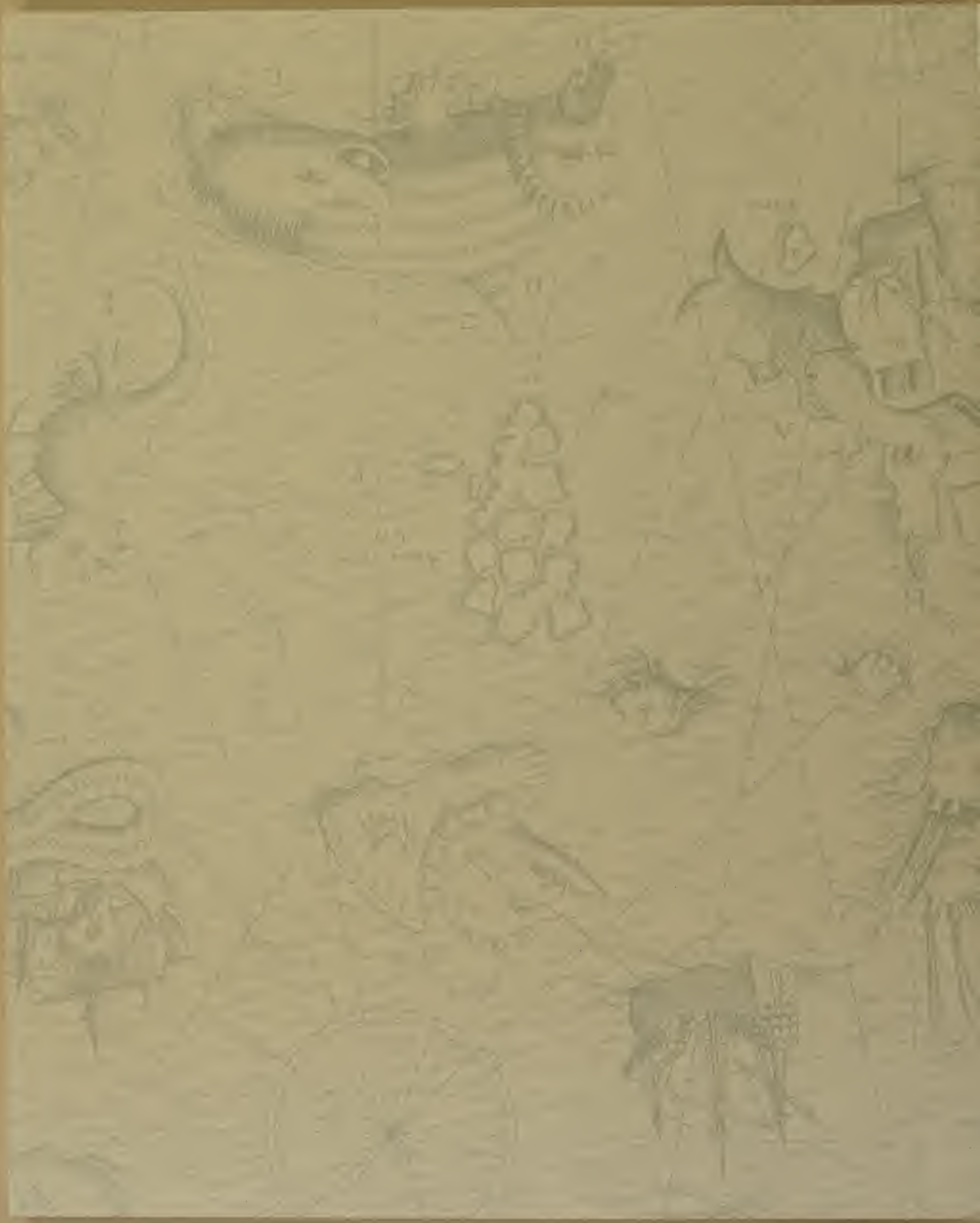
"The Boundless Deep..."

The European Conquest of the Oceans, 1450 to 1840



"The Boundless Deep..."

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inhoudende een corte beschrijvinghe der selver Landen ende Zee-custen/met aenwijsinge van alle de voornaemde principale Havens/Revieren/hoecken ende plaetsen/ tot noch toe van de Portugesen ontdeckt ende bekent: Waer by ghevoecht zijn / met alleen die Conterfeytsels vande habyten/dzachten ende wesen/so vande Portugesen aldaer residerende/ als vande ingeboornen Indianen/ ende huere Tempels/Afgoden Huysinge/met die voornaemste Boomen/Vruchten/Kruyden/Specerijen/ende diergelijcke materialen/ als ooc die manieren des selfden Volckes/so in hunnen Godts-dienſten / als in Politie eñ Huys-houdinghe: maer ooc een corte verhalinge van de Coophandelingen/hoe eñ waer die ghedreven eñ ghevonden worden/ met die ghedenckweerdichste geschiedenissen/ voorghevallen den tijt zijnder residentie aldaer.

Alles beschreven ende by een vergadert, door den selfden, seer nut, oorbaer, ende oock vermakelijcken voor alle curieuse ende Liefhebbers van vreemdigheden.

t'AMSTELREDAM.

By Cornelis Claesz. op't VVater, in't Schrijf-boeck, by de oude Brugghe.

Anno CIↃ. IↃ. XCVI.

"The Boundless Deep..."

The European Conquest of the Oceans, 1450 to 1840

Catalogue of an Exhibition of

Rare Books, Maps, Charts, Prints, and Manuscripts

relating to Maritime History

from the

John Carter Brown Library

by

JOHN B. HATTENDORF

Ernest J. King Professor of Maritime History

U.S. Naval War College

THE JOHN CARTER BROWN LIBRARY

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The John Carter Brown Library is an independently funded and administered institution for advanced research in history and the humanities, located at Brown University since 1901. The Library houses one of the world's outstanding collections of books, maps, and manuscripts relating to the colonial period of the Americas, North and South, from 1493 to ca. 1825.

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Frontispiece: **Jan Huygen van Linschoten, *Itinerario.***
Amsterdam, 1596.

A tale of adventurous travels and exploration at sea that also included detailed sailing directions and practical information on ocean currents, dangerous shoal waters, distant ports, and far-off islands, Linschoten's *Itinerario* represents in a single volume the wide range of topics that comprise the universe of maritime books.

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Drawn on vellum, this chart with its wind rose, odd shape, and decorative colors, gives the impression of dating from the age of exploration. In fact, Lieutenant Antonio de Matos drew it in 1740 on the modern Mercator projection for the use of ships and pilots of the Spanish navy. (See page 102, below).

Fig. 1.15 **Willem Janszoon Blaeu, terrestrial globe**, Amsterdam, 1602.

The leading cartographic publisher in Holland, Willem Blaeu, presented a set of globes similar to this one—one celestial, one terrestrial—to the Admiralty of Zeeland in 1602 "for the furthering of navigation and prosperity in these lands." A terrestrial globe is designed to show the relationship of the sea and the land, an idea put forward in ancient Greece, but no such globes were constructed before the fifteenth century. (See page 21, below).

FOREWORD

by Norman Fiering

From an American perspective, the John Carter Brown Library is a relatively old institution, founded as it was more than 150 years ago, in 1846. Yet there is remarkable continuity of purpose in the Library's history and an intense self-awareness by the Library staff of the institution's past, such that a century and a half here is like one day. Preparing an exhibition of books, maps, and manuscripts on maritime history is merely the ripened fruit at this particular moment of the Library's long-standing and ongoing commitment to that area of study.

The John Carter Brown Library (universally referred to as the "JCB") specializes in the history of the Americas, North and South, during the colonial period; or one might say, the history of European expansion to the west in the early modern period. As the title of the exhibition implies, *"The Boundless Deep…": The European Conquest of the Oceans, 1450 to 1840*, maritime history is a critical facet of that story.

From the time of its inception, the Library has collected books relating to the European conquest of the oceans, although not necessarily consciously as "maritime history" books. The Library's focus is now, and has always been, the history of the Western Hemisphere, as noted, roughly from the time of Columbus to the death of Simón Bolívar in 1830. In the early years of the JCB, works by or about Columbus, Vespucci, Magellan, or Drake, to mention but a few famous names out of hundreds, were more likely to be thought of as books of "discovery and exploration," which indeed they are, rather than as "maritime" books.

Within the world of academe, however, historical fields and fashions are constantly bifurcating, ramifying, re-grouping, dying, and reviving, all of which at the John Carter Brown Library has little practical impact. Our essential goal has always been the same—to collect and preserve in perpetuity the *totality* of contemporary documentation of the Americas, from the moment of the appearance of European powers on the scene to their unceremonious eviction in the late eighteenth and early nineteenth century. How historians interpret this primary material in any given decade of the present is not the Library's major concern. We actively promote advanced research through fellowships and other programs, and ride with the current trends in how scholars are investing their time.

The Library has always collected in the field of maritime history because it is quite obvious that European prowess and achievement at sea was the precondition of European power on land. The conquest of the oceans was integral to the invasion of the Americas, although in recent years historical studies in the United States may have been somewhat blinded to this fact. Similarly, although the JCB has always collected in the field of "European expansion to the west," and in the field of "Atlantic history," fifty years ago no one discussed these events or topics in expressly those terms.

This exhibition has the subtitle "The *European* Conquest of the Oceans," and perhaps what most distinguishes the John Carter Brown Library's acquisition of maritime books since 1846 is the pan-European nature of it. The English are primarily interested in their national maritime history and the French in theirs. At the JCB, we acquire maritime books indifferent to their national origins, which results, in fact, in a picture truer to the reality of the early modern period. The conquest of the oceans was a shared achievement of the European countries, with incessant exchange of technology and methods, driven by the impetus of intense competition. The Italian maritime cities, such as Venice and Genoa, and Portugal, Spain, the Netherlands, France, and England, were all participants in this reciprocal purloining.

Not only were ideas and methods borrowed, but in addition, no form of human endeavor in the early modern period was more cosmopolitan or internationalized in its personnel than the maritime trades. Port cities and ships' crews were typically microcosms of the maritime peoples of the world. Seamen and navigators sold their skills without regard to "national" loyalties at a time when, in any case, the nation-state was not yet a fully formed entity. Columbus himself is, of course, the classic instance, migrating from Genoa, to Lisbon, to Seville; or Verrazzano, the Florentine sailing under the flag of the king of France.

The John Carter Brown Library's holdings of maritime books for any one nationality cannot compare to the great collections

of their own history in European national libraries and maritime centers, but it would be hard to find as many Dutch and Portuguese maritime books in any institution in England and France as are in the JCB, and vice versa: our holdings of French and English maritime books quite probably exceed the holdings in Dutch and Portuguese libraries. Moreover, the Library is continuing to grow actively and aggressively in these areas.

If one were to pick a moment when the Library first *consciously* thought of itself as building a maritime history collection, it would be when Lawrence C. Wroth, Librarian of the JCB from 1923 to 1956, published a little book entitled *The Way of a Ship: An Essay on the Literature of Navigation Science* (1937). Wroth was a master at integrating descriptions of old books into narrative history, a skill that *The Way of the Ship* exemplifies. It is a book above all about early maritime books, virtually all of them, of course, already in the John Carter Brown Library collection.

One section of *The Way* discourses on the earliest navigation manuals, for example, such as Martín Fernández de Enciso's *Suma de Geographia* (Seville, 1519), acquired by the Library in 1848, or the essential aids to navigation, such as the *Almanach perpetuum* (Venice, 1502) by Abraham Zacuto. One of the most beautiful of these works was the French edition of Pedro de Medina's *Arte de Navegar* (1545), which appeared in a Lyon edition in 1554, and indeed in numerous other editions, including English and Italian.

The earliest American manual of navigation was published in Mexico in 1587—*Instrucion Nauthica* by Diego García de Palacio, which Wroth mentioned in *The Way*; but ten years later, Wroth went on to publish an essay directed specifically to the subject: "Some American Contributions to the Art of Navigation, 1519–1802," (*Proceedings of the Massachusetts Historical Society*, vol. LXVIII [1947]). Of the *Instrucion Nauthica*, Wroth says, its "superior was not to come from the pen of an American writer until Nathaniel Bowditch performed his great work of revision, elaboration, and restatement in 1802." Nathaniel Bowditch's *New American Practical Navigator*, called the "seaman's bible," published in Newburyport, Massachusetts, in 1802, was a considerable improvement upon the most popular English navigation manual of the day, *The New Practical Navigator*, compiled by John Hamilton Moore, although much dependent on it.

The bibliographer of Bowditch's *American Practical Navigator*, John F. Campbell, noting the three-hundred-year ancestry of the book's contents, remarks: "Plagiarism in the writing of early nautical books was both common and necessary. Each succeeding author corrected and revised what had been written before, and some added new material to existing works."

Wroth not only confirmed the Library's interest in acquiring maritime books *per se*—even maritime books without a specific reference to America if they were of central importance to the conquest of the oceans—he did the same with maps and charts. His *Early Cartography of the Pacific* (New York: Bibliographical Society of America, 1944) is a remarkably wide-ranging essay that includes a "List of Principal Maps Mentioned in the Text," over one hundred items in all, beginning with medieval contributions and running to the end of the eighteenth century. Maps by Giacomo Gastaldi (1546), Abraham Ortelius (1570), Louis de Bougainville (1771), and Cook (1777), among many others are cited, and Wroth relied heavily on the JCB's collection to compile the list.

Wroth retired as Librarian of the JCB in 1957, and only months before his death in 1970 he had the pleasure of holding in his hands his last work, the *Voyages of Giovanni da Verrazzano, 1524–1528* (Yale University Press, 1970), which remains the standard account.

It could be said that Wroth's enthusiasm for books relating to the sea was inherited by his successor at the helm, Thomas R. Adams, were it not the case that Adams already had a predilection for the subject, perhaps as a result of his service in the U. S. Navy in World War II. Adams greatly furthered the Library's acquisitions of maritime books, and it was under his aegis that for the first time a survey of our holdings was prepared, *Maritime History: A Preliminary Hand-List of the Collection in the John Carter Brown Library...with a Special Section on Sir Francis Drake* (Providence, 1979), compiled by Danial Elliott, then a Library staff member.

The precipitant for this project was the gift to the JCB in 1978 of over one hundred maritime books, dating from 1673 to the mid-nineteenth century, from the collection of Dr. Francis Chafee. The gift included an all but complete run of Bowditch's *New American Practical Navigator*, from 1802 to the last privately printed edition of 1867, among other treasures. Our *Maritime... Hand-List*, which the Library is re-issuing this year, incorporating acquisitions made since 1979, is organized topically. That fact is of some interest at this moment because it is also the approach taken in the presentation of the *"Boundless Deep"* exhibition. The table of contents of the *Hand-List* reads, for example: "Navigation and Seamanship, 1474–1883"; "Sailing Directions, Marine Atlases & Pilot Guides, 1490–1875"; "Marine Architecture, Ship Construction, & Rigging, 1611 to 1893"; "Piracy and Privateering, 1603–1856"; "Shipwrecks, 1594–1865"; and so forth.

Fifteen years later, in 1995, Thomas Adams in collaboration with David W. Waters applied the same concept to their massive compilation, *English Maritime Books Printed Before 1801: Relating to Ships, Their Construction and Their Operation at Sea*, which the JCB published jointly with the National Maritime Museum in Greenwich. This volume, too, has a topical arrangement—"Almanacs," "Charts," "Dictionaries and Bibliographies," "Gunnery," "Health at Sea," "Longitude," and so on, but it includes also an alphabetical list. The alphabetical list has nearly 4,000 entries. As the distinguished English maritime historian N. A. M. Rodger wrote in his foreword to the work: "Only those who have compiled even a small bibliography will know how much painstaking labour has gone into this volume, and only those who have written history books will know how much trouble it will save future historians."

The author of this catalogue, which describes some 215 items in the JCB collection, is Prof. John Hattendorf of the Naval War College in Newport, Rhode lsland. Without hesitation l can say that most of what has happened at the Library in the area of maritime history since 1983 (when l succeeded Adams as Director and Librarian) has been with the collaboration of Professor Hattendorf, with my role being principally that of facilitator. We have undertaken much together (always with the essential assistance of a number of JCB staff members) to promote maritime history as a field of study in the United States—which sadly lacks a national maritime museum such as one finds in many European countries.

The exhibition addresses the epic story of the European expansion across the oceans, beginning with the Portuguese voyages down the west coast of Africa in the middle of the fifteenth century and culminating in the great scientific expeditions of the eighteenth and early nineteenth centuries. This achievement, which on land often caused extraordinary and painful disruptions in traditional societies around the world, at the same time made possible the geographical unification of the earth and the overcoming of human isolation in every corner of the globe.

Judged simply in terms of sheer daring and human resourcefulness, the European venture into the vast seas of the planet in the period from 1450 to 1840 surpasses the flights into outer space in the twentieth century. Because we now take for granted the interconnectedness and uniformity of the earth, it is easy to underestimate what powers of imagination and intellect were needed to first conceptualize the geography of the earth and the oceans, what determined pioneering was required to organize the great voyages, and what ingenuity and fortitude were called upon to accomplish them.

The John Carter Brown Library's endowment is the source of virtually all of its regular funding, and the yield from several of our endowment funds is restricted to expenditures in the area of maritime studies: for buying books, for publications, and for research fellowships. Nevertheless, to mount *"The Boundless Deep..."* exhibition and to publish this exhibition catalogue, it was necessary to appeal to many generous patrons—foundations, corporations, and individuals. They are listed on pages ii and iii of this catalogue, and l want to express to them all the Library's deepest gratitude.

Fig. 4.24 Alexander Tweedie, ***Naval achievements of Admiral George Lord Brydges Rodney.*** Edinburgh, 1782.

This political caricature attacking the Whigs includes an image of keelhauling, although in this case it is Lord Rockingham and Charles James Fox who are being punished, not miscreant sailors. (See page 83, below).

INTRODUCTION

by John B. Hattendorf

"The Boundless Deep" is a phrase that succinctly and economically captures the sense of wonder and awe with which many have viewed the oceans. This phrase from Tennyson's "Crossing the Bar" echoes an earlier line from a sonnet by Shakespeare, who noted that neither "brass, nor stone, nor earth, nor boundless sea, but sad mortality o'ersways their power." Thomas Moore spoke of "this narrow isthmus twixt two boundless seas, the past, the future,—two eternities" while Byron, too, observed that "O'er the glad waters of the dark blue sea, our thoughts as boundless, and our souls as free, far as the sea can bear, the billows foam."

Mankind's enduring sense of humility and respect for the power and vast expanse of the world's oceans is the fundamental starting point in any investigation of the historical development, during the four centuries between the mid-fifteenth century and the mid-nineteenth century, of the practical ability and desire that grew among European seamen to cross the oceans. Although this process is often described as a "conquest," it is an overstatement. The great forces of nature that sweep across the oceans remain such a constant challenge that even modern sailors will agree that, in a larger sense, the sea has remained unconquered. Yet between 1450 and 1840, Europeans did succeed in using the oceans for their own purposes, but not without daunting difficulties. In the process, Europeans in the early modern period developed a wide diversity of relationships to the oceans.

Then, as today, the oceans remain a vast and dangerous region that covers the greatest part of our globe. Sailors today can easily recognize the problems that navigators faced in the age of sail, centuries ago. The fundamental problems remain the same, although, in the twenty-first century, we have much more knowledge and more sophisticated equipment to deal with the oceans, continuing to use them for our advantage and building on the experience developed from the fifteenth century onwards.

The history of maritime ventures beyond the familiar coastal waters of Europe to the west across the Atlantic and, then, into the southern hemisphere, must trace the ways in which seamen devised new technologies and adapted the most advanced understanding of their time to overcome the natural perils of the sea. In this process, ordinary seamen, who were typically among the most humble and practical of people, had to comprehend and to apply some aspects of the most advanced scientific thinking of the age.

