Spring 2003

Vocational science and the politics of independence: The Boston Marine Society, 1754--1812

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VOCATIONAL SCIENCE AND THE POLITICS OF INDEPENDENCE: THE BOSTON MARINE SOCIETY, 1754-1812

BY

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DISSERTATION

Submitted to the University of New Hampshire
in Partial Fulfillment of
the Requirements for the Degree of

Doctor of Philosophy
in
History

May, 2003

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14 April 2003
Date

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This dissertation is dedicated to my mom,

Carol S. McKenzie,

and in memory of my father,

Robert A. McKenzie
(November 7, 1932-December 15, 2002)

Thank you for all you have given me.

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ABSTRACT

VOCATIONAL SCIENCE AND THE POLITICS OF INDEPENDENCE:

THE BOSTON MARINE SOCIETY, 1754-1812

by

Matthew Gaston McKenzie

University of New Hampshire, May, 2003

Between 1754 and 1812 the Boston Marine Society developed vocational scientific practices adapted from day-to-day work routines to expand the navigational knowledge of New England's coastlines. For this reason, the Marine Society's navigational work suggests important parallels with the history of colonial science in other areas during the late eighteenth century. Notwithstanding most other studies in the history of American science, the Boston Marine Society indicates that colonial Boston shipmasters were not dependent upon learned societies for their navigational research needs. Rather, they adapted their mutual aid society and developed methodologies to collect navigational observations, analyze them for reliability and accuracy, and in a few cases, publish their findings for the benefit of the community.

Given the close ties between seafaring, economic growth and political influence in a mercantile economy, the Marine Society's work in navigational research granted them social and political influence in Boston during the Early Republic. With this added influence, the Marine Society crafted themselves into Federalist "fathers of the maritime people" to legitimate their efforts to become one of the town's new post-revolutionary elites. Ultimately, the Marine Society lost its political influence as changes in navigational research, shifts in Boston and national politics, and new market centers for scientific information combined to weaken the Society's position in both the political and navigational research worlds.

INTRODUCTION

In the spring of 1755, Captain Hector McNeill was in command of a merchant vessel in a small flotilla convoying an army up the Bay of Fundy. The fleet had left Boston a few days before with the task of safely delivering 2,000 New England soldiers to fight against their French imperial rivals at Fort Beaussejour. As the fleet sailed along the current swept, rocky shores, Col. Robert Monckton worried about the fate of his army. Back in Boston, there had been almost no charts for him to consult, and even fewer descriptions of the currents and tides that made this region so dangerous. Moreover, his and his army's fate rested in the hands of a few Boston merchant skippers, like Captain McNeill, none of whom likely knew the latest and best techniques in navigation.

Despite his fears, however, and the dangerous shoals and hazardous headlands, the fleet proceeded safely. When Monckton approached McNeill about their progress, curious as to how a colonial trading skipper could successfully undertake such a hazardous job, McNeill showed him information which no British commander in North America or London knew existed. Trading along the coast, McNeill had collected five years of nautical observations, including (presumably) tides, currents, coastal descriptions, and manuscript drawings. From these observations, McNeill had drawn a chart covering the coast from Cape Cod to Cape St. Mary's including the Bay of Fundy.

McNeill's chart impressed the British commander. And shortly after the Boston skipper safely delivered his regiments, Monckton dislodged the French from Beaussejour.[1]

McNeill was not alone in his interest in marine cartography in New England. In 1760, he joined a group of master mariners in Boston, called the Boston Marine Society (BMS), which had also been systematically collecting navigational observations since 1754. Both McNeill and the Marine Society understood that local navigational knowledge carried commercial, political, and imperial opportunities. Consequently, when the organization united senior captains for mutual aid, they also recognized that they stood in an important position between London imperial agents in North America, and the coastline that interested them. Furthermore, they were actively collecting data as every member returned to Boston—a feature that they would try to barter for greater influence in Boston and within the Empire.

Historians are fortunate in the Marine Society's meticulous record keeping and parliamentary procedure. Two key issues help modern researchers see the society's collective will and motivation. First, as membership was limited to captains alone, the Society was self-conscious that they spoke as an elite body in Boston's maritime community. Second, as an organization of captains predicated upon fellowship and mutual aid and with a distinct role within the port, the Society went to great lengths to follow proper parliamentary procedures and to act only on decisions taken unanimously. As part of this process, the Society maintained meeting minutes recording the Society's (though not individuals') opinions, resolutions, and approved actions. Consequently, throughout its 250-year history, the society left committee reports, resolutions, and clear

[1] Hector McNeill to Lord Colville, January 17, 1763, Boston Marine Society Papers (Massachusetts Historical Society, Boston, Mass.).

statements that reveal its collective will and motivations. These records allow historians to uncover not only what the organization did, but why.

This is not the first study of the Boston Marine Society. Earlier studies of the Marine Society have cataloged in some detail the work the Marine Society undertook during its long history. Nathaniel Spooner stitched together a rough narrative in his 1879 *Gleanings of the Boston Marine Society* (Boston, 1879, 1999). In 1982, William A. Baker's *A History of the Boston Marine Society* (Boston, 1982) integrated the Marine Society's history more closely with changes in Boston politics and economics and assembled systematic information on the society's more than 3,000 members. Both of these works greatly aided the project that follows. Yet neither delved into the society's influence upon the history of American science, with the exception of Baker's study of the Society during the American Revolution, neither Baker nor Spooner were interested in examining how the society operated as an active agent in Boston's historical development.

This study seeks to examine the society within the context of the history of American Science. Academic centers and learned societies have been the focus for most considerations of American science because of their prominence in the nineteenth and twentieth centuries. The Marine Society's scientific interests indicate, however, that colonial groups could and did develop their own scientific agenda that they pursued through methods adapted from common vocational practices. In doing so, the Marine Society's navigational work draws important parallels to the history of colonial science in other areas during the late eighteenth century. In the simplest form, I argue that colonial Boston shipmasters were not dependent upon learned societies for their navigational

research needs. Rather, they adapted their mutual aid society and developed methodologies to collect navigational observations, analyze them for reliability and accuracy, and in a few cases, publish their findings for the benefit of the community. Furthermore, given the close ties between seafaring, economic growth and political influence in a mercantile economy, the Marine Society's work in navigational research granted them social and political influence in Boston. With this added influence—power would be too strong a term for it—the Marine Society tried to stabilize post-Revolutionary Boston politics, and to legitimate their efforts to become one of the town's new elites. Ultimately, the Marine Society lost its political influence as changes in navigational research, shifts in Boston and national politics, and new market centers for scientific information combined to weaken the society's position in both the political and navigational research world.

The Marine Society gives us a glimpse of the rise and fall of what I call "vocational science." In many previous studies discussed below, science and research were considered as a purely intellectual—"academic"—exercise, centered in learned academies, universities, and laboratories. I argue, to the contrary, that those who used navigation to carry their vessels safely into port, and expanded navigational knowledge, pursued science just as much as those who approached navigation from theoretical understandings of geodesy, mathematical astronomy, and spherical trigonometry. Whether using complex mathematical models to develop an absolute understanding of coastal features, or using piloting techniques, rule of thumb guidelines, simple instruments, and best-as-possible guess-work, both vocational and academic researchers

formed part of a larger process by which the knowledge of New England's coast expanded.

The idea of vocational science also highlights an important mechanism by which specific groups used science to shore up their economic, social and political positions within their local area. While most prior work on American science has shown how the pursuit of scientific knowledge translated into improved cultural and social reputation, most have seen these efforts as a neutral desire to expand humanity's understanding of the world. Yet in this case, engagement in scientific research carried immediate economic, political and social benefits that were anything but neutral. As Joyce Chaplin has shown, colonial Carolina low-country planters sent botanical specimens to the Royal Society and the Royal Society of Arts in exchange for agricultural innovations. These innovations—seeds, water control mechanisms, and processing machinery—helped them secure political control over Carolina politics during the Early Republic and helped create the land-owning elite of the Ante-bellum south.[2] James McClellan argues that while French planters in Saint Domingue did not embrace science as openly as their Carolina counterparts, science did serve the mercantilist interests of the state, and helped perpetuate slavery in the French Caribbean.[3] Finally, John Lauritz Larson has shown that experimental engineering designs for locks, dams, and internal waterways promised America's post-Revolutionary elite a means to promote private improvement schemes

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[2] Joyce Chaplin, *An Anxious Pursuit: Agricultural Innovation and Modernity in the Lower South, 1730-1815* (Chapel Hill, 1993), 131-142.

[3] James E. McClellan III, *Colonialism and Science: Saint Domingue in the Old Regime* (Baltimore, 1993), 9, 289-292.

with public funds and in the face of public opposition.[4] In all these situations, science—whether tied to European centers or not—worked to bolster a specific group's local political and economic positions. Not pursued solely for knowledge in its own right, science expanded knowledge of the natural world, yet at the same time advanced specific interests.

Readers will find the terms "science," "navigational knowledge," and "research" used quite liberally and perhaps over-interchangeably in the pages that follow. This is intentional. The structured and distinct practices that we associate with science today had yet to develop in the second half of the eighteenth century. The lines between "amateur," "practitioner," and "interested gentleman" were blurry to say the least. As others have shown, to impose such categories on inquiries into the natural world and the inquirers themselves clouds more than clarifies. Only after science underwent dramatic changes in the early nineteenth century would science have such clear structures.[5]

The Marine Society's scientific research forces a reconsideration of how science, politics, and society converged in the late colonial and early republican period. Early understandings of American science rested upon what George Basalla later called in 1968 "the cultural dependency model" of scientific development that compared American learned societies and institutions with their European progenitors. Authors such as Dirk Struik, Brooke Hindle, John C. Greene, George Daniels, and Nathan Reingold, saw American science as developmentally stunted and wholly dependent upon British

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[4] John Lauritz Larson, *Internal Improvement: National Public Works and the Promise of Popular Government in the Early United States* (Chapel Hill, 2001), 1-37.

[5] See McClellan, *Colonialism and Science*, 7; and Roy MacLeod, "On visiting the Moving Metropolis: Reflections on the Architecture of Imperial Science," in *Scientific Aspects of European Expansion*, ed. William K. Storey (Hampshire, 1996), 24-27.

intellectual centers of scientific validation before Federal sponsorship began in earnest in the 1830s.

This interpretive line has deep roots in the American past. Benjamin Franklin, for example, saw independence in the 1780s as allowing scientific institutions to thrive. Once the colonists were finally free from the demands of settlement, he wrote, "there are many in every province in circumstances that set them at ease, and afford leisure to cultivate the finer arts and improve the common stock of knowledge."[6] In 1803, Samuel Miller refined this criticism by complaining that American learning suffered for a lack of European institutional foundations. In his view, America suffered from a dearth of broadly funded universities, lacked leisure and a leisured class who would fund and undertake scientific inquiries, and was hampered by a grasping commercial spirit that supported few books and booksellers and offered few careers to intellectual research.[7]

Dirk Struik adopted this interpretive angle in 1948, but granted that Americans held great interest in specific sciences in the course of their daily lives. Struik recognized that science was not limited to intellectual centers of society.[8] Yankee men of science, however, could not measure up to their British counterparts, even in the commercially important field of navigation.[9] Economic relationships between Britain and America also discouraged American scientific development, which "contributed to the primitive condition of colonial science, despite the ardent work done by many amateurs and some

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[6] Brook Hindle, *The Pursuit of Science in Revolutionary America* (Chapel Hill, 1956), 1.

[7] John C. Greene, *Science in the Age of Jefferson* (Ames, Iowa 1986), 7.

[8] Dirk J. Struik, *Yankee Science in the Making* (Boston, 1948), 65.

[9] Struik, *Yankee Science*, 39.

professionals, and despite the relative prominence of colonial science in the whole framework of British science."[10]

In 1956, Brooke Hindle refined Struik's vision of American science before the Revolution. Hindle argued that American scientific work carried significant prestige throughout British science circles of the day. Using the "natural history circle" and activities surrounding the transits of Venus as models, Hindle demonstrated that American researchers regularly contributed important observations and raw data to European intellectual centers for analysis and publication, often solely for validation and access to cosmopolitan patronage.[11] Despite the cases where accidents of geography or ecological diversity gave Americans different angles to European problems, Hindle still saw the American scientific climate as developmentally lacking.[12]

In 1971, George H. Daniels took up Hindle's argument that Americans contributed significant findings to European research goals, but pushed the point one step further.[13] He argued that American novelties—new plants, animals, phenomena, observation points, weather, and currents—challenged European conclusions and pushed scientific apparatus, both physical and intellectual alike, much further than old world limits.[14] Daniels saw science as a strictly intellectual exercise that granted those within intellectual circles patronage. Scientific work also gave a "sense of membership in an international community to [Americans] who keenly felt their provincial limitations, and

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[10] Struik, *Yankee Science*, 28-29.

[11] Struik, *Yankee Science*, 162.

[12] Hindle, *Pursuit of Science*, 84.

[13] George H. Daniels, *Science in American Society: A Social History* (New York, 1971).

[14] Daniels, *Science in American Society*, 3-4.

made them feel that they were participating in an important intellectual enterprise."[15] Despite Daniels' new insights into how New World flora, fauna, and natural observations challenged and modified European knowledge systems, he persisted in centering the sciences only within learned societies whose reliance upon European institutions prevented American science from growing in the colonies.[16] Ultimately, Daniels saw American science suffering under post-Revolutionary hardships. Theoretical research had to make way for more practical work, and the leisured patrons and generously supported institutions of the Old World did not yet exist in the new republic. In their place, Daniels argued, science depended upon small local organizations that kept the candle burning while American institutions grew to replace those lost in the breach with Britain.[17]

By the 1980s, when John C. Greene gauged the state of research in this field, little had changed. He argued that "[The] conditions of life in America militated against early development of the institutions requisite for maintenance of a high level of scientific activity."[18] Greene concluded that early American "patronage" for science was limited due to a lack of public and private support. Ultimately, he concluded that between 1750 and 1820, "the development of science had [not] reached the point where a few strategically located men of science could assemble the researches of others less favorably located and work them into comprehensive treatises."[19]

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[15] Daniels, *Science in American Society*, 51-52.

[16] Daniels, *Science in American Society*, 63.

[17] Daniels, *Science in American Society*, 128.

[18] John C. Greene, *Science in the Age of Jefferson* (Ames, Iowa 1986), 11.

[19] Greene, *Science in the Age of Jefferson*, 12.

While historians of colonial American science have focussed intently upon scientific cultural dependency and the role of science in bringing about the American Revolution, work on other eighteenth century colonial settings has provided new angles from which to evaluate the role of colonialism and science. Recent studies of Joseph Banks by David Philip Miller, Peter Hanns Reill and John Gascoigne have shown that science had a direct influence on international and domestic politics. Miller and Reill argue that Banks' position at the Royal Society and the Royal Gardens at Kew allowed him to exchange governmental patronage for useful specimens from all around the world. For the botanists and natural historians working in distant colonial lands, connections to Banks gave them greater influence in their local area. For Banks, reviewing in-coming contributions allowed him to further British imperial interests in the Pacific through the successful transplantation of plants that carried important strategic and commercial value.[20] Banks's role at the center of imperial science also held important implications for domestic policy as well. John Gascoigne has shown that Banks's prestige as a botanist and as a quasi-governmental official allowed him to use his scientific reputation and governmental connections to influence the Corn Law debates of the 1780s and 1790s for the benefit of his social class, the landed gentry.[21] More than just a pursuit of knowledge for its own sake, science in the late eighteenth century formed a tool by which connected parties could expand their political interests.

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[20] David Philip Miller, "Joseph Banks, Empire, and 'Centres of Calculation' in Late Hanoverian London," in *Visions of Empire: Voyages, Botany, and Representations of Nature,* ed. David Philip Miller and Peter Hans Reill (Cambridge, 1996), 21-37.

[21] John Gascoigne, *Science in the Service of Empire: Joseph Banks, the British State, and the Uses of Science in the Age of Revolution* (Cambridge, 1998), 81-87.

Studies on the British expansion into India after 1763 have also provided important parallels to the American experience. Matthew Edney's study of British survey operations highlights the complex relationships between cartography and colonialism. Edney argues that maps helped conceptually transform British possessions in India into a solid idea of empire. Maps aided in the expansion, cataloging and exploitation of natural resources, and conveyed to the British Raj a sense of legitimate ownership. Edney also sees surveying as a means by which British colonizers distinguished themselves from native Indians and non-elite Europeans—a distinction that helped reinforce power relationships between colonizers and colonized.[22] Yet these power structures were not clean cut. Kapil Raj argues that British scientific work in India depended upon native informants for its success, a contradiction that Edney also points out. For Raj, British surveyors needed Indian technical knowledge to ensure the best results. In addition, they needed Indian social knowledge that provided the basis by which informants' information was evaluated for reliability.[23] Bayly further reinforces Raj's conclusion, arguing that access to Indian information networks was essential to the expansion of British rule.[24]

Examining the Marine Society's work in Boston allows us to reconsider the role of science in the American colonies, with a new emphasis on the importance of vocational science. As a much smaller center of observation and collection, the BMS predated Banks in using their unique status for political influence. As this dissertation

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[22] Matthew Edney, *Mapping An Empire: The Geographical Construction of British India, 1786-1843* (Chicago, 1997).24-25, 32-33, 84.

[23] Kapil Raj, "Colonial Encounters and the Forging of New Knowledge and National Identity: Great Britain and India, 1750-1850," *Osiris*, 15 (2000), 129-134.

[24] C. A. Bayly, *Empire and Information: Intelligence Gathering and Social Communication in India, 1780-1870* (Cambridge, 1986), 11, 21, 64.

explains, they translated that status into political power at a national level after the Revolution. Like British operatives in India, they used their navigational work to distinguish themselves from others in the seaport, sometimes for explicit political purposes. Furthermore, they also sought to catalog and exploit North American natural resources through improved charts. And, though this cannot be pushed too far, the Marine Society's intimate local knowledge and social networks paralleled the role that Indians played during early British survey operations. The point, as Col. Monckton realized sailing east in the Bay of Fundy, is that provincials' local knowledge contributed to the advancement of imperial science in cartography and navigation.

Studying the Boston Marine Society allows us to track the rise and fall of a set of practices, interests, and ambitions that defined "vocational science." Chapter 1 sets the Marine Society within its economic, political and scientific context. Chapter 2 explores how its members applied vocational practices to meet their navigational needs, and how that related to European practices developing at the same time. In Chapter 3, I trace how the Marine Society was able to apply the influence they gained through their navigational work to Boston's politics and national development before and after the Revolution. Such successes, however, were short lived, and as Chapter 4 shows, the challenges of Pacific navigation and the sophistication of Boston's navigational market during the 1790s worked to undermine the Marine Society's claim to influence. Ultimately, the Marine Society's vocational foundation for scientific authority waned as market forces, changes in national politics, and changes in the organization itself encouraged the society to return to local port management roles where they had long been dominant.

A large community of friends, family and colleagues developed around me through this study. I have tried to let people know my gratitude as I went along, but words, spoken or written, cannot convey the fullness of my thanks. The help they gave me, through close reading of drafts, invigorating discussions, welcome distractions, needed meals, and the occasional well-intended swift kick allowed me to finish this project even when I had given up any hope of doing so. To them, I give my greatest thanks. While I may be the author, this study, if it is any good, is really a testament to their kindness and generosity.

I would like offer my special thanks to the co-chairs of my committee, Prof. Jeff Bolster and Dr. Jan Golinski. Their support and patience helped me develop this project and encouraged me to explore all its implications. Both helped refine this work through challenging questions, supportive and critical commentary, and close editing of numerous drafts. Dr. Golinski introduced me to the world of the history of science—a field that formed one of the foundations for this analysis. Jeff Bolster made available his deep knowledge of maritime history and gave me his appreciation for old fashioned, tedious, and difficult social history research. I hope this work represents to some degree the complementary synergy that I experienced working with both of them. With Prof. Dane Morrison of Salem State College, I drank numerous cups of tea brainstorming ideas and their implications. He generously gave his time encouraging me to see beyond the hard, fast, and arbitrary barriers I had placed around my work, and opened opportunities to publicly present my ideas at Salem State College's summer seminars and through the Bowditch Conference in November, 2002. Prof. Lige Gould read a manuscript draft of Chapter 3, and encouraged me to press on, and Prof. Jennifer Selwyn's support about

life-during-dissertation-writing let me know she was in my corner. Danny Vickers helped resolve some difficult conceptual problems at an all-too- brief lunch in Boston in September 2002. Alan Taylor and Karen Haltunnen had a disproportionately beneficial influence on my work during my brief tenure at the University of California at Davis. Jim Millinger started this whole process by opening my eyes to maritime history and ecology during SEA's Maritime Studies Semester (W-123). My thanks go to all of them.

In more material terms, I want to thank Jeff Bolster again for awarding me the Hayes Chair Research Assistantship in the final year of this manuscript's preparation. Special thanks also go to the Boston Marine Society and the Massachusetts Historical Society for awarding me the Short-Term Fellowship for Maritime History in the summer of 2002. Bill Fowler, Peter Drummey, Conrad Wright, and Brenda Larson gave their insights and copious knowledge, and helped me meet Dr. Thea Hunter and Dr. Kate Davies whose input was invaluable. I also wish to thank Cindy Larson and Judy Zubrow at the College for Lifelong Learning for supporting my writing through letting me teach at the college. UNH College of Liberal Arts came forward with funds that allowed me to present my ideas in Leeds, England in January 2000, and the History of Science Society helped me with travel funds to present a paper at their annual meeting in November 2001. Andy Rosenberg at UNH College of Life Sciences and Agriculture lent me office space so I could get out of the encroaching four walls of my apartment. Without the research librarians at UNH's Dimond Library, this project would have never gotten off the ground: Louise Buckley, Peter Crosby, Valerie Harper, David Severn, Debbie Watson, and Deanna Wood always met me with a friendly faces and encouragement that kept me going through the darkest hours.

Countless other friends, inside and outside the academy, also helped build my support structure. First, I must thank the never-ending generosity of Stephan, Astrida, and Helena Schaeffer. They opened their family, their hearts, and often their larder, to me, and gave me love and support that has truly blessed my life. Karen Alexander also gave time, expertise and friendship that drew out the best in me and in my work. She rescued this project from the dustbin, and over countless cups of coffee, this marred smattering of ideas turned into, I hope, something that testifies to her brilliance. Dr. Bill Leavenworth never held back with his encyclopedic knowledge of New England history, and was always willing to offer suggestions and sources. Maurik Holtrop, Dal Barison, and now Yela, also formed a bedrock to my work, and their time, friendship, peaceful home, and love were refuges from the storm. My life-long friend and hiking partner Ian Striffler got me to the Inca Trail in Peru and bought me countless dinners to get my mind off of one sticking point or another. Conversations with Bruce McLaren and the long friendship I have had with Cynthia Lay also helped me through tough times. I can say without hyperbole that without all of you, I would not have survived this project. Thank you for your gifts of friendship and love: you are as much a part of this work as I am.

Numerous friends also contributed in ways that too numerous to recount here: Vladmir Pistalo, Glenn Grasso, Mehul Dholakia, Jim Price (for his help as a teacher and for keeping my car running), Damian Siekonic, Sally Flemming, Jeff Peterson, Alex Landrum, Hugh Braley, Kevin Gumieny (for his thoughts on John Churchman and his paper at the Bowditch Conference), Sterling Wall, Yvonne and Vitek Mechlinski, Kasia Wasilewski, Michael Corbo, and Ellen and Martin Carmody, gave more than could be expected from friends. Again, thanks.

Finally, I wish to thank my family who also lived this long process without complaint. My brothers Andrew L. McKenzie, Allen Q. Bohnert, and J. Carl Bohnert helped me greatly, sometime with needed funds, other times with delicious food, and always with good-natured questions about how the student profession was treating me. Craig, Jacquie, and Ian Williams opened their home to me, and while they were too far for me to take advantage of their aid, I always knew they were in my court. My cousins Amy, Dan, Drew, and Tory Ceglinski shared their home in Gloucester with me more than I can recall, and my aunt, Claire Darrow has always been a source of loving guidance, whether she knew it or wanted it, or not.

Jenny Carmody gave me an unqualified love that allowed me to move ahead. She also taught me again how to live and laugh. With unwavering support, patience, and an occasional loving swift kick, she never questioned nor doubted me. I have never known the power that such love brings, and without her this work, quite literally, would not have been written.

Words cannot begin to detail all the blessings I received from my mom, Carol S. McKenzie. She gave me the love of life, music, and art that reinvigorated me when I could not work any more. She has always been a source of strength and laughter, and those gifts have been more precious to me than I can recount.

I also cannot explain how much I owe my dad, Robert A. McKenzie, for his gifts. He gave me his love for the sea, and taught me how to pilot a vessel when I was twelve. I had blessing to work with him from age eight to eighteen, and during that time our conversations on history and politics inspired me to look deeper into the subjects. He died only a few months before I finished this work, and because of that, I regret everyday

I dragged this project out, denying him the opportunity to see it to an end. He read and edited every chapter before he passed, however, and I can only hope he was proud of what he saw.

If this work is any good, it is because of what these people and the others whom I have failed to mention have given me. If it isn't, well, that's my fault.

CHAPTER I

ORIGINS OF THE BOSTON MARINE SOCIETY, 1742-1759

In December 1752, about a dozen senior ship captains in Boston met at the British Coffee House to discuss business. Since 1742, this group of captains had met monthly as the Fellowship Club to manage and disburse funds they pooled together for mutual assistance in times of need. This evening, however, they voted to take their mutual aid society a step further. After discussion, the assembly voted that Jeremiah Gridley, a local lawyer working with the group, should present to the Massachusetts General Court a petition for incorporation and charter.[1]

The petition languished in government hands for the next nine months, with the club not receiving any word about its progress. In September, 1753, the group grew impatient and voted that Capt. Joshua Loring, a prominent Boston captain, merchant, and member should congratulate Governor William Shirley for his recent return from London and to move the petition along. The ploy worked. Three months later in December 1753, some of the most significant and active Boston ship captains waited on the governor, and publicly signed their petition for incorporation. On February 2, Governor William Shirley granted a charter, and three days later, the newly incorporated Boston Marine Society voted bylaws, elected officers, and created a committee to oversee the distribution of charity funds. They also voted some of the same individuals who waited

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[1] Boston Marine Society Records, 1752-1762 [*sic*], Dec. 5, 1752, Boston Marine Society Collection (Massachusetts Historical Society, Boston, Mass.), hereafter referred to as BMS Records.

on the governor two months before to a committee set up to examine and review navigational observations brought in by other members.[2]

In broadening the roles of their mutual aid society, members of the Boston Marine Society responded to Boston's particular need to stabilize the personal risks and dangers in commercial seafaring. Dependence upon imperial markets in Europe and the West Indies, and on financial centers in London, meant that Boston's economic growth relied, at some point, upon ocean travel. Boston's need to embrace risky maritime ventures required some form of insurance that would offset seafaring's attendant dangers. In Britain, such needs were met by a variety of public and private institutions that supported mariners, managed ports, and maintained navigational markers. Organizations such as Trinity House and seamen's charitable funds stepped in to offer some support when maritime tragedy struck. Other institutions, such as Christ's Hospital, the Royal Observatory, and the Royal Navy, worked to reduce maritime disasters by rigorous navigational instruction, improved almanacs and astronomical data, and better charts, all geared to reduce loss at sea. The benefits of these organizations, however, did not stretch across the Atlantic. While the British Atlantic empire created avenues for Boston mariners to find a profitable niche in the world, such opportunities came with great risks to merchants, masters, and mariners alike.[3]

As the Marine Society developed, it looked back towards Europe for models to shape its efforts. The society that emerged in Boston, however, was not a simple

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[2] BMS Records, Feb. 5, 1754.

[3] Jon Press, "The Collapse of a Contributory Pension Scheme: The Merchant Seamen's Fund, 1747-1851," *Journal of Transport History*, 5 (1979), 91-104; Roy Porter, *Unpathed Waters: Account of the Life of Joseph Huddart, FRS* (London, 1989); Joseph Cotton, *Memoir on the origin and incorporation of the Trinity House of Deptford Strond* (London, 1818); Trinity House, *The royal Charter of confirmation, granted by his most excellent Majesty King James II* . . . (London, 1780).

replication of a British institution. Like many other elements of European life transported to America, the Marine Society embraced and adapted a variety of British models to their own particular colonial experience.

Three key concepts stood at the center of the Marine Society's publicly proclaimed bylaws. First, technical merit and vocational experience formed the major criteria through which Boston masters joined the membership. Only individuals who currently or had previously commanded merchants ships in and out of Boston, and who had the sponsorship of a current member, could join. No mere gentleman's club, common work experiences defined the society as a community, set aside from the rest of the town. That uniqueness, in turn, formed the foundation for mutual aid. In times of shipwreck, accidental death, or capture by an enemy, members and their families could rely on the Marine Society to provide some modicum of support.

Second, members were also required to behave in a civil and orderly manner. The 13th article of the 1752 Laws mandated that "the Society shall & will avoid all Quarrels, Fighting, Chalenging [*sic*] each other to fight & all Needless Contentions and debates, that may tend to Create any fighting or Quarrelling or to disturb the Good Order, peace Friendship & Love that each Member shall and ought to bear to the other."[4] The Society also prohibited members from excessive drinking and cursing. Failure to conform to behavioral rules or failure to pay dues in a relatively timely manner could lead to expulsion.[5] In requiring better behavior, the Marine Society reflected closer cultural ties to Britain that accompanied an increased trade across the Atlantic. Increased trade in

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[4] Boston Marine Society, "Laws—Boston Marine Society," Feb. 26, 1754, as in William A. Baker, *A History of the Boston Marine Society, 1742-1981*(Boston, 1982), 308-309.

[5]Boston Marine Society, "Laws."

luxury goods and fine artistry, helped educate and equip a rough mannered American gentry in the ways of their cultural betters in London.[6] While only the most successful Boston captains had the wealth that would justify genteel distinction within their community, the Society's orders against abusive, rough and publicly humiliating behavior reflected a growing importance of public "delicacy" that lay at the heart of refinement. "Delicacy forbade an individual to assert superiority or to degrade another. Delicacy detested the slightest shadow of blame or derogation and acted to lift that shadow from any across whom it fell."[7] In general, delicacy, and its encompassing virtue of gentility, "heightened self-consciousness, not in any deep philosophical sense, but in the common meaning of becoming aware of how one looked in the eyes of others."[8]

Gentility also helped present a unified face of benefaction. For a body of men who looked after other impoverished members and dependent families, genteel behavior at once reinforced social hierarchy and emphasized the generosity of the Society's benevolence. The Marine Society required that applicants for charity petition the society, a requirement that instantly put the applicant in a position as supplicant. The Relief Committee would then "inquire into [their] circumstances & report at the next meeting of the society," and would more likely approve some modicum of aid.[9] Marine Society records also reveal, however, that members on the "Committee for Relief" occasionally issued moralizing judgements about the "objects" of their charity. And in these cases, the Society denied or withheld aid. For example in January 1757, the Society voted that,

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[6] Richard Bushman, *The Refinement of America: Persons, Houses, Cities* (New York, 1992), 181-186.

[7] Bushman, *Refinement*, 81.

[8] Bushman, *Refinement*, xiv.

[9] BMS Records, Oct. 7, 1755.

> whereas the sum of three pounds was ordered to be paid Elizabeth Rand by the Treasurer last meeting but on information that said Elizabeth Rand would make bad use of the money the Treasurer having informed the society that there still remained in his hands thirty six shillings voted that this thirty six shall be appropriated to the use and benefit of the children of said Rand.[10]

It was important that, when the Society made decisions that affected people's well being, they did so with the appearance of unanimity. Division and discord, manifested through coarse and rude behavior, would inevitably lead to charges of faction, interest, and therefore, unfairness. Prohibition of discord also reflected larger ideas about how community politics should operate. Like the polities that surrounded them, the Marine Society governed itself with the same emphasis upon unanimity.[11] As Michael Zuckerman has argued about colonial Massachusetts' town meetings, "the men of the province established their agreements on policies and places, and there they legitimized those agreements so that subsequent deviation from those accords became socially illegitimate and personally immoral."[12] Marine Society regulations mandating poorly behaved members to be expelled enforced unanimity in a similar fashion as in other political bodies. "All those whose acquiescence in public action was necessary were included, and all those whose concurrence could be compelled otherwise or dispensed with were excluded."[13] As the Marine Society grew in local significance, proper behavior

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[10] BMS Records, Jan. 4, 1757.

[11] See also Robert A. Gross, *The Minutemen and Their World* (New York, 1976), 14-16.

[12] Michael Zuckerman, "The Social Context of Democracy in Massachusetts," in *Colonial America: Essays in Politics and Social Development*, Fourth Edition, ed. Stanley N. Katz, John M. Murrin, and Douglas Greenberg (New York, 1993), 436.

[13] Zuckerman, "Social Context," 439.

would help support the socially prominent role they would assume, lending greater credibility and certainty to their findings and assessments.[14]

The third, and most important focus for this study, required that each member "Communicate his [*sic*] Observations inwards & outwards of the Variation of the Needle the Soundings Courses & distances and all other Remarkable things about this Coast in writing to be Examined & digested by the Committee Appointed by the Society for that purpose and Lodg'd with ye Clerk of said Society in order to be Recorded in the Records of said society."[15] As eighteenth century New England towns tended to view themselves as an organic, unified community, at least in theory, it was only natural that an organization receiving specific social sanction return the favor through applying their unique skills to the betterment of the whole. In this case, both the Marine Society and Governor Shirley recognized that the Marine Society offered a unique opportunity to provide accurate navigational information without incurring the costs of a formal coastal survey. The Marine Society's ability to provide more information like this stood at the foundation of their incorporation. This relationship was not merely implied. In writing Malachy Salter in March, 1754, Jonathan Clarke, the Marine Society's first elected Master, stated that "in order to obtain this charter [the society] have laid themselves under an obligation to the government" to collect navigational data. This information ultimately was to be "put upon the records of the Marine Society so that in time a new and correct draught of this coast may be made for the advantage of the public."[16]

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[14] See chapter 2, below.

[15] Boston Marine Society, "Laws."

[16] BMS Records, March 3, 1754.

The Society's mutual aid mission and technical requirements attracted experienced mariners well established in their careers. Data for BMS members is surprisingly sparse: ages at time of admission could be found for only 29 of the 274 members admitted before the Revolution, and tax records list only 72 names that can be confirmed as BMS members.[17] Inducted members' ages ranged from 20 to 61, but averaged out at 33 years old, suggesting that if they survived ten years of sea service, they were willing to retire to more shore based livelihoods. Surviving a career at sea was no sure thing, however. Of the twenty-three members known to have died before the Revolution, seven—almost a full third—died in foreign lands, most often the West Indies, or during a passage.[18] If the individual survived, he was likely to attain some respectable shore-side livelihood: 19 (47.5%) had made the jump to merchant, trader, or shopkeeper by the end of their lives. Consequently, the BMS attracted men who had survived their stint as captains and who looked forward to more secure lives on shore.

The 1771 Massachusetts tax rolls show how members' progress from the quarterdeck to the counting house appeared at a frozen moment in time. Tax lists, rather than probate records, give a fuller understanding of how Marine Society members made their livings. Of the 72 BMS members identified in the lists, 22 (31%) owned from £13 to £1500 in merchandise, and ten individuals (14%) owned from 20 to 203 tons of

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[17] Ages were determined mostly through death announcements in Boston. See Robert J. Dunkle, *Deaths in Boston, 1700 to 1799* (Boston, 1999). John Tyler faced similar, though not as extensive, difficulties in determining the ages for many of his subjects. Where there was overlap with the BMS, ages were taken from Tyler's work. See John Tyler, *Smugglers and Patriots: Boston Merchants and the Advent of the American Revolution* (Boston, 1986), 253-277. For Massachusetts 1771 tax records see Bettye Hobbes Pruitt, *The Massachusetts Tax Valuation List of 1771* (Boston, 1978). The 72 names represent only about 29% of the total members inducted before the Revolution, minus the 22 individuals known to have died before 1771, Howard A. Baker, *A History of the Boston Marine Society, 1742-1981* (Boston, 1982), 318-361.

[18] Dunkle, *Deaths in Boston.*

shipping. Thirteen individuals owned warehouses or tan houses, and three people owned from 1157 feet to 3450 feet of wharfage. Several of the wealthier members, such as Samuel Harris and Nathaniel Greene, owned merchandise, shipping tonnage, warehouses, and wharfage. Overall, this information further suggests that after retiring from sea service, BMS members kept interests in all aspects of coastal and overseas trade.[19]

Success fell in varying degrees upon BMS members. Generally, BMS members who survived seafaring fared well economically. On one end of the scale, 15 of the 72 BMS members identified in the 1771 tax list paid no taxes at all. On the other end, John Frazier's house, shop, and £200 in merchandise, for example, generated a tax bill of £46 13s 4d. Well over half, 38 (52%), owned enough property to pay between £9 8s and £27 4s in taxes.

Table 1: Assessed Taxes in 1771 by 20% Brackets (£)

Wealth Bracket	No. in bracket	Assessed Tax in 1771 (£ s d)	Proportion of Population
Top 20%	8	£37 12s-£4	11%
2nd	6	£28 6s-£37 12s	8%
3rd	19	£18 18s-£28 4s	26%
4th	19	£9 10s-£18 16s	26%
5th	20	0-£9 8s	28%
Total Population	72		100%

Source: Pruitt, *Massachusetts Tax Evaluation*; and Baker, *Boston Marine Society*, 318-361.

Other indicators further reinforce this image of varying material wealth. Sixty-eight percent owned their own homes in Boston, and it is likely that wealthier individuals that did not have a house listed in their assessed taxes owned a home in one of the nearby towns. William Downes Cheever, for example, owned a warehouse, "2 servants for life," and £268 in merchandise, but lived in a home in Cambridge. All who owned their home

[19] Pruitt, *Massachusetts Tax Evaluation.*

also owned an adjacent shop (though not all that owned shops always had merchandise listed in their property listings). In addition, eight individuals owned at least one "servant for life", most likely a personal slave, and three, Nathaniel Greene, Cheever, and John Bradford, owned two slaves each. Ultimately, most BMS members that retired to shore achieved some form of propertied security.

Some Society members also held civic leadership roles, sitting just below crown officials and General Court membership. At least two members, John Simpson and Henderson Inches, occupied positions to loan money to the colonial government for an expedition against Crown Point in 1757. Two others were elected as Justices of the Peace: John Barret for Suffolk County in 1761 and Edward Davis for Plymouth County in 1762. Barret also served as overseer for Boston's poor in 1765, and helped the colony manage French neutrals during the French and Indian War. Henderson Inches and Edward Davis were also appointed Selectmen for Boston in 1769 and 1758, respectively, and Joseph Bradford served as Suffolk County Sheriff in 1739.[20] As prominent captains, and then merchants, some members successfully drew upon their commercial successes to leverage themselves into public service roles in town government.

Not all succeeded, however, in acquiring the financial resources that allowed further participation as civic leaders. A full 28% of the members identified in the tax lists lacked the property to pay any taxes at all. Some even lost wealth they had acquired. Lewis Turner, for example, hanged himself in his bedroom in April 1772 to escape debts

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[20] [Creditors on account of Crown Point Expedition], 1757, vol. 21, 612; [John Barret appointment to Justice of the Peace for Suffolk County], Nov. 12, 1761, v. 85, 321 and 330; [John Barret appointment to overseer of poor in Boston], March 19, 1765, vol. 24, 534 and 537; [Charge of John Barret mentioned in Boston account for care of French neutrals], Jan. 29, 1755, vol. 23, 334 and 336; [Boston Selectmen] July 1, 1769, vol. 118, 394; [Selectmen's receipts for account of French neutrals], May 28, 1759, vol. 24, 193; [John Bradford appointment as Suffolk Co. Sheriff], June 3, 1739/40, vol. 41, 483 (Massachusetts State Archives, Boston Mass.).

he owed to one Dr. Sprague.[21] Most of the poorest members simply could not amass enough wealth to purchase a house. Eleven members (15%) were tenants, and in at least one case, one member rented from another. Despite their hard financial situations, poorer members still pursued trade. Joseph Pierce, for example, owned £80 in merchandise, but still rented from Benjamin Kent. Benjamin Homer owned 20 tons of shipping and £60 in merchandise, but did not own his own home, at least not in Boston. Less wealthy members with homes also rented out rooms to bring in revenue: four members (all in the second and third lowest 20% brackets) had tenants.

The Marine Society received significant support from Boston captains both before and after its incorporation. During the years of the Fellowship Club, from 1742 to 1751, between five and seven new members joined each year, except for 1746 when no members joined.[22] As members began to discuss incorporation, however, Boston captains responded with tremendous support. In 1752 alone, 26 new members joined the Fellowship Club, with another 17 the following year, suggesting that captains supported the Fellowship Club's desire for incorporation. Support for Marine Society activities, with some variation, would remain relatively consistent until the Revolution.

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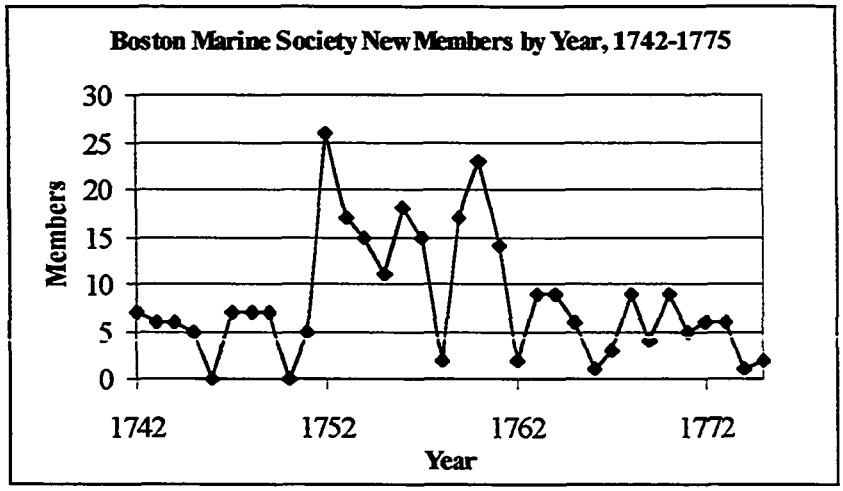
[21] John Boyle, "Boyle's Journal of Occurrences in Boston," *New England Historic and Genealogical Register*, 84 (1930), 359.

[22] Baker, *Boston Marine Society*, 318-361.

Table 2: Marine Society New Members by Year, 1742-1788.

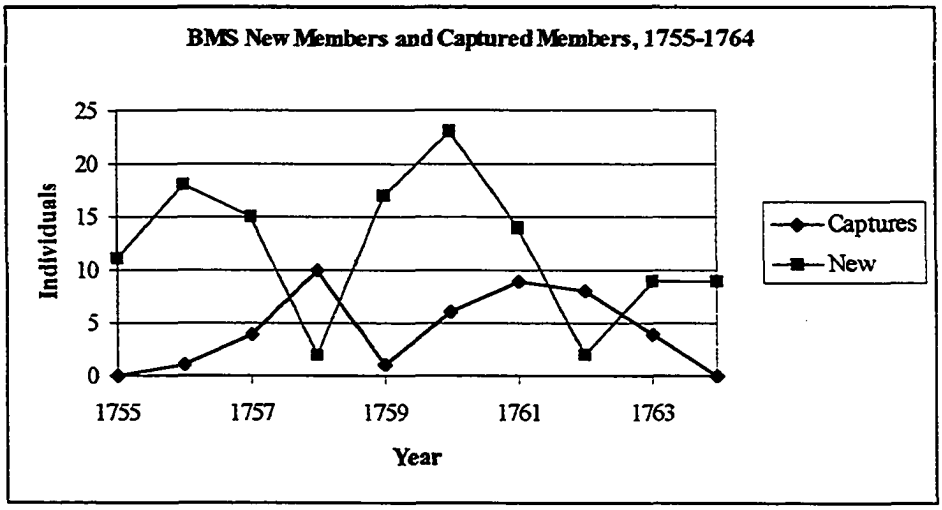


Source: Baker, *Boston Marine Society*, 318-361.

Members joined for a variety of reasons. Some were sociable: members met monthly when in town and used the meetings to catch-up as well as discuss business. The society also kept tabs on members who were at sea and spread word when members were over-due to keep track of monthly membership payments. As a society based upon acknowledged merit, some joined for the prestige that came from membership. Most members joined to offset the dangers of their trade. Early support for incorporation suggests that masters actively supported expanding the mutual assistance networks for members and their families, and embraced increasing the knowledge of the coasts. With the outbreak of war in 1754, however, masters joined for more immediate concerns. The Marine Society's records reveal that many members fell into enemy hands during the war. As the by-laws mandate, captured or castaway members were not held liable for monthly dues during their forced absence, and as a result, Marine Society clerks kept close tabs on the membership to keep financial accounts accurate. As more Boston

captains were captured by French and Spanish forces during the French and Indian War, more masters joined the Marine Society for the added security the organization held for their families during their possible captivity.

Table 3: Members Captured and New Recruits by Year, 1755-1764.



Source: BMS Records; Baker, *Boston Marine Society*, 318-361.

A few unfortunates fell into enemy hands early in the war. In 1756, Edward Sohier returned from "being taken" in December and Robert Buttler returned from captivity in June of 1757.[23] Alexander Inglish returned in May 1757 just in time to be taken again and return to Boston by December of the same year.

[23] BMS Records and Boston Marine Society Minutes, Boston Marine Society Collection, (Massachusetts Historical Society, Boston, Mass.), hereafter referred to as BMS Minutes. The Marine Society settled back dues, levied fines, and excused fines when members returned from their voyages. Consequently, we only know when individuals returned from their periods of captivity rather than when they were taken. In some cases, however, the clerk did record how long the member had been taken, giving an indication as to when he was captured. The Marine Society also levied dues on a two tiered system: a higher rate for those in town, and a lower one for those at sea. Given this two tiered system, and the spotty nature of the records, it is difficult to use the fines excused or levied to calculate length of captivity.

