Wooden Shipbuilding in Maryland Prior to the Mid-Nineteenth Century

by Ben Ford

> Shipbuilding is America's greatest pride and in which she will, in time, excel the whole world.
>
> Thomas Paine, *Common Sense*, 1776

Shipbuilding was one of the first industries to take hold in the Chesapeake, providing a means to transport the ever prevalent tobacco to the European market when it was in demand and acting as a buffer against economic recession when the weed was in decline. Even today, wooden boatbuilding is a major component of the region's ideology and the construction of massive ships in Baltimore yards is an economic boon to the community. However, there have been few comprehensive or systematic attempts to trace the development of early shipbuilding at the statewide level. Here the disparate accounts of early shipbuilding drawn from county and maritime histories are synthesized and their results analyzed. Additionally, original research was conducted using land transaction records, city directories, and secondary histories to provide a more positivistic depiction than that rendered by earlier histories, which are generally anecdotal and impressionistic. By combining these two approaches, it was possible to construct an anthropological history of the shipwright's trade in Maryland. This study focuses on the environmental determinants of shipbuilding and the historical trends that caused the expansion and contraction of the shipbuilding market. Furthermore, the factors that led to shifts from county to county and from the Eastern Shore to the western margin of the Chesapeake Bay and the eventual centralization in Baltimore are explored in detail.

This article does not purport to take into account all of the maritime construction that took place within the boundaries of Maryland prior to the middle of the nineteenth century. Only shipyards that constructed sizable sail-powered vessels are considered here. Many landowners built small vessels for trade and transportation along the rivers

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and shores of the region, but these do not constitute shipbuilding. For the purposes of this article, shipbuilding is defined as a permanent or seasonal occupation that resulted in the construction of vessels large enough to engage in interstate voyaging. Steam powered vessels are not considered here. These ships were beginning to dominate the market by the middle of the nineteenth century, but the material and labor requirements for their construction place them outside of the scope of this work.

Natural Resources

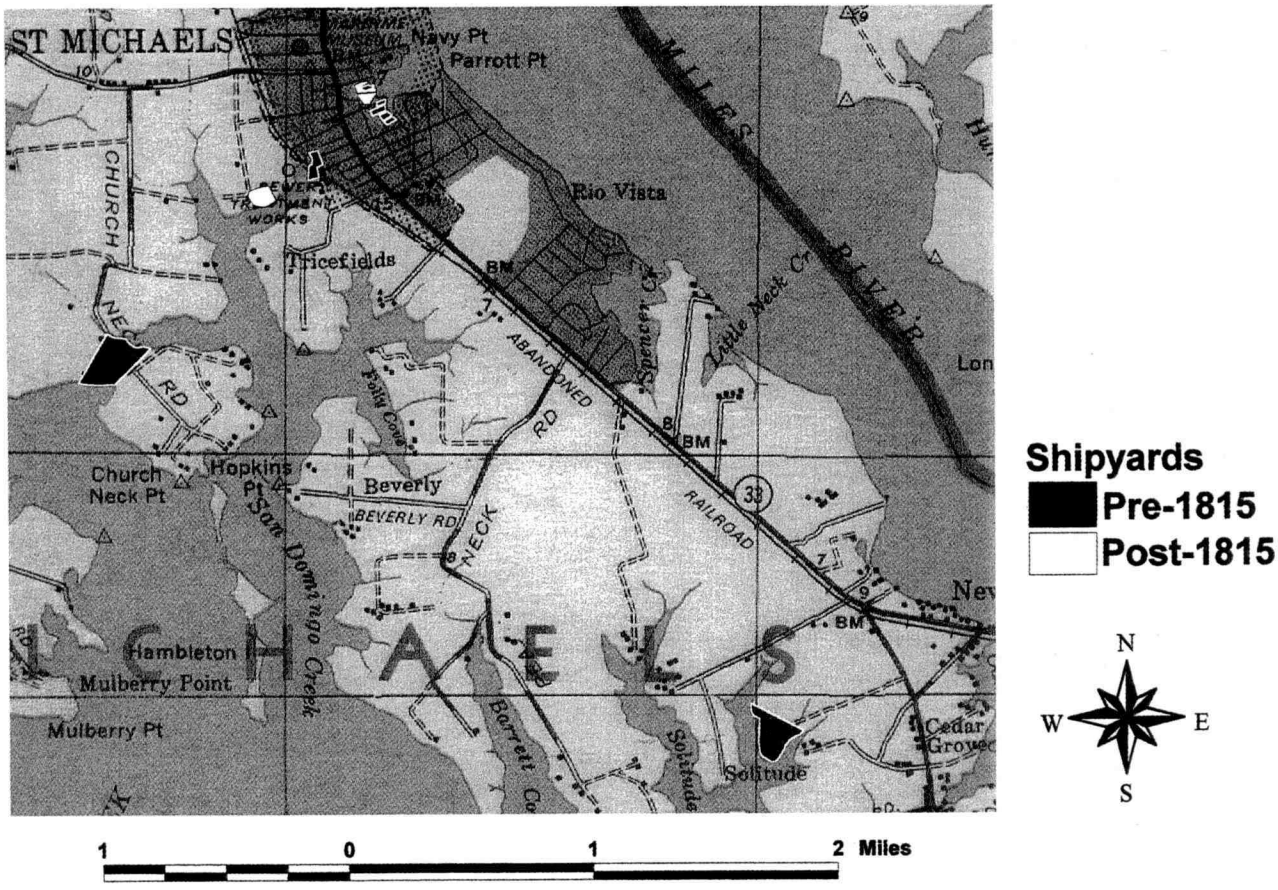
From the earliest period of European-American settlement it was recognized that Maryland contradicted Longfellow's claim that "There's not a ship that sails the ocean, but every climate, every soil, must bring tribute, great and small, and help to build the wooden wall."[1] *An Account of the Colony of the Lord Baron of Baltimore, 1633* went on at length about the natural resources of the new colony, including its natural stores of timber suitable for all forms of construction.[2] Similarly, *A Relation of Maryland* noted that "Brave ships may be built without requiring materials from other parts."[3] This claim was not simply propaganda aimed at recruiting settlers for the colony. English merchants initially believed that the Chesapeake colonies would supply naval stores to England. However, these plans were altered when the much more lucrative export of tobacco was discovered and the center of shipbuilding attention was shifted to New England.[4] In fact, only the counties of Talbot, Somerset, and Dorchester, all on the tobacco poor Eastern Shore, ever produced naval stores commercially, exporting pine, tar, and cypress.[5] Despite this lack of commercial exportation, the area still contained prodigious quantities of wood, both for building vessels and the creation of necessary wood derivatives such as tar and turpentine. Furthermore, iron and hemp were locally available and the coastline of the Chesapeake Bay, with its numerous large rivers and sheltered coves, was ideal for shipbuilding. The combination of these factors eventually led to the creation of a shipbuilding community that was second in the nation by the end of the colonial period.

Oak is the single most important material for wooden ship construction; it forms the skeleton and skin of the vessel. There are no known quantitative historical accounts of the amount of oak available in Maryland, but oak seems to have been readily available, as evidenced by the predominance of oak-promoting soils throughout the region.[6] Today, oak still dominates the tree species in Maryland.[7] Specifically, white oak *(Quercus alba)* is preferred by shipbuilders because it is dense enough to deter rot for many years. The white oak of the Chesapeake was of a quality equal to that available in England, and was, in fact, exported to other regions, such as New York.[8] However, throughout the colonial period, American white oak, with the exception of that grown in Dorchester County, was considered inferior to English white oak. At the time, it was believed that American oak grew more quickly than its British counterpart and was therefore less dense. In truth, the inferiority of American oak may have been caused by the wood not being seasoned as long as British oak prior to its use in construction. Regardless of the cause, it appears that during the early colonial period American oak tended to decay with greater celerity than that grown in England.[9] The reputation of American oak and American vessels improved during the middle of the eighteenth century with the adoption of live oak *(Quercus virginiana)* for ship construction in the Chesapeake. Live oak proved to be more durable than either American or British white oak, and was available throughout the region.[10] Both local white and live oak continued to be used in ship construction through the 1820s, when deforestation and the gradual shift to iron hulls caused builders to look to other sources for their materials.

Besides its abundance of oak, Maryland offered shipbuilders a number of other sylvan resources. Pine (*Pinus* sp.) for masts and spars grew on the is-

lands of Kent and Wye on the Eastern Shore.[11] In a letter to the Maryland Council of Safety, dated 17 September 1781, Stephen Steward, the owner of a shipyard south of Annapolis, articulated this plan: "As soon as it is possible for me to go I intend over the Bay myself to get Masts for the Galley."[12] He was likely intending to purchase appropriate timbers from suppliers on either Kent Island or Wye Island. Besides masts, the Eastern Shore, especially the Pocomoke River area, supplied cypress (*Taxodium* sp.) for knees.[13] Tar and turpentine were also refined from local sources. The primary locations for the production of these materials in Maryland were Charlestown, at the head of the bay, and the Pocomoke River.[14] Tar and turpentine were also imported from the Great Dismal Swamp of Virginia and North Carolina.[15]

As time progressed and shipbuilding became a significant activity, the natural timber resources that had made ship construction a viable industry began to be depleted. Beginning in roughly 1760, it became necessary to import timber from other colonies to fill the vacuum created by deforestation. This trend increased until by 1868 it was the rule rather than the exception.[16] Areas such as St. Michaels in Talbot County that historically had been centers of shipbuilding were denuded earlier than other regions in the state. St. Michaels suffered a collapse of its shipbuilding industry around 1820 largely due to the fact that the area had been almost



Map showing the number and distribution of shipyards in the St. Michaels area before and after the collapse of the shipbuilding industry in that region.

