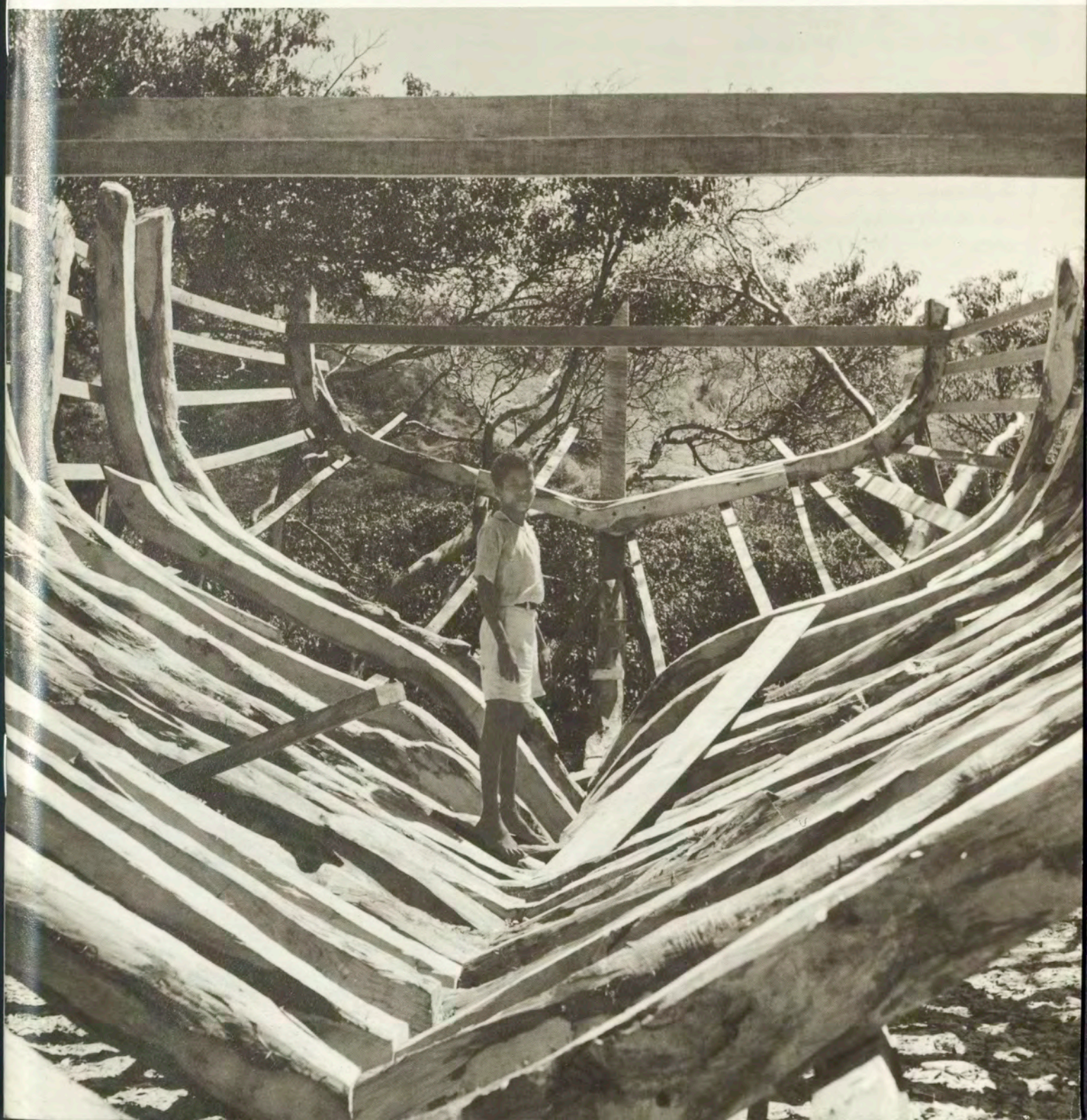
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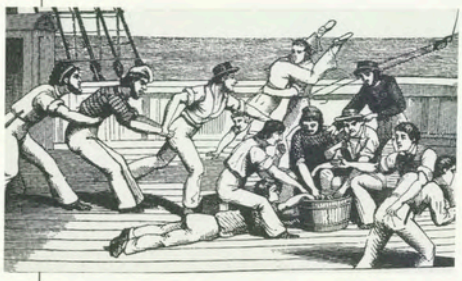
Summer
2002

Volume 54, No. 1



Contents

1
Sightings





26
Aerating the North Pond
JAMES H. McKENNA

Inside Back Cover
Mystic Seaport Salutes
The National Council of Advisors



16
Poetry in Motion
The photography of Carleton Mitchell



2
2002 GERALD E. MORRIS PRIZE ARTICLE
The Scourge of "The Scurvy"
A Mariners' Occupational Disease
LOUIS ARTHUR NORTON

11
Oar Power
Mystic Seaport and the Sport of Competitive Rowing
BARRY PEALE

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On the cover: Sailor, writer, and photographer Carleton Mitchell photographed this traditional sloop in frame on Petit Martinique in the Grenadines during a 1947 Caribbean pasage described in his influential book, *Islands to Windward* (1948). This and other striking Carleton Mitchell photographs are on exhibit in the Museum's Mallory Building—see page 16. (Mystic Seaport 1996.31.1096)

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ROLEX

Sightings

This issue's authors write of topics spanning antiquity and modernity, and reaching from sport and recreation on inshore waters, as represented at Mystic Seaport, to survival on the high seas. There's even a lesson in marine ecology to be learned from the Museum's handsome landscaping.

Special congratulations go to Louis Arthur Norton, Professor Emeritus, University of Connecticut Health Center. His is the 2002 Gerald E. Morris Prize Article, "The Scourge of 'the Scurvy,' A Mariners' Occupational Disease." Professor Norton's work was selected for publication and a prize of $1,000 by a committee comprised of the *Log*'s Editorial Board and members of the Fellows of the G.W. Blunt White Library here at Mystic Seaport. Sponsored by the Fellows for more than 20 years, and named for the Museum librarian who established it, this contest rewards researchers who use primary sources to convey the stories of America and the Sea.

* * *

Fine writing and fine boats have come strongly to mind this summer. In the forward to his book, *The Points of My Compass*, E.B. White wrote of his craft, and his penchant for privacy: "If a man is foolish enough to reveal his thoughts, the least he can do is conceal his whereabouts." Well, with apologies here for bending Mr. White's whimsical rule, the thoughts revealed below were inspired in the very whereabouts he (quite understandably) sought to keep to himself.

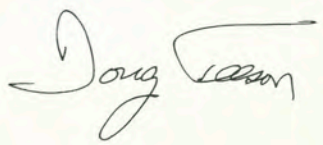
The getting out of a classic boat in wood is a fine and age-old form of art. Sculpting, in fact, albeit for purposes more pragmatic than merely pleasing the eye. For in a good sea boat, form and substance must meet in the most elegant of combinations. Thus the builder of wooden boats works not with just any wood, nor even any single kind of wood, but a medley of woods, carefully chosen, shaped, and fitted, for the purposes constituting a boat: oak for keel and frames, cedar for hull planking, teak for decks, mahogany for cabins and hatches, spruce for spars, and so on. And the sculpting of wooden boats rests in far more than using the right woods in the right ways for the right purposes. To shape their creations, the boatbuilders of yesteryear often followed hand-carved half models, in the design of which were captured and condensed the artistry, craft, and wisdom of seafarer-builders down across the ages.

These days, neither the designers nor the builders of wooden boats are so easily found as during earlier heydays. (Nor are the woods they choose to work with, for that matter.) But the lineage of the more elegant wooden boats, the ones people naturally call classics, traces in subtle lines and patterns from the hands of the Herreshoffs, the Stephenses, and other past masters. And their work lives on in certain magical places, in the hands and handiwork of those who love wooden boats. Mystic Seaport, of course, is such a place.

E.B. White's "concealed whereabouts" is another. Up in Maine, not far from where White lived and raised a family, messed about in boats, and wrote his lifetime best, there now blooms in mid-summers a fantastic garden of classic boats. Living sculpture under sail, this treat for the eye and soul is known as the Eggemoggin Reach Regatta. It's based at the famous WoodenBoat School in Brooklin, Maine, and it was my privilege to participate in this year's celebration of the art. Framed there at Eggemoggin by granite and spruce and sea and sky, the individual beauty of the boats at their moorings and the collective beauty of the fleet under sail are the stuff of dreams. Reflected everywhere are the passions and talents of many, living and passed, with a love for classic wooden boats. Passions of people like the Museum's Trustees Jon Wilson, originator and publisher of *WoodenBoat* magazine, and Maynard Bray, author, authority, and matchmaker of wooden boats with owners who will restore, cherish, and pass them along. Talents of those like E.B. and Katherine White's son, the late Joel White (formerly a Museum Trustee), and grandson Joel Steven White, in whose boatyard right there in Brooklin were and still are preserved and built many a classic wooden boat.

As author Douglas Whynott put it in his thoughtful book *A Unit of Water, A Unit of Time* (Doubleday, 1999), which is about Joel White, the people of his boatyard, and their life's work: "it can be said that Joel is an artist of the stature of his own father, but that he was working in a different medium." As Joel White himself put it, quoted by Bill Mayher in a true jewel of a new book about White and his art, *Joel White: Boatbuilder/Designer/Sailor* (NOAH Publications, 2002): "So much in life changes beyond repair or recall that there is a wonder in . . . changeless things."

I think he's right.



The Scourge of "The Scurvy"
A Mariners' Occupational Disease

BY LOUIS ARTHUR NORTON

"No man will be a sailor who has contrivance enough to get himself into a jail; for being in a ship is being in a jail, with the chance of being drowned. A man in jail has more room, better food, and commonly better company," suggested Samuel Johnson.[1]

A sailor's life during the age of sail was unpleasant and dangerous. Ships were often over-crowded, and the hull became a breeding ground for roaches, rats, and other vermin. Because it was impossible to keep the ship dry, the living quarters always smelled dank. On long voyages, half the crew might be lost to accidents or disease. Of the dangers inherent in maritime life, scurvy evolved into one of history's most devastating occupational diseases. From the sixteenth through the nineteenth century, collected records indicate approximately two million scurvy deaths occurred among the world's sailors.[2]

"The Scurvy"

The debilitating nature of the disease is illustrated by the following description of a seaman's case of scurvy:

