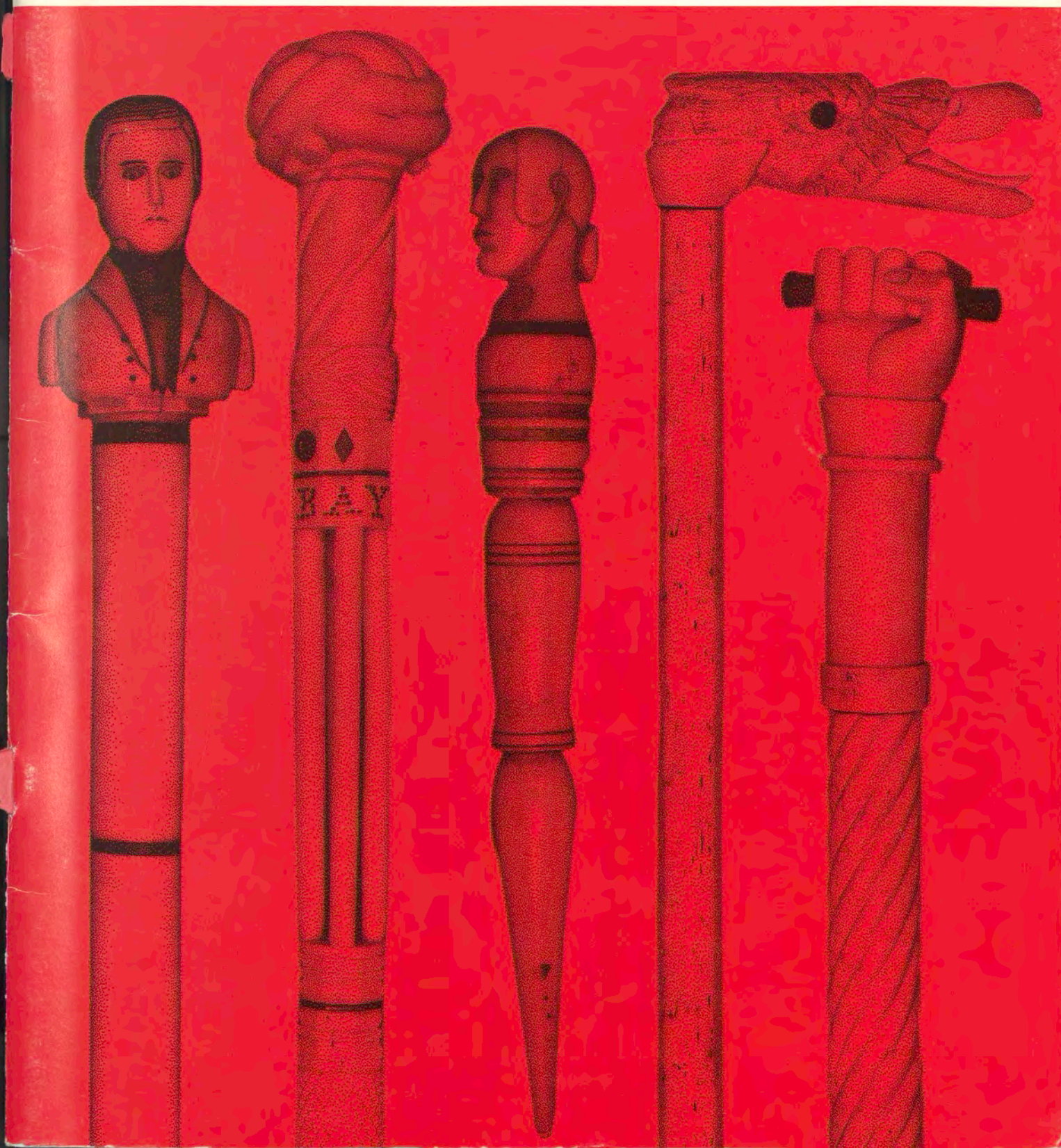
The Log *of* Mystic Seaport

Summer 1995

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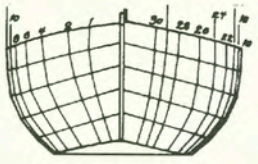
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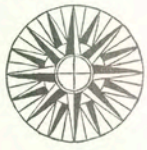
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Sightings

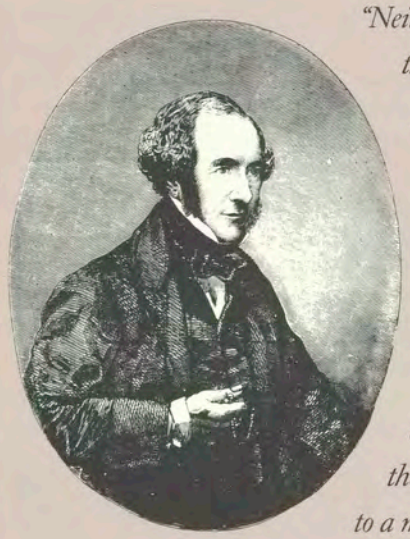


On this page of *The Log*, 25 issues ago in the winter of 1988, I reflected on the extraordinary accomplishments of John Gardner, who had been on the staff for 20 years and was easing back from his very full work load. At that point John was 83 years old. In the years since, John has answered innumerable letters, written many articles, given a number of speeches, counseled dozens of people, written one book, and is just finishing another. So much for a reduced work load. Now, at age 90, John is seriously talking about giving himself some time off and is planning to move to Massachusetts to be with his daughter. As the dean of American watercraft scholar-practitioners John has made an enormous impact on Mystic Seaport and on the lives of virtually millions of people who have been exposed to his efforts here or through other contact. ❧ John was motivated to join the staff of Mystic Seaport through the persuasiveness and commitment of Curator Ed Lynch. Through his writings in the *Maine Coast Fisherman*, John was an acknowledged authority on small craft when he came to Mystic. The union of these two institutions, Mystic Seaport and John Gardner, created a dynamic that has had a positive impact around this country and internationally. During his first year at the Museum, John worked with the Curatorial Department to create the first Small Craft Workshop, which has continued as an annual weekend event that brings hundreds of boating enthusiasts and nearly one hundred boats to the Museum. June 1995 will see the twenty-sixth such event here; but more important than this enduring record is the Small Craft Workshop's role as the model from which dozens of variations on the theme have been developed in maritime museums and communities in the U.S. and abroad. The healthy proliferation of this kind of gathering has introduced tens of thousands to the joys of "simply messing about in boats." ❧ John also recognized that there was a need to meet the strong public interest in learning to build wooden boats. His boatbuilding classes began as a course taught one night a week for ten weeks. Very soon he was teaching a different group each night of the week for the ten week course as people sought this opportunity to study with the master. We became aware of an unusual problem during the early years of the classes. People were driving great distances–sometimes three or more hours each way one night a week for ten weeks–to experience John's instruction. The solution was to create a concentrated version of the course with instruction going on for three full days in succession. Not only did this resolve our concern for the safety of the long-distance commuters, but also it opened the opportunity for people from all over the country. Just as with the workshop, the concept of avocational boatbuilding classes has proliferated around the country. ❧ John's great legacy is being created through his writing. He generously shares his knowledge through the millions of words he has put in print over many decades and through his correspondence. He receives and answers fan letters and inquiries from all over the world, and his books and articles–including in this issue his eighteenth contribution to *The Log*–will be read for generations. ❧ John, as we all might suspect, is a native of Maine, who made his way to Columbia University for his academic training. With his solid values and solid education, he spent the first 65 years of his life gathering knowledge of our watercraft and their heritage as well as the skills of the boatbuilder. Then, at an age when other people would be considering retirement, John began his new career here at Mystic Seaport. During the last 25 years, he not only taught and wrote, but also researched, designed, and built boats, guided the development of a great collection of traditional tools, and inspired the growth of our boat collection, which has become a unique historic asset of more than 480 boats, a resource unequaled in any maritime museum in the world. ❧ As John completes his career here, he should find great satisfaction in what he has achieved, not for himself but for all of us who have benefited from his efforts. He is a gentle man and one with a wry and lively sense of humor. He is a brilliant scholar and teacher, and a skilled craftsman. Without John's presence here in Mystic there will be a void in our lives. We will value the enduring legacy of his writings, but we will greatly miss the pleasure of his company. ❧

J. Revell Carr

A Tale of Two Shipbuilding Societies: The Influence of Construction Materials on Nineteenth-Century Shipbuilding

WILLIAM H. THIESEN



JUDY BEISLER PHOTO

"Neither the shapes, the proportions, the joints, the fastenings, nor the functions of the various members forming the hull of an iron ship, can be said to resemble, much less to copy, those of wood." So wrote British engineer John Scott Russell in 1865, continuing: "Thus has the art of shipbuilding undergone an entire revolution by the mere fact of the change of material from a vegetable to a mineral substance."[1]

John Scott Russell. Illustrated London News, *3 April 1858.*

As Scott Russell's remarks suggest, the material employed in building a ship plays a critical role in determining the nature and method of its design. Wood, a readily-shaped organic material used by shipbuilders for thousands of years could be altered with relatively simple handtools and required only rule-of-thumb building techniques. The nineteenth-century adoption of iron required a new manner of shipbuilding, divorced from the tools and methods associated with wood and more akin to modern-day engineering. Iron's introduction also fostered the need to understand new material properties and accurate hull design, encouraging the use of testing and theory. In Britain, the adoption of iron shipbuilding material facilitated development away from a previously shared Anglo-American shipbuilding tradition toward a distinctive theoretically based tradition.

During the same period, the American industry's reliance on wood encouraged a shipbuilding tradition based on practical methods.

By comparing the shipbuilding trade of Great Britain and the United States, this article will analyze the influence of the use of iron construction materials on nineteenth-century ship construction. Focusing on topics such as material testing, ship design, and professional education and publication, it will also address such issues as how iron changed British and American shipbuilding, how ship construction methods differed in each country, and what caused these differing approaches.

To provide some context, this story first requires a brief history of Anglo-American shipbuilding traditions during the colonial period and British and American shipbuilding industries during the nineteenth century. Prior to the American Revolution, there developed a common Anglo-American shipbuilding tradition first transmitted from England to America through skilled immigrant shipwrights. The basis for this tradition rested on the use of drawings, observation of natural laws, and the use of practical experience. As early as the sixteenth century, English shipbuilders had employed drawings from which to lay down the dimensions for their ships. Drawings continued to be used by American shipbuilders through most of the eighteenth century. Anglo-American shipbuilders relied upon natural forms to design their ships' hulls. Through the early nineteenth century both the British and Americans believed the underbody of a ship should resemble the shape of a fish, or the immersed lines of a duck, where the form is full forward and fine to the rear. Finally, to improve each successive vessel they built, shipbuilders gathered information from observation and practical experience with their products.[2]

Throughout the late eighteenth and early nineteenth centuries, American shipbuilders became renowned for producing high-quality wooden sailing vessels at competitive prices. From the War of 1812 until the Civil War, low production costs and a reputation for quality workmanship enabled America's shipbuilders to become the world's leaders. After the Civil War, the falling prices of British-built iron vessels sent America's wooden shipbuilding industry into decline. Despite this predicament,

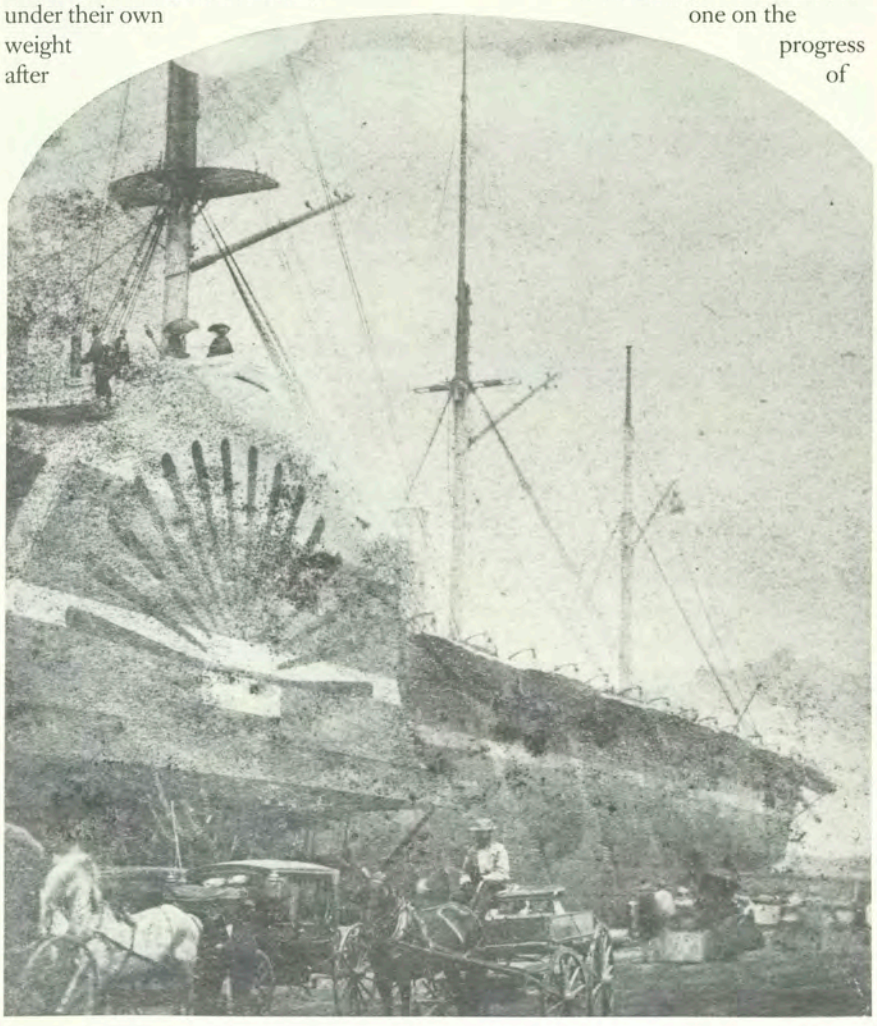
America's wooden-ship production continued to exceed its iron-ship production for the rest of the nineteenth century due to the unnaturally high cost of tariff-protected iron, the country's plentiful supply of shipbuilding timber, and the immense capital costs required to establish an iron shipyard.[3] Even in Pittsburgh, center of the country's greatest iron and coal reserves, wooden vessels could be built for half of the price of comparable iron ships during most of the nineteenth century.[4]

In contrast, the British began a tradition of iron shipbuilding in the late eighteenth century due to the increasing scarcity of suitable domestic shipbuilding timber. This was enhanced in the nineteenth century by the introduction of lucrative government mail subsidies. Until 1783, when Englishman Henry Cort devised the process for rolling iron plate, it was impossible to construct iron boilers and hulls. The British moved quickly, however, to exploit this new use of iron. By 1786, they had applied iron plate to the manufacture of boilers and, within a year, John Wilkinson fabricated the canal boat *Trial* from iron.[5] In 1818, Scottish shipbuilders on the Clyde constructed the first iron sailing vessel, the *Vulcan*. In 1822, the London-built *Aaron Manby* incorporated steam power in an iron vessel for the first time. And finally, in 1858, the British constructed the mammoth nineteen-thousand-ton *Great Eastern*, over three times the size of the day's next-largest iron vessel.[6]

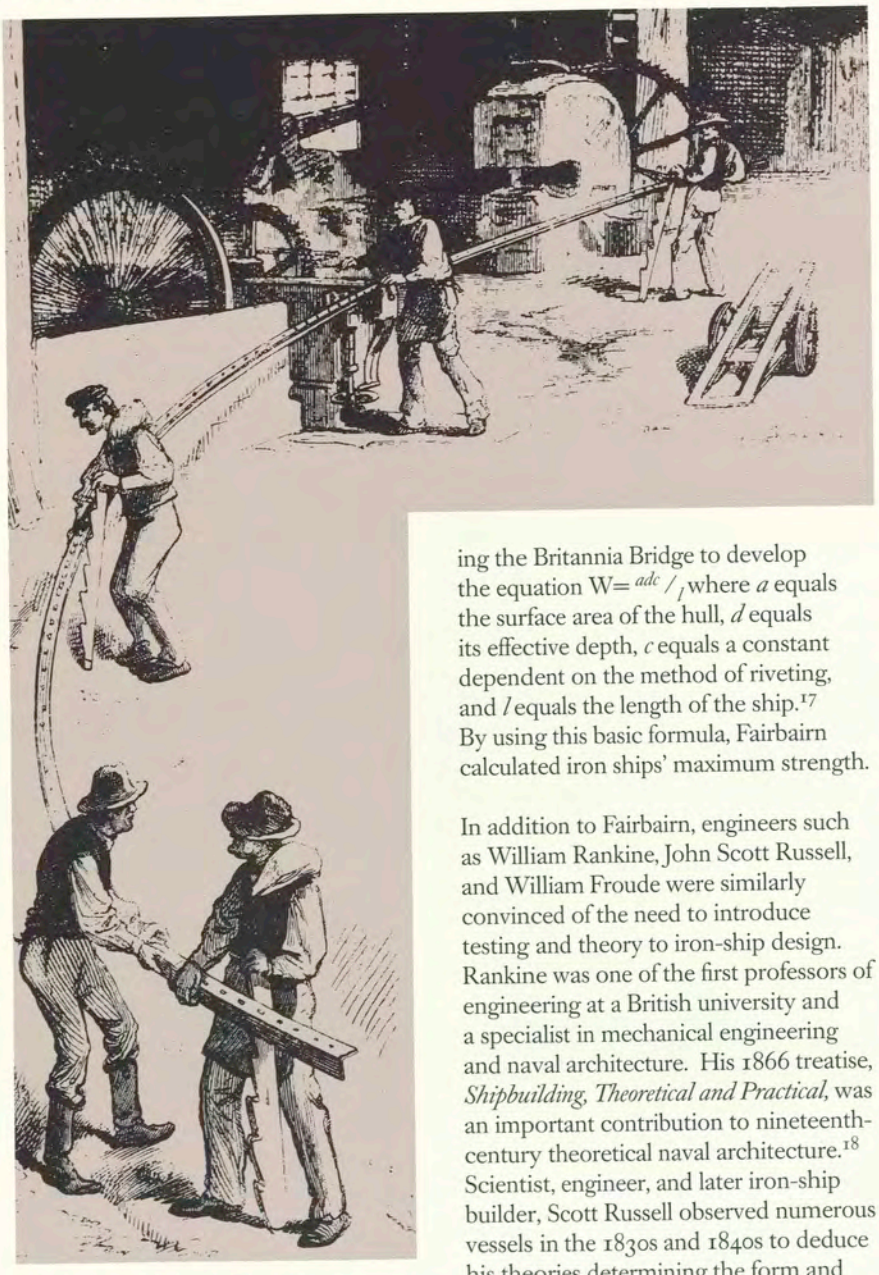
Along with the introduction of iron to British shipbuilding came an early form of experimental engineering. In order to improve their standards for insuring iron ships, Lloyds Registry, the marine underwriters association of London, began testing iron-plate strength and riveting methods in 1857.[7] Dismayed by the lack of knowledge and guiding principles determining the use of iron, engineer William Fairbairn had been testing its properties since the late 1830s.[8] With Eaton Hodgkinson, he conducted the world's first important tests with cast iron for the British Association for the Advancement of Science. In the early 1840s, he tested the structural strength of iron to assist in the design of the famous Britannia Bridge.[9] During his lifetime, Sir William contributed nearly eighty publications relating to the mechanical properties of iron and its application to civil engineering and naval architecture.[10]