As bad as 1756 and 1757 were, however, 1758 proved disastrous. The Marine Society heard of Thomas Baker's capture in April, followed shortly by news that Robert Buttler and Nathaniel Holland had again fallen into French hands in May. The next captain to fall into French hands is unclear: either a member named Nathaniel Howland was taken by the French in June, or, somehow, Nathaniel Holland returned only to be captured again in the same month.[24] John Bradford was reported to have been "cast-away," either by enemy action or by bad weather in July, the same month William Sharad was also captured. Somehow, Sharad returned, but only to be captured again in September. The French then captured Edward Emerson in August, Robert Jarvis in October, and Andrew Newell in December. In all, about one-eighth of all Boston Marine Society members fell into French hands in 1758 alone.

As British forces won victories overseas and in Canada, BMS members faced better odds. Only Thomas Cartwright was captured in 1759, marking a significant lull in merchant losses in Boston from the previous year, or suggesting reluctance among recently returned captains to return to sea immediately. Between 1760 and 1763, however, captures again increased. Six members were captured in 1760, eight in 1762, and nine in 1763. By the end of the war, a total of 39 Marine Society members had fallen into French hands, almost half of the 1754 membership total, and six were captured at least twice.

Frequent, short-term periods of captivity made these interruptions to daily life somewhat routine for some. Alexander Inglish and possibly Nathaniel Howland, for example, were undeterred from returning to sea after their internment. They returned

[24] As with many manuscript sources from this time, proper names often witnessed different spellings, making tracking individuals difficult.

from captivity only to turn around and ship out again within a matter of weeks. William Sharad took two months to get back out to sea after his capture in 1758. For most other captains, however, one "vacation" in enemy hands was enough, and the costs to their reputations and investments most likely represented hazards of the job that they wished to avoid. After 1763, Boston masters continued to join and support the Marine Society, as captured members' experiences continued to make a good case for membership even after the restoration of peace.

The Marine Society appealed to those looking to stabilize their lives after a career at sea. Taking their earnings from voyaging, many members were able to achieve merchant or trader status before the Revolution, or at least continue to make a living in the overseas trading or shipping industries. That said, the society was far from a group of successful captains and merchants. As the technical base of membership would suggest, individuals who made their names as respected captains, and not necessarily as successful traders, were also members. Almost a third of the membership did not own homes and had no taxable property. Consequently, seafaring experience, and not wealth, played a greater role in determining membership.

That the Marine Society looked to character and ability, and not just wealth, for the group's leadership is best seen in the Marine Society's office holding and committee membership. Based on the 1771 tax lists discussed above, the Marine Society drew its leadership from across the body's range of wealth holding.

Table 4: BMS Office Holding and Wealth Bracket, 1753-1775.

Wealth Bracket	Assessed Tax in 1771 (£ s d)	No. office Holders within Bracket	Proportion of Officeholders
Top 20%	£37 12s-£4	5	42%
2nd	£28 6s-£37 12s	1	8%
3rd	£18 18s-£28 4s	3	25%
4th	£9 10s-£18 16s	2	17%
5th	0-£9 8s	1*	8%
Total population		12	100%

Source: Baker, *Boston Marine Society*, 316-317; and Pruitt, *Massachusetts Tax Evaluation*. Note: John Blake was not assessed real estate taxes in 1771, but owned £150 in vessels and £600 in merchandise, suggesting that he fell elsewhere in the distribution.

Almost as many members in the third and fourth 20% brackets held offices as did their colleagues from the wealthiest. Hezekiah Welch, for example, who was the longest-term office holder and held the post of clerk from 1763-1775, was assessed the median tax of £16. The second wealthiest group had the fewest office holders.

The Marine Society itself grew out of a dramatic expansion of New England shipping. During the first two-thirds of the eighteenth century, New England merchants and shippers adapted to a lack of staple exports by diversifying their trading patterns in goods and markets. Like sugar and tobacco plantation owners in Virginia and the Caribbean, New England merchants looked to European markets to sell their timber and fisheries products. London merchants eagerly bought New England fish as they scrambled to find a commodity to trade for wine with Catholic southern Europe. In addition, growing slave populations in the Caribbean gave merchants a market for New

England livestock, grain, and fish. They imported molasses and sugar from the Caribbean to distill into rum.[25]

Table 5: Average Annual Value and Destinations of Commodity Exports from New England, 1768-1772 (£ Sterling).

Commodity	Great Britain	Ireland	Southern Europe	West Indies	Africa	Total
Fish	£206		£57,195	£94,754		£152,155
Livestock, beef, pork	374		461	89,118		89,953
Wood Products	5,983	£167	1,352	57,769		65,271
Whale Products	40,443	9	804	20,416	£440	62,103
Potash	22,390					22,399
Grains, Grain Products	117	23	3,998	15,764		19,902
Rum	471	4	1,497		16,754	18,766
Other	6,991	1,018	296	247		8,552
Total	£76,975	£1,261	£65,603	£278,068	£17,194	£439,101

Source: McCusker and Menard, *Economy of British America*, 108.

Demand in the Caribbean and in other British colonies for timber products such as planks, shingles, and ships, also generated considerable trade between New England and the rest of the empire. Beginning with England's wars with France between 1689-1713, New Englanders increasingly supplied ships needed for imperial trade. By 1730, Ralph Davis estimates, and Jacob Price concurs, that one in six English ships were American built, and by 1760 that ratio had increased to one in four.[26] In 1769, Lord Sheffield estimated that Massachusetts and New Hampshire alone built 182 of the 447 ships built

[25] See John J. McCusker and Russel R. Menard, *The Economy of British America, 1607-1789* (Chapel Hill, 1985), ch. 5.

[26] Jacob M. Price, "A note on the Value of Colonial Exports of Shipping," *Journal of Economic History*, 36 (1976) 706.

in British America (about 41%).[27] Alexander Cluny, an experienced merchant writing in 1769, reported that New England was responsible for 70 of the 155 (45%) total vessels sold to Britain between 1763 and 1768.[28] In addition to exporting timber and fisheries products, New Englanders also expanded into the imperial carrying trade. "Early in the colonial era, New England developed a diverse and tightly integrated commercial economy . . .All [of New England's diverse industries] relied on a shipping industry to disperse their products to market and bring back again those things that they consumed."[29] James F. Shepard and Gary M. Walton estimate that New England earned £55,000 in carrying charges in 1768 alone, the earliest data they offer on the subject.[30] While other colonies relied upon the export of staple crops to pay off debts to British creditors, the imperial carrying trade allowed New Englanders to make up their balance of payments. As Boston shipping expanded, more Boston captains faced the risks of seafaring, and looked to the Marine Society to offset those risks.

The Marine Society's charitable works also helped the town fulfill its obligations as part of a British commercial empire spanning the North Atlantic. Intermittent warfare between Britain and France from the late seventeenth century required larger towns like Boston to provide soldiers, capital, ships, and workers for an imperial struggle that raged into the eighteenth century. War and the mercantilist theories that drove Europe's

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[27] See Price, Table 1, p. 707. Figures were calculated by adding numbers of "Topsails" and "Sloops and Schooners" for "Mass." and "N. H.", and determining their percentage from the total numbers of each category built in the British American colonies for 1769 alone.

[28] Price, "Note," 710-711.

[29] McCusker and Menard, *Economy of British America*, 110.

[30] James F. Shepard and Gary M. Walton, *Shipping, Maritime Trade, and the Economic Development of Colonial North America* (Cambridge, 1972), Table 7.6, 128.

political economy targeted enemy merchant vessels as much as they targeted enemy warships. Despite the uncharacteristic long-term peace from 1713 to 1739, these threats increased dramatically with the construction of the French fortress at Louisborg, Cape Breton Island in 1720. When war broke out again in 1739, French privateers and naval vessels could more easily harass Boston shipping running from the Nova Scotian fishing banks to the Caribbean. Consequently, Boston mariners faced as much risk of capture, death or mutilation as Boston soldiers and militia sent to fight in upstate New York. The Marine Society's desires to protect members and their families from harm grew immediately out of the imperial tensions that marked the eighteenth century northwest Atlantic.

The Marine Society also addressed an imperial need for more navigational information for the New England coast. Unlike Old Régime France, Britain came to recognize the importance of concerted coastal surveying relatively late in the eighteenth century.[31] The French government established an office for plans and charts in the seventeenth century, and created the Académie Royale de Marine at Brest in 1752 to improve French marine cartography.[32] In Britain, however, British imperial agents avoided centralized cartographic offices and were content to allow the free market to meet the demand for navigational information. Consequently, throughout the eighteenth century, few sources of navigational information, such as charts, rutters, sailing directions or harbor surveys, existed in published form to aid vessels. The Dutch, too, had long

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[31] James E. McClellan III and François Regourd, "The Colonial Machine, French Science and Colonization in the Ancien Regime," *Osiris*, Second Series, 15 (2000), 36-37.

[32] James E. McClellan III, *Colonialism and Science: Saint Domingue in the Old Regime* (Baltimore, 1992), 124.

excelled in coastal cartography, dominating the British market until the early eighteenth century. Most European energies were focussed on surveying home waters, leaving descriptions of colonial waters to brief, vague information, often ages old.[33]

One of the earliest and most consistent of these was John Sellers' *The English Pilot: The Fourth Book.* Covering the entire eastern seaboard, this publication and its handful of charts offered at least brief instructions for vessels approaching American ports. Comprehensive in nature, its brevity and initial lack of charts made the work only useful in the broadest terms. In addition, from its publication in 1689, the work was rarely revised in its almost hundred years of publication, even as coastal navigational aids changed in the course of the eighteenth century.[34]

In addition to Sellers' work, Cyprian Southack drew charts of the New England and Nova Scotian coastline during his long tenure as the captain of the *Province Galley.* Beginning in 1694 with a draft of Boston Harbor, Southack produced a series of charts of the New England and Nova Scotian waters throughout the first third of the eighteenth century. After two manuscript maps that brought him acclaim, Southack published "A New Chart of the English Empire in North America" in 1717. He followed with charts of Canso Harbor and the coast from the Mississippi River to Cape Breton, many appearing in revisions of Sellers' *Fourth Book.* Between 1718 and 1734—historians are not sure when—Southack published *The New England Coasting Pilot* that combined charts with

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[33] William P. Cumming, *British Maps of Colonial America* (Chicago, 1974), ch. 3. See also Coolie Verner, "John Seller and the Chart Trade in Seventeenth Century England," and Jeanette Black, "Mapping the English Colonies in North America: The Beginnings," in *The Compleat Plattmaker: Essays on Chart, Map, and Globe Making in England in the Seventeenth and Eighteenth Centuries*, ed. Norman Thrower (Berkeley, 1978), 127-158 and 101-126.

[34] Cumming, *British Maps*, ch. 3. See also Verner, "John Seller," and Black, "Mapping the English Colonies," in *The Compleat Plattmaker*, ed. Norman Thrower, 127-158 and 101-126.

over one hundred notes on safe harbors, currents, and soundings. These works, however, were not much better than Sellers' outdated publications.[35]

The dearth of charts and sailing directions for the North American coast can be largely attributed to the fact that few knew how to conduct even remotely accurate coastal surveys until mid-century. Until the mid-1750s, when Murdoch Mackenzie published the first standardized manual, most marine surveying was more of an individual art than a systematic process. Navigators often gathered data during their voyages and submitted the information to European chart makers and plate engravers. Aside from the inaccuracies inherent in these observations, the many individuals involved in chart production, such as mathematicians, copyists, engravers, and translators, introduced additional errors in the final publication. In 1753, for example, John Greene harshly ridiculed Buache and De L'Isle's *Countries to the North of the South Seas* for misplacing "discoveries ascribed to De Font, 10 degrees more north than he ought to have done . . . that the error had been owing to the copist [sic], or Translator, putting one Figure for another."[36] Less forgivable errors also found their ways into this chart. On further examination of De L'Isle's work Greene "perceived that the 6 in 63 had not the Appearance of other sixes, wither in the Shape or Situation, . . .and on examination found, that the Number had been actually printed off 53, and the 5 changed afterwards into a 6 with the Pen."[37]

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[35] Clara Egli LeGear, "The New England Coasting Pilot of Cyprian Southack," *Imago Mundi*, 11 (1954), 141.

[36] John Green, *Remarks in Support of the New Chart of North and South America in Six Sheets* (London, 1753), i.

[37] Green, *Remarks*, ii.

Without any learned societies, academic institutions, or sources of government support for coastal surveys, New England captains relied upon age-old, relatively simple navigational practices that had guided European ships for centuries. Beginning in the mid-eighteenth century, however, European masters began to embrace new instruments and new mathematical methods for determining a ship's position, such as Hadley's Reflecting Octant and Maskeleyne's lunar distance method for determining longitude,. Most New England masters, however, continued to rely upon simpler Davis quadrants until the end of the century. Introduced in 1594, backstaffs, or Davis quadrants, remained one of the more popular instruments to take latitudinal measurements until the 1780s. Relatively cheap—priced in the eighteenth century from four shillings to six guineas—these instruments were preferred by New England masters to the more expensive improvements available in Europe.[38] Furthermore, eighteenth century New England logbooks for trans-Atlantic voyages indicate that most masters estimated their longitude from their dead reckoning track and did not use more complicated methods. For example in 1778, navigators aboard the Sloop *Peggy* and the Schooner *Success* determined their daily positions with course directions, distances run, differences in latitude from previous measurements, latitudes by dead reckoning, latitudes by observation, "meridional distances"—that is distance in meridians from departure, difference in longitudes, and

[38] Deborah Jean Warner, "Davis' Quadrants in America," *Rittenhouse*, 3 (1988), 26. As Silvio Bedini points out, Thomas Godfrey, an American instrument maker in Philadelphia came up with similar improvements to the Davis quadrant as Hadley did, and even communicated his ideas to the Royal Society of London before Hadley received a patent for his reflecting octant. Because of Royal Society oversight, Hadley received a patent for his work, and soon dominated the market for reflecting octants in Europe and America. See Silvio Bedini, *Thinkers and Tinkers: Early American Men of Science* (New York, 1975), 118-123.

longitudes in degrees from Greenwich.[39] From these pieces of information, a navigator could determine a rough idea of the ship's position, set and drift, and most importantly, when to begin soundings. An exercise book from 1806 required students to calculate similar information.[40] In neither case did navigators use lunar distance calculations for their daily positions.

Consequently, New England mariners relied upon practical and relatively simple navigational methods in conducting their voyages. Dead reckoning, an ancient and crude technique, figured largely in their work. Position fixes by dead reckoning relied on the simple compilation of how far and in what direction the ship traveled over a period of time. This information was transferred hourly onto a specially designed board or a framed piece of slate. Before charting the ship's position on a chart, the few masters who knew how applied some basic spherical trigonometry to these notes to correct for the earth's curvature. The resultant distance and direct run for the day was tacked onto the previous day's position, and from that, a master could estimate the vessel's longitude.

Masters also took daily sun sights when the sun approached the highest point in the sky (called local apparent noon) to get an independent determination of latitude. As the sun approached local apparent noon, the navigator would observe the angular distance between the sun and the horizon with a Davis quadrant. With the aid of an almanac, the navigator could correct the observed altitude for index error, dip, and refraction, and make a few simple calculations to determine the ship's latitude. The resulting figure,

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[39] Log of the Sloop Peggy, Schooner Success, Privateering Log, October, 1778 to January, 1779. Peabody Essex Museum LOG 1778S, Salem, Massachusetts.

[40] Student Exercise Log Book, LOG1795₂ (B24) (Peabody Essex Museum, Salem, Mass.).

combined with the estimated longitude from the dead reckoning provided the ship's approximate position.

Maintaining as accurate a position as possible helped masters approach coastlines and islands, but they rarely relied solely upon their calculated positions as they came onto a coast. With only rough position calculations, masters could not rely upon their charted positions to guarantee that they had made the landfall expected or were clear of any coastal dangers. As a vessel approached the coastline, masters had the crew begin soundings using a lead and line. This tallow-tipped lead weight attached to a known length of line gave masters not only depths, but also types of bottom, which, when compared to the ship's calculated position and to charts or personal notes, offered more information on the ship's actual position.

Using these methods, masters not only navigated their ships, but also drew up their own sailing directions and drafted their own charts of the New England coast. These were then exchanged with colleagues by either copying notes into log books, or by word of mouth. The log of the brigantine *Duke* from 1748 provides a good example of these practices. The keeper of this log recorded directions for sailing from North America to Whitehaven in the northwest of England and then to the Orkneys, giving courses and distances for important way marks. Because the directions fall in a neat sequence at the beginning of the journal, this master most likely copied these notes from another master or from a set of sailing directions owned by a colleague that would provide similar information. In either case, this mariner relied upon his peers as sources of information when no others were to be had.[41]

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[41] Brigantine *Duke*, "Shipping Logbook," Apr. to Sept. 1748, LOG 1748 D (Peabody Essex Museum, Salem, Mass.).

New England masters' retention of older methods in the face of newer ones highlights a current misunderstanding within navigational history circles. Many authors, perhaps best represented by Dava Sobel, have implicitly assumed that newly developed technologies and methods immediately translated into changed practices.[42] Yet before new practices and technologies begin to affect the practice of a given craft, "practitioners" must retrain and develop new skills, tasks that busy working professionals rarely had the luxury to accomplish.

The ability to determine longitude was one of the most famous scientific problems for the eighteenth century. But practicing navigators, criss-crossing the Atlantic on a regular basis, did not necessarily agree that they needed to embrace new methods. The expenses incurred in retraining and purchasing new instruments—if available—offered little incentive to New England masters to change.

Unlike other centers of research in the New World in the mid-eighteenth century, the BMS did not model their society on Old World academies and formal centers of intellectual work. Rather, they adapted procedures from a variety of other Old World organizations that addressed specific issues. As an organization concerned with charity and the welfare of its members, the Marine Society borrowed features from Britain's Merchant Seamen's fund. Founded in 1747, the fund was created by Parliament to offer relief to poor and distressed mariners. Each port collected funds from common seamen's wages, pooling contributions that that specific port could give to "its" mariners. Unlike the Fellowship Club, and later the incorporated Marine Society, this fund was created

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[42] Dava Sobel, *Longitude: The True Story of a Genius Who Solved the Greatest Scientific Problem of His Time* (New York, 1995).

through Parliamentary legislation and carried with it a larger desire to protect mariners for future naval service in times of war.[43]

Trinity House, Britain's organization that maintained harbors and ensured safe navigation in the largest ports, also blended charity with port management, and consequently also appealed to Marine Society members as they defined their relationship to the port of Boston. Dating back to the reign of Henry VIII, Trinity House regulated and examined prospective pilots, maintained navigational markers, and managed the port's almshouses for mariners. They heard grievances from masters and mariners alike, and held power to judge these cases pending approval of the Lord Admiral.[44] In addition, Trinity House sponsored Christ's Hospital, a school founded in the 16th century for the instruction of mathematics and navigation. In blending charity and navigational research, the Marine Society took some elements from this British organization, and left out others. As a smaller port in the Atlantic basin, Boston lacked the shipping traffic that could support all the charitable and educational roles that Trinity House embraced. The Marine Society, could look to Trinity House for its focus upon the promotion of local navigational knowledge that helped shipping safely enter ports.

Organizing interested captains into collecting hydrographic data represents a technical innovation that reflected members' responses to their unique colonial setting and needs for greater navigational knowledge. This process, too, was based upon European precedents and reflected other trends towards more systematic data collection. In learned societies and governments throughout Europe, more consistent data collection

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[43] "Collapse of a Contributory Pension Scheme," 91-104.

[44] Porter, *Unpathed Waters*, 71-73.

revolutionized scientific and social understanding. Beginning on the continent, monarchs began ordering more measurements of key national information such as birth rates and population censuses not just for the sake of knowledge but for more immediate, practical concerns of the state. As J.L. Heilbron has claimed, "This instrumentalism was a key ingredient of the quantifying spirit after 1760. Everywhere we see an increased emphasis on the practical uses of number and system."[45] Heilbron, unfortunately sees this trend only in governmental and institutional centers of research. The Marine Society's dedication to systematic data collection, recording, and analysis, on the other hand confirms Larry Stewart's contention that scientific principles went beyond the walls of learned institutions and created new centers of scientific authority in eighteenth century Britain. Speaking of Restoration London, Stewart argues "By the early eighteenth century, the market-place for natural philosophy implied the unification of the world of trade with that of Sprat, Defoe, and Newton. . . . Long-standing utilitarian objectives ensured that mathematical or experimental learning would not be the sole preserve of academicians."[46] Furthermore, as those ideas went beyond learned circles, new sources of authority such as the Marine Society developed accordingly. "Social authority would increasingly be founded on the doctrine of utility. The community of experimenters, the instrument makers, and self-styled engineers . . . , and the devotees of the public lectures, constructed a broad bottom for natural philosophy."[47]

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[45] J. L. Heilbron, "Introductory Essay," in *The Quantifying Spirit in the 18th Century*, ed. Tore Frängsmyr, J. L. Heilbron, and Robin E. Rider (Berkeley, 1990), 3.

[46] Larry Stewart, "Other Centres of Calculation, or, Where the Royal Society Didn't Count: Commerce, Coffee-Houses and Natural Philosophy in Early Modern London," *British Journal for the History of Science*, 32 (1999), 134 and 139.

[47] Larry Stewart, *The Rise of Public Science: Rhetoric, Technology, and Natural Philosophy in Newtonian Britain, 1660-1750* (Cambridge, 1992), 384.

One could easily add Marine Society navigators in colonial Boston to that population. The spread of ideas from the academy to the larger public should not be seen as a European phenomenon alone. In Boston's shipping community with a need for greater navigational knowledge, the Marine Society developed methods similar to those embraced by European rulers and ruled alike to systematically expand the information available to Boston captains.

The Marine Society developed new administrative methods to produce navigational information. As sharing observations was the first step in dramatically increasing public knowledge of the coasts, the Society required all members to submit their observations to an annually elected committee for evaluation and review. The clerk then recorded the observations in a central book that all members could consult. Unfortunately, this book has not survived but consistent referral to its management and maintenance, such as in September 1759, February 1761, and November 1775 suggests that records were kept. In addition, the Society voted the prominent members who had been elected previously to wait on the governor to form a committee to digest incoming data. The Society also disciplined members failing to make observations. In April 1755, the Committee of Observations were required to report at every monthly meeting whether they received observation from lately arrived members and present their information to the whole.[48] Members appear to have complied for a time but for no clear reason—perhaps laziness—they needed to be reminded of their obligations. In November 1758,

[48] BMS Records, April 1, 1755.

the society voted to fine members six pence for every month they had been on their voyage for failure to provide information.[49]

In September 1759, the Marine Society attempted to fill its public mandate for navigational data for the first time. Member Daniel McCarthy submitted for the Society's review a set of observations for Georges Banks, which the society accepted, recording them in the book of observations, and voting that the "observations be printed in each of the papers of public news as a public benefit and at the expense of the society's money."[50] Executing such intentions, however, proved more difficult. The same week that the Society voted McCarthy's observations to be published, Boston's newspapers overflowed with news celebrating British victories in Europe, Crown Point, New York, and on the high seas. Subsequent weeks further buried the Society's desired directions with accounts of the fall of Quebec, the last bastion of French Power in Canada.[51]

Despite this setback, the society determined to fulfil its mandate to publish navigational information. In February 1763, the Society hired John Leach as clerk to manage incoming data. For the previous seven years, Leach earned a significant living as a mathematics, navigation, and barrel guaging teacher for Boston residents. Leach most likely came to the Marine Society's attention through sixteen members whose children attended Leach's school.[52] When the members voted on his admission, they required that Leach would deliver good, processed data from their observations. They required that

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[49] BMS Records, Nov., 1758.

[50] BMS Records, Sept. 4, 1759.

[51] See *The Boston Evening Post*, *The Boston News-Letter and Post Boy*, and *The Boston Gazette*, Sept. - Nov., 1759.

[52] "Index of Names," John Leach Account Book, 1754-1760, H. H. Edes Collection; John Gilman to Mary Gilman, Nov. 4, 1754, A. Gilman Collection (Massachusetts Historical Society, Boston Mass.).

"he shall from time to time, as the society shall have occasion, record what remarks that shall be delivered to him by said society for that purpose, also to make all plans & views fair & clear in the Book, as from time to time shall be requested."[53] In addition, the Society exempted Leach from most of the monthly dues, and in exchange for the two dollar entrance charge, hired him to draw up a "plan of the Isles of Sable now in the Book of Records."[54]

Boston's growing trade with the rest of the British Empire created a set of conditions compelling Boston masters to organize. As Boston's increasing reliance upon the imperial carrying trade opened new opportunities for mercantile success, such opportunities also carried significant dangers. Eighteenth century Atlantic seafaring remained a dangerous occupation where natural disasters and political conflict on the high seas exacerbated economic uncertainties, leaving masters and their families precariously exposed to an unpredictable future. Furthermore, where Britain had a long tradition of offering support for its maritime population, such supports were not extended to the colonies. Consequently, the combination of increased seafaring within the Empire and the dearth of imperial support structures created a compelling incentive for Boston masters to organize into an organization that could best suit its members' needs.

British institutions shaped, but did not dictate, the Marine Society's ultimate organization. In designing their mutual aid society, members of the Marine Society borrowed from long-venerated and recent British institutions that addressed the needs of Britain's seafaring population. Yet such adaptations were not blind aping—in addition to

[53] BMS Records, February 3, 1761.

copying seamen's compensatory schemes and Trinity House's role in maintaining local port facilities, the Marine Society also embraced the need for navigational information for the New England coast that would help reduce the possibilities of shipwreck. Consequently, while British in inception and in design, the Marine Society emerged in the 1750s as a unique combination of mutual aid and navigational research geared towards stabilizing members' lives, improving the safety of trade, and streamlining that trade within the Empire.

The combination of mutual aid and navigational research may sound odd to modern readers. Shaped by the professionalization of the sciences and their breakdown into increasingly smaller disciplines, modern understandings of the scientific world have little room for such a clear combination of social concerns and scientific work. As will be discussed in the next chapter, however, research goals and organizations were far more flexible in the eighteenth century, and certainly in the eighteenth century American context, and the goals of mutual aid and increased knowledge of the coasts were easily accommodated therein.

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[54] BMS Records, February 3, 1761.

CHAPTER II

ESTABLISHING AUTHORITY IN NEW ENGLAND NAVIGATION AND SURVEYING

As the Boston Marine Society collected and presented navigational data to the community, they sought to use their work to access the patronage networks running between New England and London. As early as 1754, members of the Marine Society showed an interest in informing London centers of research about their interests and their work. Beginning in March, the society sought to tap into London patronage by sending a list of candidates to the Admiralty for the significant roles of port surveyors for Boston.[1] In cases when cargo arrived damaged, surveyors evaluated the cause, determining who was accountable. Merchandise poorly packaged would put the seller at fault and leaky vessels would leave the owner (or possibly the captain) responsible. More often, however, ship captains could be held liable for poorly stowed merchandise or merchandise damaged due to poor ship handling. If found accountable for damaged goods, captains and especially those partially invested in the cargo, faced financial hardship.

The Marine Society's list of possible surveyors performed three functions. Even though the King approved the Society's charter in April 1754, the letter officially informed the Admiralty that the Society existed and was willing to help manage the port

[1] BMS Records, April 15, 1754.

of Boston.[2] Secondly, it represented an attempt by the Society to use their members' status as senior captains to place their own people in key positions where members could better anticipate and affect litigation and financial responsibilities. And as Admiralty appointed port surveyors, the Boston Marine Society would establish direct links to London centers of patronage, that would, in turn, give the Marine Society greater influence and prestige in Boston.

These high aspirations came to nothing, for the Admiralty never replied to the Society's offer. With war in 1754, the admiralty had more important concerns to address, and Marine Society members faced significant challenges themselves as many members fell captive to French naval and privateering ships. Consequently, their efforts for recognition from London waned until after 1763. With peace, however, the Boston Marine Society seized new opportunities to make significant connections with London agents.

The French and Indian War had radically changed the environment in which the Marine Society sought support for their work. In London, the war showed several high-ranking British officers and colonial agents the importance of accurate knowledge of British colonial possessions for defense, control, and commercial development. Beginning in the early 1760s, a series of London agents began systematic land and coastal surveys under the auspices of the Board of Trade, but the Admiralty lacked interest. Setting up well funded operations, the Board of Trade sent Samuel Holland to begin surveying Saint John's Island (now Prince Edward Island) and Nova Scotia, and his

[2] BMS Records, April 15, 1754.

counterpart for the southern department, William DeBrahm, began surveying Georgia and Florida around 1764.

The Admiralty, however, was late to see the importance of accurate surveys of American possessions. North Atlantic commanders Captain Richard Spry, and then his successor, British Commodore Alexander, Lord Colville, both vigorously lobbied the Admiralty for support for coastal surveys after the French and Indian War. With the French removed from Canada, however, the Lords of the Admiralty saw little reason to spend government funds on surveys that had little or no strategic value. Only with reluctance did the Admiralty allow Colville some funds that allowed J. F. W. DesBarres, an army officer trained in surveying techniques, to begin a systematic survey of the Nova Scotian and New England coastlines. Even then, and despite the obvious benefits to be gained from this work, the Admiralty repeatedly choked-off funding throughout the ten-year project, often forcing DesBarres to exhaust his own personal resources for the project.[3]

For the Marine Society, London's new interest in coastal surveying in the 1760s meant that well-connected agents interested in similar subjects would be working close at hand. Hoping proximity could lead to opportunities and valuable personal ties, the Marine Society attempted to make connections with British representatives operating in their area. In January, 1763, the Marine Society encouraged member Hector McNeill to use his prior introduction to Colville, then based in Halifax, Nova Scotia, to secure Admiralty funds for a chart of the Bay of Fundy.[4] Like Cyprian Southack before him,

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[3] G. N. D. Evans, *Uncommon Obdurate: The Several Public Careers of J. F. W. DesBarres* (Toronto, 1969), 9-26.

[4] This chart does not seem to have survived.

McNeill had drafted his own personal chart of those waters while captaining a trading ship in the late 1740s and 1750s. In 1755, he had used this chart to convey General Monckton's forces against the French at Beaussejour. The general found the chart so useful that he asked McNeill for a copy of it, and encouraged him to publish it. Later that year, however, McNeill fell captive to Indians, and lost the opportunity to pursue the project.[5]

In presenting his case to Colville in 1763, McNeill attested to the "truth and exactness" of his chart based on his years of sea time in the region. "[I]n the course of so long experience [I] was enabl'd to make an exact draught of the coast Extend'g to the North'd and East'd from Cape Cod to the most distant part of the Bay of Funday [*sic*]." For McNeill, such a project had a greater historical significance than merely increasing knowledge of the coasts.

> There is no error of however little consequence that's in our power to Remedy—but what I think also a duty incumbant on us and due Posterity; when therefore 'tis considered that no man, has yet so much as lay'd the foundation, of a True and Exact chart of this Coast—I am ambitious of the opportunity and willing to make the first Esay [and am] content to Risque the success of my undertakings upon being able to prove the Truth and Exactness of it.[6]

Given the struggles Colville experienced in securing funding for DesBarres' work, McNeill's gambit touched a sore nerve. In February, Colville sent a curt note explaining that while he saw the idea "a laudable undertaking," he was also "not

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[5] Hector McNeill to Lord Colville, Jan. 17, 1763, Boston Marine Society Collection (Massachusetts Historical Society, Boston Mass.).

[6] Hector McNeill to Lord Colville, Jan. 17, 1763, Boston Marine Society Collection.

authorized to put the government to any expense on that account; therefore cannot promise to assist you . . ."[7]

Snubbed by Colville, the Marine Society turned its attention to DesBarres himself. In June, 1764, members unanimously agreed to "Vote the compliments of this society to J F William [*sic*] DesBarres, Esqr His Majesty's Engineer at Halifax [and] to assist him with all the knowledge of the coast that we know."[8] Two months later, when no reply had arrived, the Society tried again. This time they appointed four of the most prominent members to write a more personal letter to DesBarres extending their services. To sweeten the deal, the society exercised one of their little used by-laws, and voted DesBarres one of their first honorary members. As with the Admiralty in 1754, however, DesBarres never replied: not to the offer of aid, nor to the honorary membership. DesBarres was well known as a stubborn, proud and compulsive worker, and this may explain some of his silence. Whatever the explanation, however, neither the Admiralty, Colville, nor DesBarres held any interest in the overtures of a group of colonial captains in Boston, regardless of their experience.

Three times the Boston Marine Society attempted to make their interest, talents, and resources available to London agents, and in all three attempts, British surveyors and officers curtly declined their offers or ignored them altogether. Several reasons explain why the society failed to, or was prevented from, tapping into patronage networks centered in London. Most significant was the structure of British-American relationships immediately following the French and Indian War. Recent scholarship into questions of

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[7] Lord Colville to Hector McNeill, Feb. 27, 1765, Hector McNeill Papers (Massachusetts Historical Society, Boston, Mass.).

[8] BMS Records, June 5, 1764.

trans-Atlantic identity suggests that while Americans were feeling more proud about being members of the British Empire, and proud that their society was beginning to more fully replicate the refinement, elevation and taste of the mother country, British sentiments did not follow suit.[9] As Richard Bushman has pointed out, the structure of British patronage did not translate well into colonial American society. "From an eighteenth-century perspective, the most notable fact about provincial Massachusetts society was the weakness of the dependency networks in the lower reaches." While upper levels of government were clearly aligned with political agents in London, below the level of royal appointees, "the ties of superior to inferior were frail and thin. Too large a population of Massachusetts families owned land and too few held offices or received substantial favors from their social superiors for unpopular measures coming from the top to be respected at the bottom of society."[10] For the Marine Society, the limited routes to political patronage formed significant obstacles to the recognition they sought.

Other colonial researchers faced similar barriers to London recognition. Within the halls of the academies and learned societies in eighteenth century Britain, most Americans participated as data gatherers only, with analysis and interpretation retained in London.[11] As work by George Daniels, Brooke Hindle, Dirk Struik, I. B. Cohen and

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[9] For works dealing with larger questions of social and cultural development, see Richard Bushman, *The Refinement of America: Persons, Houses, Cities* (New York, 1992); T. H. Breen, "An Empire of Goods: The Anglicization of Colonial America, 1690-1776," in *Colonial America: Essays in Politics and Social Development*, Fourth Edition, ed. Stanley N. Katz, John M. Murrin, and Douglas Greenberg (New York, 1993), 367-397; and John Brewer, *Party Ideology and Popular Politics at the Accession of George III* (Cambridge, 1976).

[10] Richard Bushman, *King and People in Provincial Massachusetts* (Chapel Hill, 1985), p. 246.

[11] See George F. Frick, "The Royal Society in America," and A. Hunter Dupree, "The National Pattern of American Learned Societies, 1769-1863," in, *The Pursuit of Knowledge in the Early American Republic:*

Harry Woolf demonstrate, Americans with close ties to the British investigators—John Winthrop, Peter Collinson, David Rittenhouse, and Alexander Garden, to name only a few—contributed more observations than analysis to British scientific energies in the eighteenth century.[12] Few Americans, and only those interested in natural history, botany, or astronomical observations, received the honor to have a communication published by the Royal Society or to have their work supported by prominent members within the scientific community in London.[13]

Unlike colonial French science with a centralized bureaucracy for maps and charts, the responsibility for surveying Britain and her colonies fell upon several agencies.[14] Trinity House, for example, still retained a mandate from Henry VIII and James II directing them to survey the shores and to keep that information secret for national defense. In spite of this restriction, English and Dutch mapmakers in the late seventeenth century enjoyed great commercial success. First relying upon copied Dutch charts and "waggoners" during the middle seventeenth century, British mariners later could select from a variety of English manuscript and published sources, all of which

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American Scientific and Learned Societies from Colonial Times to the Civil War, ed. Alexandra Oleson, and Sanborn C. Brown (Baltimore, 1976), 70-83 and 21-32.

[12] See George H. Daniels, *Science in American Society: A Social History* (New York, 1971); Brooke Hindle *The Pursuit of Science in Revolutionary America, 1735-1789* (Chapel Hill, 1956); Dirk Struik, *Yankee Science in the Making* (Boston, 1948); I. B. Cohen, *Science and the Founding Fathers: Science in the Political Thought of Jefferson, Franklin, Adams, and Madison* (New York, 1995); and Harry Woolf, *The Transits of Venus: A Study of Eighteenth Century Science* (Princeton, 1959) for a sampling of this type of analysis.

[13] Daniels, *Science in American Society*, 3-4, 51-52, 63, and 128. See also Andrea Rusnock "Correspondence networks and the Royal Society, 1700-1750," *The British Journal for the History of Science*, 32 (1999), 155-169; Raymond P. Stearns, "Colonial Fellows of the Royal Society of London, 1661-1788," *William and Mary Quarterly*, Third Series, 3 (1946), 208-268.

[14] James E. McClellan III, *Colonialism and Science: Saint Domingue and the Old Regime* (Baltimore, 1992), 117-127.

plotted out in detail approaches to English coastlines and harbors.[15] The Admiralty and the Royal Society also shared interests in promoting surveys of British coastlines. The Royal Society, under Edmund Halley, undertook expeditions designed to improve surveying techniques at the same time as the Admiralty funded, with very mixed results, individuals like Grenville Collins who surveyed home waters.

Britain's decentralized approach to surveying home waters only highlighted enterprising efforts by individuals in the colonies who took on surveys with little institutional help. Southack, for example, received royal acknowledgement for his surveying work in 1694 and in 1710, and stood as one of the few solid efforts at a coastal survey in New England until 1764. Despite royal acclaim, however, Southack's work was not lauded by later cartographers. John Green, for example, accused Southack of never using any instruments other than log and compass, nor ever taking a latitude. William Douglass, a respected Boston surveyor in the 1750s, called Southack's *New England Coasting Pilot* a chart of "continued error" and "random performance" that "ought to be publickly advertised as such and destroy'd wherever it is found among sea charts."[16] With Southack's work in disfavor, and with no coherent scheme for funding coastal surveys in Britain, let alone the colonies, it was almost impossible for the Marine Society to secure support from London for navigational research.

Eventually the Marine Society found local colonial officials more interested in their talents than British imperial officials. At first, local colonial officials gave the

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[15] Thomas R. Smith, "Manuscript and Printed Sea Charts in Seventeenth Century London: The Case of the Thames School," in *The Compleat Plattmaker: Essays on Chart, Map, and Globe Making in England in the Seventeenth and Eighteenth Centuries*, ed. Norman Thrower (Berkeley, 1978), 45-100.

[16] Clara Egli LeGear, "The New England Coasting Pilot of Cyprian Southack," *Imago Mundi*, 11 (1954), 137-144. William Douglass, *Summary, historical and political . . .of the British Settlement in North America* (Boston, 1749), 362, as in LeGear, p. 141.

Marine Society similar responses as their London colleagues. In January 1765, a committee of four, along with the lawyer Jonathan Gridley who was elected a member to aid the society in legal matters, unsuccessfully petitioned the Massachusetts General Court for the permission to build a lighthouse on Nantucket Island.[17] Undeterred, the society furthered its own research goals in December1766 when Job Prince offered to the society the use of his vessel "to go on survey" for two months free of charge. The society accepted the offer and agreed to send her in May 1767.[18]

In 1768, the society received the official patronage it had sought since its incorporation the previous decade. Plans for construction of a new lighthouse at Plymouth, provided the opportunity. The Massachusetts General Court approached the Society in July to survey the harbor. In addition, the survey would revise and correct the brief instructions given in *The English Pilot: The Fourth Book* from 1698. When the General Court approached the Marine Society, the members of the society recognized the importance of this request. In exchange for this recognition by colonial government, the society voted to cover the costs of the survey should the General Court fail.[19] At first the society appointed Job Prince, Moses Bennett, Thomas Allen and William Vernon to the lead in the project, but the committee changed to Bennett, William Rhodes, Thomas Allen and Nathaniel Green by the time the work was done.

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[17] BMS Records, Jan. 1, 1765.

[18] BMS Records, Dec. 2, 1766. While the society accepted the offer and thanked Prince for his gift, there is no record of what they actually surveyed. It is possible that the Marine Society used Prince's vessel for their Plymouth Survey of the following year, yet the expenses incurred suggest that a boat was hired for that purpose in 1768. See below.

[19] BMS Records, July 5, 1768. As it turned out, the colonial government did indeed fail to cover the expenses of the survey. The Marine Society haggled with the government without results for reimbursement for funds laid out for the survey up until the Revolution.

Bennett's survey of Plymouth represented a marked improvement over the brief overview provided by *The Fourth Book*, which only offered masters a short paragraph describing Plymouth and some of its dangers to ships (see Appendix A). The dated publication also situated Plymouth as lying "Seven Leagues exactly West from the Point of Cape Cod," identifying the harbor entrance as "known by a round Hammock of Land, lying on the North-side, called the Gurnet, and on the South-side a high double Land, called the Monument Land."[20]

In addition to fixing Plymouth's position relative to the new lighthouse, Bennett and his research team went further. They identified rocks and shoals presenting dangers, and offered more detailed information on bearings and courses for other harbors nearby. The most significant improvements appeared in the directions for sailing through the sand flats to Plymouth itself. *The Fourth Book* stated that "you must sail by the Gurnet-Land, which is the Chanel-side, for the Bay from the Monument-Land three-quarters over is exceeding bad, Shoal, and Quick-sand, dry in divers places; but nearest the Gurnet is a fair sailing Channel."[21] Bennett, however, offered more precise directions that were more useful to a sailing master navigating a ship.

> When you bring Saquash Head to bear W by N, you may then steer up W by S, and if you are bound for Plymouth, you must keep that Course for a large red Cliff on the Main, which is a very good Mark to carry you clear of Dick's Flat; then you must steer more Southerly for Hatch Point, or run up untill you are abreast of Saquash Head, giving it a Quarter mile Distance; then steer W by S ½ S. which will clear you of Dick's Flat, and carry you directly for Reach Point, keeping within 15 or 20 Yards of the Sandy Point, steering away to the South-ward, keeping that Distance untill you have shut in the Lights, where you may anchor in 3 or 4 Fathoms, but the Channel is very narrow, having nothing but a

[20] *The English Pilot: The Fourth Book* (London, 1698), 20.

[21] *The Fourth Book*, 20.

> Flat all the Way to Plymouth, except for this small Channel which runs close by this Neck of Land, you will have 4 and 5 Fathoms close to this point.[22]

Bennett's directions also gave directions for vessels bound for Plymouth's Cowyard or to the town, and for vessels approaching from the northward, such as from Boston.

Bennett's work differed from *The Fourth Book*'s description not just in questions of detail, but also in practical use for masters navigating ships. From a navigator's perspective, Bennett removed a step in the navigating process. In most vessels, the master often doubled as navigator, translating his calculations and estimations into courses for the helmsman to steer. While the helmsman steered by a compass permanently fixed to the deck near the wheel or tiller, the master estimated distances from the vessel's speed, ascertained by throwing a chip-log over the side and counting the time needed for a known length of line to run out.

Using *The Fourth Book*, navigators had to translate the coastline as it was described into courses, distances run, and distances off the land, hoping that their estimations from the directions and their own soundings would keep them safe. Bennett, on the other hand, described a clear path to follow. If the navigator picked up the path as first described by Bennett, say from Saquash Head bearing W by N, he could then know ahead of time what courses he needed to steer and distances to keep. Navigators still needed to keep the ship clear of dangers. Yet Bennett's survey simplified the process by which an image of a coastline, either in words or in drawings, could be translated into a vessel safely coming to anchor in a harbor.

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[22] *Directions for Sailing in an out of Plymouth Harbor; Taken by Moses Bennett, William Rhodes, Thomas Allen, and Nathaniel Green . . . . In July, 1768* (1768; Boston, 1785).

Like Southack, and in spite of the later condemnation that fell upon his work, Bennett and his team followed older traditions in surveying Plymouth that had been used by merchant captains and pilots for at least two hundred years.[23] These traditions placed functionality—safely conducting a vessel into port—over comprehensiveness—providing a comprehensive picture of the entire ocean floor and coastline. While no manuscript charts produced by Boston Marine Society members from this time remain, Nicholas Shapely's 1662 chart from Cape Fear in North Carolina provided much of the same information that Marine Society members would need 50 years later (Figure 1).[24]

As Shapley's work demonstrates, charts produced by working captains emphasized taking data—in this case depth soundings—only around points that might impede a ship's progress. Other areas, off the ship's course track or known to have sufficient water for safe passage, were left alone. The few soundings they did take were taken along the shore and around areas such as rocks and promontories that were likely to threaten their ship's progress. Latitudes, easily determined even in the late seventeenth century, appeared only rarely. For a coasting craft, working along a coast long familiar to an experienced captain, such numerical information carried less importance than his own knowledge.