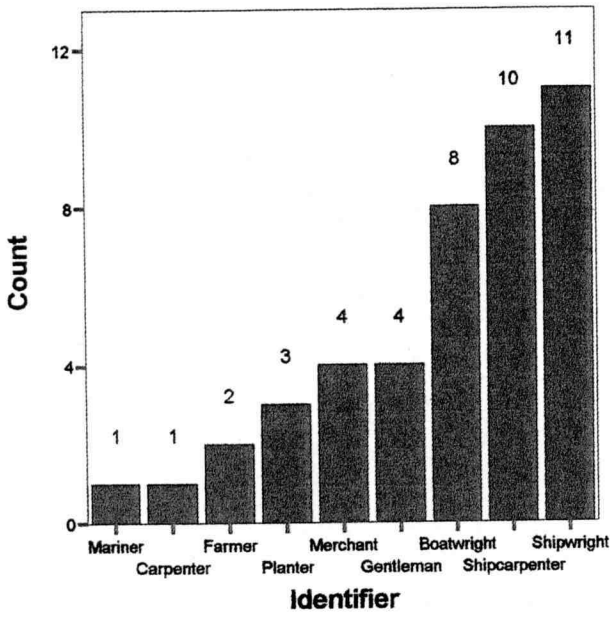
entirely deforested of all the timber required for shipbuilding.[17]

This massive deforestation is not surprising when one considers the amount of timber necessary to build a ship. For every ton of shipping a vessel held, at least one and a half loads of timber were required, with a load of timber being approximately equivalent to one tree's worth of wood.[18] More specifically, a third-rate British war vessel required two thousand trees, thirty thousand trunnels, five tons of pitch, and twelve tons of tar.[19] A barge, which was more likely than a British warship to be found on the stocks at a Maryland shipyard, required 1,200 board feet of one-inch oak planks, 1,500 board feet of pine planks, thirty oak trees, and one barrel of tar.[20] The strain on the environment must have been immense. Without replanting and other modern notions of forestry management, the fact that the natural stock of timber lasted as long as it did implies that it must have been substantial.

In addition to timber, iron was necessary to construct a vessel. A one-hundred-ton vessel required one ton of iron.[21] The barge and third-rate British war vessel required more than 526 pounds and one hundred tons of iron, respectively. Iron was used throughout the vessel: iron pintels and gudgeons held the rudder to the ship, and iron fasteners were used to attach the rigging to the hull.[22] Iron ore was available in Maryland, especially near the Patuxent River, but prior to the eighteenth century, there were no facilities to refine and shape the ore into forms that were useful for constructing a vessel.[23] Even in later years when refined iron was available off the docks at Baltimore, it still had to be worked by a shipsmith into the proper forms, as all of the pieces were unique to the vessel for which they were made.[24] It was consequently difficult to mass produce them in England.[25] Due to the custom nature of maritime iron work, many shipyards had a shipsmith on site; however, this was not always the case. When a merchant contracted for a vessel, he generally agreed to supply the ship's chandlery and the iron necessary for its construction.[26] Consequently, it is conceivable that the mixture of British and American iron found on vessels constructed in the colonies may have been a function of the merchant who contracted to have the vessel built. British merchants employed British smiths with whom they were familiar, and American merchants used the local blacksmith for their iron needs. Additionally, wrecked or scrapped vessels could be cannibalized for their iron.

Other bulk materials needed to build a vessel were hemp and flax for the sails and cordage. *A Relation of Maryland* indicates that hemp was locally available in Maryland from the earliest period of European-American settlement.[27] Some interest was taken in this natural resource, especially at the end of the seventeenth century when a collapse in the tobacco market caused planters to look for alternative sources of income. Hemp rivaled tobacco as an export by 1767.[28] Additionally, flax was grown extensively on Smith Island and the Eastern Shore. By the second quarter of the eighteenth century, sails and cordage were available from ropewalks and sail makers in Chestertown, Bladensburg, and Baltimore.[29] Despite this local availability, Goldenberg reports that the vast majority of sails and cordage were imported from England and were subject to crippling delays.[30] His comments pertain specifically to New England, but the trouble of procuring the necessary supplies appears to have been ubiquitous. Governor Seymour, in a letter to the Lords of Trade and Plantation dated 23 June 1708, complained of having trouble obtaining "sailes, rigging, and ironworks."[31] Similarly, nearly seven decades later, Stephen Steward wrote to the Maryland Council of Safety reporting that he lacked sufficient cordage and canvas to fit out a galley he had just completed.[32] Thus, it seems that, while there was a local market in hemp products that must have been supported by local shipwrights, a large proportion of the canvas and cordage used in Maryland ship construction came from overseas.

The final natural resource that made Maryland particularly attractive to early shipbuilders was its river systems. Maryland west of the Chesapeake



Graph of the titles applied to owners of shipyard properties.

Bay, with its rolling uplands that eventually become the Allegheny Mountains, has a number of swift rivers that have cut deep channels.[33] Many of the rivers along the western shore were historically navigable by oceangoing vessels right up to the fall line. The Patuxent River was passable thirty to fifty miles above its mouth, the Patapsco River fifteen miles, the Severn River ten miles, and the West, Rhode, South, and Magothy Rivers were navigable five miles inland.[34] The Eastern Shore, while it is a "flat, low, almost featureless plain," similarly had a number of rivers with deep channels.[35] The Chester, Choptank, and Miles Rivers were all navigable by large vessels twenty miles up stream. These deep channels offered shipwrights the protection of inland locations without compromising the size of vessels they could build at their yards. Additionally, the shipyards could be located in the vicinity of towns further inland to take advantage of other natural resources without any detriment to the shipyard. However, this advantage began to fade almost as soon as the colonists began to settle. The clear cutting of trees that accompanied construction and agriculture, combined with the large areas of soil left bare when cultivating tobacco and corn, led to extensive erosion that accelerated siltation of the local waterways.[36] Other habits of early settlers, such as dumping ballast stones in harbors, did not help the matter.[37] The end result of these processes was that the current head of navigation for many streams and rivers is miles downstream from where it was historically situated.[38] Towns such as Bladensburg, Elkridge, and Port Tobacco that were once viable centers of maritime trade are now essentially landlocked.[39] Shipbuilders throughout the history of Maryland sought real estate that offered a beneficial combination of an inland location and a deep channel; the areas that met these criteria were constantly changing and contracting.

Shipbuilders

Despite the prodigious amount of labor that was required to produce a vessel and the delays brought on by the lack of proper materials and inclement weather, many colonial shipbuilders managed to launch more than one ship per year.[40] The productivity of a shipyard depended largely on the workforce that the shipwright could muster. Colonial shipyards ranged in size from large commercial yards employing twenty individuals to "shade tree" yards where one or two craftsmen built small coastal sloops and schooners.[41] Small shipyards generally had little division of labor, with one individual undertaking all of the tasks necessary to build the vessel, possibly with one assistant to lighten his load. Conversely, larger yards employed an assortment of laborers and artisans, all with different skills. First and foremost among the builders was the shipwright. In many cases, this man was the owner of the yard as well as its lead employee. Out of forty-four shipyard owners identified by title in the surveyed Maryland state land records, two-thirds (twenty-nine) were identified as either "boatwright," "ship carpenter,"

or "shipwright," indicating that the shipwright owned his own yard. Even in yards owned by merchants or gentleman (eighteen percent combined), the shipwright maintained overall responsibility for the success of a building project. In all cases, the shipwright drew up the plans for the vessel (or carved the half model, as the case might be), and then oversaw all of the tasks that intervened between the conception of the vessel and its completion. He made certain that all of the timbers were hewn and positioned correctly, that the planks were attached properly, and that all the details of the interior met with his approval.[42] Working under a shipwright's supervision, the construction crew was likely to include at least a few of the following: joiners, caulkers, painters, carvers, glaziers, plumbers, coopers, sawyers, sailmakers, riggers, mastmakers, blockmakers, masons, tinmen, shipsmiths, and common laborers.[43] It seems likely that a number of these positions were filled by single craftsmen at different times during the construction of a vessel.

In Maryland, the workforce consisted of freemen, convicts, and slaves. Freemen workers were hired on by the task. For example, if a quantity of ironwork was needed for the construction of a vessel, a shipsmith was contracted to produce it, just as a team of sawyers was contracted to cut the required amount of planking, and so on. Convict and slave laborers were indentured to a shipyard for a longer period of time, although in some cases, if an owner possessed a slave or convict that had a particular skill, he might rent his services to a shipyard for a given period or task. Slave and indentured labor was used in shipbuilding throughout the colonies, but the shipwrights of Pennsylvania, Virginia, and Maryland seemed to have preferred indentured servants and convicts, possibly due to the fact that these individuals often had shipbuilding skills prior to their indenture. In Maryland, Charles Carroll depended on both slave and indentured servant labor at his shipyard, while Samuel Galloway and Patrick Creagh utilized servant labor alone.[44] Daniel Whitney, William Skinner, Solomon Kirwan, and Thomas Jones were all slave owners,[45] as was William Price.[46] Whether or not some of these slaves were employed at the shipyards run by their owners is unknown, but it is not difficult to imagine that they were. Regardless of their status, all shipyard workers were expected to toil ten hours a day, six days a week in order to complete the vessel on schedule.[47]

Shipyard Structures

The space in which the shipbuilders worked tended to be as flexible and fluid as the workforce itself. Many shipyards, especially those of the early period, kept their layout simple and the number of enclosures to a minimum in order to maximize the amount of space available to manipulate the large timbers.[48] If a shipwright was informal enough to build vessels by sight without the benefit of the patterns created during the lofting process, and his shipyard small enough that he subcontracted for its ironwork, sails, and rigging, then the only enclosed space necessary was a tool shed. Even launching ways in colonial America were generally temporary affairs.[49] However, by the 1700s, shipyards began to take on an industrial appearance, and this trend continued until shipbuilding was fully embraced by the Industrial Revolution in the second quarter of the nineteenth century.[50] With increased industrialization, certain features began to become more common at shipyards until all respectable shipyards had a sawmill (or at least a saw pit), a blacksmith, a tool shed, an oakum shed, a timber storage yard, and stocks.[51] Some shipyards may have also included a ropewalk and a sail loft.[52] Since the labor force of a shipyard was constantly in flux, it is unlikely that a large amount of housing was found on shipyard sites. However, yards that were more distant from urban centers and those that employed slave and servant labor may have had some bunkhouses on site. The shipwright himself initially tended to live at the shipyard, but as time progressed, more and more shipwrights took up residence off site so that by 1850 all ship-

builders identified in this survey maintained a residence separate from their yard.[53]

History of Maryland Shipbuilding

While the first shipwrights in the English colonies did not build vessels for intercontinental trade, but simply repaired and replaced the vessels sent from Europe, they were actively recruited by many colonial leaders. Colonial administrators felt that shipwrights were vital to a colony's success simply because ships provided the only link with the mother country.[54] In a worst case scenario, the shipwright's wares also provided the sole means of escaping a failed colony.