In order to attempt voyages of discovery, one had to have some initial concept about the nature of the globe and the sky. The actual voyages would help to prove or disprove these basic hypotheses, but scientific understanding of cosmography and astronomy formed the initial basis for practical oceanic navigation and exploration. Successful crossings of the oceans were fundamentally a process of measuring the globe as a means of finding one's way from one point to another with the help of the stars. Such voyages required the application and use of advanced mathematics in conjunction with data found from measuring instruments. Yet while we can see these connections as we look back through the context of book learning and the progress of science, we must not forget the dichotomy that history illuminates: science and mathematics were fundamental to the process, but many a successful mariner preferred intuition over mathematics. Indeed, the ordinary working seaman was often illiterate. Although practical seamen often used advanced scientific ideas, they used them in a rudimentary form without fully understanding them.

While an understanding of astronomy and the skies was essential to oceanic voyaging and navigation, understanding the nature of the seas, with its winds, tides, and currents, was equally important to piloting and grew in parallel with experience in the oceans. Here, the nascent growth and gradual development of the modern physical sciences of oceanography, meteorology, marine biology, and geophysics intersected with the work of men at sea.

Voyages required huge preparations on land and in port before they could begin. Finances had to be arranged. The building materials for ships, masts, sails, and rigging had to be found and assembled, some gathered through trade from distant places. Ships' officers and sailors had to be found and recruited. Then, the ships had to be equipped and provisioned for a voyage. Long before the eighteenth century, the sailing

ship had become the most complex machine that man had yet devised. Its maintenance, support, and operation had created a wide variety of specialized forms of labor and technical skills, resulting in the development of a variety of machines and equipment. All these trends established shipyards as the leading industrial and manufacturing centers in the period.

When the ships and sailors finally got to sea, they found themselves in a unique "wooden world." It was a microcosm of society at home and a composite of their own individual origins, but life at sea also had its own social characteristics. These reflected the maritime environment and the specialized technical skills for operating the ships as well as the evolving habits for maintaining the health and discipline of teams of men engaged in heavy labor under dangerous and difficult conditions.

At sea, sailors used their ships to conduct all sorts of activities, ranging from charting the new waters they had found to all kinds of peaceful trade, naval warfare, fishing, and piracy. In this process, Europeans developed both administrative structures and regulations to deal with the range of these maritime matters. Having reached distant lands, sailors played a role in creating settlements and interacting with other peoples and cultures.

From the voyages of Columbus in 1492–1504 to those of Wilkes in 1838–1842, the great maritime expeditions of geographical exploration and scientific discovery captured the public imagination and have retained a fascination that can only be compared to that of space exploration in modern times. The experience of those voyages gave rise not only to factual accounts, but also to fiction, poetry, and art that often became the conduits in creating cultural influences and trends in Europe.

During this period, sailors and ships on the oceans formed the only link between lands, peoples, and cultures. The history of the way in which these connections were forged and the means that were used to create them involved imagination, intellectual and practical achievements, technological innovation, political and economic development as well as war, conquest, and suffering. The process of the European conquest of the oceans over a period of four centuries between the mid-fifteenth century and the mid-nineteenth century involved such a diverse range of activities in such a wide variety of places across the globe that it may truly be seen as a major topic of world history.

An exhibition on a subject so wide and so all-encompassing can attempt neither to tell the entire story nor to show all the riches of the John Carter Brown Library relating to it. The pieces in this exhibition have been chosen for a variety of reasons. In some cases, the selection was made because of visual interest; in other cases, the choice was made because of an item's rarity or the fact that it represented an issue, idea, or important aspect of maritime history worthy of further research. The basic thought behind the exhibition was to suggest the diversity in mankind's relationships to the sea and, through this catalogue, to provide a more permanent guide for researchers approaching the maritime materials in the John Carter Brown Library, while also hoping to stimulate new work in those materials.

ACKNOWLEDGMENTS

This exhibition and its catalogue owe much to the many people who offered support, advice, and assistance over a two-year period, from its initial inception in the autumn of 2000 through the preliminary exhibition at the John Carter Brown Library in May to September 2001 to its full installation at the Newport Art Museum. First and foremost, I would like to acknowledge my indebtedness to the staff of the John Carter Brown Library, without whose scholarship, advice, and good humor nothing could have been achieved. I am particularly grateful to the director and librarian, Dr. Norman Fiering, for initiating this venture and remaining a faithful supporter of maritime history through the dozen years that we have worked together on a variety of projects to promote this field of scholarship. Susan Danforth, the library's curator of maps, has been my essential co-worker in preparing these exhibitions with wonderful assistance from Susan Newbury, Rick Ring, Lynne Harrell, Carolyn Anderson, and Nan Sumner-Mack. Sarah Buie, Professor of Graphic Design at Clark University in Worcester, Massachusetts, designed the exhibition. From the outset of our work, she made an enormous contribution, recalling the line from Tennyson as a suggestion for the exhibition title in our first meeting and readily transforming the words of an historian's broad analysis into something visually interesting, entertaining, and beautiful for the exhibition. The Newport Art Museum has provided its large Cushing Gallery for this exhibition, and the curator, Nancy Grinnell, has been helpful in numerous ways.

A number of researchers and scholars made helpful suggestions in my quest for items to include in this exhibition or provided me with research information. Among them are Dr. Gloria Clifton and Dr. Margarette Lincoln of the National Maritime Museum at Greenwich; Dr. J. D. Alsop of McMaster University; Dr. Mary Malloy of the Sea Education Association at Woods Hole; Dr. Éric Rieth of the Musée Nationale de la Marine in Paris; Dr. Albrecht Sauer of the Deutsches Schiffartsmuseum in Bremerhaven; Professor Michel Vergé-Franceschi, president of the French Society of Maritime History; and Professor Glyndwr Williams of Queen Mary and Westfield College of the University of London. I am particularly grateful to Professor Carla Rahn Phillips of the University of Minnesota for her constructive criticism of the first draft of this catalogue.

J. B. H.
Newport, October 2002

"The Boundless Deep..."

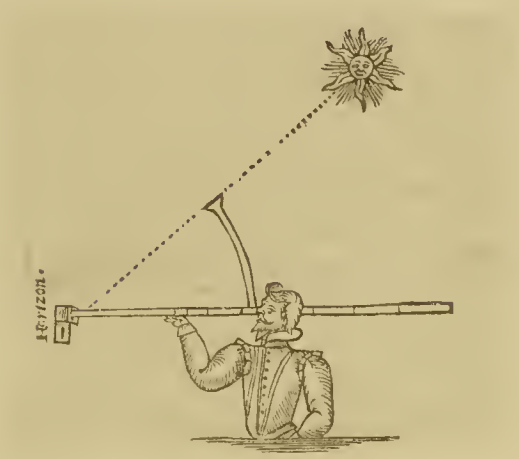


Fig. 1.15 **Willem Janszoon Blaeu, celestial globe,** Amsterdam, 1602.

The leading cartographic publisher in Holland, Willem Blaeu, presented a set of globes similar to this one—one celestial, one terrestrial—to the Admiralty of Zeeland in 1602 "for the furthering of navigation and prosperity in these lands." Celestial globes designed to illustrate the heavens and the stars were used by early astronomers. With its poles oriented correctly, a celestial globe could be used to predict the times of rising and setting of the stars. (See page 21, below).

CHAPTER 1 DISCOVERING THE GLOBE AND THE SKY

When European seamen first ventured down the coast of Africa into the Southern Hemisphere and out into the ocean past the Atlantic islands, they needed to have some understanding of the nature of the globe and the sky in order to find their way. This led very practical men to adapt and to apply to navigation the work of some of Europe's greatest scientists in the areas of geography, astronomy, mathematics, cartography, and cosmography. Yet an important and inherent division remained between the complex work of the academic in his library and the practical application of academic theory by the average sailor at sea.

Fig. 1.1 **Ptolemy**, ***Geographia***. Bologna, 1477.

In the second century, Ptolemy made the first attempt at a world atlas. Long known to Arab scholars, it became available in Europe after it was translated into Latin in 1406. A world map from the first printed edition with maps is shown here.

Geography

Between the mid-eighteenth century and the mid-nineteenth century, the study of geography became the science that is known today. Prior to that period, geographical knowledge was categorized in a variety of ways, most prominently as the study of cosmography and the study of chorography, as well as geography. The knowledge was dispersed in accounts of voyages and found on charts, globes, and maps. The practical navigator at sea needed to learn something about the size of the globe, the dimensions and shores of the seas on which he sailed, and the locations of lands and islands. The process required measuring the size of the earth and recording such information on maps and charts for others to follow. In its Classical form, the aim of the study of geography was to determine the location of places on the surface of the globe. Gradually, this mode of inquiry took on subtle political, religious, and imperial overtones.

Ptolemy (fl. 2nd cent. C.E.)
***Geographia*. Bologna, 1477.**

Ptolemy's *Geography*, the first attempt at a "world" atlas, was familiar to Arab scholars, but became widely known in western Europe only after Jacopo Angelo translated it into Latin in 1406. It contains a treatise on map-making, a series of maps, and an extensive list of places located by latitude and longitude based on a sphere divided into 360 degrees. Although Ptolemy's use of coordinates created a model for the future, it was not yet practical for sailors to use without adequate means of measuring longitude at sea. While Renaissance scholars immediately recognized Ptolemy's work as a major achievement from the Classical period, its subsequent reprintings are important as a progressive record of the growing knowledge of geography from the fifteenth century onwards. The John Carter Brown Library has forty-seven of the fifty-one editions of the work printed before 1700, each containing a variety of commentaries and critiques of Ptolemy's work. The collection includes the 1477 Bologna edition, shown here—the first to include maps—and the 1514 Nuremberg edition, which includes Johann Werner's proposal for determining longitude by using the so-called lunar distance method. Another edition, published at Strasbourg in 1525, contains a critique of contemporary nautical charts written by Wilibald Pirckheimer and annotations to Ptolemy's text by Joannes Müller "Regimontanus." (FIG. 1.1)

Martín Fernández de Enciso
***Suma de geographia*. Seville, 1519.**

The first printed Spanish navigation manual, Fernández de Enciso's *Suma* appears to have been partially based on an earlier and anonymous Portuguese work of uncertain date, *Regimento do estrolabio y do quadrante*. In his dedication to the king, Enciso acknowledged that he obtained information from working mariners and pilots. The book contains the earliest printed world-wide sailing directions, a section of which is devoted to the West Indies and constitutes the first published rudimentary sailing directions to American waters. As early as 1540, Roger Barlow translated the entire book into English, but the bulk of the translation remained in manuscript until 1932. However, a portion of the book, the sailing directions to the West Indies, was translated by John Frampton and printed in London in 1578. (FIG. 1.2)

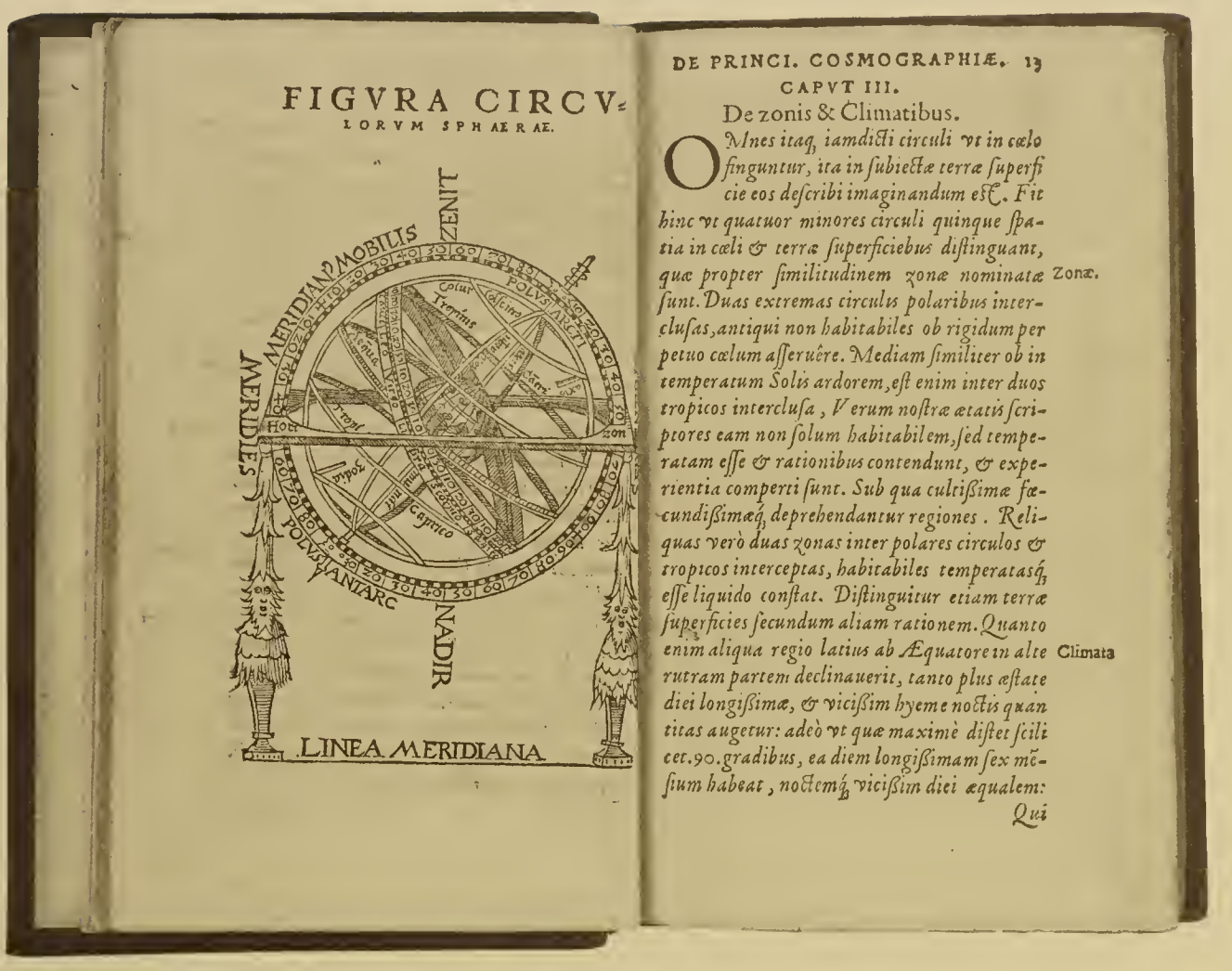
Gemma Frisius (1508–1555)
***De principiis astronomiae & cosmographiae*. Antwerp, 1553.**

First published in 1530 as a manual to accompany a globe that Gemma Frisius produced, the book appeared in at least eleven editions between 1530 and 1582, eight in Latin and three in French. Gemma Frisius speculated that there was probably a strait near Labrador that connected the Atlantic with the Pacific, and this suggestion was an important impetus to Englishmen in their search for a Northwest Passage. His most important thought, however, was the observation that one could use a portable mechanical clock to compare the differences in local time at different places on the globe and thereby determine the longitude of a location. (FIG. 1.3)

William Cuningham (b. 1531)
***The cosmographical glass, conteinying the pleasant principles of cosmographie, geographie, hydrographie, or navigation*. London, 1559.**

Cunningham's volume was the first book on the topic of cosmography to be printed in English. Written in the form of a conversation between the fictional characters Philonicus and Spodaeus, the book presents an introduction to cosmography and geography that is noted for its illustrations and use of italic type. The author stressed the usefulness of cosmography for the military and maritime defence of England. Another interesting feature of the book is its early reference to Gemma Frisius's idea of using a chronometer to determine longitude.

Fig. 1.2 Martín Fernández de Enciso, *Suma de geographia*. Seville, 1519.
This volume was the first printed Spanish navigation manual.



FIGVRA CIRCV=
LORVM SPHAERAE.

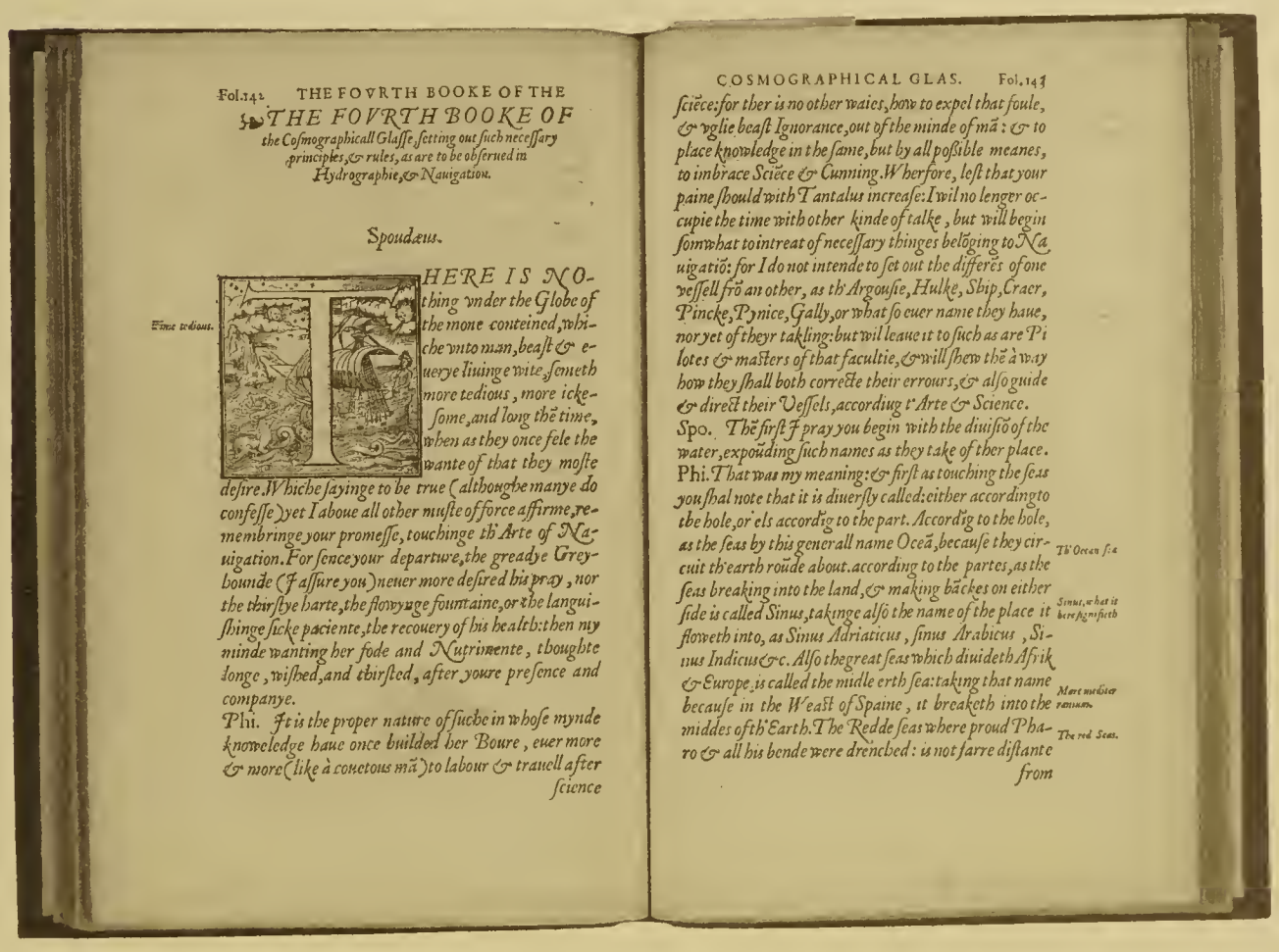
ZENIT
MERIDIAN? MOBILIS
MERIDIES
NADIR
LINEA MERIDIANA

DE PRINCI. COSMOGRAPHIÆ. 13
CAPVT III.
De zonis & Climatibus.