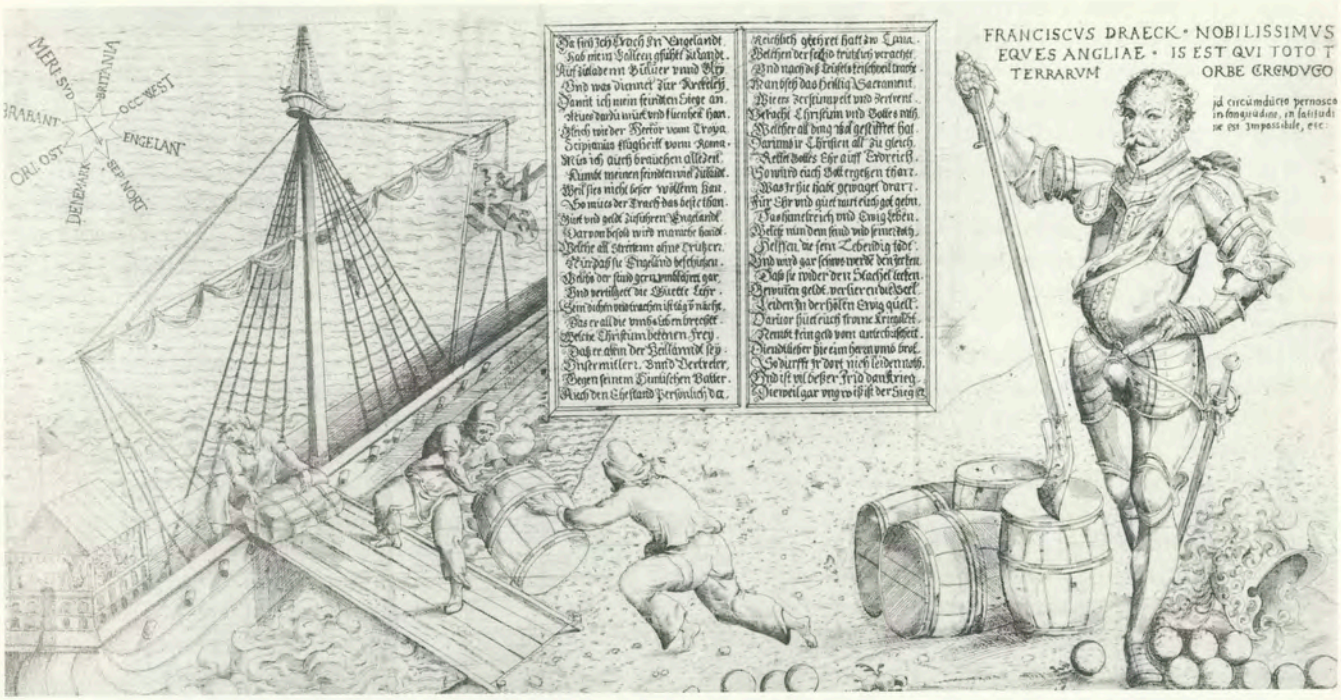
I had the experience of this destructive disease [scurvy] for about three months in a passage to the East-Indies, in the year 1738-9. . . . After eating a hearty breakfast of salt beef, I found myself taken with a pain under my left breast, where I had formerly received a dangerous blow. From this time the sea scurvy increased upon me, as it had done upon many others, a good while before me; and I observed that they soon took to their hammocks below, and became black in their armpits and hams [thighs], their limbs being stiff and swelled, with red specks, and soon died; . . . I thus struggled with the disease 'till it increased so that my armpits and hams grew black but did not swell, and I pined away to a weak, helpless condition, with my teeth all loose, and my upper and lower gums swelled and clotted together like a jelly, and they bled to that degree, that I was obliged to lie with my mouth hanging over the side of my hammock, to let the blood run out, and to keep it from clotting so as to cloak [choke] me.[3]

The medical-science history of most disease entities usually goes through four phases. First is the description of a disease of unknown cause. Second may be the serendipitous discovery of empirical remedies for the disease. This is followed by the identification of the specific cause. The last phase is solving the puzzle of the mechanism of action of the cure so that the disease can be completely understood, but the mechanism must fit the accepted paradigm of disease of the time. The disease scurvy is a classic example of this concatenation. What makes this unique is the relationship of scurvy to maritime history.

Scurvy's Rise

It is reasonable to assume that nutritional deficiencies led to some cases of scurvy throughout history, but the then-rare disease became a public health maritime problem around 1420 through 1460. Dom Henriques, Portugal's Prince Henry the Navigator, had collected a critical mass of scholars (astronomers, mathematicians, and geographers) at the seaport town of Sagres. Their scientific work and the daring of the Portuguese mariners led to the Age of Exploration. Although seafarers of the time had sailed out of sight of land for several days at a time, the impetus to discover new lands meant that they might be at sea for many weeks and even months. Prolonged voyages and extended naval blockades of hostile seaports frequently led to the vitamin-deficiency disease scurvy that took the lives of many of the world's sailors and passengers over five centuries that the preventable disease was prevalent.[4]

The food on sailing vessels was usually adequate in quantity, but not necessarily high in quality nor nutritionally balanced. The provisions generally consisted of some livestock to be butchered or used onboard (chickens, cows, and pigs), sugar, salt, flour, legumes, small amounts of perishable vegetables such as potatoes and turnips, lard, cheese, dried meats and fruits, hardtack, potable water, casks of beer, and occasionally wine. After a few weeks at sea, water frequently became non-potable. An uncovered butt was left in the open air until the noxious odor dispersed. Thus beer, which was relatively



Francis Drake (ca. 1540-1596), the quintessential English sea dog, sailed as explorer, as privateer, and as naval commander against the Spanish Armada. Drake made the first English circumnavigation of the world, 1577-80, claiming the west coast of North America for England along the way. During the voyage, Drake used beech sap to prevent scurvy. (Courtesy John Carter Brown Library, Brown University)

nonperishable, was an important source of drink on many vessels.[5]

Perishable foods were quickly consumed, and before long the sea diet became monotonous and unbalanced. The most happily anticipated part of the British naval ship's routine in the eighteenth and nineteenth century was the issue of grog, a mixture of a gill of high-proof rum diluted by three gills of water. The diluted rum was not enough to make a sailor drunk, but by saving the noon issue until the supper portion was measured out he might have enough to develop an agreeable "high" or "buzz."[6]

The signs and symptoms of scurvy were slow to appear, but steadily increased through approximately two and a half months at sea. The ship logs and memoirs of voyaging abounded with detailed and grisly descriptions of scurvy and its affect on the various missions.[7]

Remedies

The Portuguese explorer Vasco da Gama skirted the African coast during 1498-99. Because of contrary winds and obstructed landing areas, some shore-based Muslim rulers were able to harass the voyagers. By the time the Portuguese explorer rounded the Cape of Good Hope, about 100 of his 170 men had died of scurvy. In January 1498 da Gama observed that "many of our men fell ill here, their feet and hands swelling, and their gums growing over their teeth so that they could not eat." In April they were off the East Coast of Africa and bartered for some oranges with Moorish traders. Shortly thereafter all of da Gama's remaining sick recovered their health.[8]

An Italian gentleman/adventurer, Antonio Pigafetta, accompanied Ferdinand Magellan on his round-the-world voyage. Pigafetta noted:

Wednesday, November 29, 1520, . . .

We were three months and twenty days without getting [any] kind of fresh food. We ate biscuit, which was no longer biscuit, but powder biscuits swarming with worms, for they had eaten the good. It stank strongly the urine of rats. We drank yellow water that had been putrid for many days. We also ate some ox hides that covered the top of the main-yard to prevent the yard from chafing the shrouds, and which had become exceedingly hard because the sun, rain, and wind. We left them in the sea for four or five days, and then [put] them for a few moments on top of the embers, and so ate them; and often sawdust from boards. Rats were sold for one-half ducado apiece, and even then we could not get them. The gums of both the lower [and] the upper teeth of some of our men swelled, so that they could not eat under [any] circumstances and therefore died. Nineteen men died from that sickness.[9]

When Sir Francis Drake's expedition encountered a williwaw's violent wind off Cape Horn in 1578, he sought shelter on shore. Noting that some of his crew had contracted scurvy, the explorer

had sap collected from a beech tree found on shore and added this to their wine. All were cured except for two of his men who died of secondary complications of the disease. As a result of the success of this empirical remedy, Drake had a large beech cut down and a section of the trunk placed in the hold of the *Golden Hind*.[10]

In 1535 the crew of an expedition led by Jacques Cartier became ice-bound in the St. Lawrence River near the Indian village of Stadacona (now Quebec City). They were obviously suffering from the symptoms of scurvy: teeth falling out, gums putrefying, swollen limbs, and acute pain. Cartier heard that a beer made of fermented shoots, branches, and bark of evergreen trees had cured a local Indian called Domagaia. The beer was made from boiled ground bark to be drunk every other day or the residue applied as a poultice to swollen and infected legs. Cartier's sailors found the medicine very unpalatable, but those who were brave enough to drink it quickly felt better and, after two or three days, appeared to be completely cured. Subsequently the sailors pulled this miraculous tree (*Thuja occidentalis*) to pieces. Sailors frantic for relief from "the scurvy" consumed almost every leaf and piece of bark.[11]

Peder Claussøn Friis, a Danish priest and author, in "the Northern Land" (presumably northern Norway) in 1585, noted that the natives were healthy, but visiting foreigners—presumably sailors—frequently were afflicted by "scorbutus." If this disease was left untreated, it caused death. Scurvy particularly struck those who disliked or had trouble eating local food. Fatty cold-water fish were consumed without salt and, for some people, can be difficult to digest, but most high-fat fish are antiscorbutic. Friis mistakenly reasoned that scurvy was due to indigestion, but also noted a cure was the stalk and root of the herb Angelica (*Angelica Archangelica*, also called archangel, masterwort, and ground ash) that grew in the region in some abundance. Also, Friss mentioned that a stew made with cloudberries (*Rubus chamaemorus*) was equally potent in treating scurvy.[12]

During 1596, William Clowes of England wrote one of the earliest descriptions of scurvy in *Profitable and Necessary Book of Observations*. Knowing the symptoms of the disease, however, was only a convenient label. What was cause? About 130 years later, scurvy was thought of as an expression of the then-popular theory known as bodily economy. The Dutch physician Hermann Boerhaave theorized that scurvy occurred when blood serum became too thin and acrid. The putative cause was dampness, cold climate, and foul vapors. Unfortunately the term "scurvy" became somewhat generic for a number of maladies and occasionally was used to describe other nutritional deficiencies such as beri-beri that produces some similar symptoms. This imprecision in diagnosis made tracing scurvy's appearance and treatment in the medical literature confusing.[13]

From the sixteenth through the eighteenth century, Europeans cultivated *Cruciferea* or *Brassicaceae* (types of mustards) as antiscorbutics. These were from the species *Cochlearia officinalis*, commonly called "scurvy grass" or "spoonwort." When making landfall, voyagers looked for these plants or others like them. Voyaging to North America led to the discovery of antiscorbutics in the traditions of Native American folk medicine, the use of spruce essence. Native Americans chewed a spruce gum as a folk remedy and brewed a kind of tea that contained the sap of the spruce twigs. Similarly a type of spruce beer was brewed in parts of Scandinavia where the evergreen is abundant. The ethnic origin of spruce beer as a remedy is obscure, but likely was found independently in many cultures.

Spruce essence was used as a comprehensive medicine: a local anesthetic, counterirritant, stimulant, and wound palliative to treat abrasions, arthritis, boils, burns, catarrh, consumption, cough, diarrhea, dyspepsia, dyspnea, headache, inflammation, nephrosis, ophthalmia, phthisis (tuberbulosis), renosis, rheumatism, sores, sorethroat, stomach, stones, tumors, and soft-tissue wounds, as well as scurvy.[14]

An early attempt at preventive measures was found in the notes of John Woodall. Woodall, a former military surgeon, the first Surgeon General to the East India Company, and surgeon at St. Bartholomew's Hospital in London, was prescient concerning the most advantageous cure of scurvy. The scientist's 1639 volume discussed the diagnosis and treatment of "the scurvy called in Latine Scorbutum." In the preface he noted:

[W]e have in our owne country here many excellent remedies generally knowne, as namely, Scurvy-grasse, Horse-Reddish roots, Nasturtia Aquatica [sic], Wormwood, Sorrell, and many other good meanes... to the cure of those which live at home...they also helpe some Sea-men returned from farre who by the only natural disposition of the fresh aire and amendment of diet, nature herselfe in effect doth the Cure without other helps... [At sea,] the Lemmons, Limes, Tamarinds, Oranges, and other choice of good helps in the Indies... do farre exceed any that can be carried tither from England.[15]

By the end of the sixteenth century, the Dutch East India Company's vessels were carrying citrus juice, secured from their South African settlement at the Cape of Good Hope. James Lancaster, a British maritime captain, prevented scurvy in a voyage from India in 1601 by having his crew consume lemons and oranges obtained in Madagascar.