The first vessel built in the Chesapeake region was not built using the abundant native timber. Instead, it was a barge assembled by the original settlers at Jamestown from parts prefabricated in England and transported in pieces across the ocean in the hold of one of the other vessels.[55] Virginia did not get its first true shipbuilders until fifteen years after the area was settled by Europeans. In 1622, Captain Thomas Barwick and twenty-five ship carpenters relocated to the area and began constructing small craft for local use.[56] Maryland had to wait more than a decade after Barwick's arrival to see its first ship construction. During William Clairborne's tenure on Kent Island (1631–37), the first vessel constructed by Europeans on Maryland soil was built. The pinnace *Long Tayle* was constructed by William Paine with much of the ship's chandlery being imported from Virginia.[57] A few years later in 1634, the first settlers in the newly established colony of Maryland took a page from the book of their southern neighbors, and, shortly after they reached St. Clements Island, they assembled a vessel they had carried from England broken down in the hold of the *Ark*.

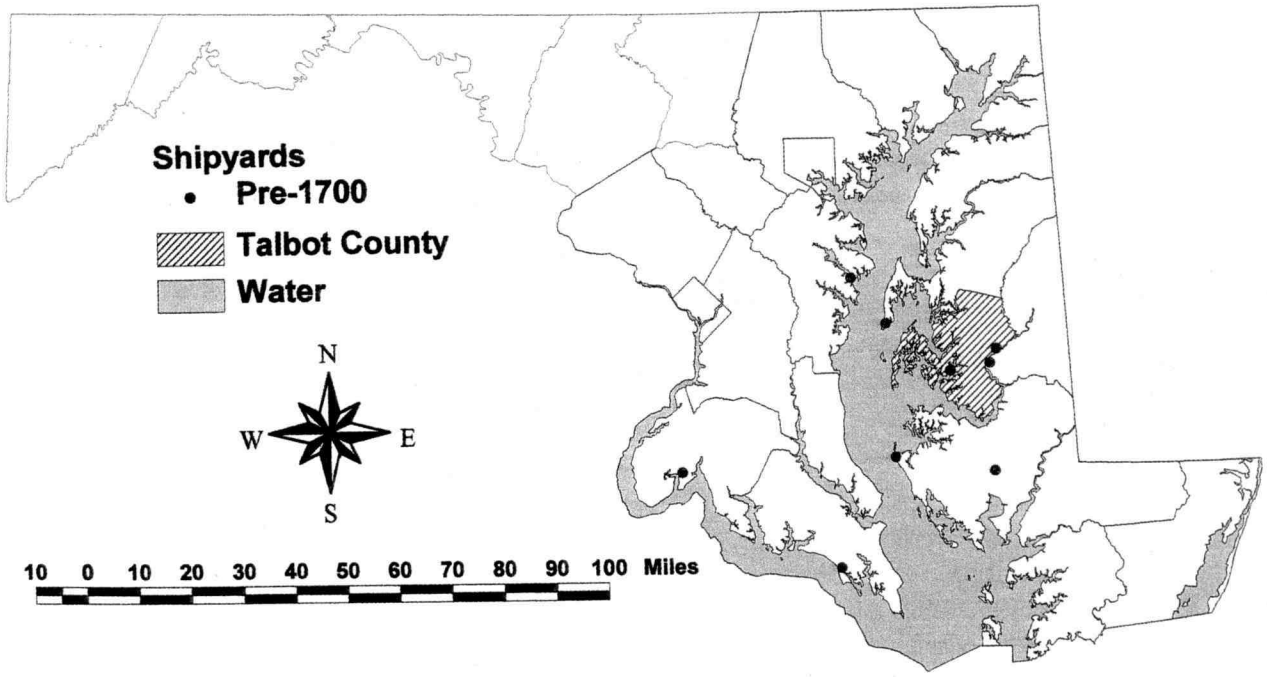
During the early years of the Maryland colony, there was far more boatbuilding than shipbuilding. A number of factors conspired to keep the industry small, including a shortage of skilled labor, capital, and supplies.[58] Shipwrights were not the first individuals to move to the new colony; consequently, the colonists had to be content with whatever vessels untrained individuals or craftsmen trained as traditional carpenters could manage. Shipwrights were no doubt slow to immigrate since the supplies necessary to conduct their trade were not yet developed in the colony. Oak, pine, and cypress were abundant, but the iron industry and the production of sailcloth and cordage would not begin for a number of decades, and a trade network to supply these necessities was slow in being initiated. Furthermore, there was no demand for the services of shipwrights during the early colonial years. Until the end of the seventeenth century, most colonists lacked the capital to invest the substantial amount of money necessary to build an oceangoing vessel.[59] Even had there been the requisite capital in the colony, there would have been little demand for ships because tobacco was so valuable in the formative years of the colony that English and Dutch merchants sent vessels laden with goods to purchase tobacco and transport it back to Europe.[60] Due to the lack of shipwrights, colonists were instructed to bring ship's chandlery and servants experienced at boatbuilding with them in order to construct even the simple vessels needed for transportation and local trade in a colony with few roads.[61]

Even after shipbuilding was established, it was a source of employment for only a small portion of Maryland's population. Consequently, it was not a prime driver of the economy or ideology of the region; tobacco was. The development of Maryland from the mid-seventeenth century through the mid-nineteenth century and beyond was driven by and fluctuated with the fortunes of tobacco. Shipbuilding was no exception. As early as 1618, the Virginia Company attempted to no avail to dissuade settlers from focusing solely on tobacco by encouraging fishing and the production of iron, glass, lumber, and ships.[62] Maryland followed a similar pattern. For two hundred years, nearly all of the tobacco in Europe was produced in Virginia and Maryland, with every county in Maryland's

coastal plain producing at least a small amount until the Civil War.[63]

Through at least the early eighteenth century, tobacco agriculture was practiced in Maryland to the near exclusion of all other trades. Marylanders "sheared their sheep to cool them and failed to put the fleece to any use. They wore hats manufactured in England and sold in the colonies at a high price rather than make them of their abundant supply of furs."[64] What drove this monomania was the demand for the weed in Europe. There was no economic reason for other crafts to develop. With all trading going on at the wharves of individual landowners where the tobacco was picked up and goods dropped off, no urban centers began to develop, which prevented any one region from reaching the critical mass necessary to support artisans. Specifically, shipbuilding did not get underway during this period because, with the dependable arrivals of English vessels, there was no need for merchants to ship their own wares, and thus no need to pay for the construction of sizable vessels.

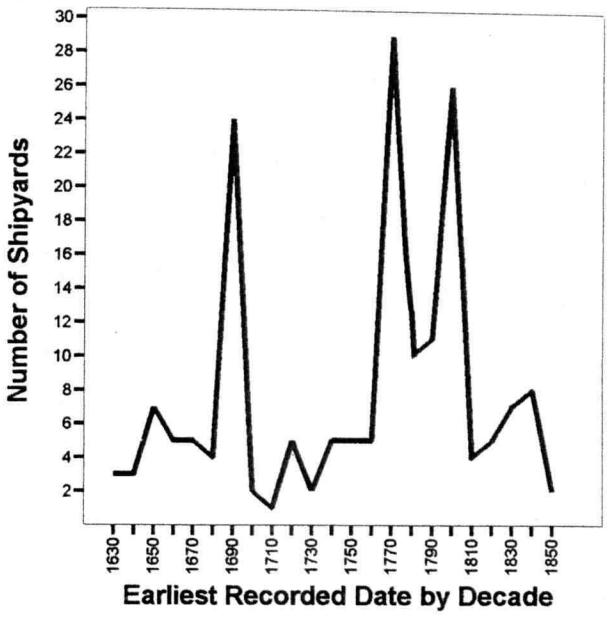
Despite these handicaps, shipbuilding did begin to grow in Maryland, likely because the area provided so many natural advantages for it. In 1641, Maryland shipbuilders saw an increase in their contracts as the English Civil War cut off overseas trade. At this point, trade shifted to intercolonial and West Indian trade.[65] The smaller coasting vessels used in this sort of trade were within the abilities of the early shipbuilders in Maryland since they primarily built pinnaces, shallops, barges, and wherries.[66] Nonetheless, the increase of the craft was still incremental at best. In 1642, Maryland reported only eight individuals even peripherally associated with shipbuilding: two boatbuilders, two mariners, one joiner, one sawyer, one blacksmith, and one brickmason.[67] In fact, the growth was so flat that in 1678 Governor Charles Calvert reported that, despite attempts to encourage it, no ships



Map depicting the pre-1700 dominance of Talbot County (the light gray area) over the remainder of the state, with three of the nine identified shipyards within its boundaries.

were being built in Maryland.[68] It would seem that while the governor had the right spirit, he overstated the situation; at the time of his statement, at least six shipyards appear to have been operational. These yards were the Smoote, Kings Creek, Dover, Avery, and Lowe shipyards, as well as the shipyard operated by Thomas Skillington, where in 1697 the largest vessel (450 tons) then produced in Maryland was launched. Additionally, a good deal of small-vessel construction was taking place on individual plantations. Small coastal trading vessels were constructed on the shores and at the wharves of many large tracts of land. However, since both the yards and the vessels they produced were small, even by seventeenth-century standards, and because shipbuilding was only a small portion of the owner's undertakings, these do not constitute true shipyards.

