also built throughout the period. And it was later estimated that altogether Bahia's yards employed 8,000 people circa 1810.<sup>50</sup>

It appears that occasionally private builders constructed ships on speculation, suggesting they had been acquiring their own capital, but the majority were built for merchants in Bahia, occasionally in

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<sup>48</sup> Luis Caetano Simões to Governor [Alfonso Miguel de Portugal], Una, 18 December 1779, APB, doc. 3.

<sup>49</sup> Luís dos Santos Vilhena, *A Bahia no século XVIII* (Salvador, Brazil: Editôra Itapuá, 1969), 218.

<sup>50</sup> Registros de petições, Série Marinha, Intendência da Marinha, Bahia, ANRJ, IX-M-98 (1784-1796); IX-M-94 (1799-1802); IX-M-92 (1802-1806); IX-M-23 (1805-1809); IX-M-96 (1810-1812); and IX-M-41 (1812-1818). Licenses to build ships are found randomly throughout the registers, often in bunches and sometimes out of chronological order. João Coelho Gomes may have had an interest in making Brazil's economy in 1810 appear more vibrant than it actually was to support his claim that later trade agreements were to blame for the decline. João Coelho Gomes, *Elementos de história nacional de economia política* (Rio de Janeiro: N.L. Vianna e Filhos, 1865), 16.



Lisbon, and, in one case, in Angola. Initially, it was the merchant ordering the vessel who petitioned for the license, but by the late 1790s, the builders were doing so exclusively on the merchants' behalf. In cases where the vessel was built on speculation, the petitions note that the builder was building the vessel "for himself."<sup>51</sup>

The Crown esteemed the experience of the private builders and frequently solicited their opinions regarding the condition of royal warships. In 1798, ten merchant builders informed the naval intendant that the cost of fixing the *Infante Dom Pedro* in Bahia could not be justified, as it would still have to be sent to Lisbon for final repairs and was likely to sink on the voyage. Strangely, however, while all government officers and most local merchants can be found in Bahia's city directories, the names of merchant shipbuilders never make an appearance.<sup>52</sup>

Private shipbuilding appears to have responded positively to royal promotional efforts. In 1809, the Crown granted shipbuilders a tax break by *alvará* (royal edict): they could import shipbuilding materials at half the tariff imposed on other goods. From the evidence that is available, the 1809 *alvará* seems to have had the desired effect. Between 1800 and 1809, 3.3 licenses were granted on average each year by the Intendency, but from 1810 to 1817 the average rose to

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<sup>51</sup> Registros de petições, Série Marinha, Intendência da Marinha, Bahia, ANRJ, IX-M-98 (1784-1796); IX-M-94 (1799-1802); IX-M-92 (1802-1806); IX-M-23 (1805-1809); IX-M-96 (1810-1812); and IX-M-41 (1812-1818). A couple of the builders appear to have invested in residential real estate, as their names appear in rent payments from the naval intendency. For example, José da Costa de Carvalho collected 17,563 *mil-réis* in 1810, at a rate of 3,840 *mil-réis* per month, for having leased his property at 1304 Rua Direita de São Pedro Velho to the commissary of the *Dom João de Castro*. Registros de petições, Série Marinha, Intendência da Marinha, Bahia, ANRJ, IX-M-96 (1810-1812).

<sup>52</sup> Termos de vistoria, Série Marinha, Intendência da Marinha, ANRJ, IX-M-83. In addition to those named above, others who built merchant ships in Bahia include Manoel Alvarez de Sá, Pedro Francisco de Gálvez, Manoel Ferreira de Carvalho, José Alvarez dos Santos, Manoel Lopes Bagunte, Maximínio da Cruz, José Gálvez de Oliveira Guedes, José Francisco Rodrigues, and João Marques de Lima. A few were master builders employed in the yards of others. *Almanaque da cidade da Bahia* (Bahia: Typografia de Manoel Antônio da Silva Serva, 1812), Instituto Histórico e Geográfico Brasileiro, Rio de Janeiro (hereinafter cited as IHGB). It is possible that, unlike merchants, shipbuilders stood to gain little by subscribing and, thus, being listed in the directory.



eight. This figure, however, may simply reflect higher rates of compliance, as after 1809 licenses secured tax benefits.<sup>53</sup>

Foreign visitors also commented on the private yards in Bahia, particularly those around Itapagipe, supporting claims of a vibrant industry and the relative sluggishness of the king's yard. In his account of his travels, Andrew Grant wrote that

the [royal] dock-yard admits but one ship of the line at a time; and the operation of ship-building appears to be here extremely tedious, as four years, and sometimes longer, are required to complete a sixty-four [gunner]...

but then added that

at Tapagippa [Itapagipe], a short distance from the city, are several private yards, in which merchants' ships of all dimensions are built, and with much greater dispatch, and at less expence, than in the king's yard. These vessels are not only well modelled, but extremely serviceable, from timber possessing the peculiar property of not being penetrable by worms.<sup>54</sup>

He also noted that it was behind the peninsula at Itapagipe that Bahia's best anchorage was found, claiming that the world's entire shipping could anchor there simultaneously.