Despite Britain's experience with iron shipbuilding and material testing, poor design and construction continued to plague its iron ships through the 1850s. According to prominent Lloyds marine surveyor Joseph H. Ritchie, iron shipbuilders had produced vessels without industry quality standards or "uniform practice in any part of the country."[11] Some of the earliest iron ships were built so top-heavy that they failed to remain upright in the water. For example, one set of vessels had to be ballasted by laying massive brick walls in their holds to prevent their capsizing.[12] During the 1850s, an appalling number of iron vessels wrecked with heavy loss of life. Many of them were newly built, such as the *Connaught*, which was lost on her maiden voyage. These iron ships often lacked the requisite hull strength to endure grounding and broke up under their own weight after striking a rock.[13] Such disasters later led American wooden-ship designer John W. Griffiths to comment: "If the engineer could be persuaded to look at the status of his own profession, which he has left for itself while engaging in the scramble for a contract to rivet iron plates together, to coffin confiding ocean-travelers, there might be some hope of ennobling his own profession, which has been left without a basis of principles, as handed down by Watt."[14]

In 1859, the passenger ship *Royal Charter* was blown ashore during a gale off Liverpool. This wreck focused public attention on the shortcomings of iron-ship construction. Rather than settling on the rocks, the *Royal Charter* had suddenly split in two, drowning nearly 450 passengers and crew.[15] At the 1860 inaugural meeting of the Institution of Naval Architects in London, the *Royal Charter* disaster provoked discussion about the state of iron-ship design and the benefits improved methods could bestow on ship construction. Papers presented at the meeting included two on the strength of iron ships, one on the progress of



Americans marveled at the Great Eastern, *paragon of British iron shipbuilding, during her calls in New York. (M.S.M. 79.108.6)*



Punching rivet holes in the rib of an iron ship. Harper's New Monthly Magazine, *April 1878.*

mathematical theory in naval architecture, and several on new methods for building iron vessels.[16]

Dissatisfied with the state of iron-shipbuilding theory for years before the inaugural meeting, Fairbairn had also developed a formula for determining the proper weight distribution for iron vessels, such as the *Great Eastern*, which had been built on his "hollow-girder" theory. Based on the assumption that ships in a seaway experienced strains similar to fully loaded iron bridges, Fairbairn applied his experience designing the Britannia Bridge to develop the equation $W = {}^{adc}/_{l}$ where a equals the surface area of the hull, d equals its effective depth, c equals a constant dependent on the method of riveting, and l equals the length of the ship.[17] By using this basic formula, Fairbairn calculated iron ships' maximum strength.

In addition to Fairbairn, engineers such as William Rankine, John Scott Russell, and William Froude were similarly convinced of the need to introduce testing and theory to iron-ship design. Rankine was one of the first professors of engineering at a British university and a specialist in mechanical engineering and naval architecture. His 1866 treatise, *Shipbuilding, Theoretical and Practical,* was an important contribution to nineteenth-century theoretical naval architecture.[18] Scientist, engineer, and later iron-ship builder, Scott Russell observed numerous vessels in the 1830s and 1840s to deduce his theories determining the form and length of hulls. Most prominent among these laws was his "wave-line" principle, which he outlined in papers presented to the British Association for the Advancement of Science. Despite Scott Russell's systematic approach to the field of hydrodynamics, his theories were later discarded in favor of Rankine's and Froude's.[19]

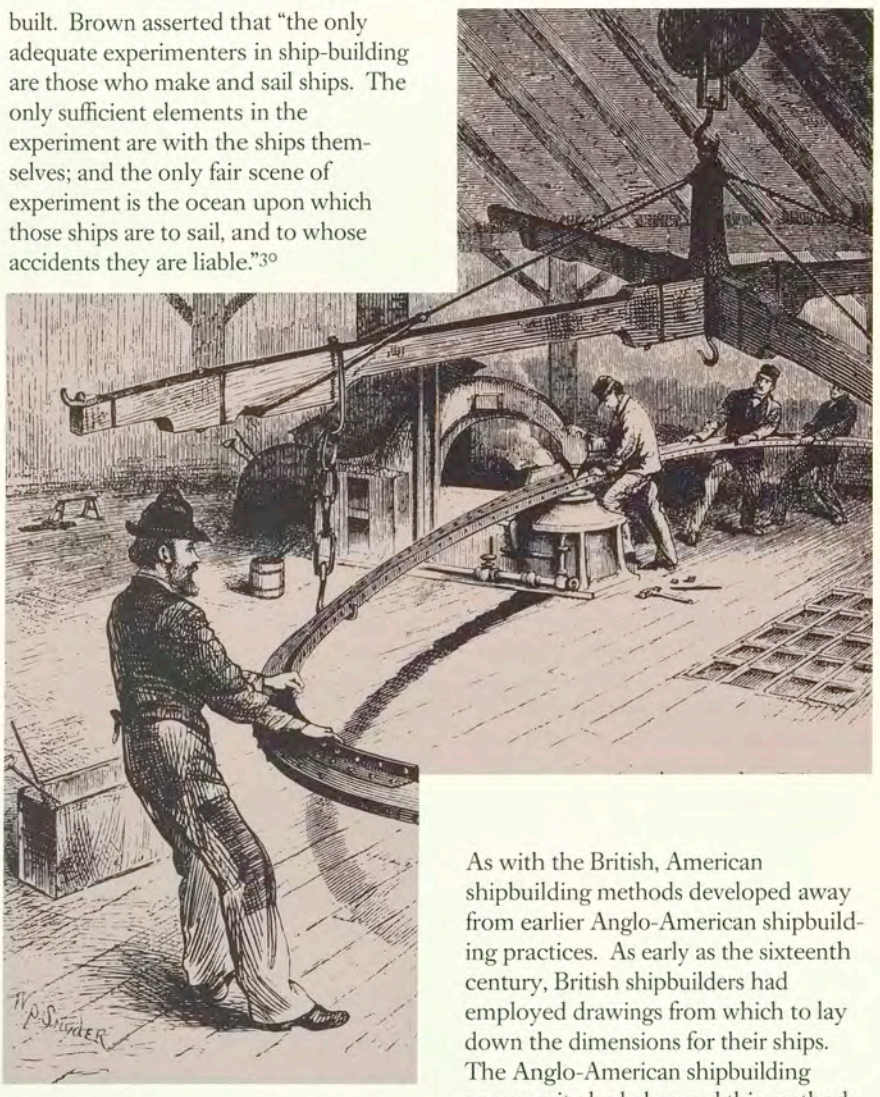
Unlike their American counterparts, British shipbuilders became interested in testing the fluid resistance of model hull forms. The English had been conducting such tests as early as 1670. By the 1790s, Colonel Mark Beaufoy pulled various solid shapes through water, recording the results in his *Report of the Committee for Conducting the Experiments of the Society for the Improvement of Naval Architecture.*[20] In the mid-nineteenth century, William Froude became Britain's most noted authority on hull stability, hydrodynamics, and tank-testing the fluid resistance of hull forms. In 1862 he published the study entitled *On the Rolling of Ships* and, with the support of the Admiralty, he established the world's first testing tank at Torquay, England, in 1871. In the 1860s and early 1870s he contributed nearly twenty articles to the Institution of Naval Architects *Transactions*, most of which related to the stability and hydrodynamics of hull forms. Some historians of technology consider Froude's paper entitled "On the Stability, Propulsion, and Sea-Going Qualities of Ships," presented before the British Association for the Advancement of Science, one of the most important nineteenth-century contributions to the study of naval architecture.[21]

The individuals mentioned above by no means exhaust the number of British engineers who believed in introducing testing and theory to iron-ship design. They merely characterize Britain's contemporary craze to determine iron's material properties, develop theoretical ship-design methods, and generally transform iron shipbuilding into a "science." By the 1860s, a basic understanding of iron's material properties had been achieved thanks to Lloyds, Fairbairn, and others. Even though strict industry standards for iron-ship construction still proved elusive by this time, the guidelines for insuring iron ships developed by Lloyds in 1854 provided the basis for such standards. Nevertheless, iron-ship builder John Grantham indulged in extreme hyperbole at the 1860 Institution of Naval Architects meeting by boasting that "The art of iron-ship building may now be fairly ranked as a science."[22] Despite considerable effort by British shipbuilders and engineers to test and theorize, iron-ship design remained largely an empirical practice throughout much of the nineteenth century. The British pursuit of scientific shipbuilding did, however, represent a departure from the methods previously employed by the Anglo-American shipbuilding community.

While British shipbuilders conducted tests and generated theories, American shipbuilders continued to employ practical methods by using full-size ships

for testing and miniature hull forms for design purposes. Many American builders were aware of the frictional resistance of water to hull forms, but they failed to see its relevance for designing ships.[23] For example, out of six articles published on fluid resistance in the *Journal of the Franklin Institute* during the 1830s, all had to be reprinted from British sources except one found in *Silliman's Journal*, an American scientific journal.[24] The first serious American treatment of fluid resistance and its influence on ships appeared as a chapter of civil engineer John Nystrom's *Treatise on Screw Propellers and Their Steam Engines*, published in 1852.[25] In an 1884 letter to the secretary of the navy, engineer and naval constructor Francis T. Bowles suggested the establishment of a government-financed test tank to study fluid resistance, but even Congress postponed funding such a facility until 1896, and the U.S. Navy failed to complete it until 1899.[26] Practical builder David Brown, of the New York shipbuilding firm of Brown and Bell, summed up the prevailing American attitude in an 1850 letter to ship designer John Griffiths, stating that "It is not in the power of an experimenter, with cut blocks, in a pond of smooth water, and with artificially applied forces, to determine the best model for a given end."[27]

Empiricism and practical observation ranked higher in the American shipbuilding tradition than so–called experiments and theory–practical builders believed that ships could not be constructed from abstract formulas concocted by theorists with little practical experience. Brown and prominent American designers, such as Henry Eckford, William Webb, and Nathanael Herreshoff, believed that the ocean provided the best test tank and observation of an actual ship provided the best test.[28] When one of his vessels returned from a voyage, Eckford would interview the ship's captain and solicit information about the vessel's performance to uncover any of its design flaws. During his working life, Herreshoff owned 28 different boats and yachts produced by the Herreshoff Manufacturing Company, and he studied their performance at regattas as either a skipper or a spectator.[29] By gathering information through experience and observation, builders tried to improve the design of each successive vessel they built. Brown asserted that "the only adequate experimenters in ship-building are those who make and sail ships. The only sufficient elements in the experiment are with the ships themselves; and the only fair scene of experiment is the ocean upon which those ships are to sail, and to whose accidents they are liable."[30]



Riveting an iron ship frame at the Cramp yard. Harper's New Monthly Magazine, *April 1878.*



John W. Griffiths. (Photo no. 32596, Smithsonian Insititution/NMHA-Transportation)

As with the British, American shipbuilding methods developed away from earlier Anglo-American shipbuilding practices. As early as the sixteenth century, British shipbuilders had employed drawings from which to lay down the dimensions for their ships. The Anglo-American shipbuilding community had observed this method until the end of the eighteenth century, when Americans began to adopt the use of models.[31] Meanwhile, the British continued to use drawings to help design their ships.

Throughout the nineteenth century, practical builders, such as New Yorkers Isaac Webb and Donald McKay, employed models to aid ship design in a manner at variance with the test tank models used by their British counterparts. The American designers "whittled" half models measuring from four to five feet using their experience and "eye" for hydrodynamic shapes to produce the most balanced and efficient hull form. These half models were then used to produce lines for the ship's hull and to determine its displacement.[32] One of the most revered yacht designers of the late–nineteenth and early–twentieth centuries, builder Nathanael Herreshoff, provides a case in point. His method of design consisted of sculpting a model, taking off its lines once it



Early lift half model, probably dating from the eighteenth century. (M.S.M. 38.436; Claire White-Peterson photo)

satisfied his requirements, then determining the hull's actual displacement by depressing the half-model in a tub of water and multiplying the spill-over according to the model's scale. Even though Herreshoff had been a student of physical sciences at the Massachusetts Institute of Technology and an engineer at the Corliss Steam Engine Company of Providence, Rhode Island, he still employed the time-honored ship-design techniques used by earlier practical shipbuilders.[33]

The use of the model dates back to the eighteenth century and spans the greater part of the nineteenth century. The original half models used by American shipbuilders, referred to as sectional models, were cut vertically across the hull to provide transverse sections of the hull for each frame. Most accounts place the origin of the more common "lift model" in Massachusetts as early as 1790, although a model preserved by Mystic Seaport may be older. The Peabody Museum holds the earliest documented model known to exist, that of the ketch *Eliza*, built by Enos Briggs in Salem in 1794, while the New-York Historical Society houses a model constructed by Orlando Merrill of Newburyport in 1796.[34] Between 1815 and 1850, the model became popular with all but a few American shipbuilders and the U.S. Navy, which required accurate drawings and specifications from its contractors. American builders embraced the employment of models because they provided useful three-dimensional tools for designing ships and training apprentices, and they could be whittled more quickly than drafts could be drawn. Due to their numerous responsibilities, American builders valued the added convenience and time-saving provided by models.[35] Perhaps, John Griffiths summed it up best in an 1844 lecture before New York's American Institute, when he commented that "there is no calculation rendered necessary that cannot be made from the model with more precision and in less time than from the draft. The model is an American invention and is a proud emblem of American genius."[36]



Lofting an iron ship. Harper's New Monthly Magazine, *April 1878.*

The popularity of the model peaked in the 1850s and gradually declined in the late nineteenth century with the increased use of iron, the consequent employment of drawings, and the circulation of naval architecture materials.[37] A few former wooden-ship builders, such as Charles Cramp of Philadelphia, continued to use models for laying off the lines of iron vessels. Using a half model, Cramp's rule-of-thumb method included estimating the weight of the vessel's midship; multiplying by the length of the ship, without correcting for diminishing at the ends to compensate for waste; then multiplying by two.[38] Such methods could have disastrous effects, however, as in the case of an aspiring New York shipbuilder, who estimated the amount of iron to order from his supplier based on calculations from a half model, but failed to multiply the amount by two.[39]

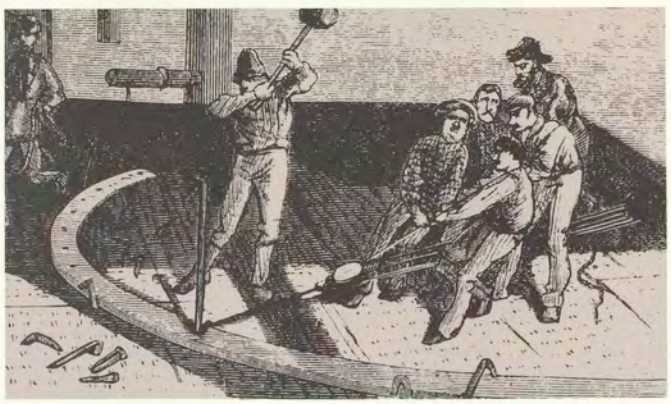
American engineer Horace See realized that an iron hull required more accuracy than designing with a wooden model could provide. In a 1906 panel discussion before the Society for Naval Architects and Marine Engineers, See blamed "the model, which in many cases was obtained from the ship carpenter, following the uncertain method of whittling and sand-papering said model into such shape as pleased the eye, who did not work out the lines on the drawing board, so it is reasonable to assume that if the vessel failed to accomplish what was desired, the failure could not be charged against the builder of the hull but to the one who furnished the model."[40]

During the nineteenth century, the British desire to elevate the trade of iron-ship building to a science prompted the founding of professional organizations. By 1800, British shipbuilders had already begun to organize into professional associations. Through the efforts of Colonel Mark Beaufoy, a group called the Society for the Improvement of Naval Architecture formed in 1791 to encourage the improvement of ship design through testing and theory.[41]



Sectional model of the bark Star, *reportedly built at Thomaston, Maine, ca. 1820. (M.S.M. 39.2134)*

Many professional builders and naval architects joined the Institution of Civil Engineers, established in 1818. By 1860 a group of these engineers, whose pursuits identified them more specifically with shipbuilding, splintered off to found the Institution of Naval Architects. This association provided an ideal forum for builders, engineers, scientists, and experienced naval officers to debate the merits of materials, construction, machines, and theory related to naval and merchant vessels. So important was this association to the contemporary development of naval architecture and marine engineering that most prominent shipbuilders and naval constructors actively participated in it. Related British associations included the Institution of Engineers in Scotland, founded in 1857; the Scottish Shipbuilders Association, founded in 1866 (the two amalgamated in 1866 as the Institution of Engineers and Shipbuilders in Scotland); and the Northeast Coast Institution of Engineers and Shipbuilders, founded in 1884.[42]