As the seventeenth century drew to a close, substantial changes began to take place in Maryland, affecting all aspects of life, shipbuilding included. For the first three-quarters of a century that the colony was in existence, the colonists strove to increase efficiency in tobacco production and to develop the wilderness into a home that Europeans could recognize. At the turn of the century, they had been successful in both of these goals, and the infrastructure of the colony was in place: stumps had been pulled, fences built, and houses erected, leading to more free time to pursue crafts. Furthermore, the sex ratios in the colony had begun to balance out due to the growth in the native-born population. As families grew, so did the opportunity to diversify production and establish home industries such as spinning and brewing.[69] The major incentive for diversification came as a result of the tobacco depression at the end of the seventeenth and the beginning of the eighteenth centuries. Prior to 1660, any abundance of tobacco in England was exported directly to the European continent, but after that date England began to enforce the Navigation Acts, which stringently curtailed this trade. Suddenly, supply outstripped demand. By 1681, the depression became so pronounced that some observers wondered whether the Chesapeake tobacco market would survive. King William's War (1689–97), and Queen Anne's War (1702–14) only exacerbated the problem.[70] With tobacco prices at an all time low, settlers sought other means of earning a living. Many continued to pursue agriculture in the form of grain and maize production, while others took up crafts such as leatherwork, weaving, and metalwork.[71] This diversification led to a steadier, expanded economy that began to generate urban centers that could support more craftsmen. Additionally, the collapse of the tobacco market and the associated decline in opportunity for advancement in the New World brought a cessation of the steady tide of white indentured servant labor that had supplied the workforce on the tobacco plantations. In response, planters began to import African slaves in 1698. With this newfound labor force, many poorer whites were no longer needed on the lands of large planters, so they also had to seek other sources of income.[72] Some of these individuals turned to shipbuilding as an alternative source of income.



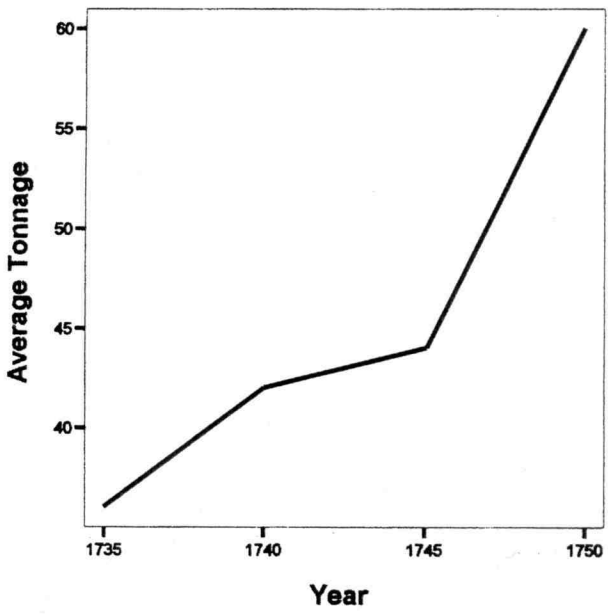
Count of shipyards graphed by their earliest recorded date of operation. The general pattern corroborates the historical accounts.

Shipbuilding benefited from this expanded interest in the crafts as well as from the formation of a new class of merchant-planters. The merchant-planters began to exclude the English factors from their trade network, and started trading directly with English and Scottish merchants. In order for Maryland entrepreneurs to conduct this trade, it became necessary for the first time for them to own vessels. Beginning during this period, these merchants began funding the construction of large vessels on both the eastern and western shores of Maryland.[73] These developments established an interesting dichotomy between tobacco and ships in terms of how the society assigned value to various objects. Tobacco was expensive because of the value people placed on it as a symbol of their wealth and their level of enculturation. Conversely, vessels were expensive because of the massive amounts of raw material and labor that their construction required and valuable because of their ability to transport tobacco to the location where its value would have been the highest.

The 1697 census reported that, since 1689, ninety-three vessels had been built on the Eastern Shore and sixty-seven in the remainder of the state.[74] Much of this shipbuilding was occurring in Talbot County, the center of the industry during this period. Furthermore, the 1698 Report of the Sheriffs references thirteen ships, nine "vessels," six pinks, twelve brigantines, seventy sloops, and fifty-one shallops owned in Maryland. The average tonnage of these vessels was 150 tons. While not all of these ships were necessarily built in Maryland, some certainly were, as were larger ones including the Skillington shipyard's 450-ton ship and the 358-ton *Elizabeth* that cleared Oxford in 1699.[75] This sudden boom in the shipbuilding market precipitated the shipyards and shipwrights taking on a more structured, professional appearance. As ships became larger, it became necessary to have permanent facilities manned by highly skilled workers to build and maintain them.[76]

The colony's increased interest in the shipbuilding industry was supported by the British government because American shipyards were more efficient than their British counterparts, producing cheaper vessels more quickly.[77] This fact had less to do with rugged individualism and colonial can-do entrepreneurship than with the timber shortages and bureaucracy that hindered British builders. The king's consent to American ship construction took the form of a number of laws passed between 1661 and 1723 designed to encourage Maryland shipbuilding. A 1661 piece of legislation imposed a tax of one pound of gunpowder and three pounds of shot per ton of shipping on vessels "not properly belonging" to the colony.[78] This law was followed by a 1694 law that had these provisions:

> And for the Encouragement of all such psons as have built Shipps or Vessells since the Assembly held at St. Mary's the 21st of September 1694 within this Province, as also for all such persons as shall from hence forward build any Shipps or Vessells within the province afd shall be free and clear from paying any



Graph of the average tonnage of vessels registered in Maryland for the years 1735–50.

> Duty impost or Custome for any Liquors imported into this Province. Liquors from Pensilvania East & West Jersey only excepted.[79]

Next in 1704, double the tax was placed on furs exported from the colony by non-Marylanders. The year 1715 saw the imposition of a tax of three pence per gallon on imported liquors and a tax of twenty shillings on each slave and Irish servant brought into the state. However, Maryland-owned vessels were exempt from these charges. Finally, in 1723, a duty of one shilling per barrel was charged on all pork for nonresidents.[80] One other law was discussed years later that provides a preview of how important shipbuilding was to become in the colony. In 1754, the General Assembly brought a motion to the Lower House that shipyard employees be exempted from being summoned to repair the Public Road.[81] Obviously, their employment, and by extension their product, was given precedence over other concerns. For shipbuilders to be relieved of public duty implies that vessels were considered vital to the public welfare.

As the 1700s progressed, some of the crafts that saw their inception during the tobacco recession of the late seventeenth century began to suffer. As large plantations strove for self-sufficiency, they incorporated many of the trades that required less skill and capital, generally employing slave or servant artisans to complete them. This trend left many of the free craftspeople of the newly established urban centers unemployed.[82] However, shipbuilders were not grossly affected by these developments as their trade involved large amounts of both capital and skill. Doubtless, small boats were still constructed on the shores of most plantations, but the larger vessels required for the European and West Indian trade were now constructed by professionals.

Throughout the early eighteenth century, shipbuilding continued to grow and the boom-bust cycle that would define much of its history was established. The trade was recessed around 1708 during Queen Anne's War, only to be revived in 1713 at the end of the hostilities.[83] There was a burst of activity until the early 1720s when another recession struck.[84] The market rebounded again in the 1730s.[85] Despite these frequent recessions, the general trend in Maryland shipbuilding was toward increase. However, none of this is to say that shipbuilding was truly a going concern during the first century of the colony. Until the 1730s, shipbuilding was underdeveloped throughout the South. There was simply too much interest in tobacco, and English shipping was too readily available. The sustaining employment of shipwrights during this period was likely ship repair, rather than new construction.[86] In 1731, the General Assembly noted that "There are but very few Trading Vessells belonging to the Inhabitants of this Province, severall Counties . . . have not one Trading Vessell belonging to them." Similarly, in 1732, the same body reported that "The number of Vessells belonging to this Province are about Sixteen Sloops, Two Snows & one Ship."[87] Clearly, although shipbuilding was on the rise, it had yet to reach a significant level.