Likewise, Thomas Lindley, a ship captain imprisoned at Bahia for brazilwood contraband, reported that many British vessels found Brazil a convenient port of call for repairs while en route to

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<sup>53</sup> Alvará, 28 April 1809, in *Coleção das leis do Brasil* (Rio de Janeiro: Typografia Nacional, 1810), 45-50. When the *alvará* was announced, José Antônio Monteiro and Joaquim José de Oliveira were building a *galera* of 114 palms and a brigantine of 105 palms respectively, both at José da Costa Carvalho's shipyard, and sought to acquire the privilege retroactively. Neither of these vessels are found in the petition registers, although both had to prove they had licenses, which suggests the incompleteness of the *registros* as a source. Termos de vestoria, Série Marinha, Intendência da Marinha, Bahia, ANRJ, IX-M-83; and Junta do Comércio, ANRJ, caixa 428, pacote, 1.

<sup>54</sup> Andrew Grant, *History of Brazil, Comprising a Geographical Account of that Country, Together with a Narrative of the Most Remarkable Events which Have Occurred There since its Discovery* (London: H. Colburn, 1809), 205, 214, Church Collection, John Hay Library, Providence, R.I.



India, the South Seas, or the Far East. And he recommended Bahia largely because of the efficiency of its private yards. He advised his readers not to approach the intendant at the royal yard for repairs but to "obtain leave to have private ship-builders, who will dispatch the business with much greater speed, and at half the expence." The royal yards, he opined, with some possible contempt toward his captors, were constantly building strong ships, "but so slowly, that there is no fear of a sudden or considerable increase in their marine."<sup>55</sup>

Private concerns built large merchant ships in other ports as well. Rio de Janeiro lacks Bahia's documentation, but just as Rio surpassed Bahia in timber exportation in the late-eighteenth century, it is possible that the two competed in ship construction as well. In the 1860s, João Coelho Gomes wrote that when João VI arrived in 1808, private facilities lined the bay from Prainha to Saúde and employed 3,000 men.<sup>56</sup> Another British visitor, James George Semple Lisle, who shipwrecked in Brazil in 1797, returned to Britain out of the port of Bahia on a fleet of 115 ships, "most of them very large ships," adding elsewhere that "most ships employed in the Brazil trade are built here [Bahia] or at Rio de Janeiro."<sup>57</sup> Johann von Spix reported that the ports of Recife, Paraíba, and Ceará produced many small vessels but no large ones. But he did tally 118 naval carpenters (36 percent of whom were slaves) at Maranhão taking advantage of the

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<sup>55</sup> Thomas Lindley, *Narrative of a Voyage to Brasil; terminating in the seizure of a British vessel, and the imprisonment of the author and the ship's crew, by the Portuguese. With general sketches of the country, its natural productions, colonial inhabitants, & c. and a description of the city and provinces of St. Salvadore and Porto Seguro. To which are added, a correct table of the latitude and longitude of the ports on the coast of Brasil, table of exchange, & c.* (London: J. Johnson, 1805), 252, 285, 292-93, Nicholas Murray Butler Library, Columbia University, New York, N.Y.

<sup>56</sup> Gomes, *Elementos de história nacional*, 15.

<sup>57</sup> James George Semple Lisle, *The life of Major J. G. Semple Lisle; containing a faithful narrative of his alternate vicissitudes of splendor and misfortune. Written by himself. The whole interspersed with interesting anecdotes, and authentic accounts of important public transactions* (London: W. Stewart, 1799), 293, 298. Luis Pinto da Silva claimed that Bahia's shipyards were responsible for the largest share of Portugal's shipping fleets. See Luis Pinto da Silva to Fernando José de Portugal, Queluz, 22 October 1795, BNRJ, Seção de Manuscritos, I-1,4,8, fol. 231, cited in Morton, *Royal Timber*, 47.



eight meter tides at the port of São Luis.<sup>58</sup> Fernando José de Portugal indicated that few large vessels were actually built at Paraíba because of the lack of good ports and its extensive wave-swept beaches.<sup>59</sup> However, as concerns Recife, some building did occur in the late-eighteenth century. Two parties petitioned the king to recognize their right, granted by the 1776 *provisão*, to import naval goods duty free. One of them, Francisco Gomes Dias, contracted master builder José da Costa "in the shipyards of Recife," to build him a ship (*navio*) of 450 sugar chests, whose name would be the *Senhor Bom Jesus da Boa Hora*. Da Costa was also the builder of the other ship, whose straight keel reached 110 *palmas* (24 meters).<sup>60</sup>