Bending an iron ship stem. Harper's New Monthly Magazine, *April 1878.*

The British emphasis on scientific shipbuilding also facilitated the establishment of professional schools. In 1864, the Institution of Naval Architects and the Admiralty co-founded the Royal School of Naval Architecture and Marine Engineering. Topics of study included practical shipbuilding, elementary mechanics, hydrostatics, and ship drawing for the "associate" level, but to become a "fellow" students had to pass examinations in the principles of ship design, advanced mathematics, applied mechanics, and the properties of metals. Voluntary subjects for special certification included "Dynamics and hydrodynamics," "Strength of materials and structures," "Theory of marine propulsion and fluid resistance," "Theory of waves and behavior of ships," and "Heat, in its application to marine engines, and the theory of the steam engine." In 1867, the school offered 43 courses of lectures given by such speakers as William Rankine, William Froude, William Fairbairn, John Scott Russell, and Chief Naval Constructor Edward Reed; however, it provided no instruction or lectures in the practice of using half models to design ships.[43] In 1873, the Royal Naval College at Greenwich absorbed the Royal School of Naval Architecture. And in 1883, Glasgow University also endowed a chair in naval architecture as did Armstrong College, in Newcastle, in 1890.[44]

American ship designers had fewer professional organizations with which to associate than the British because American interest in professionalization developed years later. In the beginning, professional associations related to ship design remained naval-oriented, such as the United States Naval Institute, founded in 1874. The American Society of Naval Engineers, which included naval architects as well as marine engineers, began 14 years later. Founded in 1880, the American Society of Mechanical Engineers counted many naval constructors and marine engineers among its ranks. Finally, a group of naval constructors, marine engineers, and private shipbuilders, including such prominent men as William H. Webb, convened in New York City to establish the Society of Naval Architects and Marine Engineers in 1893. This momentous event occurred nearly 33 years after the founding of the Society's British counterpart, the Institution of Naval Architects.[45]

Having begun in the 1890s, the drive to create American educational programs also lagged behind comparable developments in Britain. No American institution provided a formal education in naval architecture until 1893. In the same year that American shipbuilders founded the Society of Naval Architects, the Massachusetts Institute of Technology established a naval architecture course closely resembling the 40-year-old Royal Naval College example, which stressed applied mechanics, material science, laboratory work, descriptive geometry, and mechanical drawing. In MIT's program, classroom education and training in the use of mechanical drawing supplanted the apprenticeship system and the practice of employing half models.[46] A year later, William H. Webb created the Webb Institute of Naval Architecture. In

order to qualify for admission to the Institute, each student had to demonstrate a familiarity with the metric system and pass examinations in algebra, plane and solid geometry, and plane trigonometry.[47] Naval architecture programs soon followed at Cornell, the University of Michigan, Columbia, and Lehigh so that by World War I formal education became a requirement for the title of "naval architect."[48]

Like their civilian counterparts, American naval constructors fell into the trade of their shipwright fathers who lacked a formal education in the field. The typical background of a naval constructor included secondary education followed by apprenticeship in the navy's shipyards. In articles and annual reports, chief naval constructors, such as John W. Easby and Theodore D. Wilson, bemoaned the lack of proper education for their profession.[49] The Naval Academy offered its cadets only a brief one-term course on the rudiments of ship design and shipbuilding intended merely to familiarize them with nautical terminology and ship construction.[50] By 1879 the U.S. Navy recognized the importance of training cadets to become naval architects, and began sending specially-trained Academy graduates, referred to as "cadet engineers," overseas for such education. The Navy usually assigned these naval architecture students to the Royal Naval College, but some were also assigned to the program at Glasgow University or to one in Paris.[51]

The Naval Academy continued to send its cadets abroad for naval architecture instruction until the Royal Naval College closed its school to foreigners in the late 1890s. As a stopgap measure, the Academy initiated its own postgraduate program in 1898, but in 1901 the Academy discarded it and began sending naval-constructor trainees to MIT, which inaugurated a warship design program under the supervision of William Hovgaard, a graduate of the Royal Naval College and distinguished naval architect for the Danish government.[52] Despite this conversion to formal education, every man who served as chief naval constructor up to the turn of the century had learned the art of shipbuilding through the apprenticeship system. In 1901, however, the Navy Department filled the post of chief naval constructor with Rear Admiral Francis T. Bowles, one of the first cadet engineers to study at the Royal Naval College.[53]



Office used by designer and builder William H. Webb. Harper's New Monthly Magazine, *July 1882.*

Britain's development of professional organizations and specialized schools encouraged ship-design experts such as William Froude, Robert Montagu, and James Peake to publish numerous technical manuals and treatises. By 1820, before the large-scale adoption of iron, British shipbuilders already counted over a dozen important manuals that they could refer to on matters concerning ship design and construction.[54] Many more would follow, especially after the establishment of the Royal School of Naval Architecture in 1864. This flourish of important publication included works such as Rankine's *Shipbuilding, Theoretical and Practical* (1866), Fairbairn's *Treatise on Iron Ship Building* (1865), Naval Constructor Reed's *Shipbuilding in Iron and Steel* (1869), Scott Russell's *Modern System of Naval Architecture* (1865), Samuel Thearle's two-volume *Theoretical Naval Architecture* (1877), and William White's *A Manual of Naval Architecture* (1877).[55]

Overall, American shipbuilders produced few publications of a theoretical nature. Through the Civil War, American treatises dealt primarily with the practical considerations of building wooden vessels. For example, Donald McKay's brother and fellow builder, Lauchlan, produced the first American work on shipbuilding in 1839, entitled *The Practical Shipbuilder.* McKay mostly presented drawings of ships' lines, rather than information pertaining to vessel design and construction.[56] George W. Rogers published *The Shipwrights' Own Book* in 1845 and *Shipbuilding Made Easy* in 1865, and Leonard Boole published *The Shipwright's Handbook and Draughtsman's Guide* in 1858. These publications focused on general shipbuilding practices and the projection of lines, not information of particular

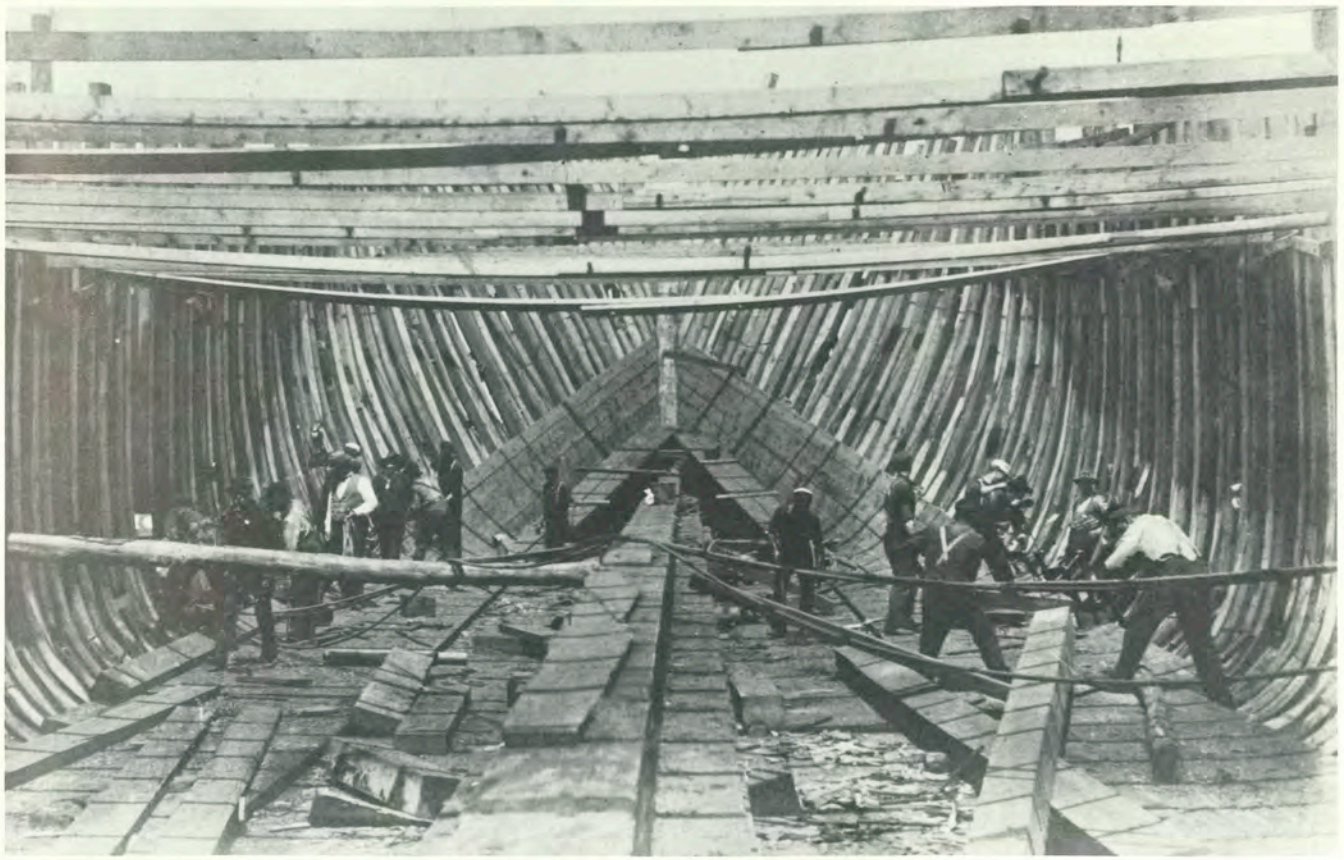
technical importance.[57] In 1863, civil engineer John W. Nystrom's booklet, *A Treatise on Parabolic Construction of Ships and Other Marine Engineering Subjects,* became the first significant publication to introduce theory to American shipbuilding literature, but it failed to convince American shipbuilders to pursue theoretical shipbuilding methods.[58]

Practical works on wooden shipbuilding continued to capture American builder's attention. Books published by naval personnel are indicative of this trend. In 1866, Samuel Moore Pook, naval constructor and father of famous clipper-ship designer Samuel Hartt Pook, published a book that stressed drafting and laying down ship lines.[59] The only noteworthy treatises that included a significant treatment of formulaic theory were Commander Richard Meade's *A Treatise on Naval Architecture and Ship-Building,* published in 1869, and Naval Constructor Theodore Wilson's *An Outline of Ship Building, Theoretical and Practical,* published in 1878. These authors intended their manuals to become textbooks for the Naval Academy's semester-long shipbuilding class; hence, they included sections on designing ships with half models in addition to sections on naval architecture reprinted from British sources such as Rankine, Reed, Fairbairn, and Scott Russell.[60] Compared to the numerous works available on practical methods, however, these textbooks and Nystrom's pamphlet represent the exceptions to the rule of American shipbuilding literature.

Of all the nineteenth-century American shipbuilders, famed clipper-ship designer John W. Griffiths did more than any other builder to promote American ship design. An experimenter, and a prolific writer and advocate of formal ship-design education, Griffiths proved to be the most remarkable of America's nineteenth-century shipbuilders. By 1840, Griffiths had constructed his own tank for testing fluid resistance, perhaps the first such tank built in America. Through his tank tests, he modified contemporary clipper-ship design to produce some of the most important models of that class.[61] In September 1844, at New York's American Institute, he delivered an address titled "Marine and Naval Architecture," the first formal lecture on shipbuilding ever delivered in America.[62] He attempted to establish a "marine architectural institute" in New York in 1847, even though it specialized in practical shipbuilding methods, such as model-making. The institute folded after only two years, in all likelihood because most aspiring American shipbuilders still chose to acquire their expertise through apprenticeship training in shipyards.[63]

As nineteenth-century America's most prolific writer on shipbuilding, Griffiths tried to bridge the gap between practical and theoretical traditions. While a young shipwright at the navy yard in Portsmouth (later Norfolk), Virginia, Griffiths began writing articles on ship design for the Portsmouth *Advocate.* Later, his 1844 lecture developed into the first important American treatise on ship design and construction, titled *A Treatise on Marine and Naval Architecture or Theory and Practice Blended in Ship-building.* Griffiths also invested much time and effort in producing the periodical *United States Nautical Magazine and Naval Journal,* which eventually failed.[64] He initiated the magazine in 1845, but suspended its distribution a year later. He continued production in 1854, but gave up the journal's publication four years later. By

The essence of wooden shipbuilding: installing ceiling planks at the McDonald yard, Mystic, 1903.



this time, Griffiths's book had become popular in Britain and had been translated into Dutch. In 1853, shortly after the publication of his *Treatise*, he produced the two-volume *Ship-builder's Manual and Nautical Referee*. His third and final book, *The Progressive Shipbuilder*, appeared in 1874. Four years later, Griffiths also launched a periodical called *American Ship*, devoted to "American industry, nautical commerce, shipbuilders, engineering, navigation, insurance, yachting and naval interests."[65] Unfortunately, this concern folded within four years, after his death in 1882.

Despite his attempts to introduce British methods to American shipbuilding, Griffiths remained a practical wooden shipbuilder at heart. During the last years of his life, America's shipbuilding industry remained the world's leader in wooden-ship production by constructing increasingly larger wooden hulls and incorporating technical improvements such as double-planking, increased framing, and iron straps to reinforce hull framing.[66] Griffiths participated in the development of wooden shipbuilding techniques by promoting a revolutionary machine that could mass produce hard-to-find structural pieces such as frames and knees that were normally cut from the root systems of large trees.[67] The U.S. Navy continued to construct anachronistic wooden warships into the 1870s, including a gunboat built on contract by Griffiths at the Portsmouth Navy Yard in 1877.[68]

America's iron- and steel-ship production finally surpassed its wooden-ship production in 1900, 18 years after Griffiths's death. The wooden shipbuilding industry survived into the 1920s, and wooden-ship builders succeeded in building a fleet of hundreds of steamers and sailing vessels to help satisfy the voracious appetite of world commerce and the Atlantic convoys during World War I.[69] During this period, American publishers even continued to produce new manuals on practical wooden shipbuilding, such as Cole Estep's 1918 volume, *How Wooden Ships are Built: A Practical Treatise on Modern American Wooden Ship Construction*.[70]

Throughout the nineteenth century, iron-ship builders introduced increasingly theoretical design methods to Britain's shipbuilding industry, while economic constraints forced American shipbuilders to rely on wood and sustain practical building techniques. American methods, however, came to resemble those of the British by the turn of the century as iron and steel replaced wood. Consequently, fluid-resistance tests replaced practical observation of ships; drawings and specifications replaced the use of models and designing by eye; professional education and publications replaced the tradition of apprenticeship and transferring knowledge by example; and the theoretical naval architect gradually replaced the practical shipbuilder.

When we compare British and American shipbuilding practices in the nineteenth century we can see construction material influenced nineteenth-century shipbuilding in two industrial societies. In Great Britain, iron encouraged the trend toward material testing, theoretical design, precision construction, and the pursuit of scientific methods. Meanwhile, in America the continued employment of wood perpetuated the use of more practical methods, and an attitude in sympathy with those methods. This examination of technological transition suggests the probability that new construction materials affected other fields of engineering, just as iron did among shipbuilders.

[Endnotes appear on page 31]

New York designer and builder Henry Steers displayed his sail and steam vessel half models in his home. Harper's New Monthly Magazine, *July 1882.*





Singing for your Supper

SARA LEONE

WITH RESEARCH BY ELENA BONESKI



Hot corn!

Hot corn! Some for a penny and some for two cents.

Corn costs money and fire expense;

Here's your lily-white hot corn!

The call of the hot corn vendor joined with the cries of the soda water sellers and the hokey-pokey men, once filled the streets from early morning until well into the night. For at least one hundred years, hot corn, sold from cedar pails filled with steaming water, was the most popular lunch on the streets of New York City.

Eating is an effective way to excite people about history, since it is such a basic and personal activity. Mystic Seaport's Historic Vending Program offers visitors the ultimate taste of America's maritime past. In the spirit of accuracy, food vended at the Museum must have been sold on the streets in the nineteenth century, not just eaten during the time period. Items are vended from spring through fall, but summertime has the widest range of refreshments.

Street vending has been an integral part of American culture from colonial days to the present; in larger cities, vendors sold everything from balloons to vegetables. Although authentic, Mystic Seaport's program is a sanitized version of the street vending that occurred in ports during that time, when many of the fruits and vegetables were old and spoiled, and freshness in fish or meat was a guessing game.

The maritime world had an enormous influence on the development of vending in the nineteenth century. Fruit traders were bringing oranges and lemons to America from the Mediterranean by the 1830s, and they began to carry Caribbean bananas north after the Civil War. The people who were the predominant force in the trade–immigrants–were arriving side-by-side with their potential future–oranges, bananas, and other produce.

Throughout the century, America witnessed an influx of immigrants from mainly agricultural backgrounds, who were not prepared for the rapidly industrializing shores of this country. A language barrier and lack of education prohibited them, at least temporarily, from many occupations. Jobs such as street vending seemed a natural place to earn a livelihood with little skill. They quickly became the majority in the pushcart trade; some had quite Spartan operations, selling from a wheelbarrow, or even a plain wooden box.



These vendors had a much harder existence than their colonial counterparts due to competition with stores that carried the same goods that they were trying to sell. Also, in most urban street markets, customers had at least three or four vegetable sellers from which to choose, not to mention even larger numbers of hot corn and oyster sellers.

Sometimes the offerings and the location were broken down by ethnicity. For example, the so-called "Pig Market" was located around Hester and Cherry Street in New York, where the street vendors were predominantly Jewish immigrants, and any item could be found–with the exception of pork.