OMnes itaq; iamdicti circuli vt in cœlo finguntur, ita in ſubiectæ terræ ſuperficie eos deſcribi imaginandum eſt. Fit hinc vt quatuor minores circuli quinque ſpatia in cœli & terræ ſuperficiebus diſtinguant, quæ propter ſimilitudinem zonæ nominatæ Zonæ. *ſunt. Duas extremas circulis polaribus intercluſas, antiqui non habitabiles ob rigidum perpetuo cœlum aſſeruêre. Mediam ſimiliter ob intemperatum Solis ardorem, eſt enim inter duos tropicos intercluſa, Verum noſtræ ætatis ſcriptores eam non ſolum habitabilem, ſed temperatam eſſe & rationibus contendunt, & experientia comperti ſunt. Sub qua cultiſſimæ fœcundiſſimæq; deprehendantur regiones. Reliquas verò duas zonas inter polares circulos & tropicos interceptas, habitabiles temperatasq; eſſe liquido conſtat. Diſtinguitur etiam terræ ſuperficies ſecundum aliam rationem. Quanto enim aliqua regio latius ab Æquatore in alte* Climata *rutram partem declinauerit, tanto plus æſtate diei longiſſimæ, & viciſſim hyeme noctis quantitas augetur: adeò vt quæ maximè diſtet ſcilicet. 90. gradibus, ea diem longiſſimam ſex mẽſium habeat, noctemq; viciſſim diei æqualem: Qui*

Fig. 1.3 Gemma Frisius, ***De principiis astronomiae & cosmographiae.*** Antwerp, 1553.

In this book, the Flemish mathematician Gemma Frisius explained for the first time how the longitude of a place may be found by using a clock to determine the difference between local and absolute time. In the book's second edition, Gemma added notes on finding longitude at sea, becoming the first person to consider that problem.



Fol.141 THE FOVRTH BOOKE OF THE

THE FOVRTH BOOKE OF
the Cosmographicall Glasse, ſetting out ſuch neceſſary principles, & rules, as are to be obſerued in Hydrographie, & Nauigation.

Spoudæus.

Time tedious. *THERE IS NOthing vnder the Globe of the mone conteined, whiche vnto man, beaſt & euerye liuinge wite, ſemeth more tedious, more ickeſome, and long thẽ time, when as they once fele the wante of that they moſte deſire. Whiche ſayinge to be true (although be manye do confeſſe) yet I aboue all other muſte of force affirme, remembringe your promeſſe, touchinge th'Arte of Nauigation. For ſence your departwe, the greadye Greyhounde (I aſſure you) neuer more deſired his pray, nor the thirſtye harte, the flowynge fountaine, or the languiſhinge ſicke paciente, the recouery of his health: then my minde wanting her fode and Nutrimente, thoughte longe, wiſhed, and thirſted, after youre preſence and companye.*

Phi. *It is the proper nature of ſuche in whoſe mynde knoweledge haue once builded her Boure, euer more & more (like à couetous mã) to labour & trauell after ſcience*

COSMOGRAPHICAL GLAS. Fol.141

ſciẽce: for ther is no other waies, how to expel that foule, & vglie beaſt Ignorance, out of the minde of mã: & to place knowledge in the ſame, but by all poſſible meanes, to imbrace Sciẽce & Cunning. Wherfore, leſt that your paine ſhould with Tantalus increaſe: I wil no lenger occupie the time with other kinde of talke, but will begin ſomwhat to intreat of neceſſary thinges belõging to Nauigatiõ: for I do not intende to ſet out the differẽs of one veſſell frõ an other, as th'Argouſie, Hulke, Ship, Craer, Pincke, Pynice, Gally, or what ſo euer name they haue, nor yet of theyr takling: but wil leaue it to ſuch as are Pilotes & maſters of that facultie, & will ſhew thẽ à way how they ſhall both correcte their errours, & alſo guide & direct their Veſſels, accordiug t'Arte & Science.

Spo. *Thẽ firſt I pray you begin with the diuiſiõ of the water, expoũding ſuch names as they take of ther place.*

Phi. *That was my meaning: & firſt as touching the ſeas you ſhal note that it is diuerſly called: either according to the hole, or els accordig to the part. Accordig to the hole, as the ſeas by this generall name Oceã, becauſe they circuit th'earth roũde about. according to the partes, as the ſeas breaking into the land, & making bãckes on either ſide is called Sinus, takinge alſo the name of the place it floweth into, as Sinus Adriaticus, ſinus Arabicus, Sinus Indicus &c. Alſo the great ſeas which diuideth Afrik & Europe, is called the midle erth ſea: taking that name becauſe in the Weaſt of Spaine, it breaketh into the middes of th'Earth. The Redde ſeas where proud Pharo & all his bende were drenched: is not farre diſtante from*

Th'Ocean ſea.
Sinus, what it here ſignifieth
Mare mediterraneum.
The red Seas.

Fig. 1.4 William Cuningham, ***The cosmographical glass.*** London, 1559.

Cunningham wrote the first English-language book on cosmography, which is also noted for the quality of its illustrations and use of italic type.

In the preface to this volume, Cuningham claimed for the study of cosmography a wide range of benefits. Among them, "she delivereth us from great and continuall traveiles. For in a pleasant house or warm study, she showeth us the whole face of the earthe, withal the corners of the same.... In travailing, thou shall not be molested by the inclemency of the air, boysterous winds, stormy shores.... In sailing thou shalt not dread pirates fear perils and great wind or have sick stomach through unwholesome smells." (FIG. 1.4)

Edward Wright (1558–1615)
***Certaine errors in navigation*. London, 1599.**

Edward Wright was a Cambridge academic, a Fellow of Caius College, who sailed with the Earl of Cumberland on a raiding expedition to the Azores in 1589. On that voyage he witnessed (and was inconvenienced by) a number of errors in navigational practice, and when he returned to England he set himself the task of correcting them. The difficult issue he saw was to provide mathematical instructions for constructing Gerard Mercator's chart projection, which the cartographer had neglected to supply, so that an ordinary seaman could use the chart to show a rhumb line (line of constant bearing) as a straight rather than a curved line on the chart. To solve this problem, Wright's most important contribution was to calculate and publish tables of meridional parts for every minute of latitude. In this book, he also published a chart of the eastern Atlantic, to show the expedition of the Earl of Cumberland to the Azores in 1589, which was the first published demonstration of his approach on a usable navigational chart. The 1657 edition, which is also in the John Carter Brown Library, contains Wright's translation into English of Simon Stevin's *Havenvinding* (Leyden, 1599)—*The Haven-finding Art*—one of the earliest Dutch contributions to navigation, which Wright first translated and published in 1599. Stevin's work contained Petrus Plancius's table of variations at various places in the world as observed by Dutch sailors, a set of practical guidelines on how to find a port when latitude and variation are known, and a description of Reynier Petersz. Van Twisk's compass of variation.

The Wright-Molyneaux map from Richard Hakluyt (1552?–1616)
***The principal navigations*, volume II. London, 1599.**

Richard Hakluyt's famous compilation of voyage narratives contained Edward Wright's first demonstration of his projection on a world map, engraved in 1599. The projection, still popularly known as Mercator's, requires that longitude lines be parallel to each other and equidistant, rather than converging at the poles. At the same time, the latitude lines are spaced proportionate to their distance from the equator. This map, now attributed to Wright, was at one time called the Molyneaux

THE
SECOND VOLVME
OF THE PRINCIPAL NAVIGATIONS, VOYAGES, TRAFFIQUES and Diſcoueries of the *Engliſh Nation*, made by Sea or ouer-land, to the South and South-eaſt parts of the World, at any time within the compaſſe of theſe 1600. yeres: Diuided into two ſeuerall parts:

Whereof the firſt containeth the perſonall trauels, &c. of the *Engliſh*, through and within the Streight of *Gibraltar*, to *Alger*, *Tunis*, and *Tripolis* in *Barbary*, to *Alexandria* and *Cairo* in *AEgypt*, to the Iſles of *Sicilia*, *Zante*, *Candia*, *Rhodus*, *Cyprus*, and *Chio*, to the Citie of *Conſtantinople*, to diuers parts of *Aſia minor*, to *Syria* and *Armenia*, to *Ieruſalem*, and other places in *Iudea*; As alſo to *Arabia*, downe the Riuer of *Euphrates*, to *Babylon* and *Balſara*, and ſo through the *Perſian* gulph to *Ormuz*, *Chaul*, *Goa*, and to many Iſlands adioyning vpon the South parts of *Aſia*, And likewiſe from *Goa* to *Cambaia*, and to all the dominions of *Zelabdim Echebar* the great *Mogor*, to the mighty Riuer of *Ganges*, to *Bengala*, *Aracan*, *Bacola*, and *Chonders*, to *Pegu*, to *Iamahai* in the kingdome of *Siam*, and almoſt to the very frontiers of *China*.

The ſecond comprehendeth the Voyages, Trafficks, &c. of the *Engliſh Nation*, made without the Streight of *Gibraltar*, to the Iſlands of the *Açores*, of *Porto Santo*, *Madera*, and the *Canaries*, to the kingdomes of *Barbary*, to the Iſles of *Cape Verde*, to the Riuers of *Senega*, *Gambra*, *Madrabumba*, and *Sierra Leona*, to the coaſt of *Guinea* and *Benin*, to the Iſles of *S. Thomé* and *Santa Helena*, to the parts about the Cape of *Buona Eſperança*, to *Quoiangone* neere *Mozambique*, to the Iſles of *Comoro* and *Zanzibar*, to the citie of *Goa*, beyond *Cape Comori*, to the Iſles of *Nicubar*, *Gomes Polo*, and *Pula Pinaom*, to the maine land of *Malacca*, and to the kingdome of *Iuſalcan*.

¶ By RICHARD HACKLVYT Preacher, and ſometime Student of Chriſt-Church in Oxford.

Imprinted at London by *George Biſhop*, *Ralph Newbery*, and *Robert Barker*.
ANNO 1599.

Fig. 1.5 **Wright-Molyneaux Map from Richard Hakluyt, *The principal navigations*,** London, 1599.

This map is Edward Wright's first demonstration on a world map of his modifications to the Mercator projection that made it practical for use at sea. The map survives in only a small percentage of copies of Hakluyt's volume. The left side of the two-sheet map is illustrated opposite.


DIEV ET MON DROIT
GRONLI
TERRA INCOGNITA
ESTOTILAND
CANADA
VIRGINIA
TROPICVS
THE SOVTH SEA
BRASILIA
By the discouerie of S^r Francis Drake made in the yeare 1577. the straights of Magellane as they are comonly called seeme to be nothing els but broken land and Ilands and the southwest coast of America called Chili was found, not to trend to the northwestwards as it hath beene described but to the eastwards of the north as it is heere set downe: which is also confirmed by the voyages and discoueries of Pedro S. Iuniet and M^r Thomas Candish. A° 1587.

Fig. 1.6 Juan Antonio González Cañaveras, ***Planisferio ó carta general de la tierra***. Madrid, 1800.

There is only one other known copy of this huge map on which the cartographer was trying to demonstrate graphically the relationship between geography and differing times of sunrise, sunset, and seasons.

map, because of its similarity in certain respects to the terrestrial globe made in 1592 by Emery Molyneaux, who, with the engraver Jodicus Hondius, constructed the first globe in England.

In terms of geographical understanding, the map is significant for showing the world's oceans based only on information from actual voyages of discovery, rather than on tradition or accepted belief. In addition, it is the first publication of a world map that demonstrates Edward Wright's adaptation of Mercator's projection for practical use. In *Twelfth Night*, which was first performed in January 1601, Shakespeare wrote a line for Maria to describe Malvolio: "He does smile his face into more lines than are in the new map with the augmentation of the Indies." Scholars have spent much time trying to interpret Shakespeare's description, which may have been a reference to the use of loxodromic lines for compass direction as well as grid lines on Wright's map, along with the inclusion of the Solomon Islands, just to the east of New Guinea, in a way that makes them appear as an extension to the East Indies. The most recent census of copies of this book shows that the map survived in only a very small percentage of copies, with only thirteen examples of this second and more complete state of the map. (FIG. 1.5)

Juan Antonio González Cañaveras
***Planisferio ó carta general de la tierra*. Madrid, 1800.**

The designer of this map, Juan Antonio González Cañaveras, was professor of geography at the University of Cádiz and treasurer of the royal palaces at San Ildefonso, Balsaín, and Río Frío. His idea in producing a map with this unusual projection was to create a teaching tool that allowed a user to see the relationship between the geography of the globe and the differing times of sunrise, sunset, hours of daylight, seasons, and broad weather patterns around the globe. González Cañaveras's son, Francisco de Paula, drew the map, and the famous engraver José Antonio Ximeño y Carrera produced the plates for it. The printer, Benito Cano in Madrid, printed it on twelve sheets, which when assembled create nearly a square, 1.52 meters by 1.43 meters. There is only one other known copy of this map. (FIG. 1.6)

Astronomy and Mathematics

Knowledge of the stars and their use in measuring the earth and locating positions on the globe was a fundamental feature of navigation when ships sailed beyond coastal waters. For a seaman, astronomy was closely tied to a practical understanding of geography. Building on Classical knowledge as well as on Arabic and Jewish scholarship, scientists and mathematicians in Portugal and Spain made the first great contributions in applying this area of study to oceanic navigation. They developed instruments and methods for determining position at sea through the observation of stars and planets. The results of the observations needed to be inserted into mathematical calculations and linked to a grid of measured latitude and longitude on the globe. The Portuguese and Spanish scientists and seamen successfully worked out practical methods in the fifteenth and sixteenth centuries to find latitude at sea, and these were transmitted to mariners in Northern Europe. Determining longitude at sea proved to be much more difficult; a practical solution was not found until the eighteenth century. As in other areas, however, it was an exceptional sailor who was able to grasp and to apply the advanced understanding of astronomy and mathematics that was required.

Ptolemy (fl. 2nd cent. C.E.)
***Almagest*. Venice, 1515.**

Ptolemy's astronomical studies were known much earlier in Western Europe than his *Geography*. The work known as *Almagest* was originally part of Ptolemy's "Mathematical Collection," and had the Greek title *Hē mathēmatikē syntaxis*. It was later titled "The Great Astronomer," or *Ho megas astronomos*. Sometime in the ninth century, Arab astronomers began to refer to it as the greatest book. In a mixture of Arabic and Greek, they termed it *al Megistē*, and thereby created the title used today. Building on the now lost works of Hipparchus,

Ptolemy summarized the Classical understanding of the Sun, Earth, stars, and planets. Ptolemy was the principal advocate of the idea that the Earth was the immovable center of the universe, around which every other celestial body moved. To account for the unequal motions of some bodies, the Ptolemaic system reflected the earlier ideas of Apollonius of Perga that some planets moved in large circular "deferents" around the earth, while others moved in smaller circular "epicycles" with centers that moved around the circumferences of the "deferents." The Ptolemaic earth-centered system was generally accepted in Europe until Nicolaus Copernicus's sun-centered system displaced it after 1543.

Joannes de Sacro Bosco (fl. 1230)
Sphaera mundi. Venice, 1491.

In the thirteenth century, an Oxford-educated Englishman working at the University of Paris, John of Holywood (often referred to by the Latin form of his name, Johannes de Sacro Bosco) summarized contemporary understanding of the astronomy that had been formulated by Ptolemy in the second century C.E. Using Gerard of Cremona's twelfth-century Latin translation of Ptolemy's *Almagest,* Holywood created an easily understandable and influential astronomy textbook that circulated in manuscript copies and in more than forty printed editions published between 1472 and 1647. Virtually all of the navigation manuals of the sixteenth century used some version of Holywood's summary to explain the fundamentals of nautical astronomy.

Holywood was the author who affirmed for educated people in the fifteenth century (including Christopher Columbus, who owned a copy of his book) that the world was round, as the ancients had well understood. The frontispiece of the book shows the figure of Astronomy with two types of astrolabes for observing the stars. In her left hand is the armillary sphere. Described by Ptolemy, it is a representation of the celestial globe, in skeleton, based on the great circles of the heavens divided into degrees for angular measurement. Raised in her right hand is the planisphere or plane astrolabe believed to have been invented by Hipparchus in the second century B.C.E., but modified about 1480 for nautical use.

Johannes Müller "Regiomontanus" (1436–1476)
Calendarium. Nuremberg, 1474.

Joannes Müller's *Calendarium* contains declination tables and illustrations (with moveable parts) of several navigational instruments. Müller, also known as "Regiomontanus" (the Latin name for his birthplace of Königsberg), became a student of the Austrian mathematician Georg von Peuerbach (1423–1461) and was a key figure in the establishment of algebra and trigonometry in Germany, creating and improving sine tables to facilitate astronomical observations. Together, Peuerbach and Müller were able to improve on the "alfonsine tables," Arabic astronomical observations compiled in 1252 by a team of Jewish cosmographers under the patronage of King Alfonso X of Castile. In addition, Müller's work included an early description of the cross-staff and a study of eclipses. Using Müller's tables, Columbus had tried to find his longitude on both his 1497 and 1504 voyages by observing the elapsed time of an eclipse. (FIG. 1.7)

Abraham ben Zacuto Samuel (b. ca. 1450)
Almanach perpetuum. Venice, 1502.

Abraham Zacuto compiled his "Perpetual Almanac of the Heavenly Bodies" in about 1474. A Spanish Jew, he was a key figure among the Jewish and Muslim scientists who provided the basis for modern nautical science through their knowledge of Arabic and Hebrew literature, their training programs, and the manuals they compiled. Zacuto calculated his tables in Salamanca before the Jews were expelled from Spain, and he eventually took refuge in Portugal, where he became royal astronomer. Before they were printed, the tables circulated for over twenty years in manuscript, the form in which Columbus consulted them. Zacuto's tables of the daily declination of the sun had a major influence on the development of astronomical navigation, providing the foundation for the calculation of latitude from the altitude of the sun. (FIG. 1.8)

Francisco Faleiro (fl. 1535)
Tratado del esphera y del arte del marear. Seville, 1535.

The Portuguese cosmographer Francisco Faleiro and his brother Rui immigrated to Spain in 1518. Rui was Magellan's partner, and the two brothers planned to organize Magellan's westward voyage to Asia that resulted in the first circumnavigation of the globe. However, before Magellan sailed, Rui became mentally ill and was unable to continue this work. Francisco remained in Seville where he was employed from 1519 on as a salaried official at the Casa de Contratación, the agency established by the Spanish government in 1503 to organize trade to the Indies and to provide navigational information and instruction. While working in this capacity, Faleiro wrote this commentary on Sacro Bosco's thirteenth-century study of the sphere. For two years, until Pedro Nunes's *Tratado da sphaera* appeared, Faleiro's 1535 volume was the best available practical summary for seamen and confirmed Faleiro's prominent position as a cosmographer. Faleiro was among the first to discuss in print the problem for navigation posed by terrestrial magnetism, providing instructions for measuring magnetic declination and compass variation, readings that he incorrectly thought were important for determining longitude. An exceptionally rare book, it is known in only two other copies. (FIG. 1.9)

Fig. 1.7 **Johannes Müller** "Regiomontanus," ***Calendarium.*** Nuremberg, 1474.

Christopher Columbus is known to have used a copy of this book, with its illustrations of navigational instruments and declination table, when he was trying to find his longitude during his 1497 and 1504 voyages.

