

Shawn William Miller. *Fruitless Trees: Portuguese Conservation and Brazil's Colonial Timber.* Stanford: Stanford University Press, 2000. xiii + 325 pp. \$55.00, cloth, ISBN 978-0-8047-3396-0.



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Many forest histories—such as Warren Dean's *With Broadax and Firebrand*, and Michael Williams's *Americans and their Forests*—have focused on documenting how forests were destroyed. In Dean's often-quoted phrase, "forest history, rightly understood, is everywhere on this planet one of exploitation and destruction." There are, however, other approaches to forest history. Shawn William Miller's *Fruitless Trees* seeks to explain how settlers in Brazil *used* the forest, rather than on how they destroyed it (a process which Miller takes as a given). Rather than approaching forest history from the perspective of modern environmentalism, a concept that Miller argues was beyond the understanding of the inhabitants of colonial Brazil, he approaches it from the perspective of conservation. He asks what benefits the colonists derived from the demise of the forests, that is, how they transformed "natural capital" into "social capital."

To study how the inhabitants of colonial Brazil used their forests, Miller devotes his work to a study of the colony's timber industry. The timber industry played only a small role in the de-

struction of Brazil's colonial forests and was largely independent of clearing for agriculture. But, as Miller writes, "the story of the failed logger provides us with a more accurate perspective on the unique nature and causes of Brazil's deforestation than we have previously enjoyed" (p. 3). Timber played a key role in the colonial economy, from shipbuilding to housing to a wide range of tools and goods necessary for survival and production. Nonetheless, he contends, little of the economic potential of Brazil's vast forests was ever realized in the colonial period. "Why," asks Miller, "were so many of Brazil's acclaimed timbers destroyed by ax and fire to no apparent profit or benefit, the same timbers that consistently achieved prices in Europe high enough to offset the exorbitant costs of colonial extraction, milling, and transatlantic shipping" (p. 3)?

Miller traces this singular profligacy to Portuguese imperial forest policy. The Portuguese Crown, anxious to guarantee reliable sources of timber for its navy, declared that all of Brazil's best trees were crown property that could only be harvested by crown contractors. Breaking these

laws carried heavy penalties. Since the forest legislation prevented most colonists from deriving any profit from timbering, argues Miller, it had the effect of making most of Brazil's trees worthless to the colonists. Portuguese forest policy, "provided no incentives for conservation, few opportunities for timbering profits, and every stimulus for landowners to destroy what, by decree, did not belong to them The Brazilian, for the most part, neither harvested nor exploited Brazil's high-quality timber trees, but annihilated them" (p. 9). Ironically, then, Brazil's colonial forest laws, although conservationist in intent, "accelerated the process of wasteful destruction" (p. 62). Miller speculates that "the king, his subjects, and the forest would have been arguably better off, under the circumstances, had there been no forest policy at all" (p. 69).

In spite of the restrictive forest policies, colonial Brazil did have a small and active timber industry. Drawing on archival sources in Brazil, Portugal, and the United States, on travel narratives, official reports, and pamphlets and books from the colonial period, Miller constructs a detailed portrait of how settlers harvested and used timber. These sources have allowed him to paint a vivid picture of Brazil's colonial timber industry, particularly as it relates to the role of timber as a commodity, such as in shipbuilding and the small overseas timber trade. The limitations of the archives mean that other important facets of the timber industry—particularly the use of timber for domestic activities—remain elusive. What is clear is that the restrictive Portuguese forest policy, coupled with its mercantilist economic policy, prevented Brazil's timber industry from reaching its full potential.

All the captaincies in colonial Brazil exported some timber, some under the direct supervision of the crown and others by licensees under royal contract. Given the variety and quality of Brazil's timbers, one would expect that they would have made up a significant portion of Portuguese tim-

ber consumption. But the Portuguese crown subjected Brazilian timber to the same duties and taxes as foreign timber. In Portugal, therefore, Brazilian timber was much more expensive than European or North American timber since its production costs were much higher. Brazil accounted for less than ten percent of Portuguese timber imports. It trailed behind Sweden, the United States, Russia, Britain, and Prussia, whose timber products were often cheaper and more accessible. Nor did timber exports play a significant role in the economy of colonial Brazil, ordinarily accounting for less than one half of one percent of the total value of Brazil's exports. The *domestic* demand for timber in Brazil was strong, for example, in building the wooden chests in which sugar was shipped to the markets. Sugar planters were exempt from royal restrictions on timber harvesting, but otherwise the monopoly effectively prevented the growth of a significant timber export industry. In short, argues Miller, "mercantilism limited timber's markets, and monopoly its productivity" (p. 104).