Immigrants from China were famed for selling a delicious treat called "pineapple candy." In "The Street Venders of New York" published in the December 1870 issue of *Scribner's Monthly*, the author described "two huge, round cakes of candy, one white as snow, one yellow as cream, and both smeared over the top

"In Printing House Square is a curious colony of vendors, among whom the principal figures are a helpless genius who whittles with his toes..." (Scribner's Monthly, *December 1870*)

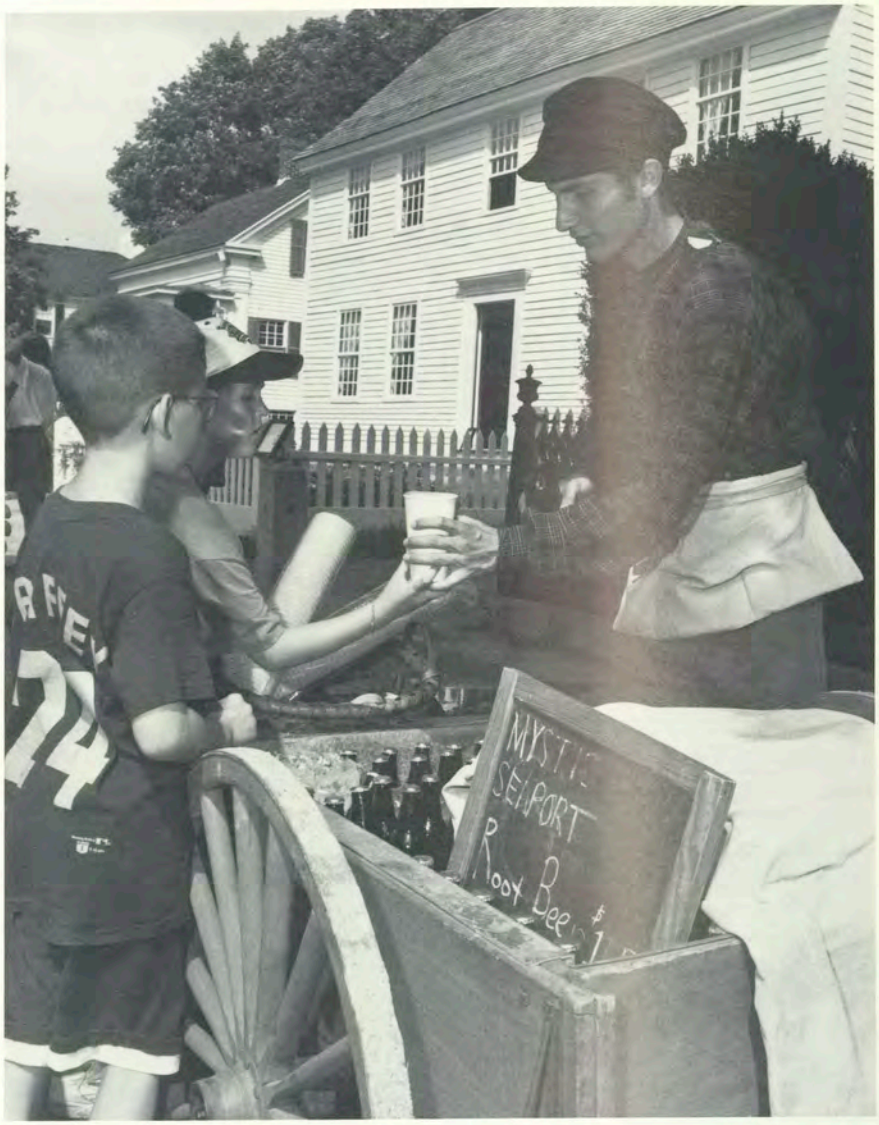
with a hard, scarlet coating. A stout, black-handled, broken-bladed carving knife and a short, heavy, hammer serve for breaking these cakes into small angular fragments." He explained that the candy was made "from water, and white or brown sugar, boiled and stirred thoroughly, seasoned with 'pineapple water from a doctor's store,' cooled in tin pans in twelve pound cakes, and coated with the last of the melted sugar, tinctured with cochineal."

Although the Museum's Vending Program is modeled on the pushcart vendors of nineteenth-century seaport cities, the small town of Mystic had its share of street vendors. During the Peace Society meeting held in the summer of 1871, vendors sold refreshments to nearly 1,000 participants.

More than one hundred years later, Mystic Seaport brought vending back to life–in the summer of 1985, when the Museum's Education Department staff set up a table with lemons and hand juicers. The hastily created lemonade experiment was overwhelmingly successful–staff couldn't keep up with the demand.

It should come as no surprise that thirsty Museum visitors have made lemonade the most popular item. Like all cultures, Americans place values, ranging from ritualistic to sentimental, on certain foods and beverages. In the United States, lemonade is a symbol of simpler times, when the pace of life supposedly permitted one to pass time in leisure, sitting on a shady porch to talk with neighbors. Sipping freshly squeezed lemonade connotes a willingness, even if just for a moment, to experience what we imagine to have been less-complicated times. Ironically, this beverage of American summers was introduced in eighteenth-century Europe; Paris, in particular, was home to an abundance of "limmondiers," or lemonade vendors.

Another warm weather favorite, ice cream, is sold in a variety of historically accurate flavors–and one not so accurate flavor! Vendors scoop up strawberry, raspberry, blueberry, blackberry, and peach ice cream–depending on the time of season. Vanilla is available throughout the summer, and so is chocolate–for those who are willing to sacrifice the authentic experience.



JENNIFER M. STICH PHOTO

Young visitors enjoy a glass of Mystic Seaport Root Beer. The beverage contains all natural ingredients and is based upon a nineteenth-century recipe.

In the nineteenth century, ice cream vendors were called "hokey-pokey men," and they sold their product in the form of a "penny lick." Customers paid one penny and licked a spoon filled with ice cream. The Museum's vendors serve ice cream in specially ordered white, unwaxed, paper cups, and hand out disposable, wooden spoons. Director of Food Services, Jim Farrell, states, "It's a balancing act; a compromise between today's health standards and the visitors' expectation of accurate, nineteenth-century presentations."



Ice cream vending debuted on the streets of New York in the early 1800s and remained quite successful throughout the century. This popularity continued into recent times, although in a different form. How many hot summer days of our childhood were made cooler by the distant, jingling bells that signaled the

approach of an ice cream truck? In a race against time, the challenge was to convince your parents that ice cream was absolutely necessary to survive the day, and that they, in fact, should have some too–by the time the bells sounded on your street!

Whether bells, yells, or whistles, vendors used the technology of the period to create attention-getting sounds. On any summer day, the astute visitor may hear a war of whistles being waged. The rumbling, baritone howl of the steamboat *Sabino*'s whistle is followed by a shrill, tinny hoot from the most interesting vending cart on the grounds: the famed "Cretor's Improved #1 Model A" steam-powered popcorn cart and peanut roaster, developed in 1894 by the company that revolutionized the world of popcorn. Cretor was the first to manufacture a steam-powered machine that cooked the popcorn evenly. Previous to this, the kernels were popped rather unevenly over an open flame. Mystic Seaport's replica was constructed from C. Cretor and Company's original plans and tooling.

Although potential snackers are usually attracted to the cart by the whistle, or the scent of freshly roasted peanuts and popcorn, a closer inspection reveals an object of great curiosity: a small, clown figure hitched up to the mechanism, and christened "the Tosty Rosty Man" by Cretor. The clown grips a shaft that turns part of the engine, giving the impression that he is propelling the system. Originally created as a gimmick to attract attention, the clown now offers visitors an opportunity to exercise their wit; as one onlooker asked, "Does the clown do all the work?" To this day, theaters still use Cretor's machines for America's favorite movie-time snack, albeit, minus the little circus friend.

At the Museum, potential edibles must pass a rigorous selection process before becoming publicly vended. The Historic Vending Manager researches the product for recipe authenticity and appropriate serving methods. The results are presented to a committee of staff from Food Services, Curatorial, and the Education Department for final approval. As Farrell states, vending is, "a natural way to blend a part of the past with a service to visitors; the challenge is to do it as authentically as possible."



In addition to food-related activities, the Vending Program manages horse and carriage rides. Although the Museum emphasizes ships and boats, other types of travel are offered to complete the visitor experience–especially one that is most characteristic of nineteenth-century transportation.

John Allegra Farms provides authentic or accurately reproduced carriages, as well as the horses, which are given the best care. At the start of the season, the horses undergo an extensive physical, and throughout the year their duties are rotated regularly. On a daily basis, each horse serves a maximum of six hours, with ample water and rest between rides. The Museum's cobblestone and dirt streets are easier on the horses, com-

The Museum's Taste of History food festival gives visitors the opportunity to sample a variety of popular nineteenth-century dishes.



MARY ANNE STETS PHOTO

pared to the heat and hardness of modern-day paved streets. In addition, their trip is paced at a sedate walk, and the wagons are small compared to the loads that these former workhorses are used to pulling.

In fact, some of the horses are alive today because of Allegra. Many are quarterhorses that are either beyond their prime on the racing circuit, or never had the necessary capability for speed. As Farrell says, "John found former race and work horses and has given a life back to them."

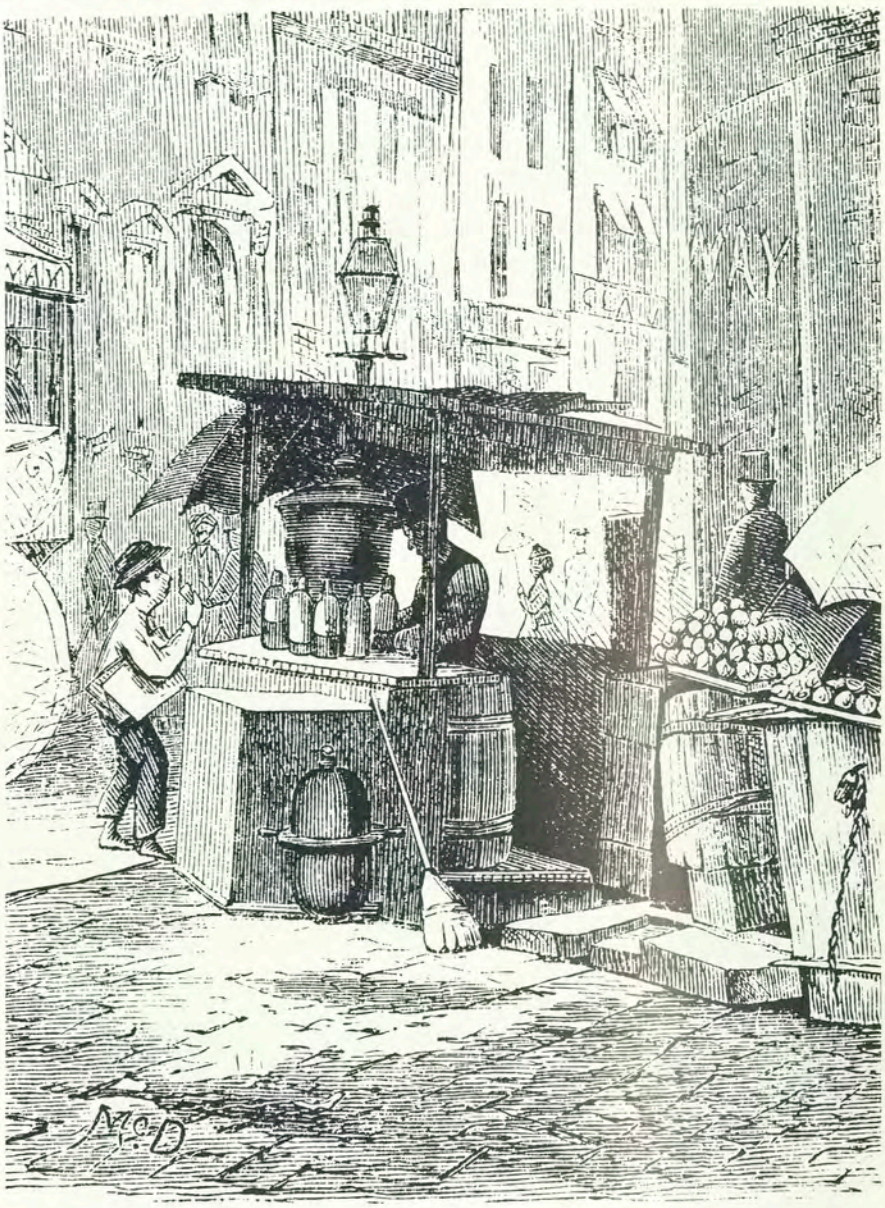
The Museum's annual Horse and Carriage Weekend, taking place on 15-16 July, gives visitors the opportunity to ride in a variety of carriages, as well as view a stunning rally on the Village Green.

Another annual event that allows visitors to experience history firsthand is the Taste of History food festival. In the nineteenth century, August was a popular month for outdoor community gatherings, such as picnics, ice cream socials, and church potluck suppers. Mystic Seaport holds the festival, researched and coordinated by the Vending Program, in an attempt to recreate the taste and spirit of these town events.

Farrell emphasizes the importance of developing the appropriate atmosphere, "the whole event is more of a challenge, but it really gets you into the experience." Diners are given tin plates, and silver(stainless steel)ware, instead of the usual picnic hardware: paper cups and plastic utensils. The recipes are authentic, but adapted to today's standards when needed. So, from 3-6 August, visitors who want to have a taste of the past can devour such nineteenth-century favorites as tongue sandwiches, lobscouse, and fresh-shucked oysters.

This summer, research is underway to offer visitors the popular nineteenth-century beverage called shrub. Originally made with rum, shrub was later introduced in the "temperance" or nonalcoholic version by the Shakers. A nineteenth-century recipe for grape shrub contained mashed grapes, vinegar, plain or effervescent water, and ice cubes.

If shrub seems like an odd name for a drink, it has many companions among nineteenth-century beverages, like cobbler, flip, and bimbo–a drink popular early in the century, consisting of brandy with sugar and lemon peels!



"Yonder is a soda-water stand with its green marble urn, its company of inverted glasses, and its array of richly colored syrups..." (Scribner's Monthly, December 1870)

The popularity of the on-site vending program encouraged the Museum to test some products in local delis and speciality food stores. Mystic Seaport's first venture, Mystic Chips, has been very successful; these potato chips have a loyal following of satisfied snackers in New England, New York, and even as far away as Ohio. The recipe is based upon the first potato chips ever produced, by George Crum in upstate New York in 1853.

On the basis of positive response to Mystic Chips, the Museum next pursued the chip's favorite companion: soda.

From soda-water vendors of the last century, who served the beverage in glasses that were handed back and refilled for the next customer, to their mechanized replacement–the vending machine–soda is particularly dear to American hearts.

In 1992, Mystic Seaport Root Beer was vended on the grounds for a trial period; the drink sold out within hours on the first day it was offered. This popularity prompted the Museum to "go public." Mystic Seaport Root Beer, Spruce Beer,

Ginger Beer, and Birch Beer are sold in gourmet shops throughout Massachusetts, Rhode Island, and Connecticut. The Museum consulted a food scientist who did extensive research and experimentation into nineteenth-century recipes from a drugstore guide. The beers are as close to the original formulas as possible, and contain natural ingredients such as brown sugar, wintergreen, molasses, ginger, and chamomile.

For those with a more spirited taste, the Museum has introduced Mystic Seaport Pale Ale. The decision to pursue an alcoholic beverage was a natural, considering the recent resurgence of microbreweries. Contrary to popular belief, these small establishments are not a new phenomena. Before Prohibition in the 1920s, there were 4,000 regional breweries in the country; after Prohibition, 40 to 50 were left–only the large breweries survived. The Museum's ale is made from a recipe similar to classic British-style ale, often called bitters, and developed by Alan Pugsley of Ringwood Brewery in England. Pugsley is quite experienced in the field; he has set up breweries around the world, from Belgium to Nigeria, and South Africa to Siberia.

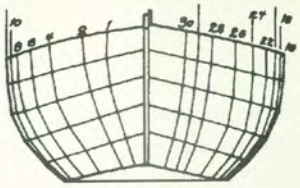
The incredible success of Mystic Seaport's Vending Program is best summed up by Jim Farrell: "We've come a long way from being a lemonade stand–in only 10 years!" When you are purchasing an ice-cold glass of our lemonade from vendors at the Museum this summer, think back to their compatriots of one hundred years ago, when being a good salesman literally meant having to sing for your supper.

Visitors experience the most popular form of transportation in the nineteenth century–the horse and carriage.



JENNIFER M. STICH PHOTO

Dutch Influences On American Small Craft During the Colonial Period

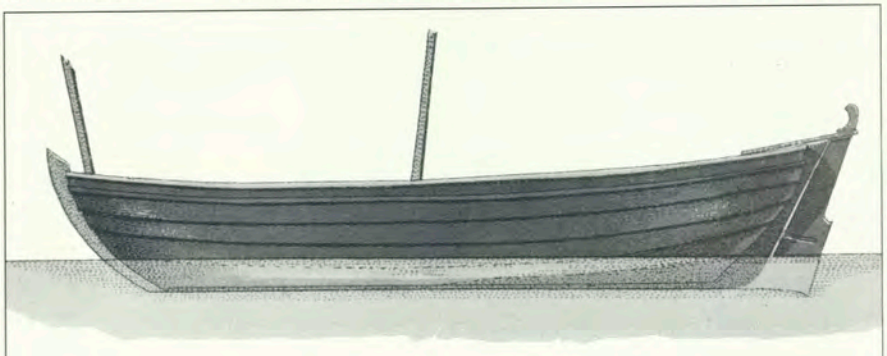


JOHN GARDNER

Small wooden boats have been almost completely neglected by historians up to now. Yet, they were an essential part of the every day life, of the material history and material culture of colonial times. Only a few accounts of the times are as detailed as those of the Reverend William Bentley of Salem, Massachusetts, when it comes to mention of small craft.[1] For the most part, the boats were so ubiquitous, and the builders were frequently unlettered and fully occupied in numerous forms of employment, so very few of them kept the sort of day-to-day account of their activities that numerous ministers have left us.

Furthermore, the builders didn't need drawn boat lines to build from, so lines of colonial American boats are exceedingly scarce. And, unfortunately for us, like all wooden boats colonial craft were biodegradable. Whether worn out in use or the victims of accidents or exposure, they tended to disappear rather quickly, so there is very little left of them for us to study. Yet, they are mentioned in the literature and diaries of the period just frequently enough to whet our imagination and to give us at least something to base our assumptions on.

The American colonists were strung out along the shore with an all but impenetrable wilderness behind them. They had few roads. In fact, there were few roads down until the beginning of the nineteenth-century, according to Henry Adams's history of Thomas Jefferson's administration. Adams says that to get home to Monticello from Washington after 1801, Jefferson had to cross five rivers without bridges, either swimming his horse or finding a fording place.[2] At the end of the 1700s, stagecoaches from Baltimore to Washington sometimes lost their way in the woods or became mired in sinkholes. A hundred years before that there were almost no roads at all. The most efficient means of travel from place to place, besides walking, was by boat. Small boats were not powered by sail as much as you might think, because it was much simpler for boatmen along the shore to jump into a rowboat, pull away on the oars, and get quickly across the bay or up the river, without having to tack or bother with a rig.