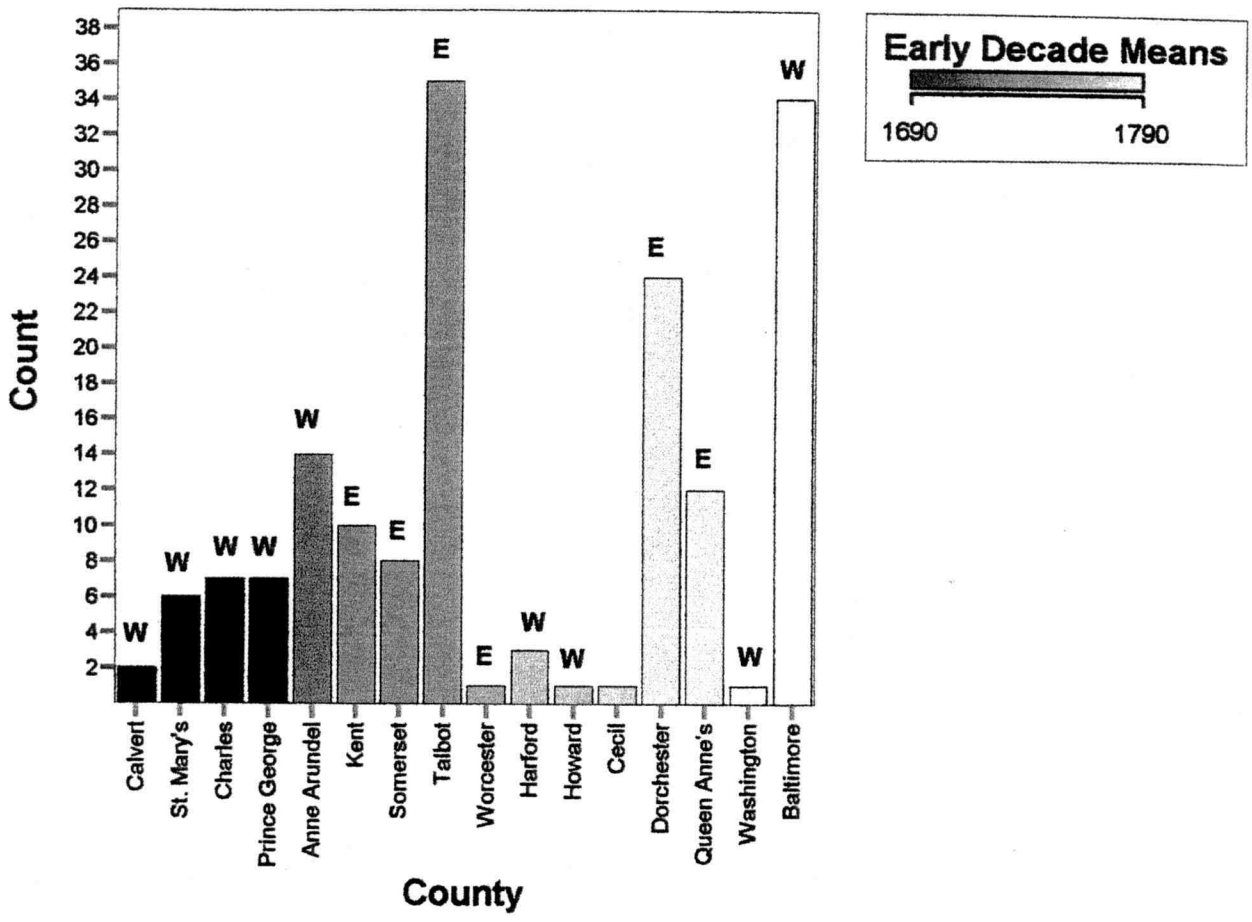
As the second and third quarters of the eighteenth century proceeded, the state of Maryland shipbuilding began to change. During the years leading up to the American Revolution, Maryland shipbuilding continued to suffer cyclical recessions, but the overall increase was much more pronounced. Throughout the 1740s and 1750s, Maryland merchants purchased more and more of their own shipping in an effort to seize greater control over the wealth generated by their exports.[88] Local merchants finally began to see the benefits that a locally owned merchant marine could foster in terms of independence from the credit system of the English merchants and their own overall economic growth. Accordingly, there was a steady increase in the average tonnage of vessels registered in Maryland. In 1735, the average was thirty-six tons; 1740 saw an increase to forty-two tons, with forty-four tons being the mean five years later. By 1750, the average tonnage had reached sixty. While this increase is impressive, it should be understood that in 1754 the average British vessel was eighty

tons. Large vessels, similar to the *Elizabeth* and Skillington's 450-ton ship, also continued to be built in the colony. In 1747, a 425-ton vessel was launched on the Nanticoke River.[89]

While all of these changes were incremental, it seems that 1748 represented the benchmark year of this period. In that year, the New England shipping to Annapolis dropped from eighty to thirty percent.[90] While this statistic is only for one port, it seems likely that Annapolis can be treated as a proxy for the state as a whole. Maryland shipbuilding had finally begun to achieve primacy in its own waters. To follow the Annapolis example further, the percentages of native-built shipping are known for the years 1747 through 1775. In 1747, only 9.8 percent of the vessels registered at Annapolis were Maryland-built. However, from 1748 to 1751, the percentage was 40.2 percent. For the next four years, the market held steady at 40.4 percent. It then increased to 48.8 percent between 1756 and 1759, only to decrease to 40.6 percent between 1760 and 1763. The percentage fell even further during the period of 1764 to 1767, reaching a low of 34.9 percent. However, the industry rebounded between 1768 and 1771 with percentages at Annapolis reaching 53.7 percent. Finally, from 1772 to 1775, the percentage was 56 percent.[91] Between 1745 and 1775, only six percent of the vessels that came into Annapolis were registered from New England. Maryland had established a strong shipbuilding industry at home and was consequently disinterested in outside shipping. To look slightly beyond the Maryland–New England dichotomy, in 1769, the Chesapeake colonies (Maryland and Virginia combined) produced 12.5 percent of the tonnage in British America from Florida to Newfoundland.[92] Similarly, while in 1771 the Chesapeake region built fewer ships, these ships were larger so the area again represented 12.5 percent of colonial shipping. For that year, Maryland represented 6.3 percent of the total, a nearly even split with Virginia.[93]

While the percentages of Maryland-built ships registered at Annapolis is a good indicator of the strength of Maryland shipbuilding in comparison to other regions, a more accurate index of the growth of the industry is the amount of built tonnage produced each year. Between 1748 and 1751, the built tonnage of Maryland vessels increased each year. This trend was reversed between 1752 and 1760. Then during the period of 1761 to 1775 the market saw a constant increase.[94] Between 1756 and 1775, Maryland produced ninety-eight ships, thirty-seven snows, sixty-six brigs, 111 schooners, and seventy-four sloops.[95] Overlapping that period and thus representing a similar sample, during the period of 1753 to 1776, Maryland built 126 vessels over one hundred tons, thirty-six over two hundred tons, and one vessel with a capacity of 320 tons. Much of this growth was stimulated by the high grain prices fostered by King George's War and the French and Indian War.[96] Vessels were required to export these grains from the colonies in order to take advantage of the growth market. In 1766, a dip in the fortunes of shipbuilders was observed as the grain market in the Mediterranean, Spain, Portugal, and the Wine Islands collapsed, causing a corresponding drop in the demand for new vessels. Shipbuilders recovered quickly by 1768, but the market was not as strong as it had been before, and shipbuilding was once again a risky business.[97] Clearly, the trends established early in the century persisted throughout: the market waxed and waned but generally tended towards an increase. In fact, the increased demand for Maryland-built vessels was so great that, by the mid-eighteenth century, there were not enough native shipbuilders to meet it. Consequently, during the 1740s and 1750s, skilled convicts began to be imported from England to fill the labor gap.[98]

The notion that the interests of local merchants drove this shift in shipbuilding fortunes is supported by the fact that between 1748 and 1759, seventy-five percent of Maryland-built vessels were owned by Marylanders. This percentage grew to 80 percent between 1760 and 1771 and reached 95 percent by the eve of the American Revolution.[99] The primary market for Maryland shipbuilders was



Graph depicting the dominance of the Eastern Shore during the first half of the eighteenth century. The letter above each column indicates if the county is located on the Eastern or Western Shore. Cecil County is not assigned to either shore because it is located at the head of the Chesapeake Bay.

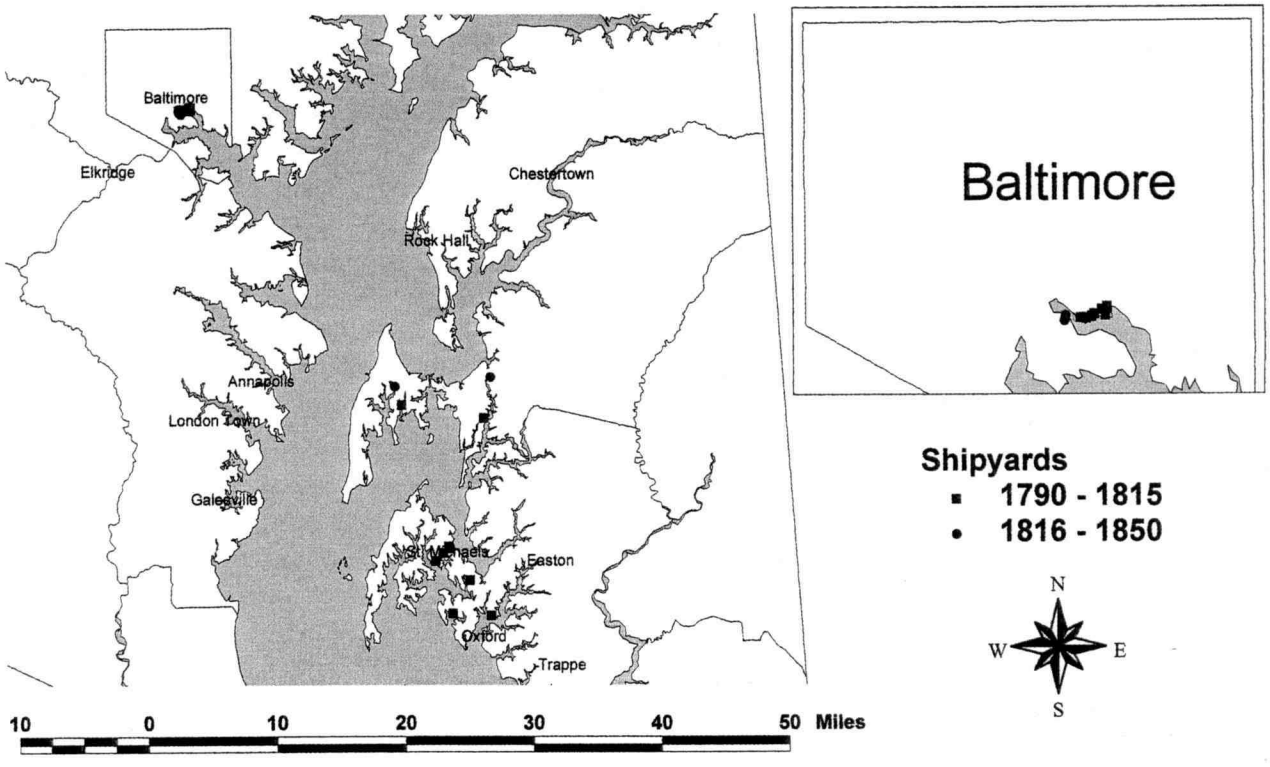
their fellow Marylanders, and it seems that their neighbors may have also been their only market. To the north, the percentage of Maryland-built tonnage reported at Boston, Philadelphia, and Portsmouth never exceeded three percent. South of Maryland, there were many years when no Maryland-built vessels were reported in either South or North Carolina, although Maryland-built tonnage did reach 9.5 percent in South Carolina for the period of 1770 to 1774.[100] Maryland shipbuilding had yet to leave an indelible mark on the shipping of North America.