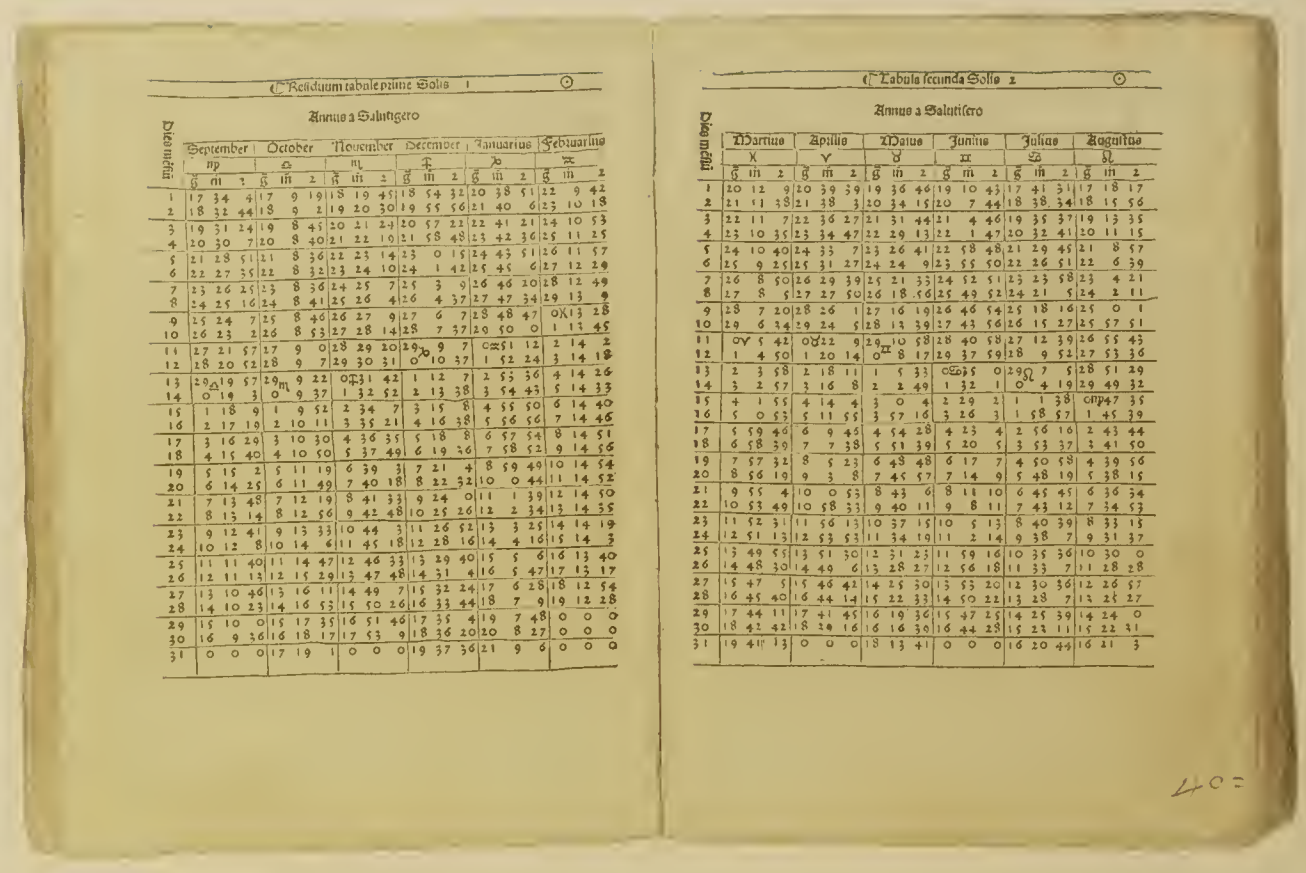


Fig. 1.8 Abraham ben Zacuto, ***Almanach perpetuum***. Venice, 1502.

These tables of the daily declination of the sun circulated in manuscript among navigators, including Columbus, for more than twenty years before they were first printed in this book.

Fig. 1.9 Francisco Faleiro, ***Tratado del esphera y del arte del marear***. Seville, 1535.

In 1535 this was the most advanced explanation in Spanish of the fundamentals of celestial navigation. Only three copies of this book are known to have survived.

Pedro Nunes (1502–1578)
Tratado da sphaera com a theorica do sol e da lua. **Lisbon, 1537.**

Pedro Nunes, the greatest Portuguese mathematician of the sixteenth century, was a professor of mathematics at Coimbra and became chief cosmographer of Portugal in 1547. His treatise, *Tratado da sphaera,* was a key contribution to the art of navigation. The first part of the book is based on the works of others, including the anonymous Portuguese work *Regimento do estrolabio,* Faleiro's book containing a Portuguese translation of Sacro Bosco's work, and an essay by Peuerbach on the sun and moon. The section entitled "Tratado da sphera" is a translation of Joannes de Sacro Bosco's *Sphaera mundi*; "Theorica do sol e da lua" is a translation of the first two parts of Georg Aunpekh's *Theoricae novae planetarum*; "Liuro primeiro da Geographia" is a translation of the first book of Ptolemy's *Geography*. In the second part, however, Nunes discarded the widely used Zacuto tables in favor of the more accurate table by Regiomontanus. Nunes's description of the "loxodromic curve" and his explanation of sailing the shortest distance between two points on a curved surface using the "great circle" route, was an original contribution. In this, Nunes discussed the deficiencies in the plane chart, which Pirckheimer had earlier noticed, but would not be resolved until the work of Mercator and Wright at the end of the century.

This book is also the first navigational manual that mentions the use of the cross-staff at sea. Other writers, such as Johann Werner, Peter Apian, and Gemma Frisius, referred to the cross-staff in academic studies of astronomy, but Nunes was the first to mention it in a practical nautical context.

Nunes's *Tratado* was the most comprehensive of the Portuguese navigation manuals published up to that time, and it quickly became the foundation for those that followed. This copy belonged to the Portuguese pilot Manuel de Figueiredo (1568–1630), the author of *Hidrographia, exame de pilotos* (1608). Figueiredo's signature is on the title page.

Peter Apian (1495–1552)
Astronomicum caesareum. **Ingolstadt, 1540.**

A landmark in the literature of astronomy, *Astronomicum caesarum* has been called "the most luxurious and intrinsically beautiful scientific book that has ever been produced." Written by the prolific Peter Apian, a German astronomer and mathematician who was a professor at Ingolstadt, the work not only summarized all current knowledge on its subject, but was also designed to be a set of instruments that could actually be used in solving problems. Its thirty-seven full-page diagrams in color, many with complicated moving parts, called volvelles, reflect the author's devotion to using visual means to explain the complexities of Ptolemaic astronomy. Employing brilliant colors, Apian designed the book for use by Emperor Charles V, who in 1532 had granted a thirty-year privilege to Apian to produce the work. Aside from its physical beauty, the volume, which took Apian eight years to produce, made an original contribution to knowledge through the publication of Apian's observations and theory on comets. In the tenth chapter of the book, Apian described the possibility of finding longitude though measuring the distance between the moon and a fixed star. The method, known as "lunar distance," had to wait until the mid-eighteenth century before adequate instruments became available to make effective use of it. (FIG. 1.10)

Pedro de Medina (1493?–1567?)
Arte de navegar. **Valladolid, 1545.**

In the mid-sixteenth century, a small number of Spanish cosmographers became increasingly interested in the subject of navigation as an applied form of their theoretical science. As these men came to be appointed to positions of authority, they began to promote the idea that the practically oriented pilots should be thoroughly educated in astronomy and mathematics. Medina was one of the group of cosmographers who eventually succeeded, over the objections of the pilots, in changing Spain's licensing examinations for pilots to include navigational theory.

In December 1538, Pedro Medina joined the staff of the Casa de Contratación in Seville, the agency that organized trade to the Indies and provided navigational information and instruction. A cosmographer, he was also licensed to make and sell charts and to sit on the examining board for licensing pilots. Although Medina did not receive a regular salary, he, like others in his position, was entitled to supplement his income by charging fees for various services, among them teaching navigation. This volume is the first of the series of navigational handbooks published by the cosmographer-teachers at Seville in their effort to encourage the application at sea of a broad understanding of astronomy. *Arte de Navegar* illustrates Spanish knowledge about celestial navigation in the mid-fifteenth century. At the same time, Medina was apparently unaware that the book that Nicolaus Copernicus had published two years earlier in 1543, *De revolutionibus orbium coelestium* (*On the Revolution of the Heavenly Orbs),* completely changed the understanding that Medina's book reflected. Meanwhile, the efforts of the staff of the Casa de Contratación to promote a mathematical basis for navigation did not overcome the reliance that sailors traditionally placed on dead reckoning in their routine practice at sea. A note on the title page indicates that this copy belonged at one time to a Jesuit library in Paris. In seventeenth-century France, the Jesuits played a key role in teaching and promoting navigational science. (FIG. 1.11)

Fig. 1.10 Peter Apian, *Astronomicum caesareum*. Ingolstadt, 1540.

A landmark in the literature of astronomy, this book is also one of the most beautiful and intricate sixteenth-century examples of the printer's art, with dozens of moving parts.

ela obſeruanda in diſpoſitione rotarum.

modus huius ſecundi inſtrumenti verus
ertus eſt, quoties annus currens ſiue pro
arcu limbi inferioris rotæ ab indice X Y
do ſecundum diei ordinem, uſq; ad 29
iarii, horam 12, Mi. 44 ſiue ſtellam lunæ
m ☽ reperitur. Annus ille cum filo (ut
ū eſt) ſignatur, eidemq; denuo index X Y
, qui inuariatus ad operationis finem ſie
it. Si uero poſt primam ſiue radicalem
anionem annus ꝓpoſitus à ſtella prædicta

ſ ſupputatione ſecundum dierum ordinem facta) uſq; ad
indicem X Y occurrat, iam dictæ ſtellæ centrum inſpice, p
hunc q̄ filū rende, cui ſubducis indicem T. Mox deinceps
filum ducatur per ꝓpoſitum ſiue currentem annum, ubi in
terſectio fili cum circulo T diem tantū, aut diem horam q̄
dabit. Dies ille tandem in limbo Ianuarii requiſitus, cum
filo ſignatur, eidemq; denuo oſtenſor X Y ſubiungitur, ita
autem rota illa ultimum ſui locum ſortita eſt. Atqui nunc
mihi uideor ſatis ſuperq; poſitionem rotæ X Y declaraſſe,
admonens interim, ut ſimilia de rota Z V intelligantur,
qualia derora X Y prodita ſunt, intereſſe tamen hoc unum
quod hic conſiderandus erit index Z V, & centrum ſtellæ
iuxta 27 Ian: diem ſignatæ cū charactere draconis ſic ☽☊

Fig. 1.11 Pedro de Medina, *Arte de navegar.* Valladolid, 1545.

This volume is the first in a series of navigational handbooks published by the cosmographer-teachers at Seville. They were intended to promote an understanding of astronomy among pilots and navigators and encourage the use of celestial navigation.

14

SECOND LIVRE

DE LA MER, ET DE SES MOVVEMENS, ET COMMENT L'ART DE NAVIGATION FVT INVENTE'.

d 2

Fig. 1.12 Pedro de Medina, *L'art de naviguer*. Lyon, 1554.

A translation of Medina's work by the French royal geographer, Nicolas de Nicolai of Dauphiné, this book exemplifies the dispersion of Iberian technical knowledge. It is also notable as a fine example of Renaissance bookmaking and for its decorative woodcuts.

Pedro de Medina (1493?–1567?)
***L'art de naviguer*. Lyon, 1554.**

Medina's work was translated into several languages and appeared in more than twenty different editions between 1554 and 1663. The royal geographer, Nicolas de Nicolai (1517–1583) of Dauphiné, produced this edition in Lyon, France, during the reign of Henry II. The book is particularly noted for the quality of its decorative woodcuts and as a fine example of Renaissance bookmaking. As in many other editions, an illustration depicting Ptolemy's view of the universe is the frontispiece of the first section, but Nicolai's edition also reflects the changing character of scientific understanding of the time. It includes Nicolai's woodcut map of the North Atlantic which incorporates fairly recent geographical knowledge, and in the margins on many pages there are rubrics that refer to current scientific debates. (FIG. 1.12)

Martín Cortés (fl. 1551)
***Arte of navigation*. London, 1561.**

Martín Cortés's *Breve Compendio de la Sphera y de la Arte de Navegar* was the most comprehensive of the Spanish nautical works of the mid-sixteenth century and marked the apogee of Spanish influence in this field. Completed, if not entirely written, at Cádiz in 1545, it was printed in two folio editions in 1551 and 1556. Little is known about Cortés beyond his own statement that he was a citizen of Bujaraloz in Aragon living in Cádiz. While not particularly original in its approach, Cortés's work was widely distributed and very influential, becoming the standard navigational text at the Casa de Contratación. Among other things, it contained the first detailed instructions for constructing a cross-staff and an astrolabe and provided tables showing the number of miles in each different degree of latitude. In addition, it contained the first printed reference in Spanish to the fact that the earth's magnetic and geographical poles were not identical. The presence of these important scientific insights should not, however, lead to the assumption that all Spanish sailors made regular use of this information or that they employed it consistently in practice.

In 1558, the chief pilot of the English Muscovy Company, William Borough, visited the Casa de Contratación in Seville, obtained a copy of Cortés's work, and brought it back to London. Richard Eden translated and published the book, which was the first navigational manual printed in English and, as such, it became a revolutionary introduction to the subject for practical English seamen, going through a total of ten English editions through 1630. While revolutionary in intellectual terms, its publication did not automatically change the conservative approach that English sailors took to their work.

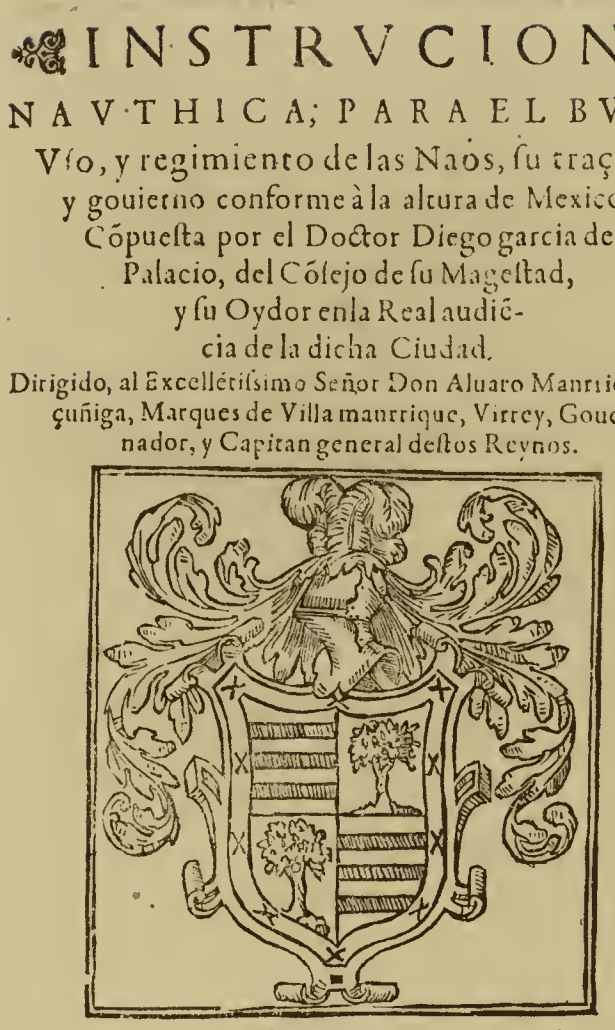
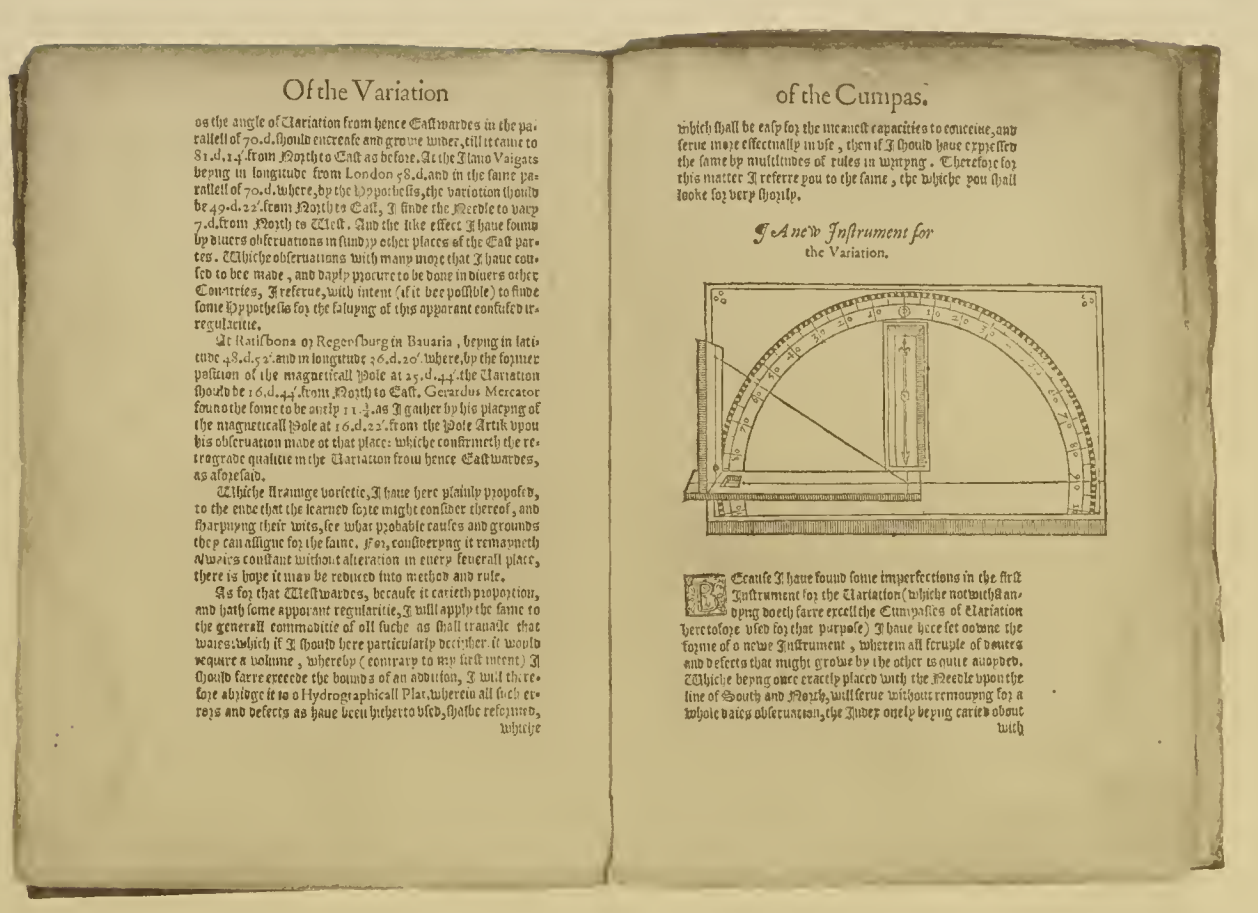

INSTRVCION
NAVTHICA; PARA EL BVEN
Vſo, y regimiento de las Naos, ſu traça, y
y gouierno conforme à la altura de Mexico.
Cõpueſta por el Doctor Diego garcia de
Palacio, del Cõſejo de ſu Mageſtad,
y ſu Oydor enla Real audiẽ-
cia de la dicha Ciudad.
Dirigido, al Excellẽtiſsimo Señor Don Aluaro Manrrique, de
çuñiga, Marques de Villa manrrique, Virrey, Gouer-
nador, y Capitan general deſtos Reynos.
Con licencia, En Mexico, En caſa de Pedro
Ocharte. Año de 1587.

Fig. 1.13 **Diego García de Palacio, *Instrucion nauthica*.** Mexico City, 1587.

This work of nautical instruction is the first maritime book printed in the Americas.



Of the Variation

os the angle of Variation from hence Eastwardes in the parallell of 70.d. should encrease and growe vnder, till it came to 81.d.14'. from North to East as before. At the Iland Vaigats beyng in longitude from London 58.d. and in the same parallell of 70.d. where, by the Hypothesis, the variation should be 49.d.22'. from North to East, I finde the Needle to vary 7.d. from North to West. And the like effect I haue found by diuers obseruations in sundry other places of the East partes. Whiche obseruations with many more that I haue caused to bee made, and daily procure to be done in diuers other Countries, I referue, with intent (if it bee possible) to finde some Hypothesis for the saluing of this apparant confused irregularitie.

At Ratisbona or Regersburg in Bauaria, beyng in latitude 48.d.52'. and in longitude 36.d.20'. where, by the former position of the magneticall Pole at 25.d.44'. the Variation should be 16.d.44'. from North to East. Gerardus Mercator found the same to be onely 11.½. as I gather by his placyng of the magneticall Pole at 16.d.22'. from the Pole Artik vpon his obseruation made at that place: whiche confirmeth the retrograde qualitie in the Variation from hence Eastwardes, as afore said.

Whiche strange varietie, I haue here plainly proposed, to the ende that the learned sorte might consider thereof, and sharpnyng their wits, see what probable causes and grounds they can alligne for the same. For, considerying it remayneth alwaies constant without alteration in euery seuerall place, there is hope it may be reduced into method and rule.