At Belém, it appears that private construction of large vessels did not coexist with the royal enterprise until after the ports were opened in 1808. An anonymous writer in 1816 described how the increase in trade from an average of twelve ships annually before 1803 to more than fifty thereafter gave the private builders an incentive to build merchant ships on their own account.<sup>61</sup> And even in the lightly populated region of coastal São Paulo, shipbuilding was a primary industry in the second half of the eighteenth century. As early as 1711, Cananéia had built a *nau* for the Crown, working under royal officials, but only after 1761 did building large private vessels become regular. In that year, Alexandre de Sousa Guimarães relocated from Rio de Janeiro and established a yard. By 1782, many of his former workers had opened their own shipyards, and the industry boomed, according to the account of a local chronicler:

[Shipbuilders] began to contend with one another, each desiring to demonstrate the work of their own industry. [And] the number of shipyards established in diverse parts of the region was admirable: nobody lost time, and there was no lack of patrons willing to back the enterprise in the hopes of profit. The forests were attacked by successive lumbermen and sawyers, and

<sup>58</sup> Johann Baptist von Spix and Carl Friedrich Philipp von Martius, *Viagem pelo Brasil, 1817-1820* (São Paulo: Edições Melhoramentos, 1960), 2:314.

<sup>59</sup> Fernando José de Portugal to Rodrigo de Sousa Coutinho, Bahia, 27 October 1798. *Anais da Biblioteca Nacional do Rio de Janeiro* 36 (1914):47.

<sup>60</sup> Provisões, Recife, 2 May and 17 September 1782, IHGB, Arquivo, 2.3.1, fols. 49v-55v.

<sup>61</sup> Ensaio econômico sobre o Pará [1816 from internal evidence], fols. 6, 59, JCB.



naval construction reached such a point that there were years in which sixteen shipyards were active.<sup>62</sup>

Affirming these claims, an 1807 British chart (based on a Portuguese chart commissioned in 1800) of what is today southern coastal São Paulo locates eleven private shipyards between Cananéia and Iguape, a distance of only sixty kilometers (see Map 1). At the mouth of the Iguape River, it is noted that the three-masted corvettes built in the region could exit this way but could not return due to the current. And at the entrance to Cananéia the notation states that the "large ships built in these bays and rivers" came and went by this entrance, and corvettes came as well to sail up the natural inland waterway to return to Iguape.<sup>63</sup> Still further south there is evidence of shipbuilding in this period at Paranaguá, where one hundred sawmills were reportedly working and reserves were also marked. Santa Catarina, however, had neither royal nor private yards of any note.<sup>64</sup>

*Lloyd's Register*, which surveyed all ships making British ports, has proven extremely valuable in ascertaining the character, if not number, of Brazil's merchant ships at the end of the colonial period. The place of build was always noted by the underwriters, for

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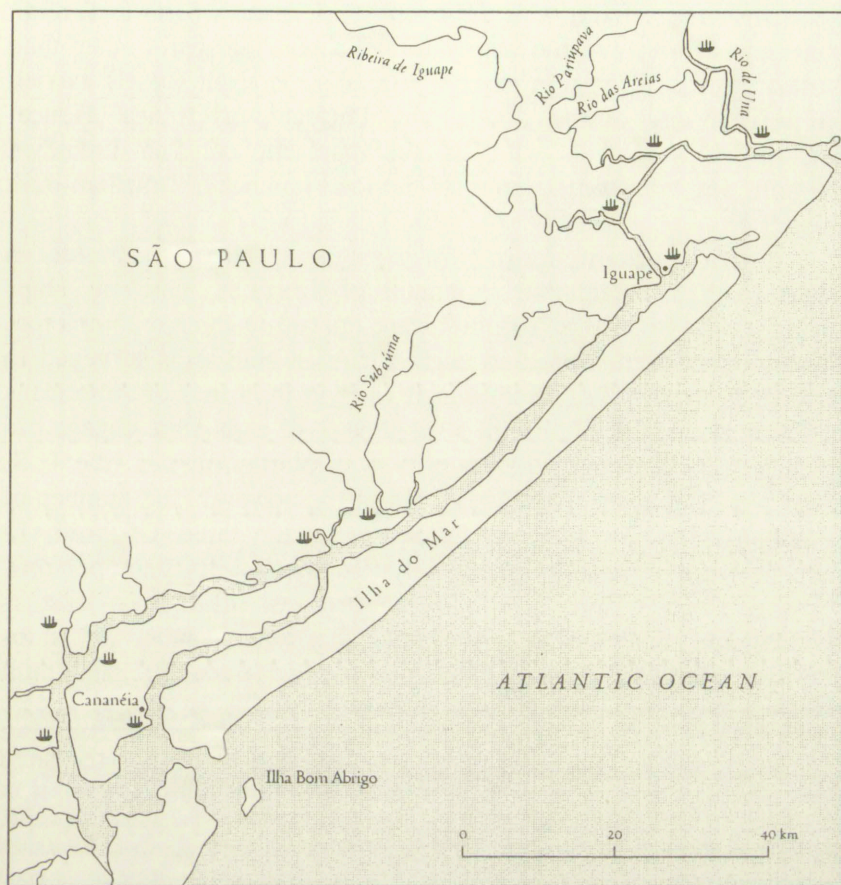
<sup>62</sup> The original wording is: "comeceram como de à porfíia a querer cada um mostrar a obra da sua industria; era entao para admirar tantos estaleiros levantados em diversas partes: nao houve tempo perdido, nao lhes faltou patrono para fiança do intentado lucro; os matos estavao situados de sucessivos cortadores e serradores: aferverou-se a obra naval de tal sorte que houve anno de dezeseis estaleiros." See "Descrição primeira em a qual se tratam os cazos memoráveis acontecidos n'esta villa de Cananéia desde sua creacao até 31 Dezembro de 1787," *Revista do Instituto Histórico e Geográfico Brasileiro* 45:64 (1882):77-96. The author is unknown, but the manuscript was apparently completed in the late 1790s. Tellingly, the storm of 1795 that horrified Cananéia with torrents of water and mud was greeted by loggers and shipbuilders as a windfall: the floods ripped hundreds of trees from the steep hillsides and deposited them within easy access on the river banks and beaches.