Much of the growth of this period took place on the Eastern Shore. The soils of that region are not as well suited for growing tobacco as those of the western portion of the state's coastal plain. Whenever the tobacco market was depressed, the inhabitants of the Eastern Shore were the first to turn to other trades.[101] Two factors drove the inhabitants of this region to produce goods other than tobacco. Primarily, these individuals began to produce their own goods to fill the void left by the products they could no longer afford to import from England. Additionally, the goods they produced allowed them a means of exchange in the local market. One of the trades that grew out of this imposed self-sufficiency was shipbuilding. Shipbuilding fitted well into the Eastern Shore

economic scheme because it allowed a means to transport their other crafts to distant markets. As the region had less tobacco to export, they had fewer goods imported from England. Consequently, they began to focus on coastal trade for which locally produced vessels were well suited.[102] The Eastern Shore dominated the early shipbuilding market, especially the counties of Talbot and Kent,[103] with a ratio of five vessels built to every three in the rest of the state.[104]

As the eighteenth century progressed, shipbuilding's ancillary industries began to develop throughout Maryland so that, fifty years prior to the American Revolution, the Chesapeake had all of the industries necessary for independent shipbuilding.[105] In 1718, the Principio Company established the first iron forge in Maryland at the head of the Chesapeake Bay.[106] By the time of the Revolution, there were fifteen to twenty such foundries in the state with the capability of supplying all of the iron needs of local shipbuilders.[107]

While the iron industry depended only slightly on shipbuilders for its growth, the production of cordage and sails was inextricably linked to the development of shipbuilding. With the growth of ship construction, these crafts were given an opportunity to flourish for the first time in Maryland. In 1736, John Conner established himself as a sail-



Map depicting the early nineteenth century shift from the Eastern Shore to centralization in Baltimore. Note that of the ten shipyards on the Eastern Shore between 1790 and 1850, only two date from between 1816 and 1850.

maker in Annapolis; he was joined in 1753 by William Bicknell. Stephen West was spinning hemp for sailcloth and cordage at London Town on the South River in 1747.[108] Adam Bence was making sails in Bladensburg along the Potomac River in 1786.[109] The first ropewalk in Maryland was established in 1747,[110] with Annapolis, London Town, and Chestertown each supporting one a year later.[111] In 1774, Christopher Lowndes established what may have been the first ropewalk in the Potomac region.[112] The only known eighteenth-century ropewalk on the Eastern Shore was the Bedingfield Hands and Company ropewalk in Chestertown.[113] This paucity of ropewalks seems odd in conjunction with the Eastern Shore's dominance of shipbuilding during this period. A partial explanation for this incongruity may be that all ships' chandlery had heretofore been imported from England, thus making it acceptable for shipbuilders to import the required goods from across the bay. Consequently, ropemakers and sailmakers were able to dwell in the more developed portions of the colony. Despite this boom in ancillary industries, most shipbuilders continued to import their ships' chandlery not only from across the bay, but from across the ocean. This was partially due to attempts by Parliament to rein in the growing economy of the colonies. In 1736 and 1737, Parliament passed a protectionist act:

> Every vessel built . . . in any of his majesty's plantations in America shall, upon her first setting out to sea have . . . one full and complete set of sails made of sailcloth manufactured in Great Britain.[114]

Another act of Parliament taxed the sails of a vessel entering an English port if the sails were not English.[115] Thus, while England was trying to encourage the development of local shipbuilding through tax relief, it was at the same time attempting to keep the market from becoming fully independent by the same means. This state of affairs was brought on by the fact that Great Britain had been largely denuded of timber by this time making shipbuilding inefficient there, but hemp for sails could still be imported cheaply from Russia, processed, and exported at a large profit. Thus, what may have appeared as a paradoxical approach to American shipbuilding was, in fact, economically wise for English merchants. This behavior is not uncommon in core nations. In addition to the economic argument, it seems that the quality and quantity of the indigenously produced wares were simply not sufficient to meet the demands of shipwrights. Thus English goods continued to dominate the market up until the American Revolutionary War.[116]

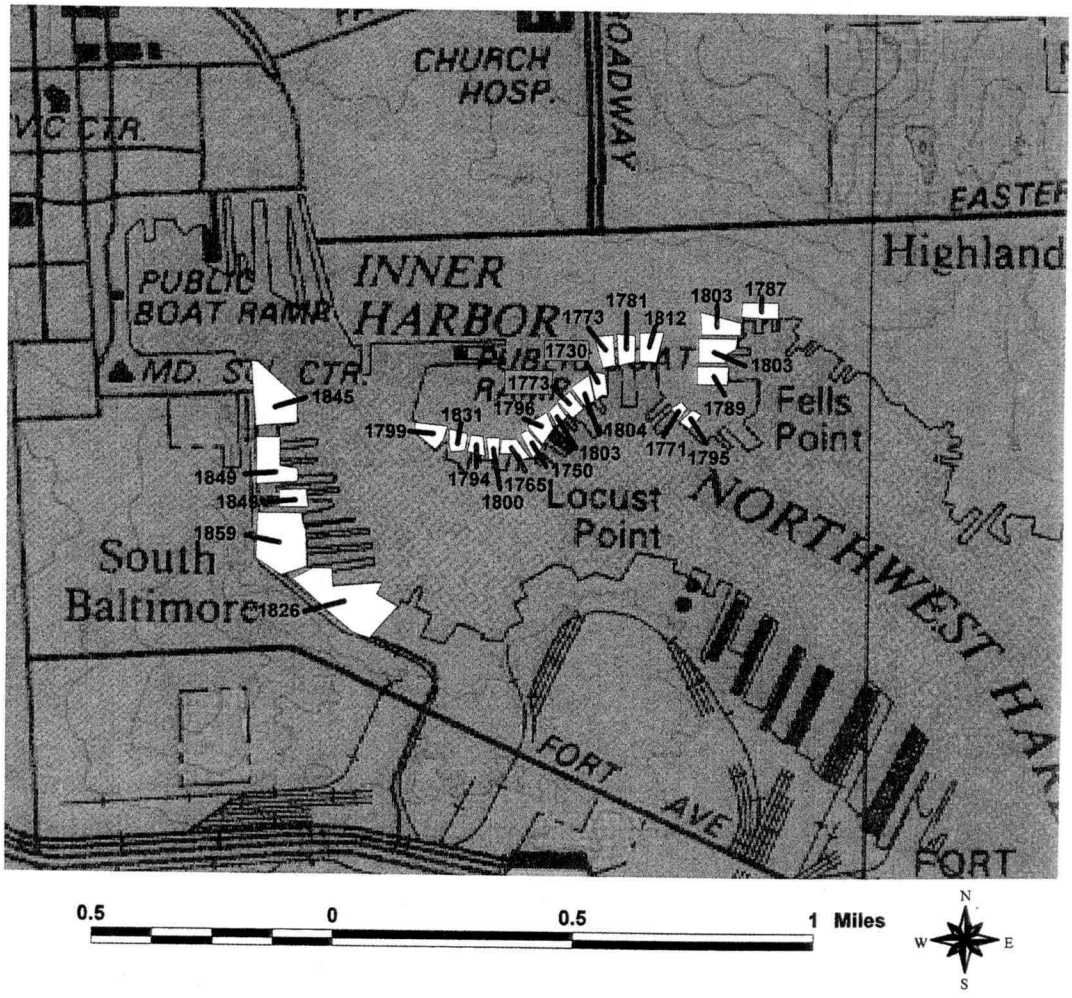
In 1776, the percentage of Maryland-built ships in Lloyd's Registry reached its highest mark to that time, 8.8 percent of the total American shipping.[117] At the same time, Maryland shipbuilders were beginning to take part in what would become the American Revolution. On 3 December 1775, Congress authorized the construction of thirteen frigates to form the basis of the federal navy. One of these vessels, the 28-gun *Virginia,* was contracted to be built by George Wells of Fells Point, Baltimore. Six months later in June of 1776, the Maryland General Assembly authorized the construction of seven galleys for the state navy. The first of these galleys was launched on 27 December 1776.[118] A few years later in May 1781, under the second Defense of the Bay Act, the Maryland Assembly ordered that eight barges and two galleys be built. Because they felt that the government was moving too slowly to defend their maritime interests, Eastern Shore citizens also began building multiple barges, and Baltimore began to build a galley in 1781. Because the builders of Maryland's official navies were concentrating their efforts on barges and galleys, their vessels were generally not menacing English shipping channels or engaging ships of the line in pitched naval battles. However, they were invaluable in deterring privateers from haunting Maryland waters, protecting merchant vessels, transporting troops, and serving as couriers in the region.[119]

Yet, some of the vessels constructed in Maryland during this period did give English vessels cause for concern. At the beginning of the Revolution, the Chesapeake was producing essentially two types of vessels: large ships and brigs that were slow, cumbersome, and conservative, but which maximized cargo capacity; and smaller vessels, chiefly sloops and schooners, that were radically designed and fast, but which sacrificed cargo space. Throughout the war, Maryland builders continued to construct these types of vessels with the larger ones serving as merchantmen and men-of-war and the smaller, quicker vessels being used as privateers. However, the Revolution had effects on both the large and small vessels. Brigantines began to outpace the other larger vessels in terms of production because their hermaphrodite rig provided a good mixture of the straight sailing speed of a square rig and the maneuverability and adaptability of the fore and aft rig.[120] Adopting a similar rig, but growing more out of the radically designed fast vessels of the earlier period, the Baltimore schooner came into its own at this time as well. The rudiments of this design had been in existence since roughly the middle of the century, but it was not until the Revolution that there was an opportunity to show its true value. With their slim hulls and raking ends, these vessels were fast enough to avoid ships of the line, but they were also large enough and sufficiently well armed to stand their ground against privateers and smaller war vessels.[121] Throughout the war, these schooners made a name for themselves and proved the legitimacy of Maryland shipbuilding. The Baltimore schooner was easily the most significant maritime development for Maryland to come out of the American Revolution. After the war, these vessels saw service wherever a sizable but speedy ship was required, most notably as privateers and in the slave trade. Eventually, this vessel type developed into the now famous Baltimore clipper.[122]

By the end of the colonial period, the Chesapeake region had replaced Pennsylvania as the second leading ship producing region; New England still maintained dominance.[123] After a recession immediately following the war, Maryland's shipbuilding industry continued to grow, especially during the 1790s.[124] Maryland merchants and planters were now left completely to their own devices in regards to getting tobacco to the European market. Ships that were large enough to transport the bulky leaf across the ocean were now in high demand.[125] The trend that had begun mid-century with merchants beginning to own their own vessels now reached fruition, and the tonnage produced in Maryland expanded. Military contracts also continued to be awarded to local shipwrights. In 1797, when Congress authorized the construction of six new frigates, one of them, the 36-gun *Constellation,* was built in Baltimore by David Stodder. This vessel was a sister ship to the USS *Constitution* of *Old Ironsides* fame. Additionally, William Price of Baltimore was authorized to build a gunboat in 1805. The firm of Flannigan and Parsons of Baltimore built the 44-gun frigate *Java* in 1813. That same year, Thomas Kemp, also of Baltimore, built an 18-gun sloop-of-war.[126] Some of Joshua Barney's gunboats were Baltimore-built as well. The fact that, while there was some naval shipbuilding in St. Michael's, Talbot County, the majority of the contracts were awarded to Baltimore-based shipyards is indicative of trends that, during the first two quarters of the nineteenth century, substantially changed the face of Maryland shipbuilding.