In an elegant chapter entitled 'the tropical woodsman,' Miller describes the people involved in the timber industry. Labor was scarce in colonial Brazil, as it was throughout the colonial New World. All ethnic groups in colonial Brazil were involved in cutting and processing timber, although their roles differed. Portuguese colonists preferred to employ Indians in clearing the forest, since they were cheap and relatively submissive, although they often ran away. Few African slaves were used in forest clearing, since their owners considered them too valuable for such work. More commonly, slaves were employed in the sawmills. Finally, many classes of white settlers were involved in the harvest. The crown often impressed poor colonists into service. The crown found it difficult to obtain free labor, since it paid poor wages, and was often late in payment. More skilled woodsmen could expect better wages, al-

though wages from the private sector were often higher.

In discussing the tools used in Brazil's timber industry--ax, ox, and sawmill--Miller challenges a standard interpretation of Brazilian technological development. While it is common to portray Brazil as somehow technologically 'backward,' Miller's study shows that Brazilian settlers did have access to the latest techniques and technologies from Europe and North America. The managers of the timber industry applied the latest scientific knowledge when deciding the best time to cut timber. Ox-drawn carts may have been clumsy, but they could at least carry timber to the rivers where it would be floated to the sawmills. The mills themselves were only marginally less efficient than their counterparts in Europe and North America. The roots of the low productivity of Brazil's timber industry were not in the *quality* of its technology, but rather in the *quantity*. The state of Sao Paulo, one of Brazil's largest producers of timber, had 53 sawmills in 1838. By comparison, New York state alone had 272 mills in 1820, and the United States as a whole had more than 31,000 mills in production in 1840. The royal monopoly on timber, coupled with the requirement that all mills have a royal license, discouraged colonists from establishing sawmills.

Brazil's geography also discouraged the development of the timber trade. Brazil has few good natural ports, and none of these were located on navigable rivers. These geographical conditions made the transportation costs much higher than they were in North America, which had better rivers and lighter woods (p. 161). Logs were slowly and tediously shipped along the small rivers to the coast where they were often reloaded onto coastal ships, then to one of the main ports where they were unloaded into warehouses and then reloaded onto ships bound for Portugal. The cost of this arduous journey from stump to shore was high. One eighteenth-century estimate calculated the cost of transporting the timber to Brazil's

coast as amounting to 34 percent of the timber's final cost, only slightly less than the cost of shipping the timber from Brazil to Portugal.

Miller painstakingly reconstructs colonial Brazil's role in shipbuilding for the Portuguese empire. Portuguese officials debated as to whether or not it was more economically feasible to build ships in Lisbon or in Brazil, closer to the supply of wood. The choice was not completely obvious, notes Miller, since if the ships were built in Brazil then almost all the other parts--nails, ropes, sails, etc.--would have to be imported from Europe. Again, Miller finds Brazil's royal shipbuilding program to be inefficient--contributing around one hundred naval vessels during the entire colonial period. Production was slow and expensive--the most expensive part being the wood produced by the royal timber reserves. Ships built in the royal shipyards at Bahia were often unstable since they were designed in Portugal but built with Brazilian timber, which was much heavier and denser than woods used for shipbuilding in Europe. Through the eighteenth century, however, shipwrights learned to adapt their designs to the Brazilian woods and the number of problems diminished. In contrast, private shipbuilding in Brazil, which was not subject to the royal prohibition on felling trees, was much more vigorous and less expensive. Private builders in the seventeenth century produced ships for trading along the coast of Brazil, and with Europe and Africa. Miller estimates that by the end of the colonial period, about a third of the Portuguese empire's merchant fleet was built in Brazil.