The 32-foot, clinker-built, Egmonder pink, a Dutch herring fishery vessel dating from the thirteenth century. Variants of this type were likely in use in New Netherlands on the Hudson River in colonial times. Van Konijenburg, Shipbuilding From Its Beginning, *vol. 3.*

CLAIRE WHITE-PETERSON PHOTO

I want to use Joshua Hempstead's diary to illustrate my point about the importance of small craft in the colonial era. Joshua Hempstead was born at New London, Connecticut, in 1678 and lived until 1756.[3] In 1711 he started a diary, which he kept until his death, so we have an exceptionally complete record of the daily activities of a man whose occupations included boatbuilder, carpenter, land surveyor, farmer, and much else, and who used small boats all the time. In his diary, Hempstead referred to numerous trips to Long Island in whaleboats to peddle rum and hard cider, then buy feathers, wool, and corn to bring back to New London. He had a farm hardly more than a mile from where Mystic Seaport is today, and about ten miles from his house in New London. He used to go back and forth between his home and his farm in small boats. One entry recorded in the spring of 1720 relates taking fifteen swine to the farm in Mystic in a whaleboat: five old sows with pigs, five harrows, and five shoats. His two sons went in the boat with the pigs while Joshua walked overland. Remember, he had ten miles to go and had to cross the Thames–by boat of course–but he returned home with his boys in the whaleboat. On another occasion late in November he and a son worked at the farm until eight at night. In returning home they had to row themselves across the Thames in a small ferryboat. Joshua was standing in the bow pushing when an oar slipped off the tholes and he pitched head-over-heels into the water. Through the goodness of God, he wrote–and with the help of his son–he climbed back into the boat and rowed home. As a result of his dunking, he caught a cold, but such exposure was routine in early-eighteenth-century Connecticut, where small boats played a large role in coastal living.

The origins of these colonial boats are difficult to trace. The British Isles, of course, influenced most strongly the New England and Southern craft, but Native American and Dutch traditions can also be identified. An example is found in the shape and evolution of a wholly extinct series of boats known as pettiaugers or perriaugers, derivatives of the pirogue. Joshua Hempstead called them pirangos. On one occasion he and John Coit, the owner of the New London shipyard where Hempstead occasionally worked, took 15,000 feet of pine lumber to New York in a sloop, sold the lumber and the sloop, and came home in a pirango obtained in Manhattan.

Pettiaugers were modified log canoes, probably derived from the Native American dugouts encountered by the first settlers all along the East Coast. In the Northeast, these were hollowed out of a pine, oak, or chestnut trunk 20 to 40 feet long. In his *New England Prospect* of 1634, William Wood wrote about Salem, Massachusetts, in the 1630s. There, the settlers had plantations across the North River, where the land was more fertile. They used to go back and forth to their farms in dugout log canoes. Every household had these "water-horses," as they were called. The Salem farmers even went leagues to sea in them to hunt waterfowl.[4]

As time went on, some dugouts were widened and deepened, becoming more stable and burdensome. With numerous modifications, they took on something of the appearance of Dutch craft, according to some contemporary accounts. Their sides were built up with one or more strakes of timber, and some were even split in two lengthwise and widened with boards added in the bottom. They were much used around Manhattan and northern New Jersey, where the Dutch settlers apparently adopted them and used them extensively. By the nineteenth century, these boats seemed to have grown quite large and were rigged to sail. They never had keels; their bottoms were quite flat, and they must have been shoal in draft, making them convenient for loading and unloading on the beach, but not very efficient for sailing. Yachting historian W.P. Stephens wrote that steamboat mogul Cornelius Vanderbilt, when barely 16, got his start in a pettiauger, running a ferry from Staten Island to Manhattan in 1810.[5]

During the Seven Years' War in the mid-eighteenth century, a number of Cape Cod whaleboats passed through Manhattan on their way to Albany to take part in the war with the French. These round-bottom, double-ended boats of the English-Scandinavian boatbuilding tradition stopped in Manhattan, and one of the whaleboats rowed a race with a local pettiauger, for what were high stakes at the time, winning easily.[6] It is from references like this in period newspapers that we know what little we do about such craft.

Eighteenth-century newspapers also contained frequent references to Moses boats that had slipped their moorings and had drifted away or had been stolen. Nobody knows the origin of the name Moses boat. Perhaps it derives from the biblical story of the infant Moses found by pharoah's daughter in the bullrushes. It has been suggested that it was a corruption of the word molasses. The molasses trade with the West Indies was a big industry at the time, and Moses boats were used as lighters in loading and unloading casks of molasses. We have a good idea of what they were like from the lines of a Moses boat, in the Hillhouse collection of draughts in the Science Museum in London.[7] These lines show a large, full-ended, heavy, burdensome craft capable of carrying hefty loads.

We also know something about gigs, a type of fast rowing craft developed by smugglers on the southeast coast of England in the eighteenth century. They are the lineal ancestors of the Whitehall boats that had such a large role in waterfront transportation in this country in the nineteenth century. The 32-foot Cornish pilot gig *Trefey*, built in 1843 and still raced at the Isles of Scilly, is representative of this class of boats.[8]

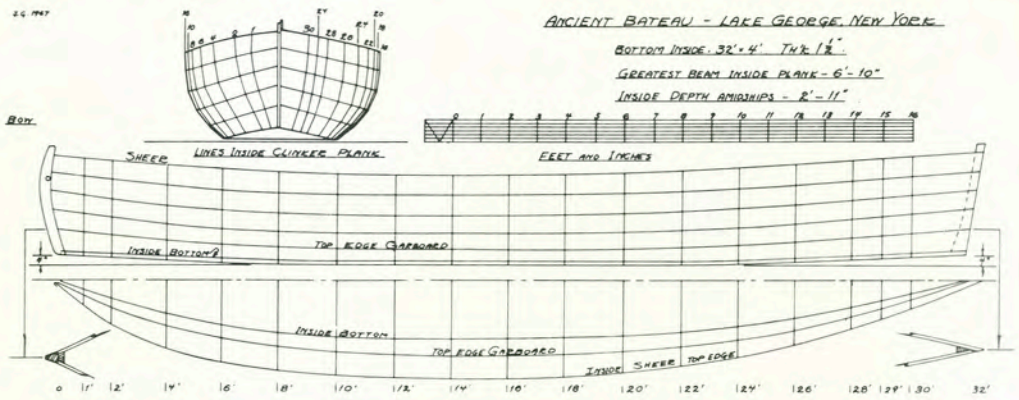
When divers discovered the remains of colonial military bateaux on the bottom of Lake George, New York, in 1960, we were given the rare opportunity to inspect actual colonial boats. These craft, presumably built about 1760, bore an undeniable resemblance to Dutch watercraft. The stems of some early Dutch flat-bottom, double-ended fishing boats shown in Nicolaes Witsen's *Architectura Navalis*, published at Amsterdam in 1690, are similar to stems of these flat-bottom, double-ended bateaux used in the Seven Years' War on New York's Lake George in the mid-eighteenth century. The Dutch had begun to settle the area that is now New York in 1624, and their influence along the Hudson River was strong for even a century after the English captured New Amsterdam in 1664. Certainly Dutch boatbuilding traditions would have survived throughout the region as boatbuilders handed their skills and practices from generation to generation. When 600 bateaux were built at the old Dutch city of Albany for Queen Anne's War (the War of the Spanish Succession) in 1711, boatbuilders from the Dutch tradition must have been employed. Unfortunately, we have no plans or remains to verify the speculation.

Dating from the thirteenth century, the Egmonder pink was the predominant

One of the bottoms of a Seven-Years'-War bateau brought up from the bottom of Lake George, New York in 1960. Sunk on the lake bottom during the winter when fighting was suspended, they were preserved, embedded in silt.



RICHARD DEAN PHOTO



MARY ANNE STETS PHOTO

The author's lines of a colonial military bateau reconstructed from the remains of ancient bateaux recovered from Lake George, New York, in 1960, and from Colonel Nathaniel Meserve's 1758 drawing of a troop transport lakeboat.

type employed in the Dutch herring fishery in those early years, and other Dutch fishing and freight boats had a similar form.[9] It is almost a certainty that there were boats of this type in New Netherlands and far up the Hudson River. The Seven-Years'-War bateaux resembled these Dutch pinks in several ways: both had flat bottoms; both were in the 30-foot size range; both were lapstrake or clinker built. Sections through the hulls reveal the same rounded ribs rising from wide, flat bottoms. The construction of the stems is closely similar.

Divers who raised the remains of these colonial military bateaux from Lake George reported long rows of these boats lined up on the bottom of the lake, half buried in silt. For the most part, these bateaux came up from the lake bottom in pieces, although in a few cases whole bottoms were brought up intact. The State of New York deposited the remains, at the Adirondack Museum at Blue Mountain Lake, New York. The first winter the disassembled parts remained buried in damp sand on the lake shore before being transferred to improvised tanks of polyethylene glycol solution for stabilization. Later these disassembled parts were taken to the museum at Blue Mountain Lake, where they were stored until three bateaux were partly reassembled from them in 1966. The bateaux have since been moved to the New York State Museum in Albany, where one is on display.[10]

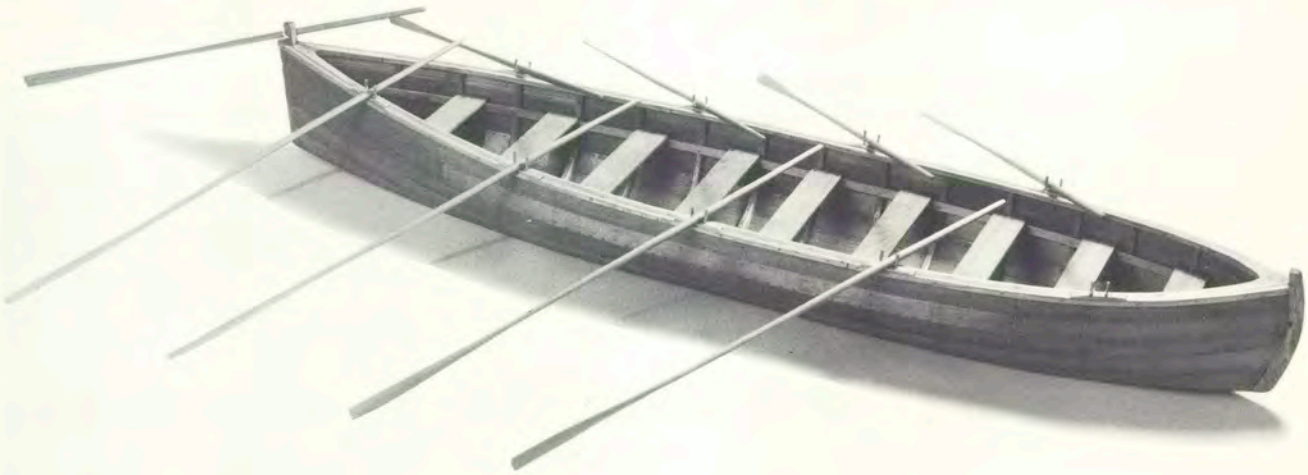
Although similar in shape to the Dutch pinks, these bateaux were heavily and crudely constructed, as demanded by the circumstances under which they were built. The curved ribs were hewn from crooked oak limbs probably selected and cut by the boatbuilders themselves in the surrounding forest. These boats were full at the bow like the Dutch boats, with a heavy, rabbeted stem slightly curved and tipped back at the head. Yet, they were quite sharp at the stern, where the beveled plank ends landed on an unrabbeted sternpost.

In reassembling and restoring the bateaux at the Adirondack Museum, it was necessary to extrapolate the shape of the upper parts of the frames, which had not been protected by silt and had eroded away during the 200 years that they had been at the bottom of the lake. Used as a control were the only boat lines known to have been produced in this country in the eighteenth century. These lines had been drawn in the winter of 1758 by Colonel Nathaniel Meserve of the New Hampshire militia, in designing a boat to take the place of bateaux on Lake George.[11]

These eighteenth-century military bateaux have not survived as a specialized type, but derivative types that are their direct descendents subsequently appeared all over this country, with some still being built and used. Dories, wherries, Saint John River salmon boats, Seabright or Jersey skiffs, Staten Island skiffs, Yankee skiffs, lumbermen's bateaux, and even Adirondack guide boats, were all derived in some degree from these bateaux.

In 1755, after he took command of His Majesty's Forces in North America following General Braddock's death, Governor William Shirley of Massachusetts almost drowned while traversing the falls in the Oswego River. He immediately realized that an adequate supply of suitable boats would be required for transportation if the war was to be brought to a successful conclusion, and in January of 1756 Shirley initiated what was called the Batoe Service. Upwards of 2,000 boatbuilders and sailors recruited along the Atlantic Coast from the Gulf of Maine to Chesapeake Bay formed this elite corps, which was placed under the command of Colonel John Bradstreet. Some of the bateaux builders kept diaries, including Ben Glasier, a young boatbuilder from Ipswich, Massachusetts, whose manuscript account of his service at Lake George is deposited at the Peabody Essex Museum in Salem, Massachusetts. In it, Glasier recounted his journey on foot across country from Ipswich, stopping at taverns along the way for claret and other refreshments, until he reached Lake George where he enlisted in Colonel Bradstreet's Batoe Service and was put to work building bottoms for bateaux. Using a factory approach, with specialized jobs, the Batoe Service built 1,200 bateaux at Albany and 300 at Schenectady in the spring of 1758 alone.[12] It can be truly said that the war was won in bateaux, the greater part of which were built, repaired, and operated by Bradstreet's Batoe Service.

After the war was won and the Batoe Service was disbanded, its former members returned home to various places along the Atlantic Coast, taking with them what they had learned about bateau design and construction. This was a classic case of diffusion, as these boatbuilders proceeded to build boats in their home regions incorporating features of the bateau. Simeon Lowell of Amesbury, Massachusetts, who is credited with devising the banks dory in



Colonial bateau model made by John Gardner in 1968 (scale 1 1/2 inches to 1 foot; 51 inches length overall). This model (Accession Number 68.147) is now on permanent exhibit at the Adirondack Museum, (photo courtesy of the Adirondack Museum, Blue Mountain Lake, New York)

1793, in a boatshop that is still in operation, had half a dozen Lowell uncles and cousins who served in the Batoe Service.

Previously it was believed that the bateau was of French origin, as the name suggests, and that it came down from French Canada, where it had been adapted from small flat-bottom boats brought to North America in the sixteenth century by French cod fishermen. English boats, which had developed in the main from clinker-built Scandinavian keel boats, did not have flat bottoms. Consequently, it is unlikely that the flat-bottom bateau could have evolved from such English round-bottom prototypes. But why not from Dutch boats, practically all of which were flat bottomed–especially as the Dutch at that time dominated the Hudson River Valley, where the greater part of the bateaux employed by the British in their war with the French were produced?

Before the bateaux were raised from Lake George in 1960, no one alive had seen a colonial bateau or had an inkling of what they were actually like with their wide, full bows and deep, rounded sides, so unlike the slimmer, sharper bateaux from Canada. Nor had they considered that perhaps their origin might have been, at least in part, Dutch.

Of course the Dutch would not have hesitated to borrow from the French, or the French from the Dutch, or British from both. Boat design is most certainly a mixing process of elements taken from many varied sources, both ancient and contemporary. A Dutch component in eighteenth-century colonial bateaux and in the various related local American small craft types that have followed is not only obvious; in my judgement it is unmistakable.

Indirect but supportive evidence for a Dutch influence on the military bateaux employed by the British colonials is to be deduced from the memoir of M. Pouchot. The commandant of the French forts of Niagara and Levis, Pouchot was a keen observer who wrote from a background of personal experience. "The bateaux used for navigation of the upper part of this [St. Lawrence] river carry six thousand pounds, and are of a peculiar form to enable them to resist the efforts made to take them up the rapids. Those that the English built at the latter place [Schenectady] were larger and lighter, but could not endure the navigation after the first voyage. They were always filled with water by efforts made to keep them up, and those of the French did much better service."[13]

Pouchot provides us with a definite statement that the French bateaux were different from the English. How were they different? The French had a peculiar form suited to the rapids, which is to say that they had flaring sides and long, sharp ends, the result of 100 years of prior adaptive evolution in the rapids of the upper St. Lawrence, begun as early as 1671 by M. de Courcelles, Governor of New France.

The British bateau "could not endure this navigation." If the bateaux whose remains were raised from Lake George in 1960 were typical of boats used in the rapids by the British, as according to every indication they were, it is easy to see why their performance was poor in comparison to that of the French boats. The blunt, full bows and full, nearly upright sides of the English boats were ill-suited to resist the turbulance of rapids or to withstand the pounding they would receive. Although the British boats took their name from the French, they obviously did not derive their model from that source. Nor were they similar to craft native to the British Isles that might have furnished a model. Furthermore, we may be sure these British bateaux were not produced *ad hoc*, that is, invented on the spot. New boat forms are never "invented" out of whole cloth, so to speak. Invariably they are produced by modifying old and familiar ones.

From what prototype were the British bateaux derived? Without doubt from a boat form long in use by the Dutch in their native Netherlands. Brought to the New World to be built by Dutch settlers in need of boats on the Hudson and its tributary streams and adjoining lakes, the boat form was adapted for war and then traveled far and wide, to serve as an unacknowledged Dutch colonial influence on some of the most characteristic American watercraft.

[Endnotes appear on page 32]

Wind Rose® Calendar of Events

For further information about Museum events call the Mystic Seaport Information Line at (203) 572-5315 unless otherwise noted.

For further information about Mystic Seaport Stores events call (203) 572-5385.

MAY

Spring hours continue. Exhibits are open 9 A.M.- 5 P.M. through 25 June.



19 Steamboat *Sabino* begins 1995 season. Daily half-hour trips on the hour, from 11 A.M. to 4 P.M.; 90-minute downriver cruise at 5 P.M. Beginning 26 June, an additional weekend downriver cruise at 7 P.M. *Sabino*: (203) 572-5351.