<sup>63</sup> See A New Chart of the Coast of Brazil from the Barra de Santos to Guaratuba, London, 1807, in *Charts, West Indies & North & South America, 1789-1809*, Maps and Charts, JCB (see Map 1, which is based on this chart). See also Cópia do Plano que foi adotado pello Exmo. General António Manuel de Melo Castro e Mendonça, Rio de Janeiro, 17 September 1808, BNRJ, Seção de Manuscritos, 7,4,63. These maps also demarcate royal timber reserves, which likely would not have existed if not for serious competition for the resource.

<sup>64</sup> Mariléa Martins Leal Caruso, *O desmatamento da Ilha de Santa Catarina de 1500 aos dias atuais*, 2d ed. (Florianópolis: Editora da Universidade Federal de Santa Catarina, 1990), 29.



## Map 1



Private shipyards in the region of southern coastal São Paulo, c. 1800. Map drawn by author based on *A New Chart of the Coast of Brazil from the Barra de Santos to Guaratuba*, London, 1807, in *Charts, West Indies & North & South America, 1789-1809*, Maps and Charts, The John Carter Brown Library; and two maps produced in the *Revista do Instituto Histórico e Geográfico de São Paulo*, 20 (1915): [after p. 658]. All were apparently based on forest surveys taken by the Portuguese Crown in 1800.



it spoke for or against the ship's overall quality. The combined registers of 1804, 1810, and 1814 list 121 Brazilian-built ships which, of course, do not include Brazilian-built ships trading to ports outside the British Isles. Even with the opening of Brazil's ports to foreign trade after 1808, and the ability to sail directly to ports other than those in Portugal, a large share of Brazil's merchant vessels carried on the majority of their trade with Portugal and Africa. Hence, Brazil's ships trading with Britain represent only an unknown fraction, and a skewed sample, of the total number of Brazilian-built ships.<sup>65</sup>

Unfortunately, *Lloyd's Register* is of almost no value in determining a meaningful minimum of Brazilian merchant ships before 1808, when Brazil's ports were opened to foreign commerce. For example, there were only eight Brazilian-built ships surveyed in English ports in 1804, six of which were in the hands of Americans or Englishmen, judging by their surnames. All eight were engaged in trade outside of Brazil, the majority with North America (the U.S. and Canada) and the West Indies. In 1810, however, the number of Brazilian-built ships surveyed jumped to seventy-three. Of those, 18 percent were owned by non-Portuguese or non-Brazilian persons, showing Brazil's ships had found international markets, at least as second-hand commodities. In 1814, the total number of ships surveyed was seventy-five.<sup>66</sup> Of the seventy-three Brazilian-built

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<sup>65</sup> *Lloyd's Register of Shipping for the Year 1810* (reprint; London: The Gregg Press, Ltd., n.d.); pages are not numbered. *Lloyd's Register* for 1810 consists of 14,020 ships with information regarding their ages, tonnage, and places of build, among other variables. Volumes for the years 1804 and 1814 were also consulted from the same reprint edition. This count, 121, is a minimum, as there are a good number of ships with Portuguese names and Portuguese masters that are listed as being built in "America." Most are North American, but a few are probably South American, and any number could be Brazilian. Consulting intermediate volumes, particularly those after 1808, will turn up more Brazilian-built ships. *Lloyd's Register* began in 1760.