In their Plymouth survey, Bennett and his Marine Society colleagues likely

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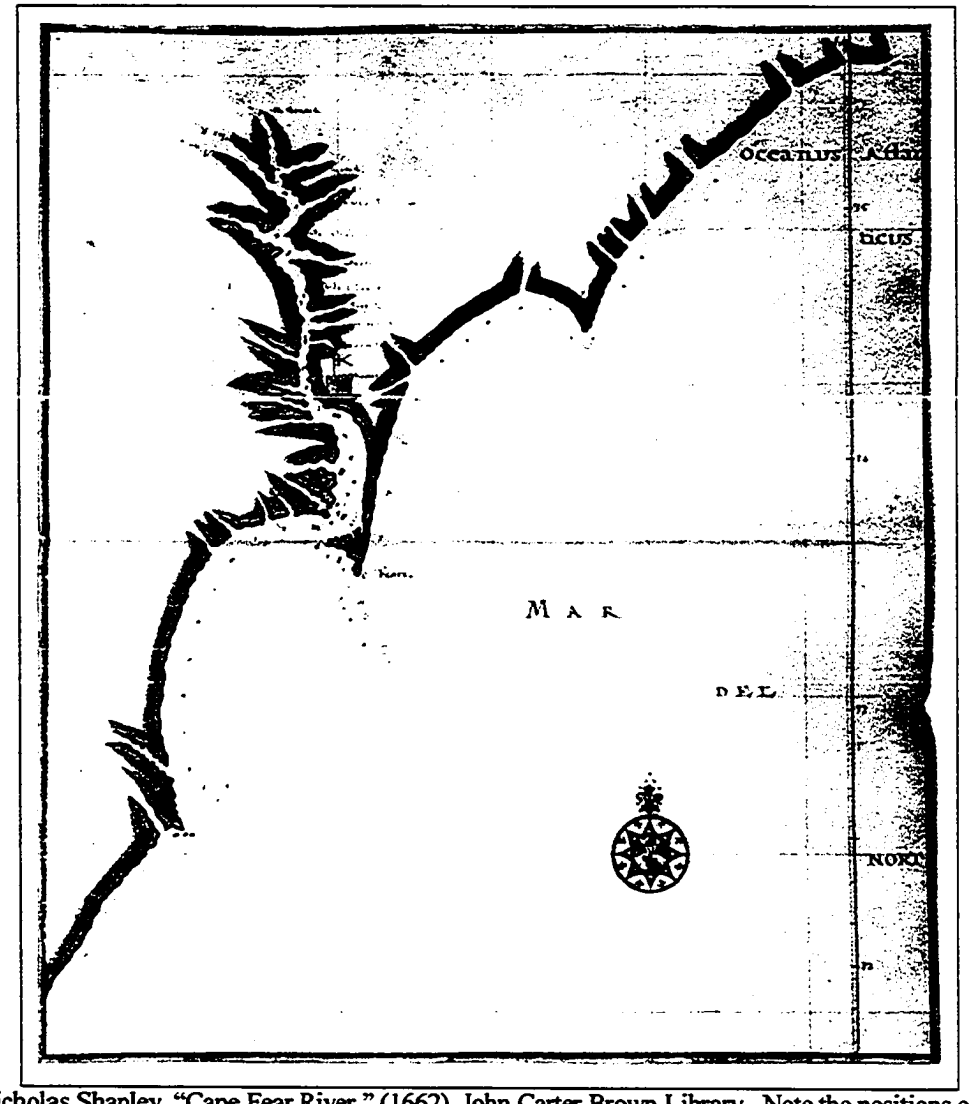
[23] Had Southack limited his surveys to just shipping lanes and areas of navigational importance, perhaps he would not have received such criticism. Yet in expanding to present not just a functional chart, but rather a comprehensive chart, Southack opened himself and his work up to the derision Douglass and Green heaped upon him.

[24] One of the reasons why no Marine Society manuscript charts exist is that they were used for hard service at sea, an environment hostile to the preservation manuscript materials. For a discussion of the challenges to the survival of manuscript charts, see Thomas R. Smith, "Manuscript and Printed Sea Charts," 76-77.

Figure 1: Nicholas Shapley, "Cape Fear River," 1662.



Nicholas Shapley, "Cape Fear River," (1662), John Carter Brown Library. Note the positions of soundings close to shore and surrounding Cape Fear, areas where masters would be most concerned with depths. Offshore areas, where it was safer to assume sufficient water depths received less attention. Courtesy of the John Carter Brown Library at Brown University.

adapted a method called the running traverse to collect their data (Figure 2). This method allowed navigators to record data quickly and efficiently, as William Bourne described in *A Regiment for the Sea* in 1577:

> In running along the coast, when you see the appearance of any land one before another, set them with your compasses, and looke how they beare from you, by what point of the compasse and so shall you know justly, howe the one lande doth beare or lye from the other. And by this you may correct your plats, by

> doing this, as often as you see you may know the distance in like manner betweene them, if you know your ships way and this when you first see any two places together as two headlands or two landes, having set them with your compasse and knowing howe the one beareth from the other, then, for that you will not come nearer unto them.[25]

This method relied upon the vocational practices, skills, and instruments commonly used in day to day ship operation. It was also well suited to record data during a commercial voyage where the safe and speedy delivery of cargo from one port to the next, and not the exploration of the coasts, remained the main goal of the ship. As the ship itself had to be navigated as precisely as possible, captains used their cruise track as a baseline for their other observations. To get data, masters did not have to stop their voyage, but rather made observations while underway in the course of the normal ship's run. Masters and navigators recorded the positions of rocks, promontories and other features by comparing the compass bearing of the object in question to the ship's cruise track as it cruised along the coast. Nor did captains need to learn more complicated mathematical skills or theoretical training than they currently used to navigate. The running traverse required no special instruments beyond a ship's compass nor special training beyond that required for conventional navigation. This method also addressed, or at least put to rest, questions of reliability and accuracy by relying upon the observer's reputation as a navigator and captain within his community. The accuracy of information collected by a respected captain was backed up by his personal reputation: A well-respected captain produced more reliable results, while less known masters were likely to have their results questioned or ignored altogether. Without any other means to ascertain

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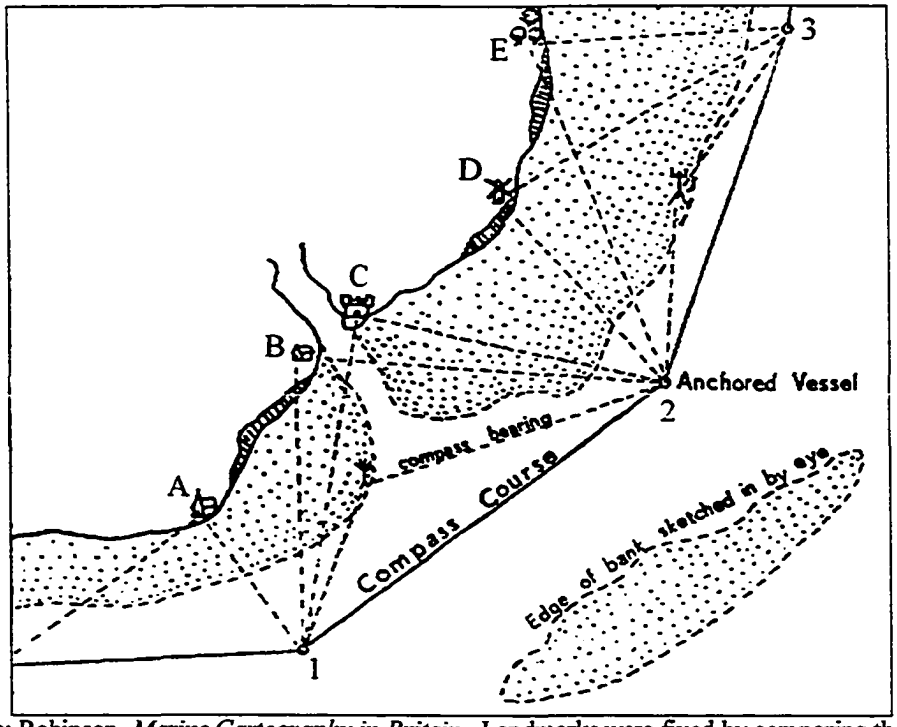
[25] William Bourne, *A Regiment for the Sea* (London, 1577), as in A. H. W. Robinson, *Marine Cartography in Britain* (Leicester, 1962), 47.

Figure 2: The Running Traverse.



Source: Robinson, *Marine Cartography in Britain.* Landmarks were fixed by comparing the line of position of the headland to the known ship's position along a course track. For example, the position of the landmark at point A was determined by taking the compass bearing of the mark from the ship at points 1 and 2. These lines of position were then compared to the ships dead reckoning fix to determine the position of the mark itself. To further verify positions, compass bearing of other landmarks B, C, D, E, were taken while at anchor to establish the position of each in relation each other, and to points 2 and 3 along the vessels course track.

accuracy, a navigator's social standing sufficed as some means to evaluate navigational data. Without time for dedicated surveys, the complex training required for scholarly methods, and the resources for expensive instrumentation, merchant captains used the running traverse to produce reasonably accurate results.

In relying upon older methods adopted from ship-board practices, Bennett and his colleagues differed from trained British surveyors working in North America at the same time. DesBarres and his research team, for example, were trained in a mathematically complex and theoretically founded "academic" approach of coastal surveying that relied heavily upon cutting edge instrumentation. In contrast with the Marine Society's

vocational method that was only concerned with safe navigation of ships, DesBarres and his team sought accurate and comprehensive representations of the entire coastline, accurately reproducing shapes on a page that existed in nature. Rather than describing how to avoid dangers to shipping, they wanted to identify all potential dangers, havens and unique features.

Almost all of the advances in surveying theory, methodology and instrumentation took place in a Britain only just beginning to address systematic coastal surveys. Before the second half of the eighteenth century, and for a considerable time after that, coastal surveys were undertaken by interested enthusiasts, and produced only questionable results. Only seventy years earlier, Greenville Collins published *Great Britain's Coasting Pilot* (1688)—the first systematic coastal survey taken in British home waters. Despite his use of such scholarly treatises as John Love's *Geodesia, or the Art of Surveying* (1688), the work faced scathing condemnation from Robert Hooke of the Royal Society and Samuel Pepys in the Admiralty.[26]

In the course of the eighteenth century, methods improved through the attention given surveying by renowned astronomers and independently-funded enthusiasts. In 1701, Edmund Halley used mathematical theories of resection developed by John Collins to improve surveying techniques. In a letter to Sir Robert Southwell, he recommended that

> In order to this Survey of a Sea Coast and to lay down truly the shoals and dangers near it, if the land be accessible the best way will be to take with all possible care the true positions of as many remarkable objects such as Steeples, Mills, Rocks, Cliffs, Promentorys, or such like as you find most conspicuous along the Coast, that is their true bearings from one another in respect of the true North and South; which is best done by measuring the angle with any proper

[26] Robinson, *Marine Cartography in Britain*, 53-55.

> instrument, from the rising or setting sun, allowing his amplitude and according to the exactness of these angles will your survey be more or less true. I prefer this method of taking these angles by the Sunn rather than by the Compass or magneticall needle, because of the smalness of the radius of the Magneticall Chart (i.e. [compass] card) and the authenticity of the variation on the Land, the needle being affected with the neighborhood of Iron Oars and Mineralls.
>
> This done you may readily plott down all those objects on the Land, by any view of them from a vessell riding at Anchor off at Sea; for if you take their true position from your Shipp, by the help of the rising or setting Sunn as before, the intersections of those lines with those of the positions of the objects to one another, will give you the places and proportionall distances of the sd Objects one from another, to which afterwards a scale may be adapted, as shall be taught by and by.[27]

Halley made the convergence of mathematical theory and field-work sound deceptively simple: his method required tremendous resources in time, money and instrumentation, and required that surveyors establish observation points on shore. This method promised the most accurate image of a coast. The trade-off, however, was it required complex mathematical calculations and instruments that few outside the academy possessed. Consequently, while more precise, Halley's method was of little use to colonials who lacked the instrumentation, the specific mathematical skills, and the sources of funding that such an exhaustive—but accurate—survey required.

Forty years later, in 1742, Murdoch Mackenzie modified this complex system in his own survey of the Orkney Islands. Rather than basing all measurements on individual observations, each relying upon the accuracy of prior ones, Mackenzie instead based his "Orometric" method on a well-defined base line that he measured over a frozen lake using a magnetic compass. From this

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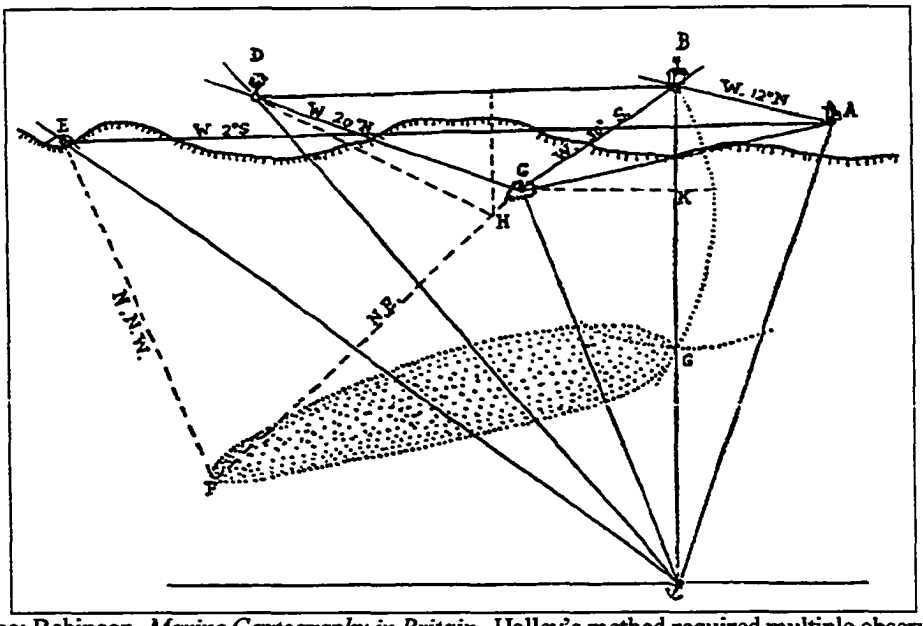
[27] Robinson, *Marine Cartography in Britain*, p. 55.

Figure 3: Halley's Surveying Methods.



Source: Robinson, *Marine Cartography in Britain.* Halley's method required multiple observation stations, each using complex instruments to take amplitudes that accurately determined the true bearings of landmarks. While more accurate than the running traverse, these methods were time consuming, required costly equipment, and could not effectively cover more than a very small area.

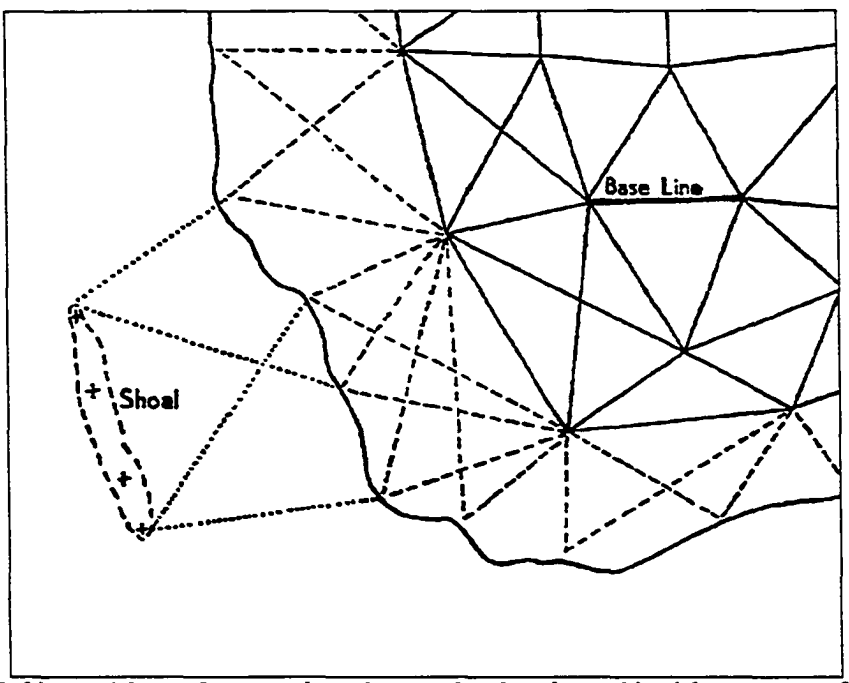
baseline, he then used a theodolite and a plane-table to take bearings on markers placed on prominent headlands, promontories, and distinct geographical features. A theodolite was an instrument used to measure vertical and horizontal angles simultaneously. A plane table fixed prominent features by comparing their relative angles from a variety of vantagepoints. With the shape of the land determined, he then took bearings for bays, headlands and landmarks on the coast that he fixed with rays. A rented shallow draft boat stood in and out from the shore taking soundings and defined features based on previously fixed headlands, and recorded tides and tidal streams.[28]

[28]Robinson, *Marine Cartography in Britain*, 61-62.

This method removed multiplying errors: a slight error early in Halley's method would be carried through, and possibly exaggerated, into all subsequent measurements. In Mackenzie's own words,

> By this way of surveying a coast, when the foundation is carefully laid, the errors which all the fore-mentioned methods are liable to, are in a great measure guarded against: for the error or inaccuracy of any one distance or angles is not communicated to the rest, but confined to that distance or angle alone, or perhaps to an adjacent side or two besides, which are not of great consequence in the draught, nor affect the positions of other charts . . .Though by this method, an extensive survey may be carried out with more accuracy than by any of those before mentioned, yet it has seldom been put into practice.[29]

Figure 4: Mackenzie's Orometric Method.



Source: Robinson, *Marine Cartography in Britain.* Mackenzie combined the accuracy of Halley's work with the speed of the running traverse by accurately measuring a single baseline, and from there, triangulate the positions of landmarks and coastal features. This way, he was able to cover more area without sacrificing accuracy.

Mackenzie's methods formed the base for DesBarres' work along the New England and Nova Scotian coastline, and also became the method by which DesBarres

[29] Murdoch Mackenzie, *Treatise on Maritim* [sic] *Surveying* (1774), xxi, as in Robinson, 63.

trained his assistants.[30] Aided by interested naval officers, DesBarres had the governmental and personal resources of time, money and instrumentation to train newcomers in the surveying principles laid down by Mackenzie. Despite the advances in the field, however, even DesBarres resorted to older, more hands-on methods when triangulation methods proved unusable or unreliable. Where DesBarres had great difficulty in measuring a distance along shore using visual means, he

> soaked a dipsey [deep sea] line in salt water, till it was fully imbibed, and then stretched and rubbed it taught, and with an iron chain, measured 100 fathoms of it, with marks at every 10 fathoms. Just before the change of the tide, on a calm day, I fixed one end of this 100 fathom line to a station on Point Bulkely and, with the other end . . .made its end fast with a grapnell, and let it run on the ground.[31]

It was far from clear that newer, more academically informed methods improving hydrographic surveying would come to replace older methods as used by Southack and the Marine Society.

In fact, it is far from clear that Halley's and MacKenzie's methods offered much to colonial surveyors at all. Vocational and academic methods differed in two crucial aspects: time and money. Accuracy in surveying translated immediately into higher costs stemming from longer periods in the field and longer periods processing the data in the drawing room. Despite his compulsive drive, DesBarres and his team of assistants, at times numbering twenty or more, took ten years to survey and publish charts for Nova Scotia and New England. While it is difficult to estimate the cost of DesBarres' final work, *The Atlantic Neptune*, Lewis Morris' survey of the Welsh coast provides some

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[30] G. N. D. Evans, *Uncommon Obdurate: The Several Public Careers of J. F. W. DesBarres* (Toronto, 1969), 15.

[31] DesBarres to Colville, 27 May 1765, as reprinted in G. N. D. Evans, "Hydrography: A Note on Eighteenth Century Methods," *Mariners Mirror*, 52 (1966), 247-250.

context. It cost the admiralty £444 17s 6d twenty years earlier.[32] In contrast, vocational methods, while less accurate, could suffice, with little or no financial impact. Beginning in July, 1768, Bennett and his Marine Society colleagues completed their surveys of Plymouth Harbor by December with a total cost of £13 15s 3d.

Differences between the Marine Society's vocational approach to surveying and the more academic school represent two competing visions of the value and intent of surveying. Bennett's survey emphasized speed, vocational utility and local use. DesBarres focused on theoretical soundness, accuracy, and catered to London viewers more concerned with the precision of the survey than its application. Furthermore, DesBarres and his team produced some of the best work that formal surveying and training had produced up to that point. Rather than relying upon older vocational traditions of surveying, DesBarres came to his project from academic roots that placed complex theory, mathematics and cutting edge instrumentation at the heart of accuracy and data validation. Not satisfied with functional goals of safe navigation, DesBarres sought to record a comprehensive image of the coast. Furthermore, the validity of his work rested not on his experience as a navigator, but rather on his experience as a surveyor. The trade-off, however, was time and financial cost.[33]

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[32] Because DesBarres and Holland worked together on the *Neptune*, one with Admiralty support, and one with support from the Board of Trade, it is difficult to determine the final costs. DesBarres' biographer Evans characterized the accounting side of the Atlantic Neptune as "tangled." See Evans, *Uncommon Obdurate*, 12. Robinson, *Marine Cartography in Britain*, 77. The actual breakdown is as follows:

Five men's salaries at £20 per annum	£100	0	0
A mate	£30	0	0
Provisions etc. for seven	£102	7	6
Yearly repairs to ye vessel at 30sh. a ton	£30	0	0
Surveyor's salary at 10sh. a day	£182	10	0
	£444	17sh.	6d.

[33] Bennett's work reveals important parallels between British and American surveying, and British experiences in India. As Kapil Raj and C. A. Bayly have pointed out, British attempts at surveying their other colonies in India relied heavily upon local guides and informants, who, throughout the eighteenth

The Plymouth Harbor survey helped the Marine Society assume a position of authority over navigational publications in New England. Performed under government request, the survey allowed the Marine Society to demonstrate to other mariners that they enjoyed the support of the Massachusetts General Court in producing navigational work. The importance of the Marine Society's survey is borne out by the fact that the Plymouth directions were re-published at least once more, in 1785. More importantly, however, it announced to those interested in American navigation that there was a group in New England as interested, or perhaps more so, in promoting navigational research as learned societies and governmental agencies in Britain.

Bernard Romans acknowledged the Marine Society's scientific authority when he submitted, *A Concise Natural History of East and West Florida* (New York, 1774) for their review and evaluation (Appendices C and D). Beginning as an assistant to William DeBrahms' surveys in Georgia and Florida in the 1760s and 1770s, Romans left Board of Trade service for New York in the 1770s to publish his study of the southern peninsula.[34] By late 1773, Romans was in Boston. On January 3, 1774 he published a lengthy

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century, operated parallel knowledge and information systems that British agents sometimes suppressed and sometimes exploited for their own purposes. When British agents used them, often the reputation of the indigenous informant or assistant formed one of the few foundations on which to evaluate their reliability. Bennett's methods indicate that in North America, too, parallel knowledge systems operated that used different means to produce locally valuable natural knowledge. Like knowledge systems in India, the quality of the data produced depended upon the reputation of the observer. Yet, unlike in India after 1780, British surveyors refused to tap into these sources. As Matthew Edney points out, the British used science to differentiate themselves not only from the colonials, but from lower class British subjects as well. Kapil Raj, "Colonial Encounters and the Forging of New Knowledge and National Identities: Great Britain and India, 1760-1850," *Osiris*, 15 (2000), 119-134; C. A. Bayly, *Empire and Information: Intelligence Gathering and Social Communication in India, 1780-1870* (Cambridge, 1996), ch. 2; Matthew Edney, *Mapping an Empire: The Geographical Construction of British India, 1765-1843* (Chicago, 1997), 33 and 84.

[34] Walter Ristow, *American Maps and Mapmakers* (Detroit, 1985), 57.

advertisement describing his work and calling for subscribers.[35] To help his sales, he provided the Boston Marine Society with a copy for their review and evaluation. The next day, the society reviewed the work and its accompanying charts, *Maps of East and West Florida* (New York, 1781), and voted their support and appointed a committee to publish their endorsement.[36] In their public recommendation, published in the *Massachusetts Gazette & the Boston Weekly News-Letter* on January 6, the committee found that Romans had "by great Labour and Expence, made actual surveys of the [Florida] Coast," which would be of "very great Utility (when published) to Navigators and Commerce." Consequently, the society recommended the work "to every Friend of America." As a further endorsement "The Laws of our Corporation do retain all our Monies for charitable Use only, or we would do more than recommend."[37]

The Marine Society's exuberant support for the work came from Romans' attention to practical details that would aid navigators sailing along the Florida coast. Although an academically trained professional surveyor, Romans paid close attention to the vocational needs of his chart's users. Like Marine Society members making their own charts, Romans focussed his time and resources near areas of the greatest concern for navigators such as shoals, coastlines, harbor entrances, and approaches to the main stream of the Mississippi leading to plantations and Mobile Bay (Figure 6). He also provided sketches and line drawings of river mouths and towns, that like sailing rutters from two centuries before, allowed easier identification of prominent features from the deck (Figure 7).

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[35] *Massachusetts Gazette & the Boston Weekly News-Letter*, Jan. 3 to Jan. 10, 1774.

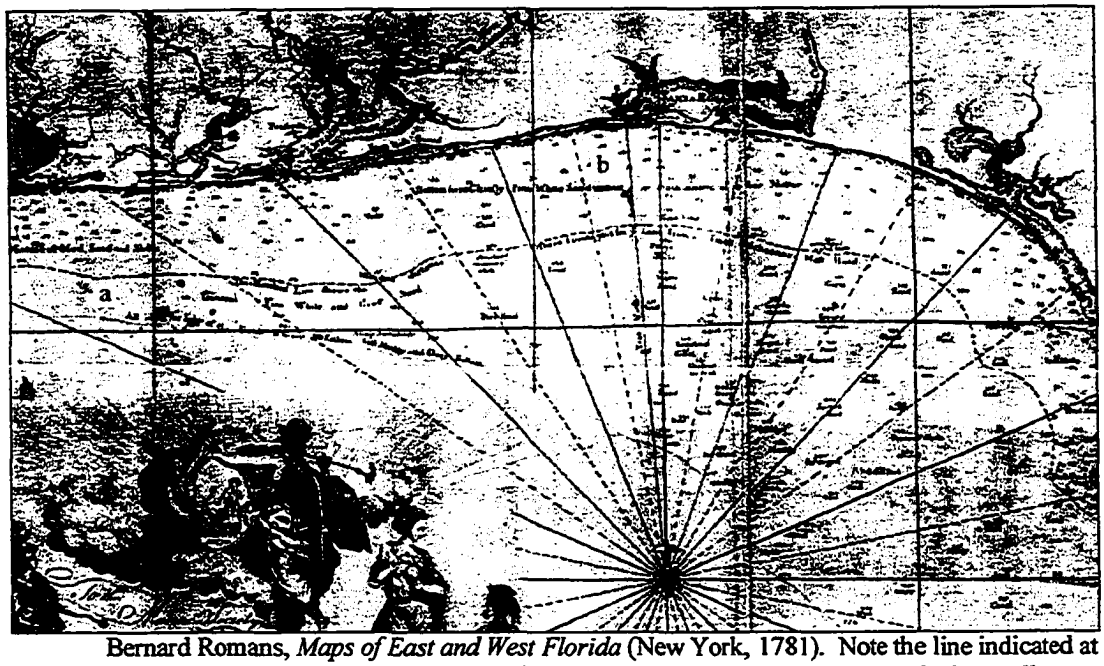
[36] BMS Records, Jan. 4, 1774.

[37] *Massachusetts Gazette & the Boston Weekly News-Letter*, Jan. 6, 1774.

Romans also added new, unique information that had rarely appeared on American charts before. He meticulously recorded the quality and character of the ocean bottom at every sounding station to help navigators using a tallow-tipped lead line. In addition, his charts indicated the distance offshore where he could first see the low lying land from his schooner's masthead, information that would greatly aid a vessel making landfall in those shallow waters (Figure 5). Romans also took details of the varying colors and clarity of the water, types of sponges and grasses observed off-shore, and predominant wind strengths and directions. Further highlighting Romans' attention to commercial utility, he also identified an illicit trade running between Native Americans living near the Mobile River and the Spaniards, that, like his chart, might help guide captains to safe and profitable markets.

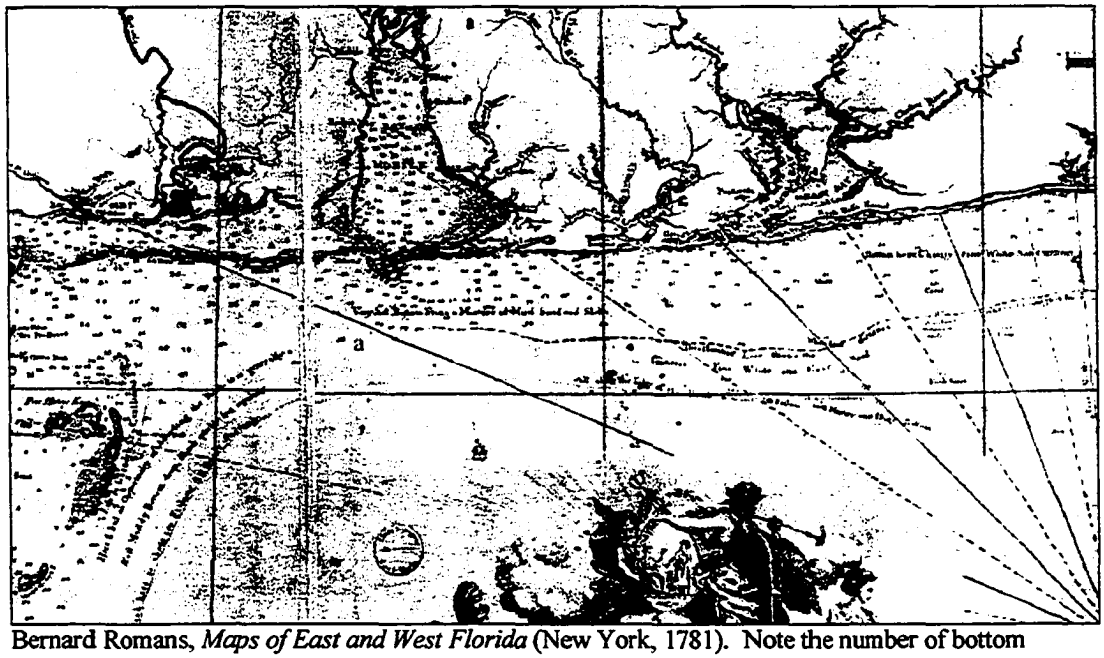
While the Marine Society claimed it could offer no financial backing because of its bylaws, the organization must have found some way to "do more than recommend." The Boston Marine Society, as a group, and several members as individuals, joined other marine societies from New York (to whom Romans dedicated his chart of West Florida), Salem, and Newburyport, and subscribed to Romans' project. In subscribing, they joined some of the most prominent royal appointees and leaders in American science and politics. These included two royal governors, one major general with several junior army and navy officers, representatives of Yale and Harvard colleges, Surveyor General of the Northern Department Samuel Holland, British agents working for the Engineers Office in America, Boston customs officials, Fellow of the Royal Society of London John Ellis, and Mathew Clarkson representing the Library Company of Philadelphia. Consequently

Figure 5: Detail of Pensacola Bay Area, Bernard Romans, *Maps of East and West Florida.*



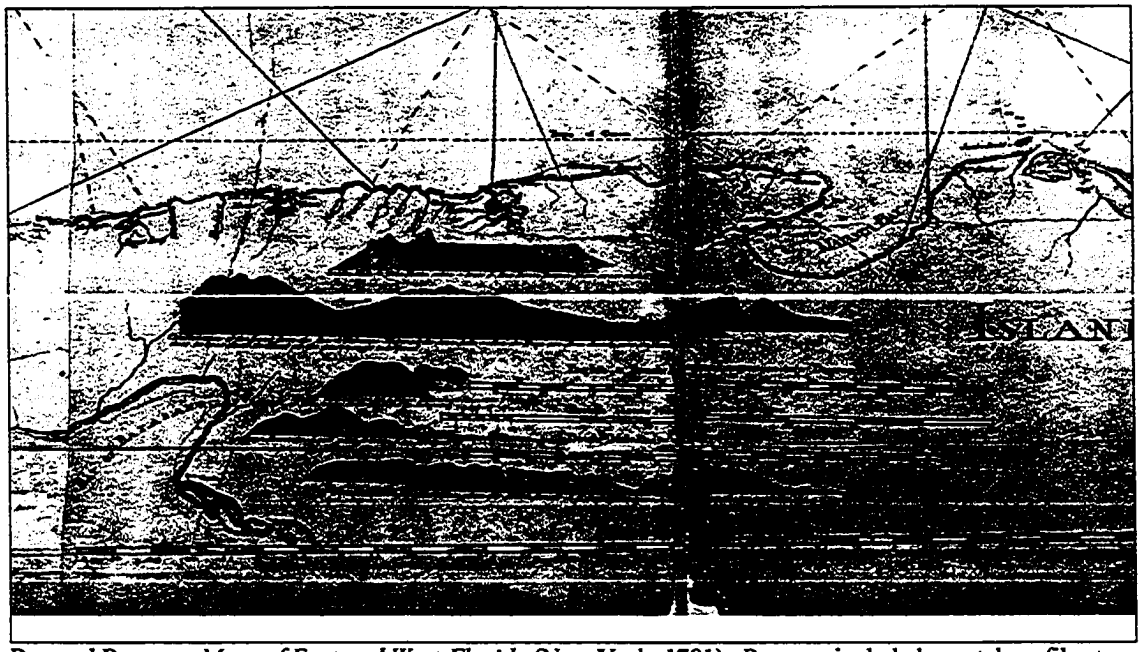
Bernard Romans, *Maps of East and West Florida* (New York, 1781). Note the line indicated at point "a", where Romans indicated the first sighting of land from the masthead of a small schooner. Note also the numerous descriptions of bottom conditions indicated at point "b".

Figure 6: Detail of Mobile Bay Area, Bernard Romans, *Maps of East and West Florida.*



Bernard Romans, *Maps of East and West Florida* (New York, 1781). Note the number of bottom soundings at point "a" illustrating Romans' more focussed attention on the entrance to Mobile Bay.

Figure 7: Detail of Coastal Profiles or Rutters, Bernard Romans, *Maps of East and West Florida.*



Bernard Romans, *Maps of East and West Florida* (New York, 1781). Romans included coastal profiles to aid mariners in pinpointing their position along the shore.

when Romans' work finally appeared in 1774, the Marine Society's name appeared among some of the most prominent leaders in American science and politics, and firmly acknowledged the organization as a significant force in American navigational science.

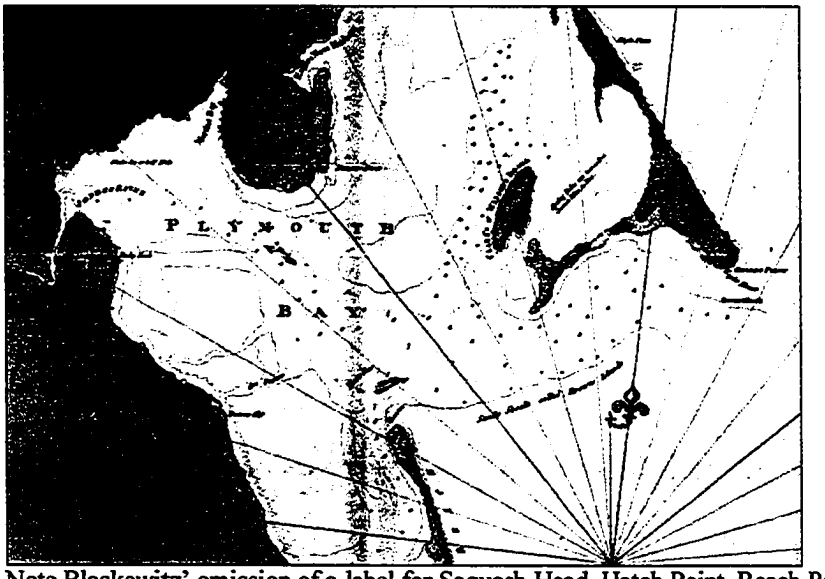
The society's first major project revealed a competing set of standards by which New England's coasts were surveyed. Bennett's survey relied upon vocational traditions that placed field-work and functionality over academic training and comprehensiveness. Relying solely upon the training and instrumentation needed for the everyday operation of a vessel at sea, the vocational methods embraced by the Marine Society by-passed the limitations imposed by the colonies' lack of research centers and centers of higher

learning. Instead, BMS members used the tools they had at their disposal to provide natural knowledge in the form of sailing directions and coastal surveys that researchers in Britain were unlikely to provide. As McNeill claimed in his appeal to Colville in 1763, BMS members saw themselves as better able to provide knowledge of the New England coasts for their colleagues. Without the theoretical background required to accurately fix geographic positions on the globe, Marine Society members viewed experience, rather than book-learning, as the most important credential for drafting coastal charts and sailing directions. Consequently, New England masters developed their own, parallel surveying discipline at the same time as academically-informed marine surveying developed in Britain in the eighteenth century. In doing so, they created a parallel set of vocational methods accessible to colonial surveyors and captains, and best suited to Boston's intellectual and instrumental resources.

In contrast to Bennett's survey of Plymouth, London representatives working along the New England coast in the 1760s carried distinct imperial perspectives that shaped their cartographic productions. These two traditions converged in Plymouth Bay in the 1760s. At roughly the same time as Bennett surveyed Plymouth Harbor for the Boston Marine Society, Charles Blaskowitz made his own survey of the Cape Cod Bay port while working for J. F. W. DesBarres. The comparison between Bennett's 1768 survey of Plymouth and Blaskowitz' chart surveyed roughly contemporaneously best highlights the tension between the local, functional surveys undertaken by Bennett, and the imperial biases carried into DesBarres' work.

Side by side, the two works stand more complementary than comparable. For example, Bennett's directions begin with a bearing from Saquash Head, reference to "a large red Cliff on the main," and call for a course that will keep the vessel clear of Dick's Flats. Blaskowitz, however, never identified Saquash Head. Nor did he identify Dick's Flats, presumably subsuming them into the sand flats to the southeast of the channel he called Brown's Islands. Blaskowitz does identify a cliff on the mainland, "Doten's Clift," but there is no reference to its color. As a shipmaster with the directions and the chart continued in towards Plymouth, more inconsistencies emerge. Bennett refers to a series of points that mark the principal headlands to be avoided in approaching the town. Hatch Point, Reach Point, Sandy Point all play important roles as landmarks in Bennett's directions.

Figure 8: Detail, J. F. W. DesBarres, [Chart of Plymouth Bay, surveyed by Charles Blaskowitz].



Note Blaskowitz' omission of a label for Saquash Head, Hatch Point, Reach Point and Sandy Point.

On Blaskowitz' chart, however, none of these features are labeled. Only Long Beach, the sand spit separating the southern tongue of Plymouth Bay from the rest of Cape Cod Bay, bears a name.

When compared to Bennett's survey, stark differences appear that highlight the different perspectives carried by the two surveying teams. For DesBarres, marine surveying was a means by which imperial agents could better assess and catalog the resources of colonial areas far from London. As Matthew Edney, Deepak Kumar, Kapil Raj, and a host of other scholars investigating colonialism and science have shown, systematic surveys on a uniform scale were part and parcel of the process of empire building.[38] Edney, in particular, has shown that surveying using a standard, global graticule of latitude and longitude allowed British imperial surveys to be compared across space, which, in turn helped not only exploit the resources of empire, but also gave imperial officials concrete evidence that such an empire actually existed.[39] With this information on paper, decision-makers back in London could better exploit resources contained within their territorial holdings, and better project imperial expansion. Bennett's work represents a distinct perspective from that of Holland and DesBarres. For the Marine Society team, the primary goal of the Plymouth survey was to facilitate captains' safe passage into Plymouth Harbor. Bennett worked in a local framework by referencing commonly known and acknowledged headlands that privileged local knowledge over imperial comparability.

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[38] Edney, *Mapping an Empire*; Deepak Kumar, *Science and the Raj, 1857-1905* (Delhi, 1997); Kapil Raj, "Colonial Encounters," 119-134.

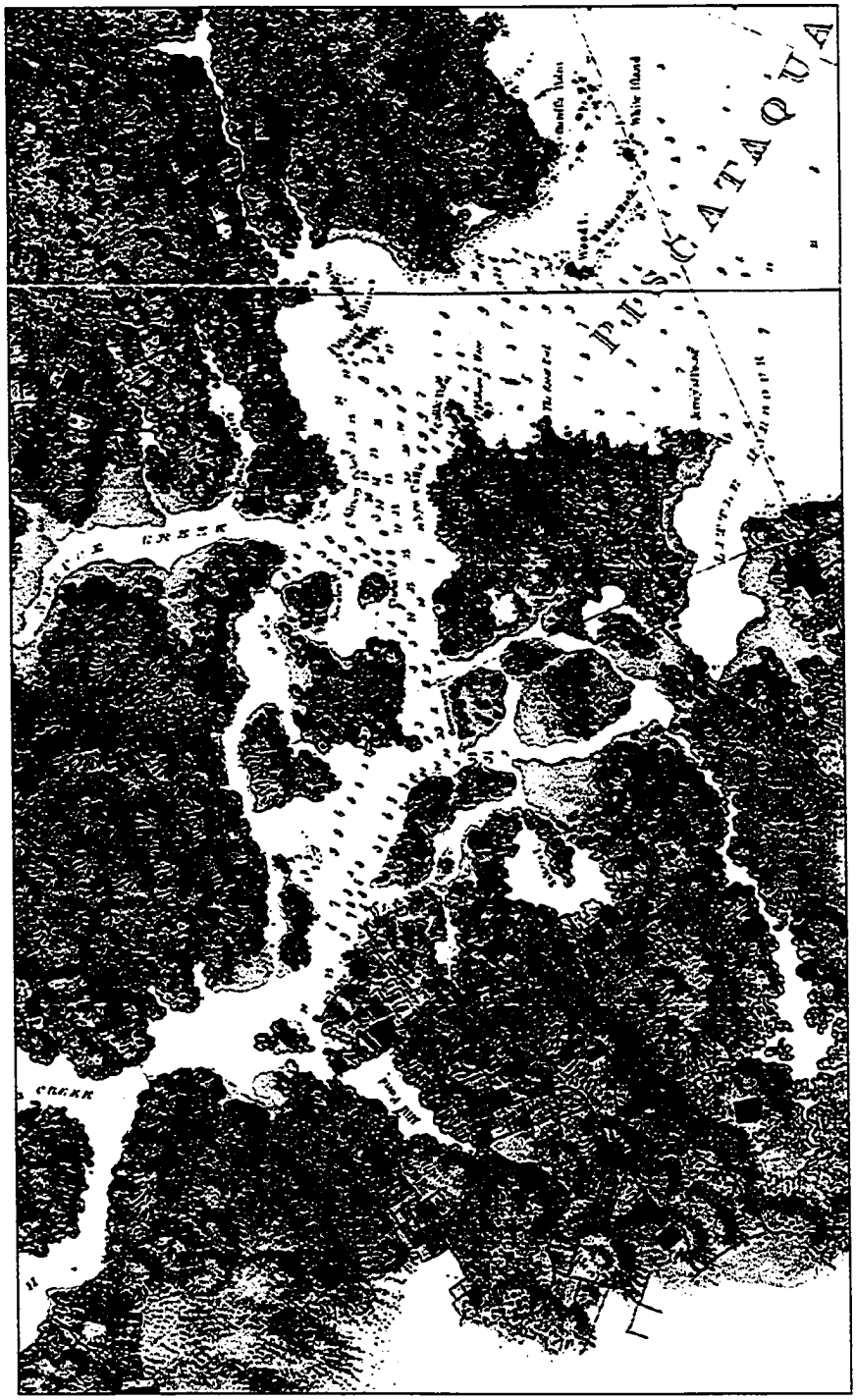
[39] Edney, *Mapping an Empire*, 24-25.

DesBarres' concern for the imperial over the local carried into other aspects of his chart production. For example, DesBarres took pains to collect information that would be useful to naval forces operating for long periods of time in American waters. In his chart of Portsmouth and his chart of Plymouth, DesBarres clearly identified orchards, hills, farm fields and fresh water creeks—all information a commander would need to guide foraging crews to replenish ships. The city of Portsmouth, in contrast, is drawn poorly, the town barely discernable from the land surrounding it. Towns, while important centers for securing crew and purchasing supplies, sat lower on a naval captain's priority list.

While DesBarres included information that appealed to Royal Navy supply officers, he ignored—that is left blank—spaces in the interior where local mariners might see as centers of colonial activity. For example, DesBarres only filled in geographical detail relevant to the immediate coastal areas, leaving important information about inland waterways, such as New Hampshire's Great Bay, off his charts entirely. In addition, timber yards, ship-yards, and other concerns that fueled the local economy and drove local shipping were ignored. Such blank spaces, or in Harley's words "silences," "act to legitimize and neutralize arbitrary actions in the consciousness of their originators. In other words, the lack of qualitative differentiation in maps . . . serves to dehumanize the landscape."[40]

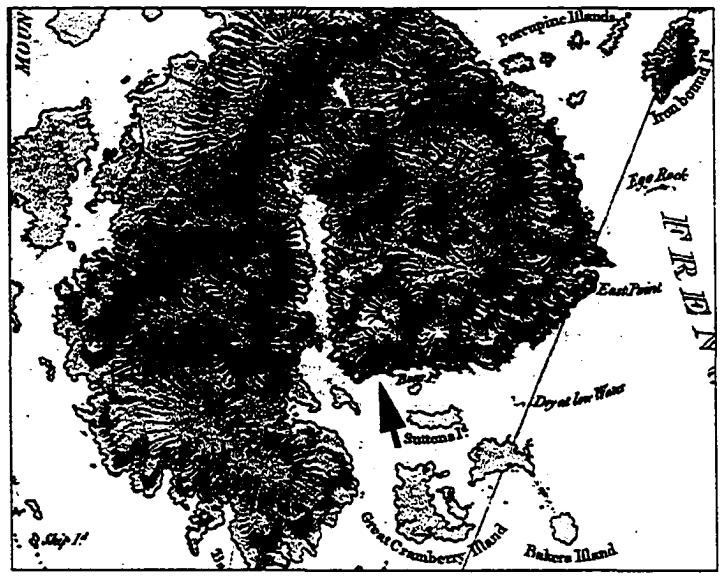
[40] Harley, *The New Nature of Maps*, 98-99.

Figure 9: Detail, DesBarres, J. F. W. [survey by James Grant and Samuel Holland], [Piscataqua Harbour].



In at least one case, DesBarres consciously changed the shape of the coastline to suit imperial needs, thus pitting local needs against imperial desires. In his chart of the coast of Maine from Frenchman Bay to Mosquito Harbor, DesBarres failed to indicate Northeast Harbor, the best harbor in the region, or anything that might resemble a harbor along the southern coast of Mount Desert island.[41] DesBarres' omission was almost certainly intentional, as the rest of the island's features, including its topography, coves, and hazardous rocks, were laid out in DesBarres' characteristic detail, and in more detail than the rest of land areas on the chart. DesBarres most likely left this strategically important harbor out of consideration for military reasons. In this case, imperial concerns outweighed the need for accurate local charts for free commerce.