20 The Boathouse opens. Weekends only, 10 A.M. to 5 P.M., through 25 June. Sailboat rides aboard *Breck Marshall* and launch rides aboard *Resolute* (12 noon-5 P.M.). Members receive a discount on rowboat and sailboat rentals. Boathouse: 572-0711, ext. 4233.

JUNE

8 Sea Music Festival Members' Preview Concert.
Refer to back wrap for details.

9-11 Sea Music Festival. Refer to back wrap for details.

10 Sea Music Symposium. Refer to back wrap for details.

10 Interpreter for Visitors with Hearing Impairments. Available at 10:30 A.M., noon, and 2 P.M. in the Visitor Reception Center.

18-23 *Brilliant* **Teen Sail.** Take the helm, handle the sails, and learn traditional skills aboard our 61-foot schooner. Open to teens ages 15-19; board and disembark at Mystic Seaport. $650. Sail Education: (203) 572-5323.

20 Traditional Sailboat Racing Series Practice. Beetle Cat and Portsmouth Handicap Class, 6 P.M. Ten-week racing series begins 27 June. Livery boats are available at $14 per hour rental; race your own boat for $4 per night or $20 for the series. Boathouse: (203) 572-0711, ext. 4233.

25-30 Elderhostel Program. Participants live aboard the *Joseph Conrad* and learn basic seamanship, rowing, navigation, and sailors' arts. Four spaces are reserved for local members who may commute to the program on a daily basis. Education: (203) 572-5322; for commuter registration call Jan Larson at (203) 572-0711, ext. 5036.



CLAIRE WHITE-PETERSON PHOTO

25-30 *Brilliant* **Teen Sail.** Refer to 18 June entry.



CLAIRE WHITE-PETERSON PHOTO

26 Museum Hours Change - Summer Schedule Begins. Full schedule of outdoor activities, participatory drama, horse and carriage rides, vending, and Kids Today activities, from 9 A.M. to 6 P.M.

26 Boathouse open daily. 10 A.M. to 6 P.M., through 4 September. Sailboat rides aboard *Breck Marshall* and launch rides aboard *Resolute* (12 noon-6 P.M.). Members receive a discount on rowboat and sailboat rentals. Boathouse: (203) 572-0711, ext. 4233.

27 Traditional Sailboat Racing Series Begins. Refer to 20 June entry.

28-8/30 Family Skywatchers Guide. Learn about the stars and other heavenly bodies inside the Planetarium–with a feature topic each week, then go outside to observe the summer evening sky; 90-minute program on Wednesday evenings at 8:30 P.M. Planetarium: (203) 572-5355.

JULY

2-7 *Brilliant* **Teen Sail.** Refer to 18 June entry.

2-7 *Joseph Conrad* **Level I Program.** An introduction to sailing and small boat seamanship for youth ages 10-13. Students practice traditional sailors' skills aboard our ships and around the Museum grounds. Program includes a trip aboard the research vessel *Enviro-Lab II* to study the ecology of Long Island Sound. Cost is $425 ($450 for nonmembers). Sail Education: (203) 572-5323.

3-7 A Sailor's Life of Long Ago Summer Day Camp for youth ages 8-9. Explore life at sea and in port in the days of sail. Activities include making rope, trying a harpoon, splitting a codfish, singing chanteys, and learning about sea traditions. Camp runs from 9 A.M. to 3P.M. Cost is $110. Education: (203) 572-5322.



JUDY BEISLER PHOTO

4 Independence Day. Visitors can participate in a recreation of an 1870s Fourth of July. There are patriotic ceremonies and a parade of "Antiques & Horribles." Special activities for kids include an old-fashioned spelling bee.

7, 14, 21, 28 One-Day Traditional Boat-handling Classes. 9 A.M. to 5 P.M. $45 ($55 for nonmembers). Boathouse: (203) 572-0711, ext. 4233.



CLAIRE WHITE-PETERSON PHOTO

8 Interpreter for Visitors with Hearing Impairments. Available at 10:30 A.M., noon, and 2 P.M. in the Visitor Reception Center .

9-14 *Brilliant* **Teen Sail.** Refer to 18 June entry.

10-14 On The Water Week Summer Day Camp for youth ages 9-11. Campers spend time sailing, rowing, steamboating, learning rigging, and exploring the lore of ships and boats. Shoreside activities include sailors' knots, chartwork, marine weather, and other nautical skills. Camp runs 9 A.M.-3 P.M. Cost is $175. Education: (203) 572-5322.

10-14 Mystic Seaport Science Summer Day Camp for youth ages 9-10. Campers explore tides, river life, weather, energy, machines, computers, navigation, and astronomy. Includes a 2 1/2 hour trip aboard the research vessel *Enviro-Lab II.* Camp runs from 9 A.M. to 3P.M. Cost is $110. Education: (203) 572-5322.

11 Project Oceanology Cruise. Collect and examine the underwater life of Long Island Sound aboard *Enviro-Lab II.* Departs from Lighthouse Point; 4-6:30 P.M. Cost is $12 for adults, $6 for youth ages 6-15. Children 5 and under travel free, but must have reservations. Membership Office: (203) 572-5339.

13-17 *Georg Stage* **visits Mystic Seaport.** Refer to page 24.

15-16 Horse and Carriage Weekend. Ninth annual gathering of horses and antique carriages. Costumed drivers offer rides along the Museum's waterfront and streets for a small fee. Rally on the green at noon on both days.

16-21 *Brilliant* **Teen Sail.** Refer to 18 June entry.



JENNIFER STICH PHOTO

16-21 *Joseph Conrad* **Level II Program.** Designed for accomplished beginning sailors (ages 11-14) who want to improve their skills. Instruction focuses on improved boat-handling and seamanship. In addition to dinghies, students sail aboard a 28-foot whaleboat and row other traditional vessels. Program includes a cruise down the Mystic River aboard *Sabino.* Cost is $425 ($450 for nonmembers).
Sail Education: (203) 572-5323.

17-21 Mystic Seaport Science Summer Day Camp.
Refer to 10 July entry.

18 Project Oceanology Cruise.
Refer to 11 July entry.

18-19 ASTA Sail Training Rally. Refer to page 25.

22 *Sabino* **Dixieland Jazz Cruise** for members. Listen to a Dixieland band during a relaxing 1-1/2 hour cruise down the Mystic River aboard the steamboat *Sabino.* Cost is $13 for adults, $8.50 for youth 15 and under; trip begins at 7 P.M. *Sabino* Booth: (203) 572-5351.

22-23 Antique and Classic Boat Rendezvous Weekend. Visit the Museum and see a colorful array of



JUDY BEISLER PHOTO

restored wooden sail and motorboats. This year, the classic vessels parade downriver on Sunday.

23-28 *Joseph Conrad* **Level I Program.**
Refer to 2 July entry.

23-28 *Brilliant* **Teen Sail.** Refer to 18 June entry.



JUDY BEISLER PHOTO

24-28 Mystic Seaport Girls of Long Ago Summer Day Camp for girls ages 8-10. Campers make old-fashioned toys, play games of yesteryear, put together a sampler quilt, and dress up in nineteenth-century clothes. Other activities include cooking, sewing, weaving, and gardening. Camp runs 9 A.M. to 3 P.M. Cost is $110. Education: (203) 572-5322.

30-8/4 *Brilliant* **Teen Sail.**
Refer to 18 June entry.

31-8/1 10th Annual Moby-Dick Marathon. Enthusiasts gather to commemorate Herman Melville's birthday with a marathon reading of the classic on board the *Charles W. Morgan.*

31-8/4 On the Water Week Summer Day Camp. Refer to 10 July entry.

31-8/4 Mystic Seaport Girls of Long Ago Summer Day Camp.
Refer to 24 July entry.

AUGUST

3-6 A Taste of History. Savor nineteenth-century menus from ship and shore. Food is served on the Village



MARY ANNE STETS PHOTO

Green. See cooking demonstrations in our historic buildings.

4, 11, 18, 25 One-Day Traditional Boathandling Classes.
9 A.M. to 5 P.M. $45($55 for nonmembers). Boathouse: (203) 572-0711, ext. 4233.

5 Coast Guard Day. The flag for the "Class of 1999" is presented to incoming cadets in a ceremony and band concert on Chubb's Wharf.

6-11 *Joseph Conrad* **Level II Program** for youth ages 11-14.
Refer to 16 July entry.

7-11 Mystic Seaport Sampler Summer Day Camp for youth ages 6-7. Campers sample Museum activities that combine play and learning with arts, crafts, music, and games. The fun includes using a printing press, hearing sailors' songs and stories, enjoying old-fashioned games and toys, and taking a ride on the *Sabino.* Camp runs 9 A.M. to 3 P.M. Cost is $110.
Education: (203) 572-5322.

11 *Sabino* **Dixieland Jazz Cruise** for members. Refer to 22 July entry.

12 Interpreter for Visitors with Hearing Impairments. Available at 10:30 A.M., noon, and 2 P.M. in the Visitor Reception Center.

13-25 Special *Brilliant* **Two-Week Teen Sail.** Includes a weekend on Nantucket and the Classic Boat Race "Opera House Cup." Open to teens ages 15-19. $1295. Sail Education: (203) 572-5323.

13-18 *Joseph Conrad* **Level III Program** for students (ages 12-15) who have completed Level II or are experienced sailing solo in a small boat. Instruction includes fine-tuning sailing skills and an introduction to racing rules and strategy; includes a racing regatta. Cost is $425($450 for nonmembers).
Sail Education: (203) 572-5323.

14-18 Mystic Seaport Sampler Summer Day Camp.
Refer to 7 August entry.

19, 20 Antique Marine Engine Exposition. Collectors from across the U.S. and Canada gather for the fourth annual exposition of pre-World War II marine engines and engine models. Unique engines power watercraft in a boat parade on both days.

27- 9/1 *Brilliant* **Teen Sail.**
Refer to 18 June entry.

From Boats to Broadswords: Mystic Seaport's Collections

Mystic Seaport's collections are more than artifacts; they comprise the physical record of the American experience. They document important moments, trends, values and changes in American life. Using this material culture to explain history is the Museum's most important interpretive technique–we see the lives of our ancestors, and also our own lives, reflected in these objects.

The American Maritime Education and Research Center is a major component of Mystic Seaport's broadened goal to tell the stories of America and the Sea. The Center will enhance the Museum's ability to offer its collections as a public resource, as well as make them electronically accessible both internally to staff and visitors, and via the Internet.

The Museum holds over 2 million items, including vessels, photographs, film and video footage, manuscripts, imprints, art, tools and artifacts dating from the eighteenth century to the present:

Watercraft

- over 480 vessels

The largest collection of small craft in the world

GW Blunt White Library

- 65,000 volumes of books and periodicals
- 2,000 rolls of microfilm
- 1,000 ships registers
- 700,000 manuscript pieces
- 1,200 logbooks
- 600 audiotaped oral history interviews
- 200 videotaped interviews
- 9,000 maps and charts



150 years of American maritime activity is represented

Maritime objects and tools

- 70 figureheads
- 5,000 works of art on paper
- 300 carvings
- 2,000 ship models
- 8,150 tools
- 100 marine engines
- 1,120 paintings
- 1,400 pieces of scrimshaw
- 1,800 patterns and molds
- 1,000 half models
- 400 trophies and commemorative items



- Also sea chests, decorative ropework, ceramics, fishing gear, netmaking machines, furniture, medical and pharmaceutical items, clothing, jewelry, sheet music, musical instruments, toys, and games

Ships' Plans

- 100,000 sheets of plans
- 86 gore books and bound volumes

Photographs

- 200,000 images of American commercial and recreational maritime activity, persons, buildings, etc. dating from the 1840s to the present



Rosenfeld Collection

- 800,000 images

Film and Video

- 1.5 million feet of film
- 4,000 videotapes

The largest single collection of maritime photography in the world

Wind Rose® Museum Notes

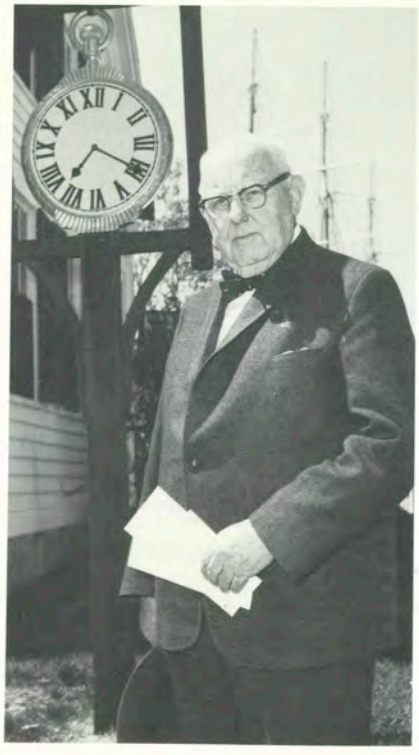
Georg Stage *Visits Mystic Seaport*

During 13-17 July, the Danish training ship *Georg Stage*, sister ship to the Museum's *Joseph Conrad*, visits Mystic Seaport. On 14-16 July, visitors can board the *Georg Stage*, as well as view sail handling demonstrations by the cadets aboard the vessel. The *Georg Stage* is a privately owned ship, training young people for service in the Danish merchant marine. It has the distiction of being the world's smallest full-rigged training ship and is run by the world's oldest sail training institution, founded in 1882. The vessel was built in 1934 to replace the original *Georg Stage*, which was rechristened as *Joseph Conrad*. At present, the ship's complement consists of 11 officers and 60 students.



MARY ANNE STETS PHOTO

The Joseph Conrad *(left) and* Georg Stage, *during that ship's first visit to Mystic Seaport in 1989.*



MARY ANNE STETS PHOTO

We remember with great appreciation and fondness the many contributions of Ed Pugsley.

Plaques Honor Deceased Friends of Mystic Seaport

Mystic Seaport honors four employees and volunteers with new plaques installed in the Memorial Garden behind the Planetarium.

Recent changes to the Garden, including the planting of hedges along the west side, reflect the Museum's attempt to create a peaceful, secluded area. Benches, and seats in the gazebo offer visitors a quiet spot away from the usual bustling summertime activities on the grounds.

The Museum's staff is represented by John Durburow, who worked as an interpreter in the Education Department for 11 years before passing away in 1993. Volunteers are represented by Charlie Maxwell, who worked for 6 years in the Planetarium. The sundial is dedicated in memory of Frank Turnbull Crawford, who was also a Planetarium volunteer.

The plaque in memory of Edwin Pugsley, whose vision and enthusiasm brought about the construction of the Planetarium, is mounted on the front side of the building.

Pugsley became a family member of Mystic Seaport in 1942, and a life member in 1946. He was a Museum trustee from 1946 until his death in 1975 at the age of 90.

In addition to his participation in Museum activities, he donated a number of clocks and navigation instruments, including the sidewalk clock in front of the Galley and the armillary sphere in front of the Planetarium. His other gifts encompass a wide range of artifacts, from doll house furniture to carriage stepping stones, blacksmithing tools to a rare tobacco box!

For many years Pugsley repaired clocks and barometers in the Museum's collection, particularly those on display in the Pugsley Clock Shop, which used to occupy the Edmondson House–present home of the Children's Museum.

Mystic Seaport Hosts ASTA Sail Training Rally



MARY ANNE STETS PHOTO

Schooner Brilliant *will join the ASTA fleet for a cruise to Block Island.*

Tall ships and sail training vessels are rendezvousing at Mystic Seaport on Tuesday, 18 July, as they gather to participate in a Sail Training Rally organized by the American Sail Training Association. Museum visitors can view these magnificent sailing vessels on 18-19 July. Crews from vessels such as the *Pride of Baltimore II, Spirit of Massachusetts* and the *Lettie G. Howard* will compete in a variety of shoreside events emphasizing seamanship skills, safety–and speed! Trainees will engage in rowing races, tug-of-wars, bucket brigades, and knot-tying relays, while the captains exercise their talents in a dinghy race. Visitors to the Museum are invited to watch the crew competitions on Wednesday, 19 July, from 1 to 4 P.M.

Mystic Seaport's schooner *Brilliant* joins the ASTA fleet for a Cruise in Company on Thursday, 20 July. The fleet departure promises to be a memorable sight as these graceful vessels set their sails and head for Block Island. The next day, 21 July, the Tall Ships® Race from Block Island to Newport takes place, followed by a dockside ASTA Awards Reception in Newport on Saturday evening, when a variety of awards and trophies will be presented to the competing ships and crews.

Traditional sailing vessels are encouraged to participate in the Sail Training Rally and Tall Ships Race, and the public is invited to attend the Mystic and Newport festivities. Volunteers are needed to staff various events. For further information, please call the ASTA office at (401) 846-1775, fax at (401) 849-5400, or write to the American Sail Training Association, 47 Bowen's Wharf, P.O. Box 1459, Newport, RI 02840.

Special Members' Discount !

The Bookstore at the Mystic Seaport Museum Stores is offering the new Mystic Seaport Classic Army Knife at a special price for members. The knife case is deep blue with "Mystic Seaport" imprinted in white, and contains a blade, nail file, screwdriver, scissors, tweezer, toothpick, and key ring. The regular price is $19.95, but members pay only $15.95–that's a 20 percent discount!



CLAIRE WHITE-PETERSON PHOTO

The perfect accessory for the suburban adventurer!

About the Log *Authors*

This year's Gerald E. Morris Prize Article Contest winner is WILLIAM H. THIESEN, a Hagley Fellow in the Department of History at the University of Delaware. He received his M.A. in the Program in Maritime History and Nautical Archeology at East Carolina University. He is indebted to Peter R. Kolchin, Eugene S. Ferguson, Arwen P. Mohun, and Mary H. Thiesen for their helpful suggestions and criticisms.

The 1994 Morris Prize Article Contest attracted nine essays in the competition for publication in *The Log* and a $500 award sponsored by the Fellows of the G.W. Blunt White Library. The panel of judges included five Fellows of the Library and two members of the *Log* Editorial Board. Established by former Mystic Seaport Librarian Gerald Morris in 1980, the contest encourages primary research on many aspects of American maritime history. Contest rules and entry forms are available from the *Log* Editor at the Museum address.