<sup>66</sup> *Lloyd's Register of Shipping for the Year 1810*. In 1865, João Coelho Gomes claimed that Brazil's merchant ships, which were in the port of Lisbon when João VI fled Portugal, came under the command of British Admiral Sidney Smith who took them all, with their cargoes, to London, where they remained until 1810 or 1811. Gomes, *Elementos de história nacional*, 30. I have been unable to corroborate or disprove the assertion. However, while it may help explain why so many Brazilian ships were found in Britain in 1810, it cannot explain why there were as many in 1814. The author, who is biased against England and those who made treaties with



vessels in the 1810 register, the majority are listed as being built in the "Brazils," but six are specifically attributed to Bahia, such as the thirty-two year old *Sara Piqueno*, a ship of 600 tons. The ship *Bom Irmis* of 380 tons, age seven, and the brig *Boa Fé* of 219 tons, whose age is not given, are attributed to the ports of Rio de Janeiro and Maranhão, respectively.<sup>67</sup>

Many Brazilian writers repeated that Brazil's woods were superior for their longevity at sea in comparison to the timbers of other nations. The contribution was largely in hull planking or sheathing. The timbers *putumaju*, *vinhático*, and *oiticica* were renowned for their abilities to resist dry rot and shipworm. Rio de Janeiro's *tapinhoã* was the colony's most coveted planking timber, and by the third quarter of the eighteenth century, the Crown restricted it to the exclusive use of the royal shipyards.<sup>68</sup> *Lloyd's Register* also supports these claims of the high quality and desirability of Brazil's woods.

It is impossible to find the average life span of any nation's ships, for the final deterioration of a vessel was not as readily recorded as its annual comings and goings, or its tragic loss at an early age. However, the average age of a nation's ships is readily determined and can be used for rough comparisons.<sup>69</sup> The average age of all ships built outside of Brazil in 1810 was 11.4. The average age of Brazilian ships, with recorded ages, was 13.8 in 1810 and 15.0 in 1814. However, these figures understate the actual average age of Brazilian ships. First, more than 8 percent of Brazil's ships are listed as "old" compared to only 1 percent of those of other nations. And, second, for the remaining twenty-eight Brazilian ships with a blank in the age column, it is known that all but one were older than a decade,

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her, suggests Brazil's ships were essentially held in London for ransom until the treaty of 1810 could be completed, and he calls the financial losses associated with the stay as "taxes of incarceration."

<sup>67</sup> *Lloyd's Register of Shipping for the Year 1810*.

<sup>68</sup> José de Saldanha, capitão engenheiro [to Crown], Porto Alegre, 30 June and 6 November 1799, ANRJ, cod. 68, vol. 16, fols. 173-74; Carta régia, Lisbon, 1 April 1707, *Anais da Biblioteca Nacional do Rio de Janeiro* 46 (1924):284; and Baltasar da Silva Lisboa, *Riqueza do Brasil em madeiras de construção e carpinteria* (Rio de Janeiro: n.p., 1823). For information on the legislation of *tapinhoã*, see Silva Lisboa, *Annaes do Rio de Janeiro*, 4:154-57.

<sup>69</sup> What is difficult to account for is the relative rate of shipbuilding in previous years.



as they received "E" and "I" (second and third class) ratings rather than an "A" (first class) rating, which was reserved for ships younger than 10-12 years. Class designations are consistent with age, and the average ages for the A, E, and I classes are 6.1, 16.1, and 29.2 respectively. If the average age for each rating is used for those ships labeled "old" and for those with no recorded age, then Brazil's ships average 15.6 years.<sup>70</sup>

Ships built in any locale could last a long time, if fortunate enough to avoid shipwreck and if constantly repaired. But at some point the cost of constant repairs became prohibitive. It is possible Brazilians simply repaired their ships for longer periods, but it seems unlikely. The Portuguese, whose trade, industry, and culture were most like those of Brazil, maintained a merchant fleet with an average age of only 9.0 years (see Table 1).

Brazil's ships were also larger than all other national ships trading with England in 1810, with the exception of Britain's East India ships. Brazil's ships averaged 351 tons compared to those of all other nations at 175. The comparison is not entirely fair, as longer voyages, such as those to Brazil, correlate with larger ships, and many vessels trading with England were on shorter, coastal runs. But vessels not built in Brazil making the long passage between Britain and Brazil were still smaller, averaging only 239 tons. In fact, the largest ship in the 1810 register, which contains more than 14,000 ships, was the Brazilian-built *Gram Careta* at 1,205 tons, surpassing slightly ten of Britain's East Indiamen that weighed in at 1,200. It also exhibited the largest draught at 25 feet. The comparative density of Brazil's timbers was expressed by the fact that in the same tonnage brackets, Brazil's ships drew on average 2.4 feet more water than other ships.<sup>71</sup>

Azeredo Coutinho remarked that in Brazil's better ports "merchants build large ships with large keels" of their own initiative. In the Brazil trade, with its bulky commodities, the larger the ship the greater the profits in freight relative to operating costs, and he suggested that Brazilians build even larger ships.<sup>72</sup> Ships licensed for

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<sup>70</sup> The figures were derived from a data set based on *Lloyd's Register of Shipping for the Year 1810*.