A similar example of treatment was found in a 1643 dialogue:

Admiral: . . . the difficulty consisteth in that our common seamen are so besotted in their beef and pork that they had rather adventure on all the calentures and scurvies in the world than to be weaned from their customary diet.

Captain: . . . their cassada, [cassava prepared from the tuberous roots of the manioc], pompians [pumkins], potatoes, plantains, oranges, lemons, limes, pines; which are excellent against the scorbute; so that the Dutch men-of-war, which yearly haunt all those coasts, do continually maintain themselves.[16]

Scurvy also harried the French mariners, although they had vague supposition about its management as revealed in the following passage.

[Scurvy] usually appears during long journeys at sea because of unsanitary conditions such as not bathing in clean water and not changing into clean clothes and because of [bad] air from the sea and a lack of use unspoiled water. Cold water and sleeping outside during the day also cause this disease. To avoid this disease, one should abstain from drink [alcoholic beverages], sleep during the day and not exercise. There is no cure for the disease, but some people have found relief from soft water, oranges and fruits. Lack of salt necessary to preserve food is the cause of this disease.

[Scurvy] is very debilitating or fatal if nothing is done about it. A change of air and environment can be helpful. Mustard extract has been shown to be an excellent treatment. . . . All bitter plants are recommended as remedies whether they are dried or cooked and the greens of these plants are [especially] very good . . . . Cochlearia of Septentrionaux, a weed of the sea, is also suggested. . . . Other weeds such as those related to watercress, as well as a red soil found in Norway, and the extracts of oranges and lemons are also very useful.[17]

Theories about the etiology and cure for scurvy were the concern of many maritime nations. In 1752



James Lind (1716-1794) apprenticed as an apothecary in Edinburgh, Scotland, before entering the Royal Navy as a surgeon's mate in 1739. He conducted his scurvy experiments aboard HMS Salisbury *in 1746, seven years before publishing his* Treatise of the Scurvy. *From 1748 to 1758 he was a physician in Edinburgh, completing an eminent career in service to disease prevention as physician of the Royal Naval Hospital at Haslar. While Lind had confirmed the antidote to scurvy, it would be 180 years before vitamin C was identified and the mechanism was understood.*

---

an interesting piece in quaint "Old Dutch" roughly translated as follows:

Various practitioners have postulated that the salty sea-vapor causes illnesses. Our country [Holland], lying next to the North Sea, therefore is visited by the scorbutus [scurvy], and this illness affects all countrysides and peoples, all crewmembers, wherever they navigate; . . . however [it is] easy to cure with just fresh little lemons: newly arrived [scurvy victims], [were found in the hold of] a slave-carrier. This scorbutus is not from the sea-vapor, idleness or the stink in the Ship's hold where they [the slaves] were locked up like criminals, but the air within the ship, moldy cheese, and meat and bacon that is too salty creates the mold-illness.

It appears that insufficient or polluted water is the cause of scorbutus. Water, if good, and clear, is refreshing by character. It can be easily consumed with food and quench the thirst. It can be used to mix and/or dissolve some foods. Also it may serve as a laxative. These beneficial elements make it a necessity, but if it is tainted, it is also cause of illness.[18]

By the middle of the 1700s, Britain's scientific community was largely in agreement that fresh fruit, particularly citrus, could cure scurvy. Their challenge was to find the etiology of the disease that also fit the popular paradigm of disease explanations. There were many abortive theories, but the one that had the most proponents was called "pneumatic chemistry." They had data on the physiology of the lungs and rudimentary knowledge of the physics of elasticity. The chemistry and physics of gases were being extensively studied. This knowledge led them to presume that when the balance of the physiological gases got out of balance, oxygen decreased and putrefaction occurred. They postulated that the result was scurvy. This was not the correct answer, but the theory led to far better ventilation and sanitation on ships.[19]

James Lind, a surgeon's mate in the Royal Navy, published a classic work, *A Treatise of the Scurvy,* in 1753, in which he described a controlled clinical nutrition study on 12 sailors with scurvy. All had the well-known symptoms of the disease, as well as having lived in the same place and consumed the same diet of "water gruel sweetened with sugar in the morning; fresh mutton broth often times for dinner; at other times puddings, boiled biscuit with sugar etc.; and for supper barley, raisins, rice and currants, sago and wine, or the like." Two patients were given a quart of cider a day. Two others took an "elixir vitriol three times a day upon an empty stomach" and an acidulated gargle for their mouths. Another pair was given

"two spoonfuls of vinegar three times a day upon an empty stomach," plus the gargle regime. The two patients with the worst symptoms were put on a regimen of a half-pint of seawater per day. Another duo's diet included two oranges and one lemon every day. "These they eat with greediness at different times upon an empty stomach. They continued but six days under this course, having consumed the quantity that could be spared."

The two remaining patients were provided with a honey-based nutmeg concoction three times a day, followed by three or four daily purges during this treatment course. The result was that "sudden and visible good effects were perceived from the use of the oranges and lemons; one of those who had taken them being at the end of six days fit for duty. . . . [I] observe that the result of all my experiments was that oranges and lemons were the most effectual remedies for this distemper at sea." Lind's study was designed to test the hypothesis that vinegar did not cure scurvy. The surreptitious finding that citrus was curative was not emphasized in his treatise.[20]

The log of the *Discovery* revealed that Captain James Cook and his crew brewed spruce beer while exploring Nootka Sound in 1778. Cook was likely aware that, during the Bering expedition of 1724, Bering's men survived through winter after being shipwrecked on one of the Aleutian Islands by eating cranberries, spoonwort, various mustard cresses, and other unidentified green herbs. Cook was an advocate of wort (malt) as a cure for scurvy, usually combined with a portion of a "rob" (a tenfold concentration) of lemon juice. Cook also brewed a spruce beer while making landfall near Tierra del Fuego, and also in New Zealand's Dusky Bay.

The evidence that citrus was a preventative as well as a curative measure for scurvy became accepted and was gradually introduced into the British grog ration. In spite of this, some ship's crews met the introduction of juice into their grog with resistance because it changed the taste of one of the few rewards of life at sea. (Later "lime and lager" would become a popular pub beverage.) The "cocktail" was greeted with suspicion by some officers and shellbacks, a "public health procedure" that they did not trust, similar to public mistrust of fluoridation of water supplies in the latter half of the twentieth century.

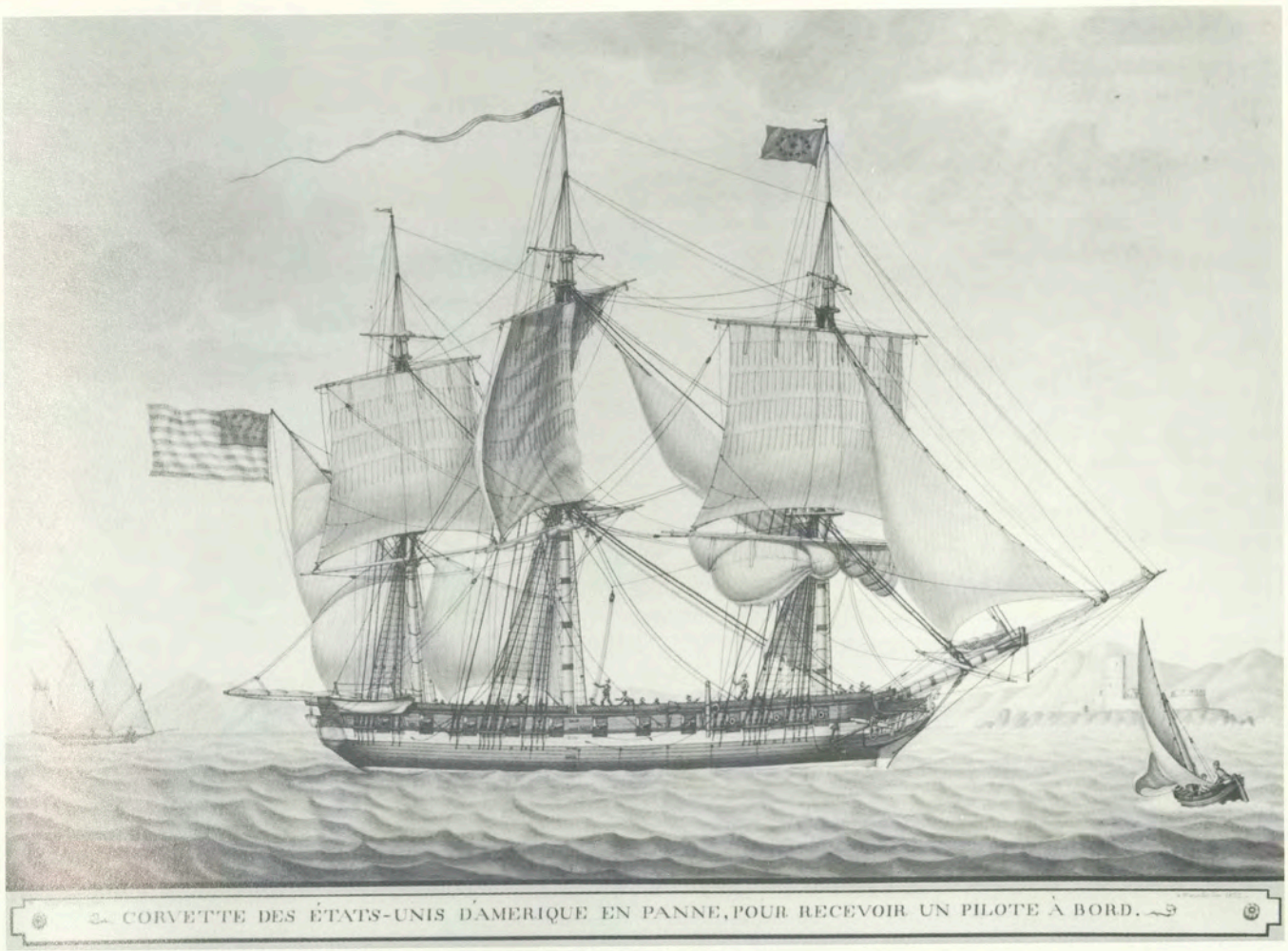
Because of politics and strife, the Royal Navy had difficulty obtaining large quantities of citrus, most of which was grown in Spain or parts of the Mediterranean under Spanish or Barbary control. When England was not actually at war with Spain, its diplomatic relations with its southern neighbor were strained. The four Barbary States of North Africa—Morocco, Algiers, Tunisia, and Tripoli—were relatively lawless. They harassed maritime commerce, demanded tributes of money, seized ships, ransomed crews, or sold them into slavery. In spite of these political obstacles, the British managed to obtain the citrus they needed. In order to preserve it, they boiled the juice into a concentrate and conserved it with sugar. Unfortunately, the boiling and storage method decreased much of the vitamin C content of the juice. Unaware of the biologically active ingredient in citrus, the Royal Navy committed another blunder. Reasoning that limes were an equally good source of the cure for scurvy, they established lime plantations in the British West Indian colonies. Only much later was it discovered that the active ingredient was a vitamin, and that limes contain only about two-thirds of the vitamin C per 100 milliliters of juice as do either oranges or lemons.