Figure 10: Detail of Mount Desert Island, DesBarres, [Coast of Maine from Frenchman Bay to Mosquito Harbor].



[41] See J. F. W. DesBarres, [Coast of Maine from Frenchman Bay to Mosquito Harbor], (London, 1776). For comparisons with the current shape of the coast, see U.S. Coast Survey, *Frenchman and Blue Hill Bays and Approaches*, Chart no. 13312, 20th edition (October 31, 1992).

Figure 11: Detail of Mount Desert Island south coast, U.S. Coast Survey, *Frenchman and Blue Hill Bays and Approaches*.

Between 1768 and 1775, the Marine Society established themselves as authorities in Boston's navigational research world by meeting local needs for navigational research. The Society based their authority upon older, functional methods of surveying that optimized area and accuracy while minimizing cost. These methods were rooted in the routines of ship management, and relied upon instruments and skills commonly used by mariners. During this period, the Marine Society used these methods to fill needs for cartographic work in a colonial setting that was far from metropolitan centers of learning and theoretical investigation. Rather than waiting for formally educated surveyors to turn their attention to the New England coasts, the Marine Society adapted the resources at their disposal to the meet immediate needs for navigational information. When British representatives did arrive, they carried a different set of criteria on which to focus their cartographic work. In addition to more theoretically sound methods, skills, and

instrumentation, London surveyors also carried an imperial agenda that focussed upon interests that differed from those held by the local community. On the eve of the Revolution, two parallel traditions operated along New England's coasts and yielded differing results. After 1775, however, international politics radically changed the world in which the Marine Society operated, and created new opportunities for the Society to extend their influence in Boston's maritime community.

CHAPTER III

THE MARINE SOCIETY IN BOSTON AND NATIONAL POLITICS, 1763-1798

Between 1763 and 1775, the Boston Marine Society found itself at the center of an imperial crisis that fundamentally changed their world. As other historians have argued, Boston merchants and the goods they carried played important roles during the 1760s and 1770s in political opposition to Parliamentary revenue acts, extensions of Admiralty authority into Boston civic life, and the constitutional conflicts over colonials' roles within the British empire.[1] Not surprisingly, Boston Marine Society members, both as merchants ordering these goods and as captains shipping them, found themselves and their society at the center of the political conflict as it played out in Boston.

Initially, the Marine Society appeared as the unified body their bylaws required. In December, 1760, for example, nine members signed a petition—as individuals—against Admiralty decrees expanding the government's power to search and seize ships

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[1] The best accounts of this process are John W. Tyler's *Smuggler and Patriots: Boston Merchants and the Advent of the American Revolution* (Boston, 1986), and Arthur Meier Schlessinger's *The Colonial Merchants and the American Revolution, 1763-1776* (New York, 1939). See also Charles McLean Andrews, *The Boston Merchants and the Non-Importation Movement* (1916-1917; New York, 1968), Benjamin Woods Labaree, *The Boston Tea Party* (New York, 1964), Gary Nash, *The Urban Crucible: The Northern Seaports and the Origins of the American Revolution* (Boston, 1979, 1986). For the role of consumer goods in the imperial crisis of the 1760s and 1770s, see T. H. Breen, "An Empire of Goods: The Anglicization of Colonial America, 1690-1776," in *Colonial America: Essays in Politics and Social Development*, Fourth Edition, ed. Stanley N. Katz, John M. Murrin, and Douglas Greenberg (New York, 1993); and John Brewer, *Party Ideology and Popular Politics at the Accession of George III* (Cambridge, 1976), 367-397. For the role of the Royal Navy in the conflict, see Neil R. Stout, *The Royal Navy in America: A Study of Enforcement of British Colonial Policy in the Era of the American Revolution* (Annapolis, MD, 1973), and Carl Ubbelohde, *The Vice-Admiralty Courts and the American Revolution* (Chapel Hill, 1960). For a clear analysis of larger imperial issues during the imperial crisis, see Eliga Gould, *Persistence of Empire: British Political Culture in the Age of the American Revolution* (Chapel Hill, 2000).

suspected of smuggling.[2] BMS member and customs official Benjamin Hallowell was even reputed to have called himself an enemy to the Vice Admiralty courts seeking to enforce customs regulations, and accused those bodies of being a public nuisance.[3] Yet Hallowell and other members began to change their tune as the tensions over the Sugar Act, the Stamp Act, and the Townsend Duties politicized Boston's merchant houses and merchant captains, and forced more and more BMS members to take sides. Between the mid 1750s and the mid 1760s, for example, 12 BMS members joined the Boston Society for the Encouragement of Trade and Commerce (BSETC), an organization seeking to organize Boston's merchant community in an attempt to defend Boston's notoriously lax customs collector Benjamin Barons from Crown charges of negligence.[4] In one of the largest outbursts of revolutionary activity experienced in Boston in 1766, Hallowell watched his house suffer damage at the hands of Stamp Act rioters in 1766—rioters possibly incited by fellow BMS members in the BSETC.[5]

While the rest of the BMS was notably quiet during the Stamp Act riots, the advent of the non-importation agreements in the late 1760s polarized the society and forced BMS members to publicly stake positions contrary to fellow members' views. The commercial nature of non-importation planted Boston's merchants and captains squarely in the center of opposition activity. Consequently, BMS members found themselves forced to stand on convictions, causing a rift within the society. In the first

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[2] [Petition against Admiralty Decree], December 26, 1760, vol. 44, p. 447, Massachusetts State Archives.

[3] Deposition of Charles Paxton, February 18, 1761, as quoted in Tyler, p. 37.

[4] Ezekiel Price Papers, pp. 78-81(Massachusetts Historical Society, Boston Mass.), and Tyler, pp. 253-277.

[5] Benjamin Hallowell, [Claim for damages inflicted on house from mob violence], Dec. 8, 1766, vol. 26, pp. 242, 249 (Massachusetts State Archives, Boston, Mass.). For a more thorough examination of the BSETC, see Tyler, *Smugglers and Patriots*, chapters 1 through 3, and Andrews, *Boston Merchants*.

two weeks of March, 1768, Boston merchants retaliated against the Townsend duties by signing a public document, boycotting English goods until their grievances could be addressed. Along with dozens of other Boston merchants, seven Marine Society members signed the document and cancelled their orders for English merchandise.[6] For the first time, however, two Marine Society members, John Taylor and Jonathan Simpson, publicly opposed their fellow members and refused to sign the document. Along with about 18 other merchants, these opponents to non-importation threatened to undermine the entire efficacy of the gesture—and promised great profits to those who dared stand out as sole importers of highly demanded English goods.

In July 1769, about a dozen Boston citizens joined into the non-importation cause. With such popular support for the movement in place, leaders of the Non-importation movement visited other merchants to ensure compliance. In August 1769, this body included Henderson Inches—now a selectman for Boston—and Samuel Dashwood, both of whom resorted to physical violence and threats on non-supporters' life and property to keep a solid front.[7]

While Inches, Dashwood, and other BMS members sided with Whigs opposing Parliamentary revenue acts and the enforcement of customs duties, other BMS members sided with the Crown and the government. Joseph Dommett, for example, received a recommendation from Thomas Hutchinson for a position in the customs service in 1769, and sailed for London to secure the job.[8] John Andrews protested the Solemn League

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[6] Ann Dashwood, presumably related to BMS member Samuel Dashwood, also signed, bringing the total in favor up to eight.

[7] Tyler, *Smugglers and Patriots*, 135-151.

[8] Massachusetts Archives, vol. 27, pp. 255, 256, and 264.

and Covenenant in 1775 in the *Massachusetts Gazette* in July 1774.[9] Others, however, showed their support for the Royal government in less public ways. John Bryant and Robert Jarvis, for example, both carried letters for beleaguered Governor Thomas Hutchinson.

By 1775, a few prominent members of the BMS had developed considerable reputations as radicals not only in Boston, but in London as well. In April, an anonymous London writer included several BMS members in an attack on Boston Whigs. The author characterized William Davis as "of small importance & great conceit"; John Bradford as "a Brave & Valiant sea commander only a little bashful which is well known to the underwriters in London"; and John Pulling as "Bully of the Mohawk Tribe," suggesting some involvement with the Boston Tea Party. The author also singled out Job Prince as "Remarkable for his pretended hospitality to strangers"; and indicted Caleb Hopkins as "The northern politician and talks on both sides of the Question occasionally." Edward Davis finished the list, characterized as "a Tatler and minds every Body's business but his own."[10]

In 1773, Boston residents, dressed as "Indians," stormed aboard the Beaver and the Dartmouth, dumping British tea into the harbor. That event forced growing tensions to a breaking point. In response, Parliament passed the punitive Boston Port Act that closed the port until the tea was paid for. The act also brought Regulars into Boston, and through the winter of 1774 and into the spring of 1775, both sides dug in their heels. Finally, in April, British Regulars and radical Whig "Patriots" pushed the conflict to open

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[9] *Massachusetts Gazette*, July 7, 1774.

[10] "Tory Account of Boston Whigs," April 18, 1775, Ms-L. (Massachusetts Historical Society, Boston, Mass.).

warfare. After retreating from Concord, British forces remained besieged in Boston from April, 1775 to March of the following year. As tensions grew between Boston and London, the BMS remained torn between members actively supporting anti-government protests and those wishing for more moderate, or even pro-government actions.[11]

For some members who may have tried to remain neutral, the divisiveness of civil war made such efforts impossible. Moderates faced suspicion from British and self-styled "Patriot" authorities alike, suffered public humiliation, and in John Leach's case, lost personal property and faced charges of treason. Because of the very knowledge that the Society had sought to promulgate one year earlier, Leach found himself targeted. A mathematics teacher, petty merchant and clerk for the Marine Society, he was beset by Regulars in June:

> At 3 this afternoon a few steps from my house, I was seized upon by Major Cane of the Regulars, accompanied by one Loring who is lately made a Sherriff, they obliged me to return to my House, where Major Cane demanded my keys of my desks and searched all my drawings, writings, &c. and told me I had a great deal to answer for[.] I replyed it was very well, I stood ready at a minutes warning to answer any accusation; I had a drawn hanger, I could have took hold of in a moment, and cut them both down, I had both courage & inclination to do it, tho' they had each their swords by their sides[.] but I suddenly reflected that I could not escape, as the whole town was a prison, God wonderfully restrained me . . .[12]

British officers suspected Leach of using his cartographic skills to supply the besieging Americans with drawings of British fortifications. Although the trial itself was a farce—the lead witness against Leach kept forgetting his name and the charges were dropped—he suffered materially for his associations. British Regulars destroyed his school, seized his papers, and pulled apart his wharf, leaving Leach only his optical

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[11] See Labaree, *Boston Tea Party* for more detailed study of these events.

[12] John Leach, "Journal Kept in Boston Jail, 1775", June 29, 1775, John Leach Collection, (Massachusetts Historical Society, Boston, Mass.).

instruments and surveying tools to salvage. The Patriot cause committed similar abuses. William Cheever, Edward Davis, Samuel Bullfinch, and Job Prince, despite some of their associations with the Sons of Liberty were listed as persons "inimical to the interest of the united colonies," and watched by the committee for public safety for good behavior.[13]

When fighting broke out in April 1775, the Marine Society ceased their monthly meetings, and the society's books were smuggled out of the city for protection. Furthermore, each member had to choose sides. Some members kept to their radical beliefs and took up arms against the crown. Fourteen others accepted commissions as continental naval or privateer officers, while others fought the Crown through administrative roles as prize agents, or on governmental boards supplying the war effort.

When the society reconvened in November 1775, the group remained split. Of the six members at the meeting, BMS Master Job Prince and Samuel Dashwood actively defended the "patriot" cause. Former master Robert Jarvis, Deputy Master William D. Cheever and Samuel Bullfinch identified with pro-Crown sentiments. Caught between the two sides, and without a quorum, the society adjourned stating that they could not do anything in good faith.[14]

The British retreat in March, however, ended the tense stalemate, and purged the society of Loyalist sympathizers. Once the colonists had installed artillery brought from Fort Ticonderoga on the heights overlooking the city, British garrison commanders removed their army to Halifax, Nova Scotia. Former masters Robert Jarvis, Benjamin

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[13] "Arrest Warrant for Cheever *et al*," April 5, 1776, Cheever-Davis Collection, (Massachusetts Historical Society, Boston, Mass.). For Cheever's association with the Sons of Liberty, see "An Alphabetical List of the Sons of Liberty who dined at the Liberty Tree, Dorchester, August 14, 1769," *Proceedings of the Massachusetts Historical Society, 1869-1870* (Boston, 1871), 140-142.

[14] BMS Records, Nov. 7, 1775.

Hallowell, and William Coffin fled with the British Regulars, along with half a dozen others. In 1778, four more members were officially banished from the commonwealth by statewide act.[15] Some suspected loyalists chose to stay, but no longer enjoyed the status they once had within the society or the community. John White, John Hill, and William Cheever all had to post bonds for good behavior before the Committee of Sequestration between February 1777 and March 1778.[16]

In November 1776, when the Society met for the second time since Lexington and Concord, radical Whigs clearly held control. Job Prince and John Pullings, already known to London as Whig activists, joined with Whig supporters William Mackay and Hector McNeill—who would soon command the frigate *Boston*—and several other members to resume the society's regular meetings. Without Loyalist members, however, the radical Whig leadership was now free to have the society take an active political role in the war. Beginning in November 1777, the society repeatedly voted radical Whigs Henderson Inches and Job Prince as treasurers. As treasurer, Inches directed the society to lend money to the war and the new government in the following March. Despite the uncertainty of state and Continental securities, and with rampant inflation, the society lent out on State or Continental security all but £50 of the paper money in hand.[17] By putting their paper money into securities from the new government, the society made a clear statement of support for the new government by risking their funds in uncertain government paper. Furthermore, by November 1780, the society was confident enough

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[15] Tyler, *Smugglers and Patriots*, 253-277.

[16] "An Account for the money rec'd for the Committee [of] Sequestrations, February, 1777 to March 17, 1778," Cheever-Davis Collection, (Massachusetts Historical Society, Boston, Mass.).

[17] BMS Records, March 3, 1778.

in American independence that they hired a lawyer to help them extend their charter.[18] In addition, the Society also used membership to reward individuals with distinguished naval service against British forces. Through the course of the war, membership expanded not only to those recommended for their navigational abilities, but also to honor those with naval and privateering service for their new-found country. Of the twenty-three members that had military service inducted before or during the war, nine were inducted during the war itself.[19]

The political crises of the 1760s and 1770s fundamentally changed the way the Marine Society related to the larger Boston community. With merchants and captains at the heart of non-importation agreements and public protests over taxation, the Marine Society found its apolitical stance impossible to maintain. After almost a year of division within the society, the BMS loyalists fled in March 1776, allowing those remaining to actively pursue in the war against Britain.

The American Revolution changed the relationship of science to government throughout the Anglo-American world. For Americans, the war inspired scientifically inclined gentlemen to seize the ideals of virtuous republican citizenship, and use their interests to carve a place for themselves in the new republic.[20] John Gascoigne, Richard Harry Drayton, and Miller and Reill have shown how in Britain the war between 1775

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[18] BMS Minutes, Nov. 7, 1780.

[19] William A. Baker, *The Boston Marine Society in the American War for Independence* (Boston, 1976), v-xi. Published with William A. Baker, *A History of the Boston Marine Society, 1742-1981*(Boston, 1982).

[20] Brooke Hindle, *The Pursuit of Science in Revolutionary America, 1735-1789* (Chapel Hill, 1956); I. Bernard Cohen, *Science and the Founding Fathers: Science in the Political Thought of Jefferson, Franklin, Adams, and Madison* (New York, 1995); George H Daniels, *Science in American Society: A Social History* (New York, 1971); John C Greene, *Science in the Age of Jefferson* (Ames, Iowa, 1986).

and 1783 highlighted a need for improved administrative effectiveness in the British Empire. In the Royal Society, the American War marked a watershed after which administrative changes and reforms "helped to provide the institutional matrix within which scientific considerations at last began to impinge on the concerns of the British State."[21] This affected Joseph Banks and other prominent figures, too.

The changed relationship between science and government was as clear in the navigational realm as anywhere else. After 1783, the BMS realized significant political authority: for the first time in thirty years, they seemed poised to get access to political power, and perhaps to governmental patronage. Through the political debates of the 1780s, stemming from Boston's post-war recession in the maritime trades and political disputes over debt legislation, the Marine Society found a niche where they could present themselves as "fathers of the maritime people" and to try to stabilize Boston's poltical situation. These efforts soon attracted the attention of Federal officials, thus opening a route to the patronage the society had long sought.[22]

In America, while national leaders urged Americans to apply their talents to the security of the union, Americans interested in scientific research applied classical republican theory to the role of science in the new republic. As Gordon Wood, Joyce Appleby and J. G. A. Pocock have argued, classical republican political ideals called for citizens to subordinate their individual interests to the good of the whole.[23] Only through

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[21] John Gascoigne, *Science in the Service of Empire*, (Cambridge, 1998), 21-22. See also Richard Harry Drayton, *Nature's Government: Science, Imperial Britain, and the 'Improvement' of the World* (New Haven, 2000), 67-81.

[22] Alan Taylor, *William Cooper's Town: Power and Persuasion on the Frontier of the Early American Republic* (New York, 1995), ch. 6.

[23] Gordon Wood, *The Creation of the American Republic* (New York, 1969), Joyce Appleby, *Capitalism and a New Social Order: The Republican Vision of the 1790s* (New York, 1984), J. G. A. Pocock, *The*

the civic virtue that called for citizens to restrain personal desires for gain, and channel their energies to improve the lot of the whole, could republican liberty remain intact. Britain, republican theorists lamented, suffered from an endemic pursuit of self-interest, through which power—that great enemy to the delicate flower of liberty—had been able to blind subjects to the erosion of their rights as freeborn Englishmen that their lassitude had allowed. Yet republican virtue required more than just self-sacrifice. As the republic now drew sovereignty from the people, the very same people needed to apply their individual skills to meet the needs of the larger community. Thus virtue was more than simply a denial of self-interest: it represented the transformation of that self-interest into disinterested public duty and civic service. In a land blessed with new-found liberty, individuals would be rewarded as the community as a whole improved through individual self-denial and collective community service.[24]

The call for civic service was not limited to political and economic concerns alone. The new republic's needs for learning and science appealed to the few learned societies that existed in the colonies at the end of the Revolution. As historians Brooke Hindle, John C. Greene, I. B. Cohen, and George Daniels have shown, the same sentiment for public service and civic duty that filled the political world, also animated the American scientific world.[25] Nowhere is this better seen than in the opening remarks of the first volume of the American Academy of Arts and Sciences' *Memoirs* (Boston,

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Machiavellian Moment: Florentine Political Thought and the Atlantic Republican Tradition (Princeton, 1975), 462-505.

[24] Wood, *Creation,* chapter II, especially 45-82.

[25] Brooke Hindle, *The Pursuit of Science in Revolutionary America, 1735-1789* (Chapel Hill, 1956), ch. 12; George H. Daniels, *Science in American Society: A Social History* (New York, 1971), ch. 6. I. B. Cohen reverses this equation and examines the intellectual history of how scientific thought shaped this republican

1785). In this first publication of the Boston society formed in 1781, contributing authors called upon citizens to apply their skills to solve pressing technical concerns of the union—in the same spirit that ordinary citizens selflessly applied their talents for the common good. For indeed, science held immediate benefits for the new nation:

> The labors of the Astronomer are much needed, and will be peculiarly useful—particularly those observations and calculations, which will serve to perfect the geography of the country, and improve navigation, as has been before intimated. Hereby, the boundaries between one State and another in the Union, may be accurately determined, and disputes prevented or settled: the latitudes and longitudes of our sea-ports and head lands ascertained, and our intercourse with foreign nations facilitated.[26]

Phillips Payson, in offering some astronomical observations, saw science as playing a integral part in stabilizing a shaky union between states with competing boundary disputes, and unlocking American potential:

> The extensive territories of the United States of America, are a foundation in nature for a vast empire—The geography of its interior parts, though of great importance, is, at present, but little better than conjectural: To perfect which, and fix the interesting boundaries and lines, the best, and indeed the only proper method is, that of astronomical observations, which, it is probable, the Supreme Council of America will soon adopt, now the glorious revolution is so happily completed. To promote such observations . . .highly merits the attention of the Academy: For though they should not at first be made with such accuracy as modern astronomy can boast of, they will prove great helps for future improvements.[27]

The AAAS recognized that science was not as fully developed in America as in European countries. Scientific competition with the Old World was not at the heart of the

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sentiment. See I. B. Cohen, *Science and the Founding Fathers: Science in the Political Thought of Jefferson, Franklin, Adams and Madison* (New York, 1995).

[26] *Memoirs of the American Academy of Arts and Sciences*, 1 (1785), xi, hereafter cited as AAAS *Memoirs*.

[27] Phillips Payson, "Some Select Astronomical Observations made at Chelsea . . .," AAAS *Memoirs*, 1 (1785), 124.

society's agenda. "[I]t will not, at present, be expected, that this Academy should vie with familiar institutions in old countries, where they have peculiar advantages for such prosecutions."[28] Rather, the immediate needs of the country required the AAAS to look to domestic concerns for their most useful application. Though admittedly the "least entertaining of any in the collection," articles on astronomy and surveying "principally exhibit such observations and deductions, as are subservient to the cause of geography and navigation, the improvement of which is of great importance to this country."[29]

The AAAS made a similar call to a virtuous scientific community. "It is the part of every patriot-philosopher to pursue every hint—to cultivate every inquiry, which may eventually lead to the security and welfare of his fellow citizens, the extension of their commerce, and the improvement of those arts, which adorn and embellish life."[30]

The AAAS clearly linked science to the political needs of the emerging American nation. American scientific authors claimed a distinct role for their work in aiding the expansion of the American State and in stabilizing the union. As they were expected to place the economic and political good of the community before their own self interests, republican scientists saw the benefits of their work at first going to improve the well-being of their fellow citizens, and indirectly, themselves. Whether this was a romantic ideal or the actual motivation behind publishers in the early 1780s is not important. The important issues were that the Revolution shifted the social place of science within the

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[28] AAAS *Memoirs*, 1 (1785), viii.

[29] AAAS *Memoirs*, viii.

[30] AAAS *Memoirs*, viii.

republic. Science and research needed to play important roles in establishing the new republic and in aiding its people to live better lives.

The marriage between science and domestic politics continued through the 1780s as individual states began to take more active roles in promoting science. The AAAS's *Memoirs* clearly showed the institutional desire to apply science to public concerns. Nicolas Pike turned his individual energies to similar goals in his 1788 publication, *A New and Complete System of Arithmetick Composed for the Citizens of the United States.* A teacher and mathematician, Pike secured state support to present a study of natural sciences specifically catered to American citizens. With the United States free from European control, Pike felt that the natural sciences, in this case mathematics, should reflect the liberty of republican government. In his eyes, political independence offered scientifically minded Americans an opportunity to cast off previous modes of thinking imposed upon them by generation after generation of inflexible European tradition.

> It may, perhaps, by some be thought needless, when Authors are so multiplied, to attempt publishing any thing further on Arithmetic, as it may be imagined that there can be nothing more than the repetition of a Subject already exhausted. . . .but as the United States are now an independent Nation, it was judged that a system might be calculated more suitable to our Meridian, than those heretofore published.[31]

Pike was not alone in these sentiments, and his contemporaries saw the work as having more than just national utility. Communicating with Pike about his soon to be published treatise, Joseph Wheelock extended the value of Pike's work to all of humanity: "America is released from the chains of European politics—Let it be independent in genius and the efforts of art. I shall wait for this satisfaction of seeing your piece with the

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[31] Pike, *A New and Complete System,* preface.

belief of its future utility to mankind . . ."[32] Massachusetts governor, James Bowdoin, also saw the work as reflecting well upon American virtue.

> So valuable a work, declared such by good judges who have examined it, will be an honour to the States, for whose use it is intended, and in particular to the ingenious gentleman, who composed it. I heartily wish there may be an extensive demand for it, that the public, and the author, may be reciprocally benefited.[33]

Bowdoin had other reasons for appreciating the work: Pike asked the governor if he would accept the dedication of the work, an offer Bowdoin, of course, accepted.[34] Bowdoin also helped spur demand by granting state financial support to the work. On Pike's petition, the Massachusetts General Court exempted *A New and Complete System* from all excise duties.[35]

This trend lasted into the 1790s, when John Churchman continued to bring classical republican ideals into his works.[36] When in 1790 Churchman engaged the problem of longitude, he also revealed a dedication to republican science. Breaking with European traditions, Churchman claimed that titles performed limited roles in America:

> Titles are considered as being of several kinds: 1st, Such as are merely epithetical; 2nd, the usual names of office; 3d, appendages. &c. In a republican government, it is hoped that none in the following list will be offended at the omission of the

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[32] Joseph Wheelock to Nicolas Pike, Feb. 23, 1786, Nicolas Pike Papers (Massachusetts Historical Society, Boston, Mass.).

[33] James Bowdoin to Nicolas Pike, Jan. 17, 1788. MHS, Nicolas Pike Papers.

[34] James Bowdoin responded to Pike's request: "The person, to whom you propose to dedicate it, if I rightly conjecture whom you intend, would esteem such a dedication an honour done him: which, though he cannot make pretensions to it, must afford him no small satisfaction, as it would indicate the opinion of a gentleman, whose abilities and character he highly esteems." James Bowdoin to Nicolas Pike, Jan. 17, 1788, Nicolas Pike Papers.

[35] Pike, *A New and Complete System*, i.

[36] The author would like to thank Kevin Gumieny for his discussion of Churchman's work and visions of America.

> former, especially as the personage to whom the Magnetic Atlas is addressed has generally no other title than that of President of the United States.[37]

Instead, Churchman printed his subscriber's names with unique characters, relegating the various titles to a few code symbols that would not distract from individuals' names.

Churchman's pursuit of egalitarian simplicity extended to his method for determining longitude as well. As a surveyor, Churchman recognized the importance of accurate measures of longitude in clarifying boundary disputes between states and among individuals. Consequently, a simple and reliable method could be applied to frontier situations to settle boundary disputes. Rather than relying upon the complex mathematics of Nevil Maskelyne's lunar distance method, and instead of incurring the expense of Harrision's chronometer, Churchman sought longitude through a simpler method using magnetic variation.[38] He was not alone in seeking longitude from magnetic variation. Like fifteen others who submitted magnetic variation solutions to the Board of Longitude after 1737, Churchman believed magnetic variation could indicate longitudinal location on the globe.[39] Churchman postulated that two independent poles migrated around the earth—one in the south, and one in the north. The plane defined by these two poles represented the 0° variation "magnetic meridian." As the observer moved further from this line, variation increased in a systematic fashion. Consequently, Churchman believed,

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[37] John Churchman, *An Explanation of the Magnetic Atlas or Variation Chart* . . . . (Philadelphia, 1790), vi.

[38] For questions about the accuracy of Harrison's chronometer, see entry for Jan. 27, 1795, "Log of the ship Britannia to the Pacific, 1792-1795," LOG 1792B, (Peabody Essex Museum, Salem, Mass.).

[39] For a more complete discussion of the cultural importance of magnetism in eighteenth century Britain, see Patricia Fara, *Sympathetic Attractions: Magnetic Practices, Beliefs, and Symbolism in Eighteenth-Century England* (Princeton, 1996).

variation and the resultant "magnetic meridians" could be plotted and compared to latitude to determine longitude.[40]

Churchman was certainly not the first researcher to utilize this approach. Although it was fundamentally flawed, Churchman believed that his method represented a simple and universal means of determining longitude. Instead of complex mathematics or expensive equipment, Churchman's method required only a "magnetic atlas" predicting future magnetic meridians, a relatively inexpensive compass, and either a back-staff or a Davis quadrant. His method, had it worked, would have made the determination of longitude simple, quick and easily understandable for a moderately educated individual operating in the backcountry. Consequently, his method reflected his beliefs in the role of science in the American republic—that it should be open and easily accessible, free from the traditional hierarchies of the Old World.

For the AAAS, Pike and Churchman—just to name a few individuals actively applying science to the American political world—science carried unique political implications. The AAAS perceived the importance of pursuing and applying natural knowledge to the needs of an unsteady and problem-stricken young nation. Pike's work, geared specifically for an emerging commercial nation, carried with it a new egalitarianism and represented a sharp break with past European social and intellectual hierarchies. Churchman also embraced this leveling vision of science by reducing titles designed to highlight the individual's importance to society to a mere standardized code. His work on longitude further reflected his interests in making science useful to all citizens, and not just a few specially trained elite gentlemen. In all cases, researchers

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[40] John Churchman, *An Explanation of the Magnetic Atlas or Variation Chart* . . . . (Philadelphia, 1790).

wove new political needs and ideals into their investigations into nature, and they took pains to be clear that science was part of the nation-building experiment.

As a group interested in the promotion of navigational science, the BMS also followed this trend. Though less vocal than traditional centers of scientific learning, the BMS applied their expertise to the needs of their community with the same fusion of classical republican citizenship and scientific interest. Immediately after the war, the BMS applied their resources to civic needs, embraced civic responsibilities and promoted community economic recovery. Society funds management, charitable works, and maritime improvements extended their work beyond just navigational science promotion. The BMS's work in navigational science held political, as well as navigational implications. Driven by a desire to play a greater role in shaping the community, and fueled by classical republican ideals of self-sacrifice for the common good, the BMS's expansion into the civic aspects of navigation made political statements about new leaders and the new nature of leadership.

The BMS first expanded into Boston's long under-developed and confused pilot organization. Since 1716, when Boston Light was first erected, lighthouse keepers also operated as harbor pilots. When not tending the lights, keepers kept a boat with which they approached inbound vessels to offer their services to guide them up channel to the town. From 1716 to 1733, this arrangement operated moderately well. In 1733, however, Boston Light keeper and harbor pilot Robert Ball complained to the General Court that unofficial pilots stole away too much of his business while he was tending the light, and consequently asked that he alone be named official pilot. The Court agreed,

but required that he maintain two pilot boats, clearly labeled as such, and stationed at the light.[41] The 1733 Act, however, did not solve all the state's pilotage problems. A new Massachusetts law in 1783 reforming state pilotage cited the need for an expanded pilot system that went beyond Boston. Highlighting the importance of the service, the General Court claimed for itself the sole authority for licensing pilots for Boston. The 1783 Act also named pilots for north shore ports such as Salem and Newburyport, Cape Cod ports, Nantucket, Martha's Vineyard, and south shore ports. Furthermore, the Act called for state certification of all branch pilots, suggesting that illicit pilotage remained a problem throughout the eighteenth century.[42]

General Court management of pilots apparently sat poorly with Boston's maritime community, and as their efforts in 1783 show, the BMS felt that pilot management and certification played too significant a role in Boston's port community to be left in the hands of politicians. In June the BMS offered their advice "in the Choice of pilots & care of the lights similar to that already presented, with this difference, that we will give our time for one year gratis."[43] Prospective pilots would face examination by the Marine Society before they could be recommended to the state for branch positions. Furthermore, the society would hear and adjudicate complaints against harbor pilots, and would recommend changes in the service as necessary.[44]

The BMS also embraced changes that would allow them to better aid the town's merchants as well as its mariners. As an organization that received hard currency for

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[41] American Pilots' Association, *State Pilotage in America: Historical Outline with European Backgrounds* (Washington DC, 1960), 6-7.
[42] Commonwealth of Massachusetts, *An Act for Regulating Pilotage . . . .*(Boston, 1783).

[43] BMS Minutes, June 3, 1783.

dues and fines, the BMS was one of the few groups that possessed specie in a city starved for hard currency. Changes in bylaws in 1785 allowed Marine Society funds to help Boston's economic recovery during the post-war recession. Pre-1785 regulations allowed society funds to be invested only on bonds or on mortgages solidly backed by land valuations. In January, the body modified its laws allowing that "all monies of the Society shall either be laid out in shares of the Massachusetts Bank, or let at interest upon bond with collateral security of land free of encumbrances lying in the Town of Boston and the soil independent of the buildings thereon to be equal in value to the sum advanced."[45] By investing their currency in a bank, the BMS freed up desperately needed hard currency that could go to commercial investments. Such investments, in turn would launch voyages and spur the port's maritime trade, opening opportunities for maritime workers and attendant tradesmen.

In embracing both pilot management and the freeing up of capital reserves for the support of the banking industry, the BMS applied their resources to the needs of Boston's maritime community. The society's pre-war status as a group actively interested in promoting the well-being of mariners, masters, and merchants alike allowed them to aid in port administration in the aftermath of the Revolution.

While the BMS responded to the state's economic crises by taking on port administrative tasks and offering up investment capital, western farmers and debtors responded to post-war crises in more violent ways. Pressured by debt for consumer

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[44] The Marine Society still retains the responsibility of evaluating prospective harbor pilots for Massachusetts, the only non-governmental agency in America to hold such a position.
[45] BMS Minutes, Jan. 5, 1785.

goods that flooded Massachusetts following the Revolution, western farmers began in 1785 and 1786 resisting legal actions taken by coastal merchants suing for payment on back accounts. Facing imprisonment or foreclosure on their farms, western yeoman farmers called for tender laws and paper currency that would make repayment easier. In response, however, the General Court under pressure from merchants not wanting to see the value of their credits diminished, refused such relief to farmers. By late 1786, farmers went beyond petitioning and took up arms against a government they saw as distant, grasping, and unresponsive to its citizens' needs.[46]

From late 1786 into 1787, Massachusetts fought a small internal conflict that pitted western farmers against more commercialized coastal towns and pitted agrarian interests against seaboard commercial ones. Taking up symbols from the Revolution of a decade before, Shaysites directly challenged the rule of the mercantile elite in Boston, presenting them in the same light as the Crown in the 1770s.[47] As western militias refused to suppress Shaysite insurgents, merchants and retailers in eastern districts put up funds for an army under the commanded of Benjamin Lincoln to quell the rebellion. As Shaysite bands closed courts, harassed local retailers, and directly challenged the General Court throughout 1787, Lincoln and his semi-privately funded army chased rebels down until dispersing them at Springfield, and then at Petersham, in February, 1787. While Shaysites continued to harass government officials and retailers through the winter and

[46] For a concise discussion of Shays' Rebellion situated within an English Marxist tradition, see David P. Szatmary, *Shays' Rebellion: The Making of an Agrarian Insurgency*, (Amherst, MA, 1980). For more recent interpretations, see Robert Gross, ed., *In Debt to Shays: The Bicentennial of an Agrarian Rebellion* (Charlottesville, Virginia, 1993).

[47] Szatmary, 92-98.

into the spring, cooperation between Massachusetts, Vermont, New York, and Connecticut governments eventually extinguished the rebellion by summer, 1787.

Shays' Rebellion was an attack upon merchant rule in Boston and a call to Revolutionary traditions of rebellion. As government policies and stringent debt laws led to the seizure of farms, protestors resurrected an image of the free and independent farmer as a symbol of American liberties with which to justify their opposition. To many in western Massachusetts, the debt crisis represented the efforts of a non-productive, quasi-elitist commercial segment of society to steal away the hard earned property accumulated through productive agricultural work that fed the whole commonwealth. Eastern commercial and landed interests, who on the other hand "rarely . . .felt comfortably in command [as they] anxiously observed the spreading populist tide," feared lost property, anarchy, and chaos should Shays win.[48] Given the harshness of the post-war depression, Shaysite sentiments might also find fertile ground in coastal areas facing the combined effects of economic recession, pressures to pay back debts to British creditors, the collapse of the French trade, and tensions with the former ally over access to coastal fisheries.[49]

In response to Shays' challenge of Boston's mercantile elite, the BMS began making public processions and appearances with increasing confidence as care-takers for the town's maritime interests. Beginning in 1786, the BMS made its most regular public appearance through annual "feasts" that coincided with their annual meetings. In these

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[48] Stephen E. Patterson, "The Federalist Reaction to Shays Rebellion," in Gross, *In Debt to Shays*, 104.

[49] Stephen E. Patterson, "The Federalist Reaction to Shays Rebellion," in Gross, *In Debt to Shays*, 108-113. While Patterson sees the economic frustration as fuelling a nascent Federalist appeal, such economic hardships were likely to have affected Boston's maritime workers in different ways.

annual dinners, the BMS elected officers and inducted new members. In the past, these affairs had taken place in the private meeting rooms that the society rented in local coffeehouses. In November, 1786, however, the society voted that three members form a committee "to manage the [BMS public dinner] and that they publish the proceedings of this annual Meeting, with a list of the new members also the standing vote of the society relative to the communications of observations on coasts and Bays." The committee was instructed to "invite such gentlemen to the Feast as they may think proper."[50]

In 1787, the Marine Society also expanded its charitable work beyond members and their families. Approached by Rev. John Clarke, Dr. John Warren, and Dr. Aaron Dexter of the Humane Society of the Commonwealth of Massachusetts, the Marine Society agreed to help guide the Humane Society's efforts in building three shelters for shipwrecked mariners in more remote areas surrounding Boston harbor. These shelters promised some protection for shipwrecked mariners until help could arrive. In responding to the request, the Marine Society stated, "[B]eing in a degree the Representatives of the Maritime part of the community[, we] feel a very warm sense of the benevolent design of the Humane Society & return their most cordial thanks for their truly human[e] attention to so exposed & valuable part of the citizens of this state as the seamen are [*sic*] most certainly are."[51]

In addition to public feasts and expanded charitable work, the BMS also united with local civic leaders to demonstrate the stability of the current rule. For three years beginning in 1788, the Society invited prominent clergy to their annual dinners, including

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[50] BMS Minutes, Nov. 7, 1786.

[51] BMS Minutes, Jan. 2, 1787.

such prominent figures as Reverend Joseph Eckley, Jeremy Belknap, and Jonathan Clarke. In 1790, invitations went out to Reverend Oliver Everett, Reverend Samuel West, and again to Jonathan Clarke. By inviting clergy, the BMS sought to emphasize their apolitical public service by uniting with other non-political leaders, who in theory rose above worldly concerns to guide the community in spiritual matters. The invitations to clergy ceased suddenly in 1791, but through the next fifteen years, the Society's annual public dinners symbolically united their stewardship of port affairs with other community oriented service organizations.

Several key features emerge from the Society's shift into the public light. First, and most obvious, was their intention to publish their proceedings. As the society embraced more port functions through the 1780s, the Society's publication of their work demonstrated their interest, authority, and efforts in maritime affairs, and highlighted local captains skilled and experienced enough to be granted membership in the prestigious organization. Secondly, in voting on navigational observations in public, the BMS rested their authority upon their continual work with vocational science. Unlike politicians, whom many saw by the mid-1780s as corrupt and self-serving, the BMS's standing stemmed from their interests in promoting the collective good through navigational science. Thus, their authority rested outside politics, granting them the appearance of truly looking out for the common interest as good Republicans without self-serving ambitions. Third, the BMS tied their work to others' interests in the town by inviting prominent gentlemen who they thought fit to share their prestige. Such invitations linked their interests intimately with Boston leadership and highlighted the BMS's interests in civic service and public duty. Finally, coastal shelters also

demonstrated a public effort by Boston community leaders to care for mariners engaged in trade. Consequently, such efforts reveal a concerted attempt to publicly demonstrate a government responsive to the needs of a maritime working community. As part of this effort, the BMS sided itself with the religious and civic leaders of the town to diffuse any potential unrest among unemployed mariners suffering through a deep commercial depression.

The BMS's responses revealed the group's perception of their role within the community. During a post-Revolutionary period where new leaders and new governments emerged, the BMS used their navigational work to help bolster their position as "fathers of the maritime people." Like genteel politicians of the time, the BMS held onto beliefs that disinterestedness and natural talents set some individuals above others and above petty faction, and allowed them to govern with the interests of the whole community in mind.

Such patriarchal ideas of social authority date from before the Revolution, when gentility, *noblesse oblige*, and elite status clearly marked those who ruled from those who were ruled. Yet, as Alfred Young, Robert Gross, and Alan Taylor have explained, the Revolution challenged this system. Young argues that the Revolution empowered common men from humble means to see themselves as equals to their hitherto social betters.[52] Taylor argues that politics in the Early Republic forced paternalist elites to find new ways to make traditional forms of paternalist authority relevant in a new, egalitarian republic. Faced by upstart *nouveaux riches* who used new-found wealth to buy into traditional positions of authority, or by ungentlemanly politicians presenting themselves

[52] Alfred Young, "George Robert Twelves Hewes (1742-1840): A Boston Shoemaker and the Memory of the American Revolution," *William and Mary Quarterly*, Third Series, 38 (1981), 561-623.

as "friends of the people," would-be leaders in the early Republic could no longer simply rely upon social inferiors willingly deferring to their social betters as natural leaders. As Taylor wrote, maintaining gentility, and hence an older form of social authority, "was such a chronic and demanding preoccupation precisely because there was sufficient social mobility both to produce a steady stream of *nouveaux riches* and to threaten the old elite with genteel poverty."[53]

The BMS's justification for authority over Boston's maritime affairs rested on its, charitable works and public service. By demonstrating their benevolence, they, like other individuals seeking to fill power vacuums left by the Revolution, sought to claim a greater role over the port's affairs than they had enjoyed before the war. In addition, their public demonstrations also highlighted the benevolent and responsive government that Massachusetts's residents currently enjoyed. In the face of Shays' agrarian challenge, the BMS sought to show that the status quo was responsive to the needs of the port's maritime workers. While in many ways the BMS was preaching to the converted, their actions also reflected a fear that the challenges presented by western agrarians might find resonance among an economically distressed port workforce with a tradition of revolutionary activity. Depending not only upon merchants, but also upon maritime workers, it was in the BMS's best interests to present to the people an organization seeking to look out for the common good of all mariners and port residents. While never publicly denouncing Shaysite rebels, members presented themselves as concerned

[53] Alan Taylor, *William Cooper's Town: Power and Persuasion on the Frontier of the Early American Republic* (New York, 1995), 143. For the failure of Cooper in establishing himself as a "father of the people," and on the successes of "friends of the people," see also pp. 256-281.

members of a maritime community who were responsive to the needs of a port city fallen upon hard economic times.

The BMS also defended the many benefits Boston's government secured for the maritime workers and the maritime community. The Society's actions also resemble the unity and idealism characteristic of classical republican citizenship, as well as an attempt to legitimate newly established authority. Rather than supporting one side of the conflict over the other, the BMS sought to rally support for the system of overseas trade and commerce that they believed offered the best path for inclusive prosperity, well-being, and stability.

After Shays' rebellion, the Society continued their public demonstrations of authority into the 1790s. As public dinners celebrated the society's leadership within the town, the BMS's funeral processions further demonstrated a deceased member's service to the community. In such processions, the tables were turned, with the town expected to show their thanks for distinguished service. In July 1790, for example, the Society voted to attend the funeral of the deceased treasurer, Nathaniel Patten. More than just attending a gravesite service, however, the Society agreed to attend in procession, "from his late dwelling house in Roxbury, & that carriages be provided for the members at the expense of the society."[54] While other members did not receive such lavish attention—Patten had been a member since 1752 and died holding the office of treasurer—members' deaths allowed the Society and the town to publicly mourn one who had served their community. James Bowdoin's funeral in November 1790 also gave the Society an

[54] BMS Minutes, July 6, 1790.

opportunity to show their civic dedication to the town, as the Society assembled to pay due respects to the deceased former governor.[55] The Marine Society placed great importance upon funeral processions, for paying final respects, but also in showing a unified face in their service to the community. Furthermore, funeral processions were not optional, and as had been the case from the 1750s, members failing to attend faced fines, censure and other disciplinary measures. For example, in 1770, the Society voted that members failing to attend a brother's funeral were to be fined £10 (old tender) for the absence. As public dinners allowed the Society to pledge themselves to the town, funerals allowed the town to pay public respects to those who had served.

President George Washington's visit to the northeast in 1789 marked a high point for the BMS public presence in civic events. With towns and cities from New York to Portsmouth, New Hampshire preparing lavish celebrations for the visiting general and first president, the visit allowed each town to present in a ritualized form the most important leaders. In these preparations, Boston was no different than other cities. In October 1789, the presidential tour received a formal welcome from the inhabitants of Boston. Led by a military contingent commanded by Col. John Bradford, light infantry, fusiliers, artillery, and martial music led the parade through Boston's streets. The civilian authorities followed, with local selectmen, the Town Clerk, deputy sheriffs, sheriffs, the Council, the Lieutenant Governor and finally the Marshall of Massachusetts District building the suspense for crowds waiting to see Washington. On "an elegant white horse, attended by Major Jackson, and Mr. Lee, his secretaries," Washington followed the massed civilian and military officials. Behind Washington marched Vice President John

[55] *Columbian Centinel*, Nov. 10, 1790.

Adams, Governor Bowdoin, and various town officers, rounding out the civil service segment of the procession. After the political officials came representatives of the town's various trades. Signifying their importance to the whole community, merchants and traders carried a flag with a device of "a quay with a ship coming in, and another loading. Motto—Generous Commerce binds the nations by a golden chain."