<sup>71</sup> *Lloyd's Register of Shipping for the Year 1810*.

<sup>72</sup> The original wording is: "fazem os negociantes alguns navios de alto bordo e grande quilha." Azeredo Coutinho, *Ensaio econômico*, 96. Ralph Davis notes that by



construction in Bahia between 1791 and 1817 lacked sufficient information to calculate their tonnages, but their dimensions were considerable. The largest exceeded 36 meters (120 feet) in the length of its straight keel, ignoring the additional length of the prow and poop, and reached nearly 11 meters (35 feet) in beam. Only the license for the ship *São Tiago* in 1807 noted tonnage that, upon completion, would exceed 1,000 tons, but no dimensions were provided (see Table 2).<sup>73</sup>

Brazilian builders were succeeding despite the many challenges that tropical timbers and forests presented. Among the most critical was the density of Brazil's timbers. This made the extraction of logs quite difficult as their specific density—particularly of the best framing timbers—was greater than water. Simple rafting down river was out of the question, so more costly and cumbersome techniques were employed—from river navigation by small vessels to rafts with supplementary flotation devices, to overland travel by oxcart. Additionally, these timbers generally did not grow in common stands but were dispersed throughout the forests, making overall logging operations less efficient. While the quality of the timbers remained superior, it was more costly to remove them from the forest.

Possibly the most severe obstacle to merchant shipbuilding was artificial: the Crown's monopoly on Brazil's timbers that applied to both private and public lands. It is not that private shipbuilders were denied access to these timbers, for licenses were not withheld and reserves were set aside. The general underproduction of timbers in Brazil, however, and the timber sector's undercapitalization due to royal restrictions, made the cost of timber relatively high. When the ports finally opened in 1808, the United States reportedly sold timber in Rio de Janeiro for less than the price of local timbers.<sup>74</sup>

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the 1760s, the cost per ton of cargo to feed and pay a crew on a large ship was two-thirds that of a small ship. Davis, *The Rise of the English Shipping Industry*, 73.

<sup>73</sup> Registros de petições, Série Marinha, Intendência da Marinha, Bahia, ANRJ, IX-M-98 (1784-1796); IX-M-94 (1799-1802); IX-M-92 (1802-1806); IX-M-23 (1805-1809); IX-M-96 (1810-1812); and IX-M-41 (1812-1818).

<sup>74</sup> John White, *A Voyage to Cochín China* (Kuala Lumpur: Oxford University Press, 1972), 5; and Augusto de Saint-Hilaire, *Viagens pelo distrito dos diamantes e litoral do Brasil; com um "Resumo histórico das revoluções do Brasil, da chegada de d. João VI à América à abdicação de d. Pedro,"* trans. Leonam de Azeredo Pena (São Paulo: Companhia Editora Nacional, 1941), 366.



**Table 1**  
**Average Age and Tonnage of Ships Trading with Britain**  
**by Place of Build, 1810**

Place of Build	Average Age	Average Tonnage
Brazil (N=39)	13.8*	351**
Britain (N=3,924)	12.6	180
Caribbean (N=56)	12.0	169
Holland (N=466)	12.6	134
India (N=49)	11.7	456
Portugal (N=173)	9.0	130
Scandinavia (N=1,365)	12.0	178
United States (N=1,081)	8.7	225
All Shipping (N=14,020)	11.4	175

\*When this average is adjusted for ships listed as "old" and for those with no recorded age by assigning them the average age of their class rating, the sample size increases to 72, and the average age increases to 15.6.

\*\*N=72

Data compiled from *Lloyd's Register of Shipping for the Year 1810*.



Table 2

Average and Maximum Dimensions of Selected Vessel  
Types Built in Bahia, 1791-1817 (in meters\*)

Type	Straight Keel		Beam	
	Avg.	Max.	Avg.	Max.
Navio (N=10)	29.9	36.3	9.9	10.8
Galera (N=7)	26.2	29.7	7.7	8.8
Brigue (N=16)	23.3	27.5	7.8	8.8
Bergantim (N=29)	19.9	24.6	7.3	7.9
Sumaca (N=45)	18.1	22.0	6.8	7.5

\*Converted from Portuguese *palmos*, which equal 0.22 meters.

Note: Measurements provided by the sources are inadequate to determine tonnage, and, as no vessel built at Bahia in this period can be identified in *Lloyd's Register*, estimates by comparison are impossible.

Registros de petições, Série Marinha, Intendência da Marinha, Bahia, ANRJ, IX-M98 (1784-1796); IX-M-94 (1799-1802); IX-M-92 (1802-1806); IX-M-23 (1805-1809); IX-M-96 (1810-1812); IX-M-41 (1812-1818).