Sailors and Citrus

Although the British sophistication in science made great advances, from about 1700 to 1780 the incidence of scurvy at sea rose dramatically. The major European powers were at war, and large fleets roamed the seas or patrolled off hostile foreign stations for long periods of time. Supplying the widely scattered vessels with fresh food was a huge problem. From 1774 to 1780 the Royal Navy recruited 175,990 men, an impressive number on a population base of about 10,000,000 British citizens. From these personnel, 1,243 (0.7 percent) were recorded as killed in action or died from wounds, 18,541 (10.5 percent) died from disease (mostly scurvy), and 42,069 (24 percent) were listed as deserted on the muster books.

Scurvy was a serious problem in Britain's Channel Fleet, but it was a disaster in its West Indian Fleet. By mid-1781 Admiral George Brydges Rodney's vessels in the West Indies were crippled with nearly 3,000 cases of the disease. Rodney's Physician to the Fleet Gilbert Blane noted that fresh vegetables, particularly citrus fruits, prevented and cured the disease. For storage, the physician advised that two quarts of French brandy be added to five gallons of citrus juice and stored in casks for later distribution by the fleet's small craft.[21]

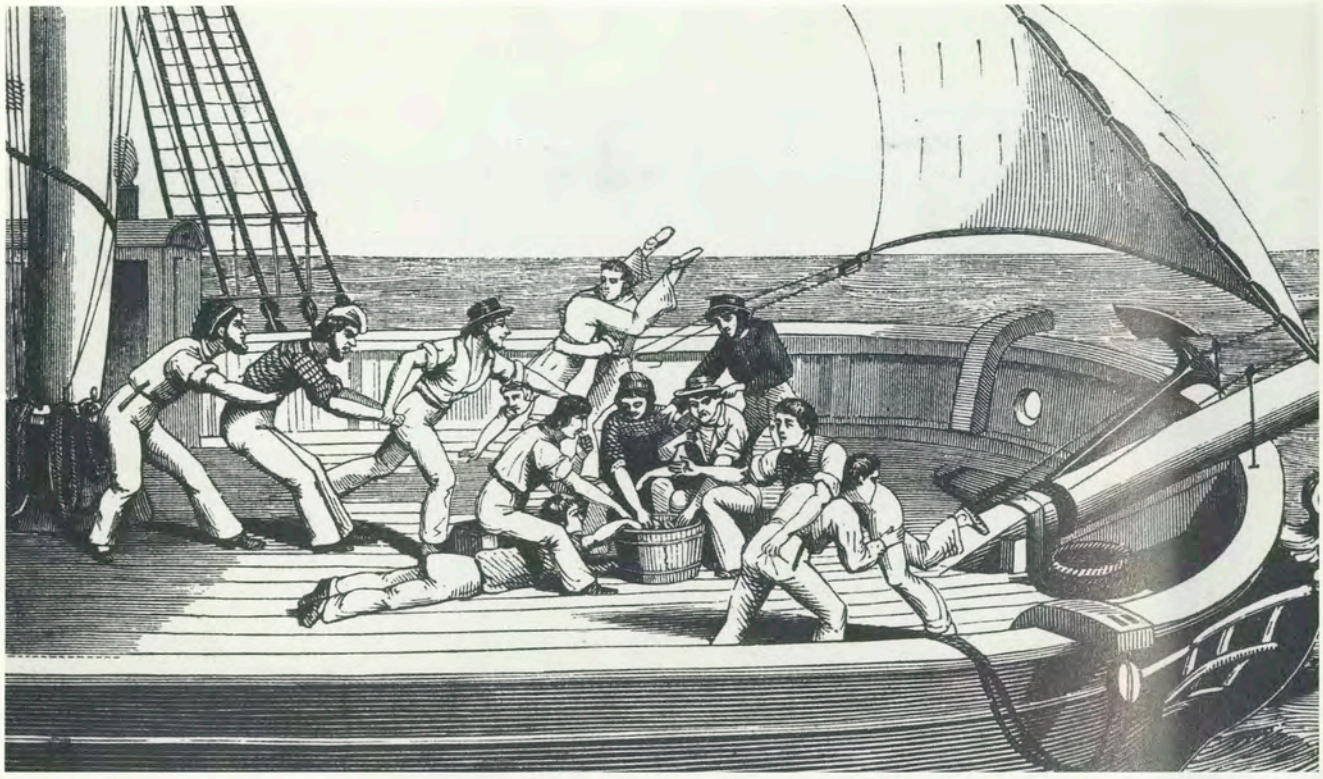
In a memorial of grievance, Admiral Horatio Nelson denounced the British Navy for leaving its seamen "finished at forty-five, double-ruptured, raw with scurvy, and wracked with agonizing pains after every meal." Although the British gradually adopted a scurvy-prevention program, their navy was on blockade duty off France and in the Mediterranean, sometimes years on end. Their impressed sailors were rarely allowed the freedom of shore leave; therefore scurvy became a major problem during the Napoleonic Wars. It should be noted that the British attempted to supply a daily ration



When their ship hove to for a pilot off Marseilles in 1822, as depicted in this painting by Jno. Etienne Toulza, the 150 crew members of the US sloop of war Ontario *were well protected from scurvy. The U.S. Navy had recognized the efficacy of citrus juice, and the Mediterranean Squadron obtained a regular supply. Earlier, however, the* Ontario *had rounded Cape Horn in 1817 and was off Cape Disappointment in August 1818 when her captain, James Biddle, claimed Oregon for the U.S. Far from a supply of citrus fruit there, her crew might have had to resort to spruce beer, as had Captain James Cook on the Northwest Coast 40 years earlier. (Mystic Seaport 1982.124)*

of three-quarters of an ounce of limes and lemons to their sailors starting in 1795. From 1795 to 1814, Admiralty records indicate that 1.6 million gallons of citrus (lime) juice were given to their sailors. During this period the term "Limey" became applied to British seamen. Citrus was not regularly provided to American warships until about the outbreak of the War of 1812. The reason that this simple preventive medicine measure was not adopted is not clear, but likely it was one of limited supply of the fruit and no well-known alternatives.[22]

Scurvy had an impact on the procurement of crews to man America's nascent navy. A 1798 recruitment broadside issued by Captain Samuel Nicholson of the frigate *Constitution* said, "None will be allowed to enter this honorable service, but such as are well organized, healthy and robuss [robust]; and free from scorbuttic and consumptive affections." This became a problem for this famous vessel when its second captain, Silas Talbot, noted in the ship's log on 6 June 1800 that 30 men reported sick; "their chief diseases are the fever and scurvy, the latter of which daily increases." Incidents of scurvy continued during America's Barbary War off North Africa. The surgeon Peter St. Medard of the frigate *New York* noted on 1 June 1803 that "the prevailing diseases which have chiefly affected our ship's company were . . . rheumatism, a few scurvy, diarrheas, intermiting & 2 typhus . . . I should have the happiness of informing you that none have died." St. Medard was aware that citrus could reverse the symptoms of scurvy because after giving 26-year-old seaman Lawrence Conley fresh fruit, he went into remission. St. Medard noted that the symptoms returned when the lemon supply ran out and there was a direct correlation between the increased incidence of scurvy and the cold times of the year when fresh fruit was unavailable. He also observed that the number



Even after the effect of citrus was known, scurvy haunted ships on long passages, such as to California or Asia, as well as whaleships. These whalemen may fight to get to their communal dinner kid, but the usual sea diet was an unpalatable mix of salted beef or pork, hard bread, beans, and occasional potatoes and other vegetables, which provided little vitamin C. On shipboard, cases of scurvy would appear about 75 days into the voyage, after the last fresh fruits were consumed. (J. Ross Browne, Etchings of a Whaling Cruise, *1846)*

of new cases of scurvy doubled about every 12 days at sea. All other nutritional factors being equal, the crew of a ship would expect to have a maximum of scurvy symptoms in about 75 days.[23]

Although the remedy for scurvy became widely known, it continued to plague select seamen well into the latter part of the nineteenth century. Many of the forty-niners who sailed around South America to California contracted scurvy en route. A forty-niner made the following journal entry: "A great many persons from the long voyages around Cape Horn arrived [in California], sick with the scurvy, owing to want of vegetables at sea, most of whose systems underwent a change to become acclimated to the country; some seriously and others more mildly." The government-sponsored Goode fisheries industry report, published in 1887, noted that scurvy appeared to be the most common disease among whaling vessel crewmen: "[It] usually begins to show itself about six to eight months after the vessel has left home port. [This disease caused] swelling up and softening of the limbs of the sufferer. . . . the limbs turning black and shriveling in size . . . often leav[ing] . . . the victim lame for life."[24]

Origin and Mechanism

The crucial questions are as follows: What is the cause of scurvy? What is its treatment? Can it be prevented? Scurvy is a disease that is the result of an impeded crucial biochemical step in the production of collagen. Collagen, a complex protein, exists in the body as twisted strands like stout manila rope; in a nautical sense, it is analogous to the running rigging of a sailing vessel. Collagen binds groups of cells together to form the connective tissues of anatomy, in another seafaring analogy, like caulking in the seams of a vessel. Ubiquitous connective tissues form the ligaments of joints, the infrastructure of most organs, and acts as webbing to hold the vast vascular system together. For example, poorly formed collagen can cause the walls of blood capillaries to break down and secondary hemorrhaging can ensue throughout the body. The loss of the capillary "glue" that holds them together produces the most visible symptoms of scurvy.[25]

Although Lind established that citrus fruits cured scurvy in 1753, this was a nutritional concept rather than a pharmacological one because replacing a missing dietary component was a bizarre medical thought at the beginning of the nineteenth century. It was therefore ignored. A prevalent explanation for disease was the complex doctrine of the Four Humors or the Humoral Theory of Disease, the basic tenet of the Hippocratic Corpus. Four bodily constituent elements were identified—phlegm, blood, yellow

bile, and black bile—all of which had to be in correct proportion to one another or disease would result. The adjustment of these bodily fluids was the rationale behind patient bleeding and the medical use of leeches. Although this disease theory had largely been discarded during the Renaissance, the concept was easy to understand and, with the eighteenth century veneration of the classics, it regained many academic advocates. The idea that a disease could be caused by a nutritional deficiency did not fit the accepted model; therefore it was slow to gain acceptance in the orthodoxy of the medical community. The debate continued until the end of the nineteenth century, when many in the medical community reluctantly accepted that a disease could be prevented or cured by dietary manipulation. But even then it came into conflict with the widely accepted germ theory of disease. Some physicians started to argue that infection was the explanation for the etiology of scurvy.