The Boston Marine Society followed the merchants and traders, signifying their status just beneath the wealthiest members of the community. Led by member Samuel Dunn, the body marched before the town's other master mariners, a position symbolizing the BMS's status as self-styled representatives of the maritime interest of the town. The Society's flag carried a symbolic device—"a ship passing the Light-House, and a boat going to her"—that highlighted the importance of navigational improvement to the organization's success. Behind the Marine Society marched revenue officers, naval officers, "preceded by Dr. Eustis" of the Humane Society, and the "Artisans, Tradesmen and Manufacturers, alphabetically arranged."[56]

The Society's position represented the mingling of science, commerce and politics that the BMS had attained by the late 1780s. As it had since the 1750s, safe navigation stood at the heart of the BMS's identity, a concern symbolized by the ship entering Boston Harbor and warmly greeted by a pilot to safely finish the voyage. At the same time, such interests also allowed the society to march in a public demonstration of social organization and hierarchy. Historians David Waldstreicher, Susan Davis and Simon P. Newman have argued that such parades reified the political and social structure

[56] *The Massachusetts Centinel*, Oct. 28, 1789.

of the community for all to see.[57] In Washington's visit, the BMS stood as intermediaries between mariners on one hand, and merchants, civil servants, and government officials on the other. Rather than being geared toward partisan politics, the Marine Society's public events in the 1780s and 1790s represented the stability, effectiveness, and ability of the town's merchant and maritime leadership. Like that of many other gentlemen politicians of the time, the Society's civic mindedness was designed not only to help the city, but also to demonstrate their concern for the collective good. In this sense, they illustrated the role that vocational science could play within the new republic. As other men of science and formal scientific societies adapted their skills to the new nation, the BMS applied the vocational and the scientific side of their work to not only help make Boston's mariners safer, but also to restore the port's trade and aid its maritime families.

Rather than engaging in formal politics, the BMS's civic duties, and public processions indicated their desire to stabilize the rule of the mercantile elite during a period of post-revolutionary economic hardship. The Marine Society's work to restore trade, regulate pilots, ease the plight of the maritime unemployed, and aid in the construction of shelters for the shipwrecked between 1783 and 1789 formed a contrasting image to that presented by western Massachusetts farmers protesting mercantile elite rule during the Shays' rebellion between 1786 and 1787.

The BMS's combination of vocational science and politics went beyond the local and state arenas. Following Shays' Rebellion, debates over the ratification of the Federal

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[57] See Susan G. Davis, *Parades and Power: Street Theatre in Nineteenth Century Philadelphia* (Philadelphia, 1986); David Waldstreicher, *In the Midst of Perpetual Fetes: The Making of American Nationalism, 1776-1820* (Chapel Hill, 1997); Simon P. Newman, *Parades and the Politics of the Street: Festive Culture in the Early Republic* (Philadelphia, 1997).

Constitution again split the commonwealth and the city of Boston in 1788 and 1789. Like their response to Shays' Rebellion, the BMS lent its natural authority as father of the maritime people to legitimate a new Federal government during the late 1780s and early 1790s. While not formally political, the BMS's public service carried political implications that blended science and politics in such a way as to support Federalists and Federalist policies. In exchange, the BMS called upon their contacts within the Federal government to support and promote maritime improvements designed to ensure the safety and well-being of Boston's mariners. Beginning with technical information, but later expanding to lighthouses, marine hospitals, and coastal surveys, the BMS used their experience, expertise, and local prestige as navigators and mariners to help promote Federally funded navigational improvements and secure Federal support for other BMS concerns. As the BMS and Federalist officers worked together, both parties demonstrated to an uncertain population that a centralized and distant Federal government was capable of ruling in accordance with local concerns with respect to local conditions. Furthermore, a strong, centralized Federal government brought more resources to bear on local maritime developments than previous local support systems. Consequently, maritime developments, fueled by Federal power but directed by the BMS, demonstrated the benign nature of the new government's rule, and undermined Revolutionary era fears of a grasping, distant regime that might threaten newly won liberty.

Political debates surrounding the ratification of the Federal Constitution in 1787 and 1788 politicized navigation and navigational science, and inserted both into a wider debate over the nature of power, the structure of the American political economy, and

how new centers of authority would establish legitimacy and extend their powers. The complexity of the issues that surrounded navigation and maritime improvements during this period requires extensive discussion and highlights how navigation fit within competing visions of the American political and economic future.

While the Marine Society worked to prop up Boston's shipping industry and step in to fill administrative voids left after independence, national politics suffered from confusion and inactivity under the Articles of Confederation. Developed under duress during the Revolution, the Confederation Congresses managed to govern in the face of the war. With peace however, and the removal of a common enemy, Congress failed to provide adequate national leadership.[58] After four years of centralized confusion and inaction, a convention of delegates met in Philadelphia in May of 1787 to revise the Articles of Confederation to make the national government more effective. In September, 1787, the convention presented to the nation not a revised Articles of Confederation, but an entirely new Federal Constitution that granted a central government much wider powers than Congress had previously enjoyed. Such an apparent *coup-de-état* polarized American politics and set the stage for contentious ratification conventions that met state by state in the Fall of 1787. At the heart of these debates sat new divisions in American society over the strength and nature of the American national government.[59]

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[58] For an in depth discussion of the failings of the Articles of Confederation government, see Wood, *Creation*, ch. 10.

[59] George Athan Billias, *Elbridge Gerry: Founding Father and Republican Statesman*, (New York, 1976), 68.

In the past, some historians have assumed that the strong pro-trade faction among supporters of the Federal Constitution translated into ironclad support for the document among seaport towns, with opposition emanating from inland agrarian communities.[60] The specifics of ratification, however, suggest that port communities, especially Boston, were not solidly behind Federalist plans, at least on a popular level. Furthermore, Federalist supporters of the new constitution were aware that Massachusetts would play an important role convincing the rest of the nation to ratify the new government.[61] But early developments in the convention itself suggested that the state would not be easily won over. In September, delegate Elbridge Gerry of Marblehead, Massachusetts refused to sign the document, publicly announcing his opposition. Gerry feared that the strong centralized government the document created would split Massachusetts and lead to civil war. On one side, Gerry saw a party "devoted to Democracy, the worst . . . of all political evils." On the other, he saw a landed elite "as violent in the opposite extreme."[62] Inspired by Gerry, Massachusetts Antifederalists, mostly from western lands, saw the new centralized government that emerged from the Philadelphia Convention as a reincarnation of the British tyranny in America.[63]

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[60] See Charles Beard, *An Economic Interpretation of the Constitution of the United States* (New York, 1941), Samuel Eliot Morison, *The Maritime History of Massachusetts, 1783-1860* (1921; Boston, 1961), Paul Goodman, *The Democratic-Republicans of Massachusetts: Politics in a Young Republic* (Cambridge, Mass., 1964), and to some extent, Alan Taylor, , *Liberty Men and Great Proprietors: The Revolutionary Settlement on the Maine Frontier, 1760-1820* (Chapel Hill, 1990).

[61] Jackson Turner Main, *The Antifederalists: Critics of the Constitution, 1781-1788* (Chicago, 1964), 187-200.

[62] Gerry, as quoted in Billias, *Elbridge Gerry,* 199-200. Samuel Banister Harding, *The Contest Over the Ratification of the Federal Constitution in the State of Massachusetts* (Cambridge, Mass., 1896), 19.

[63] Jackson Turner Main, *The Antifederalists: Critics of the Constitution, 1781-1788* (Chicago, 1964), ch. 3.

Boston was home to a strong Antifederalist contingent. Writing in Boston, the opponents of the new constitution attacked the document on the same grounds as Boston attacked crown rule in the 1770s. One writer calling himself "Jan de Wit" argued that the new government was aristocratic at its core, "calculated to find employment for men of ambition, and to furnish means of sporting with the sacred principles of human nature."[64] "A Republican Federalist" argued that the document "established a precedent . . .for building on its ruins a compleat system of despotism," and would establish propertied wealth as the foundation for representation and suffrage.[65]

Ratification procedures in Boston further revealed divisions within the community over the document. Gerry himself remained quiet, at least until October 18th, 1787 when his letter of opposition was published to significant attention.[66] Within the city, such important leaders as Samuel Adams, James Warren, Nathan Dane, James Winthrop, Benjamin Austin, and Samuel Osgood all sided against it. Most significantly, Governor John Hancock, while chair of the ratification convention, remained silent.[67] In January 1788, when the delegates assembled to deliberate, Antifederalists dominated the group with a majority of around 40. Through the deliberations, Samuel Adams and Hancock, both locally popular among Boston's maritime community, emerged as key swing delegates, and ultimately emerged publicly supporting the document after political

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[64] *American Herald*, Nov. 19, 1787, as in Harding, *Ratification*, 27.

[65] *Massachusetts Centinel*, Jan. 12, 1788, as in Harding, *Ratification*, 30.

[66] Harding, *Ratification*, 18-19.

[67] Main, *Antifederalists*, 200-201.

arm-twisting and enticing promises of future political support.[68] In the end, the document passed, though, according to historian Jackson Turner Main, "It seems clear that a majority, though not a large one, of the citizens of Massachusetts opposed the Constitution when it was ratified, and it is probable that a majority continued to oppose it."[69]

Recent investigations by Doron Ben-Atar and Barbara Oberg suggest that Federalist rule, even after ratification, was not as uncontested as had been previously believed. Rather than an uncontested and fully legitimate government, Ben-Atar and Oberg argue that, "The success of the experiment in nation making depended upon the Federalists' abilities to bind the loyalty of former British subjects to the idea of the nation and to its governing elite."[70] To accomplish this, Federalists had to respond to the political realities of post-Revolutionary America: "The Federalists interpreted the Revolutionary mandate to mean the creation of a representative government responsive to, yet independent of, the popular will. They were nationalists who respected local autonomy. They were aristocrats competing in a new political world for the votes of ordinary individuals."[71] Rogers M. Smith argues that Federalists were also "acutely aware that their fledgling government faced stiff challenges from every direction. Many Americans doubted that the new national institutions were any good, much less deserving of their highest loyalties. Communal attachments were overwhelmingly local, extending

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[68] Harding, *Ratification*, 96-97. For a more complete narrative of the political maneuverings around Massachusetts' ratification of the Constitution, see Main, *Antifederalists*, 204-208, from which the preceding narrative is derived. See also Harding, *Ratification*, 83-89.

[69] Main, *Antifederalists*, 201-209.

[70] Doron Ben-Atar and Barbara B. Oberg, eds., *The Federalists Reconsidered* (Charlottesville, 1998), 4.

[71] Ben-Atar and Oberg, *Federalists*, 8.

at most to state or regional identities."[72] Consequently, it is clear that while the Federalists won the ratification in Massachusetts, national Federalist leaders could not simply ignore local Boston concerns and impose a distant will upon the town's constituencies. Politically, commercially and economically, the port town was too important, and had proved too contested, to assume that it would follow Federalist leads.

After ratification, the port town continued active resistance to Federalist policies and candidates. As late as January, 1789, Antifederalists continued to control the Massachusetts House of Representatives.[73] Even after losing the House, continued depression in the maritime trades helped Antifederalists gain increased support from Boston's maritime community, and allowed Senator Benjamin Austin to use this crisis to attack Federalists and their policies.[74] As coastal towns from Nantucket to Gloucester petitioned the General Court for relief in 1790, Austin authored a report calling for Congressional action to improve the nation's maritime trades. Fearing European retribution in other trading markets, however, other Massachusetts delegates supported weak Federal legislation that did next to nothing to help Massachusetts' fishermen. As William Welch claims, "the Federalists of Massachusetts were holding the fishermen of the commonwealth hostage to the more important demands of a mercantile elite."[75] Largely spurred on by Austin and the collapse in the maritime trades, Antifederalists continued to exercise significant clout among Boston residents as late as 1792. While they could do nothing about Federal legislation, Boston's working community united to

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[72] Rogers M. Smith, "Constructing American National Identity: Strategies of the Federalists," in *The Federalists Reconsidered*, ed. Doron Ben-Atar, and Barbara B. Oberg (Charlottesville, 1998), 21.

[73] Main, *Antifederalists*, 208-209.

[74] William Welch, "The Virtuous Republic of Benjamin Austin, Jr.," *Locus*, 8 (1995), 32.

[75] Welch, "Virtuous Republic," 32-34.

oppose Federalists in other areas. In a town meeting discussing a reform of Boston's police force, for example, John Quincy Adams reported that Austin "with the utmost degree of vehemence and absurdity," and using a long speech that was to Adams a "farrago of nonsense and folly," managed successfully to oppose the acts that the Federalists were supporting. "Seven hundred men, who looked as if they had been collected from all the Jails on the continent, with Ben Austin like another Jack Cade at their head outvoted by their numbers all the combined weight of Wealth, Abilities, and Integrity of the Town. . . . From the whole Event I have derived a confirmation of my contempt for democracy as a Government."[76]

The strength of Massachusetts Antifederalists posed challenges to new Federalist officers, such as Secretary of the Treasury Alexander Hamilton, who were seeking to stabilize and legitimate the new government. As Austin and other Antifederalists worked to develop solid opposition to Federalist policies, Hamilton began to use his position as Secretary of the Treasury to sway the state to the Federalist camp. He first began shoring up Federalist support in Massachusetts by doling out Federal positions in the state to Federalist place-men. According to Carl E. Prince, "Among the primary dispensers of [Federalist] ideology were the [customs] collectors and, in the larger ports, the naval officers and surveyors of customs."[77] These officers, many reporting to Hamilton's close ally and Port Collector for Boston, Benjamin Lincoln, "anchored the local Federalist parties in a dozen of the commonwealth's most populous towns and cities. Using their influence and positions with a full measure of commitment, these cadremen formed the

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[76] John Quincy Adams, as quoted in Welch, "Virtuous Republic," 34.

[77] Carl E. Prince, *The Federalists and the Origins of the U. S. Civil Service*, (New York, 1977), 23.

backbone of the Federalist establishment in the harbor towns."[78] For Hamilton, and his concerns for Massachusetts' support after the ratification, the customs service and the other numerous positions falling under the Secretary of the Treasury's influence represented a fountain of patronage to be doled out for political support and information.

Hamilton soon realized other avenues to shore up political support for the Federalist administration in the contentious state. In 1789 Elbridge Gerry, returning to Congress after losing the ratification battles in Boston, proposed a bill calling for Federal assumption of lighthouses, buoys and public piers—issues that coastal communities had long held as important local affairs. The bill, passed in August, called for Federal assumption of all lighthouses, beacons, and public piers from local control. In exchange for ceding the land on which the light stations stood, Gerry's bill provided for Federal payment of maintenance, upkeep and staffing for a one-year period, with the option for renewal.[79]

Because of their utility, lighthouses and beacons were politically popular among residents in coastal towns. For example, in July 1791, William Bentley of Salem recorded "Yesterday the intended Beacon at Baker's Island was raised by a large and jovial party of our Mariners. It is to be forty feet in height. Every exertion of this nature is to be considered as favorable to the public happiness, & as a source of our good hopes

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[78] Prince, *Federalists*, 22.

[79] John Lauritz Larson had noted that this was the last national-scale internal improvement bill to sail through Congress. Subsequent bills faced stiff resistance before the 1820s, as many improvements were seen as fonts of political and financial patronage, largely as a result of this bill's subsequent history. See John Lauritz Larson, *Internal Improvement: National Public Works and the promise of Popular Government in the Early United States* (Chapel Hill, 2001), 45-55.

for the improvement of our navigation."[80] Yet lighthouses had long posed a problem for Massachusetts communities. Since 1713, when local Boston residents petitioned the General Court for a lighthouse at the mouth of Massachusetts Bay, lighthouse maintenance and support were a haphazard and local affair.[81] While receiving some public funds for construction, lights were often staffed and maintained through duties levied on vessels entering the harbor, their upkeep depending on the amount of traffic entering the port and not on a regular schedule of support.[82] Furthermore lighthouse keepers were often distracted by other occupations such as cattle grazing or pilot services, and faced sporadic government payment of expenses.[83] Despite the haphazard nature of support, the need and public benefit of lighthouses spurred numerous stations on the coast through the eighteenth century. Massachusetts' residents constructed lighthouses on Nantucket in 1746, in Plymouth in 1768, and off Cape Ann in 1771.[84] In Newburyport, local merchants and the Newburyport Marine Society joined forces in 1783 and developed rules and signals for beacons marking the mouth of the Merrimack River that

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[80] William Bentley, *Diary of William Bentley*, comp. Alice G. Waters (4 vols., Gloucester, Mass., 1962), 281.

[81] The practice of petitioning colonial governments for lighthouse construction was not limited to Massachusetts. In both New York and New Hampshire, local residents appealed to Crown governors for lighthouse construction. In New Hampshire, the Portsmouth Marine Society actively appealed to the Royal government for support for the Portsmouth light that was erected in 1771. See Francis Ross Holland, *America's Lighthouses: Their Illustrated History Since 1716* (Brattleboro, VT, 1972), 15; Ronald Quilici, "The Portsmouth Marine Society: Social Diversity in a Colonial Maritime Community," *Historical New Hampshire*, 30 (1975), 101-112; and Dennis Noble, *Lighthouses & Keepers: The U.S. Lighthouse Service and Its Legacy* (Annapolis, 1997), 5-7.

[82] See Holland, *America's Lighthouses*; Noble, *Lighthouses & Keepers*, and Malcolm Willoughby, *Lighthouses of New England* (Boston, 1929) for the local nature of lighthouse support.

[83] The intermittent, yet consistent petitions of Robert Ball for back pay and cost reimbursements represent the haphazard attention given to lighthouse maintenance during the colonial period. See Robert Ball's petitions to Massachusetts General Court, vol. 64, 26-28, 54, 197, 202-203, 239, 340; vol. 66, 14-15, 254-255 (Massachusetts State Archives, Boston, Mass.).

[84] Holland, *America's Lighthouses*, 16. Willoughby, *Lighthouses of New England*, 153-156.

informed masters of safe times to cross the river bar, and merchants which types of vessels were entering the harbor.[85] Yet new light stations suffered from the same haphazard support system as Boston's light, and consequently, were less reliable than would otherwise be the case. Furthermore, the local nature of lighthouse construction left unmarked the most dangerous areas that threatened shipping but stood far from a local population center —areas such as Cape Cod and Nantucket Shoals—despite their importance to shipping.[86] As a result, while local harbors were building light stations, areas that needed them most received no attention.

With lighthouses in such a state, Federal control over these important stations offered Hamilton great political benefits. They allowed Hamilton to expand support for the government by doling out Federal patronage through lighthouse maintenance and supply contracts to local Federalist supporters. In Massachusetts, with six of the nation's ten lighthouses, such patronage was not inconsequential.[87] Lighthouses also allowed Hamilton to promote his economic plans. Federally supported lighthouses reduced hazards to foreign and local shipping, thereby promoting foreign commerce with American ports.

While Federal assumption of lighthouses promised great boons to the Secretary and his political allies, the move did not lack dangers. In a state already torn by a hotly contested ratification debate and continued Antifederalist opposition on a local level, Federal assumption of lighthouses radically changed local traditions and sources of

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[85] William H. Bayley and Oliver O. Jones, *History of the Marine Society of Newburyport, Massachusetts* ([Newburyport, Mass.], 1906), 36-38.

[86] Noble, *Lighthouses & Keepers*, 5.

[87] Harold C. Syrett, ed., *Papers of Alexander Hamilton*, (27 vols., New York, 1961-1967),VI, 43.

patronage in port towns. Lighthouses had been traditionally staffed by local residents familiar with the waters and shipping traffic of their respective ports, and as New Hampshire's case revealed, some were not eager to hand over such facilities to Federal control. Lighthouse-keeping positions and contracts, therefore, represented important sources of patronage to local governments.

In addition, ceding even a small portion of local land to Federal control set a dangerous precedent regarding local property and Federal authority. In a hesitant New Hampshire, for example, the state legislature only ceded the Portsmouth lighthouse land to Federal control on condition that the state could reclaim the land should the Federal government fail in its navigational duties, and that all state writs, warrants and executions retain jurisdiction on the ceded land.[88] As a result, to many Antifederalists, land cessions might appear as the thin edge of a wedge by which the Federal government wrested away local power, authority, and property.

Consequently, while promising great returns, Hamilton had to tread lightly in extending Federal control to local lighthouses. In January, 1790, Hamilton recommended that all the current light house keepers be retained.[89] Contracts for lighthouse oil and supplies, however, were too important to simply leave to local control.

> As however it is the intention of the Legislature, that the expenditures for these establishments, should be conducted on the spot, it seems advisable for this and other reasons, which will occur, that in the distant States, there should be some other persons than the immediate Superintendents of the Light house connected with them in the business. As a temporary arrangement for this purpose, the Secretary wou'd propose that the Superintendents . . . In Massachusetts [be put under the supervision] of the Collector of Boston.[90]

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[88] Albert Stillman Batchellor and Henry Harrison Metcalfe, *Laws of New Hampshire Including Public and Private Acts, Resolves, Votes, etc,* (10 vols., Manchester, New Hampshire, 1904-1922), V, 685-686.

[89] Syrett, ed., *Hamilton Papers*, VI, 45.

[90] Syrett ed., *Hamilton Papers*, VI, 43-49.

While respecting traditional local patronage, Hamilton also ensured that lighthouse assumption carried benefits to new supporters.

In this political tension between Federal and local patronage, the BMS emerged as a group through which Hamilton could extend Federal power without arousing local animosity. Wary of arousing Antifederalist fear of a grasping central government, it was the politically astute Benjamin Lincoln who approached the Boston Marine Society in 1789 for information to help the transition of lighthouses to Federal control. A retired general, Lincoln emerged from the ratification conflict as a Federalist with a moderate bent. For his support for Federalist policies, Hamilton named him to the post of Collector for the Port of Boston in 1789. But the customs officer had also proven able to work between arch-Federalists, such as Stephen Higginson and Jonathan Jackson, and popular leaders such as John Hancock, Theodore Sedgwick, and John Adams. Politically subtle and loyal, Lincoln came to be an important source of information for Hamilton about political conditions in Massachusetts.[91]

When Lincoln received Hamilton's circular letter in October, 1789 requesting that his officers collect information about repairs of lighthouses, beacons and buoys in their jurisdictions, he immediately consulted with the Boston Marine Society as the organization most immediately familiar with the Boston's port. In early November, Lincoln presented the letter to the membership of the Boston Marine Society. The

[91] Prince, *Federalists*, 27.

Society formed a committee to respond to Hamilton's queries, and "give him such information, as shall conduce to the public benefit."[92]

Lincoln's initial approach to the Marine Society laid the foundation for a series of other consultations between 1789 and 1798. In October, 1790, the BMS held a special meeting to respond to Lincoln's request for recommended dimensions for a revenue cutter then under construction in Newburyport.[93] The next month, the Society voted Lincoln membership.[94] During this period, Lincoln's membership and informal contact with the Society helped maintain the relationship between government and the BMS. In December, 1796, when the federal government finally agreed to build a light on Cape Cod, Lincoln approached the BMS again asking their expertise regarding the station's design and placement. The following August, the BMS formed a committee to advise Lincoln on buoy placement and construction. In September, 1797, Lincoln asked BMS advice in establishing the light pattern for the new light, and in October, the society formed a committee to aid fellow member and revenue cutter commander John Foster Williams to develop sailing directions for the new lighthouse. The BMS then published the directions in January, 1798. As early as December, 1796, Lincoln had worked closely enough with the Marine society to report to Hamilton that, "more information is I think to be collected from [the Boston Marine Society] in this business [of lighthouse design] than from any other source."[95]

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[92] BMS Minutes, Nov. 3, 1789.

[93] BMS Minutes, Oct. 12, 1790.

[94] BMS minutes, Nov. 2, 1790.

[95] Benjamin Lincoln to Alexander Hamilton, Dec. 7, 1796, letterbook, B. Lincoln Papers (Massachusetts Historical Society, Boston, Mass.).

Such support, however, did not come free, and almost as soon as Lincoln began consulting with the BMS, the BMS used their connections to the new Federal government to push for more marine development projects. The very first communication from the Marine Society to Hamilton carried with it a request for Federal responses to local concerns. In their November 16th, 1789 response to Hamilton's October 5th Treasury Circular, the BMS informed the secretary that, "A very respectable Body of the Merchants of this Metropolis [have] thought proper to communicate to us, the Members of the Boston Marine Society, a Copy of their proposed application to the President of the United States on the subject of the Pilotage of this Bay and Harbour."[96] Without any subservience or deference, the BMS informed Hamilton, "We find ourselves compell'd by Motives of Publick Duty to observe to you Sir, that a Reform is necessary in the Pilotage, &c. of the Harbour."[97]

While Hamilton's response has not been found, the Society began coupling their responses to requests for information with further demands from Federal authorities.[98] In their special meeting in October, 1790, for example, the BMS not only recommended dimensions for revenue cutters as per Lincoln's request, but also formed a committee to develop plans for the situating, housing, and funding of a marine hospital for sick and disabled mariners.[99] Two weeks later, at the same time as voting Benjamin Lincoln as an honorary member, the Society drafted a petition to Congress for Federal support for

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[96] Syrett , ed., *Hamilton Papers*, V, 517, 518 note 1. For information about Hamilton's interests see Treasury circular Oct. 5, 1789.

[97] Syrett, ed., *Hamilton Papers*, V, 517-518.

[98] Syrett, ed., *Hamilton Papers*, V, 568.

[99] BMS Minutes, Oct. 12, 1790.

marine hospitals. In January, 1791, the Society sent its petition to Congress, where it was referred to Hamilton for consideration.

The BMS petition for marine hospitals offered Hamilton another opportunity to bolster American overseas trade while showing the responsive nature of Federal power. For Hamilton, marine hospitals represented a key element in maintaining healthy mariners for the American merchant service and, in times of war, naval service. "The establishment of one or more Hospitals in the United States is a measure desirable on various accounts. The interests of humanity are concerned in it, from its tendency to protect from want and misery, a very useful, and, for the most part, very needy class of the Community."[100] Furthermore, Federal support for marine hospitals may help entice trained mariners away from other nations' merchant services. "The interests of navigation and trade are also concerned in it, from the protection and relief, which it is calculated to afford to the same class; conducing to attract seamen to the country."[101] Marine Hospitals also afforded Hamilton a chance to show Federal benevolence to local communities in responding to their immediate needs and concerns. Hamilton saw hospitals as fulfilling some of the social problems facing high risk maritime labor: "The benefit of the fund ought to extend, not only to disabled and decrepid [*sic*] seamen, but to the widows and children of those who may have been killed or drowned, in the course of the service as seamen."[102] In addition, the hospitals could also offer continued aid to its former patients: "It will probably be found expedient, besides the reception and

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[100] Syrett, ed., *Hamilton Papers*, XI, 295.

[101] Syrett, ed., *Hamilton Papers*, XI, 295.

[102] Syrett, ed., *Hamilton Papers*, XI, 295.

accommodation of the parties entitled, at any hospital which may be instituted to authorizing the granting pensions, in aid of those who may be in condition, partly to procure a subsistence from their own labor. There may be cases, in which this mode of relief may be more accommodating to the individuals, and, at the same time, more economical."[103] But the Marine Society did not get all that it wanted from their petition to Congress about Marine Hospitals. In 1791, when they first formed a committee to select a site, the committee had chosen a site in Charlestown, Massachusetts. Hamilton, however, wanting such a font of patronage closer to his own location, argued for the first hospital to be situated in Washington, then in Virginia.[104]

The delayed response to their request for a marine hospital, which sat in Congress until 1798, taught the Marine Society that Hamilton's advocacy was not enough to get their wishes met by the new government. While they waited for Hamilton to present their petition to Congress, the BMS began pressing for more marine improvements, calling upon more political contacts than the Secretary of the Treasury alone. Drawing upon their long-standing relationship with the Massachusetts executive dating back to the 1760s, the society asked the Governor for aid in petitioning Congress for a lighthouse on Cape Cod in February, 1792. In pressing for the governor's support, the BMS also joined forces with the Humane Society of the Commonwealth of Massachusetts and other marine societies in the area. On February 4th, 1792, the Marine Society at Salem contacted the Newburyport Marine Society to see if they would help pressure government

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[103] Syrett, ed., *Hamilton Papers*, XI, 295.

[104] The case for marine hospitals sat in Congress until 1798, when the Federal government endorsed establishing hospitals for mariners. Although Hamilton originally argued for their situation in Washington, Congress in 1798 sanctioned the establishment of one hospital in Charlestown, Mass., as the BMS had recommended in 1791.

for a Cape Cod lighthouse.[105] On the 15th, the joint communiqué arrived at the Boston Marine Society, just over a week after the BMS presented their case to the governor.[106]

The need for a light on Cape Cod was clear to mariners operating in New England waters. Jutting 90 miles into the ocean, surrounded by shoal waters, and washed by strong currents, Cape Cod had long proved hazardous to New England shipping. Furthermore, sailing directions and charts called for vessels sailing around the Cape to come inshore to Sankaty Head on Nantucket Island to avoid the shoals and currents of Georges Banks.[107] Sailing between Nantucket to the west and Georges Banks to the east, however, required vessels to thread the needle of the shoal waters and currents around Monomoy and Cape Race. A light on Cape Cod would make such a passage safer by giving vessels a reference point from which to judge their relative bearings to the Cape, Nantucket and Georges Banks.

The problem with a light on Cape Cod had long been how to support the station. Without major populations centers wealthy enough to fund the construction of a lighthouse in the area, the outer Cape stood unmarked, and was likely to remain so without government funding.

Despite the strong grassroots support for the light station, however, the BMS saw little progress made by 1795. Furthermore, with Hamilton leaving the Treasury in 1795, the Marine Society lost one of their more powerful contacts in the Federal government. To put the issue back onto the Congressional table, the BMS re-appointed a committee to

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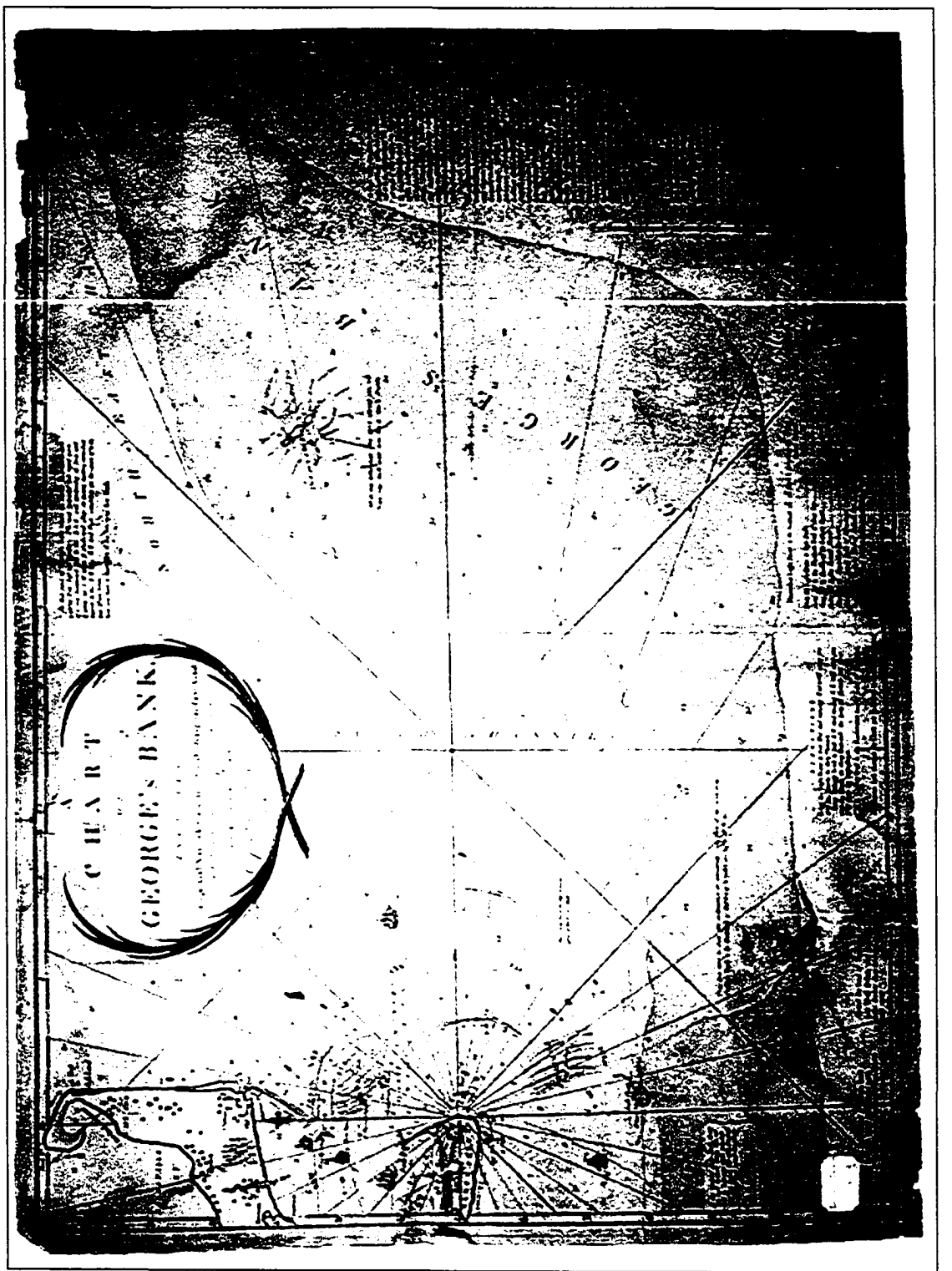
[105] "Salem Marine Society Instituted 1766," Feb. 4, 1792, vol. 1, Marine Society at Salem Papers (Peabody Essex Museum, Salem, Mass.).

[106] BMS Minutes, Feb. 7 and Feb. 15, 1792.

[107] Paul Pinkham, *A Chart of George's Bank Including Cape Cod, Nantucket and the Shoals lying on their Coasts, Surveyed by Capt. Paul Pinkham* (Newhaven [*sic*], Conn., 1797).

Figure 12: Paul Pinkham, *A Chart of George's Bank*, 1797.



Courtesy of the Peabody Essex Musuem, Salem, Massachusetts.

petition Congress directly for a Cape Cod light station in November, 1795. The BMS also contacted the Humane Society and called up support from the Chamber of Commerce in their renewed campaign. In December, the Newburyport Marine Society also weighed in and asked BMS support with their own petition to Congress for the lighthouse.[108] In January, 1796 the Marine Society at Salem added their voice to the outcry and presented their own petition.[109]

Again, the BMS, along with Newburyport and Salem Marine Societies, felt frustrated with Congressional indifference to their requests. In February, 1796, Newburyport's Marine Society continued to pressure Congress, this time through their district representatives.[110] In July, the BMS went over the governor's head, submitting their petition to Congress directly, and formed a committee in November to prod Congress for action on the issue.[111] Finally, after six years of pressure, Congress agreed to construct Cape Cod Light, situating the station on the Highlands of Truro marking some of the more treacherous shoal waters in the area. Capt. John Foster Williams of the US Revenue Service, as a member of the Marine Society, accepted the aid of a committee of his brother members to draw up sailing directions for the new light station as the society had done in Plymouth 30 years earlier. In 1798, Cape Cod Light was lit for the first time.

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[108] William H. Bayley and Oliver O. Jones, *History of the Marine Society of Newburyport, Massachusetts* ([Newburyport, Mass.], 1906), p. 75.

[109] Marine Society at Salem Papers, Jan. 28, 1796, vol. 1 (Peabody Essex Museum, Salem, Mass.).

[110] Bayley and Jones, *Newburyport Marine Society*, 75.

[111] BMS Minutes, July 2, and Nov. [*sic*], 1796.

Throughout the campaign for Cape Cod Light, the Boston Marine Society continued to demand other developmental aid from the Federal government. Before Hamilton's departure from the Treasury in 1795, the BMS requested that Hamilton place buoys at Harding's Rocks and at a few other locations along the New England coastline.[112] Yet after Cape Cod Light was lit, the BMS hoped to press the advantage of their recent victory by securing Federal funds for another burning navigational concern in the area. Since long before the early eighteenth century, when Cyprian Southack tried to present a chart of Cape Cod and Nantucket Shoals, mariners had been wary of the shallows jutting southward from Cape Cod. While Cape Cod Light helped mariners sailing around the eastern shore of the Cape, few aids existed to help vessels coming north from New York or points south. In many ways, those shoals represented some of the most dangerous areas along the coast, and surveyors had long tried to get accurate charts of the region. Paul Pinkham and Edmund March Blunt tried in 1797 and 1798, but the BMS found their chart a poor tool for navigation and refused to sanction the work.

Hoping to follow up on the victory over Cape Cod Light, the Boston Marine Society voted to petition Congress to fund a coastal survey of Nantucket Shoals. As in the past, they drew upon the close working relationship that had developed with honorary member Benjamin Lincoln, and they contacted other marine societies for further grass-roots support for the work. Naming Lincoln to the committee, they began drafting their memorial in February 1798. This time, however, the BMS stood down from the campaign. In March, the society ordered the committee drafting their petition to suspend all proceedings, and the issue was never raised again.

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[112] BMS Minutes, Aug. 7, 1792.

Throughout the 1790s, Hamilton and the BMS cooperated for their own agendas, resulting in significant navigational improvements and political voctories. For the BMS, cooperation with Hamilton and Lincoln allowed them access to the resources and authority needed to address pressing navigational concerns in the Boston area. For Hamilton and Lincoln, such cooperation allowed the new Federalist regime to allay Antifederalist fears still circulating after ratification. In working through the BMS to extend Federal authority into the local level, Hamilton and Lincoln demonstrated that Federal authority was to be exercised in limited and restrained fashions, and not simply to emerge as another distant center of power curbing newly won liberties. This working relationship was a full partnership in that both sides entered negotiations holding important cards. Federalists could not afford to alienate the Marine Society for fear of political and developmental costs: the Marine Society could not afford to alienate Federalist agents in Boston for fear of losing the opportunity to further their interests in maritime developments. This helped Hamilton allay Antifederalist fears and help secure Federalist allegiance in the key port city of Boston.

By the late 1790s, the Boston Marine Society had fully integrated their maritime improvement efforts within the political world. Working closely with Federalist representatives, collaborating on projects that brought prestige to the Society and political support for the government, and continuing a tradition of civic service through maritime research, the BMS had attained considerable political, and well as scientific authority in Boston shortly before the end of the eighteenth century. Signifying their confidence in the political realm, the BMS ventured into foreign affairs in 1798, when the assembled members voted to advise President John Adams on the tensions the United States were

experiencing with France in the Caribbean. In a brief to President John Adams, BMS president Thomas Dennie argued for a firm stand against French aggression in Europe and in the Caribbean: "when we find this nation . . .artfully aiming at the utter subversion of the political, religious and social institutions of all governments. . . they become enemies of all mankind, and ought to be opposed by every country." Postulating that "wooden walls, are confessedly, our best defense," Dennie extended the services of the society in this, the diplomatic policy he advocated. "Many of this society have been engaged in maritime warfare; and when their country again calls they trust, that under your pilotage, they shall not be found wanting."[113]

In responding to the Society's paper, Adams revealed the importance that the Marine Society had played in the preceding years of Federalist government. After discussing the constitutional explanations for the French Revolution, an affair that Adams, like most Federalists at the time, said "has ever been incomprehensible to me," he laid out the options he saw for the United States.

> If the French, therefore, will become the Enemies of all mankind, by forcing all nations to follow their example, in the subversion of all the Political, Religious and social institutions which time, Experience and Freedom have sanctioned, they ought to be opposed by every Country, that has any pretensions to principle, Spirit, or Patriotism.[114]

The Marine Society, furthermore, had and would continue to play an important role in future American responses to French "depredations." "Floating batteries and wooden walls have been my favorite System of warfare and defence for this Country, for three and twenty years," wrote President Adams to the Society in 1798, "I have had little

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[113] BMS Minutes, Sept. 4, 1798.

[114] John Adams to the Boston Marine Society, Sept. 7, 1798,as in Baker, *Boston Marine Society*, 313.

success in making proselytes.—At the present moment, however, Americans in general, Cultivators as well as merchants and mariners, begin to look at that source of security and protection; and your assistance will have great influence and effect, in extending the opinion in theory and in introducing and establishing the practice."[115] By 1798, the BMS had become a key advisor not only to navigational concerns, but as Adams indicated, an important source of support in Federalist plans for naval expansion and international affairs.

The BMS's experiences with at first state and then Federal agents reveal that science and commerce in the early republic was actively involved in the political challenges that faced the rest of the community. Like other virtuous republican scientific groups in America, the Boston Marine Society applied its talents, skills and resources to the needs of their new nation. At first, these needs were managerial, charitable, and technical concerns. Yet as the political crises of the 1780s and 1790s threatened the shaky republic, the BMS found itself extending its scientific work into the political realm as a stabilizing force. In applying their authority to stabilizing Massachusetts politics during Shays' Rebellion, the BMS attracted the attention of Federal officers in town, who later called upon their influence to help stabilize the new Federal government.

The relationship was not a one-way street, however, and as the BMS consulted more with the Federal establishment, they also used their position to further their own interests in promoting navigational improvements. Successes at erecting lighthouses, improving navigational aids, and securing Federal support for marine hospitals brought greater prestige and authority to the Marine Society—authority which they then reinvested into their relationship with the Federal government. Consequently, between

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[115] John Adams to the Boston Marine Society, Sept. 7, 1798,as in Baker, *Boston Marine Society*, 313.

1790 and 1798, the BMS's scientific work allowed the society to achieve considerable influence in political affairs.

CHAPTER IV

THE APEX OF VOCATIONAL SCIENCE, 1789-1800

While the Marine Society applied their resources and influence to politics, they also moved to solidify their authority over Boston's nautical research and publication market. Taking advantage of post-war uncertainty concerning nautical authority, the BMS emerged during the late 1780s as the organization controlling nautical research in Boston. Such authority, however, was not uncontested. In exercising their authority, the BMS ran into individuals, such as cartographer Matthew Clark and publisher Edmund March Blunt, who challenged the BMS's vocational foundation to judge charts and sailing directions. Consequently, no sooner had the BMS established themselves as the authoritative center of navigational research in the new nation, than others began challenging that foundation.

The challenges that the BMS faced at this highpoint of their scientific authority stemmed from practical issues as well. As others challenged the BMS's abilities to judge cartographic publications, BMS members such as Job Prince, Joseph Ingraham, and James Magee enjoyed only limited success in adapting vocational methods to the more challenging tasks of navigating routes beyond the Capes and into the Pacific. By 1800, the demands of private commercial seafaring and national scientific exploration proved to be incompatible. Pressures to return profits displaced the BMS's desires to bring back valuable navigational data.

Ultimately, the apex of the BMS's role as a center of scientific authority in navigation was short lived. Methodological challenges at home worked with challenges in adapting to new trading routes to undermine BMS authority in the navigational research world. While the BMS still held political influence as navigational research consultants in 1800, the foundations of that authority had weakened precipitously.

When Bartholomew Burges submitted *A Short Account of the Solar System* (Boston, 1789) to the Boston Marine Society for review, he had already sought work in the Boston area for several years. In 1786, the ambitious and self-assured Burges applied to Christopher Champlain for work as a supercargo or factor in the India trade recently pioneered by newly independent American merchants. In the opening of his letter to Champlain, Burges confidently stated his pedigree:

> Gentlemen,
> Recommended by Lord Clive to the court of directors in London for an Establishment in the Honorable East India Company Service abroad, I went in the Northington to Fort William in Bengall . . . [1]

As if such credentials were not enough, however, Burges put his accomplishments in more stark terms: "remained in the country for 7 or 8 years in which time I acquired a fortune of 70,000 pounds sterling . . . ."[2] With experience in the East India Company before the Revolution, he felt he was a natural choice for the trading interests in Essex County, Massachusetts. Yet Burges continued to present his skills to prospective

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[1] Batholomew Burges to Christopher Champlain, Aug. 5, 1786, George Wetmore Collection (Massachusetts Historical Society, Boston, Mass.).

[2] Batholomew Burges to Christopher Champlain, Aug. 5, 1786, George Wetmore Collection. Emphasized numbers in original.

employers with almost ungentlemanly frankness. Calling himself "an Enterprising Genius," Burges cited his abilities to speak "Indostan like English and work a Ship in the Lascar Tongue."[3] Champlain, however, did not appear overly impressed by Burges' self-assessment. Without any other embellishment, Champlain noted on Burges' letter of application that Burges might be "capable of a station in an Indiaman," though what that station might have been was not indicated.[4] Furthermore, Burges never had the opportunity to demonstrate what his genius might have produced. While Champlain may have been intrigued with the opportunity to challenge British trading companies in the lucrative India trade, poor economic conditions in the new United States could not assure him good markets, and Burges never returned to India.

Instead, the "enterprising genius" applied himself to new markets for nautical publications opened by Congressional acts seeking to encourage learning and the practical arts in the United States. Under the Articles of Confederation government, Congress held little authority to sponsor research, learned societies, or other centers of higher learning such as those that European nations were beginning to establish during the eighteenth century. Yet the new republic clearly had dire needs for improved surveying, navigation, and mechanical learning. Consequently, Congressional acts in the mid-1780s created a market for publications in the arts and sciences that offered copyrights for science presented to the public.[5]

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[3] Batholomew Burges to Christopher Champlain, Aug. 5, 1786, George Wetmore Collection.

[4] Batholomew Burges to Christopher Champlain, Aug. 5, 1786, George Wetmore Collection.

[5] For a discussion of early Congressional copyright legislation and their effects on the American printing industry, see Rollo Silver, *The American Printer, 1787-1825* (Charlottesville, Virginia, 1967) 111-113.

Through this market, Congress encouraged interested individuals to publish work that would benefit their own purse at the same time as expanding national knowledge. In one sense, the idea worked: interested and informed researchers, such as mathematician Nicolas Pike, published their research for public utility and personal gain. At the same time, however, Congressional acts also made the nautical publications market appealing to entrepreneurs, including a self-styled "Enterprising Genius," of questionable abilities. By the time Burges submitted his treatise on the solar system to the BMS for review, the BMS had gained enough stature within the community through its previous scientific research and current public service to assume for itself the role of critical review, separating useful knowledge from the hack publications. Furthermore, BMS sanction emerged in late 1780s Boston as an important validation for the reliability—and hence commercial success—of charts, surveys, and other nautical publications produced under Congressional encouragement.