JOHN GARDNER, Mystic Seaport's Associate Curator for Small Craft Studies for 25 years, continues to study and write on the history, technology, modern adaptations, and enduring values of traditional small craft and their use. He delivered a version of this paper to a Yale-Smithsonian Seminar in 1990.

MARIFRANCES TRIVELLI is Cataloguer in the Registrar's Office of the Museum's Curatorial Department. She holds a B.A. from the University of Rhode Island and an M.A. in History from the University of Connecticut.

SANDRA L. OLIVER, a foodways historian in Maine, began her study of coastal cooking 20 years ago in Mystic Seaport's Education Department. In the spring, the Museum published her much acclaimed *Saltwater Foodways,* a mix of history and period New England recipes.

SARA LEONE, *The Log's* Associate Editor, is a veteran of many departments at Mystic Seaport. She has a B.A. from Connecticut College.

Brick Loaves and Domestic Discord



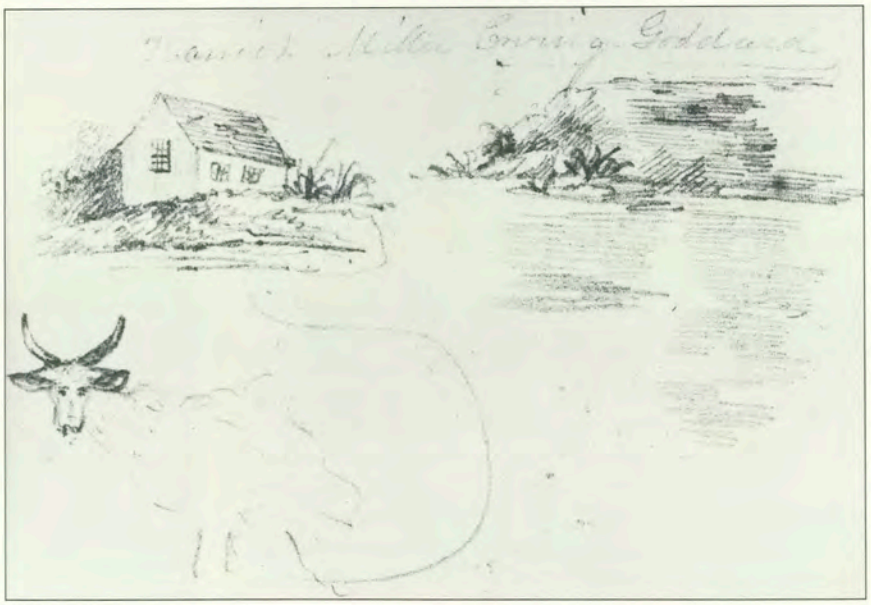
SANDRA L. OLIVER

Mr. and Mrs. William Goddard were having a tough time in the summer of 1840. He complained about her housekeeping and she complained about his lackadaisical church attendance. This bit of domestic gossip comes from Harriot Miller Erving Goddard's two-month-long diary, started 6 August and ended early in October of 1840, which is part of the newly-acquired Goddard Collection (Coll. 238). The Goddard papers contain a good account of the Boston and eastern trade with China and India in the early nineteenth century.

Through Harriot's diary we get a view of prosperous Bostonian social life–afternoons spent taking tea with friends and family, evenings spent playing bagatelle and whist. Mrs. Goddard could afford to have a dressmaker fashion a new silk dress; Mr. Goddard hired a cabinetmaker to make them some furniture. But as we have all heard, money doesn't buy happiness. Harriot wrote about her sick parents and relatives, a bad tooth she suffered with, and the 15 Whig delegates the Goddards housed during the political convention in Boston. After she and William visited the cabinetmaker, she wrote, "Oh! How I wish that William could find a house to please him, but I almost despair."

Although he thought to invite Harriot on a business trip to New York and Philadelphia, and he often took her in the carriage when he made business calls around Boston, William was preoccupied with his business fortunes. The firm's ship *Norfolk* had been wrecked on Cape Cod in January. In the spring, the *Claudius* and the *Sarah and Caroline* had arrived from Calcutta. By fall, the *Navigator* was expected with a cargo of cordage and sailcloth from Russia, the *Congress* was due from Smyrna, the great fig port of Turkey, and the *Claudius* would soon return from Liverpool with a cargo of salt.

With the economy in the doldrums since the Panic of 1837, and with the pressures of a fairly recent marriage, William's discontent spilled over into his relations with his wife. Harriot wrote, "In the evening William came, he found fault with my housekeeping because I would not send away the cook which I have told him before was an impossibility–as I did not feel sufficiently acquainted with the family arrangements to undertake to tell a new girl what were her respective duties, I am sorry that William shows little gratitude for the exertions I have made, it is very hard after trying to do the best in my power to be blamed."



Harriot Miller Erving Goddard seems to have sketched this bucolic scene in the back of her abbreviated 1840 diary. (Coll. 238, G.W. Blunt White Library)

For her part, Harriot was constantly disappointed in William's church-going. An Episcopalian, she regularly attended St. Paul's and sat in "Mother's" pew. At the back of the diary she wrote down the dates of each succeeding Sunday with a "yes" or "no" next to them; an examination of the diary shows that the two out of nine Sundays recorded as "yes" were the only two that William attended church. Harriot reported William's excuses for not going. Once he said that he didn't like to sit in her mother's pew and couldn't afford one of his own–obviously an excuse from a man who drove a horse and chaise and commissioned furniture and who could surely swing the customary pew rental of the time. Another time, he told her he wouldn't go because he was ashamed to be seen with her in the old shawl she wore. Other Sunday mornings, he was simply among the missing when the church bells rang, calling worshipers for the last time.

Occasionally, Harriot reported on her activities in the kitchen. On 23 September she wrote, "Spent the morning preparing peaches for Mary to preserve, did not finish till near two." On 9 August she reported that she spent much of the day in the kitchen preparing food for the convention of Whig delagates who would be in town to celebrate Bunker Hill–the New Bedford

contingent arrived aboard a whaleship, Harriot noted. The next day, she and William provided bed and breakfast for 15 people, leaving Harriot exhausted.

In 1840, a prosperous housewife like Harriot Goddard was certainly expected to do some "hands-on" kitchen work, especially of the fussier items, like the peaches for preserves, while her hired cook did the heavy lifting. Harriot probably directed kitchen operations, instructing the cook to make certain dishes in a particular way. In fact, the very first page of the notebook in which Harriet kept her diary contained four–rather unremarkable–recipes.

There are two stuffing recipes, one each for goose and pigeon, but identical to one another; one for "hard custards"–that is, firm custards as opposed to soft, sauce-like custards–and one for bread pudding. In spite of their access to, and probable wealth to buy, all the rare and wonderful spices of India, China, and the Mediterranean sometimes carried by William's ships, the Goddards apparently were people with simple tastes, using nothing more exotic than pepper, nutmeg, marjoram (which Harriot spelled "margorium"), rosewater, and lemon. Her bread pudding bears remarkable similarity to the bread-and-butter pudding in the recent edition of the Fanny Farmer cookbook. In fact, the most interesting thing about the recipes is the reference she makes in the bread pudding to a "brick loaf" of bread–apparently one baked in a pan in the now-familiar rectangular shape.

In 1840, a shift was under way from cast loaves–that is, round loaves baked directly on the floor of a fire-heated beehive oven–to loaves baked in pans in stove ovens. Technological changes like this one are rarely uniform, and bread may have even been baked in pans in beehive ovens. Since the Goddards were city dwellers, they could have purchased their bread from a bakery. Or, since they had domestic help, perhaps they ate homemade bread baked in a newer style Rumford oven with stove-like shelves in it, often found in kitchens of New England's urban gentry, or in a cast-iron stove. Prosperous city people seemed to accept stoves a little more readily, while some rural New Englanders continued to use fireplaces through the mid-nineteenth century.

It took Harriot two tries to write her bread pudding recipe clearly, but the second, ungarbled version is perfectly usable:

Bread Pudding

Take a brick loaf
spread six slices with butter
lay these one by one in your dish
a cup of currants sprinkled
between each slice 3 eggs
to a pint & half of milk.



I don't think she meant literally to sprinkle a whole cup of currants between each slice of bread, but rather to divide them evenly; I prefer to plump my currants in a little warm water before adding them. If you buy a loaf of unsliced bread, or make your own, you can cut the slices as thick as you please. Use a small rectangular baking dish, greased, and make three layers of bread, each layer two slices wide. A pint and a half is three cups, so the proportion of egg to milk is one egg for every cup. Let the pudding sit for half an hour before baking it in a 325° oven for an hour. If your slices are thick, the bread may absorb most of the egg and milk mixture. If you wish a slightly softer pudding, add another cup of milk and egg.

Please note that the recipe does not call for sugar. If you want a sweet pudding, use from 1/4 to 1/2 cup of sugar to the three cups of milk, or more to taste. Though the original does not call for spice, you are free to use a grating or so of nutmeg, a teaspoon of cinnamon, and a teaspoon of vanilla to season your pudding.

I hope, if you are married, you eat this pudding in a happier mood than the Goddards seemed to have shared 155 years ago this summer.

Around America in ★ 1853 ★ Maritime and More

Mystic Seaport's Potato Chips are inspired by the story of George Crum, a chef from Saratoga Springs, New York, who made the first chips in 1853. Do you know what was happening around America that year?



The U. S. becomes the first country in the western hemisphere to establish ties with Japan since that country was closed to foreigners in 1683. On 8 July, Commodore Matthew Perry sails into Tokyo Bay with documents from President Millard Fillmore that request the opening of relations. Perry returned the next year for the treaty signing.

★

A yellow fever epidemic strikes parts of the South with losses especially high in New Orleans, where more than 7,000 people die from the affliction.

★

The Crystal Palace Exhibition of the Industry of All Nations is held in New York City to showcase American inventions. The Palace structure is topped by a cast-iron and glass dome that is the largest in the country.

★

The first edition of the women's suffrage magazine *Una* is published in Washington, D.C.

★

The clipper ship *Northern Light* makes a record-breaking 76-day, 6-hour voyage from San Francisco to Boston.

★

The United States and Mexico sign the Gadsden Purchase, which annexes the southern portion of Arizona and New Mexico to the U.S.

★

George Greenman & Co. launches the clipper *David Crockett* in October. The clipper is the largest vessel built on the Mystic River to that time.

Kids Corner

Can a Boat Talk?

If it could, what would it say? Boats have stories to tell and a language of their own. When you look at a boat does it look strong, fast, new, old, narrow, wide? Maybe a long, thin, new boat is getting ready for a race. That wide boat with the low sides looks as if it might hold you and all of your friends for a lazy trip on the river, but maybe it was really made for hard work on the ocean–strong and wide to hold fish or lobster traps.

Can you speak boat language?
You may already know words like: **bow** (front), **stern** (back), **plank** (boards along the sides), **frame** (boards that act like our ribs)

bow stern plank frame

Try drawing a line from each of these words to the correct boat part.

With these words, let's try to "read" the boat in this picture?

Look at the bow and the stern. Which is which? This boat is pointed on both ends! That means it moves easily both forwards and backwards.

Where is the boat's middle? Is it wide or narrow? It looks wide. This boat has room to hold things.

Where do you sit to row? Probably in the middle on the thwart (seat). And which way do you face to row? If you're sitting, oars work best if you pull on them, so you face the stern. Sometimes this boat is rowed standing up! The boat in the background near the wharf, with a boy in a dark jacket, has high wooden oarlocks so he or his father can row standing up. Then, he'll have to face forward and push on the oars.

How about the frames ? Are there many of them? Are they close together? That makes this boat strong.

This boat is called a peapod and is a good worker. With extra parts, it could even be sailed. The peapod on the left, with a man raising his hand, has a rolled up mast and sail in it. Boats like these were often used for lobstering in Maine. That's one of the reasons why the rowers stood up to row sometimes–they needed to see their lobster buoys in the water.

Why is it called a peapod? Next time you're in the grocery store, look through the vegetables and find some peapods. You'll see how this boat got its name. Just for fun, look for other shapes in the vegetable section that might make a good boat.

Would You Like To Try Rowing a Peapod?

Mystic Seaport's Boathouse provides an opportunity for adults and children to row on the Mystic River. You could rent a peapod, dory, or butthead skiff–just to name a few. Have an adult check the Calendar in this issue to see when boats can be rented.

What's Up At Mystic Seaport?

Next fall, someone might ask, "How did you spend your summer vacation?" How would you answer that question if you were living in a seacoast town 150 years ago? Girls and boys ages 6-10 can join us for an action-packed week of Summer Day Camp and find out what children did during the summers of long ago. If you love being on the water and are age 9-11, you can sign up for our "On the Water Week" and learn how to sail a small boat on the Mystic River. Have an adult check the Calendar in this issue to find out how to sign up.

Photographed 113 years ago in Deer Isle, Maine, these boats are named for the food they look like. Do you think the boy in the foreground is showing off his boat or the load of clams he has in it? (Detail; Hudson Collection, Mystic Seaport Photo Archives)



Ever wonder what it might have been like to chase whales from a rowboat that was sometimes only half as long as the whale you're hunting? Or, how you would share a small boat with 2,000 pounds of fish? Wouldn't you tip over? This summer, come down to our beach by the *Australia* exhibit and play with models of these two workboats to discover why they worked so well.

Do you like plays? Outside? By the Mystic River on a warm summer afternoon? Every summer day, we put on a short play called "A Tale of a Whaler." The play is about a woman who sneaks on board a whaling ship by dressing up as a man. Does she get away with it? Come see the play and find out for yourself. You may even be picked to have a part in it–no rehearsing needed.



What's a Kid To Do?

From late June to the end of August, we have things going on for kids *every hour of the day*! At both entrances, you can pick up a list of activities just for kids called the "Kid's Today." You'll find activities like:

• Sandcastles Down Under–Sandcastle building by the *Australia* exhibit.

• Make It and Take It–make a simple craft to take home with you.

• Summertime Fun/Toys & Games–try out toys like the ones kids played with over 100 years ago.

• Meet a Mystic Critter–maybe you'll be lucky enough to see one of the Mystic River's creatures up close as you help Museum staff catch them.

Fill In The Blanks Story

Words can make a big difference when you are telling a story. Here is a game to play with another person. Start off by keeping this story hidden from the other person and just ask them for the kind of word you are looking for. "Give me an adjective. Please tell me a boy's name." When you have collected all of the words, filling in the blanks along the way, then you can read the story out loud to your partner. The stories often turn out to be silly and fun. Try it. By the way, there is a chart under the story to help you.

It was _____ and it was _____ and it
adjective *adjective*

was wedged into the sand. But what

was it? _____ and _____ had to find
boy's name *girl's name*

out. "Let's_____it towards the
verb

water and see if it floats," they shouted. Into the rushing _____it went and the
noun

two kids climbed in.

"Wow. This is _____. Where should we
adjective

go?" said _____. "We need a pair of
boy's name from above

_____to help us row anywhere,"
plural noun

answered_____. They found a pair of
girl's name from above

_____ _____ in the bottom of the
adjective *plural noun*

boat and began to _____ _____.
verb *adverb*

They _____and _____until they got
past-tense verb *past-tense verb*

back to shore. They were _____but
adjective

they'd had a _____time.
adjective

Noun: a person, place or thing, like Mom, school, cat.

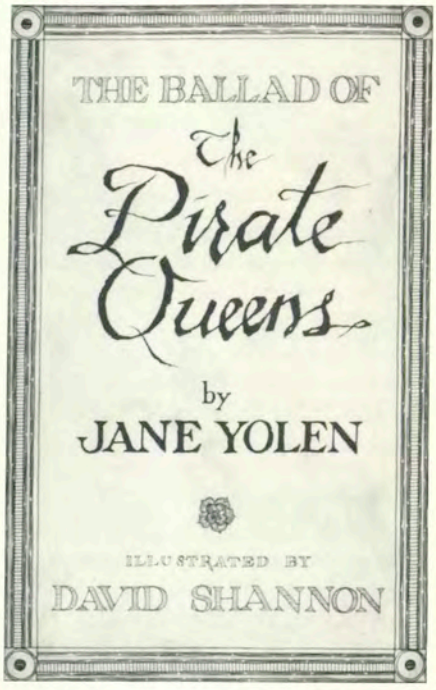
Plural Noun: more than one person, place, or thing, like dogs, books, friends.

Adjective: a word that describes a noun, like nice, brown, frisky.

Verb: an action word, like play run, jump
Past-tense verb: action word to describe what someone has already done, like played, ran, jumped.

Adverb: describes a verb and often ends in -ly, like slowly, gently, quickly.

REVIEW



I just read a book called *The Ballad of the Pirate Queens*, by Jane Yolen. It was about two girl pirates named Anne Bonney and Mary Reade and the pirate ship *Vanity*. I did not like the book because it was not fun to read. I liked the illustrations. It was hard to understand because of the way the book was written. I liked the idea of girl pirates. I wondered why they were not married to the boy pirates before they had babies. I guess the problem with *The Ballad of the Pirate Queens* was that it was too much of an adult topic, and it took a lot of explaining so that I could not read the book alone. I found that very frustrating, but I did like the ending when all the children were playing with their grandmothers Annie and Mary. I think maybe this was a picture book for adults.

Martha Hill Canning, 8 years old
Stonington, CT



Angeline Potter's Bedroom Set



MARIFRANCES TRIVELLI

Ask the average person to describe the collection of objects at Mystic Seaport, and the answer will probably include figureheads, scrimshaw, ship models, and, of course, boats. So it may seem surprising that one of the newest additions to the collection is a set of nineteenth-century bedroom furniture.