Prior to this time, physician George Budd proposed the idea that some physical disorders result from defective nutriments. Budd noted that specific conditions could result from the absence of dietary factors other than the more common carbohydrate, fat, and protein. The absence of these factors would be associated with a particular disease. Furthermore, Budd believed that scurvy could be due to the "lack of an essential element which it is hardly too sanguine to state will be discovered by organic chemistry or the experiments of physiologists in a not too distant future."[26]

It was not until 1907 that Holst and Frohlich reported that scurvy could be induced in guinea pigs and cured by dietary manipulation (the guinea pig is unique because it is one of very few animals that can contract scurvy). Experiments using the scorbutic animal model were used to assess the antiscorbutic value of different foodstuffs that identified the thermolabile nature of the antiscorbutic factor.[27]

The first significant development came from the laboratory of the Hungarian biochemist Albert Szent-Györgyi. Szent-Györgyi isolated hexuronic acid, later renamed ascorbic acid, a reducing compound present in crystalline form in oranges, lemons, cabbages, and adrenal glands. In 1932 chemists W. A. Waugh and King at the University of Pittsburgh published an important paper titled "The Isolation and Identification of Vitamin C," in which they published a photograph of vitamin C crystals.[28]

The consumption of fresh fruits and vegetables, particularly citrus fruits and broccoli, is the prevention and cure. Vitamin C is also found in liver and many varieties of fatty fish as mentioned earlier. Therefore, scurvy is rarely endemic in Inuit populations. The total body pool of ascorbic acid in a 70-kilogram man is estimated at about 1.5 grams and can be attained in most people by the sustained daily intake of 60 to 100 milligrams. A daily intake of 10 milligrams of vitamin C results in a steady-state body pool of about 350 milligrams and no signs of scurvy unless the pool falls to below 300 milligrams. When vitamin C intake is depleted there is a comparatively rapid loss of vitamin C due to a continuing catabolism of the vitamin and a urinary excretion of its breakdown products.[29]

Recent data indicate that vitamin C plays a critical role in the biosynthesis of collagen, but its mechanism of pathophysiology may not be the simple defective hydroxylation. Vitamin C also influences the development of connective tissue by modifying the nature and formation of the extracellular matrix molecules, and indirectly proteoglycan formation, thus its physical chemistry properties.[30]

The pathophysiology, mechanism of action, and the simple means of prevention of scurvy are now well known. What has been largely forgotten is that as a transient occupational disease of sailors, scurvy had a significant impact upon a variety of maritime endeavors and events for approximately 400 years as humans sought to understand the prevention of this debilitating deficiency disease.

Notes

1. J. Boswell, *Life of Johnson*, 4 vols., (Edinburgh: Edinburgh University Press, 1791), quotation from March 1759.

2. C.P. McCord, "Scurvy As An Occupational Disease," *Journal of Occupational Medicine* 13 (1959): 318.

3. W. Hutchinson, *A Treatise on Naval Architecture* (Liverpool: T. Billinge, 1794), 286-89.

4. In 1419 two Portuguese captains under Prince Henry's direction landed on Madeira. In 1427 another reached the Azores. By 1434 a Portuguese ship commanded by Gil Eanes rounded Cape Bojador, and eight years later Nuno Tristaõ passed Cape Blanco. These expeditions led to a spurt of maritime activity. More than 30 ships licensed by the prince sailed to Guinea between 1444 and 1446. Several Portuguese navigators reached Senegal in 1445. Diniz Diaz rounded Cape Verde in 1446, and in that same year Alvaro Fernandez pushed on just short of Sierra Leone; Pedro da Sintra would reach it in 1460, just months before Henry's death; Louis A. Norton, "The Legacy of Prince Henry: 'The Navigator' Re-examined," *The Mercator's World* 6 (2001): 44-49.

5. Herman Melville, *Moby-Dick* (Evanston: Northwestern University Press, 1988), 446, "A long detailed list of the outfits for the larders and cellars of 180 sail of Dutch whalemen; . . . [including] 10,800 barrels of beer."

6. The rum ration was first introduced into the British Navy in 1731and abolished 1 August 1970. The U.S. Navy substituted whiskey for rum in 1806. The enlisted man alcohol ration ended in 1862; the officers' shipboard wine mess was terminated in 1914.

7. The clinical signs of scurvy include raised red spots appearing around the hair follicles of the extremities, buttocks, and back; hemorrhaged capillaries around the hair follicles (scurvy spots), sometimes coalescing into red

and blue patches (scorbutic rosary) over the ribs and sternum; weak, stiff, swollen, and painful joints that are easily luxated; dolorous periosteal hemorrhage; bulbous and hemorrhagic gingiva; loose and brittle teeth; ulcerative oral mucosa; and fetid breath. Wound healing is slowed and scaring abnormal. Lethargy secondary to anemia from multiple episodes of bleeding is common.

8. Daniel J. Boorstin, *The Discoverers: A History of Man's Search to Know his World and Himself* (New York: Random House, 1983), 177, 288; K.J. Carpenter, *The History of Scurvy and Vitamin C* (Cambridge: Cambridge University Press, 1986), 1; E.G.A. Ravenstein, *Journal of the First Voyage of Vasco da Gama, 1477-1499* (London: Hakluyt Society, 1898), 20-21, 124.

9. Ravenstein, *Journal of the First Voyage of Vasco da Gama,* 265.

10. Samuel E. Morison, *The European Discovery of America: The Southern Voyages* (New York: Oxford University Press, 1974), 646.

11. Samuel E. Morison, *The European Discovery of America: The Northern Voyages* (New York: Oxford University Press, 1971), 419.

12. Translated by K. Jensen. The green leaves and stems of Angelica contain up to 96 milligrams of vitamin C per 100 grams, but the root is almost devoid of the vitamin.

13. H. Boerhaave, *De Materia Medica, et Remediorum Formulis Liber* (Leyden, The Netherlands: University of Leyden, 1727).

14. The ingredient that gave the beer its medicinal power was *Resina Pini*, a resin of the Norway Spruce. This cure worked, but by luck, since boiling this concoction too long likely would have destroyed much of the activity of the vitamin C. The spruce extract has been shown to contain on the order of 200 milligrams of ascorbic acid per 100 grams of needles or shoots; C. Erichsen-Brown, *Use of Plants for the past 500 years* (Aurora: Breezy Creeks Press, 1979).

15. J. Woodall, *The Surgeon's Mate, or Military and Domestique Surgery* (London: Printed by R. Young for Nicholas Bourne, 1639), 160.

16. Nathaniel Boteler, *The Historye of the Bermudaes or Summer Islands: Boteler's Dialogues* (London: Sloane Collection Manuscripts, British Museum, 1634), 65-66.

17. G. Fournier, *Hydrographie: Du Scurbut & Autres Maladies de la Zone Torride, que doit connoistre tout Chirurgien qui monte sur Mer* (Paris: 1667), translated by B. Schroff.

18. T. Abraham, *Geneeskunst der Heelmeesters, tot dienst der Zeevaart* (Amsterdam: 1752), translated by D. Tang.

19. Carpenter, *History of Scurvy*, 75.

20. J.A. Lind, *A Treatise of the Scurvy in Three Parts: containing an inquiry into the nature, causes and cure of that disease, together with a critical and chronological view of what has been published on the subject* (London: A. Millar, 1753).

21. N. Miller, *Broadsides: The Age of Fighting Sail, 1775-1815* (New York: John Wiley and Sons, 2000), 60; C.C. Lloyd, ed., *The Health of Seamen: Selections from the Works of Dr. James Lind, Sir Gilbert Blane and Dr. Thomas Trotter* (London: Navy Records Society, 1965), 142, 168-89.

22. Lloyd, *Health of Seamen,* 164; C.C. Lloyd and J.L.S. Coulter, *Medicine in the Navy 1200-1900*, vol. 3, 1714-1815, (Edinburgh: Livinston, 1961), 320-24.

23. J.W. Estes, *Naval Surgeon* (Canton, Massachusetts: Science History Publications, 1998), 34, 43, 129; R.E. Hodge, J. Hood, J.E. Canahan, H.E. Sauberlich, and R.E. Baker, "Clinical Manifestations of Ascorbic Acid in Man," *American Journal of Clinical Nutrition* 12 (1963): 21-29.

24. D. Knower, "The Adventures of a Forty-niner," G.W. Blunt White Library, Mystic Seaport, 111; George B. Goode, ed., *The Fisheries and Fishery Industry of the United States,* sect. 4, (Washington, D.C.: Government Printing Office, 1887), 93.

25. The precursor molecule of collagen, procollagen, is made up of amino acids. In the amino acid sequence in procollagen, every third amino acid is a glycine and there is a high frequency of hydroxyproline and hydroxylysine. Vitamin C or ascorbic acid (AA) participates in the synthesis of procollagen as a reducing agent that keeps prolylhydroxylase in an active state. Prolylhydroxylase is activated by the ferrous iron molecule (Fe^{2+}) that is relatively unstable and easily oxidized. AA maintains Fe in the 2+ form and not in the more stable 3+ form, thus acting as an enabler or a cofactor. AA enables prolylhydroxylase to be active and make hydroxyproline and hydroxylysine from proline and lysine respectively. This chemical reaction, the hydroxylation of procollagen, is a posttranslational modification in the rough endoplasmic reticulum where the biochemical cascade events occur creating the triple helixes characteristic of the collagens. Clinically, the imperfect collagen needed for connective tissue (blood vessels, bones, joints, and tooth support) is more easily broken down, particularly when during an elevated body temperature.

26. G. Budd, *Scurvy, Practical Medicine*, A. Tweedie, ed., 5, (London: 1840), 58-95.

27. A. Holst and T. Fröhlich, "Experimental Studies Relating to Ship Beri-Beri and Scurvy." II. On the etiology of scurvy," *J. Hyg.* 7 (1907): 634-37; L.G. Wilson, "The Clinical Definition of Scurvy and the Discovery of Vitamin C," *Journal Hist. Med.* 30 (1975): 40-60.

28. A. Szent-Györgyi, "Observations on the Function of the Peroxidase Systems," *Biochemical Journal* 22 (1928): 1387-1409; W.A. Waugh and C.G. King, "The Isolation and Identification of Vitamin C," *Journal of Biological Chemistry* 97 (1923): 325-31.

29. A. Kallner, "Vitamin C—Man's Requirements," in *Vitamin C (Ascorbic Acid)*, J. N. Counsell and D. H. Hornig, eds., (London: Allied Science Publishers, Ltd, 1981).

30. B. Peterkofsky, "Ascorbate Requirement for Hydroxylation and Secretion of Procollagen: Relationship to Inhibition of Collagen Synthesis in Scurvy," *American Journal of Clinical Nutrition* 54 (1991): 1113S—27S.

Louis Arthur Norton, a native of Gloucester, Massachusetts, is a professor emeritus at the University of Connecticut Health Center at Farmington. Educated at Bowdoin College and Harvard University, he recently received a master's degree with a concentration in maritime history from the University of Connecticut at Storrs. Norton, a frequent author on maritime subjects, has recently published a biography, *Joshua Barney: Hero of the Revolutionary War and 1812* (Naval Institute Press, 2000).

Oar Power
Mystic Seaport and the Sport of Competitive Rowing

BARRY PEALE

In the early morning sun, two racing shells drift on wind-ruffled water off Lighthouse Point. They are 60-foot needles with eight sweep oars and coxswain.

On shore a crowd has gathered. Mike Nowak, coach of the Stonington High School crew, raises his loud-hailer.

"Coxswains, bring your boats to the starting line."

The shells glide ahead. As they approach, we see that they are crewed by young women. A couple are laughing together. Several look at the people on land. One waves and calls out, "Hi, mom."

"East Lyme, move up a little."

One shell inches forward. The girls are perfectly still now, frowning with concentration.

"Ready? Row!"

The shells erupt into controlled fury. The girls' faces contort as they hammer the water with short, vicious strokes. They lengthen their swing, searching



Along the Museum's waterfront, the Stonington High School men's and women's crews prepare to practice in the spring of 2000. (Jamie Lohr photo)



The General Lafayette, *John Gardner's reproduction of the ca. 1820 four-oared Whitehall racing gig* American Star, *is sometimes rowed on the Mystic River. (Ken Mabler photo)*

to find the perfect unity that produces speed.