In 1789, Burges brought forward two works that he hoped would secure sponsorship, recognition, and thereby his fortunes. The first, *A Short Account of the Solar System* (Boston, 1789) he dedicated to the most prominent centers of formal higher learning emerging from the Revolution, the American Academy of Arts and Sciences in Boston and the American Philosophical Society in Philadelphia, in the hopes of gaining national prestige. In this work, he also took the opportunity to plug his next work to hit the market, *The American Seaman's Daily Assistant*, which, Burges assured readers, "when completed, will be submitted to the Examination of Men of known Abilities for their Approval—and if approved of as a Work of publick Utility, the Patronage of the

Publick will be solicited."[6] By "Men of known Abilities" Burges referred to the Boston Marine Society, and in August 1789, Burges submitted *The American Seaman's Daily Assistant* for that approval.[7]

The BMS did not receive his work favorably. In a terse response to his request, the Society denied Burges even a committee to review his publication. Breaking from previous practice, the BMS cited a lack of credentials for their decision. "Mr. Burgis [*sic*] has produced no recommendations of his character and scientific abilities which are necessary before this society can with propriety attend to the applications of the kind stated in Mr. Burgis' [*sic*] letter."[8]

These comments reveal that, like other European learned societies, the BMS was willing only to review works produced by gentlemen with established credentials. Just as members' technical reputations carried important implications in assessing the quality of the data they brought back to the society, ritualistic obeisance played an important role in ensuring that the submitter would respect the conventions of the society.[9] Such acts would demonstrate the submitter's acceptance of the review committee's decision, thereby reaffirming the committee's authority over the work and in the field. Consequently, Burges' omission of such a courtesy might have been perceived as an insult, leading the membership to refuse review until Burges had acquiesced in offering proper homage through credentials.

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[6] Bartholomew Burges, *A Short Account of the Solar System*. . .(Boston, 1789), 19.

[7] BMS Minutes, Aug. 3, 1789.

[8] BMS Minutes, Aug. 3, 1789.

[9] Steven Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago, 1994), chs. 1, 3 and 5.

Secondly, the BMS also had an axe to grind with the upstart Burges. In another foray into the nautical publications market, Burges promised would-be purchasers of his charts of the American coast that each chart would be signed and approved by the Marine Society before being delivered.[10] The Marine Society, however, had never agreed to this provision, and published a statement in local newspapers claiming that Burges had no authority to make such a claim.[11] To make their point loud and clear, the society also raised the bar for Burges' other publications.

Chastised by the BMS for his presumptuousness, Burges enlisted his silent partner, Matthew Clark, to help make amends. In October 1789, Clark submitted charts of the coast to the BMS, and in December, the society agreed to review the work. Clark, challenging the Marine Society's assessment, and cognizant of the importance of Marine Society approval, brought in the well-respected Boston mathematics teacher, Osgood Carleton.[12] Carleton had long carried significant prestige within Boston as a mathematician and surveyor. During the French and Indian War and through the Revolution, Carleton had served British, then American forces as military surveyor and engineer. After the wars, he established a mathematical school, gave public lectures, and ran a surveying office for locally prominent land-owners.[13] Carleton also represented a rival source of authority to BMS reviews. Rather than reviewing surveys and charts from a vocational foundation, Carleton, with his more formal training, could offer more

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[10] *Massachusetts Centinel*, Aug. 5, 1789.

[11] BMS Minutes, Aug. 3, 1789.

[12] David Bosse, "Osgood Carleton, Mathematical Practitioner of Boston," *Proceedings of the Massachusetts Historical Society,* 107 (1995), 152.

[13] Bosse, "Osgood Carleton," 147-148, and 152.

intelligent and well-considered criticisms in support of Burges' and Clark's charts than the BMS could detract from them.

The Society's minute books are typically silent on the deliberations between Clark, Carleton and the BMS. Yet in the end, the two camps compromised. The BMS, facing a theoretically trained surveyor and mathematician, had to defer to better training and judgement, yet they did so without a complete surrender. Rather than sticking to their original position, that Burges' and Clark's charts were unworthy of recommendation, they declared in January, 1790, that "they had examined several of said charts in company with Mr. Osgood Carleton, Teacher of Mathematics & find them so far as they examined to be accurate copies of good charts."[14] While not an unmitigated statement of support, the Society's findings did allow Burges, Clark, and Carleton's joint venture to hit the market with some support from the Marine Society.

The conflict between the BMS and Burges and Clark represents a key point in the determination of scientific authority over the Boston nautical publications market. Burges' advertising claims illustrate the importance BMS sanction held over nautical publications in the Boston market in the late 1780s and 1790s. Burges' submission of his *American Seaman's Daily Assistant* to the BMS, as opposed to dedicating it to the AAAS or the APS as he did with *A Short Account*, reveals that Burges felt that BMS approval carried more weight in the navigational world for this type of publication than the word of more established learned societies. Furthermore, Burges' claim that the BMS would review his charts before delivery represented an attempt to steal acceptability from the BMS, and reinforced the important role the society held in sanctioning work. BMS

[14] BMS Minutes, Jan. 5, 1790.

approval tied the reputation of an organization long associated with local navigation to publishers' works, translating into greater sales.

The conflict with Burges, Clark and Carleton also revealed to the BMS that they needed to consult other authorities in the chart review process if they were to retain any influence in the Boston nautical publications market. In the first place, the BMS was forced to recognize the better foundation for chart review that Carleton brought into the practice. Faced with the challenge of a trained surveyor, the Marine Society not only deferred to Carleton's judgement, financially tied to the project or not, but also enlisted his services as chart reviewer for all future consultations.[15] "The committee further report that Mr. Osgood Carleton who has undertaken to examine the charts before they are offered for sale, is a person well acquainted with the mathematics, & capable of undertaking the inspection."[16]

In addition, the BMS was also forced to accept Carleton's own standards and models of accuracy. Despite the previous rude silences the Society received from DesBarres in the 1760s, the BMS, under direction from Carleton, was forced to admit the superior quality of DesBarres' charts.

> At the desire of the Publisher of the Book; and being recommended for that purpose, by the Boston Marine Society, I have with the strictest scrutiny examined these charts of the Coast of America . . . compared them with those of Joseph Frederick William DesBarres, Esq., they being considered by the said society as the best Charts of the Coast (so far as they extend).[17]

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[15] John Leach, clerk to the society before the Revolution, may have known of Carleton through John Norman, an engraver both he and Carleton worked with in the 1780s. See Bosse, "Osgood Carleton," 154-155.

[16] BMS Minutes, Jan. 5, 1790.

[17] Matthew Clark, *Charts of the Coast of America from Cape Breton to the Entrance of the Gulf of Mexico* (Boston, 1790), ii.

Osgood Carleton emerged as the real winner in the BMS-Burges controversy. Called in by the chart's publishers as their own expert, Carleton found himself accepted, and then adopted, by the BMS as a reliable and credible chart reviewer in Boston. Such a position, in essence uniting new forms of technical expertise with the social prestige of the more traditional sources of authority, allowed Carleton to expand his chart work in the subsequent years. Partnering with John Norman, Carleton reviewed Norman's *The American Pilot,* published in 1791 and revised in 1792, 1794, 1798, and 1803. With William Norman stepping in during in the 1790s, Carleton also played roles in publishing *A Pilot for the West Indies* (1795), *The New West-India Pilot* (1803), and *The New East India Pilot* (1804).[18]

Carleton's role in the expanding nautical publications market, however, soon sidelined the BMS as a center of critical review, as Carleton never acknowledged his support from the BMS in any of the Norman's works. Advertisements for charts covering North America, the West Indies, East Indies, the Pacific Northwest, and Labrador included in the 1803 edition of *The American Pilot*, also reveal how fast the market had expanded. In each of these publications, including detailed charts of Nantucket and Georges Bank, John and William Norman drew upon a wide array of authorities for testimonials of their publication's accuracy.[19] Rather than going to the BMS, Norman and Carleton looked to surveyors, captains, explorers, and in the case of Paul Pinkham of Nantucket, a lighthouse keeper, to replace the BMS's imprimatur on his works.

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[18] David Bosse, "Osgood Carleton," 152-153.

[19] John and William Norman, *The American Pilot. . .from. . . Belle-Isle to Essequibo* (Boston, 1803).

As late as 1798, the Marine Society still retained enough influence for Edmund March Blunt, a nautical publisher from Newburyport, Massachusetts to submit his chart, *George's Bank and Nantucket Shoals* for evaluation (see chapter 3, p. 127). Failing to consult Carleton—whose financial ties to the Normans may have been seen as a conflict of interest—the BMS named John Foster Williams to head the review committee, and to use their own practical and vocational experience to evaluate the work. "The committee . . .having attentively perused and compared said chart with former charts, and having taken the best information and advice thereon, as well as from their own individual experience," reported first that, the Society questioned the chart's originality, arguing that "Mr. Blunt offers no proof of any actual observations upon George's Bank, and that if copied from any former Charts, it must also be subject to their errors."[20] In fact, the Society review revealed that Blunt copied Paul Pinkham's chart, which they also criticized as having not been drawn from actual observations made by Pinkham himself.

The Society's committee also criticized the chart's ability to offer information required by navigators operating in the charted waters. Williams' committee argued "that it is necessary to fix the certain situation of the shoals of George's Bank, and the exact soundings round it within the limits of the Shoal waters, the affect of the tides, and the shifting of the shoals, if *shifting or fixed* [emphasis in original]."[21] In addition, the committee felt that the work omitted other information that was generally expected from reliable charts:

> . . .no person in surveying said Bank, or in making actual observations upon it, would omit to notice the quality of the ground at each sounding, and that it is essentially necessary to a chart for the governing of mariners [ ] to fix the

[20] BMS Minutes, March 6, 1798.

[21] BMS Minutes, March 6, 1798.

> boundaries & extent of the Bank, the first soundings in coming in and going off [the bank], and the nature of adjacent soundings, and that the South Channel lying between Nantucket and Georges and as far as it extends southward, is known to have bottom peculiar to itself and different from that of the Banks on either side.[22]

In their final point of criticism, the Marine Society's committee revealed that Blunt's work challenged the Society's authority to review charts. In attacking Blunt's portrayal of the shape of Cape Cod, Williams argued that "Mr. Blunt in his Chart of Cape Cod has varied the actual form of Said Cape, ascertained by a late survey under the direction of the Boston Marine Society. . ."[23] In condemning Blunt's chart, the Society saw themselves as not merely protecting their intellectual turf, but also doing a service to mankind: ". . .consistently with our duty to our Brethren Mariners, as well as to mankind in general, we cannot recommend a chart which appears deficient in any part, and which may expose their lives & property, from the errors of a chart not drawn from actual survey."[24] Ultimately, Williams' criticisms condemned the chart as not worth the public's attentions. In defiance, however, Blunt went to six other ship captains, who praised the work, and he published the chart anyway.[25]

While the BMS's comments certainly had merit, Blunt's work did offer more information than prior charts. Yet the conflict between Blunt and the Marine Society was not one over accuracy. Both the Marine Society and Blunt relied upon the reputations of the captains involved to determine accuracy, a standard that could hardly solve the issue.

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[22] BMS Minutes, March 6, 1798.

[23] There is no record in the Marine Society records of this survey.

[24] BMS Minutes, March 6, 1798.

[25] P. J. Guthorn, "Eighteenth century Shore and Harbour Charts Printed in America," *The Map Collector* (no. 12, 1980), 29.

Rather, the conflict was one over who held control over Boston's nautical publications market. In many ways, throughout the 1780s and the 1790s, the BMS was establishing themselves as, in Roy MacLeod's terms, a new "metropolis" for nautical research in a politically independent United States. For MacLeod, metropolitan science marked the organization of British science in the later eighteenth century. Projects were defined by the Royal Society, which also performed the theoretical analysis and publicly presented their findings. MacLeod argues that science defined and pursued by learned societies and individuals inhabited a central core in London, Edinburgh, or in the Oxbridge-London triangle.[26] According to him, this centralized, European "monarchical" metropolitan science pursued the expansion of maritime trade, the discovery of raw materials, and the opening of new markets.

The BMS's work in the 1780s and 1790s, represents a colonial version of this model.[27] They, too, were trying to direct maritime research and development through their cooperation with the state and Federal governments. Their research concerns were intimately tied to the expansion of American trade and markets, and, as seen in their deliberations with Burges, Clarke, and Blunt, they also worked to retain evaluative authority over new nautical publications. Consequently, the Marine Society was at least attempting to create a new research metropolis for American nautical publications in an effort to make American nautical science independent of European centers and to shore-up their influence in Boston.

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[26] Roy MacLeod, , "On Visiting the 'Moving Metropolis': Reflections on the Architecture of Imperial Science," in *Scientific Colonialism: A Cross-Cultural Comparison*, ed. Nathan Reingold (Washington DC, 1987), 229-230.

[27] MacLeod, "Moving Metropolis," 230.

In the next two years, the Marine Society reviewed more work produced by Boston area researchers. Not surprisingly, the Marine Society praised John Foster Williams' draft of Cape Cod Harbor, now known as Cape Cod Bay, thanking him for "his exertions in accuracy in executing it and for his handsome & marked attention to this society in the dedication."[28]

By 1800, when John Churchman submitted his *Magnetic Atlas* to the Marine Society for review, the BMS did not feel comfortable enough to issue either a firm endorsement or a scathing indictment as they had done with other navigational works in the past. Others had taken interest in Churchman's theories before he contacted the Marine Society. In his 1790 edition of *An Explanation of the Magnetic Atlas*, Churchman included a long list of names of patrons from both the New World and the Old interested in his work. On the other hand, Churchman also hedged his bets, and included letters of recommendation from several prestigious Old World scientific leaders commenting on the utility of his ideas, including Joseph Banks and Charles Blagden of the Royal Society of London, and Sir Hyde Parker of the Board of Longitude.[29]

Whether from the Old World or the New, none of Churchman's correspondents had much faith in his ideas, replying to his entreaties with encouragement, but not endorsement. For example, Thomas Jefferson, to whom Churchman wrote to present his ideas to the Royal Academy of Sciences in France, reported that the Academy could not "formally" decide the merits of Churchman's methods, but they did enter his ideas into

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[28] BMS Minutes, Feb. 5, 1799.

[29] John Churchman, *An Explanation of the Magnetic Atlas or Variation Chart* . . . . (Philadelphia, 1790),vi. For recommendations from European societies, see pp. 73-76.

their journal to preserve his claim. They also entertained doubts as to Churchman's ability to determine accurately variation at a given place and questioned whether instrumentation could be developed with the fine gradations Churchman's methods required. Most others thanked him for his work, and encouraged him to continue his inquiries.

By 1800, Churchman revised his Magnetic Atlas to a third edition and had it republished, seeking newer reviewers for endorsements. Newer contacts, however, maintained the reticence of Churchman's older correspondents. Moving away from the most prestigious scientific societies in London and Paris, Churchman pitched his ideas to less renowned learned societies in Lisbon and Berlin, and to societies in Boston, such as the Boston Marine Society and the American Academy of Arts and Sciences. In the Berlin academy, a review committee saw Churchman's work less as a solution in itself, but more as a point of departure for other work. In responding to Churchman's correspondence, the committee reported that

> It is known that the two magnetic points had a motion, but Mr. Churchman is the first who, to my knowledge, has declared to determine this movement, and to assign their periodical times. This step is bold, without doubt; but it is good that it is made; it will serve to awaken the attention of Geometricians and Astronomers. They may examine and discuss the theory of Mr. Churchman; compare it with new observations; and attempts to modify his hypothesis, till they may approach to exactness, as near as can be hoped in sciences physico-mathematical.[30]

In Boston, the American Academy of Arts and Sciences more blandly replied

> I have the pleasure to assure you, that the Society is pleased with your application to the subject, and highly approves your very laudable design of improving magnetic observations. Convinced of the importance of ascertaining, with accuracy, the magnetic variations in different parts of the globe, the

[30] John Churchman, *Magnetic Atlas or Variation Charts* (New York, 1800), 73.

> Academy wishes you success in your proposed voyage; and that it may contribute towards perfecting a discovery highly useful to mankind.[31]

The Marine Society also hedged its bets with Churchman's 1800 submission of the *Magnetic Atlas*. Rather than condemn or condone the work based solely on their own opinions, as they had done with Burges, Blunt, and Clarke in the past, the Marine Society refrained from being the sole source of authority for reviewing Churchman's work. The committee reviewing the work relied not only on their own skills, but also enlisted the aid of others, as they had done with Carleton throughout the decade, and limited their comments to the practical issues on which they had most confidence in their own abilities. In reporting to the membership, the BMS review committee stated that they had "taken the matter into consideration and with the best advice they can get, find it a work of great merit. . . ." Yet the society refrained from issuing any further recommendation or criticism, instead opting for more practical evaluations before final conclusions could be made. Ultimately, the society felt that "the utility of [Churchman's methods] must depend upon actual observations and experience. The Society wishing to encourage as much as in their power every improvement in navigation that can direct the mariner in his course and promote his safety, would recommend to their brethren to try Mr. Churchman's method, and at the expiration of their voyages, communicate the result and success of their observations."[32]

Like other learned societies, the BMS had doubts about Churchman's ideas. But unlike previous reviews, the BMS refrained from evaluating the work solely on their own skills alone. Their review of Churchman's work was actually the last time the Society

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[31] Churchman, *Magnetic Atlas*, 76.
[32] BMS Minutes, Jan. 6, 1801.

convened a committee to review nautical publication. It is clear that through the conflicts in the 1780s and 1790s, the BMS had come to recognize limitations in their ability to review certain scientific works. It is obvious that some of these publications were simply beyond their expertise. As trained cartographers and surveyors produced more works, the Marine Society had less of a role in evaluating new productions. Still respected sufficiently for researchers such as Churchman to submit work for their approval, the Society came to see that their role in the production of navigational information was not as secure as it had been ten years previously. This became clear when, in 1801, William T. Class submitted his "New American Seaman's Daily Assistant" for review.[33] A decade earlier, the Marine Society, as self-styled representatives of the seafaring element of the community, would have accepted the charge. In 1801, however, the Marine society politely refrained from presenting their opinion of Class's publication. In declining, the Marine Society voted "that the society approve of his exertions for our seafaring brethren, but as the work which he intends to publish will require a great deal of time in the examination, and as it must finally rest on its own merits, they must decline his request."[34] While the society still encouraged work in the field, the membership realized that they lacked the expertise to assess its reliability. They left the work to rise or fall in the market place without Marine Society sanction.

Unwilling to put their support behind works they could not effectively evaluate, the Marine Society also withdrew from evaluating Matthew C. Graves' ideas for

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[33] The contents of this work are unknown. It appears that the work itself was never published: neither Class' name nor the work's title appear in the American Antiquarian Society's Early American Imprint Series nor the National Union Catalog.

[34] BMS Minutes, March 3, 1801.

determining longitude. Harrison's chronometer had been established as a reliable means of determining longitude three decades earlier, but ships' chronometers remained too expensive for most navigators to purchase.[35] For many mariners, estimations from dead reckoning or Maskeleyne's complicated lunar distance method remained the best available method for determining a ships' longitudinal position. Graves' methods apparently were no simpler than Harrison's. The Marine Society declined to review the essay citing, "that as the truth of the principles adopted by Capt. Graves depend upon optical instruments that cannot be procured in this country, the absolute result cannot now be ascertained, but your committee think the ideas ingenious & deserving encouragement."[36]

In declining to review Graves' work, the society acknowledged that by the 1790s, nautical publications coming to market relied upon concepts, skills, and instrumentation beyond their experience. The BMS's vocational scientific approaches worked well enough for the rough publications produced with simple instrumentation and methodology during the 1780s. As American researchers produced more technically demanding material, the Society's utility as a review body waned.

Recognizing their limitations, the Marine Society was nevertheless not scientifically dormant during the 1790s. Rather, they reviewed works that fell within their vocational expertise and scientific leanings. In May, 1792, member John Foster Williams presented to the society a method for extracting fresh water from salt water

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[35] For a discussion of early efforts to copy Harison's designs, see Jonathan Betts "Arnold and Earnshaw: The Practicable Solution," in *The Quest for Longitude: Proceedings of the Longitude Symposium, Harvard University, Cambridge, Massachusetts, November 4-6, 1993*, ed., William J. H Andrewes (Cambridge, Mass., 1996), 312-328.

[36] BMS Minutes, June 7, 1803.

while at sea. Fresh water, more important to human survival than food, represented one of the most uncompromising limitations to a vessel's ability to remain at sea. The process of refilling ships' water casks required vessels to stop in port or locate coastal sources of fresh water. In either case, the labor-intensive process of breaking out casks, floating them to shore, filling them with water, and then re-stowing the heavy and ungainly barrels hindered a ship's progress. Refilling water casks also exposed crews to dangers in transferring heavy casks from a small tending boat up into the ship's hold and could compromise the barrels' water-tightness. Casks could suffer unseen damage in loading and unloading, and resealing barrels at sea may not have worked as well as sealing casks in a cooperage.

Consequently, the practical nature of Williams' research fit well with the Marine Society's expertise in managing ships and crews. At the May meeting, Williams "presented to the society the results of sundry experiments he had made to extract fresh water from salt with a plan of apparatuses made use of by him for same. . . ."[37] Williams ensured that the society would see the practicality of his methods: "You will observe that the apparatuses made use of are such as are generally on board a vessel at sea."[38] Using a tin sauce-pan, a cabin stove, an iron pot, a barrel, and some old canvas, Williams constructed a series of stills that he used to run his experiments. "I put 4 quarts of salt water in a tin sauce pan, in the stove in the cabin, in 55 minutes I got from it near a quart good fresh water; one quart of water left in the pan, the rest was [lost]. The machine made use of was a tin crane, with a barrel or cooler made to it of the same, containing

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[37] BMS Minutes, May 1, 1792.

[38] *Columbian Centinel*, May 5, 1792.

about 8 quarts, with a hole in the top and bottom to put the cold water in . . ."[39] Williams, however modified his instrumentation as he identified short comings. "I found that the barrel was not large enough to keep the tube cold. I then put 5 gallons of salt water in an iron pot, made the pot lid tight by putting some old canvas round it—made a hole in the middle with a hollow plug to [receive] the crane—I got from it a quart of good fresh water in one hour and a half; but finding my cooler was not large enough to keep the crane cool, I left off for a time."[40] The BMS minute book recorded that "[Williams] also introduced the various kinds of water thus extracted, some of which was made into punch & highly agreeable, as respected tastes and smell, being quite pure. . . ."[41]

How well the Society could ascertain the purity of Williams' water in an alcoholic punch remains questionable. Unlike Clark's charts, however, whose accuracy could only be determined through a thorough knowledge of surveying that rested beyond the technical expertise of the membership, Williams' research could be evaluated using more empirical, and less technical, methods. Ship-masters with years of sea experience could evaluate water produced from Williams' ship-still because they had stomached ships' water with wide ranging degrees of palatability, and more importantly, had a good idea of what crews would agree to drink and what they would not. Furthermore, Williams' methods were straightforward and utilized simple devices. With a confidence they lacked in the Clark chart controversy, the Marine Society voted solidly to affix their recommendation to Williams' methods. The meeting passed a motion thanking Williams

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[39] *Columbian Centinel*, May 5, 1792.

[40] *Columbian Centinel*, May 5, 1792.

[41] BMS Minutes, May 1, 1792.

for his work, and the membership voted that their approval would be published in the local shipping papers, the *Columbian Centinel* and the *Massachusetts Magazine*, "for the advantage of our seafaring brethren."[42]

The Marine Society also ran "experiments" on a new light-house lamp design by William Cunnington that, like their review of Williams' desalination efforts, reveal their continued reliance upon vocational methods for scientific evaluation. Mimicking a public science lecture, the Marine Society committee called upon the Boston community to participate. The committee had the lamp hoisted into the state-house cupola, "first giving notice in the public newspapers of our intentions and inviting the attendance of the Citizens in this neighborhood and requesting their comments respecting the appearance of the light at different times in the evening."[43] In addition, two committee members took station aboard a revenue cutter anchored between the state-house and Boston light. Like some other public science displays of the period, the audience and the "scientists" were both intimately involved in determining the scientific question at hand.[44] "Many people kindly attested to the brilliancy of the light and the members of your committee had the same idea." For a more empirical evaluation, however, the committee reported that "the power and glass of the light far exceeded the light from the Boston light-house although that was viewed in its most favourable state while the lantern was clean and the

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[42] BMS Minutes, May 1, 1792.

[43] BMS Minutes, Jan. 7, 1800.

[44] In this regard, the Boston Marine Society parallels Jan Golinski's connection between gentility and chemistry in William Cullen's work in the later eighteenth century. In both cases, genteel experts served as intermediaries between the public and the science. Yet unlike Cullen, the BMS saw navigation as a distinguishing and unique practice, and not part of broadly defined proper education. See Jan Golinski, *Science as Public Culture: Chemistry and Enlightenment in Britain, 1760-1820* (Cambridge, 1992), 31-37.

lamps newly trimmed."[45] Not only safer for navigation, Cunnington's new lamp was more economical, as "from the experiment they are fully convinced that the System proposed would . . . reduce very considerably the amount of oil now consumed."[46] The committee finally reported that Cunnington's system should be supported to protect life and property.

Through their dealings with Burges, Clarke, Carleton, and Blunt, the Marine Society recognized that the expertise required for reviewing current nautical publications lay beyond their experience-based vocational approach to navigational science. In declining to review works by Class and Graves, the Society tacitly admitted that they lacked the skills and specialized training needed to form a useful, critical opinion on research emerging from American researchers. Still respected for their opinions on nautical affairs, the society limited their review activities to subjects on which they could offer constructive, applicable commentary informed by long-term sea-service. In experiments such as Williams' distillations and Cunnington's lamp, the Society's evaluation were more "vocational" and less "scientific" relying upon pragmatic, unrefined, and un-quantified assessments of utility—methods in line with members' experience on board vessels.

While other forms of technical knowledge challenged BMS authority in Boston, the BMS ideal of collecting scientific data during commercial voyages ran afoul of increasing pressures for profits as American trade expanded into the Pacific in the 1780s

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[45] BMS Minutes, Jan. 7, 1800.

[46] BMS Minutes, Jan. 7, 1800.

and 1790s. While such trade was small, in terms of volume, and even in revenue, when compared to older trade routes to Europe and the West Indies, early American voyages to the Pacific and Indian oceans carried important symbolism for Americans looking to engage the world as an independent nation. For American ships to enter the Pacific and challenge British hegemony in the China market represented a commercial coming of age that placed Americans on par, overseas at least, with other European powers.[47]

Marine Society members captained several early important voyages to the Pacific and Indian oceans. Three of these voyages, and the experiences of the members commanding them, reveal differing ways that vocational science and Pacific exploration combined poorly. For Job Prince in the *Massachusetts*, the methodological demands for sailing "beyond the capes," showed that vocational methods well-suited for the North Atlantic were not sufficient for successful voyaging to the East Indies. For Joseph Ingraham in the *Hope*, the combination of Pacific exploration for public good and Pacific merchant sailing for private gain was an uneasy one at best. Success in the former did not translate into success in the latter, and ultimately, the notes, observations, and discoveries he brought back to the Marine Society did not ease Ingraham's professional sufferings. Finally, James Magee's voyage in the *Margaret* highlights how increased competition in the Pacific among Boston traders pushed Marine Society captains away

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[47] For a discussion of the interest the Federal government took in promoting U.S. trade to the Pacific, see Donald D. Johnson [with Gary Dean Best], *The United States in the Pacific: Private Interests and Public Policies, 1785-1899* (Westport, CT, 1995), 9-14; and Ernest Dodge, *Islands and Empires: Western Impact on the Pacific and East Asia* (Minneapolis, 1976), 57. Dodge's interpretation is problematic. In contending that American interests in the Pacific were driven by natural history, discovery, and the exploitation of natural resources, he claims this was not an imperialistic interest. How this is the case is perplexing, as researchers such as John Gascoigne have shown that most western interest in the Pacific was imperialistic. For the US, Walter Lafeber has clearly shown that US interest in the Pacific was commercially imperialistic from the late 18th century onward; Walter LaFaber, *The New Empire: An Interpretation of American Expansion, 1860-1898* (Ithaca, New York, 1963), ch. 1. See also John

from collecting navigational data, and pushed them towards collecting ethnographic information that would help investors anticipate future desires of the Native American sealers in the Pacific Northwest.

Job Prince assumed command of the *Massachusetts* in 1790. Inducted into the Boston Marine Society in 1774, Prince's father had been one of the Marine Society's earliest members. The ship itself was New England's version of the elegant and profitable East Indiamen, and according to Second Mate Amasa Delano, positions onboard her were highly prized. The ship, however, suffered a plague of problems from the start, not the least of which were navigational. After an embarrassing departure, Captain Prince lost track of the ship's position enroute to the Azores, causing the ship to miss its landmark completely. Once around the Cape of Good Hope, Prince got lost again as they were approaching Java Head in the East Indies. As Delano relates:

> On the third of August, we found ourselves in latitude 6° 52' south, that being nearly the latitude of Java Head; and by reckoning, in 103° 00' east of longitude. We saw no signs of land. This was sufficient to shew that we were to the westward of our reckoning, as that latitude and longitude would have nearly or quite brought us in sight of Princes' Island, to the westward of Java Head. We tacked ship, head to the southward, and stood as far south as latitude 16° 20' south, making at least 15° easting before we got back into the latitude of Java Head again. . . .[48]

For Delano, Prince's lack of navigational skill was the problem.

> All of this time loss happened on account of our not having any chronometer on board, nor any officer who [k]new any thing about lunar observations. This shews how important it is for officers to know how to observe their longitude, and work the observations. It is simple and plain to every capacity when once understood. Every commander should furnish himself with a good brass sextant,

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Gascoigne, *Science in the Service of Empire: Joseph Banks, the British State, and the Uses of Science in the Age of Revolution* (Cambridge, 1998).

[48] Amasa Delano, *A Narrative of the Voyages and Travels . . .Round the World* (Boston, 1817), 36-37.

> and so should every chief officer of any ship bound round Cape Horn, or the Cape of Good Hope.[49]

Ultimately, the *Massachusetts* was sold to the Dutch in Batavia after she was found to have been rotting from the inside out. Yet his navigational problems reveal important assumptions that Prince carried into his trade. As a senior captain in the Atlantic trades, Prince may not have needed sextants, chronometers, nor the education required to calculate lunar distances. But for voyages into the Pacific and Indian Oceans, relying solely upon dead reckoning and latitudinal observations would not suffice. Consequently, Prince's poor preparation and poor officer selection revealed the difficulties masters, familiar with Atlantic trade routes, faced as they rounded the Capes in the China trade.

The Marine Society's involvement with Joseph Ingraham reveals just how science and commerce could not effectively mix when merchants took on the increased commercial risk of sending ventures out into the Pacific. Inspired by John Ledyard's accounts of his voyages with Cook to the Pacific, Joseph Ingraham sailed as a mate aboard the Columbia in 1787 when she ventured to the Pacific to open the American maritime fur trade.[50] Aboard the *Columbia*, Ingraham shipped out on a voyage of mixed goals closely corresponding to the Marine Society's notions of combining science and commerce. First and foremost, the *Columbia* sailed as a private commercial venture funded by Boston merchant Joseph Barrel. Along with five other investors, Barrel's first concern was that Kendrick turned a profit, or at least bring back information that would

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[49] Delano, 36-37.

[50] Mark D. Kaplanoff, ed., *Joseph Ingraham's Journal of the Brigantine Hope on a Voyage to the Northwest Coast of North America, 1790-1792* (Barre, Mass., 1971), xiii, hereafter cited as Ingraham,

help them increase their private fortunes through new trade networks. For Ingraham, as second mate, the voyage was also one of discovery that rivaled the British voyages into the Pacific under Cook. Consequently, when the first mate left the ship after a quarrel with Kendrick early in the voyage, Ingraham embraced the opportunity as acting first mate to mix discovery and commercial seafaring.[51]

As first officer, Ingraham took a leading role in the successful navigation of the voyage, a role that did not go unnoticed in Boston's merchant community. Although his log of the first voyage is lost, references to it in his second log indicate that he recorded extensive notes on navigation, natural history, and early ethnographic data.[52] Furthermore, the *Columbia's* voyage around the world, and consequently the information with which the *Columbia's* new captain, Robert Gray, and Ingraham returned to Boston, took on national importance. The *Columbian Centinel* characterized the voyage as one of great public pride and national significance: [53]

> Their Country is also under obligation to the intrepid Navigators who have conducted this voyage—whose urbanity and civility have secured the friendship of the aboriginals of the country they visited; and whose honour and intrepidity have commanded the protection and respect of the European *Lords of Soil*, to the American flag; while that of another nation hath been forbidden to be unfurled on the coast. [54]

Journal. For more on Ledyard and his impact upon the New England maritime fur trade, see Ernest Dodge, *New England and the South Seas* (Cambridge, 1965), 22-26.

[51] Robert Haswell, "A Voyage Round the World Onboard the Ship Columbia-Rediviva and Sloop Washington," in *The Voyages of the Columbia to the Northwest Coast, 1787-1790 and 1790-1793*, *Massachusetts Historical Society Collections*, ed. Frederic W. Howay, 79 (1941), 7-8.

[52] Ingraham, *Journal*, 11.

[53] Barrel himself envisioned the *Columbia's* voyage within a national context. In his instructions to Kendrick, Barrel wrote "The sea letters from Congress and this State you will also show on every proper occasion; and although we expect you will treat all nations with respect and civility, yet we depend you will suffer insult and injury from none without showing that spirit which will ever become A FREE AND INDEPENDENT AMERICAN" (emphasis in original, Howay, *Voyages*, 112).

Within the public praise for the *Columbia's* accomplishments, however, lay the seeds of a contradiction. While Ingraham returned with great information about the Pacfic Northwest, the voyage itself was a private commercial endeavor. Consequently the public utility of *Columbia's* exploits ran counter to the private, profit driven motives that compelled Barrel and his associates to fund the venture in the first place. This contradiction was not lost on another young, but promising, Boston merchant seeking to set up his own trading house. Thomas Handasyd Perkins, then supercargo of the Boston ship *Astrea*, met Ingraham when the *Columbia* arrived in China in 1789.[55] By the time Ingraham returned to Boston in 1790, Perkins had assembled a group of investors, including BMS member James Magee, to buy a small ship and take advantage of the route pioneered by the *Columbia*. Within days of his return, Perkins met again with Ingraham and offered him command of the 76-ton brig *Hope*, an offer Ingraham accepted.

When the *Columbia* returned on August 9th, 1790, Ingraham's navigational work aboard the *Columbia* attracted the immediate attention of the Boston Marine Society. Following precedents laid down during the Revolution, the BMS rewarded Ingraham's national public service with membership in the society, and Ingraham was inducted on September 7th, 1790—no doubt with the aid of his new employer James Magee—just nine days before he sailed on the *Hope*.

The society's records are silent on the Ingraham nomination, although the minutes only intermittently record who nominated incoming members. Yet it appears that the

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[54] *Columbian Centinel*, Aug. 11,1790, as in Howay, *Voyages*, 145.

[55] For more on Perkins' view of Ingraham's voyage, see Carl Seaburg, *Merchant Prince of Boston: Col. T. H. Perkins, 1764-1854* (Cambridge, Mass., 1971).

BMS's interest in Ingraham stemmed not only from Magee's financial interest in the 28-year old captain, but also from his navigational work. Significantly, Robert Gray, captain first of the *Lady Washington* (who sailed as escort to the *Columbia*) and then of the *Columbia* herself, was not inducted into the society, nor does he appear to have been nominated. Furthermore, Perkins' favorable impression of Ingraham, established in China, most likely stemmed from his abilities as a navigator, as Ingraham as first officer would not have played a significant role in striking deals while the ship was in port.[56]

Once the *Hope* sailed on September 16th, 1790—just six weeks after arriving aboard the *Columbia*—Ingraham took data collection seriously, as BMS requirements stipulated. Like earlier Marine Society members, Ingraham drew charts and included information that was easy to use and took great care to record navigational information on charts that others could later consult. For example, as the *Hope* cruised down the South American Atlantic coast, Ingraham oriented the chart with south at the top of the page, an orientation that placed South America on the left as it was while a vessel coasted towards Cape Horn. Ingraham's charts also emphasized a local, in addition to a global, orientation. With the same patriotic relish that marked Ingraham's return in the *Columbia*, he brought national politics into his navigational science. Ingraham centered his charts' graticules (which measured eastward and westward progress) on Boston as well as London, placing Ingraham's home port on an even footing as the Royal

[56] Ingraham was not the only crewmember from the *Columbia* voyages to receive membership in the BMS. In 1796 Robert Haswell was also inducted, but only after several other successful voyages.

Figure 13: *Hope's* Track in the South Atlantic.

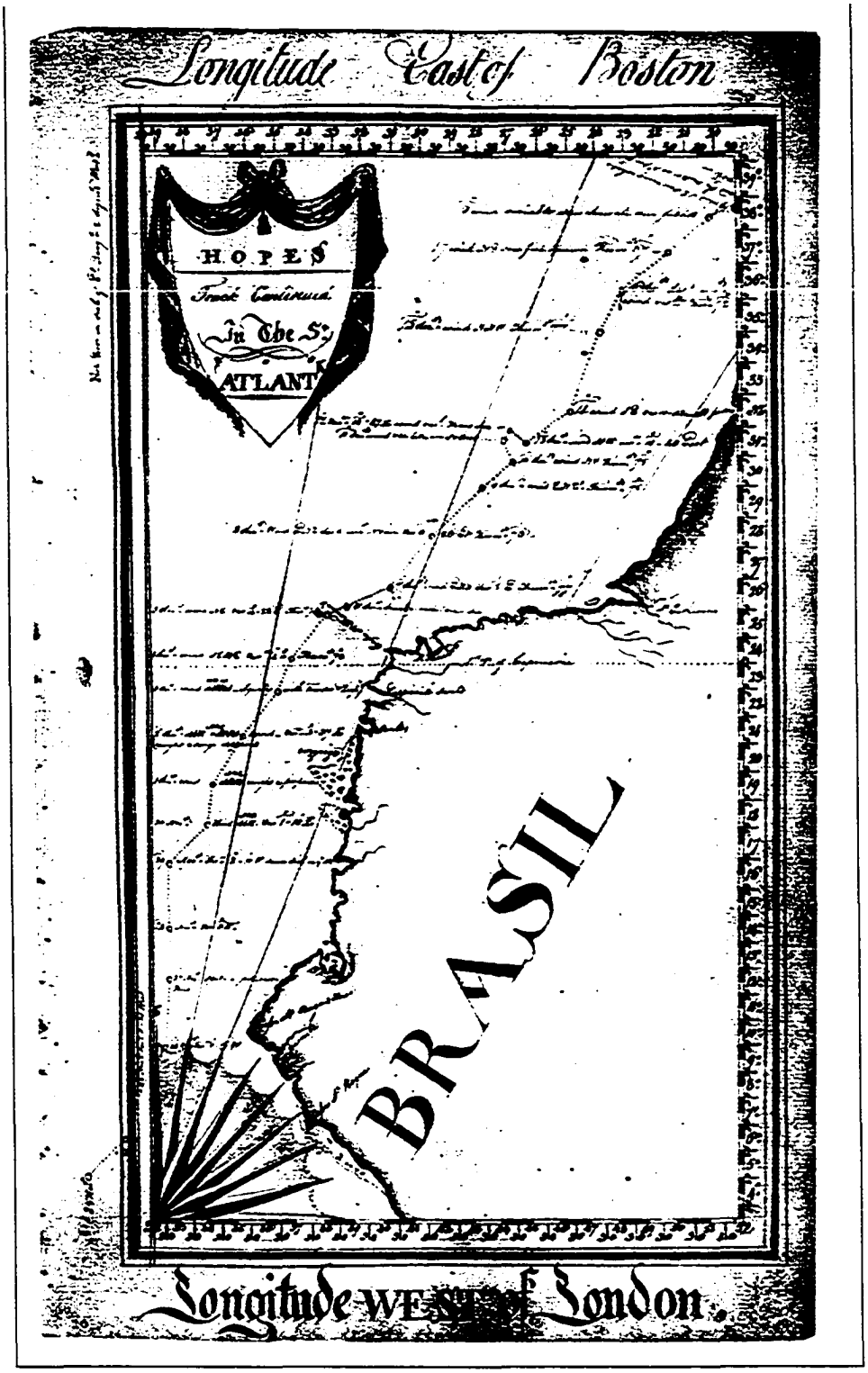
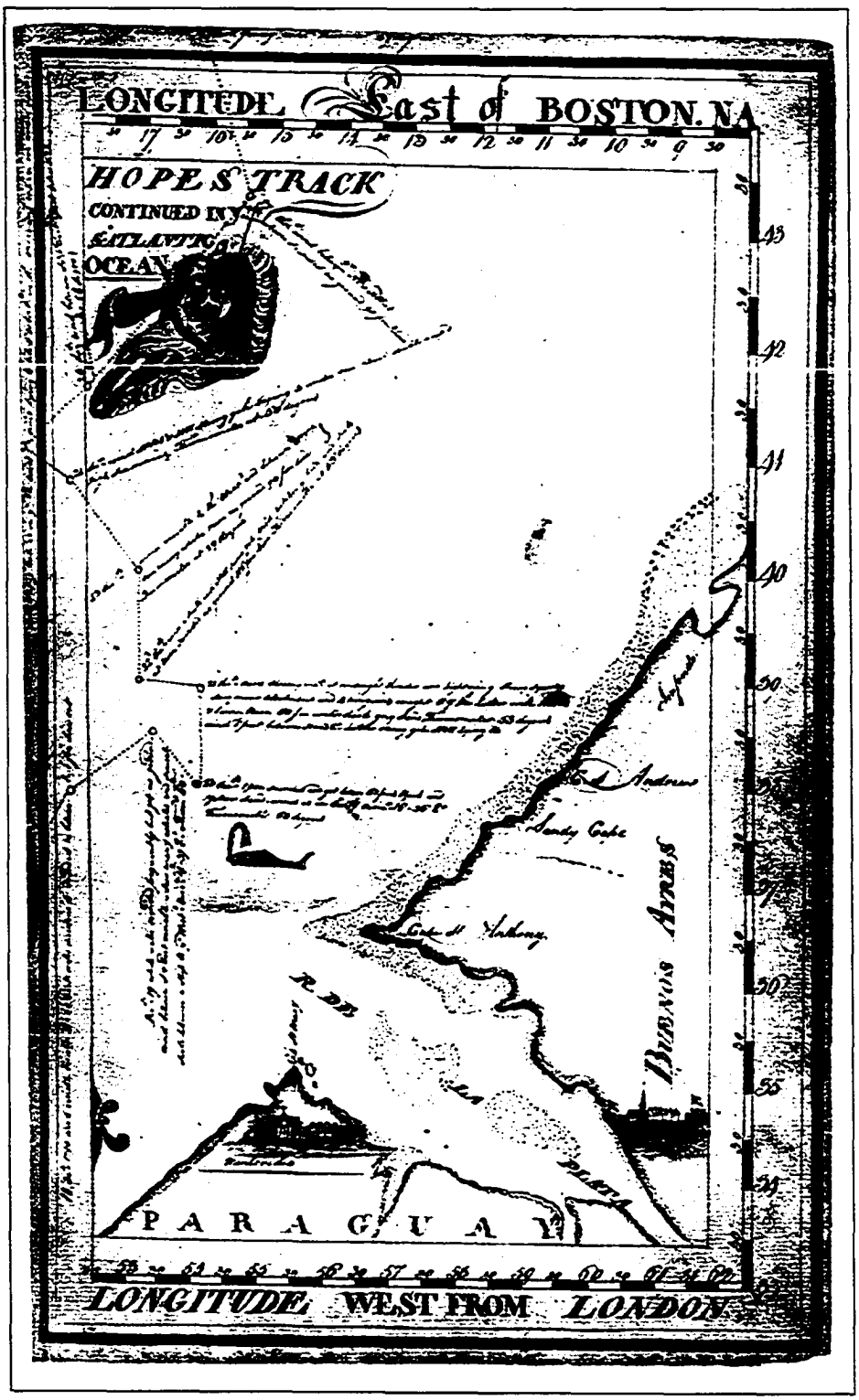


Figure 13 (cont.): *Hope's* Track in the South Atlantic.



Observatory. Sailing to China, Ingraham included in his manuscript charts profiles of the island of Formosa, drawings reminiscent of medieval sailing rutters and far more useful to a navigator approaching an island from sea than simply a top down plan. Ingraham's cartographic work was not the only area where he showed a dedication to systematic and critical research. In addition to recording manuscript charts and providing types of information and orientations focussed on ease of ship-board use, Ingraham also consulted the published literature from earlier writings.

Ingraham's dedication to navigational science reveals an intensive scholarly interest in navigation and exploration. More than that of any other early American navigator to the Pacific in the 1790s, Ingraham's journal mimicked the language and structure of previous journals of exploration. Unlike other merchant mariners, Ingraham cited the accounts of British explorers in his journal in a comparative and critical manner that offered those who would follow his journal the references needed for a comprehensive understanding of a given navigation challenge. For example, with his usual modesty, Ingraham recounted

> Of the Falkland Islands I was able on my last voyage to give a short description, relating to Brett's Harbor in particular, where the Columbia lay a fortnight. At present I shall offer no apology that I do not make any addition to my former faint attempt as the jealousy of the Spaniards confined me on board during our stay. I must, therefore, refer the reader to Commodore Byron's account of the isles when he visited them in 1765 (Hawkesworth, vol. i, p.48) or to the more perfect one of Mons. De Nerville, who resided three years at Port Soledad, then called Port Lewis (See Monsr. De Bougainville's voyage, chap. 4, page 44).[57]

Ingraham did not merely cite previous voyages, however. With a critical eye to detail and his own observations, Ingraham critiqued not only the accounts by some of the most famous European explorers of the 18th century, but also their attitudes towards nautical

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[57] Ingraham, *Journal*, 26.

science. With a critical tone characteristic of 18th century enlightened skepticism, Ingraham wrote

> I was much surprised to observe the remarks of Mons. Bougainville, that experienced and celebrated navigator, relative to this bird (page 127 English edition) which in spite of the great respect due his nautical abilities I can term no better than idle prejudice. After speaking of some bad weather they had experienced, he said, 'During all this time we saw the birds called quebrantabuessos or albatross and what in all seas of the world is a bad sign, petrels, which disappear when the weather is fair and smooth.' Were this really the case I believe few would attempt a second voyage to sea . . .[58]

Yet Ingraham was not merely a naturalist on a vessel, and Ingraham saw data collection as the key to safer navigation. As captain of one of the first American vessels to venture into the Pacific, Ingraham saw himself as part of a larger project that saved lives through scientific observation and research.