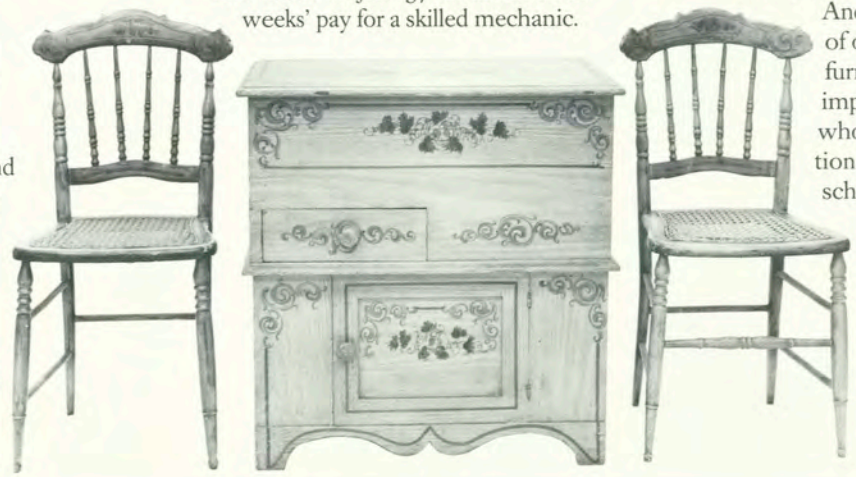
The furniture set was originally the property of Angeline Whitford, who was born in Greene, (a village of Coventry), Rhode Island, in 1834. According to family history, she acquired this cottage-style bedroom set shortly before her 1862 marriage to David Douglass of Voluntown, Connecticut. "Cottage style" furniture is a type of machine-made, simply decorated pine furniture, which was first manufactured during the 1840s. Angeline's set included three chairs, a bed, bureau, mirror, four-drawer chest, and commode, all painted with a wild strawberry design.

The term "cottage" refers to an architectural style popularized by the trend-setting landscape architect Andrew Jackson Downing. Seeking "truthfulness of character" in American architecture, Downing had pioneered alternatives to the prevailing Greek Revival style of architecture and classical motifs in furniture. He championed improved farmhouse designs for farmers, villas for those "of easy income," and cottages–inspired by his admiration for English cottage architecture–for "industrious and intelligent mechanics and working men". For Downing, both house and furniture "should clearly express the modesty and simplicity of cottage life."

Like the architectural style, the furniture style appeared in the mid-1840s. A move toward the factory approach to furniture manufacture about the same time, along with the perfection of the circular saw for ease in cutting pieces and lathes for turning, all powered by steam, made such furniture cheap to manufacture. And when it was popularized by authors like Downing, or the editor of *Godey's Lady's Book*, the style reached a wide audience of consumers.

In his *Architecture of Country Houses* (1850), Downing described the features that made cottage-style furniture popular for 30 years: "This furniture is remarkable for its combination of lightness and strength, and its essentially cottage-like character. It is very highly finished, and is usually painted drab, white, gray, a delicate lilac, or a fine blue–the surface polished and hard, like enamel. Some of the better sets have groups of flowers or other designs painted upon them with artistic skill. When it is remembered that the whole set for a cottage bed-room may be had for the price of a single wardrobe in mahogany, it will be seen how comparatively cheap it is."

Downing pointed out that Edward Hennessey's furniture factory, on Brattle Street in Boston, produced a great deal of cottage furniture and shipped it around the country as well as to the West Indies. In 1850, Hennessey was selling a set composed of a bureau, wash sink, small table, French bedstead, and four chairs for just $37–or about three weeks' pay for a skilled mechanic.



A few months after their marriage, Angeline Douglass's husband David enlisted in the 21st Connecticut Infantry Regiment in the summer of 1862. He died in Virginia early in 1863. Two years later, Angeline married her distant cousin, Elisha Potter, of Voluntown. Their belongings, including the bedroom set, were packed up and moved by ox cart to their new farm in Griswold, just west of Voluntown. In the years following the Civil War, Griswold was undergoing a transformation from an agricultural to a manufacturing town. The newly built mills harnessed the power of the Pachaug River, and produced buttons, woolen items, hats, twine, and textiles.

In spite of the industrial progress, Griswold did not experience a population boom. Angeline and Elisha's son, John, attended the Boardman School, a one-room schoolhouse close to their home. John's daughter, Nancy Potter, also attended the school from 1934 to 1939. In 1949, she donated the school building to Mystic Seaport, and in the summer of 1994 she made the additional gift of her grandmother's furniture.

The Potter furniture is an important addition to the Museum's collection for several reasons. The "cottage style" is appropriate to the time period and social status represented in several of Mystic Seaport's domestic life exhibits. And, through its history of ownership, the furniture provides an important link to those who began their education in the Boardman school, as well as giving us an additional glimpse into the lives of a typical nineteenth-century Connecticut family. [M.S.M. 94.75]

CLAIRE WHITE-PETERSON PHOTO

Notes to Two Shipbuilding Societies

1. John Scott Russell, *The Modern System of Naval Architecture* (London: Day and Son, 1865), *xxix.*

2. Frederic Tudor, *Some memorandums, by which it is attempted to be shewn that an improved model may be adopted in the construction of ships, by a new application of well-known principles* (Boston, 1812), 2-5; John McLeod Murphy, *American Ships and Ship-Builders* (New York: Charles W. Baker, Printer, 1860), 22; John W. Griffiths, *Treatise on Marine and Naval Architecture, or Practice Blended in Ship Building* (New York: John W. Griffiths, 1850), 90; and Howard I. Chapelle, *The Search for Speed under Sail, 1700-1855* (New York: Bonanza Books, 1967), 15, 22.

3. Henry Hall, "Report on the Ship-Building Industry in the United States," *10th Census of the United States, 1880,* vol. VIII, Special Reports. U. S. Department of the Interior, Census Office (Washington: Government Printing Office, 1884), 199; F. W. Taussig, *The Tariff History of the United States* (New York: G. P. Putnam's Sons, 1914), 221-23, 236-37; John G. B. Hutchins, *The American Maritime Industries and Public Policy, 1789-1914* (Cambridge, Massachusetts: Harvard University Press, 1941), 257-86; and William Armstrong Fairburn, *Merchant Sail,* vol. 2 (Center Lovell, Maine: Fairburn Marine Educational Foundation, 1945-55), 911-57, 1495-1552.

4. Ibid., 215-16.

5. Adam W. Kirkaldy, *British Shipping: Its History, Organisation and Importance* (London: Kegan Paul, Trench, Trübner and Company, 1914), 33-37; and J. F. Clarke, *The Changeover from Wood to Iron Shipbuilding* (Newcastle-upon-Tyne: Newcastle-upon-Tyne Polytechnic, 1986), 21.

6. Ibid.; John Grantham, *Iron, as a Material for Ship-Building; Being a Communication to the Polytechnic Society of Liverpool* (London: Simpkin, Marshall, and Co., Stationers' Hall Court, and J. Weale, 1842), 6; and William Fairbairn, *Treatise on Iron Ship Building: Its History and Progress* (London: Longmans, Green and Company, 1865), 1-2.

7. Discussion of "The Strength of Iron Ships," by William Fairbairn, Institution of Naval Architects *Transactions* 1 (1860): 99-104.

8. William Fairbairn, *Useful Information for Engineers* (London: Longman, Brown, Green, Longmans, and Roberts, 1856), 2-3.

9. William Pole, ed., *The Life of Sir William Fairbairn* (London: Longmans, Green, and Company, 1877), 159-62, 341-42.

10. Ibid., 401-22; William Fairbairn, *An Experimental Inquiry into the Strength of Wrought-Iron Plates and Their Riveted Joints: as Applied to Ship-Building and Vessels Exposed to Severe Strains* (London: R. and J. E. Taylor, 1850); William Fairbairn, *On the Application of Cast and Wrought Iron to Building Purposes* (London: John Weale, 1854); William Fairbairn, *Useful Information for Engineers* (London: Longman, Brown, Green, Longmans, and Roberts, 1856, 1860, 1866); William Fairbairn, *Treatise on Iron Ship Building: Its History and Progress* (London: Longmans, Green and Company, 1865).

11. Discussion of "The Strength of Iron Ships," by William Fairbairn, Institution of Naval Architects *Transactions* 1 (1860): 82.

12. Russell, *Modern System of Naval Architecture, xxiv.*

13. Clarke, *Changeover from Wood to Iron Shipbuilding,* 35-36.

14. John W. Griffiths, *The Progressive Ship Builder,* vol. 2 (New York: John W. Griffiths, 1876), 251-52.

15. K. C. Barnaby, *The Institution of Naval Architects, 1860-1960* (London: Royal Institution of Naval Architects, 1960), 15.

16. Ibid., 13-21, 580; and consult Institution of Naval Architects *Transactions* 1 (1860).

17. William Fairbairn, "The Strength of Iron Ships," Institution of Naval Architects *Transactions* 1 (1860): 73-78.

18. William John Macquorn Rankine, *Shipbuilding, Theoretical and Practical* (London, 1866); William John Macquorn Rankine, "Stream-line Surfaces," Institution of Naval Architects *Transactions* 11 (1870): 175-81; Nathaniel Barnaby, *Naval Development in the Century* (London: W. and R. Chambers, 1904), 274-76; and R. A. Buchanan, *The Engineers: A History of the Engineering Profession in Britain, 1750-1914* (London: Jessica Kingsley Publishers, 1989), 169.

19. George S. Emmerson, *John Scott Russell: A Great Victorian Engineer and Naval Architect* (London: John Murray, 1977), 12-20; Barnaby, *Naval Development in the Century,* 276-79; K. C. Barnaby, *The Institution of Naval Architects,* 19-20, 66; and Buchanan, *The Engineers,* 189.

20. Colonel Mark Beaufoy, *The Report of the Committee for Conducting the Experiments of the Society for the Improvement of Naval Architecture* (London: Printed by Order of the Society, 1800). In 1834, Beaufoy's son Henry reprinted a greatly expanded version as *Nautical and Hydraulic Experiments with Numerous Scientific Miscellanies.*

21. William Froude, *On the Rolling of Ships* (London: Parker, Son, and Bourn, 1862); "On the Stability, Propulsion, and Sea-going Qualities of Ships," *Reports* of the British Association for the Advancement of Science, (London, 1869); Barnaby, *Naval Development in the Century,* 287-94; Sidney Pollard and Paul Robertson, *The British Shipbuilding Industry, 1870-1914* (Cambridge, Massachusetts: Harvard University Press, 1979), 132-33; Buchanan, *The Engineers,* 164. Also see C. A. Russell and D. C. Goodman, eds., *Science and the Rise of Technology since 1800* (Bristol, England: The Open University Press, 1972).

22. John Grantham, "The Strength of Iron Ships," Institution of Naval Architects *Transactions* 1 (1860): 1.

23. Tudor, *Some memorandums,* 3-4; and John W. Griffiths, *Treatise on Marine and Naval Architecture,* 204.

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42. For a complete description of these associations consult R. A. Buchanan, *The Engineers: A History of the Engineering Profession in Britain, 1750-1914* (London: Jessica Kingsley Publishers, 1989).

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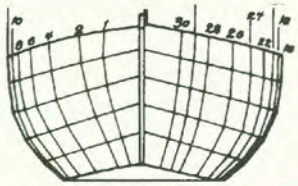
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69. William Joe Webb, "The United States Wooden Steamship Program During World War I," *The American Neptune* 35 (October 1975): 287. Also see Carlos deZafra, "Revival of Wooden Shipbuilding as a War Industry," Society of Naval Architects and Mechanical Engineers *Transactions* 26 (1918): 33-39.

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Notes to Dutch Influences

1. John Gardner, "Boats and Ships in One New England Seaport," *The Log of Mystic Seaport* 29:2 (July 1977): 42-51.

2. Henry Adams, *History of the United States of America During the First Administration of Thomas Jefferson*, 2 vols., (1921; reprint, New York: Antiquarian Press, 1962), 1: ch. 1.

3. *Diary of Joshua Hempstead of New London, Connecticut, Covering a Period of Forty-Seven Years from September 1711 to November 1758* (1901; reprint, New London: New London Historical Society, 1970).

4. William Wood, *New England Prospect* (London, 1634); Roger Williams, *Key Into the Language of the Indians of America* (London, 1643); John Gardner, "Native Dugout Canoes," *The Log of Mystic Seaport* 21:2 (June 1969): 57-60.

5. Unpublished essay on the Whitehall boat, Coll. 91, W.P. Stephens Papers, G.W. Blunt White Library, Mystic Seaport Museum; Kenneth Durant (author of *The Adirondack Guide-Boat*) to John Gardner, 3 May 1967, at the time of my *National fisherman* article attributing a Dutch influence to American colonial bateaux was in preparation, reported: "My Century Dictionary under 'pink,' cites John Winthrop, *History of New England*, ' a Dutch pink arrived which had been to the Southward trading.' De Lait's *New World, 1609*, in *Narriatives of New Netherlands*, ed. Jameson, p. 50, 'The Country abounds in timber suitable for shipbuilding; it is sought by our people, who have built general sloops and tolerable yachts.' I remember having read that the first passenger vessel on Lake Champlain was a 'yacht.' We do not know what it looked like, but there is a fair presumption of Dutch origin. The 'sloops' of early traffic on the Hudson were surely sloep not chaloupe; so the gondolas of Lake Champlain and the eastern rivers came out of Amsterdam rather than Venice. The periaugua, a common form of ferry on the Hudson and Lake Champlain, a most unDutch name, had flat bottoms with lee boards. There was one such on Lake George, 'managed by one man who was also helmsman and very frequently drunk," Da Costa, *Lake George, 1968*." Leeboards are an unmistakable Dutch signature.

6. Boston *Weekly New Letter*, 6 May 1756, reported: "Tuesday Evening last, sixteen whale-boats, with six men in each arrived here [New York City] from Cape-Cod, in the province of Massachusetts Bay and are to set off this day for Albany, in order to be employed in the Battoe Service. A wager of 20 dollars was rowed for by one of the above mentioned Whale-boats, and a Pettiaguer belonging to this City, on Saturday last, which was won with greatest ease by the former." Clearly the full-bowed, beamy, flat-bottom pettiauger was not built for speed.

7. Hilhouse Folio of boat plans, Hilhouse and Company, Eighteenth-Century Shipbuilders, Bristol, England. Science Museum, South Kensington, London.

8. Edgar J. March, *British Pilot Gigs: Inshore Craft of Great Britain*, (Newton Abbot, England: David and Charles, 1989), 2: ch. 6; see also John Gardner, *More Building Classic Small Craft* (Camden, Maine: International Marine Publishing, 1989), ch. 2.

9. Nicolaes Witsen, *Architectura Navalis...* (Amsterdam, 1690), reproduced in E. Van Konijenburg, *Shipbuilding From Its Beginning*, 3 vols., (Brussels: Permanent International Congresses of Navigation, 1895-1905), 1:3.

10. John Gardner, a series of six articles on the recovery and reassembly of the Lake George bateaux, *National Fisherman*, October 1966, April, May, June, July, and August, 1967.

11. Nathaniel Meserve, *Dictionary of American Biography*, 577. John Gardner, *National Fisherman*, July and August 1967. Merserve's plan for a boat to replace bateaux on Lake George is in the Loudoun Papers, Henry E. Huntington Library and Art Gallery, San Marino, California.

12. Meserve to General Amherst, 31 December 1758, quoted in American Antiquarian Society, *Manuscript Records of the French and Indian War in the Library of the Society* (Worcester, Massachusetts: American Antiquarian Society, 1909).

13. Franklin B. Hough, trans, *Memoir upon the Late War in North America between the French and the English, M. Pouchot, Commandant of Forts Niagara and Levis in Canada* (Roxbury, Massachusetts: W. Elliot Woodward, 1866).

SEAPORT SALUTE

William C. Ridgway III



MARY ANNE STETS PHOTO

Trustee William C. Ridgway III's expertise and enthusiasm are bringing Mystic Seaport into the 21st century with a renewed vigor. ❧ The combined efforts of the Ridgway family have helped to guarantee that future generations experience the stories of America and the Sea. Bill Ridgway's father, William C. Ridgway, Jr., served as Museum President from 1971 to 1976; his foresight and emphasis on long-range planning had a significant effect on the development of the institution. Bill's mother, Emily, has continually supported the Museum, and generously set up a unitrust in the name of her husband. Bill and his wife, Carol are Pilots. Carol serves on the Pilot Steering Committee, and on Pilot's Weekend can usually be found enthusiastically debarking logs. ❧ Bill Ridgway became a Mystic Seaport trustee in 1976, and since that time he has become extensively involved with the day-to-day operations of the Museum. As chair of the Capital Campaign Committee and Development Committee, Bill plays a crucial role in coordinating and overseeing the strategy of the Development Department. The Museum's fundraising efforts are more focused and successful due to his guidance. He is also chair of the Trustee Information Management Committee. ❧ Bill's experience in computers and communications is assisting Mystic Seaport in synthesizing its diverse aspects into a cohesive unit. At present, the Museum's collections and information are located in different buildings, and Bill is helping to create a system that links this material: "When the Museum's broad range of collections and information is tied together, it will make a richer presentation." These efforts are laying the foundation for the American Maritime Education and Research Center in the former Rossie Mill. ❧ Bill is a pioneer in the computer world; his interest developed in the 1950s as an undergraduate at Princeton. His B.S. in electrical engineering is equivalent to a computer science degree, as are his subsequent degrees: an M.S.E.E. from New York University, and a Ph.D. from Stanford University. ❧ Putting his education to work, Bill spent almost thirty years at Bell Labs in New Jersey, managing technical support facilities and developing software for military systems; he worked on *Telstar,* the original communications satellite. At present, Bill runs his own information management consulting business. ❧ Bill actively pursues many other interests. Fishers Island is especially dear to his heart. He has spent every summer there since childhood, and met his wife Carol on the island. Bill works on a variety of projects for the community. Most recently, he is involved in gathering data for a Geographic Information System, and developing a map of the island that provides information for critical environmental needs and better management of the island's resources. ❧ In his spare time, he enjoys his hobby of collecting steam locomotives, although as he says, they are easier and less time consuming to simulate on the computer than to actually build! ❧ "A good cause will sell itself," says Bill, but it is guided immeasurably by someone with his vision, dedication, and skill. Mystic Seaport is grateful to have Bill helping to further its cause.

Enjoy Summertime Activities at Mystic Seaport!

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There's plenty to do at Mystic Seaport during the summer. Join us for a season full of exciting events, from food festivals to Dixieland cruises aboard the steamboat *Sabino.* Take advantage of your members' guest discount to share a summer day at Mystic Seaport with your friends.