The crowd cheers them on as they drive toward the finish, 1,500 meters upstream.

Standing beside me is Dana Hewson. As Clark Senior Curator of Watercraft and the Museum's Vice President, Watercraft Preservation and Programs, he is one of the prime movers of competitive rowing at Mystic Seaport.

He stares after the fast-receding shells and murmurs, "Isn't it great?" His daughter rowed stroke for the Stonington crew before going on to row for the University of New Hampshire.

In the Henry B. duPont Preservation Shipyard, 27 feet of slim lapstrake elegance rests on its cradle in a sheltered shed. She is the *General Lafayette*, built by John Gardner in 1975 as a near replica of the famous racing Whitehall *American Star*.

The *Lafayette* represents the beginning of competitive rowing in the United States, a sport that sprang from the working rowing boats of our commercial seaports. Speed was needed for harbor transportation and to deliver shipping agents (and landsharks) to incoming vessels ahead of competitors. An especially fast rowing gig was developed in New York Harbor and soon spread up and down the coast. They came to be called Whitehalls, from their principal landing area at the foot of Whitehall Street near Manhattan's Battery.

By the early 1800s these boats and their derivatives were racing for cash prizes, and in 1824 a match race was arranged between *American Star*, the fastest of the New York Whitehalls, and a British challenger. Upwards of 50,000 people cheered from shore as the *Star* decisively beat her opponent, and she became an icon of national pride over the entire eastern seaboard.

She was presented to General Lafayette on his last visit to the United States in 1825, and is still preserved at his chateau in France, where Gardner traveled to take her lines 150 years later.

As you walk into the Visitor Reception Center at the south entrance to Mystic Seaport, hovering in the air overhead is a floating vision of cedar and spruce, with its eight sweeps outspread, blades painted with the red, white, and blue of the National Rowing Team. It is the racing shell *Martini Achter*, one of the most significant boats in the modern era of rowing.

"She certainly signals Mystic Seaport's involvement in rowing history," Hewson comments. He adds with a smile, "Plus, its about the only place we found room enough to display her."

The *Achter* was built by Empacher of Germany, and was won as a prize in the 1973 Heidelberg International Regatta by the U.S. National eight. Since then she has won a host of races, including the 1974 World Championship, 1976 Henley Ladies Challenge Plate, and the 1977 Henley Grand Challenge Cup. The *Martini Achter* represents perhaps the ultimate development of the wooden shell at that time, and her basic design has contributed in a significant way to shell design to this day.



Built at Boston in 1879, the Bailey Whitehall is the only known example of a New York or Boston Whitehall to have survived from the period of their greatest popularity. With sliding seat and round oarlocks, it was designed for performance. The boat is on exhibit in the Museum's North Boat Shed. (Maynard Bray photo)

Between the *General Lafayette* and the *Martini Achter* lies much of the history of competitive rowing in this country. Competitive rowing started with fixed-seat Whitehall workboats. By the mid-1800s, watermen raced lengthened versions of these boats—some as long as 30 feet and more—and their matches became the biggest sport in the nation, attracting spectators in the thousands. In 1843 Yale became the first college on the water with a student's purchase of the 19-foot Whitehall *Pioneer*. Harvard responded a year later with the enormous 37-foot, eight-oared Whitehall *Oneida*. The two schools inaugurated intercollegiate athletics when they held their first regatta 150 years ago, in 1852, on New Hampshire's Lake Winnipesaukee.

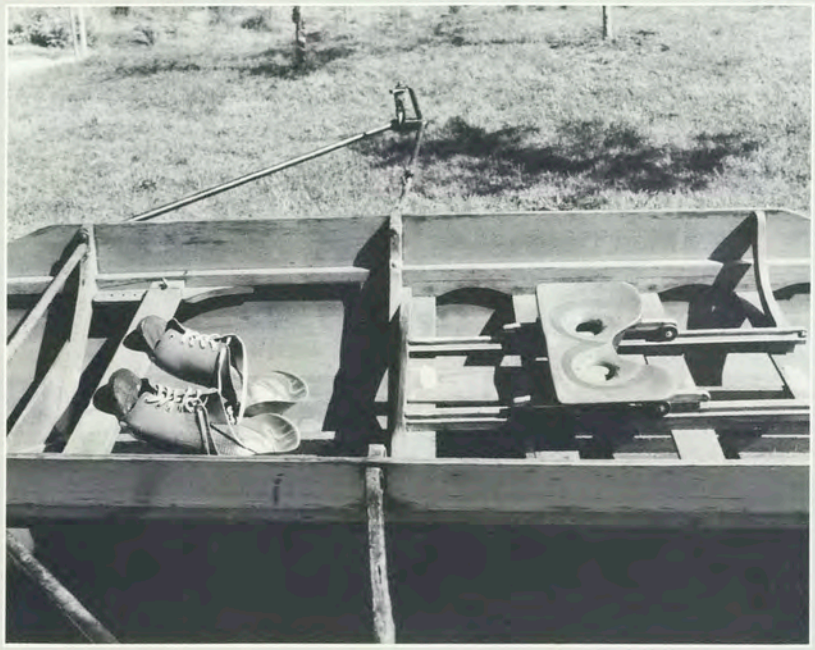
The first sliding-seat shell didn't appear until 1869. A match race that year between Harvard and Oxford drew three-quarters of a million spectators, and nearly a thousand London bobbies were called out to keep order.

College rowing caught on quickly, with match races between schools and then the Rowing Association of American Colleges (1871) and, in 1895, the Intercollegiate Rowing Association, which was formed by Cornell, Columbia, and the University of Pennsylvania, joined shortly after by Syracuse and the U.S. Naval Academy. (Oddly, to this day they are the only bona fide members of the IRA, with as many as 50 other colleges competing as "invited guests.")

Nowhere is the story of American competitive rowing better told than at Mystic Seaport, which houses the largest collection of racing boats (over 40 Whitehalls, wherries, and shells), documents, and photography in the United States. The preeminence of Mystic Seaport in telling this



The Boathouse boat livery at Mystic Seaport offers women and men, young and old, the chance to row Whitehalls and other fine pulling boats. (Claire White-Peterson photo)



Built for training, this beamy practice wherry is an elegant cousin of the sleeker single sculls used for racing. Built by master shell builder George Pocock of Seattle, Washington, the boat was donated to Mystic Seaport by the National Rowing Foundation. (Mystic Seaport 1999.19.1; Judy Beisler photo)

story is the result of the close association of two organizations: Mystic Seaport and the National Rowing Foundation; and two dedicated men: Dana Hewson and Hart Perry.

Hart Perry is executive director of the National Rowing Foundation, a steward of the Henley Royal Regatta, adjunct curator of rowing at Mystic Seaport, and an inexhaustible dynamo of energy and ideas. A member of the National Rowing Hall of Fame, Perry coached the Kent School crew for 34 years, winning 11 New England championships and three national championships. He has coached at several colleges, and at present he is probably one of the most well known and respected people in U.S. rowing, serving as chairman, trustee, or director of organizations too numerous to list.

Under his leadership, the effectiveness of the National Rowing Foundation (NRF) in it's primary mission to promote United States participation in international rowing competition is paralleled by the growth of the national team: from 29 athletes in 1966 to 144 men and women today.

But under Perry's impetus, the NRF's support of competitive rowing has grown in every direction. The history of rowing is represented by NRF donations to Mystic Seaport of over a dozen boats and extensive documents and visuals, including the E.G.H. Moody book collection, the John DeGange Collection of material on the Harvard-Yale Boat Race, and the Mendenhall Collection, all residing in the collections of the G.W. Blunt White Library at Mystic Seaport. Perry has also chosen to locate the NRF's National Rowing Hall of Fame at Mystic Seaport.

Perry and Hewson are united in their commitment to encourage present-day domestic rowing programs. The NRF works as a conduit for acquisition and designated financial support.

Mystic Seaport provides a rowing venue with launching floats, physical support, and an acclaimed flat-water course on the upper Mystic River. Perhaps just as important, Mystic Seaport offers a first opportunity to experience the sport of rowing.

Just southeast of Lighthouse Point, the Mystic Seaport Boathouse stands at the water's edge. At its floating docks lie nearly two dozen watercraft, representing the history of fixed-seat rowing from the 1800s to the present, including examples of competitive, recreational, and commercial types. Close to 10,000 visitors a year rent these boats and go out on the river to experience the exhilaration of boats designed to move rapidly under oars. For many, it's the first time they've rowed a boat.

I ask Sharon Brown, director of the Mystic Seaport Boathouse boat-livery program, whether being introduced to fixed-seat rowing at the Boathouse ever resulted in visitors entering into rowing competition later on.

She said, "Absolutely. The rowing experience here often starts with a family going out on the water, and there are often one or two who get hooked. I may see them again a year later, when they appear to ask for jobs as volunteers."

She smiles. "I always encourage the girls especially, telling them how great it is if their moms know how to row. Every year I find several of my 'graduates' on school or college crews."

I learn as well that this fall, Mystic Seaport will again host the Will Ansel Rowing Event, when young people associated with the Hull (Massachusetts) Life-Saving Museum, New York's Floating the Apple, New Haven's Sound School Aquaculture Center, and other youth rowing programs will visit Mystic Seaport to hold informal races on the river in a variety of

fixed-seat craft supplied by the Museum.

Mystic Seaport's first venture into sliding-seat competition was the cosponsorship, with Connecticut Sea Grant and other local businesses and organizations, of Coastweeks Regatta, which began in 1992 with a dozen rowers in recreational singles. In 2001, Coastweeks drew upwards of 120 shells, boating about 240 rowers. Again this September, the Museum will be awarding its own Coastweeks Regatta at Mystic Seaport medals in conjunction with the Connecticut Sea Grant Program, and the event will be a sanctioned regatta of the Masters Rowing Association.

After applauding with the crowd for winners and losers alike, as the Stonington and East Lyme women's crews row back around Lighthouse Point from the finish, Dana Hewson and I walk back to the floats to watch the crews land their shells. There we talk to Mike Nowak, one of the two young visionaries who started the Stonington crew. As Mike tells the story, in the fall of 1997 his old friend and teammate Ken Godfrey was relaxing at Lighthouse Point with his son. Godfrey had rowed at Simsbury High School and Syracuse, and the thought suddenly occurred to him that the upper Mystic River would make an ideal rowing course.

By November, Godfrey and Nowak had met with the Stonington High School principal and athletic director, who had offered a provisional okay to form a rowing club, if Godfrey and Nowak could find the equipment and launching area. By mid-January they had two eight-oared shells, oars, and a trailer, all donated by local schools and colleges. But their attempts to interest the river marinas in providing storage and launching space for their shells had met with no takers. With one week to go before reporting back to the school authorities on their progress, they had no place to launch.

Then Mike called Mystic Seaport, and a meeting was quickly arranged. Mike and Ken were bowled over when 10 Museum staff members filed in, including Dana Hewson and the most famous and formidable coach of their rowing days, Kent School's Hart Perry. Almost before they finished their pitch, staff members started discussing how they could make this work at Mystic Seaport.

"There was no preamble as to 'could we' or 'should we,'" Mike recalls. "They just went ahead and made it happen. Competitive youth rowing on the Mystic River became a reality at that meeting."

In March of 1998, over 50 young men and women assembled on the grounds of Mystic Seaport for Stonington High School's first crew practice. By the 2001 season, 81 of Stonington High's 600 students came out for crew, making it the largest varsity sport in the school.