As for design, dense timbers presented problems of stability that baffled the king's builders for years. Considering the sparsity of maritime-related documentation, one is impressed by the number of references to royal ships built in Brazil that could not carry cannon nor full cargoes, or could only sail with the wind abaft due to inherent instability.<sup>75</sup> As all royal ships built in Brazil were designed by shipwrights in Lisbon, the blame often fell on Brazilian carpenters for their inability, or unwillingness, to follow directions. But the relative density of Brazil's timbers provides a better explanation. Each ship timber had a *bitola* (scantling) that determined its width and thickness depending on the size of the vessel. But as far as can be determined, Lisbon's drafters were using scantlings established for European oak rather than Brazil's framing timbers, which were not only denser but stronger. Hence, colony-built royal ships were too strong and too heavy: the draftsmen at Lisbon should have designed timbers with smaller dimensions, as Brazil's timbers did not need to be as thick as those of oak to achieve the same strength. If indigenous masts were used, which were twice the density of Europe's conifers, the problem compounded. Hence, the greater mass reduced cargo capacity and magnified the rolling of the ship in rough weather due to a greater portion of the mass being in the hull, rather than in the cargo. It should be noted that establishing scantlings in Lisbon for Brazilian timbers would have been difficult, as a variety of framing timbers could be used in a single hull. Also, the first known experiments demonstrating the relative strengths of Brazil's timbers were not made until 1780.<sup>76</sup> By the late-eighteenth century, references to poor design in royal ships disappear, but one wonders if private builders

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<sup>75</sup> Unsigned letter, Bahia, 20 July 1704, abstracted in *Os manuscritos do Cadaval*, 2:56; Papel do Marquis de Fronteira sobre a necessidade de uma reforma na marinha, Lisbon, 4 November 1713, abstracted in *Os manuscritos do Cadaval*, 2:120-1; and Manuel Joaquim José da Cruz, "Sobre o regimento," in Ferreira de Sousa, *Legislação florestal*, 84.

<sup>76</sup> Many of Brazil's framing timbers (*sapucaia*, *peroba*, *pau de arco*, and *angelim*) had specific densities (a measure of density compared to that of water which is established as 1.0) that exceeded 1.1. The most popular, *sucupira-mirim*, weighed in at 0.95, compared to white oak at 0.70. The *óleo vermelho*, Brazil's most popular mast, had a density of 0.90, compared to white pine at 0.36. See Colonel Theodózio da Silva Raboxo, *Mappa das experiencias das madeiras que fez nesta cidade de Bahia*, Bahia, [January 1780], AHU, Bahia, doc. 10,529-30; and *Wood Handbook: Wood as an Engineering Material*, Agriculture Handbook Series #72 (Washington, D.C.: U.S. Department of Agriculture, 1987).



overcame these difficulties more quickly because they were able to design their own ships.

Additionally, shipbuilding itself was no simple enterprise, for it required rare skills and material inputs of every possible kind: timber (the colony's most cumbersome commodity), iron for fittings, fiber for cordage and oakum, textiles for canvas, and also various naval stores like tar and pitch. Besides timber and oakum, only a few of these items were produced in Brazil, and most materials were imported at a considerable cost. After 1809, the lists of shipbuilding materials imported at half the tariff rate demonstrate that Brazil was still rather dependent on Europe for most goods other than timber. Even a relatively small brigantine required tens of thousands of iron and bronze nails, chain, lead, copper plates, sail cloth, tar, pitch, whale oil, and about fifty-five different kinds of rope and cable. A ship's displacement tonnage—its actual weight without a cargo—far exceeded its carrying capacity. In Europe, it required two to three ships of the same size to supply the materials for one.<sup>77</sup> In Brazil, it required even more, as the specific density of ship timbers was often double that of timbers used in the temperate north. The industry also required hundreds of tools, enormous cranes for moving timber, winches to *engenhos de querenar* (careen ships), and a considerable, if unsophisticated, infrastructure consisting of slips and warehouses.

The capital required to build a large merchant ship was also considerable. Of twenty merchant ships built privately at Bahia between 1776 and 1782, each had an average original value of 16,500 *mil-réis*. José da Silva Lisboa reported in 1781 that the cost of the smaller smacks and corvettes intended for the African trade was 4,000 and 8,000 *mil-réis* respectively.<sup>78</sup> A private frigate built in Bahia in the 1790s had a total cost of 7,422 *mil-réis*, comparable to royal ships of similar size during the same time.<sup>79</sup> It should be kept in

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<sup>77</sup> Davis, *The Rise of the English Shipping Industry*, 19; and Junta do Comércio, Bahia, ANRJ, caixa, 428, pacote 1. It is possible that before 1809 builders sought more locally produced goods, which may have been cheaper with the full tariffs in place.