As for that Westwardes, because it carieth proportion, and hath some apparant regularitie, I will apply the same to the generall commoditie of all suche as shall trauaile that waies: which if I should here particularly describe, it would require a volume, whereby (contrary to my first intent) I should farre exceede the bounds of an addition, I will therefore abridge it to a Hydrographicall Plat, wherein all such errors and defects as haue been hetherto vsed, shalbe reformed, whiche

of the Cumpas.

which shall be easy for the meanest capacities to conceiue, and serue more effectually in vse, then if I should haue expressed the same by multitudes of rules in wryting. Therefore for this matter I referre you to the same, the whiche you shall looke for very shortly.

A new Instrument for the Variation.

BEcause I haue found some imperfections in the first Instrument for the Variation (whiche notwithstanding doeth farre excell the Cumpasses of Variation heretofore vsed for that purpose) I haue here set downe the forme of a newe Instrument, wherein all scruple of doutes and defects that might growe by the other is quite auoyded. Whiche beyng once exactly placed with the Needle vpon the line of South and North, will serue without remouyng for a whole daies obseruation, the Index onely beyng caried about with

Diego García de Palacio (fl. 1576–1587)

***Instrucion nauthica*. Mexico City, 1587.**

Published in Mexico City in 1587, Diego Garciá de Palacio's *Instrucion nauthica* was the first maritime book printed in the Americas. Written in the form of a dialogue and with no illustrations, it presents the basic information about practical navigation, shipbuilding, and other matters, including a vocabulary of common nautical terms. It was a workmanlike summary of contemporary knowledge with little attempt at originality. (FIG. 1.13)

William Borough

***A discours of the variation of the cumpas, or magneticall needle*. London, 1581.**

Aside from its clearly maritime use, this was also one of the first scientific books published in England. Its author, William Borough, had sailed in the Baltic, White, and North Seas as well as the Bay of Biscay. In 1587, he served as Drake's vice-admiral on the expedition to Cádiz. Between 1581 and 1599, he served as comptroller of the navy and wrote this small book as a supplement to Robert Norman's *The New Attractive*. In it, Borough provides the first authenticated practical observations of magnetic variation, obtained during a voyage beyond Norway's North Cape. Borough describes the mathematical applications needed to correct a ship's compass course for the earth's magnetic field and suggests an improved instrument for this, made by Robert Norman. (FIG. 1.14)

Willem Janszoon Blaeu (1551–1638)

Globes, terrestrial and celestial. Amsterdam, 1602.

In 1602, Willem Blaeu presented a set of two globes to the Admiralty of Zeeland "for the furthering of navigation and prosperity in these lands." Blaeu's firm was the leading cartographic publisher in Holland for the first three-quarters of the seventeenth century. Blaeu had studied for a year under the Danish astronomer Tycho Brahe. He first produced a set of globes in 1599, then went on to publish maps beginning in 1604, and later became hydrographer of the Dutch East India Company in 1633. The nine-inch globes shown here are printed on twelve gores and are modifications of his first globes. The terrestrial globe has the prime meridian based on Cero or Flores in the Azores and shows Olivier van Noort's track around the world in 1598–1601. The celestial globe shows the Latin names for the constellations drawn in the "saenredam" style and categorizes the stars in six different levels of magnitude.

In this period, globes were sold mostly to wealthy merchants as symbols of their status, suggesting not just wealth but also learning. The fundamental purpose of both terrestrial and celestial globes was to present a more realistic image of the earth, which was so difficult to present on a flat sheet of paper. While not completely practical for use at sea, a globe could assist in teaching the basic tenets of astronomy and navigation and in making navigational calculations. The Dutch East India Company supplied its ships with terrestrial globes during the first half of the eighteenth century and, between 1746 and 1760, also issued celestial globes for use with the recently invented octant. (FIG. 1.15) (See pages xiv and 2, above).

Fig. 1.14 William Borough, *A discours of the variation of the cumpas, or magneticall needle.* London, 1581.

Borough's book provided the first authenticated practical observations of magnetic variation, obtained during a voyage beyond Norway's North Cape.

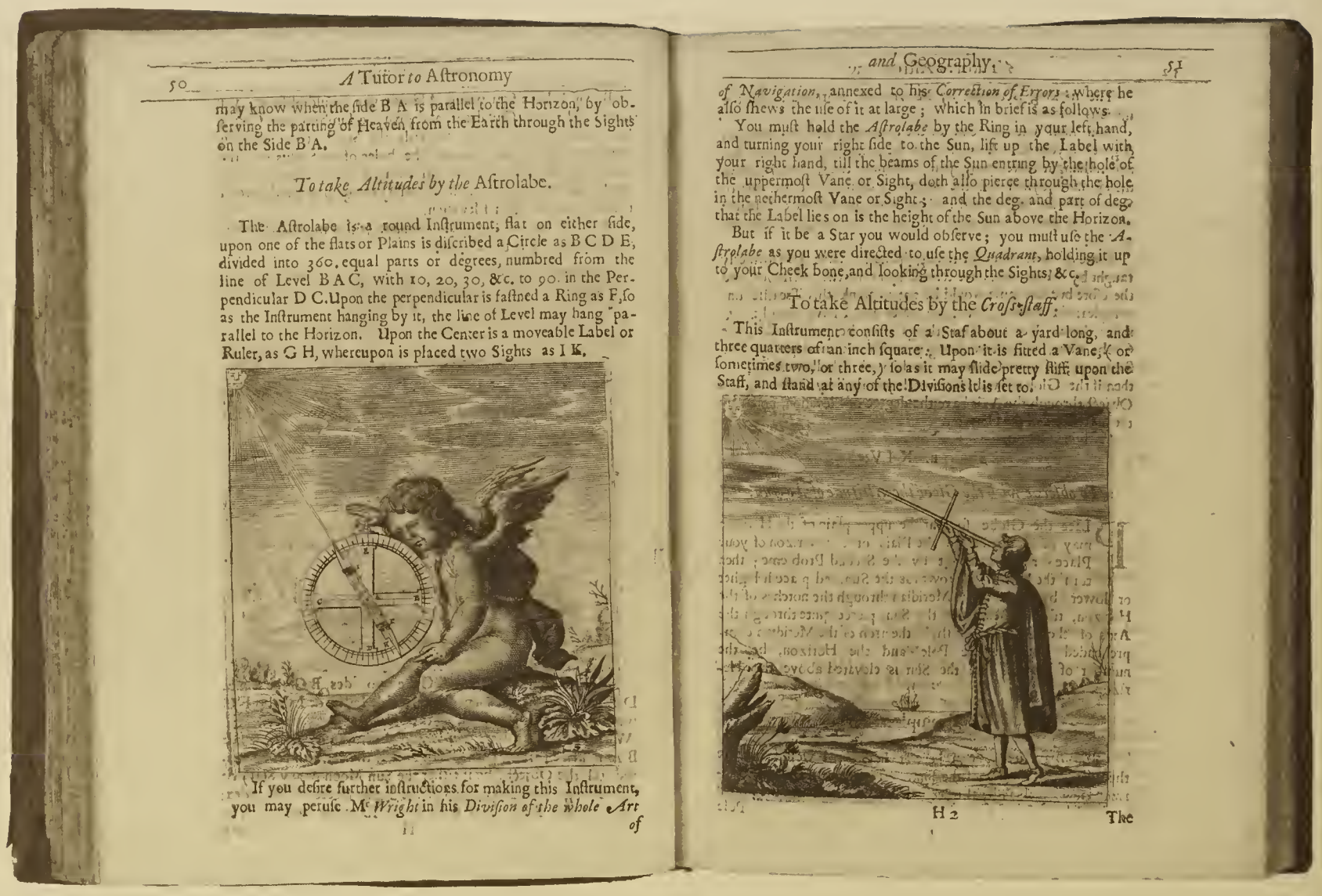


Fig. 1.16 Joseph Moxon, *A tutor to astronomy and geography.* London, 1659.

Joseph Moxon was a key figure in transmitting Dutch navigational knowledge to England. This was his most popular book, appearing in seven editions up to 1699.

Manuel de Figueiredo (1568–1630)
Hidrographia, exame de pilotos. Lisbon, 1625.

First published in 1608, this book by the Portuguese pilot Manuel de Figueiredo contains the earliest printed table of the sun's amplitude for each degree of declination and each degree of latitude up to 54°, thereby making it possible for sailors to correct their compasses daily at sunrise and sunset.

Giovanni Battista Nicolosi (1610–1670)
Teorica del globo terrestre et esplicatione della carta da nauigare. Rome, 1642.

Giovanni Battista Nicolosi was a Sicilian cartographer working in Rome. This early work dealt with the theory of making terrestrial globes and nautical charts. Later, he traveled to Germany during the Thirty Years' War, and in 1652, the papal office of *Propaganda Fide* at Rome commissioned him to prepare an atlas, which he published eight years later under the title *Dell'Hercole e studio geografico*. The work became known for Nicolosi's use of the most authoritative sources. A second edition of this work was published in 1670 shortly after Nicolosi's death under the title *Hercules siculus sive studium geographicum*.

Giovanni Battista Nicolosi (1610–1670)
Mexicum in hac forma in lucem edebat Ioannes Baptista Nicolosius S.T.D. Rome, 1660.

When Nicolosi first published his map *Mexicum* in his 1660 atlas, he used a projection that ties this work to his early study on the making of globes. The projection has a grid framework marked at every ten degrees with curved parallels equidistant at the intersection of each curved, converging meridian.

Despite its title, the four-sheet map shows much more than just Mexico. It includes Baffin and Hudson bays, and stretches south as far as 7° N, encompassing the St. Lawrence River, the Great Lakes, the Caribbean, and the northern coast of South America, including coastal features, ports, and dangerous shoal areas. Nicolosi's representation of the most northerly parts of North America probably derives from Nicolas Sanson's 1656 map of *Le Canada*; however, his information on the Great Lakes and from the coast of Georgia southwards is much more detailed and based on newer sources. Nevertheless, Nicolosi's work continues to show the typical mix between myth and fact that characterized so much early cartography. Here, the Rio Grande River (named the Rio Escondido) is represented with greater accuracy and detail than had ever been done previously, yet the map also shows California as an island and three locations for the explorer Coronado's fabled city of gold, "Quivira."

Joseph Moxon (1627–1691)
A tutor to astronomy and geography. London, 1659.

Joseph Moxon was a key figure in transmitting Dutch navigational knowledge to England. With his parents, he had emigrated from England to the Dutch Republic about 1637 and spent his youth in Rotterdam and Delft, where his father was a printer. Returning to London in 1646, father and son set up a partnership at the sign of the Atlas in Cornhill. Among the things they brought to England with them was W. J. Blaeu's newly published handbook on globes. In 1654, Moxon translated Blaeu's work, but five years later he wrote an entirely new handbook for the English market using the same title. His most popular work, it appeared in seven editions before 1699. (FIG. 1.16)

The Search for Longitude

During the period of the first voyages on the open ocean, seamen learned relatively quickly to find their latitude at sea. They also discovered, however, the serious difficulty they faced in trying to determine their longitude, which remained the principal block to finding their precise position on the globe. As ships began to move across the seas from Europe, followed by the establishment of regular trade in an environment of intense competition for dominion and empire, a solution to the problem of determining longitude at sea became a practical necessity. Ships and lives were increasingly lost due to failures in navigation that were attributable solely to the lack of knowledge of location relative to east-west meridians.

In 1598, Philip III of Spain offered a perpetual pension of 6,000 ducats to the person who could first discover the means to readily find longitude at sea. The Dutch followed by offering a similar prize to their seamen. After the drowning in 1707 of one of England's most famous seamen, Admiral Sir Cloudesley Shovell, along with 1,315 sailors in a shipwreck on the Scilly Isles, the British Parliament in 1714 offered the largest reward, with a £20,000 prize, and established a government-funded Board of Longitude to investigate the problem.

The challenge stimulated a wide variety of responses; some were serious scientific proposals while others might be considered "crack-pot" schemes. Among those worthy of serious consideration, the solutions fell into three broad areas: (1) using the earth's magnetic field; (2) using measurements and calculations based on the position of various heavenly bodies; and (3) using a mechanical timekeeper at sea that could keep a standard time and be compared with local time in other parts of the globe.

AN

ACCOUNT

OF THE

PROCEEDINGS,

IN ORDER TO THE

DISCOVERY

OF THE

LONGITUDE:

IN A

LETTER

TO THE

RIGHT HONOURABLE *******,

MEMBER OF PARLIAMENT.

LONDON:

Printed by T. and J. W. PASHAM, in Black-Friars, and Sold by the BOOKSELLERS, in London and Weſtminſter. M.DCC.LXIII.
[Price One-Shilling.]

Fig. 1.17 John Harrison, *An account of the proceedings, in order to the discovery of the longitude.* London, 1763.

In 1759 the clockmaker John Harrison brought to a successful end a long scientific quest. He crafted a chronometer that could keep accurate time on board a ship, thereby making possible with relative ease the determination of longitude at sea.

Dorotei Alimari (d. ca. 1725)
Mathematici veneti longitudinus. London, 1715.

The Italian mathematician Alimari (ca. 1650–1727) offered the first published work in competition for the newly established British longitude prize. Published in Latin and English in 1714 and 1715, Alimari's proposal involved the use of special equipment with the preparation of highly precise ephemerides: calculated tables of the precise location of celestial bodies. Although seamen found the recommendations impractical for use at sea, scientists seriously respected Alimari's effort to apply mathematics to the quest for longitude.

Emanuel Swedenborg (1688–1772)
Försök at finna östra och westra lengden igen igenom månan, som til the lärdas ompröfwande framstelles. Uppsala, 1718.

In the latter part of his life, Emanuel Swedenborg became famous for his religious mysticism and theology, which led to the founding of the Swedenborgian sect. However, the early part of his career was devoted to work as an engineer and scientific researcher. After studying at Uppsala University, Swedenborg left Sweden in 1710 for a three-year period in London. There he studied mathematics, mechanics, and physics, while thinking about inventing such things as airplanes and submarines. On his return to Sweden, he became a student of the country's leading scientist, Christopher Pohlem, and began to publish a series of books in Latin and Swedish on such varied fields as mathematics, astronomy, physics, metallurgy, geology, and natural philosophy. In this volume, Swedenborg presented a reconsideration of earlier ways of finding longitude by using the moon.

Jane Squire (1671–1743)
A proposal for discovering our longitude. London, 1742.

Jane Squire rejected most of the common approaches to the study of astronomy and proposed in their stead a new terminology and notation, along with recognition of a prime meridian based on Bethlehem. She proposed an entirely new division of the globe and sky into a million "cloves," each with its own "zenithal" star by which to calculate astral and local time. Squire seems to have begun her work about 1720 despite criticism that "mathematicks are not the proper study of women." The first edition of this book appeared in 1731 with its text in French and English on facing pages. Despite her valiant efforts, officials never took her proposals seriously, and Britain's astronomer royal declined to acknowledge her work.

John Harrison (1693–1776)
An account of the proceedings, in order to the discovery of the longitude. London, 1763.

After many inventive minds had looked for theoretical solutions to the problem of how to determine longitude at sea, it was the English watchmaker John Harrison who accomplished the practical task of successfully constructing a chronometer that could withstand the motion of a ship at sea and the changing climatic conditions on an ocean voyage. The British Board of Longitude required that any device proposed for the competition be fully tested. Harrison's son William made a voyage to Jamaica in 1761–1762, during which he was able to determine his ship's longitude within eighteen nautical miles. Two good friends wrote this account of John Harrison's success for him: the optician James Short (1710–1768) and a well-known barrister, Taylor White (1701–1771). After further tests between 1765 and 1773, Harrison eventually received the long-standing British prize for finding the most practical method of determining longitude at sea. As a result, this small book has become an icon of a great scientific quest. (FIG. 1.17)

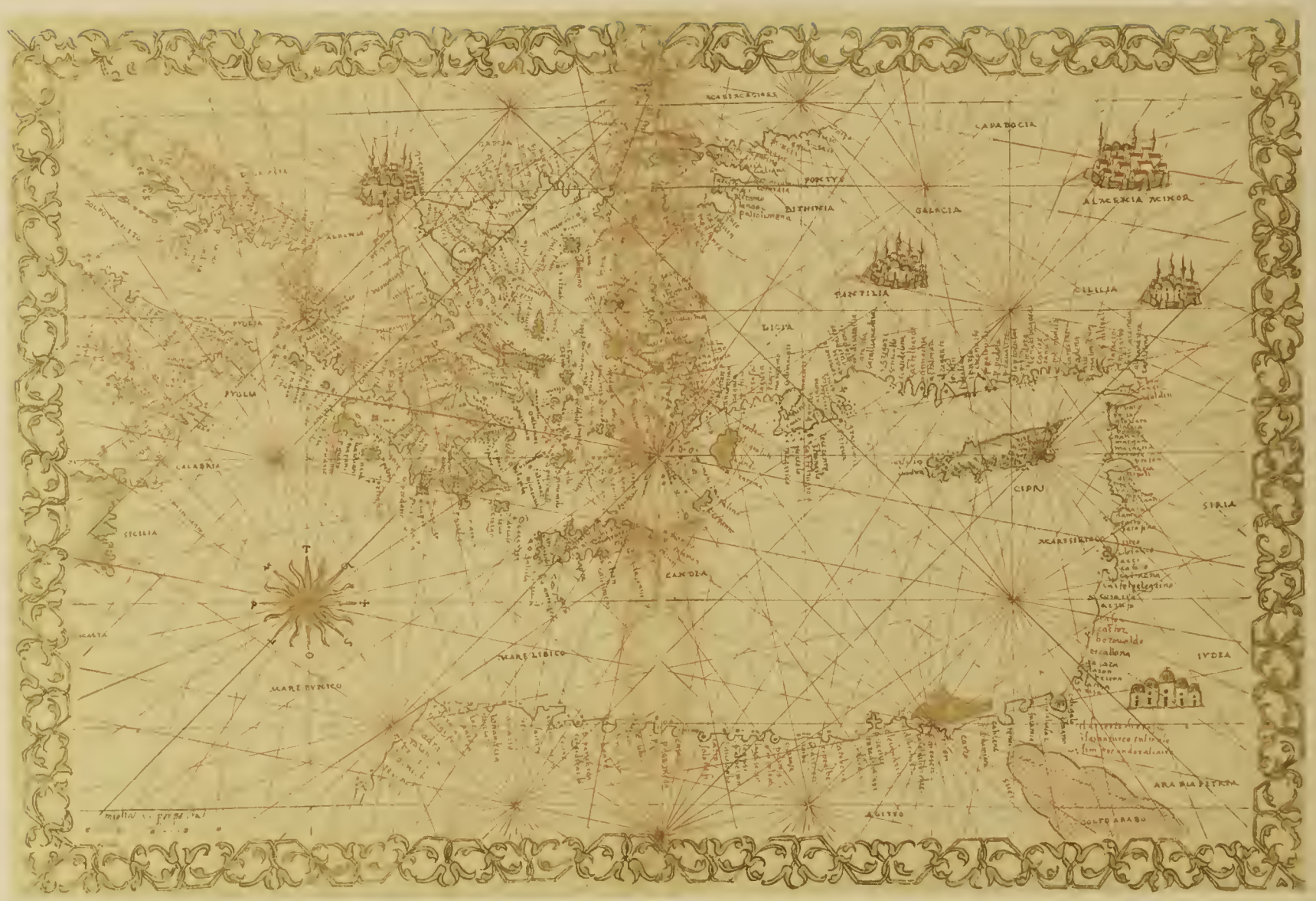


Fig. 2.3 **Marco Francesco Gisolfo, Portolan chart of the eastern Mediterranean.** [Manuscript]. Genoa, ca.1565.

The "Rose" near the center of the left hand side of this chart is labeled for the sixteen wind directions, while the loxodromic lines that cross the chart serve as rhumb lines and magnetic courses. The letters placed clockwise around the Wind Rose (t,g,l,s,o,g,p, and m) are abbreviations for the names of the winds in the Mediterranean: *tramontana, graeco, levante, sirocco, ostro, garbin, ponente,* and *maistro.* (See page 31, below).