I went to this year's awards night in the Museum's Clagett Boat Shed, where well over a hundred rowers, parents, and friends shared their enthusiasm and support for this amazingly successful program. Much of this support comes from the Friends of Stonington Crew, a booster organization working on fund-raising, logistical support, and promotion.

"Community response has been overwhelmingly positive in it's support of the Stonington High School crew program," said Randy Lohr, president of the Friends.

A prime example of this commitment is the National Rowing Foundation, which is running a raffle to support rowing projects at Mystic Seaport and the U.S. national teams. The prizes, which include a custom-built Resolute eight-oared shell, have been donated to the NRF.

I spend some time in the Museum's new rowing history exhibit in the Mallory Building before meeting Dana Hewson and Hart Perry for lunch. Titled "The Rise of Intercollegiate Rowing," it is a fascinating collection of vintage photography, posters, and memorabilia, including the impressive silver IRA Varsity Challenge Cup. The exhibit was on display at the Garde Theater in New London for a program celebrating the 150th anniversary of the Harvard-Yale Race in June, and will remain in the Mallory Building through October.

Joining Hewson and Perry for lunch at the Galley, I listen as the two spin out thoughts for competitive rowing at Mystic Seaport in the future. They speak of the Museum's fledgling staff rowing club, with one practice wherry refurbished and due to be launched next spring, and more fixed-seat competition in traditional craft such as dories and whaleboats. And perhaps someday a boathouse, housing school crews, a community program open to all, and the National Rowing Hall of Fame. Knowing what these two dedicated men have accomplished to far, I leave convinced that it all will soon come to pass.

Barry Peale was coxswain of the undefeated, Henley-winning Harvard crew that won the Grand Challenge Cup in 1959. His lifelong addiction to boats led him to a career in the yacht yard business, and he has been a frequent contributor to boating magazines. Peale is presently a part-time employee of Mystic Seaport, where he works in the Henry B. duPont Preservation Shipyard as a painter and self-appointed provocateur. He has also become involved in supporting various rowing programs at the Museum, including the Stonington High School crew and the CoastWeeks Regatta.

Poetry in Motion
The Photography of Carleton Mitchell

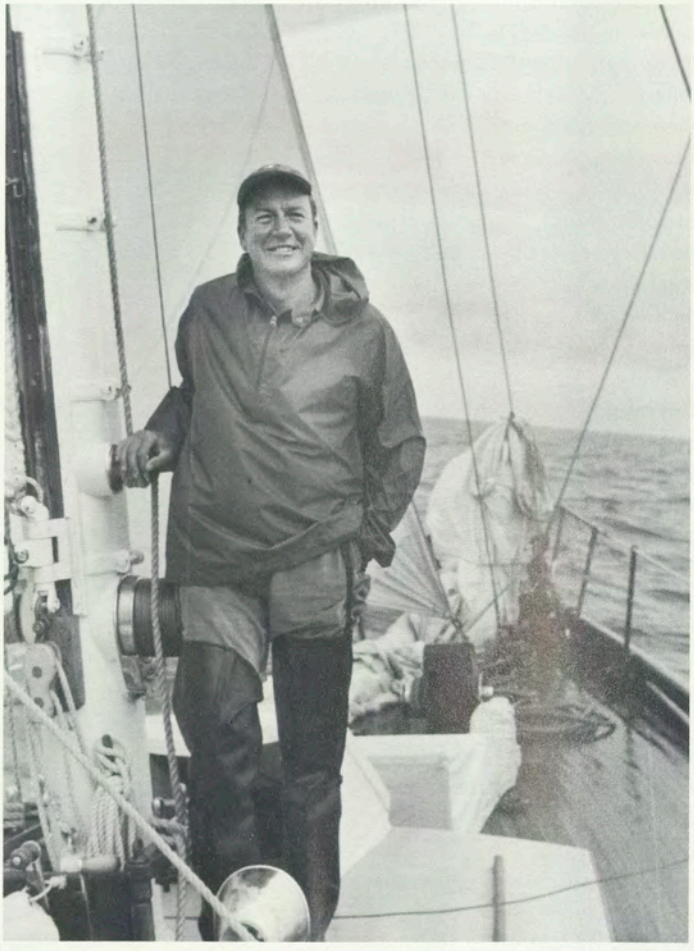
This sampling of images and label text offers an introduction to Mystic Seaport's newest exhibit, displaying the visual legacy of sailor, writer, and photographer Carleton Mitchell.

"To me, pictures should be natural and easy, literally the unstudied record of a given instant in time; they should be direct and uncluttered, and have something to say; above all, they should convey a sense of participation."

Carleton Mitchell, *Yachtsman's Camera* (1950)

It was Carleton Mitchell's boyhood dream to become a writer and sailor. It was a dream he fulfilled to perfection. As yachting historian John Rousmaniere has said, Carleton Mitchell "set the highest standards of performance as a writer, as a photographer, and as a sailor."

Carleton Mitchell taught himself photography in the 1930s in order to illustrate his magazine articles. Serving as a naval officer during World War II, he organized and supervised the U.S. Navy Combat Photography Units. Many of his best-known and most-compelling images document Caribbean island life in the late 1940s, before tourism impacted the island cultures. Recording his own experiences and creating images for his books and articles, he photographed maritime subjects from the Caribbean to the Baltic, from California to the Mediterranean, from racing for the America's Cup to playing in small boats. Thanks to the generosity of Carleton Mitchell, this remarkable record of nearly 50 years on the water is preserved for the enjoyment of future generations at Mystic Seaport.





above:
Carleton Mitchell on the deck of Caribbee *during the 1952 transatlantic race*

© Mystic Seaport, Carleton Mitchell Collection, 1996.31.5389.9

left:
Carib *under sail off Trinidad, 1947*

© Mystic Seaport, Carleton Mitchell Collection, 1996.31.5998.1

People of the Caribbean Islands

"All my life I had sailed, but I cannot remember when I began wanting to make a passage through the West Indies. In 1932, on my first island landfall—Bimini on Christmas Eve aboard the venerable ketch Temptress*—I was enchanted, and vowed that someday I would see them all, from Trinidad to Grand Bahama."*

Carleton Mitchell, *Islands to Windward* (1948)

As a photographer, Carleton Mitchell is best known for the images he recorded during his sailing passage from Trinidad to the Bahamas in 1947. He shipped his 47-foot ketch *Carib* to Trinidad, then spent three months sailing up the chain of islands. Many of these photos were published in his 1948 book, *Islands to Windward,* which served a generation of sailors and tourists as a travel guide to the Caribbean. As these images show, in 1947 the islands of the Caribbean were remote settlements, each with its own distinct character and a unique blend of races and cultures shaped by centuries of international commerce. Mitchell's photos and engaging descriptions of the islands contributed to the wave of tourism that engulfed the islands, beginning in the 1950s.



above:
Hell Cats steel band, Grenada, 1947
© Mystic Seaport, Carleton Mitchell Collection, 1996.31.5998.7

below:
Roseau, Dominica, 1947
© Mystic Seaport, Carleton Mitchell Collection, 1996.31.5998.24







above:
Harbor scene at Basseterre, St. Kitts, 1947
© Mystic Seaport, Carleton Mitchell Collection, 1996.31.5998.12

left:
Crew of the coconut sloop Concordia, *1947*
© *Mystic Seaport, Carleton Mitchell Collection, 1996.31.5998.26*



left:
Boatbuilding, Roadtown, Tortola, 1947

© Mystic Seaport, Carleton Mitchell Collection, 1996.31.5999.20

below:
Waterfront scene at Nassau, Bahamas, 1947

© Mystic Seaport, Carleton Mitchell Collection, 1996.31.6242



A Way of Seeing

"Nothing rewards a little study and application as much as photography. Results are tangible and immediate, yet last a lifetime."

Carleton Mitchell, *Yachtsman's Camera* (1950)

True to his vision that photography should engage the viewer, Carleton Mitchell kept his camera at hand to record images of sailing as he knew and loved it.



right:
Henry K. "Bunny" Rigg railbird hunting with pusher "Weepy" Carroll on the Patuxent River, Maryland, ca. 1947
© *Mystic Seaport, Carleton Mitchell Collection, 1996.31.2323*

below:
Anchor light on Caribbee, *ca. 1949*
© *Mystic Seaport, Carleton Mitchell Collection, 1996.31.4052*





Woman with Laura, the "man-hating parrot of Basseterre," St. Kitts, 1947
© *Mystic Seaport, Carleton Mitchell Collection, 1996.31.1390*

Sailing the Baltic

"We angled across the Baltic to Visby, on the island of Gotland, still reaching, still basking in sun by day and ticking off stars by night; still sailing into reality our own someday cruise to somewhere, and finding it perfect."

Carleton Mitchell, *Yachtsman's Camera* (1950)

In 1949 Carleton Mitchell shipped *Carib* to Europe and cruised the Baltic in company with another boat. He gloried in the clear skies, rocky islets, and friendly people of these ancient waters. But among his most compelling images of the trip were shots of the scars of World War II that were still so evident in places like Gdynia, Poland.

World War II bomb damage, Gdynia, Poland, 1949

© Mystic Seaport, Carleton Mitchell Collection, 1996.31.6712



The Joy of Cruising

"And cruising is a wonderful part of sailing. A cruising man is an incurable romantic. Boats cruising are like little houses . . . . To a real cruising man, where his boat is anchored is home. It is a nomadic life."

Carleton Mitchell, *Yachtsman's Camera* (1950)

Beginning in the 1930s, Carleton Mitchell was captivated by the possibilities of cruising. He enjoyed everything about operating a boat and the self-sufficiency of the cruising sailor. While racing challenged his expertise, cruising fulfilled his wanderlust. His cruising photographs record the drama and the serenity of passages at sea, landfalls made, and quiet anchorages.





above:
Carib *underway in the Anegada Passage, Virgin Islands, 1947*

© Mystic Seaport, Carleton Mitchell Collection, 1996.31.1578

left:
Horace W. "Hod" Fuller mending sail on Carib, *Bahamas, ca. 1946*

© Mystic Seaport, Carleton Mitchell Collection, 1996.31.317



Moonlight view of small island, Bahamas, ca. 1946

© Mystic Seaport, Carleton Mitchell Collection, 1996.31.5999.31

The Challenge of Racing

"Men who have followed the sea have always taken pride in their seamanship. Making a boat go fast through the water is part of seamanship . . . . A boat perfectly tuned is alive. It is the closest thing to poetry in motion."

Carleton Mitchell, *Yachtsman's Camera* (1950)

Carleton Mitchell was a renowned racing sailor in the 1950s. Having been exposed to small-boat racing as a child, and having cruised extensively, he began to race his yawl *Caribbee* in 1949, becoming a frequent winner in the Southern Ocean Racing Conference (SORC) and winning the 1952 transatlantic race (described in his 1953 book *Passage East*). But as a racer he is best known for winning three consecutive Newport-to-Bermuda Races—1956, 1958, and 1960—in his trendsetting yacht *Finisterre*, a feat that has never been duplicated. With his intimate knowledge of racing and racers, he photographed and wrote about the 1958 America's Cup competition, the first sailed in 12-Meter sloops, published as *Summer of the Twelves* (1959). Behind the wheel or behind the camera, his sailing expertise came to the fore in racing situations.



above:
J.A. "Basil" McKinney adjusts Caribbee*'s mainsail during the transatlantic race, 1952*
© Mystic Seaport, Carleton Mitchell Collection, 1996.31.6721

below:
"Coffee grinder" winch on 12 Meter Weatherly, *with* Columbia, Easterner, *and* Vim *in the distace, 1958*
© Mystic Seaport, Carleton Mitchell Collection, 1996.31.5270.29



Happily Afloat

To desire nothing beyond what you have is surely happiness. Aboard a boat it is frequently possible to achieve just that: that is why sailing is a way of life, one of the finest of lives."