> Shipwreck is often the fate of mariners, but more especially those who pass through unknown seas, which must often be the case with those who circumnavigate the globe. However they may endeavor for their safety to tread the steps of others who have preceded them, yet by various unforeseen causes they will at times fall in with dangerous shoals or lands seldom frequented and not well known.[59]

The most important element of an explorer's duty, therefore, was to produce accurate charts. Yet Ingraham was not a captain of a voyage of exploration like other Europeans who sailed in the Pacific before him. Like his Marine Society colleagues in Boston, Ingraham saw the improvement of charts as a job that aided everyone, explorers and commercial mariners alike, and not just a task for a designated survey voyage.[60] Consequently, Ingraham kept the Marine Society's edicts for observations close in mind

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[58] Ingraham, *Journal*, 34.

[59] Ingraham, *Journal*, 19.

[60] Ingraham, *Journal*, 153.

during his voyage. In addition to navigational observations about harbors, and bays, he also collected information about seawater temperature and bird life. In rounding Cape Horn, Ingraham recorded

> The same afternoon by some accident my thermometer was broken, to my great mortification, just as we were about to arrive where memorandums of its rate might have afforded pleasure to the curious. Besides it deprived me of the pleasure of gratifying some of my friends by these observations, which I promised prior to my departure from America.[61]

Once in the Pacific, Ingraham kept accurate navigational logs, noting course tracks, birds, marine life, and changes in the make up of the marine growth on the *Hope's* bottom.[62] Sailing north towards the equator in April, 1791, Ingraham noted a number of new islands, which, through a detailed discussion of de Bougainville's accounts of Spanish voyages in the Pacific (specifying the edition and page number of the English version consulted) and of Cook's accounts of his voyages, Ingraham determined to be undiscovered. "As I could not from the most diligent search find the least account of these islands, I conceive there could be no impropriety or presumption in naming them and claiming the discovery as my own."[63] After indicating their positions, Ingraham proceeded to name them with the same patriotic flourish with which he undertook the voyage. The group he named the Federal Islands, in honor of the new government of the United States, with individual islands named Adams, Lincoln, Federal, Franklin, Knox and Hancock.[64]

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[61] Ingraham, *Journal*, 41.

[62] Ingraham, *Journal*, 42.

[63] Ingraham, *Journal*, 63.

[64] These islands are the northwest group of the Marquesas Islands. Nukuhiva (Federal Island), Ua Huka (Washington Island), and Ua Poa (Adams Island) are some of the larger islands.

Ingraham's dedication to navigational data collection and analysis—often with scholarly interest in previous voyages as well—reveals that he saw himself in a tradition of British naval exploration into the Pacific, beginning with Drake, then followed by Anson, Wallis and finally Cook. Ingraham looked upon his role as captain of the *Hope* as being to make observations that would allow other American vessels to follow.

Yet Ingraham pursued his work in a different environment from the European explorers he emulated. Early British voyages under Anson, Carteret, Wallis, and Cook were specifically scientific, their purposes being either astronomical observation or exploration, and all shared government sponsorship and used Royal Navy vessels and personnel.[65] The *Columbia* and the *Hope*, on the other hand, ventured into the Pacific as private trading ventures, and lacked the financial resources that allowed a purely scientific voyage. Consequently, Ingraham carried two mutually exclusive goals into the Pacific: on one hand, to use his navigation to return a profitable voyage for his owners, and on the other, to return with public information that would help others compete with his employers in that same trade.

The tension between the private nature of his employment, and Ingraham's public goals as a navigator and explorer emerged most clearly in matters of communication back home. To Ingraham, who also viewed his success in terms of keeping his crew alive and happy, letters to and from home were essential means to maintain morale. To Perkins,

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[65] Glyndwr Williams, "The *Endeavor* Voyage: A Coincidence of Motives," in *Science and the Exploration in the Pacific: European Voyages to the Southern Oceans in the Eighteenth Century*, ed. Margaret Lincoln (Rochester, New York, 1998), 3-18. Williams questions whether Cook sailed for astronomical observations or for the purposes of exploration. In either case, his voyage was intended to be the scientific and navigational foundation for future commercial expansion and was not expected to turn a profit in and of itself. His suggestion that the Admiralty chose Cook because of his experience with colliers, and not because of his technical skill, ignores his previous cartographic experience with J. F. W. DesBarres in North America. A recognition of cartographic skill would further his own argument in favor of the *Endeavor's* sailing as a voyage of discovery.

however, such information could enable competitors to better challenge Perkins' potential lock on the Pacific Northwest market. Consequently, Perkins imposed tight strictures prohibiting the transfer of commercially sensitive information through letters to loved ones at home.

Ingraham first encountered these limitations while on board the *Columbia* in 1788. Ingraham's colleague, Robert Haswell, reported that Captain Gray took up Captain William Douglas's offer to carry letters back to India, and then to the US when the *Columbia* met up with British vessels in the Pacific Northwest in 1789. Shortly thereafter, however, Captain Douglas returned Gray's letters claiming he was not touching at India. Robert Haswell, at anchor in Nootka Sound with Ingraham and the *Columbia*, was skeptical: "This scheem was well [concerted] . . . he was fearful that through the letters to our connections some information would be communicated relative to the trade on the Coast that would be of disadvantage to the interest of his companey."[66]

Ingraham encountered this restriction again aboard the *Hope*. Even though the *Columbia* sailed after the *Hope*, and would normally out of consideration carry letters for her crew from family and loved ones, the *Columbia's* owners forbade that service. Fortunately for Ingraham, Robert Haswell, then aboard the *Columbia* on her second trip, freely ignored the order, and carried the letters anyway.[67] "For these letters, I am indebted to Mr. Haswell, who brought them unknown to the owners of the Columbia. These gentlemen, filled with envy against all who mean to share with them this valuable

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[66] Howay, *Voyages*, 50.

[67] Ingraham, *Journal*, 113.

trade, gave orders that no letters should be borne out in their ship to anyone on board the Hope."[68]

Ingraham spent the summer of 1791 trading along the coast of the Pacific Northwest, and to his pleasant surprise, collected a remarkably large number of skins for trade in China. Expecting financial windfall, Ingraham recorded that by August 15th, he had already collected 850 skins. Two weeks later, Ingraham wrote: "I had now been trading about these islands 49 days, in which time I had purchased cutsarks and skins equal to 1400 sea otters, over 300 sables, and some beavers wolverines, etc. I esteemed myself very fortunate indeed."[69] When Ingraham arrived in China, however, he did not realize his fortune. Believing Americans and Europeans to have sided with the Russians in a border dispute, Chinese authorities closed Canton to western shipping, pulling the bottom out of the skins market, and making American and British traders scramble for means to unload their useless cargoes. To make matters worse, Ebeneezer Dorr, Ingraham's supercargo and business agent, left the ship as soon as the *Hope* arrived in China., and returned to Boston to libel Ingraham as a drunk, a whore-monger, and an ineffective captain. After trusting another captain who had a line on some smuggling routes, and leaving the rest of the cargo in storage, Ingraham returned to the Pacific Northwest with the pressures of a failing commercial voyage looming over his head.[70] Ingraham's next season fared worse. James Magee, part owner of the *Hope*, came to the coast aboard the larger and better-stocked *Margaret* and undercut Ingraham in the Native

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[68] Ingraham, *Journal*, 113.

[69] Ingraham, *Journal*, 146.

[70] See Kaplanoff's introduction to Ingraham's journal for a more detailed account of Ingraham's experiences on the coast.

American trade. At one point, Magee agreed to help Ingraham cut his losses by shipping a partial cargo of skins to China, a service that Ingraham could gain freight charges for. At the last minute, however, Magee changed his mind, and like the previous season, Ingraham returned to China to face financial disaster.

By the time Ingraham returned home to Boston in 1792, his reputation hung in tatters. Dorr, arriving a full year before his victim could defend himself, wielded condemnations that were merely made more believable when Perkins realized Ingraham left his firm accountable for almost $50,000 in debts in China. In the face of such a financial disaster, very few people cared that Ingraham returned with valuable navigational information. His accomplishments as a navigator—keeping his ship safe, losing only one man in three years at sea, discovering the Federal Islands, recording reliable navigational data, and impressing European explorers such as Bodega y Quadra and George Vancouver—helped pave a smoother road for other Americans to peacefully trade along the coast. But this was not enough.

Joseph Ingraham, taking his duties to the Marine Society so seriously, revealed the contradictions between exploration and vocational science, and the Boston Marine Society membership found itself caught in the middle. Upon Ingraham's return in the *Hope*, the prestigious Massachusetts Historical Society worked with Ingraham and helped him publish his discovery of the Federal Islands. But the Marine Society would not indulge in the celebrations they had three years earlier. With many of its members retired to merchant status after an earlier life at sea, the Marine Society relied upon trade and profit to govern their seafaring concerns. Consequently, when he returned to the poisoned social environment that awaited him, Ingraham was judged not on his scientific

and technical success, but rather on his commercial failures. As Ingraham's family suffered financially between 1793 and 1799, the Society voted him no support funds nor did any member offer him a berth on any vessel. Finally, in 1797, Ingraham wrote Henry Knox for a commission on the US Frigate *Pickering*, which after eighteen months Knox granted. On August 20, 1799, the *Pickering* sailed from Newcastle, Delaware and was never heard from again.

Ingraham's story reveals the fundamental contradiction embedded within vocational science, a contradiction that emerged only as captains attempted to meet the increased scientific needs of an independent American merchant fleet and the financial demands of commercial sailing. While captains could gather information during their voyages of well-traveled routes in the Atlantic, the observations of specific rocks, headlands, shoals, or even a fast manuscript chart, required for exploration of more unknown areas, consumed time and attention that cut into the need to effectively manage a ship's commercial dealings. Furthermore, while British explorers operating under government auspices were expected to publish their findings to spur commerce, Ingraham and other American navigators working for private investors faced only increased commercial competition for doing the same. Ultimately, exploration and commerce were mutually exclusive: while the former voyages were undertaken to promote public knowledge of a region that would help others, commercial exploration was predicated upon private success. This contradiction was not lost on Ingraham's contemporaries. John Adams himself worried that American commercial expansion into the Pacific might be limited by private interests keeping their information private. In writing to John Jay in 1785, Adams worried that "These facts [of commercial opportunities in the Pacific

trades] are known to individuals in America, but will probably be concealed from the public at large, lest the speculators and adventurers be too numerous for the profit of a few."[71] In commercial voyages, the navigational knowledge gained while trading in unknown areas had to take secondary position to the private profit pursued in the voyage itself, and in some cases, represented commercially sensitive information that owners meant to remain private. Ingraham's inability to find work in any seafaring venture highlights the distance the Society placed between themselves and the young master of the *Hope*, and demonstrates that the scientific ability was not sufficient to overcome a captain's commercial shortcomings.

The tension between commerce and exploration took on greater importance as more American vessels, and vessels from Boston, competed with earlier pioneers of the trade. Citing the renowned Pacific Northwest researcher Frederic Howay's estimations, historian Donald D. Johnson shows that between 1785 and 1794, fifteen American ships competed with twenty-five British vessels working on the Pacific Northwest coast. Between 1795 and 1804, however, those numbers radically changed. British traders all but disappeared, dwindling to nine vessels in the trade: meanwhile, Americans had fifty ships on the coast, more than triple the number in the previous decade.[72] Vessel clearances from Boston paint a finer picture of increasing commercial competition among Boston traders in the Pacific Northwest. From 1787 to 1792, seven vessels cleared from Boston for the fur trade. Between 1793 and 1798, that number more than doubled to 15.

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[71] John Adams to John Jay, Nov. 11,1785, as quoted in Johnson, *United States in the Pacific*, 13.

[72] Johnson, *United States in the Pacific*, 32.

Between 1799 and 1805, that figure more than doubled again to thirty-five.[73] Consequently, the Boston fur trade that Ingraham returned to in 1792 was far more competitive than the one he left in 1787 and in 1790.

Not surprisingly, James Magee's own voyage on board the *Margaret*, between 1791 and 1794, reveals how those increased competitive pressures affected Marine Society members' data collecting activities. As competition increased, data that would help others enter the market was less desirable than data collected that would give an individual trader an edge. As a result, Magee returned with fewer discoveries and observations than he returned with ethnographic "curiosities" that could be used to anticipate Native American tastes for future voyages.

During Ingraham's disastrous first season, Magee sailed around Cape Horn on the larger and better-supplied *Margaret*. Like Ingraham, Magee was consciously aware of his role within a larger American movement into the Pacific trades. As a long time member of the Boston Marine Society, Magee carried the same mandate for navigational observations as Ingraham, and appears to have taken it seriously at least at first. To record the discoveries that he was *sure* to make, Magee shipped onboard Jonathan Howell as an "historian." to ensure his findings would return to Boston, and set himself up to make his requisite observations.

Like Prince, Magee used traditional methods to round Cape Horn, such as soundings and dead reckoning for getting a position as they approached Cape Horn.

> 1/16/92: "At 8 PM being 4 to 5 miles from off the land was sounded had 14 fathom of water over a bottom of Pebble stones; . .."

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[73] Data compiled from Mary Malloy, *"Boston Men" on the Northwest Coast: The American Maritime Fur Trade, 1788-1844* (Kingston, Ontario, 1998), Part 2.

> 1/18: sounded, determined Lat by observation, "Our Long. by Reckoning at Meridian was 65°25' W"

From the journal of the voyage, it is also clear that Magee calculated lunar distances to determine longitude. Without any date or time noted, a page of calculations clearly show that someone onboard the *Margaret* had the skills and inclination to slog through the complicated calculations required to use lunar distance longitudinal calculations.

Magee's few published observations lacked Ingraham's detail. In 1795, Magee published a five paragraph account of his "discovery" of a group of islands in the North Pacific.[74] Unlike Ingraham, who carefully studied prior accounts and analyzed his islands' previously recorded positions, Magee simply assumed no one had seen them before. Nor did he bother to land and find out. During his travels, he gave brief and at best cursory descriptions of their location and sailed on.

Magee's voyage show a marked shift toward commercial and ethnographic, and not navigational, research. Instead of the rich navigational materials Ingraham collected, Magee returned with a large number of Indian and Islander artifacts that gave insights into the customs of the Pacific Northwest Indians. Some of these items—a stone axe, thread, a comb, a lance and harpoon, and cordage samples—might have given Magee ideas about what to ship to the Pacific Northwest on his next venture.[75] Other items—a canoe model, and elk's horn, lip ornaments, a decoy bird, and bracelets—reveal Magee's interest in exploring Pacific Northwest Indian culture for more "scientific" reasons.

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[74] James Magee, "An Account of the Discovery of a Group of Islands in the North Pacific Ocean . . .," *Collections of the Massachusetts Historical Society* (Boston, 1795), 261-262.

[75] This is a very speculative point—according to Mary Malloy, New Englander designed axes and manufactured goods sold quite well, suggesting that New Englanders did not need to cater too closely to Indian tastes. That said, however, these items do closely parallel types of manufactures readily available to

According to Mary Malloy, American mariners began collecting artifacts as post-war American learned societies joined in European societies' keen interests in categorizing the human, as well as the natural world.[76] As a result, Magee looked to cater to those interests more than any desire to expand upon navigational knowledge.

Nor did Magee make the important discoveries he had planned upon his departure from Boston. The ship's historian, Howell, failed to produce any significant write-up of Magee's voyage at all, and what few navigational observations were recorded were shoddy in comparison to Ingraham's work and were of little use to subsequent voyagers. As a result, Magee's voyage indicates that the commercial prospect of Pacific voyaging took precedent over the need for navigational information, and implicitly acknowledged the failure of Marine Society members to combine commerce and navigational research as they had successfully done in the Atlantic.

As American navigational research and commercial exploration expanded in the 1790s, the Boston Marine Society found itself unable to grow to meet the demands. Vocational methods adapted from North Atlantic seafaring were simply not enough for the more complex navigation required in the Indian and Pacific oceans. Onboard ship, increased trade and competition for profits forced scientific observations to a marginal status as American vessels entered the world trade arena and butted up against competitors. In this realm, BMS mandates for publicly useful nautical observations ran counter to the commercial interests of privately funded commercial voyages of trade and discovery. Furthermore, trade alone made a successful captain. Ingraham's

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merchants assembling trade goods to be shipped to the Pacific Northwest. For a list of items Magee collected on his voyage, see Malloy, *Souvenirs*, 94.

accomplishments, though praised by those outside the commercial world as expanding national knowledge of the Pacific, were not enough to salvage his trading career. Finally, other information about Native American culture, aesthetics, and tastes displaced navigational information as trading—and not navigation—emerged as greater hurdles to American merchants in the Pacific trades.

While Marine Society members reacted to new challenges in expanding American markets, the Society itself faced a series of changes that worked to diminish the organization's role within the Boston nautical publications market. In facing challenges brought by researchers such as Clarke, Burges, Blunt and others, the Marine Society found itself relying upon outside expertise for their review process. By 1794, the Marine Society had all but completely farmed out their chart review functions to the mathematician Osgood Carleton. In addition, while the Marine Society still relied upon their practical evaluative techniques, such techniques increasingly fell out of step with nautical publications that incorporated theoretically informed methods. In reviewing Churchman's *Magnetic Atlas*, the Marine Society admitted to the seafaring community that their methods lacked the scientific rigor that new publications were being judged against. As a result, the Marine Society backed away from reviewing other nautical works presented to them.

These changes in the market may not have been unwelcome. While the Marine Society spent many years seeking the role of scientific arbiter, the advances in American research must have pleased the older members who could remember the few works that shed light on New England's poorly charted coastline. In facing obsolescence, the Marine Society also embraced success. The Revolution freed the Society to throw their

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[76] Malloy, *Souvenirs*, 31-33.

support behind a new nation heavily dependent upon sea-borne trade. The Marine Society aided Hamilton's desires to expand that trade, as a patriotic duty, and as a patriotic organization wedded commercially and militarily to the republican experiment. Their assistance also granted them new sources of political influence. Furthermore, other interests in the welfare of the Port of Boston and in the growth of Federal involvement in navigation demanded much of their attention. Yet changes wrought by a new American republic soon marginalized the Society from centers of Federal patronage, as political changes and market structures diminished much of the Society's influence and role in national navigational research.

CHAPTER V

MARKET, POLITICS, AND METHODOLOGY: THE END OF VOCATIONAL SCIENCE, 1800-1807

If, by 1798, the Boston Marine Society could still claim to be leaders of Boston's maritime community, their status as such was short lived. While no single event marks the demise of the Marine Society's influence, it is clear that changes in national politics and international affairs undermined the Society's political and social standing. Just as the Marine Society was able to use scientific expertise to secure greater political influence, the loss of political influence helped to weaken acceptance of their vocational scientific methods. Furthermore, fundamental changes in American navigational research in the first ten years of the nineteenth century displaced vocational methods from the forefront of nautical research. Consequently, the Marine Society's prestige as the best and brightest navigators came to an end not simply because better navigational and surveying methods finally became more widespread. In addition to the better known changes in navigational practices then affecting the maritime world, changes in national politics, international affairs, and the increased role of the open market of ideas in determining research accuracy, all undermined the social and scientific foundations upon which the Marine Society based its authority. By 1811, the Marine Society, perhaps a victim of its own success, retired from national politics and their dominant role in the nautical publications market, and returned to the fundamental issues of mutual aid and local port management with which it had begun.

It can be argued that the BMS's claim in 1789 to represent a united set of maritime interests in Boston, ranging from mariner to master to merchant, reflected in some sense the political reality in the town. Yet through the 1790s fissures within that unity emerged and split both the mercantile community and the Federalist party. Beginning with Jay's Treaty and Adams' handling of French tensions in the Caribbean, merchants divided over how to deal with Britain and France. Such fissures grew through the decade, allowing new merchants allied with Jefferson's Republican party to make steady gains in Boston elections. With Jefferson's election in 1800, Boston's mercantile community, once united under the Federalist banner, sat widely divided.

Jay's Treaty in 1795 first revealed splits within Boston's maritime community. New men in trade and other non-Federalists initially despised the treaty as giving too much to Britain without anything in return. The treaty supposedly addressed American concerns for impressed seamen, high seas searches of cargoes, and British withdrawal from northwestern forts in the Ohio country, in exchange for favorable trade terms to British merchants. When the terms of the treaty returned to the US, however, many felt that Jay had given up too much for too little, at the expense of favoring British over French trade.

As a result, the treaty alienated many new merchants who had staked their chances on new trade opportunities with France and its West Indian islands. For many merchants in New England, and Boston in particular, new avenues to trade with France created new opportunities for aspiring traders unable to break into traditional trades with British houses. Newly prominent traders—such as fur trader Russel Sturgis, James

Bowdoin (the son of the late governor), Samuel Brown (merchant and purchaser of Thomas Hutchinon's estate), Ezra Davis and John Brazer (shipbuilders and merchants), and grocer Amos Binney—all had developed significant ties to France in the 1790s.[1] When, Jay's Treaty threatened such trade by granting favorable trade status to Britain in exchange for almost nothing—and to the exclusion of France—Republican opposition mounted in increasing force.[2]

Federalist traders, mostly those who continued traditional trades requiring ties to British trading firms and British credit lines, supported the treaty as a means to ease international tensions and stabilize the commercial climate. Jay's negotiations preserved American access to British ports and appeared to address American concerns over western forts on the American frontier. The treaty also appeared to establish clearer definitions of which cargoes Royal Navy vessels would seize as war materiel bound for Revolutionary France, thus reducing confusion and possible losses as the Royal Navy enforced its blockade. While initially despised as a sell out to British interests at the expense of American complaints, Jay's Treaty went on to receive tremendous public support fueled by an increasing, and increasingly lucrative, mercantile sector benefiting from war time prices in Europe.[3]

As Jay's treaty revealed new divisions within Boston's mercantile community, the XYZ Affair of 1799 revealed growing splits within the Federalist party, which traditionally had supported policies favorable to trade with Britain. Beginning in the

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[1] Paul Goodman, *The Democratic-Republicans of Massachusetts: Politics in a Young Republic* (Cambridge, Mass., 1964), 97-101.

[2] Goodman, *Democratic-Republicans*, 97-98, Stanley Elkins and Eric McKitrick, *The Age of Federalism: The Early American Republic, 1788-1800* (New York, 1993), 431.

[3] For Jay's Treaty effect on public opinion, see Elkins and McKitrick, *Federalism*, 431-449.

early 1790s, French corsairs had increasingly attacked and seized American shipping to the West Indies. Federalist merchants in Boston saw French assaults on American shipping as yet another reason to ally formally with Britain. These merchants saw the French Revolution representing the worst elements of democracy released against a world of orderly, peaceful trade. To Federalists, this was readily apparent in the West Indies, where international warfare and retreating British forces left French colonial territories in chaos. Encouraged by French Commander Victor Hugues, who saw all American vessels as valid war prizes, French privateers poured forth from West Indian islands hoping to gain great wealth at the expense of American traders.[4]

French attacks on American trade effectively drove up insurance rates from 6% in 1796 to more than 33% by 1798. As American losses mounted—with more than 330 American ships seized in 1797 and 1798 alone—American profits and trade declined, while overhead costs soared.[5] For "High Federalists," such as Secretary of State and former Essex County Representative to Congress, Timothy Pickering, privations against American shipping formed a solid foundation for war against France and an alliance with Britain, whose naval forces could protect American shipping in the West Indies.

President John Adams, however, sought to avoid war at all costs, or at least use it only to protect American overseas shipping and reduce insurance rates.[6] And while conservative, pro-British Federalists sought war, Adams worked to restrain such impulses by balancing the defense of American trade and honor with the costs and risks of full-

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[4] Elkins and McKitrick, *Federalism*, 643-662.

[5] Elkins and McKitrick, *Federalism*, 645.

[6] Elkins and McKitrick, *Federalism*, 647.

fledged engagement in the Wars of the French Revolution then raging across the Atlantic.[7]

In 1798 Adams dispatched to France a negotiating team led by Republican Elbridge Gerry seeking an end to the informal war between the US Navy and French privateers that had wrought havoc with American trade to the Caribbean. Before Adams' negotiations for peace could commence, however, French delegates, given the pseudonyms X, Y, and Z, demanded bribes from the American delegation. In the face of such treatment, Federalists claimed the incident vindicated their pro-war position, and, seeing the bribes as an insult to American national honor, Adams recalled the entire delegation in the spring of 1798. Yet Gerry remained in France, hoping to open negotiations through informal meetings. With Gerry's help, and against the advice of more hawkish Federalist members of his cabinet, Adams agreed to re-open negotiations with France to end the informal war.

Jeffersonian Republicans emerged as the true winners from the whole crisis. As Federalists split over Adams' French policies, Republicans continued to make steady gains within the Boston mercantile community.[8] For more common Boston residents, Jefferson's popular platform of the 1790s emerged as an alternative to the elitist platforms of Federalists such as Nathaniel Ames, Timothy Pickering and Stephen Higginson.[9] Furthermore, prominent Boston Republicans such as Benjamin Austin, John

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[7] Elkins and McKitrick, *Federalism*, ch. 14.

[8] Elkins and McKitrick, *Federalism*, 725-743; Goodman, *Democratic-Republicans*, chs. 7 and 8; Ronald P. Formisano, *The Transformation of Political Culture: Massachusetts Parties, 1790s-1840s* (New York, 1983)ch. 3 and 108-110; and Drew McCoy, *The Elusive Republic: Political Economy in Jeffersonian America* (New York, 1980), 185-188.

[9] Formisano, *Transformation*, ch. 6. This is not merely a question of populist politics versus deferential styles of politics. Formisano points out that Jeffersonians used deferential political practices in some

Sullivan, and Levi Lincoln held strong ties to the populist Hancock faction in Boston politics from the 1780s and early 1790s, and benefited from Republicanism's appeal to popular feelings among artisans and workers in the seaport community.[10]

Consequently, the split in the Federalist party combined with Jefferson's increasing popularity in New England coastal towns and countryside helped propel Jefferson into the presidency in 1800. The new administration brought with it new faces who fundamentally changed Boston's mercantile world. Despite his claim to be both Federalist and Republican at inauguration, within the first years of his presidency Jefferson purged 146 incumbents out of the 316 second-level offices in 1801, or about 46 percent. Out of those, Carl Prince has identified at least 118 as Federalist office holders named to the posts by previous Federalist administrations.[11] While Federalist judges and internal revenue inspectors received the brunt of Jefferson's removals, the customs service also took heavy losses. The President removed 50 of 146 customs officials, 41 of whom were Federalists.[12] These changes had significant impacts on northeastern port towns. New York and Philadelphia saw only one incumbent in the entire customs establishment retained in each port. In New England, Portsmouth, New Hampshire watched all its customs officers ousted, as did New Haven and Middletown, Connecticut. Massachusetts saw ten customs officers removed, though not in Boston. There, Jefferson

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circumstances while Federalists began to appeal more directly to common voters. Furthermore, Formisano argues that deferential politics remained a common feature of Massachusetts campaigning well into the nineteenth century. Consequently, such findings return the matter to substance and the message of the candidates and their supporters rather than just the style of the campaigns.

[10] Goodman, *Democratic-Republicans*, 97, 100-101.

[11] Carl E. Prince, "The Passing of the Aristocracy: Jefferson's Removal of the Federalists, 1801-1805." *Journal of American History*, 57 (1970-1971) 565.

[12] Prince, "Passing of the Aristocracy," 570.

let Benjamin Lincoln stand in office, likely due to his political moderateness and his influence with wealthy Boston merchants of all political creeds. Lincoln also bent with the change in the political wind. In November, 1802, Lincoln instructed his lieutenants to remember the appropriate place for partisan politics:

> I know gentlemen that I may appeal to you with the highest confidence that you will assent to the truth of the declaration that I have never attempted to controul your political creeds, or influence any of your work in the choice of officers at any of our [ ] meetings. If I have ever said any thing on the subject it has been *[at] the meetings, [it has been to] exercise your rights and give your votes as your* best judgement dictates. I also wish that on all proper occasions you will express your sentiments with firmness & freedom and never feel yourselves under controul from any quarter, but such as shall be dictated by cool reflection, good information & judgement. To all this I think you are justly entitled. But if any of you have gone further and have in the public walk, vilified the chief Magistrate of the Union in terms rude and indecent and should justify yourselves that herein you only express your right, I have to ask that you will in future recollect that there is a difference between Right & the propriety of expressing that right. A word to the wise is enough.[13]

Despite Lincoln's survival, however, Jefferson's customs service purges elsewhere in New England had done their damage to Federalist control of Massachusetts civil service.[14] In other areas of civic leadership, Republicans were also encroaching upon Federalist bastions. For example, after his election, Jefferson named physician, Constitutional delegate and Republican orator Dr. Charles Jarvis to head the Charlestown Marine Hospital, originally called for by the Marine Society, in 1805. Republicans also went head-to-head with the Massachusetts Medical Society and Cambridge's bastion of Federalism, Harvard University, to open the institutions to non-Federalist, elite families.[15]

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[13] Benjamin Lincoln to [Officers under his direction], Nov. 19, 1802, L. Shaw Papers (Massachusetts Historical Society, Boston, Mass.).

[14] On the importance of the customs service because of the patronage attendant with such positions, see Prince, "Passing of the Aristocracy," 570.

[15] Goodman, *Democratic-Republicans*, 166-169.

Not surprisingly, Boston also underwent significant changes in its political representation at the same time. While returning votes for the Federalist candidates for President, Boston sent Republican Dr. William Eustis to the House of Representatives in 1800. Also a moderate, but on the Republican side of the aisle, Eustis had a distinguished military service in the Revolution and during Shays' Rebellion, serving as surgeon in both conflicts. He remained moderate in the vituperative political debates of the late 1790s, an action that won him accolades from Federalist counterparts who saw him as respectable and able to be worked with. Moderate or not, however, Eustis was a Republican, and one with sufficient ability eventually to serve as Madison's Secretary of War.[16] In addition to changes at the Federal level, Massachusetts Republicans made considerable gains at a local level, controlling the General Court from 1806 to 1812 (except for 1809), winning the executive for the first time in 1807, and repeating the performance four times from then until 1812.[17]

Consequently, when the dust cleared after Jefferson's Revolution of 1800, the unified maritime community that the BMS had claimed to represent in 1789 could not even be imagined. No longer could the BMS present itself as representatives of the community, for the community was no longer sufficiently focussed for a single, and mildly partisan, body to see itself as its leader. Furthermore, the BMS found itself on the wrong side of the political spectrum and with significantly fewer ties to government patronage sources. The Marine Society's white-paper urging Adams to war in 1798

[16] Goodman, *Democratic-Republicans*, 98-99.

[17] Goodman, *Democratic-Republicans*, 154.

suggests that they sided with high Federalists.[18] Yet with Lincoln hemmed in by Republican placemen, and planning to retire soon , and with Boston represented in Congress by a Republican, the strings to Federal resources that the BMS had been able to call upon in the 1790s were either severed completely or tied to dead-ends. As long as Federalists held the Massachusetts executive, the Society could still exercise some influence in the port, but after 1807 the political forces which they had ridden to success in the 1790s had washed away. Without a unified community to represent, and without ties to Federal funds that could serve as such a foundation's proxy, the BMS's influence in Boston politics ebbed.

Jefferson's election reduced the BMS's political influence. The test case came in 1803, when it called for the preservation of a Boston Harbor island called Nick's Mate. Similar requests for local improvements had met little resistance in the 1790s. When the Republican Congress balked at the Society's proposals, however, it was clear that the BMS did not hold the same influence that they had a decade earlier.

Since the seventeenth century, a small island called Nick's, or Nix's, Mate marked the Broad Sound approach that ran southeast from Boston harbor. While the island was large enough to show relatively prominently on Southack's 1694 chart of Boston harbor, by 1800, the island had been all but washed away.

[18] See Elkins and McKitrick, *Federalism*, 619-641, and 665-672, for more lengthy discussions of the political debates over the mission within Adams' cabinet.

Figure 14: Detail, John Hills, [Boston Harbour, with the surroundings, etc.].

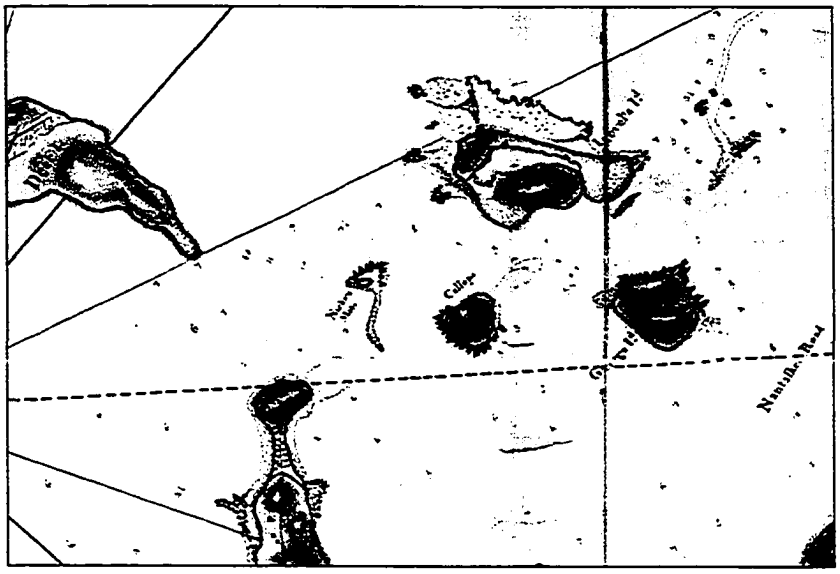
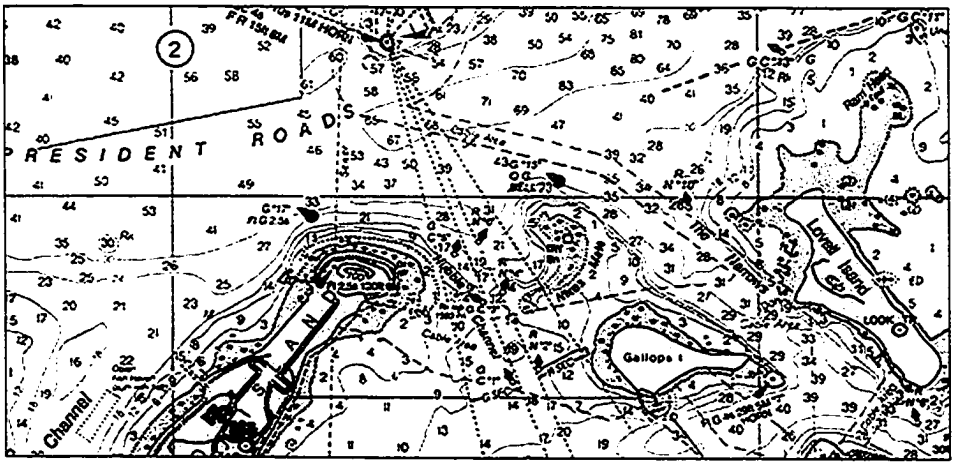


Figure 15: Detail of Nixes Mate, U.S. Coast Survey, *Boston Harbor*.



In September, 1803, the Marine Society unanimously voted to approach Lincoln for Federal funds to prop up the island against the elements. Requesting his recommendation to the State Department, the Society proposed that a wall be constructed around the island "to protect it from total destruction by the violence of storms of the

approaching season."[19] The society then petitioned Congress directly in December, basing their appeal, as they had in the past, on their status as "fathers of the maritime people."

> The Boston Marine Society taking a lively interest in all that concerns the Communal property of the United States, and feeling it a Duty incumbent on them to point out improvements or advantages which may immediately affect the Communal interests of this Metropolis, beg leave to Express to the Honourable Congress of the United States, the necessity of preserving an ancient Land mark of the greatest importance to the Navigation of the Port of Boston.[20]

After describing the extent of the island's erosion and its important position to Boston shipping, the Society also informed Congress that they had approached Thomas Knox, the island's owner, about selling the island. In addition to building a wall around it, the Society also requested that a beacon be erected to mark the channel more clearly. Ultimately, such improvements were not a local issue, but rather a national one, as "It is the opinion of this Society that a [project] increasing to the revenue of the United States [ultimately] is the consequence of such precaution, by preventing many of those accidents to which vessels are over exposed in dangerous [and] narrow channels."[21]

Their initial request attracted Eustis' attention, whose request for a budget for the project in January 1804 compelled the society to call a special meeting. Yet the matter stalled after Eustis' initial correspondence. For the next five months the Society had no word from Eustis, and at their May meeting, the Society voted that Master Nathaniel Goodwin ask him for an update. The details of that meeting were not recorded, but

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[19] BMS Minutes, Sept. 6, 1803.

[20] BMS Minutes, Dec. 6, 1803.

[21] BMS Minutes, Dec. 6, 1803.

subsequent inaction suggests that the Marine Society's request did not receive Congressional support. At a special meeting in June, the Society moved to take their appeal to the governor of Massachusetts.[22]

Unlike their petition to Congress, their June petition to Governor Caleb Strong dropped language that spelled out their role within the community. "The Island is of importance as a Land mark to all coasting vessels entering this port from the northward and Eastward, being surrounded by an expansive body of Rocks, bordering on the main Channel, which renders it extremely dangerous to approach at all times."[23] Instead of relying upon their role in Boston's maritime community, as they had with their petition to Eustis, the Society presented its appeal to the state legislature based on pragmatic considerations. Without appeals to duty or reminders of obligation, the Society asked that their petition be laid before the legislature. The Society also implicitly pledged federal funds to offset state expenses on this account. "As the object is of a general as well as of a local nature, it is presumed that whatever may be done under the immediate authority of the State, will be acceded to and reimbursed (as in justice it should be) by the general government at the next session of Congress."[24]

The Marine Society's failure to secure Federal funds fomented a change in the language of their state petition, a change that revealed a shift in their understandings of their own role within the community. Since 1789, the Marine Society had legitimated their petition on the port's behalf with their status as fathers of the maritime people of the

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[22] BMS Minutes, Jan. 11, May 1, and June 14, 1804.

[23] BMS Minutes, July 3, 1804.

[24] BMS Minutes, July 3rd, 1804.

state. Their petition to Congress carried much of the traditional tones of a natural elite looking after the wards they assumed responsibility for. In approaching the state in 1804, however, such language disappeared, replaced instead with arguments founded upon strict utilitarian assessments of costs and benefits. While their roles within the community allowed them to make the petition, the importance of granting it had less to do with leadership than with protecting shipping. Such a change in language, while subtle, marks an important change in the Marine Society's view of themselves within the community. Without their powerful friends in Washington, the Marine Society began to step away from their self-proclaimed role as representatives of the maritime interests of the port. Instead, their petition to the Massachusetts governor indicates a return to a technical foundation of their authority. In petitioning the state, the Marine Society's expertise as masters, rather than their social roles, formed the foundation of their appeal.

The governor looked favorably upon the designs of the Society. On June 22, 1804 Governor Strong passed through the General Court a resolution granting the Marine Society $3000 for the restoration of Nick's Mate and for the construction of a beacon to mark the channel. In spite of this grant and the previous urgency of the Marine Society's earlier appeals, work did not begin until the following year. In the following March, a Marine society committee sailed to the island to survey the required work, and in June, the committee joined efforts with one Col. Rice, who was appointed by the state as superintendent of the project.[25]

Work progressed through the summer and into the fall, so that by November, the remnants of the island lay surrounded by a 6-foot thick and 16-foot high wall enclosing

[25] BMS Minutes, June 4, 1805.

an area 14-feet long and 32-feet wide. A columnar beacon 32 feet high, "of the magnitude which [the committee] have no doubt will answer the purposes contemplated [for guiding shipping]" also " stood in the middle of the stone basement" and marked the island for incoming traffic.[26] Despite the success of the project, the work outstripped the initial budget by an additional $4000. In response to a separate appeal presented to the Massachusetts legislature by the Marine Society and Col. Rice, the General Court granted the additional funds.

The Nick's Mate project, while itself a minor affair, brought to the fore a significant change in the Marine Society's relationship to the Federal government. Whereas throughout the 1790s the Marine Society used its close collaboration with Lincoln and other Federal agents to rely upon Federal funds for local navigational improvements, political changes in Washington denied them such support by 1803. Rather than directing Federal resources towards harbor improvements, Jefferson's election in 1800 removed Federalists friendly to both the Marine Society's interests and to Lincoln's status within the party. While Eustis may have been interested in supporting the Marine Society's petition to Congress, lack of Federal support forced the Society to approach the state for funding which had, in the previous decade, emanated from Federal coffers.

Ultimately, the Embargo of 1807-1809 polarized Boston's maritime community more than all previous crises. Jefferson's embargo was an attempt to find a third way between the Scylla of war with Britain, and the Charybdis of war with France. Both options risked alienating important domestic constituents and antagonizing strong

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[26] BMS Minutes, Nov. 5 , 1805.

European powers with little respect for American neutral trading or, for that matter, sovereign rights on the high seas. In Boston, the embargo embittered Federalists who saw Jefferson's prohibition of foreign imports and exports as the president mortgaging their livelihoods for the sake of a Francophile administration. For Republican defenders, the embargo symbolized an American determination not to suffer impressments and seizures on the high seas from either Britain or France. In refusing to export or import goods from Europe, Jefferson tried to use America's commercial weight in the Atlantic economy to bring the two strongest European powers to the negotiating tables.[27]

Boston's opposition to the embargo was very mixed. Boston's Federalist paper, the *Columbian Centinel*, masked their political attacks on the embargo in populist terms. With news of the embargo arriving in late December, the *Centinel* appealed to readers' sensibilities with a letter from "Jacob Standfast" to "Jonathan Holdfast" recounting how his friend "Nell's" plans for marriage had been postponed because her betrothed, "Jack Anchorstaff," had lost his job with the embargo. "The poor fellow's *turn'd out of employment*—not mind ye, because he did not conduct right! for he was *d'tarnation* good boy and earned money fair." The embargo had inflicted such misfortune upon the honest sailor and his dutiful love. Standfast continued to trail the implication of the embargo throughout the economy: Jack wanted to buy a fishing smack, but because Standfast could not sell some land and crops to help him out, such an investment was out of the question. The fisheries, the Federalist polemicist continued, were also closed to Jack as well, with British cruisers able to operate freely along the New England coast. Carpentry, another of Jack's skills to make a living, was also likely to yield no

[27] McCoy, *Elusive Republic*, 209-235.

recompense during the embargo, as few would likely build with the threat of war. "[M]ayhap the plan may be, for we can only guess which[,] is to drive all our sailors and mechanics to Virginia and the southward to help the slaves plant cotton, rice, tobacco."[28]

The Republican *Independent Chronicle* presented their support for the embargo in less ambiguous terms, and characterized Federalist partisanship as a denial of the popular will.

> The Embargo must be considered by every considerate citizen the most wise and prudent measure to be adopted by the government. It would be the greatest folly for the Americans to sport their property between the contending powers of Europe. . . .To this prudent measure the Essex Junto, or the British Faction, are opposed, and every method will be taken to raise jealousy and dissension in the country, to frustrate the embargo.[29]

The *Independent Chronicle's* editors also anticipated Federalists' populist appeals and saw opposition to the Embargo as Tory treason.

> We shall hear a great deal about the poor farmer and poor tradesman, on account of the embargo; but the fact is that, the persons who are making the outcry are those, who care neither for the farmer nor the tradesman. We have in every seaport a new fangled group of *nominal merchants*, who are very willing to risk their vessels and cargoes at sea—knowing that if they are taken, they shall not be the losers, but the loss will fall on the tradesmen and farmers who trust them. . . .We know "by their roaring," the government has hit them right.' The more the Tories roar, the better for the country. We found this was true in '75—and the same group of Traitors are now growling at the measures of government.[30]

While Boston may have been still a center of Federalism before the embargo, Boston Republicans were making gains and splitting popular support. Both sides increasingly vilified their domestic political opponents. For Republicans, Federalist opposition to the embargo signified their willingness to trade seamen's rights and lives for continued trade with an unabashedly disrespectful Great Britain, which had been

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[28] *Columbian Centinel*, Jan. 2, 1808.

[29] *Boston Independent Chronicle*, Dec. 21, 1807.

forcing American sailors to serve in the Royal Navy against their will since 1793 and before. For Federalists, Republican support for the embargo symbolized their willingness to destroy the wealth and property of New England merchants in favor of abstract principles and British deserters.[31]

Despite claims from successive historians about mobs of unemployed seamen and "Jefferson's nightcaps" sitting on top of mastheads in protest, researchers into Boston shipping records reveal a different story.[32] Examining the ship news from the *Columbian Centinel*, Robin D. S. Higham, for example, found that coasting voyages almost doubled during 1808, the only full year of the embargo. Furthermore, such an increase in the coasting trade more than made up for decreases in overseas clearances. In 1807, 535 coasting vessels cleared into Boston and 486 vessels cleared out. The following year, 1,267 coasting vessels cleared into Boston, with 1,192 vessels departing. Overseas traffic suffered dramatically, but the trade was not entirely shut down: 1807 saw 907 ships arrive from overseas and 573 vessels depart. In 1808, such numbers fell to 330 vessels arriving, and only 71 departing. When outbound vessels are tallied, more ships cleared out of Boston in 1808 than did in 1807: a total of 1,059 ships cleared out of Boston, on traditional voyages along the coast, to Europe, and to the West Indies. The following year, however, that total rose to 1,263 ships, leaving mostly on coasting voyages. Consequently, the embargo did not shut-down all of Boston's shipping.

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[30] *Boston Independent Chronicle*, December 21st, 1807.

[31] McCoy, *Elusive Republic*, 218-220.