<sup>78</sup> "Discurso preliminar, histórico introdutivo," 117-19; and Silva Lisboa, "Carta muito interessante," 504.

<sup>79</sup> José de Mendonça de Mattos Moreira [to Rodrigo de Sousa Coutinho], Bahia, 20 January 1799, AHU, Bahia, doc. 19,669. Comparatively, the same source lists the cost of royal vessels built in the same period in Bahia: Frigate *Graça*, 12,369 *mil-réis*; frigate *Princesa Carlota*, 11,630; and the frigate *Vincis*, 7,254.



mind that the selling price of new ships generally did not include sails, anchors, running rigging, block and tackle, guns, boats, instruments, cooking facilities, or a host of other expenses—nor did the price of older ships include the cost of repairs.<sup>80</sup> To cite just one example, João Gomes Vale purchased a used English *galera*, the *George*, for 7,200 *mil-réis*, but had to invest another 10,000 to make it safe for Atlantic voyages.<sup>81</sup> Individuals purchased small shares in ships not only to spread risk but also because a fraction of a single ship was all many could afford. Excluding some urban and rural real estate, a ship was the single most costly item in the colony.<sup>82</sup>

One does find large ships selling for low prices, but this is due to their advanced age. New wooden ships were costly, but they depreciated quickly, especially after a decade of service. Ralph Davis estimates, for example, that English ships depreciated at an average rate of 4 percent per year. Some ships, however, were still in service after their book value had theoretically reached zero. These could be bought for a song by those foolhardy enough to attempt one more crossing. An old ship was cheap to purchase but was risky to engage, and, like life insurance, the cost of insuring a vessel increased with its age. If a ship was significantly repaired, or rebuilt, its value increased and its premiums declined.<sup>83</sup>

Yet despite the obstacles of extraction, monopoly, design, and cost, Brazil's private shipbuilders constructed hundreds of large ships in the late-colonial period. Colonial merchants furnished the capital; shipbuilders supplied the skills; and the shipbuilder's profits offered competitive wages, purchased African slaves, and provided ready payment to private loggers for Brazil's excellent ship timbers. At the end of the eighteenth century, the Crown had three colonial shipyards supported by dozens of royal logging operations in Bahia, Alagoas, Pernambuco, Paraíba, and Pará, but, in fact, the Crown built few ships and the supply of timber was inadequate. Frequently, due to the

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<sup>80</sup> Davis, *The Rise of the English Shipping Industry*, 367.

<sup>81</sup> Petição de João Gomes Vale, 1812, Bahia, Junta de Comércio, ANRJ, caixa 375, pacote 1.

<sup>82</sup> For example, a *tarifa* (4,356 m<sup>2</sup>) of prime sugar land at the beginning of the nineteenth century cost only 30 *mil-réis*. Barickman, *A Bahian Counterpoint*, 106, table 11.

<sup>83</sup> Davis, *The Rise of the English Shipping Industry*, 376. The average price of ships changing hands in Rio de Janeiro, 1800-1816, was 2,800 *mil-réis*, suggesting most were used. Fragoso, *Homens de grossa aventura*, 275, table 17:1.



underproduction of the royal loggers, the king's yards were forced to purchase timber from the private yards, on credit and at high rates of interest.<sup>84</sup> By all accounts, the stagnancy of the royal shipbuilding enterprise stood in stark contrast to the bustle in the private yards.

Plantations and mines remained the driving sectors of the colonial economy, but in the absence of direct prohibitions against shipbuilding, a portion of the merchant capital earned in colonial trade was being transformed into native—if primitive—industrial capital. On the eve of their revolution for independence, Britain's North American colonists were producing about one-third of British merchant shipping.<sup>85</sup> Brazil, however, may have produced the majority of Portugal's merchant ships over the half century before its own independence—one more manifestation of the colony's prosperity relative to the economic difficulties of Portugal and testimony to the power of the colonial economy to diversify and develop independently. Once the ports were opened to foreign trade in 1808, Brazilians found they could not generally compete for price and quality with the manufactures arriving from Northern Europe. But in shipbuilding they found a manufacture in which an exceptional natural resource—timber—furnished them a compensating natural advantage.

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<sup>84</sup> Luís Diogo Lobo da Silva to Tomé Joaquim da Costa Corte Real, Recife, 25 April 1757, IHGB, Arquivo, 1,1,14, fols. 57-60. Baltasar da Silva Lisboa stated it was a source of shame that foreigners in need of repairs could always find the timber they needed at the private yards while the royal yards had nothing. Baltasar da Silva Lisboa to João VI, Valença, 10 September 1808, in Greenhalgh, *O arsenal de marinha do Rio de Janeiro*, 218-23.

<sup>85</sup> Joseph A. Goldenberg, *Shipbuilding in Colonial America* (Charlottesville: University Press of Virginia, 1976), 125.