Carleton Mitchell, *Yachtsman's Camera* (1950)

For Carleton Mitchell, sailing was pure fun. Even when wet, cold, and exhausted, he liked nothing better. His images convey the delight of being fully engaged with a boat.





above:
Elizabeth Mitchell and Horace W. "Hod" Fuller on Carib, *ca. 1946*
© Mystic Seaport, Carleton Mitchell Collection, 1996.31.515

left:
Ernest A. Ratsey in a nylon bathtub on Wogg Too, *ca. 1948*
© Mystic Seaport, Carleton Mitchell Collection, 1996.31.2972

As noted in the September/ October 2002 *Wind Rose*, this exhibit opened in the Museum's Mallory Building just before Members' Weekend and will remain until Spring 2003. Note cards and fine art reproductions of some of these images will be available at the Mystic Seaport Store. For an overview of Carleton Mitchell's work as a sailor, writer, and photographer, see Amy German's "'A Sense of Participation': The Carleton Mitchell Collection," in *The Log* 51:4 (Spring 2000).

Aerating the North Pond

JAMES H. McKENNA, Ph.D.

If you visited Mystic Seaport this summer, you might wonder why the Museum has planted a fountain right in the middle of the beautiful little pond by the North Parking Lot. Falling water is pretty, but it looks incongruous in such a natural setting. Well, what you saw is not a fountain; it's an aerator, intended to pump life-giving oxygen back into the water to keep the pond healthy.

The pond is part of the drainage system for the hillside above the site of the Museum. In the 1800s, it was the lower portion of a boggy section of meadow, where livestock drank after grazing. It had grown into a large marshy pond by the time the Museum acquired the property in 1956 and began grading the parking lot in 1958. The pond was walled in for skating, and for 40 years was a shallow, stagnant body filled with algae and frogs. By the 1950s the stream connecting the pond to the Mystic River had been run through a culvert, which runs near the G.W. Blunt White Library. When the pond was low, it did not reach the lip of the culvert to flow out; when the tide was especially high, the culvert backed up, impeding the flow.

During the Greenmanville Streetscape Project, 1994-99, the Museum worked with the Town of Stonington to upgrade the Route 27 (Greenmanville Avenue) approach to Mystic, using funding from the State of Connecticut Department of Economic and Community Development and from the federal Intermodal Surface Transportation Efficiency Act. The design firm LANDSCAPES developed detailed treatments for the streetscape,



When Everett A. Scholfield took this photo of Greenmanville, ca. 1873, there was a pond along Greenmanville Avenue in the lower part of the meadow where the Museum's North Parking Lot is now. (Mystic Seaport 1972.92.513)



As reconstructed in 1998, the pond is somewhat smaller than in the 1870s and is surrounded by plants native to Connecticut. Falling water from the "fountain" adds oxygen to the pond water to sustain the high rate of respiration and decomposition during the summer season. (Judy Beisler photo)

the Museum's parking lots, and their surroundings. As one element of this effort, the pond by the North Parking Lot was brought back to a more natural condition with the removal of the wall and the deepening and reshaping of the pond bed.

Like the tidal pond by the Museum's South Parking Lot, this freshwater pond serves several functions. First, it is a piece of naturalistic landscaping to beautify the Museum grounds. Second, it has been turned into a small nature preserve with the planting of species native to southern Connecticut habitats. The pond has also become home to algae, fish, frogs, and turtles, and serves as an occasional resort for waterfowl that eat them. Insects are attracted to the flowering plants beside the pond, and they become food for birds, frogs, and turtles. And third, the pond retains its original function in draining the hillside and acting as a natural water purification system, removing sand, particulates, and organic matter from the water. This last function has become increasingly important with the paving of the hillside above it and is critical to maintaining good water quality in the Mystic River.

How does the pond act as a water

purification system? When it rains, water flows down from the roof of the Collections Research Center and across the paved lots, sweeping sand, particulate material, and organic matter along with it into the catch basins (which have deep sumps to allow some sand and particulates to settle out). Flowing rapidly through the drains, the particulate material and organic matter are carried by the storm water into the pond. The pond accepts the increased water by expanding into the mat of reeds that fringes the edge of the pond. This expansion slows down the water velocity, and the sand and other particulates will begin to settle to the bottom of the pond. The reeds themselves also act as a filter, trapping the particulates and organic matter between the reed stalks. This process removes the particulate and organic matter from the water and at the same time enriches the sediments around the plant roots and in the bottom of the pond. The organic matter trapped in the pond is consumed by bacteria and higher life forms and is thereby naturally recycled into new plant and animal matter. The water eventually flows out of the pond and into the Mystic River, but only after the pond has significantly reduced both the particulate and the organic load.

The particulate and organic loading to the pond can become quite high at times, and in order for the pond to perform its ecological functions most efficiently, it needs to be aerated. In the case of the pond, the fountain acts as an aerating bubbler. Without aeration, the oxygen in the pond water would be depleted, resulting in the detrimental effects of anoxia. This situation is particularly problematic during the summer when high water temperatures both stimulate oxygen-consuming biological activity and decrease the solubility of oxygen. Under anoxic conditions, decomposition of the organic matter occurs through anaerobic respiration, a much slower and less efficient process than the aerobic respiration that occurs in the presence of oxygen. Anaerobic decomposition results in thick layers of partially decomposed organic material on the bottom of the pond.

But it is not just the pond that suffers. In times of slow anaerobic decomposition, when pond water is flushed into the Mystic River it carries with it this potentially high load of partially decomposed organic matter right when the river is least capable of dealing with it. Though broad, much of the river is quite shallow, so its ability to sustain aerobic decomposition during summer is limited too. If organic loading to the Mystic River is high enough, it could also result in anoxic conditions in the river. Aerating the pond should result in greater decomposition in the pond and hence less organic loading to the river.

Aeration should help avoid other detrimental effects associated with anoxia as well. Along with decreased decomposition, anaerobic respiration results in the production of smelly byproducts, such as hydrogen sulfide (the rotten egg smell) and methane (the marsh gas smell), among other things. In addition to the smell, anaerobic decomposition often produces unsightly oily surface films. By increasing aerobic decomposition and reducing anaerobic decomposition, aeration will greatly improve both the look and the smell of the pond.

If a water body goes anoxic, most of the organisms living in the water will have no oxygen for respiration and will either suffocate and die or have to move to a new environment. If the pond were to go anoxic, birds and turtles would likely be able to migrate to a new environment, but many of the frogs and fish, which can't easily migrate out of the pond, would probably die. There are also the innumerable small insects, snails, and other invertebrates that would be impacted in a similar fashion. Anoxia often leads then to a dramatic decrease in biodiversity.

Of course there are some less pleasant attributes of a healthy freshwater environment. We know that mosquitoes lay their eggs in still water such as ponds. A spraying aerator such as the one installed here should keep surface waters moving and reduce the number of mosquitoes breeding in the pond.

There was much debate at the Museum regarding the appropriateness of a fountain for aesthetic and historic reasons. However, the aerating fountain plays a critical role in maintaining the ecological health and biodiversity of both the pond and the adjacent Mystic River environment. Running during the warm months, the fountain rains down on the pond, pumping essential oxygen back in and keeping surface waters moving. The result is a much healthier and balanced system. The next time you visit Mystic Seaport, take a walk up to the pond and admire this diverse and thriving little ecosystem. Remember as well the complex and multifaceted service it naturally offers.

Jim McKenna received his Ph.D. in oceanography from the University of Rhode Island in 1996. He has been teaching at the Williams College-Mystic Seaport Maritime Studies Program since 1996 and was appointed Assistant Professor of Marine Science at Williams College in 1998. His research focuses on organic and nutrient cycling in coastal marine environments, with an emphasis on land-sea interactions.

Mystic Seaport Salutes!

THE NATIONAL COUNCIL OF ADVISORS

In 1997, under the leadership and inspiration of then-Trustee Chairman William E. Cook, Mystic Seaport established a new advocacy organization to be named the National Council of Advisors. The group was formed to provide advice to the Board of Trustees and the professional staff of the Museum. Advisors are selected for their interest in maritime history and preservation. They come from cities all across the country, serving as regional representatives of Mystic Seaport. They alert Museum personnel to relevant issues or activities in their home areas and assist in the solicitation of financial support. Members are assets to the Museum through their expertise, the prestige they bring, and the national recognition and support they attract. Advisors serve for five-year terms and may be nominated for an additional five-year term. Meetings are held annually in May.



Advisors attending the 10 May meeting gathered outside the Stillman Building after seeing the Voyages *Exhibit. Seen from left to right are Rich Davis, Ted Okie, Breene Kerr, Andrew Singer, Don McGraw, Tom Crowley, Dick Leather, and Steve Munger. (Dennis A. Murphy photo)*

After an initial organizational gathering in October of 1997, the first official meeting took place in May of 1998. Invited that year as special guests were Jacques and Madeleine Chauveau, who were visiting this country from Paris, France, where Jacques is a Trustee of the Musée de la Marine and an active and dynamic leader of the maritime preservation movement in France.



President Doug Teeson points out to Advisor Hank Luce some of the changes envisioned for a renovated Hall of Boats. Chairman of the Board of Trustees Bill Forster looks on. (Dennis A. Murphy photo)

The fifth annual gathering took place on 9 through 11 May 2002, and Advisors considered topics ranging from exhibiting in the 21st century to audience building strategies for the Museum's Preservation Shipyard. Those in attendance were enthusiastic about the agenda, appreciated the valuable discussions held between the Advisors, Board members, and staff, and contributed highly original inspiration for the Museum's exciting future.

Members of the group include

Mr. Donald C. McGraw, Jr., Chairman
Mr. Mark Asbury
Mr. C. Thomas Clagett, Jr.*
Mr. Hays Clark
Mr. Thomas B. Crowley, Jr.
Mr. Richard M. Davis
Mr. Steven T. Florio
Mr. Breene Kerr
Mr. Terry G. Klaus
Mr. Richard B. Leather
Mr. Edward A. Lozick
Mr. Henry Luce III
Mr. Stewart MacDonald
Ms. Elizabeth E. Meyer
Mr. Stephen R. Munger
Mr. William T. Okie, Jr.
Mr. Edmund T. Pratt, Jr.*
Mr. Martin Ford Puris
Mr. David Ross
Mr. William E. Simon*
Mr. Andrew J. Singer

*Deceased

This group is already having a beneficial impact on the business of the Museum. Mystic Seaport is proud to salute our newest ambassadors, the National Council of Advisors.

HAPPY 25TH ANNIVERSARY
WILLIAMS-MYSTIC!



JOIN US IN CELEBRATING THIS MILESTONE IN EDUCATION AT MYSTIC SEAPORT.

Since 1977, Williams-Mystic, the Maritime Studies Program of Williams College and Mystic Seaport, has been hosting 22 students per semester from the best colleges and universities in the country for an intensive, interdisciplinary study of the world's oceans. More than 1,000 students have called Mystic Seaport their home while studying Literature of the Sea, Marine Policy, Maritime History, Marine Ecology and Oceanography.



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