Miller closes the book by discussing the emergent critique of imperial forest policy in Brazil during the late eighteenth century. Pamphleteers, most of them anonymous, began to argue that the royal monopoly encouraged the wanton destruction of the forests. Although the royal monopoly on timber was designed to conserve Brazil's forests for royal use, it had the effect of making "timber's annihilation a more rational choice [for

colonists] than its conservation or even its harvest" (p. 224). These critics looked to British forest policy as a model. In the British empire, the crown both managed its own crown reserves and worked with private timber interests to promote the effective use of wood and regeneration of forests. Miller follows most of these critics. Miller notes that in spite of the monopoly, the small quantity of Brazilian timber that was sold on foreign markets earned rich profits. Given this, he speculates that without the royal monopoly, the timber trade could have been even more profitable. Although the fate of Brazil's forest was, in the end, similar to that of Europe's North American colonies, Miller argues that the key difference is that "comparatively few of Brazil's timbers were employed in the effective accumulation of colonial wealth and capital" (p. 231).

Miller has also included three appendices, which provide even more revealing details about the timber industry in colonial Brazil. One is an inventory of the timbers Miller encountered in colonial documents, which includes more than two hundred different woods. Where possible, Miller also includes a brief description of the wood, its properties and uses. This, as he notes, attests to the wide range of woods used as timbers in colonial Brazil, and to the detailed popular knowledge that colonists had of their forests. A second appendix gives metric equivalents for the often bewildering array of colonial weights and measures—including such obscure measures as the *alqueire*, the *covado*, the *tarefa* and the *arratel*. The third appendix reproduces an eighteenth-century list of tools required to establish a new *corte* in Paraíba. It gives an idea of the complexity of even the smallest timber enterprises. The list includes whetstones, iron rings, picks, scythes, two-man bucking saws, axes, adzes, chisels, compasses, staves, mathematical instruments, and files, among other things.

This work is sure to stir the debate over forest destruction in Brazil. One of the key issues at

stake here is the issue of "Brazilian exceptionalism." Historians who have written about Brazil's forest history disagree profoundly over whether deforestation in Brazil was somehow singularly destructive. The answer to this question depends in part on the countries, which have been chosen as comparisons. To date, most of the comparisons have been with North America and Europe. Warren Dean argues that Brazilian settlers were uncommonly destructive of their forests; and the destruction of Brazil's forests was a singular event. In a review of Dean's *With Broadax and Firebrand*, Jose Drummond vehemently disagrees with Dean's assessment, arguing that "the destruction of the Atlantic forest in Brazil was exceptional only because it was a tropical biome."^[1] Drummond criticizes Dean for not comparing the history of Brazil's forests with that of forests elsewhere. *Fruitless Trees* is a tacit rejoinder to Drummond. Miller does make systematic comparisons with Europe and North America. Based on the comparison with North America and Europe, Miller makes a compelling case that forest destruction in Brazil was exceptional not because of its scale or because Brazil was a tropical environment, but because Portuguese forest policy ensured that colonists would derive little benefit from the destruction. The British crown did encourage the use of its colonial timber resources to greater effect than did the Portuguese crown. Colonists in British North America often sold the trees they cleared from their farms, and the profits from these sales provided vital capital with which they then developed their farms. Miller's approach is valuable in placing Brazil in the context of the north Atlantic and he shows convincingly that forest policy and forest use in colonial Brazil were significantly different than in Europe and North America.

But the Brazilian case might not be so distinctive if it were compared with other tropical colonies rather than with North America and Europe. This comparison is important since, as Miller often notes, Brazil's dense and strong tropi-

cal hardwoods had quite different properties than timbers from temperate Europe and North America. The size and nature of the markets for tropical timbers would, therefore, have been different than those for timbers from temperate regions. How did the Brazilian timber industry compare with those of as British India or Dutch Indonesia? Comparisons with Brazil's neighbors would be particularly valuable. Settlers in colonial Surinam, for example, appear to have been just as profligate with their forests as their Brazilian counterparts. Dutch settlers used only a small range of tree species for construction materials or as fuel for the sugar mills. Much of the surplus timber left over from clearing had no value to anyone in the colony and was simply burned. There is no evidence that timber estates in Surinam ever reforested areas that they had felled--rather, they simply cut down adjacent stands of virgin forest. Unlike colonial Brazil, however, there were checks on forest destruction in colonial Surinam. The colony was never a significant source of tropical hardwoods for the Dutch empire. More importantly, the colony entered a long period of economic stagnation after about 1775 and the total acreage under plantation agriculture declined through most of the nineteenth century. [2]