CHAPTER 2 DISCOVERING THE NATURE OF THE SEA: WINDS, TIDES, AND CURRENTS

Geography and mathematics allowed one to locate the boundaries of the sea on the planet and to find one's way across it using the stars, but the sea itself held mysteries. Stories that seamen brought back from their experiences on the open ocean stimulated visions of imaginary creatures as well as of imaginary islands and peoples. Very slowly, the progress of empirical investigation and abstract theory dispelled these visions and led toward a scientific understanding of the causes and patterns of winds, tides, and currents. As with the fields of geography, astronomy, and mathematics, the knowledge and technology of the sea paralleled the development of the modern physical sciences of oceanography, meteorology, marine biology, and geophysics.


HVITSARK
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Més.3
Clima.16
P.27
P.28
P.29
P.30
P.31
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Vestrabord
Isafiord
Iokel
Hanafiord
Rok
Nix perpetua
Igniscóburens aquá
mons hekle.
Scalholdin
Saxa
Chaos
Sulfur
Vespemo
Ostrabord
Bremen
Hamburgen.
Scoti
Lubicenses
Corui albi
Vrsi albi
Nix
Chaos
Mons Sanctus
Butirum
ISLANDIA
Holensis
Vallen
Berghé
Cripto porticus
Vrsi albi
Pistrum siue Phiset
Monstrum 1537. uisum.
TILE
Hec Insula habet 30. millia popul. & amplius
Hec habitat Dous.
Hordero
Sudero
FARE
Eclea
Mulse
Moachus
Stremb

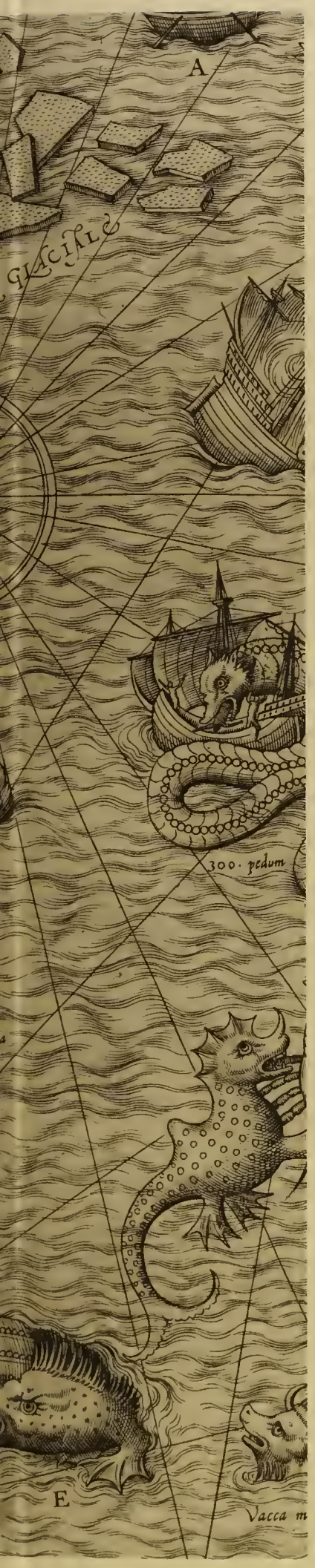


Fig. 2.1 **Olaus Magnus, *Carta marina*.** Rome, 1572.

This detail from Archbishop Olaus Magnus's map of Scandinavia shows the Norwegian Sea inhabited by a wide array of imaginary monsters.

The Sea in the Imagination

At the outset of the age of oceanic conquest, much of the available information about the nature of the sea was speculative and conjectural. Fantasy and vivid imagination gave rise to false accounts that were only slowly disproved by observation and careful reporting.

Olaus Magnus (1490–1557)
***Carta marina*. Rome, 1572.**

The map of Scandinavia shows a full array of monsters that many imagined inhabited the sea, as well as a variety of maritime activities. The cartographer Olaus Magnus, the last Catholic archbishop of Sweden, spent much of his life in exile. He apparently drew this map to demonstrate to the Pope the extent of the area that the Roman Church was losing to the Protestants. He began work on the *Carta Marina* in 1527 while living in Gdansk and completed it in Rome, where it was first published in 1539. (FIG. 2.1)

Abraham Ortelius (1527–1598)
***Theatrum orbis terrarum*. Antwerp, 1574.**

Abraham Ortelius compiled and published the first modern atlas of the world. (The word that we use to describe the genre comes from the uncompleted work of Gerard Mercator [1512–1594] and his posthumously published *Atlas* with his own cartographical projection). Using a systematic and consistent format—each map was of uniform size—Ortelius also collected the most authoritative information available and included the latest news about America. In the process, he accepted the reality of several islands that existed only in the imagination of mariners who thought they had sighted land in the misty seas, such as St. Brendan's Island (S. Brandani), the Isle of Demons (dos demonios), Estotilant, Frislant, and Icaria, which are grouped at the upper right in the North Atlantic. Frisland was probably an early sighting of the Färoe Islands, while some of the others may have been sightings of Labrador. (FIG. 2.2)

Fig. 2.2 Abraham Ortelius, ***Theatrum orbis terrarum***. Amsterdam, 1574.

Ortelius produced the first modern atlas of the world. His famous map of the Americas reflects much authoritative new information, but he also accepted reports of a number of imaginary islands in the North Atlantic: dos demonios, S. Brandani, Frislant, Sept cites, and Santana.

Observations and Scientific Theories about the Nature of the Sea

Careful observation of the sea by European navigators began in the Mediterranean. Knowledge gained there over centuries was transferred to the Atlantic and beyond. As European seamen moved into the oceans, they observed new phenomena. At first, scientists and academics at home tried to relate the new observations to already established interpretations, sometimes only succeeding in creating more misunderstanding. It often required a long process to replace old notions with new, based on a full understanding of what had been observed.

Marco Francesco Gisolfo
Portolan chart of the eastern Mediterranean. [Manuscript]. Genoa, ca.1565.

In the Mediterranean, steady seasonal winds could be relied upon as indicators of direction. In the hands of a skilled and experienced navigator, dead reckoning was an accurate way of sailing from one port to another. The rose, showing the sixteen primary winds, also provides the basis for magnetic compass courses, indicated by the loxodromic lines at angles across the central and eastern Mediterranean. The same approach that was used in the Mediterranean was successfully transferred to long-distance navigation in the Atlantic and other oceans although it lacked precision. It was the "tried and true" method that conservative sailors typically relied upon, even while the cosmographers, astronomers, and navigation teachers were trying to promote the use of sophisticated instruments for celestial navigation to determine position by latitude and longitude. (FIG. 2.3) (See page 26, above).

Jean Taisnier (1508–ca.1562)
***A very necessarie and profitable booke concerning navigation.* Translated by Richard Eden. London, 1579?**

In publishing this book, an English translation of a collection of scientific treatises in Latin that Johannes Taisnier had gathered and published in Cologne in 1562 under the title *Opusculum perpetua memoria dignissimum,* Richard Eden was attempting to bring to England the scientific information necessary for launching England's maritime enterprises. Little information of this type was readily available to English readers at the time. Yet the work was a conflation of science, pseudo-science, superstition, and tradition, and clearly illustrates the prevailing confusion.

The book covered a range of topics that included the lodestone, continual and local motions, the proportions of ships, and the "flowing and reflowing" of the tides. The section on tides was taken from the work of Fredericus Delphinus, professor of mathematics at Padua, and "divers learned men." Taisnier's section on the lodestone is well known to have been plagiarized from the work of a thirteenth-century writer Petrus Peregrinus, printed in Augsburg in 1558 under the title *Epistola de magnete.*

Ralph Bohun (d.1716)
***Discourse concerning the origine and properties of wind.* Oxford, 1671.**

In the age of sail, wind and wind patterns were of essential importance, yet the relationship of wind to ocean currents and changing atmospheric pressure was not readily apparent. In this volume, Ralph Bohun, a tutor in mathematics at New College, Oxford, offered his understanding of the matter. His stated intention was to compare the observations of seamen with the writings of philosophers in order "to arrive at a more perfect History of Winds." Bohun, teacher to the son of the diarist John Evelyn, is remembered for requiring his pupils in mathematics and science to read Aristotle's *Ethics* and *Rhetoric* in their original Greek, to teach "the right sympathy between passions and words." As amply demonstrated in his book on winds, Bohun looked upon Aristotle as "the greatest master of methodizing our thoughts." (FIG. 2.4)

César d'Arcons (d.1681)
***Le secret du flux et reflux de la mer.* Rouen, 1655.**

César d'Arcons was a barrister in the high court at Bordeaux who published a variety of studies that ranged from biblical philology to an explanation for the ebb and flow of the sea. His book is more speculative than scientific.

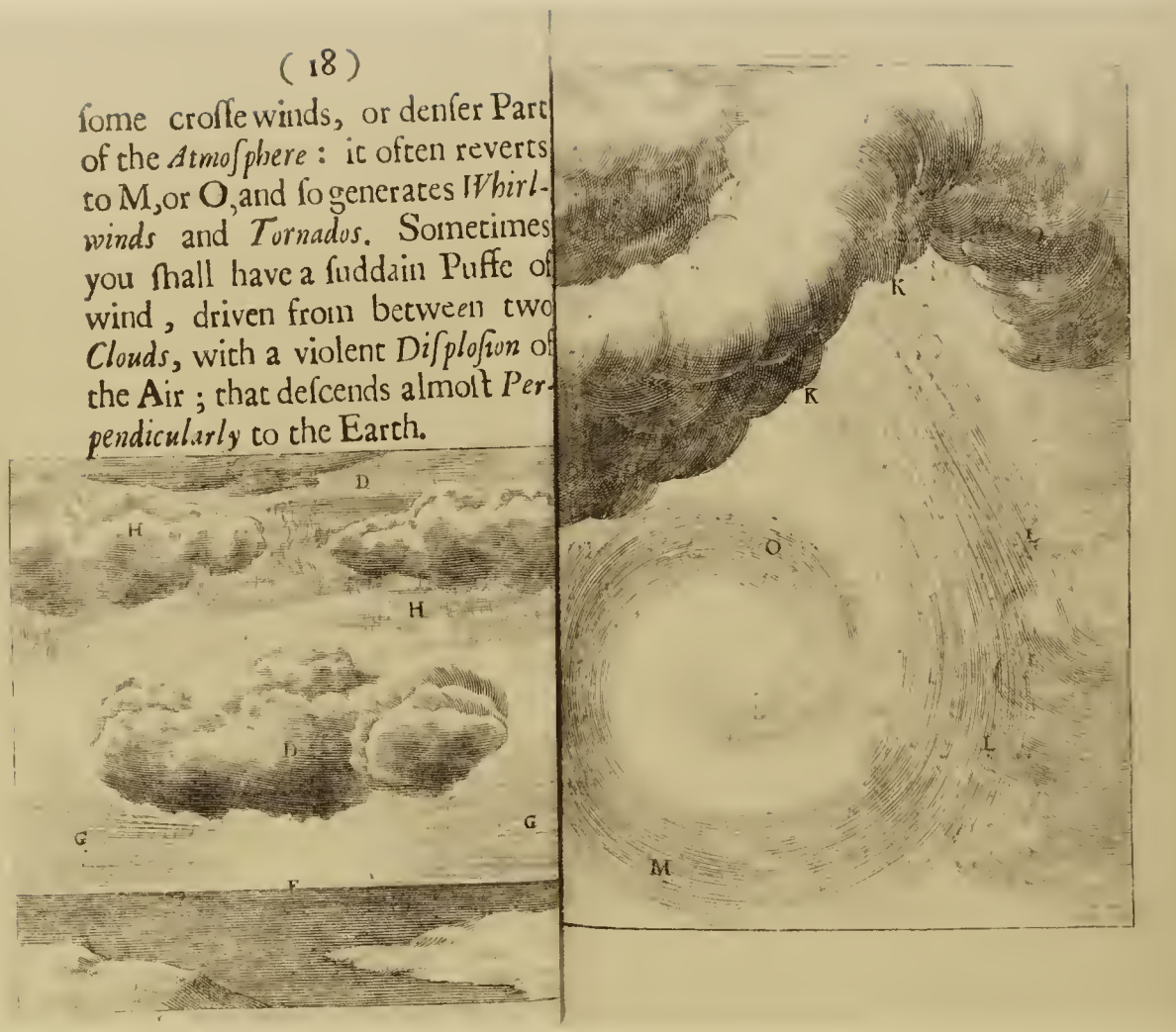


Fig. 2.4 Ralph Bohun, *Discourse concerning the . . . wind.* Oxford, 1671.

In trying to understand the nature of the winds, Ralph Bohun, a Fellow of New College, Oxford, tried to compare the observations of sailors with the writings of ancient philosophers "to arrive at a more perfect History of Winds."

Fig. 2.5 Athanasius Kircher, *Mundus subterraneus.* Amsterdam, 1678.

This is the earliest printed thematic chart of currents in the open ocean. It was intended to demonstrate Kircher's theory that currents are connected to a worldwide system of underground canals and reservoirs.

Isaac Vossius (1618–1689)
***De motu marium et ventorum.* The Hague, 1663.**

Isaac Vossius, a Dutch scholar who had served for a time as librarian to Queen Kristina of Sweden and later emigrated to England, was one of the few scientists in the sixteenth and seventeenth centuries who devoted a book-length study to the subject of tides. First published in Latin in 1663, the volume drew wide attention, and an English translation appeared in 1677. In his conclusion, Vossius proposed that the action of the sun's heat was the single force responsible for winds, tides, and ocean currents.

Athanasius Kircher (1602–1680)
***Mundus subterraneus.* Amsterdam, 1678.**

The Jesuit polymath Athanasius Kircher produced the earliest printed thematic chart of currents in the open ocean. He believed that there was a worldwide system of underground canals and reservoirs that were connected to above-ground rivers and oceans, forming a global system of water circulation. In this, he followed the Greek legend that rivers of the world derived from Oceanus, the sea that encircled the habitable world, through underground connections. (FIG. 2.5)

Francisco de Seixas y Lovera (fl. 1688–1703)
***Theatro naval hydrographico.* Madrid, 1688.**

A table in this book shows the names of the winds in four languages—Castilian, Italian, German, and Latin. The work is devoted to the study of the winds and currents of the world's oceans. In a later edition, Seixas accused a Jesuit teacher of rhetoric and mathematics, Francisco Petry (1641–1695), of having plagiarized his ideas in a volume entitled *Causas eficientes y accidentales del fluxio del mar* (1694), published under the pseudonym Pedro de Castro. Petry's book, which is also in the John Carter Brown Library, like Seixas's, shows no awareness of the modern explanation of the tides that Newton propounded in the *Principia* (1687).

Francisco de Seixas y Lovera was a widely experienced Spanish mariner, who lived a remarkably adventurous life, although not one entirely uncommon for men of the sea in this era. After studying mathematics and cosmography as a young man, he went to sea around 1661. Following a voyage to Smyrna and Constantinople, he went to France and sailed in the ship carrying the French ambassador to the court of the Grand Mogul. Then, sailing in a Portuguese ship to the China Seas, he visited the Moluccas, where he transferred to a Dutch ship to cross the Pacific en route to the Netherlands. Returning to Spain, he sailed to India with the fleet under Enrique Enríquez, before returning to Cádiz in 1672. He commanded a privateer against France in the War of 1689–1697, and then from 1697 to 1701, he was in Central America, where he explored for gold and silver. In 1704, he became a captain in the Spanish navy and governor of the province of Tacuba in New Spain. In addition to the *Theatro naval hydrographico,* which also appeared in a French edition in 1703, he published *Descripción de la region austral magallánica* (1690).

Philippe Buache (1700–1773)
***Cartes et tables de la géographie physique ou naturelle, présentées au Roi le 15 mai 1757.* Paris, ca. 1770.**

Phillipe Buache's *Cartes et tables* was the first thematic atlas, and its theme was physical geography. In it, we find the earliest attempt to map the ocean floor, and some of the first steps toward a theory of continents, including such matters as the continental shelf and the relationship of continents to island groups. Buache made his academic reputation with this work, in which he showed that the typical geological features of the land—mountain ranges, valleys, and canyons—also exist under the ocean. He wrote, "the use I have made of soundings, and which no one has employed before me to convey the depths of the ocean, seems to me very appropriate to make known in a sensible manner the gradient or slope of the coasts, and . . . which shows us by degrees . . . the bottoms of the basins of the sea."

Buache was a pupil of Guillaume de L'Isle, whose daughter he married. The Academy of Sciences awarded him its architecture prize in 1721, and in 1729 he became "*premier geographe du Roi*" in the Dépôt des Cartes et Plans. The following year, he succeeded de L'Isle as a member of the Academy of Sciences and adjunct-geographer, and served as the professor of geography to the king's children. Buache later revised and updated de L'Isle's maps, collecting them in an atlas that was published after both men had died. Buache is also known for having concluded from his geographical studies, before the Alaskan peninsula and the Aleutian Islands were discovered, that a geographical connection existed between Asia and America near the Bering Strait. His nephew Jean-Nicolas Buache de Neuville (1741–1825) was also a hydrographer at the Dépôt des Cartes et Plans. (FIG. 2.6)

Benjamin Franklin (1706–1790)
[Course of the Gulf Stream]. [Paris, ca. 1778].

By the eighteenth century, seamen had accumulated much experience about the nature and path of the Gulf Stream along the coast of Florida, but had not fully appreciated the full extent of its swing across the North Atlantic. In 1767, when Benjamin Franklin was serving in London as deputy postmaster general, he investigated the reasons why a slow-sailing merchant vessel from Rhode Island could arrive in London two weeks ahead of

Fig. 2.6 Philippe Buache, ***Cartes et tables de la géographie physique ou naturelle, présentées au Roi le 15 mai 1757.*** Paris, ca. 1770.

The first example of a thematic atlas of any kind, this atlas of physical geography contains the first attempt to map the ocean floor. In it, Buache presented his revolutionary idea that the ocean floor had geological features, such as mountains and valleys, that were comparable to those on land.

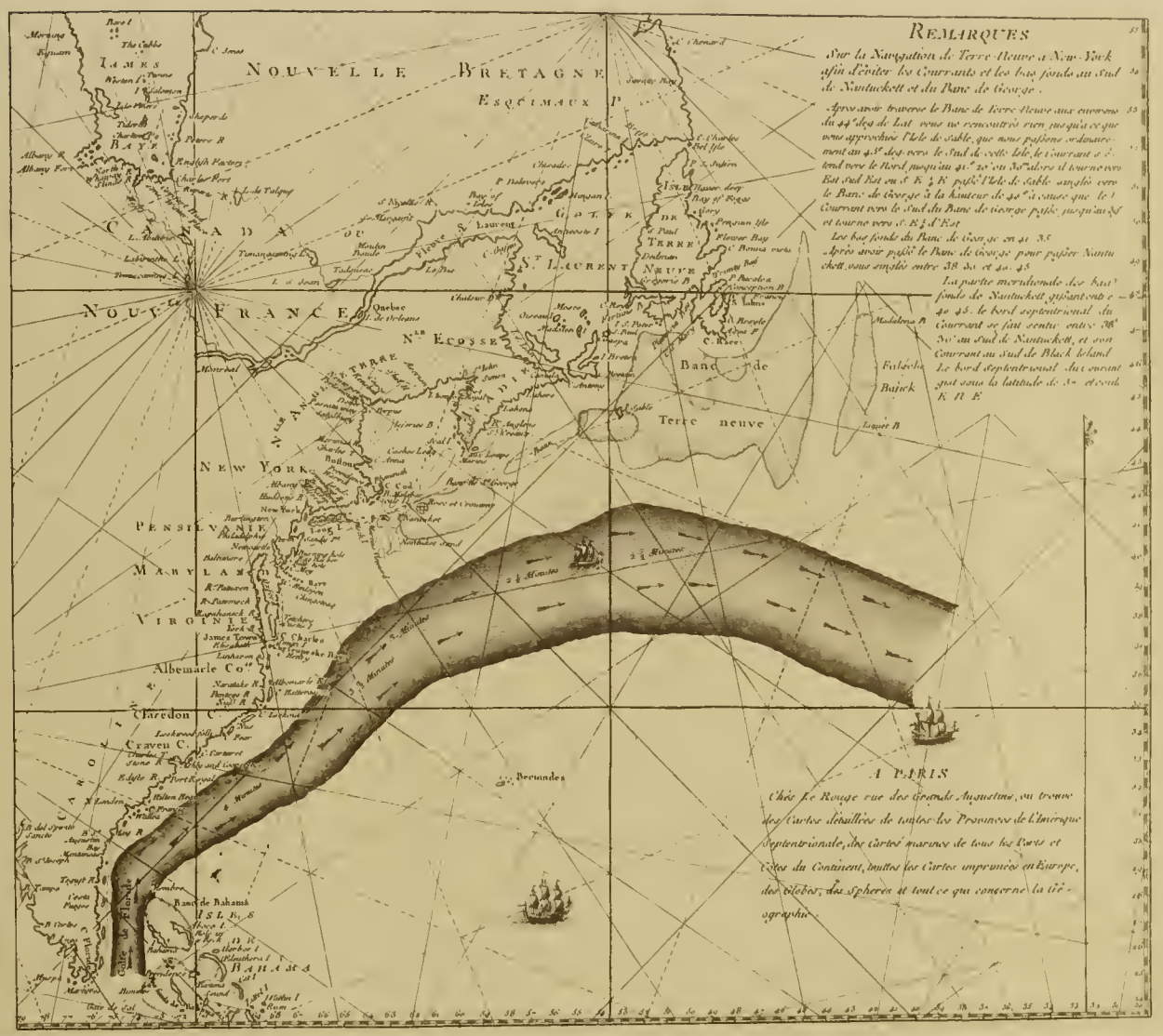


Fig. 2.7 **Benjamin Franklin, [Course of the Gulf Stream].** Paris, ca. 1778.