[32] Despite claims as this practice being a symbol of protest, Higham points out quite correctly that capping mastheads protected the end grain of the spar from drying and developing cracks while the vessel remained laid up for routine maintenance and during the winter. See Robin D. S. Higham, "The Port of Boston and the Embargo of 1807-1809," *American Neptune*, 16 (1956), 189-210.

Yet statisitics of arrivals and departures do not tell the full story. W. Jeffrey Bolster revealed a similar increase in coastwise arrivals and departures in Providence, Rhode Island during the embargo. But while many vessels were still sailing, Bolster notes that profits suffered tremendously. Instead of carrying lucrative cargoes, coasting ships faced dropping freight rates for several seasons. Vessels that had previously sailed internationally transferred into the coasting trade at the same time as the embargo depressed coastal towns' economics. Some of the coasters sailing in and out of Providence during the embargo literally carried nothing but "bags of bags."[33] While more vessels were still sailing, profits and wages fell off dramatically.

Governor James Sullivan's notorious generosity with shipping permits for Boston vessels also helped keep some mariners working through the embargo. Throughout 1808, Sullivan was remarkably lax in allowing Boston masters to run grain to Maine—grain that often missed Maine entirely and wound up in New Brunswick and Nova Scotia. Such smuggling runs, while risky in and of themselves, also helped keep Boston mariners at work and ships at sea. Bolster cautions us to be wary of romanticized visions of Maine smuggling. Most Providence vessels that found new ports in Maine during the embargo cleared their cargoes legally, leaving the tricky smuggling work to locals familiar with the Passamaquoddy Bay area.[34]

Whatever its impact on the local economy, the embargo forced the BMS to withdraw from political affairs as it had from charitable issues. With foreign policy

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[33] William Jeffrey Bolster, "The Impact of Jefferson's Embargo on Coastal Commerce," *Log of Mystic Seaport*, 37 (1986), 111-123.

[34] Bolster, "Impact," and Joshua M. Smith, "Patterns of New England Smuggling, 1789-1820," in *The Early Republic and the Sea: Essays on the Naval and Maritime History of the Early United States*, ed. William S. Dudley and Michael J. Crawford (Washington DC, 2001), 35-54; John D. Forbes, "Boston Smuggling, 1807-1815," *American Neptune*, 10 (1950), 144-154.

polarizing Boston's maritime community, the Marine Society lost much of its luster as "fathers of the maritime people." While the society said nothing directly about the embargo itself, its long association with Federalists placed them in a camp whose opposition to the measure ran counter to many mariners' own growing nationalism and patriotism.[35] Consequently, the Marine Society's traditional role between 1800 and 1807 grew increasingly out of step with those they claimed to represent. In November, 1808, the Marine Society voted that its annual public dinner be cancelled in light of the "embarrassing state of the trade," and never again would the society dine in public as they had in the 1790s. After the embargo, annual dinners did reconvene, but the annual affairs reverted back to the private gatherings that they had been before 1787.

Structural and managerial changes in 1808 further marked a separation from the community. Instead of monthly meetings, the society resorted to quarterly meetings, reducing the days that members gathered as a cohesive civic body. Furthermore, the society created a board of trustees (who continued to meet monthly) to manage charity requests and payments, bond issuance, and the society's finances. The net effect of these changes was to create an internal hierarchy that distanced the members from one another and the society from the town at large. Quarterly meetings greatly reduced the number of times members met not only to discuss business, but to also view themselves as a concerted group that shared a unique social and vocational role within the community. Furthermore, trusteeship meant that individual members had less say in how society funds were allocated and charity distributed.

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[35] Paul Gilje lays out this dynamic in, "The Meaning of Freedom for Waterfront Workers," in *Devising Liberty: Preserving and Creating Freedom in the New American Republic*, ed. Thomas Koenig (Stanford, California, 1995) pp. 109-140.

The Marine Society's role at the higher levels of government was all but over on the eve of the War of 1812. Between 1805 and 1811, the society continued to discuss the management and maintenance of Boston Harbor buoys and beacons, pilot and port warden management, and to evaluate the visibility of Winslow Lewis' new lighthouse lamps.[36] In 1810, when Winslow Lewis asked their approval for a new design of lighthouse lamps—a design that he managed to sell to American lighthouses—the BMS conducted similar experiments as they had for their review of Cunnington's lamps earlier. Less scientific and more vocational, the society approved of the lamps and reported favorably back to Lewis Shortly afterwards, they met with Henry Dearborn, Lincoln's successor as Collector for the Port of Boston about harbor markers.[37] While the Society's opinion in these mostly local affairs was important, the society did not extend their interests beyond the Port of Boston.

Membership trends reveal the society's decreasing ability to retain its local relevance and attract new members. New member induction increased dramatically in the 1790s as the society took more active roles in local charity and politics. Yet, as Boston's politics grew more divisive in the late 1790s and early 1800s, the society found fewer captains willing to join, even at a time when Boston overseas trade expanded tremendously.

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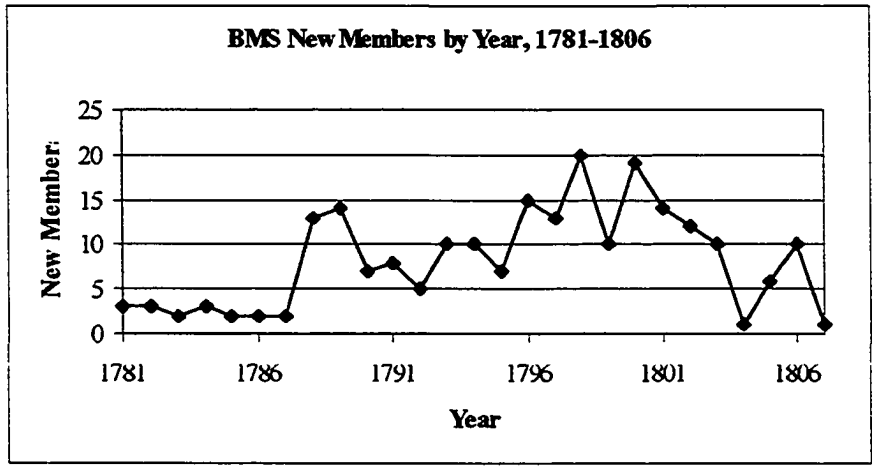
[36] For discussion with Lincoln regarding local buoyage and beacons in Boston Harbor, see BMS Minutes May 6, June 3, July 1, and Aug. 6, 1806. For Pilot management issues, see BMS Minutes Feb. 3, 1807. For Port Warden management, see BMS Minutes, Nov. 1, 1808. For Winslow Lewis lamps, see BMS Minutes, June 5, 1810.

[37] BMS Minutes, July 11, 1810.

Table 6: BMS New Members by Year, 1781-1806.



Source: Baker, *Boston Marine Society*, 318-369.

Reaching a high of 20 in 1798—the year the society sent its foreign policy white-paper to President Adams, new membership dropped off dramatically except in 1806 and 1808. Between 1788 and 1800, the society inducted an average of about 12 .5 new members per year. Between 1801 and 1812, that figure dropped to seven. To put the matter in more dramatic terms, the society inducted more new members in the three years from 1798 to 1800 (49) than it did in the first twelve years of the nineteenth century (48). Furthermore, the 1808 peak of eleven new members represents a heightened interest by masters facing the economic uncertainty of the embargo. After the embargo was lifted, the Marine Society could not attract fresh members

The Society's union of navigational science and political influence received the final blow in 1811, when local planners at home and in Washington did not even feel the necessity of consulting the Marine Society regarding the construction of a lighthouse at Scituate, Massachusetts. In a shrill petition to Albert Gallatin, the Society found itself

explaining to Jefferson's Secretary of the Treasury why his decision to erect a light at Scituate Harbor should have included their input.

> In this instance it may not be irrelevant to state to you the situation which this Society has now been placed for many years, to demonstrate more clearly their motives on this occasion. The Boston Marine Society originated in an Association of old and respectable Ship Masters in the year 1742, with a view to promote the general interests of navigation and to assist the unfortunate members and their families. Since which period this Society has increased in numbers and respectability with an accumulation of considerable funds; and is now composed of upwards one hundred former masters who have been retired from the Sea with adequate fortunes, many of whom are largely interested in the insurance Offices and as *Underwriters* [emphasis in original], and about fifty of the most respectable merchants & Ship owners and Gentlemen of the highest stations in the Commonwealth, the rest of the society is composed of the more active & younger Mariners who still follow the Seas as a professional business. The importance of this Society, connected with the knowledge & experience of its members, has been recognized by the Legislature of this State in various instances, and their immediate agency and recommendation are necessary to the appointment of Pilots and many other Officers connected with the general affairs of Commerce.

After informing the Secretary of their past experience, the Society expressed their displeasure at realizing that "The first notice the Marine Society had of the intended Light House was the publication of proposals for erecting the Buildings, &c."[38] Calling a special meeting to discuss the new light, the Marine Society opposed the construction of a light on a variety of grounds. First, the potential for confusing incoming masters who may have been at sea when the light was announced remained too high for the light to be lit.

> Cape Cod Light is now a steady fixed Light, eight leagues from Cape Cod Light W by S is Plymouth Light also a fixed Light, Six Leagues NW by N from Plymouth Light is Scituate Light, at present intended to be a fixed light, four leagues from Scituate Light NW is Boston Light, the whole distance being about 18 leagues forming nearly a segment of a circle by the horizon. Vessels approaching either of the above mentioned lights in the usual course from the East by North, they will each be seen in about the same direction, say South westwardly, and in the night no land being seen, the Light is of course the only guide, the destinations being Boston or one of the nearest Ports, it is absolutely

[38] BMS Minutes, Oct. 9, 1811.

> necessary that the Light be seen should be known, as the course and distance from one being mistaken for the other would almost inevitably lose the vessel, cargo, and lives.

Secondly, placing a light at Scituate Harbor invited new dangers, as more ships would seek refuge in the small harbor.

> To increase the danger, the Cohasset Rocks lying in a North and Westerly direction from Scituate two leagues from the shore are always considered the most dangerous to approach & always fatal when a ship strikes on them; these rocks may have been originally the cause of the petition for the Light on Scituate, but the intention of a Light House being to point the safe way to a Harbour, this object is totally lost in the present case for Scituate is a harbour dangerous to approach in bad weather and cannot be entered except at high water when there is only ten feet water, and it is only used by a few small coasting vessels in the daytime and simmer season. All of these observation will apply to Scituate Light where it shall be universally known as an established Light, with how much greater force they apply *now* when so such knowledge exists and no notice has been given.

Finally, if the light should be constructed, the Society recommended that some means of making it distinct at night would also help prevent confusion.

As they had done in 1768 with Gurnet Point Light in Plymouth, and in 1798 with Cape Cod Light, the Society offered their expertise to help notify the public.

> And in the mean time, the Boston Marine Society will endeavor to have prepared and published general directions as may point out the marks, bearings, distances, and situations of each of the Lights on this coast, which may be circulated through the medium of the Custom House to aid our maritime Brethren in reaching their Port of destination in Safety.[39]

Finally, the Society recommended that the government postpone lighting Scituate station until March, 1812, to give time for ships at sea to return and receive appropriate public notice of the new light to avoid confusion.[40]

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[39] BMS Minutes, Oct. 9, 1811.

[40] BMS Minutes, Oct. 9, 1811.

Despite the good sense of the Society's ideas, Gallatin did not accept their recommendations. Scituate Light was lit in 1811, and the society never published sailing directions taking the new light into account. Furthermore, a petition from the Society presented to Congress on behalf of the residents of Truro, Cape Cod for building a lighthouse at Race Point fell upon equally unreceptive ears. While the Society submitted the proposal in February, 1811, the light itself was not constructed until 1816.

By 1811, the BMS's role in Boston's community had radically changed. While there may not have ever been a wholly unified maritime interest, it was clear that the changing political landscape and embargo politics highlighted divisions that even the Marine Society could not ignore. Facing a breakdown of unity within a community they had sought to represent, the society retreated from scientific evaluations to port management affairs where its authority remained strong.

As the Marine Society lost its ability to wield political influence, it also lost its authority over Boston's—and the nation's—nautical publications market. Two trends in the organization of American navigational science converged in the first decade of the nineteenth century to undermine the BMS's vocational approach, and consequently, their social status derived from that work. First, market-share, and not social status as navigators, emerged as a key determinant of the accuracy of any given set of charts or plans. Beginning in the late 1790s, Edmund March Blunt responded to a growing American demand for charts, pilot books, and navigational texts fuelled by the expansion of American shipping. By combining older vocational navigation methods with newer ones—such as Maskelyne's lunar distance method—that required more training with new

instruments and more complicated calculations, Blunt realized great success with the *American Coast Pilot* and *The New American Practical Navigator* whose popularity quickly set the standard. Second, beginning in 1807, the Federal government took a more active leadership role in the promulgation of navigational research and surveying than it had before. The creation of the US Coast Survey in that year, set up along European academic lines rather than American vocational lines, marked the Federal government's first attempt at creating a permanent, government funded center for navigational science. Both these pressures converged by 1807 to make vocational science, and the BMS, less relevant in the scientific realm than they had been before.

Blunt entered the nineteenth century undeterred by the BMS's condemnation of his charts in 1798. Before submitting his chart of Georges Bank to the BMS, Blunt had already received wide acclaim for his publication of Capt. Lawrence Furlong's *American Coast Pilot* (1796). In many ways, this work represented the best that vocational surveying methods could produce. In a single volume, Blunt and Furlong published sailing directions for every major port along the North American coast. Despite Blunt's claims to be completely original, many parts of the work were copied from earlier coast pilots such as John Norman's *American Pilot* (1791), and Cyprian Southack's 60 year old *New England Coast Pilot* (ca. 1729-1734), which included material copied from John Sellers' *The English Pilot: The Fourth Book* (1689).[41] Its original aspects emanated not from an academically trained surveyor, but from a mariner with years of experience sailing along the North American coast. His experience, guided the composition, organization, and publication of the *American Coast Pilot*. What made Blunt's work

[41] John F. Campbell, *History and Bibliography of* The New American Practical Navigator *and* The American Coast Pilot (Salem, Mass., 1964), 29.

unique, however, was that neither Norman, nor Southack, nor Sellers included directions for so many harbors in a clearly organized single source. In prior sources, both Southack and Norman squeezed the specific directions for a given port in the margins of a larger chart, which, in a way made sense—giving the directions for the relevant ports on the area in focus. Yet following that line, captains only had directions for harbors for which they had charts. In compiling a comprehensive collection of sailing directions, Blunt presented a new tool to the maritime community that, while not completely accurate, gave much more information more efficiently. Blunt's success stemmed not from the accuracy of the directions, but from the comprehensiveness of the collection and the work's ease of use. Consequently, masters embraced the single compendium enthusiastically, despite its potential inaccuracies. Given the state of marine surveying throughout the eighteenth century, few mariners would have been surprised to find that directions and charts carried glaring inaccuracies.

To help sales, Blunt went to other respected members of the navigational community. In February, 1796, Blunt submitted the work to the Newburyport Marine Society, who, along with the branch pilots for Newburyport, and other coasting captains along the eastern seaboard communities, filled similar roles as the BMS did for Boston. Locally known and respected pilots and masters were the best informed on the navigation of their respective home harbors. Furthermore, as fellow Newburyport residents, Blunt and Furlong both had connections to the pilots and coasting captains operating out of Newburyport, and likely discussed pre-press editions before the final publication date.[42]

[42] As a member of the Newburyport maritime community, Furlong would certainly have had dealings with the branch pilots and other captains, and may have actually taken some of his directions from their shared logs. Blunt, as newspaper publisher and seller of nautical and religious books, also was likely to have had

The work met with quick success, and Blunt ran revisions in 1798 and 1800, and in 1804 greatly expanded the work to include small charts for key harbors along the coast.[43]

Blunt's success with the *American Coast Pilot* represents, in one sense, the success of vocational science methods. Without deferring to the BMS, Blunt embraced all the major foundations of the Marine Society's authority over nautical publications in the late 1790s. Like the Marine Society, Blunt relied upon masters with long-term sea service and experience for his information. Like the Marine Society, he distributed his work to other captains for peer review and approval. And, like the Marine Society, he made sure that such approvals were prominently and publicly printed in the volume in question.

Blunt's works differed from the Marine Society's review projects in one crucial way. Where the Marine Society's local reputation gave them the authority to determine accuracy, Blunt's works were received as accurate because of their market popularity. In bypassing the BMS, Blunt went to the centers of critical review that would more likely see the work favorably, and not the most established and revered group in the area. For Blunt, the endorsements of masters and pilots were not ends in and of themselves, but rather the means by which his publication would sell more rapidly. In addition, the commercial success that Blunt realized with the *American Coast Pilot* sidelined most other competitors in the nautical publications market, and helped undermine BMS

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strong ties to local captains, thereby giving him access to their expertise in compiling earlier drafts of the work.

[43] Harold L. Burstyn, *At the Sign of the Quadrant: An Account of the Contributions to American Hydrography Made by Edmund March Blunt and His Sons* (Mystic, Conn., 1957) 16; Campbell, *History and Bibliography*, 31.

authority.[44] In doing so, however, Blunt was doing more than merely ignoring established centers of authority. He was taking advantage of an expanding publishing market to achieve financial success, creative autonomy, and ultimately authority himself over nautical publications.

While Blunt's *American Coast Pilot* gave his press the reputation as a solid nautical publishing house, it was Blunt's publication of Bowditch's *New American Practical Navigator* that cemented his place as an authority over American, and later British, nautical publications. While the *New Practical Navigator* was a study in the calculation of position and the *American Coast Pilot* was a compendium of sailing directions, the two works had a common theme. Beginning in 1799, Blunt printed and sold editions of Jonathan Hamilton Moore's *New Practical Navigator* (1772). Like *The American Coast Pilot*, Moore's work was part original, and part plagiarized from John Robertson's *The Elements of Navigation* (1754). Moore and Blunt, however, shared the same secret for success: it was not the novelty of the ideas that gave them their fortune and fame, but rather the comprehensiveness of presentation. In revising Robertson. Moore included writings and tables from Astronomer Royal Nevil Maskelyne and others whose independent innovations worked to simplify navigation.[45]

Firmly rooted in the maritime community, however, Blunt recognized that the more complicated mathematics and tables contained in Moore were likely beyond his maritime colleagues' skills. Consequently, Blunt called upon longtime BMS ally and

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[44] Burstyn makes this claim with no evidence supporting it, but Campbell's references to the repeated revisions supports Burstyn's claim well. See Burstyn, *At the Sign of the Quadrant*, 16; Campbell, *History and Bibliography*, 31.

[45] Campbell, *History and Bibliography*, 14-15.

advisor Osgood Carleton and Nathaniel Bowditch to correct the calculations and simplify the tables in the first two editions of *The New Practical Navigator*.[46] Bowditch sat astride two sets of navigation practice: older methods of navigation embraced by masters such as those of the Marine Society, and the new methods coming from London requiring more mathematical training and understanding. A native of Salem, he went to work in a counting house at an early age, and at 22 began the first of five sea voyages to the East Indies, during which he worked as supercargo and eventually master. Bowditch's innate talents showed early, however, and encouraged by such Salem literati as Rev. William Bently, he learned Latin by reading Newton's *Principia*, and embraced complex mathematics.[47]

In many ways, Bowditch represents a transitional figure in the change from vocational science to more academic studies. As ship captain, Bowditch knew the demands and practical limitations of complex observations and calculations made while driving a ship in the open-ocean, fatigued and sleep deprived, and under less than ideal circumstances. At the same time, however, he had the intellect and training to engage academic navigational research on its own terms, and in several different languages—skills which he used to translate Laplace's *Mécanique Céleste* (1829, 1832, 1834, and 1839). Consequently he blended the theoretical, mathematical, and geometrical intricacies of navigational calculations, while at the same time considering the many other demands upon a captain's time while a vessel was underway. Ultimately, Bowditch

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[46] Campbell, *History and Bibliography*, 16.

[47] For more detailed biographies, see Nathan Reingold's biographical sketch in *Dictionary of Scientific Biography*, Charles Coulston Gillispie, ed., s.v. "Nathaniel Bowditch." See also Stephanie Ocko, "Nathaniel Bowditch," *Early American Life*, 10 (1979), 38-39 and 70-74. In addition to Reingold's piece, Campbell has the best bibliography of works by and about Bowditch; Campbell, *History and Bibliography*, 50-61.

did more than just correct Moore's tables—he redid them. By 1802 this comprehensive revision compelled Blunt to sell the work under an entirely new title as *The New American Practical Navigator*. He simplified the procedures and made position calculations more accessible to ordinary, commonly educated mariners.

In choosing to publish Moore, and then Bowditch, Blunt appealed to a different category of navigator whose interest lay beyond just the sailing directions contained in Furlong. If Furlong appealed to Blunt's simpler navigators, Moore appealed to those moving into the regions beyond the Capes that required masters to understand how to calculate longitude by methods that went beyond simple dead reckoning—in particular, using lunar distances. Blunt's decision to publish Moore revealed his acknowledgement that new methods, requiring more specialized training, were coming into the American shipping industry. By publishing Moore, Blunt was also covering the bases and introducing to American mariners a practice of navigation that utilized academic research and thereby required navigators to have a greater mathematical understanding.

Bowditch's revisions and simplifications were so successful that in 1802 Blunt had sold the rights to an English edition for 200 Guineas. Even as more academically trained astronomers came to challenge Blunt's claims of accuracy, his reputation and dominant market share helped ensure that *The New American Practical Navigator* and the *American Coast Pilot* would remain standards within the navigational field.[48] With both the *American Coast Pilot* and *The New American Practical Navigator*, Blunt's reputation for accuracy rested upon more than just improved methods—a claim which he

[48] For a discussion of Blunt's work as the national standard and the challenges he faced from the astronomer Edward Hitchcock, see Jordan D. Marché II, "Restoring a 'Public Standard' to Accuracy: Authority, Social Class, and Utility in the American Almanac Controversy, 1814-1818," *Journal of the Early Republic*, 18 (1998), 693-710.

would not hold onto for long. In addition to the technical innovations introduced by Bowditch, the popularity and market share of Blunt's publications allowed him, and subsequently his sons, to become the acknowledged center of navigation publications until the US Hydrographic Office assumed the publication responsibilities for *the New American Practical Navigator* in 1867.[49]

Jefferson's election marked not only an important change in American politics, but also an important change in the organization of American science in the early nineteenth century. Under the Washington and Adams administration, sciences received very little, if any, funding from federal sources. Concerned over the war debt, Congress proved reluctant to approve funds for proposals sent to the national assembly. In addition, Congress was unwilling to set precedents for funding national scientific work. With the exception of a national copyright law, Congress backed away from granting funds to scientific expeditions for fear of recreating the patronage networks many felt were un-republican.[50] Furthermore, Federalists used Jefferson's academic scientific interests against him during the elections as a symbol of his Deism, his Francophilia, and his inability to understand the more immediate needs of a new nation.[51]

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[49] Burstyn, *At the Sign of the Quadrant*, 85.

[50] Brooke Hindle, *Pursuit of Science in Revolutionary America, 1735-1789* (Chapel Hill, 1956), 259. A. Hunter Dupree, *Science in the Federal Government: A History of Policies and Activities to 1940* (Cambridge, Mass., 1957), 14. For the debate over Federal developments and fears of un-republican patronage, see John Lauritz Larson, *Internal Improvement: National Public Works and the Promise of Popular Government in the Early United States* (Chapel Hill, 2001).

[51] Linda Kerber, *Federalists in Dissent: Imagery and Ideology in Jeffersonian America* (Ithaca, New York, 1970), 67-94. See also Dupree, *Science in the Federal Government*, 21.

Jefferson's election, for the first time, placed an Enlightenment savant in the national executive office. And while Jefferson and other scientists were forced to bend to the more utilitarian desires of their Congressional colleagues, Jefferson's interest in science as an academic and philosophical pursuit influenced his scientific policies. In proposing the Lewis and Clark expedition to Congress in 1802, for example, Jefferson argued that the expedition's voyages through then Spanish-held territory held potentially useful and practical commercial advantages for the young nation. Yet when Jefferson approached the Spanish government with the idea earlier in 1802, the president emphasized the expedition's scientific goals. As George H. Daniels has argued, such inconsistencies were not necessarily mutually incompatible. Regardless of the ultimate goal of the expedition, Jefferson was not content to merely send surveyors and outdoorsmen—those whose occupations made them ideal for the work and who could have provided some scientific observations. Instead, Jefferson ensured that he sent along academically trained naturalists to record, in systematic fashion, all the natural history and anthropological information that could be obtained.[52]

In creating the US Coast Survey in 1807, however, Jefferson did more to undermine the Marine Society's scientific authority than all other changes in American science. In many ways, Jefferson took on the mantle that the Marine Society had laid before Congress in the late 1790s for a systematic survey of the coast. Some argue that

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[52] George H. Daniels, *American Science in the Age of Jackson* (New York, 1968). 25. See also George H. Daniels, *Science in American Society: A Social History* (New York, 1971), 177-179. As John Gascoigne and Miller and Reill have also shown, science and commerce were key elements to the British Empire at home and abroad at roughly the same time. See John Gascoigne, *Science in the Service of Empire: Joseph Banks, the British State, and the Uses of Science in the Age of Revolution* (Cambridge, 1998); David Philip Miller, "Joseph Banks, Empire, and 'Centers of Calculation in late Hanoverian London,"; and Alan Frost, "The Antipodean Exchange: European Horticulture and Imperial Designs," in *Visions of Empire: Voyages, Botany, and Representations of Nature*, ed. David Philip Miller and Peter Hanns Reill (Cambridge, 1996), 21-37 and 58-79.

the impetus for a coast survey came from the American Philosophical Society, as Robert Patterson and John Vaughn, both of the APS, submitted the idea to Jefferson possibly as early as 1800.[53] Yet the language creating the survey closely mimicked the language the Marine Society used in their charter defining their survey work. The director of the Coast Survey was authorized to survey "the islands and shoals with the roads or places of anchorage, within twenty leagues of any part of the shores of the United States; and also the respective courses and distances between the principle headlands, together with such other matters as he may deem proper for completing an accurate chart of every part of the coasts."[54] Furthermore, as the Marine Society requested in 1798 and inexplicably dropped, the Coast Survey was also ordered to undertake a detailed survey of Georges Bank and Nantucket Shoals.

Although the original idea for the Coast Survey might have originated with the Marine Society, its members would not have any role in its direction. Rather than appointing Marine Society members, who were arguably some of the most experienced navigators in America, Jefferson went instead with Swiss born Ferdinand Hassler in 1807. Hassler carried all the training that Jefferson felt a proper scientific surveyor should have. Trained in Europe in trigonometric and geodetic surveying, he also carried the academic pedigree of having studied at the Ecole Polytechnique in Paris where he had met chemist Antoine-Laurent Lavoisier and astronomer Jean-Baptiste Delambre.

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[53] Hugh Richard Slotten, *Patronage, Practice, and the Culture of American Science: Alexander Bache and the U.S. Coast Survey* (Cambridge, 1994), 42; Gustavus A. Weber, *The Coast and Geodetic Survey: Its History, Activities and Organization* (Baltimore, 1923), 1-2; A. Joseph Wraight and Elliot B. Roberts, *The Coast and Geodetic Survey, 1807-1957* (Washington DC, 1957), 4-6.

[54] 2 Stat. L., 413, as quoted in Weber, *Coast and Geodetic Survey*, 1.

Carrying this impressive *vita* with him to America in 1807, he rapidly fell into favor with Jefferson as a gentleman of the highest scientific training available.

Taken together, Jefferson's role as Enlightenment savant and philosopher, his faith in academic training, his hand in the Lewis and Clark expedition, and his shaping of the Coast Survey all marked an important shift in the organization of American science. As specialized learned societies and societies for the promotion of useful knowledge formed in other areas of scientific interest, Jefferson led the Federal government into the navigational science world that had hitherto been run by marine societies and nautical publishers.[55] Jefferson's choice of Hassler, rather than an American with the vocational experience that had previously served as adequate credentials, signaled the end of vocational science as a dominant force in the American scientific world. Even though the Coast Survey did not begin its work until after the war of 1812, the creation of the office removed the last special claim the Marine Society held with Washington.

The federalization of coastal surveying marked an end to the brief moment when the Marine Society's vocational methods held their greatest effect, and the Marine Society its greatest influence. It is important to stress, however, that new methods were not the driving agent of change in the American scientific world. New navigational techniques had indeed emerged by 1810 to replace older, less accurate ones. These new methods, however, allowed new researchers and publisher to capture markets with new manuals and texts catering to new techniques. Furthermore, newly available methods that relied heavily upon higher mathematics opened a door for theoretical researchers to

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[55] For the advent of specialized learned societies, see Daniels, *Science in American Society*, 145-149; John C. Greene, "Science, Learning, and Utility: Patterns and Organization in the Early American Republic." in, *The Pursuit of Knowledge in the Early American Republic: American Scientific and Learned Societies from Colonial Times to the Civil War*, ed. Alexandra Oleson, and Sanborn C. Brown (Baltimore, 1976), 1-20.

enter into the realm of navigational practice. Bowditch and Hassler represent the leading edge of this spectrum. Their success signaled the transition from navigational research performed by vocationally adept investigators to research based more heavily upon theoretical principles and academic disciplines. With government leading academically trained surveyors, and Blunt's popular works setting the standard for practical accuracy, little room remained for the Marine Society's former influence over Boston's nautical publications market. Perhaps grudgingly, perhaps with relief, the Marine society retired from its active role in navigational science by 1812, and returned to its original emphasis upon mutual aid and local port administration, a focus it has retained to this day.

CONCLUSION

In many ways, the Marine Society was a victim of its own success. It entered the 1790s with clear goals—to improve navigational aids along the coast, work with the Federal government to build more lighthouses, establish marine hospitals, and secure Federal support for a systematic coastal survey. By 1807, the Society had accomplished these goals, and as new centers of governmental support and funding eventually took on the responsibility of ensuring safer navigation, the Marine Society returned to their immediate task of aid in the management of Boston's own waterfront.

From a historical perspective, however, the Marine Society accomplished much more than just navigational improvements. Between 1750 and 1812, the Boston Marine Society was a center of colonial scientific investigation independent from European learned societies and academies. In responding to their unique colonial situation—one defined by mercantile trade and imperial political relations—the Marine Society adapted their charitable institution to produce the kind of scientific knowledge required by the city's main source of economic growth. In doing so, they took on responsibilities that other American scientific societies and universities were reluctant to embrace. Unlike other American academies that historians have argued lacked the independence to direct their own efforts, the Marine society defined a research agenda, developed methodologies, utilized available instrumentation and resources, analyzed findings, and presented their results to the larger community. Far from dependent upon the accolades

and patronage of European bodies, the Marine Society forged ahead on its own, investigating the natural world to address local needs.

Recognizing what the Marine Society did outside academic centers of research helps to correct an important bias in the history of American science. In research published from the 1950s onward, science has been strictly—and teleologically—defined by reference to the institutions which would emerge in the nineteenth century as centers of scientific inquiry. Such strict definitions marginalized other forms of research that productively operated in a different late-eighteenth century climate. The fact that the Marine Society's vocational science approach did not survive into the nineteenth century does not mean their work was less effective than other research done contemporaneously. Before the second quarter of the nineteenth century, science remained an open field to many who would not later be considered scientists.

Not only did the Marine Society emerge as an alternative center of research, it also developed new methods adapted from daily navigational practices. Those vocational methods existed side-by-side with other methods requiring intricate instrumentation and training in complex theories emanating from academies. Just as the Society adapted itself to meet the research needs of colonial Boston, it developed methods that utilized the limited skills and instruments available in the colonial shipping community. Far from crippled by the dearth of learned academies and instrument makers, the Marine Society overcame colonial shortcomings in both institutions and methods by taking advantage of local resources.

Domestically, navigational research formed the foundation for the Marine Society to expand their work into quasi-governmental and political realms. In addition to

cataloging New England's maritime resources, the Marine Society's role in chart-making and chart publication highlighted their ability—and suitability—to wield significant influence in the nautical publications market and in Boston's political affairs. Similar to Joseph Banks in London, albeit on a smaller scale, the Marine Society successfully, but briefly, used their scientific authority to promote their own political agenda.

The Marine Society's actions in the 1790s also reveal important new angles on contemporary American political culture. Most importantly, the Marine Society's work with Hamilton and other Federal representatives demonstrates that political deference was not simply handed over to Federal authorities after the ratification of the Federal Constitution in 1789. Such support emerged through a complex process of negotiation and exchange, whereby Hamilton earned political support by responding to the needs—and in some cases demands—of locally important organizations. This process also highlights the importance of local affairs in national politics in the early Republic. As other scholars have shown, Federalists cared far more about local affairs than had been previously acknowledged. The Marine Society's concerns over local maritime improvements was but one set of interests Federalists had to consider to retain power.

Finally, the Marine Society's experience after 1795 shows the complex process through which important technologies change. Vocational methods lost their prominence in Boston's seafaring community not simply because better methods came along. In fact, the basic practices the Marine Society members used in the 1760s continued to be used by ship captains well into the nineteenth century. The Marine Society's vocational methods were overshadowed by new challenges arising from expanding American commerce and changes in the marketplace of ideas. It was not enough that dead

reckoning and simple running traverses were not good enough to bring American vessels into the Pacific trades. Rather those simpler methods could not do so on a commercially competitive level. The purpose of the voyage—in this case commerce—was just as important as how the ship was navigated. Furthermore, the right to proclaim accuracy shifted away from respected bodies such as the Marine Society. As time went on, publications' sales and market share alone were presented to the public as sufficiently reliable indicators of accuracy. In addition to newer and better navigational methods, the forces of market and commercial competition converged to undermine the Society's authority in Boston's nautical research world.

The Marine Society developed navigational methods that allowed them to maximize the skills and instrumentation they had at their disposal in colonial and post-colonial Boston. They did so to help ensure safer navigation, reduce shipping costs, and introduce some modicum of stability in an uncertain industry. In the process, they also came to wield significant influence within the community itself. They used this influence to further their desires for improved navigation through Federalist administrations sympathetic to the needs of international and coastal shipping. Far more than merely a practice limited to a few technically adept masters, navigational science briefly defined influence and power as the young nation developed new understandings of leadership and authority.

APPENDIX A

"Directions to Sail into Plymouth," *The English Pilot: The Fourth Book (London 1698)*, p. 20.

Seven Leagues exactly West from the Point of Cape Cod lieth the Haven of Plymouth, lying in West, known by a round Hummock of Land, Lying on the North-side, called the Gurnet, and on the South-side a high double Land, called the Monument-Land; you must sail in by the Gurnet-Land, which is the Channel-side, for the Bay from the Monument-Land three quarters over is exceeding bad, Shoal, and Quick-Sand, dry in divers places; but nearest the Gurnet is a fair sailing Channel, where you may ride safe against all winds but an Easterly Wind, which is forced from your Anchors, you must run further up, and anchor within Sandy-Island lying on the West-side called Brown's Island, be carfeul for there is dry Sands on both sides, the Ground is generally foul in the Harbour, especially the first entering.

APPENDIX B

Directions for Sailing in and out of Plymouth Harbour; Taken by Moses Bennett, William Rhodes, Thomas Allen, and Nathaniel Green . . .In July, 1768 (1768; Boston 1785).

The Light-House stands on the Gurnet Head, with two Lanthorns placed N.N.W. ½ W. and S.S.W. ½ E. at 11 Feet 6 Inches Distance.

These Lights are about 86 Feet from the Surface of the Sea, and cannot be brought into one to the Northward, unless you are on shore—But to the Southward, you may bring them in one, which is a very good Mark to clear you of Brown's Island or Sand Bank.

The High Land of the Monument bears from the Lights S. ¼ W. 3 miles, and Monument Point S.S.E. 3 Leagues, and Branches Point N. ¼ W. about 3 Leagues, and Saquash Head W. ½ S. 2 Miles, and the Easternmost part of Brown's Island or Shoal that dries S.S.W. one Mile and Quarter, and the Gurnet Rock from the Body of the Light House E. by S. ¾ S. the third part of a Mile; on this Rock you have but 3 Feet at Low Water which you must observe; all the Soundings are taken—When you have shut the first Sandy Hill with Gurnet Head, you are clear of the Rock; after which you must mind not to hale in too close to the Head, as there are many sunken Rocks some Distance from Shore. When you bring Saquash Head to bear W. by N., you may then steer up W. by S., and if you are bound for Plymouth, you must keep that Course for a large red Cliff on the Main, which is a very good Mark to carry you clear of Dick's Flat; then you must steer more Southerly for Beach Point, or run up untill you are abreast of Saquash Head, giving it a Quarter Mile Distance; then steer W. by S. ½ S. which will clear you of Dick's Flat, and carry you directly for Reach Point, keeping within 25 or 50 Yards of the Sandy Point, steering away to the Southward, keeping that Distance untill you have shut in the Lights, where you may anchor in 3 and 4 Fathoms, but the Channel is very narrow, having nothing but a Flat all the Way to Plymouth, except this small Channel which runs close by this Neck of Land, you will have 4 and 5 Fathoms close to this Point. If you are bound into the Cowyard, you must steer as before directed, which will clear you of Dick's Flat and the Muscle Bank, observing to keep the House on the Gurnet Head just open with Saquash Head, untill you have opened the High Pines with Clarke's Islands; then you are clear of the Muscle Bank, when you may steer N.W., untill you have 3 Fathoms at low Water, not running into less.

In coming from the Northward bound into Plymouth, you must not bring the Lights more Southerly than S. by W., to avoid high Pine Ledge, which lays N. from the Gurnet Head about 2 ½ and 3 Miles: When you are on the shoalest Part of this Ledge, some Part of which appears at low Ebbs, you will have the High Pines in Range with Captain's Hill, which will then bear W. by S.—This Ledge of Rock lays one and a half Mile from the Shore, extending about N.N.E. for near a Mile, and close to this Ledge you will have 4 & 5 Fathoms, and deepens gradually as you run from it to the Eastward; within a Mile you have 10 and 12 Fathoms.

In coming from the Southward, bound into Plymouth, you must not open the Northern Light to the Westward, but may keep them in one which will carry you in 5 Fathoms by the Easternmost Part of Brown's Islands or Shoal, keeping that Course, untill you are within a half Mile of the Gurnet Head or higher, where you will have but 4 Fathoms; then Saquash Head will bear W by N a little Northerly, and the two outermost Trees on the Head in one, then you may steer directly for them until you bring the Light House to bear E.N.E. and the House on Saquash to bear N.W. just open with the first Sandy Beach, where you may anchor in 4 Fathoms in Saquash Road in good clear Bottom; but if you are bound for Plymouth, or the Cowyard, you must steer as before directed.—If in the Night, it is best to anchor here, as it is difficult to Make Beasch Point, if dark, or to go into the Cowyard.

In turning into Plymouth, you must not stand into the Northward in than 3 Fathoms, as it runs a Flat a long Way from the Gurnet Head to Saquash; and from both Heads Lays off a Point of Rocks a good Way from the Shore, many of them are just under Water at low Ebbs—And all the Way from Saquash on the Muscle Bank, you have shoals water: to that you must not stand in less than before mentioned—And in standing over for the Sands to the Southward, you must go about as soon as you have shoalen your Water to 4 Fathoms, as it is bold too, and you may observe the Ripps, unless it is very smooth. This Sand extends from abreast of the Lights to Beach Point, most of which is dry at low Ebbs. From the Easternmost Part of the Sand to Dick's Flat, it rounds in a considerable Sweep: you have but 5 Fathoms Water from the Easternmost Part of Brown's Island to the Gurnet Head, and no more than 7 or 8 untill you are abreast of Dick's Flat, where you will have 13 or 14 Fathoms, a deep Hole, and then shoalen to 5 Fathoms, abreast of Beach Point.

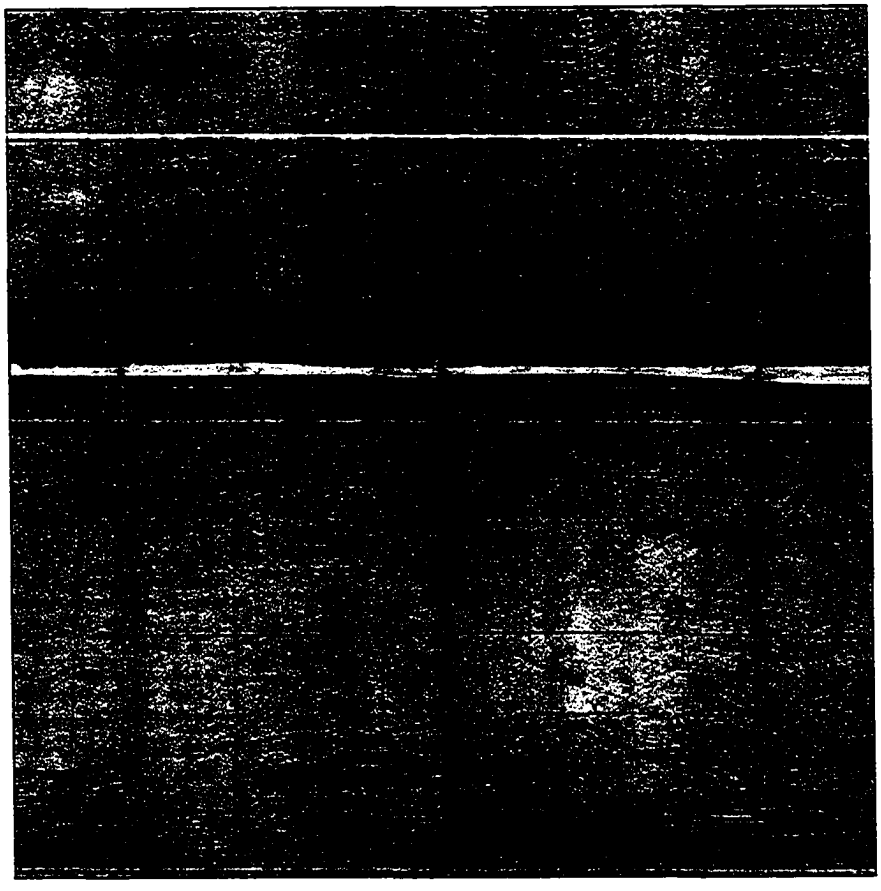
If you should fall into the Southward of Brown's Islands or Sands, betwixt them and the Monument Land where you have 20 Fathoms in some Places, you must not attempt to run for the Lights, until you have them shut in on with the other, when they will bear N.N.W. ½ W., if you do, you may depend on being on Brown's Islands or Sands, as there is no Passage for even a Boat at Low Water.

In coming in from the Northward in the Night, you must not bring the Lights to bear more Southerly than S. by W. to avoid High Pine Ledge, and keep that Course untill you have them to bear N.W. or N.W. by W., when you will be clear of the Rock, when you may steer up W. by S. untill you have the Lights to bear E.N.E., where you had best anchor in the Night. Here the Tide runs Strong Channel Course from the Gurnet to Race Point of Cape Cod, the Course is E. ½ N. about 6 Leagues Distance: and from the Gurnetto the Point going into Cape Cod Harbour, is E. by S. 7 Leagues.—If you should make the Lights in hard Northerly or N.W. Winds, and cannot get into Plymouth, you may then run for Cape Cod Harbour, bringing the Lights to bear W. by N., and steer directly for the Harbour, which you may do unless very dark, as it is bold too—and you may see Sandy Hills before you can get on Shore. You may keep within a Hundred Yards of the Shore, untill you are up with the Point that runs out to the Eastward, which you must give a Quarter Mile Distance, and then steer up N.W. If it should blow to hard that you cannot turn up the Harbour, you may anchor off the Point, clear Bottom, you have 8 and 9 Fathoms very nigh the Shore, so that there is no Danger of being one it, unless very dark.

At the Gurnet and Plymouth, the Tides are much the same as at Boston: that is, a S. by E. Moon makes a Full Sea.

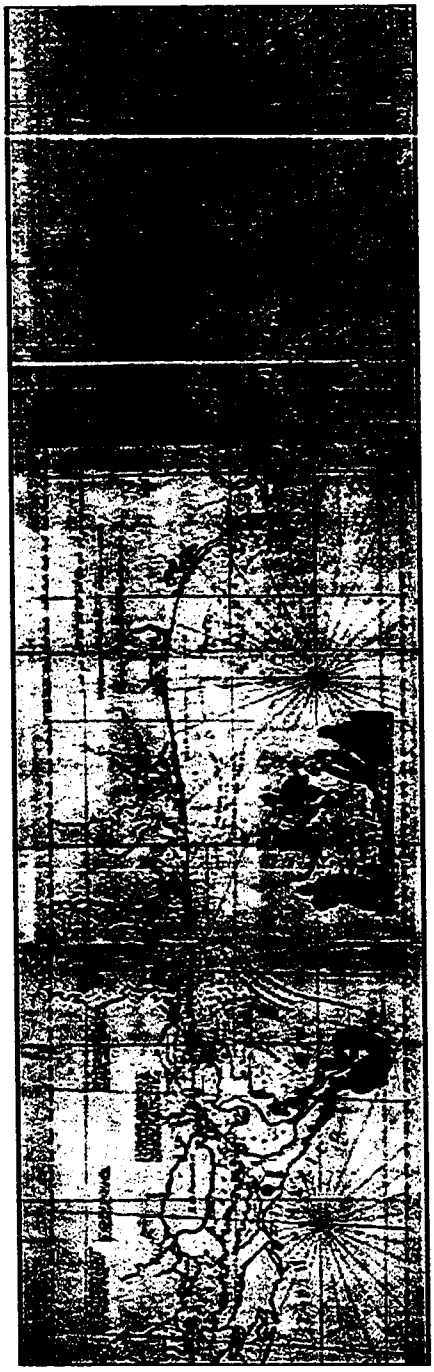
APPENDIX C

Bernard Romans, [Map of East Florida], *Maps of East and West Florida* (New York, 1781), Library of Congress.



APPENDIX D

Bernard Romans, [Map of West Florida], *Maps of East and West Florida* (New York, 1781), Library of Congress.



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