The shipbuilding industry in Maryland suffered another of its periodic recessions in 1808 in response to the Non-Intercourse Act, which cut off all trade with France and Great Britain. However, it quickly recovered in 1811, only to decline again in 1813 due to the War of 1812.[127] After a brief resurgence following the war, shipbuilding, like many other industries, was again struck by a depression in 1819 as an economic panic swept the nation. Shipbuilding was depressed in Baltimore throughout the 1820s. The St. Michael's area of Talbot County, that had up to this point been a major

shipbuilding center, all but ceased production and did not resume until the 1840s.[128] During this period, the shipbuilding industry of Maryland faced a major ecological catastrophe. Almost two hundred years of unbridled development had finally succeeded in depleting the region's natural stores of timber.[129] The Eastern Shore seems to have been particularly hard hit. While it was possible for shipbuilders to import lumber from other regions, and they most certainly did, it was harder for Eastern Shore builders to take advantage of this trade.[130] The Eastern Shore had continued to have few urban centers of any size, while the western portion of Maryland had developed major ports at Baltimore and Annapolis. The presence of these ports and the centralization of shipbuilders at them put the Eastern Shore at a distinct disadvantage when it came to importing materials. At the same time, other even more significant changes were being wrought in the worlds of science and engineering that would ultimately lead to the total centralization of all large-scale shipbuilding into a few companies located in Baltimore, namely the creation of iron vessels driven by steam engines.



Map indicating the locations and earliest known dates for shipyards located in Baltimore. Note that all of the eighteenth-century shipyards are clustered on the northern edge of the harbor near the historic center of the city, while the majority of the larger nineteenth-century shipyards are located to the west, near the railhead.

The first commercially employed steam engine was used by John Fitch in 1790 on the Delaware River.[131] This development was followed thirty-five years later, in 1825, by the *Cordus,* the first iron-hulled vessel built in the United States. The *Cordus* also had the distinction of being the first iron hulled steamship. By the middle of the century, all naval vessels had gone to steam propulsion using screw propellers.[132] However, the transition was not instantaneous. Steam vessels did not surpass those driven by the wind in tonnage until the 1880s, and it was not until after the turn of the twentieth century that the production of steamships finally outstripped sailing vessels. The transition was not complete until World War II.[133] Thus, it took more than a century for iron and steam to push wood and sail out of the market. With the advent of the Industrial Revolution and trains, people had begun to develop rigid schedules and very exacting ideas about how much deviation from these timetables was acceptable. The wind was simply not dependable enough for sailing vessels to fulfill these expectations. Furthermore, by this period, significant road networks and bridges had been constructed reducing the need for shipping. Even the beautiful clipper ships began to see a decline. With the threat of violence reduced after the War of 1812, the need for speed was replaced by a desire for more cargo space.[134] However, it was impractical to build a clipper ship larger than six hundred tons, so they could not compete with the larger iron-hulled cargo vessels. By the 1860s, even these ships had disappeared.[135]

The period when "the Industrial Revolution went to sea" had monumental effects on all facets of the shipbuilding trade.[136] The first half of the nineteenth century was a traumatic period for shipwrights as they struggled to incorporate the new materials and propulsion systems into their repertoire of skills.[137] Entirely new crafts had to be learned and incorporated into the shipbuilding process. New craftsmen such as boilermakers and punch and shear operators had to be hired. The shipyards themselves had to be expanded to include engineering works for the construction of boilers and additional equipment to facilitate working large pieces of iron. Beginning in the 1820s, there was a consolidation of shipbuilding into a few yards in centralized locations. This transition was simply a matter of economics. The smaller shipbuilders did not have the capital to purchase all of the machinery and raw material necessary to build a vessel, let alone hire all of the specialized laborers required to see it to successful completion. Gone were the days when the bulk of the materials needed were available from the surrounding environment and a handful of individuals could master all of the skills required to build a vessel. The larger yards were centralized in the big cities for much the same reason that shipyards had traditionally been in the vicinity of cities; it was necessary for them to be near their employees and customers. This new mode of ship construction depended on materials that were not locally available. They positioned themselves near importation centers located not only in major ports, but near railheads. In Maryland, Baltimore became the center of the shipbuilding industry. Gone were the smaller dispersed shipyards of the colonial period; they had been replaced by corporate "iron works" such as Baltimore's Columbia Iron Works.[138]

The only exception is the small wooden vessel construction that persists throughout the state to the present day. Areas such as Solomons Island continue to produce skiffs, bugeyes, racing canoes, and oystering vessels. However, all of these vessels are small and analogous to the plantation-based small-boat construction that has been ubiquitous in Maryland since the earliest days. While these vessels represent an important economic boon to their regions and a source of cultural pride for the state as a whole, they do not constitute true shipbuilding. By the mid- to late nineteenth century, Maryland shipbuilding had largely adopted the character that it maintains today: large industrial shipyards servicing not just Maryland merchants but international interests complemented by regional small-scale boatbuilding.

Acknowledgments

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Notes

1. Henry Wadsworth Longfellow, "The Building of the Ship," in *Best Loved Poems* (Chicago: Spencer Press, 1949), 33.
2. C. C. Hall, *Narratives of Early Maryland, 1633–1684* (New York: Charles Scribers and Sons, 1910), 9.
3. Originally 1635. Hall, *Narratives of Early Maryland,* 82–83.
4. A. P. Middleton, *Tobacco Coast: A Maritime History of Chesapeake Bay in the Colonial Era* (Baltimore: John Hopkins University Press, 1984), 179.
5. C. W. Mowbray, *The Dorchester County Fact Book* (published by the author, 1980) and Middleton, *Tobacco Coast,* 149.
6. United States Department of Agriculture, soil survey books for the Maryland counties bordering the Chesapeake Bay published between 1967 and 1982.
7. H. E. Vokes and J. Edwards Jr., *Geography and Geology of Maryland* (Baltimore: State of Maryland, Department of Natural Resources, Maryland Geological Survey, Bulletin 19, 1974), 171.
8. M. V. Brewington, *Chesapeake Bay: A Pictorial Maritime History* (Cambridge, Md.: Cornell Maritime Press, 1953), 11.
9. Middleton, *Tobacco Coast,* 244–45.
10. Middleton, *Tobacco Coast,* 245.
11. Bruce F. Thompson and John L. Seidel, *Field Procedures for the Twenty-Third Annual Field Session in Maryland Archaeology: The Stephen Steward Shipyard (18AN817)* (Crownsville: Maryland Historical Trust, Office of Archeology, 1993), 5.
12. J. H. Pleasant, ed., *Archives of Maryland XLVII: Journal of Correspondence of the State Council of Maryland* (Baltimore: Maryland Historical Society, 1930), 496.
13. Thompson and Seidel, *Field Procedures,* 5.
14. Jason D. Moser, *Ropewalks in the Eighteenth Century: The Structure of an Early Chesapeake Industry* (master's thesis, University of Maryland, 1998), 73.
15. J. A. Goldenberg, *Shipbuilding in Colonial America* (Charlottesville: University of Virginia Press, 1976) and Moser, *Ropewalks in the Eighteenth Century,* 83.
16. Maryland State Archives (MSA), Somerset County Land Records, Liber LW, no. 6, folio 43, 1859; Brewington, *Chesapeake Bay;* Mowbray, *Dorchester County,* 149; and C. W. Mowbray and M. D. Rimpo, *Closeups of Early Dorchester County History* (Cambridge, Md.: Dorchester County Historical Society, Dorchester County Public Library, no date).
17. D. J. Preston, *Talbot County: A History* (Centreville, Md.: Tidewater Publishers, 1983), 174 and E. Arnett, R. J. Brugger, and E. C. Papenfuse, *Maryland: A New Guide to the Old Line State* (Baltimore: Johns Hopkins

University Press, 1999), 181.

18. W. Abell, *The Shipwright's Trade* (New York: Conway Maritime Press, 1981), 96.

19. P. H. Spectre and D. Larkin, *Wooden Ship* (Boston: Houghton Mifflin, 1991), 179.

20. A. P. Middleton, "Ships and Shipbuilding in the Chesapeake Bay and Tributaries," *Chesapeake Bay in the American Revolution,* E. M. Eller, ed. (Centreville: Tidewater Publishers, 1981), 118.

21. Goldenberg, *Shipbuilding in Colonial America,* 16.

22. Middleton, *Tobacco Coast,* 16.

23. Moser, *Ropewalks in the Eighteenth Century,* 21.

24. Thompson and Seidel, *Field Procedures,* 5.

25. Middleton, *Tobacco Coast,* 16.

26. Goldenberg, *Shipbuilding in Colonial America,* 84.

27. Hall, *Narratives of Early Maryland,* 82.

28. Moser, *Ropewalks in the Eighteenth Century,* 35.

29. F. Tilp, *This Was Potomac River* (Alexandria, Va.: published by the author, 1978); Moser, *Ropewalks in the Eighteenth Century,* 60; and Thompson and Seidel, *Field Procedures,* 5.