Benjamin Franklin began to investigate the course of the Gulf Stream in 1767, and eventually published this chart when he was in France during the American Revolution.

the packet boats intended for fast passage between New York and Falmouth, England. Captain Timothy Folger of Nantucket passed on to Franklin information about the path of the Gulf Stream that was widely known to Nantucket whalers, who profitably hunted along its margins. The Gulf Stream chart shown here, prepared by Franklin, was published in France and was probably intended to facilitate sea communications between France and North America. (FIG. 2.7)

Matthew Fontaine Maury (1806–1873)
Maury's sailing directions—enlarged and improved.
Washington, D.C., 1858.

Matthew Maury was superintendent of the U.S. Naval Observatory and Hydrographical Office from 1844 to 1861, when, as a Virginian, he joined the Confederate States Navy. Early in his career as a naval officer, Maury had become interested in wind and current movements. Shortly after taking up his post at the Hydrographical Office, he began to analyze the data in ships' logbooks and requested additional information from merchant captains on a standardized form. After collecting and analyzing data over a five-year period, Maury demonstrated that ships were making unnecessarily long passages in an effort to escape imaginary ocean currents. Using the data Maury had collected, the U.S. Navy distributed free wind and current charts to American shipmasters, the first of which appeared in 1847 and showed the North Atlantic. One of the first ships that used the information reputedly saved thirty-five days in making a voyage from New York to Rio de Janeiro. As a result of Maury's suggestions for promoting broader scientific cooperation, the first international maritime meteorological conference was held in Brussels, Belgium, in 1853. The goal was to establish internationally accepted standards for gathering meteorological information by ships at sea.

In 1850, Maury began to publish his widely used set of *Sailing Directions,* the full title of which in earlier editions was *Explanation and Sailing Directions to Accompany the Wind and Current Charts,* and in 1855 he published his major study, *The Physical Geography of the Sea.*

Olandus carauellam,& caſas ædificare curat. XIX.

NIQVESA *noctu coorta tempeſtate, à ſuis abripitur. Qui centum millia deinde emenſi vt eum inuenirent nec quidquam intelligerent, Olando, dum Niqueſa rediret, ſummam Imperij deferunt. Is quo omnem ſocijs ſpem fuga tolleret, naues fluctuantes temere ad littus ferri atq; allidi ſinit: mox, nimis feſtinati conſilij errore animaduerſo, è fractarum nauium tabulis caraellam vnam ad ſubitos & neceſſarios vſus fabricari iubet. Inde caſas moliri, Mayzum ſeminare cœperunt.*

Indi

Fig. 3.2 Theodor de Bry, *Grands voyages,* Frankfurt, 1594.

This engraving of shipbuilding depicts members of the Diego de Nicuesa expedition to Panama in 1509. Under their commander Olando, they had run aground and were forced to build a new vessel re-using materials from the wreck. (See page 40, below).

CHAPTER 3 PREPARING TO SAIL

Preparation for going to sea involves a wide range of land-based activities that are greatly affected by the nature and character of the port city from which the voyage is to be launched. Sources of finance, the city's convenience as a gathering point for materials and information, and its manpower resources all have a bearing on success. Ports are the staging points for any voyage and are the places where the complex business of outfitting a ship takes place.

Fig. 3.1 **G. Braun and F. Hogenbergius, *Civitates orbis terrarum.*** Cologne, 1572.

This view of Lisbon shows many of the activities of a great port city. In the shipyard at left center, three ships are under construction with a large wheeled crane nearby and wood laid out for use. A variety of ship-types are shown, ranging from galleys and warships to the small Mediterranean three-masted vessels known as xebecs. A large galleon, flying flags and pennants, lies at anchor in the center, while the ship immediately to the left is just arriving, and a small boat, perhaps carrying port officials, is coming alongside to greet it. To the right, the buildings along the waterfront (marked 8) house King João III's "New India House," while the buildings behind it (marked 7) are those of the "Old India House" near King Manuel's Ribeira Palace. On the lower panel, the building on the right is the mosteiro dos Jerónimos, the monastery largely financed by profits from the spice trade, while the fortified island in the center of the panel is the Torre de Belém, marking the starting point for oceanic exploration.

Home Port

All maritime activity begins ashore. For the sailor, a port is the gateway between life ashore and life afloat, but it is also a gateway between two worlds that are closely interconnected. It is in port and on land that ships are designed, the materials for shipbuilding are gathered, the vessels constructed, the sails and rigging made, and the sailors recruited. Essential to the creation of a voyage, ports are also the endpoints for a voyage and the place where trade goods are disbursed into the hinterland, where ships are repaired, and where seamen settle their families and make their homes, anticipating return for rest and relaxation after a voyage. The locations of ports were determined by a combination of factors: navigable waterways leading from main sea routes, safe roadsteads for anchorage with easy access to the port's industrial and commercial center, and both water and land routes to the interior. These factors joined the fundamental requirements for urban growth, including a safe and defensible location with access to food and water supplies for supporting a large population.

Georgius Braun (fl. 1593–1616) and
Franciscus Hogenbergius (d. 1590)
Civitates orbis terrarum. Cologne, 1572.

Lisbon is a great capital city, distinctive in its own right, but it was also home to the typical activities of a major seaport. The view of Lisbon in the first systematic collection of views and maps of the world's cities shows much of the variety at a major port.

Civitates orbis terrarum was published in six volumes over nearly half a century between 1572 and 1617 and was designed to complement the first modern atlas, Ortelius's *Theatrum orbis terrarum*. Braun edited the first five volumes and Hogenbergius was the most important engraver of the illustrations in the book. Over a hundred artists and engravers contributed to the volumes, which illustrated 546 cities in 360 copperplate engravings. The artists included Joris Hoefnagel (1542–1600) of Antwerp, who had traveled widely through Europe drawing views of cities. After his death in 1600, Hoefnagel's son, Jakob, continued his father's work. Among other contributors, the Danish cartographer Heinrich van Rantzau (1526–1599) provided views of many northern European cities. Taken as a whole, the work is one of the most important publications of the sixteenth century. (FIG. 3.1)

Ship Design and Shipbuilding

The design and building of ships is a traditional craft that has deep roots in a variety of local traditions. Building techniques were closely tied to the particular practical uses for which a vessel was intended. In the southern Europe tradition of shipbuilding, one can trace aspects of fifteenth-century ship design and construction back to their origins at the time of the Roman Empire. In northern Europe, the traditions had both Celtic and Viking origins. Ships headed for oceanic exploration had to be built to withstand the conditions of the open sea and with a capacity for carrying provisions for a crew during a long voyage away from a base of supply. Ideas about design and construction, and the required skills in this traditional craft were passed on by word of mouth and by example and were rarely put in written form. Much is currently being learned about this subject through the research that underwater archaeologists are doing on newly discovered shipwrecks.

Hartmann Schedel (1440–1514)
***Registrum huius operis libri cronicarum cu[m] figuris et ijmagibus ab inicio mu[n]di.* Nuremberg, 1493.**

There are few records of fifteenth-century shipbuilding in Europe, but some valuable information on the subject can be found in contemporary illustrations that focus on the biblical story of Noah's Ark. In composing such scenes, artists sometimes enriched their biblical images with observations of current practice, as this woodcut suggests.

This book, known more commonly as the *Nuremberg Chronicle*, is a general work of world history that may be the earliest instance of close cooperation between author, printer, and illustrator in the making of a book. The illustrators, Michael Wolgemut and Wilhelm Pleydenwurff, initiated the project, found funding for it, and commissioned Hartmann Schedel, a local scholar, to write the text, and Anton Koberger to print the work, adapting everything to their 1,700 woodcut illustrations. A few of the woodcuts can be traced to the young Albrecht Dürer, who worked as an apprentice in Wolgemut's studio about this time.

Theodor de Bry (1528–1598)
***Grands voyages*. Frankfurt, 1594.**

This engraving of shipbuilding depicts members of the Diego de Nicuesa expedition to Panama in 1509. Under their commander Olando, they had run aground and were forced to build a new vessel, making use of the timbers of their wrecked ship, in order to return home. The details of sixteenth-century shipbuilding, however, probably derive from a Flemish shipyard that the artist had seen close at hand. Half a century later this same image was modified and republished elsewhere to show Noah building the Ark. (FIG. 3.2) (See page 36, above).

Tomé Cano (fl. 1580–1611)
***Arte para fabricar*. Seville, 1611.**

Tomé Cano's work, substantially completed about 1608 and printed three years later, provides valuable insight into Spanish ship construction for the early part of the seventeenth century. An experienced ship owner and mariner with decades of experience in trans-Atlantic sailing, he wrote this treatise in the context of government-sponsored debate regarding ideal ship sizes and configurations for Spain's American trade.

F. Dassié (fl. 1677)
***L'architecture navale*. Paris, 1677.**

Galleys were a characteristic vessel in the days of ancient Greece and Rome and even continued to be used as warships in the Baltic through the end of the eighteenth century. In France, Louis XIV began to create a large galley fleet in the Mediterranean in the 1660s. Huge sums were spent on constructing galleys, mobilizing the manpower to operate them, and maintaining the Galley Corps as a force that could fight for limited objectives and serve as a symbol of French power. Among its range of uses, the galleys were most notoriously used as prison ships employing forced labor until the Galley Corps was dissolved in 1748. (FIG. 3.3)

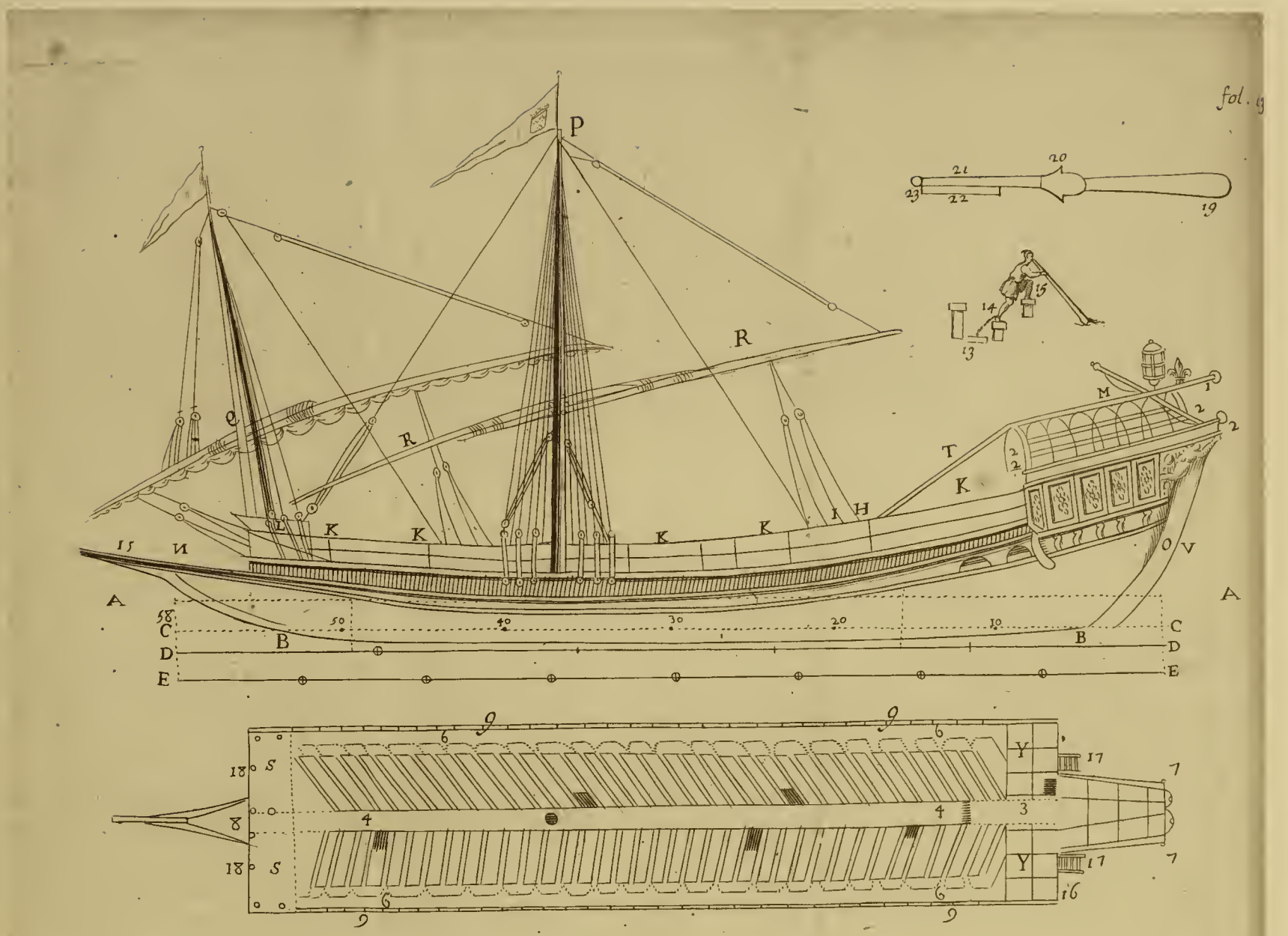
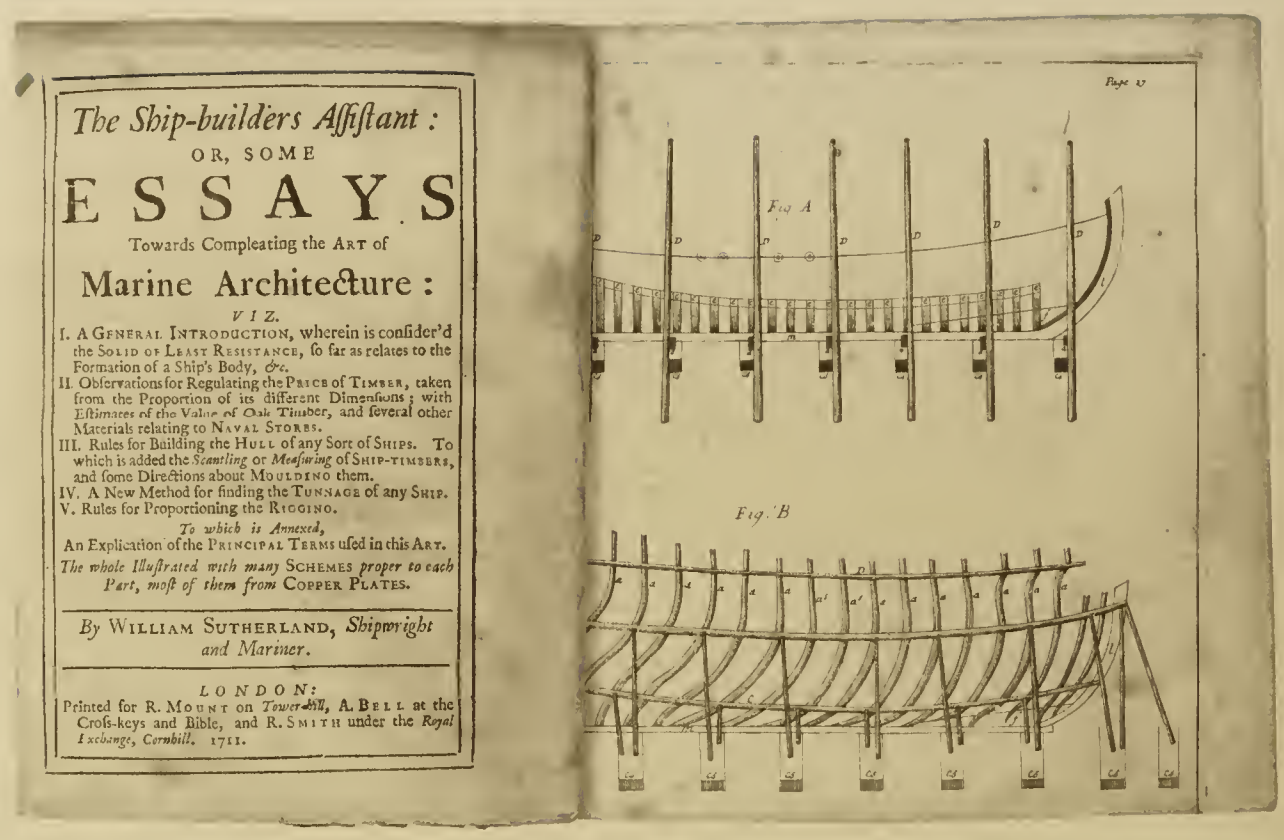


Fig. 3.3 F. Dassié, *L'architecture navale.* Paris, 1677.

Galleys were a characteristic vessel in the days of classical Greece and Rome and in the Baltic even continued to be deployed as warships to the end of the eighteenth century. In France, Louis XIV began to create a large galley fleet in the Mediterranean in the 1660s.



The Ship-builders Assistant:
OR, SOME
ESSAYS
Towards Compleating the ART of
Marine Architecture:
VIZ.
I. A GENERAL INTRODUCTION, wherein is consider'd the SOLID OF LEAST RESISTANCE, so far as relates to the Formation of a Ship's Body, *&c.*
II. Observations for Regulating the PRICE of TIMBER, taken from the Proportion of its different Dimensions; with *Estimates* of the Value of Oak Timber, and several other Materials relating to NAVAL STORES.
III. Rules for Building the HULL of any Sort of SHIPS. To which is added the *Scantling* or *Measuring* of SHIP-TIMBERS, and some Directions about MOULDING them.
IV. A New Method for finding the TUNNAGE of any SHIP.
V. Rules for Proportioning the RIGGING.
To which is Annexed,
An Explication of the PRINCIPAL TERMS used in this ART.
The whole Illustrated with many SCHEMES *proper to each Part, most of them from* COPPER PLATES.
By WILLIAM SUTHERLAND, *Shipwright and Mariner.*
LONDON:
Printed for R. MOUNT on *Tower-hill*, A. BELL at the Cross-keys and Bible, and R. SMITH under the *Royal Exchange, Cornhill.* 1711.

Page 17

Fig. A

Fig. B

Fig. 3.4 **William Sutherland, *Ship-builders assistant*.** London, 1711.

William Sutherland's book on shipbuilding first appeared in 1711 and was the most popular and longest-lived English book on the subject published in the early part of the eighteenth century.