The most important comparison to make is between Brazil and colonial Spanish America since it shared both a similar environment and a similar political system with colonial Brazil. Many of the questions Miller asks of Brazil could equally well be asked of colonial Spanish America. How did Spanish forest policy shape forest use in colonial Spanish America? What role, for example, did colonial timbers and colonial shipbuilders play in the construction of Spain's naval and merchant fleets? Were Mexican pines used for ship's masts? Was mahogany from Central America useful as ship's planking? There have been few histories of the timber industry in colonial Spanish America, but the evidence tends to support Miller's argument for Brazil's singularity. The case of the tim-

ber industry in colonial Cuba is a good example. Over the short term at least, the settlers of colonial Cuba were better able than the settlers of colonial Brazil to convert their "natural capital" into "social capital." By the eighteenth century, the island had a flourishing and diverse timber industry. Havana's timber industry supplied one of the largest shipyards in the Spanish empire and the region's rapidly growing private sugar industry. Unlike in Brazil, however, the Spanish Crown sought to balance private and public uses of the forests--to accommodate the island's shipyard and its sugar planters. Such balance was difficult to achieve, given the scarcity of the remaining forests around Havana. The crown only began to make systematic efforts to assert its legal rights over Cuba's forests in the 1740s as deforestation around Havana reached critical proportions. The Crown tried to reserve certain species of tree exclusively for naval construction. Ultimately, however, the sugar planters triumphed in 1815. The newly restored Ferdinand VII granted private individuals the perpetual right to freely harvest Cuba's forests. This led to a period of unprecedented deforestation in Cuba, which literally fueled the rapid growth of Cuba's sugar industry in the early nineteenth century.[3] As this case suggests, it will be difficult to draw any definite conclusions about the singularity of forest destruction in colonial Brazil until the case of colonial Spanish America has been studied more carefully.

Miller has asked innovative questions about colonial forest history, and produced innovative answers. *Fruitless Trees* makes a convincing case that Portuguese forest policy did lead to the unnecessary waste of colonial Brazil's timber. In making this case, Miller also gives us a finely grained portrait the timber industry in colonial Brazil. This study is also valuable for the questions that it raises about forest history in colonial Brazil, and in the colonial Atlantic world more generally. As I have suggested above, not all readers will be satisfied by Miller's argument that Brazil was somehow uniquely wasteful of its for-

est resources. But *Fruitless Trees* is valuable for this very reason--it raises important questions, which will generate further discussion and debate on colonial environmental history.

NOTES:

[1]. Jose Drummond, review of Warren Dean, *With Broadax and Firebrand* for H-Environment (June 2000) [<http://www2.h-net.msu.edu/reviews/showrev.cgi?path=8128962120768>]

[2]. Peter Boomgard, "Exploitation and Management of the Surinam Forests, 1600- 1975," in *Changing Tropical Forests: Historical Perspectives on Today's Challenges in Central and South America*, edited by Harold K. Steen and Richard P. Tucker (Durham: Forest History Society, 1992), 252-264.

[3]. Reinaldo Funes Monzote, "Los conflictos por el acceso a la madera en la Habana: Hacendados vs. Marina (1774-1815)," in *Diez nuevas miradas de Historia de Cuba*, ed. Jose Antonio Piqueras (Castellon: Universidad Jaume I, 1998), 67-90. See, also, the section entitled "Death of the Forest," in Manuel Moreno Fraginals, *The Sugarmill: The Socioeconomic Complex of Sugar in Cuba, 1760-1860* (New York: Monthly Review Press, 1976).

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