30. Goldenberg, *Shipbuilding in Colonial America,* 17.

31. C. B. Clark, *The Eastern Shore of Maryland and Virginia* (New York: Lewis Historical Publishing, 1950), 293.

32. Middleton, "Ships and Shipbuilding," 120.

33. Vokes and Edwards, *Geography and Geology,* 44.

34. Middleton, *Tobacco Coast,* 40–41.

35. Vokes and Edwards, *Geography and Geology,* 44.

36. Vokes and Edwards, *Geography and Geology,* 149 and Middleton, *Tobacco Coast,* 98.

37. Middleton, *Tobacco Coast,* 98.

38. Vokes and Edwards, *Geography and Geology,* 44.

39. Vokes and Edwards, *Geography and Geology,* 44 and Arnett et al., *Maryland,* 387.

40. Goldenberg, *Shipbuilding in Colonial America,* 71.

41. South Carolina Institute of Archaeology and Anthropology (SCIAA), *Shipyards and European Shipbuilders in South Carolina,* 2000, http:www.//cla.sc.edu/sciaa/ staff/amerc/shipbuild.html.

42. Middleton, "Ships and Shipbuilding," 122.

43. Goldenberg, *Shipbuilding in Colonial America,* 85–86; Middleton, "Ships and Shipbuilding"; and Spectre and Larkin, *Wooden Ship,* 122–23.

44. Goldenberg, *Shipbuilding in Colonial America,* 62.

45. MSA, Dorchester County Land Records, Liber HD, no. 12, folio 190, 1797; MSA, Dorchester County Land Records, Liber HD, no. 20, folio 216, 1802; MSA, Talbot County Land Records, Liber JL, no. 3, folio 53, 1803; Dorchester County Land Records, Liber HD, no. 27, folio 374, 1810; and MSA, Somerset County Land Records, Liber GH, no. 1, folio 302, 1822.

46. A. Ahrens, *Design Makes a Difference: Shipbuilding in Baltimore, 1795–1835* (Bowie: Heritage Books, 1998).

47. Spectre and Larkin, *Wooden Ship,* 218.

48. Spectre and Larkin, *Wooden Ship,* 194.

49. Goldenberg, *Shipbuilding in Colonial America,* 68–69.

50. S. G. Wolf, *As Various as Their Lands: The Everyday Lives of Eighteenth-Century Americans* (London: Chatham Publishing, 1993), 188.

51. D. J. Souza and S. M. Peters, *Shipyard Archaeology: An Encyclopedia of Underwater and Maritime Archaeology,* J. P. Delgado, ed. (New Haven: Yale University Press, 1997).

52. Spectre and Larkin, *Wooden Ship,* 146 and Moser, *Ropewalks in the Eighteenth Century.*

53. Brewington, *Chesapeake Bay.*

54. Goldenberg, *Shipbuilding in Colonial America,* 69.

55. Brewington, *Chesapeake Bay,* 9.

56. Goldenberg, *Shipbuilding in Colonial America,* 6.

57. R. Semmes, *Captains and Mariners of Early Maryland* (Baltimore: Johns Hopkins University Press, 1937), 73.

58. Middleton, *Tobacco Coast,* 253.

59. Middleton, *Tobacco Coast,* 277.

60. Brewington, *Chesapeake Bay.*

61. Semmes, *Captains and Mariners,* 72.

62. Middleton, *Tobacco Coast,* 106.

63. Vokes and Edwards, *Geography and Geology,* 154.

64. Middleton, *Tobacco Coast,* 174.

65. Howard I. Chapelle, *American Small Sailing Craft: Their Design, Development and Construction* (New York: W. W. Norton, 1951), 13.

66. Semmes, *Captains and Mariners,* 72.

67. R. R. Menard and L. G. Carr, "The Lords Baltimore and the Colonization of Maryland," *Early Maryland in a Wider World,* D. B. Quin, ed. (Detroit:

Wayne University Press, 1982), 202.
68. Goldenberg, *Shipbuilding in Colonial America,* 26.
69. Louis G. Carr, "Diversification in the Chesapeake: Somerset County Maryland, in Comparative Perspective," in *Colonial Chesapeake Society,* L. G. Carr, P. D. Morgan, and J. B. Russo, eds. (Chapel Hill: University of North Carolina Press, 1988), 351–55.
70. Middleton, *Tobacco Coast,* 141.
71. Carr et al., "Introduction," in *Colonial Chesapeake Society,* 6.
72. Carr et.al, "Introduction," 7.
73. Thompson and Seidel, *Field Procedures,* 5.
74. Brewington, *Chesapeake Bay,* 10.
75. Middleton, *Tobacco Coast,* 250–51, 278.
76. R. J. Winklareth, *Naval Shipbuilders of the World from the Age of Sail to the Present Day* (London: Chatham Publishing, 2000), 16.
77. Middleton, *Tobacco Coast,* 270.
78. Middleton, *Tobacco Coast,* 280.
79. W. H. Browne, ed., *Archives of Maryland: Proceedings and Acts of the General Assembly of Maryland, September 1693–June 1697* (Baltimore: Maryland Historical Society, 1899), 248.
80. Middleton, *Tobacco Coast,* 290.
81. Pleasant, *Archives of Maryland,* 475–76.
82. J. B. Russo, "Self-Sufficiency and Local Exchange: Free Craftsmen in the Rural Chesapeake Economy," in *Colonial Chesapeake Society,* 431.
83. Middleton, *Tobacco Coast,* 251.
84. Thompson and Seidel, *Field Procedures,* 5.
85. Middleton, *Tobacco Coast,* 253.
86. Goldenberg, *Shipbuilding in Colonial America,* 52.
87. B. C. Steiner, *Archives of Maryland: Proceedings and Acts of the General Assembly of Maryland, May 1730–August 1732* (Baltimore: Maryland Historical Society, 1917), 589.
88. Goldenberg, *Shipbuilding in Colonial America,* 118.
89. Middleton, *Tobacco Coast,* 276–77.
90. Goldenberg, *Shipbuilding in Colonial America,* 118.
91. Data drawn from the appendix of Goldenberg, *Shipbuilding in Colonial America,* 185–216.
92. Middleton, "Ships and Shipbuilding" and Middleton, *Tobacco Coast,* 263.
93. Middleton, *Tobacco Coast,* 263–64.
94. Goldenberg, *Shipbuilding in Colonial America,* 119.
95. Middleton, "Ships and Shipbuilding," 105.
96. Middleton, *Tobacco Coast,* 285, 260.
97. Middleton, *Tobacco Coast,* 261.
98. Middleton, *Tobacco Coast,* 164–70.
99. Goldenberg, *Shipbuilding in Colonial America,* 119.
100. Data drawn from the appendix of Goldenberg, *Shipbuilding in Colonial America,* 130–84, 217–45.
101. Middleton, *Tobacco Coast,* 176–77.
102. Clark, *Eastern Shore,* 292.
103. Middleton, *Tobacco Coast,* 251.
104. Clark, *Eastern Shore,* 292.
105. Middleton, "Ships and Shipbuilding," 102.
106. Middleton, "Ships and Shipbuilding" and Middleton, *Tobacco Coast,* 104.
107. Moser, *Ropewalks in the Eighteenth Century,* 21.
108. Middleton, *Tobacco Coast,* 255.
109. Tilp, *This Was Potomac River.*
110. Moser, *Ropewalks in the Eighteenth Century,* 3.
111. Middleton, "Ships and Shipbuilding," 102 and Middleton, *Tobacco Coast,* 255.
112. Tilp, *This Was Potomac River.*
113. Moser, *Ropewalks in the Eighteenth Century,* 60.
114. Moser, *Ropewalks in the Eighteenth Century,* 125.
115. Middleton, *Tobacco Coast.*
116. Middleton, *Tobacco Coast,* 254 and Moser, *Ropewalks in the Eighteenth Century,* 3.
117. Goldenberg, *Shipbuilding in Colonial America,* 246.
118. E. M. Eller, *Chesapeake Bay in the American Revolution* (Centreville: Tidewater Publishers, 1981), xxiii, 20 and Winklareth, *Naval Shipbuilders,* 126, 192.
119. Eller, *Chesapeake Bay,* xxxii, 51.
120. Middleton, "Ships and Shipbuilding," 98, 130.
121. Howard I. Chapelle, *The Baltimore Clipper: Its Origin and Development* (New York: Cover Publications, 1988) and Ahrens, *Design Makes a Difference,* 29.
122. Ahrens, *Design Makes a Difference,* 69.
123. Goldenberg, *Shipbuilding in Colonial America,* 120.
124. Ahrens, *Design Makes a Difference.*
125. Middleton, "Ships and Shipbuilding," 129–30.
126. Winklareth, *Naval Shipbuilders,* 168, 192, 193.
127. Ahrens, *Design Makes a Difference.*

128. Peter Lesher, "Edward Willey and the Revival of Shipbuilding in St. Michaels," *Weather Gauge* 21 (1995): 22–26 and Peter Lesher, "Oxford's Shipyard: Benson and Bateman," *Weather Gauge* 33 (1997): 13–18.
129. Vokes and Edwards, *Geography and Geology,* 171.
130. MSA, Somerset County Land Records, Liber LW, no. 6, folio 43, 1859.
131. Richard A. Gould, *Archaeology and the Social History of Ships* (Cambridge: Cambridge University Press, 2000), 240.
132. Winklareth, *Naval Shipbuilders,* 20.
133. Gould, *Archaeology,* 240 and Spectre and Larkin, *Wooden Ship,* 200.
134. Ahrens, *Design Makes a Difference,* 29.
135. Chapelle, *Baltimore Clipper,* 144.
136. Gould, *Archaeology,* 264.
137. Gould, *Archaeology,* 266 and SCIAA, *Shipyards and European Shipbuilders.*
138. Winklareth, *Naval Shipbuilders,* 21.