William Sutherland.
***Ship-builders assistant*. London, 1711.**

William Sutherland's book on shipbuilding first appeared in 1711 and was the most popular and longest-lived English book on the subject published in the early part of the eighteenth century. It was reprinted and revised numerous times. The publisher Mount & Page advertised its availability for more than seventy years, until 1784. Sutherland's 1717 work, *Britain's Glory,* was more substantial than the *Ship-builders Assistant,* and went through four editions, the last in 1729. (FIG. 3.4)

***Marine architecture*. London, 1739.**

Responding to demand for works on the subject, this book was virtually copied without acknowledgment from three much earlier works: Edward Bushnell's *Compleat Shipwright* (1664); Thomas Miller's *The Compleat Modellist* (1664); and Henry Bond's *The Boatswaine's Art* (1642). Its contents were outdated by 1715, but it continued to sell and was reprinted in 1749, continuing to be advertised for sale as late as 1776. Its continued popularity may tell us something about the state of shipbuilding in small, local shipyards in contrast to the major yards that were leading the industry.

Mungo Murray (d. 1770)
***A treatise on shipbuilding and navigation*. London, 1754.**

Mungo Murray was a shipwright at Deptford Navy Yard on the Thames River. According to an advertisement in this book, he taught "the several branches of mathematics treated of in this Book [i.e., algebra, geometry, trigonometry, logarithms] at his house in Deptford . . . from six to eight every evening, except Wednesdays and Saturdays." Mungo Murray's work on shipbuilding was the first substantial book on the subject in England since William Sutherland's 1711 work. In an appendix, he included an English translation of selections from a treatise on naval architecture that Henri Louis Duhamel du Monceau had published in Paris in 1752. (FIG. 3.5)

Fredrik Henrik af Chapman (1721–1808)
***Traité de la construction des vaisseaux . . . Traduit du suédois*, Paris, 1779.**

Fredrik Hendrik af Chapman was the son of an English naval officer who had emigrated to Sweden and entered the Swedish navy. Often considered the prototype of the modern naval architect, he was the first to construct ships on the basis of usable scientific principles, translating technical theory into practical formulae that shipyard workers could use. He explained his approach, which he called the "Parabolic System," in his

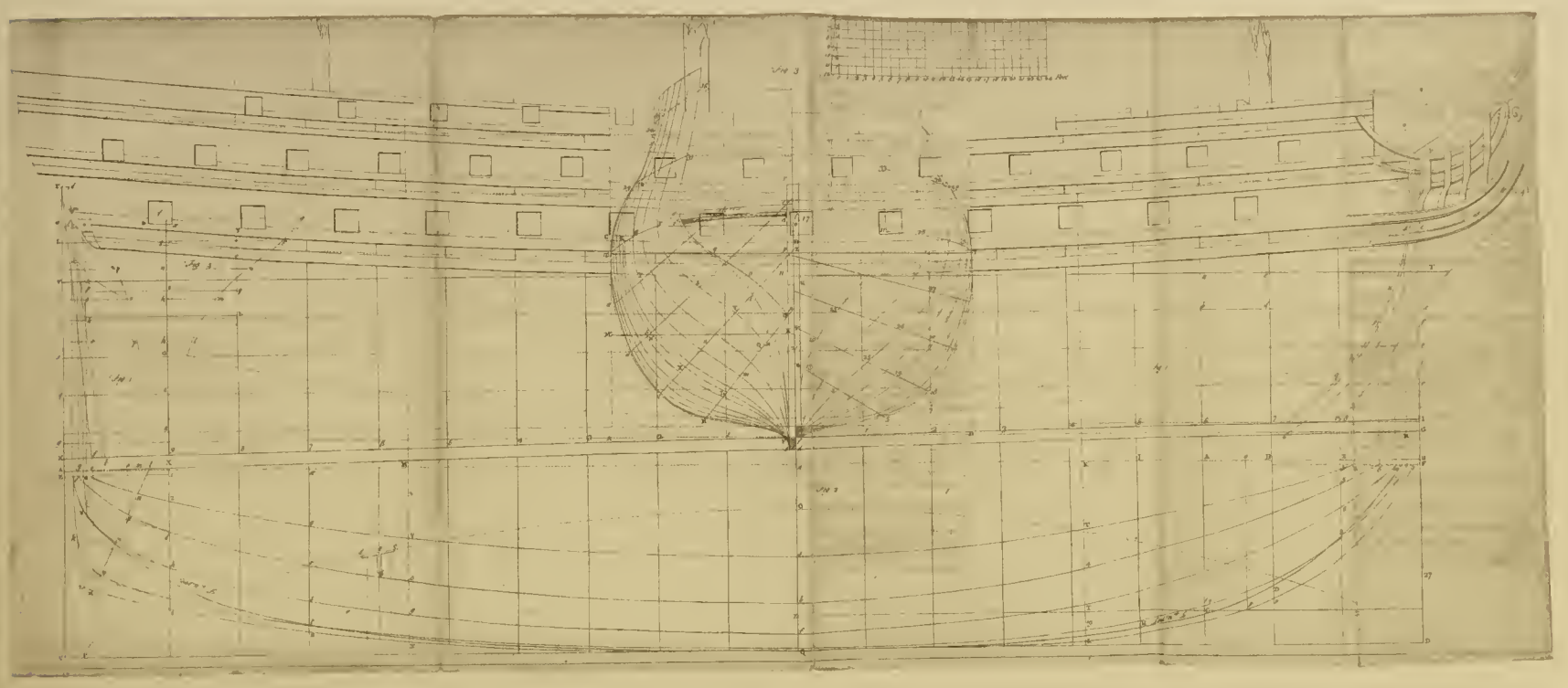


Fig. 3.5 **Mungo Murray,** ***A treatise on shipbuilding and navigation.*** London, 1754.

Murray's work on shipbuilding was a response to recent French advances in technology and was the most important book on the subject printed in England since William Sutherland's 1711 publication.

Treatise on Shipbuilding, which was first published in Swedish in 1775 under the title *Tractat om skepps-byggeriet.* That work clarified some of the ideas in his illustrated plan book, *Architectura navalis mercatoria,* published in 1768. Af Chapman's ideas received a wider audience only when his work was translated from Swedish into French in 1779. It was later translated into English in 1820 and into Russian in 1836.

Great Britain.
An act for better preserving of His Majesty's woods.
London, 1729.

Trees were the critical resource for wooden ships. In particular, the English crown had always tried to protect trees that could be used for masts. For example, the Royal Charter granted to Massachusetts by William and Mary reserved for the crown all trees of 24 inches diameter at 12 inches from the ground. In 1704, Parliament put a bounty on New England trees to encourage the importation of masts from America. By 1722, Parliament prohibited cutting any white pines north of New Jersey without a royal license. In this 1729 act, Parliament prohibited the cutting of large trees, while at the same time the government paid a premium for masts, tar, pitch, and turpentine from America.

Great Britain. Parliament, 1771. House of Commons.
A report from the Committee on . . . timber. **London, 1771.**

Following the extensive shipbuilding that had been undertaken during the Seven Years' War, concern began to grow in Britain that the kingdom's oak forests were being seriously depleted and might no longer be able to provide for the needs of the nation's defenses. A Liverpool shipbuilder, Roger Fisher, who is quoted in this committee report, had published an alarmist book predicting that within twenty years English forests would be unable to supply the Navy's construction requirements. Following the crisis over the Falkland Islands that portended conflict in 1771, Parliament convened a committee to examine all aspects of the issue, and precautions were taken so that the Navy was well supplied with timber by the time war broke out in 1776.

Fig. 3.6 David Steel, *Elements and practice of rigging, seamanship, and naval tactics.* London, 1800.

This plate shows the standing rigging, the shrouds, backstays, and stays used to support the masts, for a 20-gun warship.

EXPLANATION OF THE REFERENCES ON THE PLATE DELINEATING THE STANDING-RIGGING OF A TWENTY-GUN SHIP.

1 Gammoning.
2 Bobstays.
3 Bowsprit-shrouds.
4 Fore-tackle pendents.
5 Main-tackle pendents.
6 Mizen-burton pendents and tackle.
7 Fore-shrouds.
8 Main-shrouds.
9 Mizen-shrouds.
10 Fore-preventer stay.
11 Fore-stay.
12 Main-preventer stay.
13 Main-stay.
14 Mizen-stay.
15 Fore-topmast burton pendents and tackles.
16 Main-topmast burton pendents and tackles
17 Fore-topmast shrouds.
18 Main-topmast shrouds.
19 Mizen-topmast shrouds.
20 Fore-topmast breast backstay and runner.
21 Fore-topmast standing backstay.
22 Fore-topmast shifting backstay.
23 Main-topmast breast backstay and runner.
24 Main-topmast standing backstay.
25 ———— shifting backstays.
26 Mizen-topmast standing backstay.
27 ———— shifting backstay and runner.
28 Fore-topmast preventer stay.
29 ———— stay.
30 Main-topmast preventer stay.
31 ———— stay.
32 Mizen-topmast stay.
33 Fore-topgallant shrouds.
34 Main-topgallant shrouds.
35 Mizen-topgallant shrouds.
36 Fore-topgallant standing backstays.
37 Main-topgallant standing backstays.
38 Mizen-topgallant standing backstay.
39 Fore-topgallant stay.
40 Main-topgallant stay.
41 Mizen-topgallant stay.
42 Martingal-stay.
43 Bowsprit-horse.
44 Fore-stay tackle.
45 Main-stay tackle.
46 Main-stay tackle pendent.
47 Fore-futtock shrouds.
48 Main-futtock shrouds.
49 Mizen-futtock shrouds.
50 Stay-tackle tricing-lines.
51 Futtock-stave.
52 Ratlings.
53 Catharpin-legs.
54 Bobstay and forestay collars.
55 Jib-horses.
56 Ensign-halliard.
57 Martingal.
58 Runners of tackles, &c.

To prevent confusion of appearance in the plate of standing-rigging, the shrouds and backstays are represented only on the starboard side; but it must be remembered, that an equal number of them belongs to the larboard side. In ships from twenty guns downwards, the preventer-stays are sometimes placed under the stays; and to them the staysails are bent.

EXPLANATION

The STANDING RIGGING of a TWENTY GU SHIP.

Scale of Feet

Published as the Act directs by D. Steel 1st August 1794.

Manning and Fitting Out

Manning and fitting out are the final stages in the preparation of a ship for a voyage. They are separate, but interrelated, activities: one concerns the men and the other concerns the supplies and equipment that the men will need to operate the ship.

Some considerations on the reasonableness and necessity of encreasing and encouraging the seamen. **London, 1728.**

Finding the men, and even the boys to train up, to sail ships was always a critical problem, and it was a particular problem for the British navy, which at times resorted to impressment to man its ships. This practice had an effect on the labor supply available for other occupations, particularly for other maritime industries. The issues over manning became subject matter for pamphlets as early as 1693, and a huge pamphlet literature followed on this difficult issue. This pamphlet, attributed to Daniel Defoe, made fun of "all those labored pieces" with "their flourishing Titles and boasting Preambles," "too knotty and perplex'd" to be helpful.

Edward Haywood
The sizes and lengths of rigging. **London, 1660.**
and
John Blagrave
The mathematical jewel. **London, 1585.**

Edward Hayward's volume first appeared in 1656 and contains tables showing the amount of spar timber and rigging needed to equip a ship in this period.

In the John Carter Brown Library collection, Hayward's work is bound with a much older work, John Blagrave's *The Mathematical Jewel* (London, 1585). A wealthy gentleman from Reading with an interest in mathematics, Blagrave described how to make and to use a practical planispheric astrolabe. Thomas Blundeville popularized Blagrave's approach in his widely used book on *Exercises*. For those who could master the instrument and its mathematics, it became a handy and portable timepiece and astronomical almanac.

David Steel (1733–1799)
The art of mast making. **London, 1797.**

As is illustrated in this work, large masts and yards began to be made up from smaller pieces of timber as ships became larger and timber supplies scarcer. This work on mast making is taken from one of the many editions of David Steel's *Elements of Rigging and Seamanship*, which had first appeared in two volumes in 1794 and marked the high point of English nautical publishing at the end of the eighteenth century. It was the best and most detailed book on the subject to appear in English up to that time.

David Steel (1733–1799)
Elements and practice of rigging, seamanship, and naval tactics. **London, 1800.**

Once a ship's masts and yards were constructed in a shipyard, they then needed to be placed securely in the vessel, where they could be operated. This plate for a later edition of David Steel's 1794 *Elements of Rigging and Seamanship* shows the standing rigging, used to support the masts, for a 20-gun vessel. The running rigging, used in operating the sails and yards, was an additional set of rigging. (FIG. 3.6)

David Steel (1733–1799)
The art of sail making, as practiced in the Royal Navy, and according to the most approved methods in the merchant service. **London, 1821.**

Sails were manufactured in sail lofts, as depicted in this volume. Like the preceding items, the contents of this book originally appeared in Steel's 1794 *Elements of Rigging and Seamanship.* Steel's wife and children, who succeeded him in managing the publishing business, saw that they could profit by dividing up the larger and more comprehensive work into smaller volumes and selling them to specialist tradesmen. This volume was the first of the smaller works that followed, shown here in a third edition. (FIG. 3.7)

John Knowles, Agent
"Sail plan of the bark Wave." [Manuscript]. [New Bedford], 1882.

A drawing in this work from New Bedford, Massachusetts, in 1882 illustrates the way a traditional sail maker planned and laid out the measurements for manufacturing sails, even a century earlier. The drawing is part of a collection of sail plans collected by Thomas Card and later acquired by Zechariah Chaffee, who donated them to the John Carter Brown Library in 1941. This plan is from a group of 31 that originated with the New Bedford firms of Hart, Thomas & Co. and Briggs & Beckman. Another item in this collection is a "Draft Book of Sail Plans" from the New Bedford firm of Alden & Hafford, containing 73 leaves of plans from the period 1829–1863.

REPRESENTATION of a SAIL LOFT.

London: Published as the Act directs, Jan.y 1.st 1821, by J. W. NORIE & C.o at their Navigation Warehouse, N.o 157, Leadenhall Street.

Fig. 3.7 David Steel, ***The art of sail making....*** London, 1821.

Depicted here is a sail loft, a necessarily large room, located typically in dockyards, where sails were cut out and manufactured.

Fig. 4.15 **Carel Allard,** ***Nieuwe Hollandse scheeps bouw.*** Amsterdam, 1695.

This Dutch book on shipbuilding includes a detailed illustrated appendix on flags. The engraving shows the variety of places in the rigging of a ship where flags could be flown. (See page 72, below).

CHAPTER 4 LIFE AT SEA

The ship in the age of sail was a "wooden world" of its own. Survival on the dangerous ocean required rigid discipline and many technical skills along with heavy, backbreaking labor. In this period, ships were by far the most technically sophisticated modes of transportation. Daily life for the sailor at sea encompassed a wide range of activities that called for specialized knowledge and specific tools. Life at sea focused primarily on the work of operating the sailing ship. In addition to a sailor's unremitting duties and the constant concerns of his craft, he also had a private and personal life.

The cramped living conditions and deprivations posed dangers to health, not to speak of the terrifying struggle against natural elements. Such challenges brought forth a particular genre of religious literature.

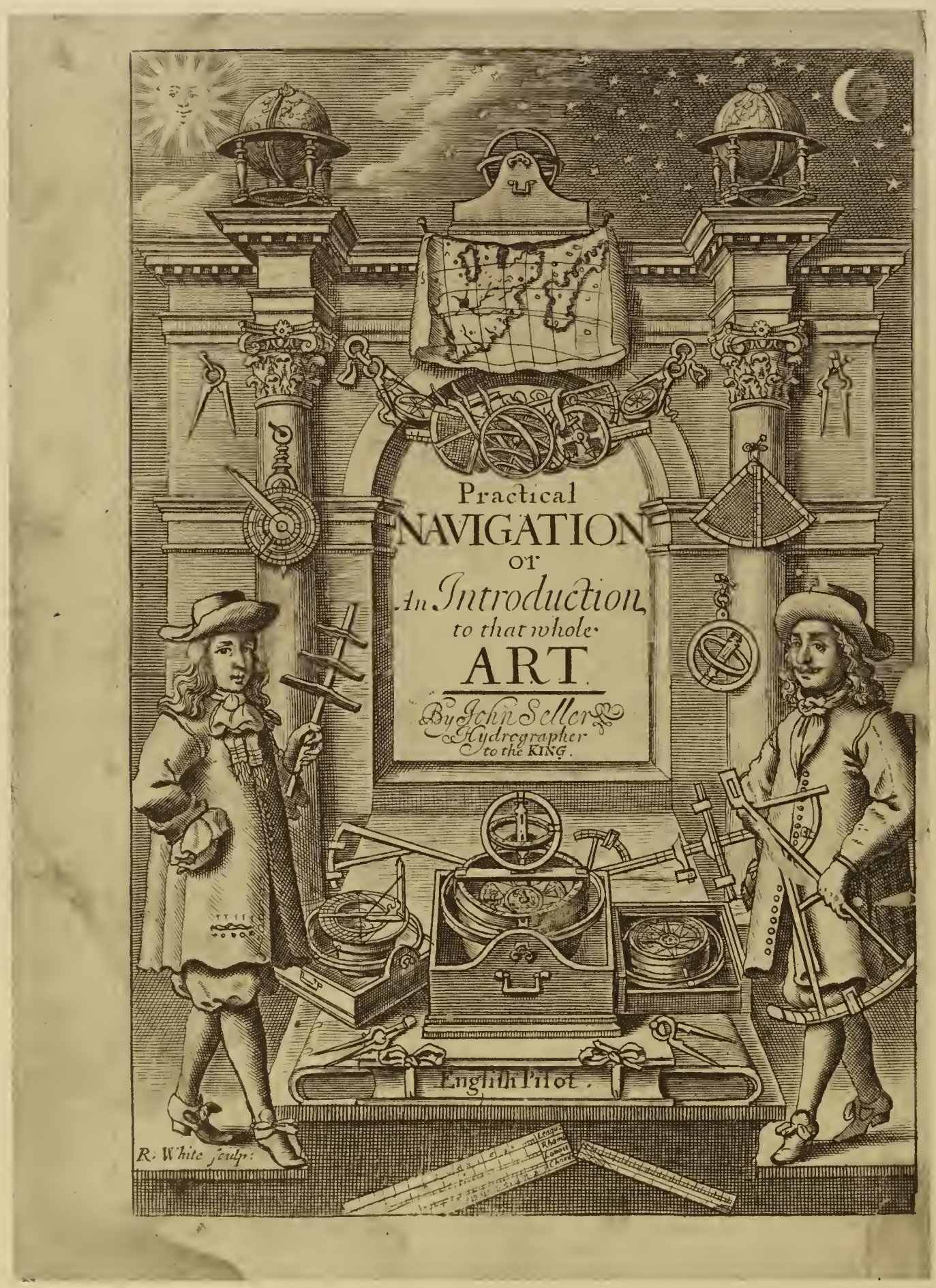


Fig. 4.6 John Seller, ***Practical navigation; or an introduction to that whole art.*** London, 1680.

First published in 1669, John Seller's work became one of the most widely used practical textbooks for English sailors. (See page 57, below).

Work

The practical application of the art of navigation, involving both piloting and celestial observations, the use of a variety of instruments, and knowledge of how to work the sails and lines on board the ship, was complicated enough, but this was not all. Most ships carried some kind of gun for protection as well as for signaling; so knowledge of weaponry was essential. In addition, a complex system of flags was often effectively used as a means of communication and identification between ships. All of this activity promoted the development of a specialized vocabulary and a language of the sea.

THE VOCABULARY OF THE SEA

The distinctive terminology of seafaring arises from the combination of the professional maritime environment in which seamen live and the specialized nature of building, outfitting, and handling ships. A specialized vocabulary emerged, fed by sailors from all of the major European maritime countries. It had its origins as work-a-day jargon, but has become embedded and preserved in a traditional form through instruction and training. It is, also, of course, embodied in much literature and poetry and has even found its way into many common expressions used by landsmen. Sea language in English was already clearly established in the Elizabethan period. In the last decades of the sixteenth century and the first decades of the seventeenth century, scholars were just beginning to prepare dictionaries of European vernacular languages and to find equivalent meanings between vernacular languages rather than resorting to Latin. At the same time, common seamen traveled around the world and visited ports where many different languages were spoken. This fact, along with the international character of the maritime labor market, in which sailors of various nationalities might join a ship's crew, were among the practical reasons why multi-lingual glossaries and dictionaries of sea words were often in demand.

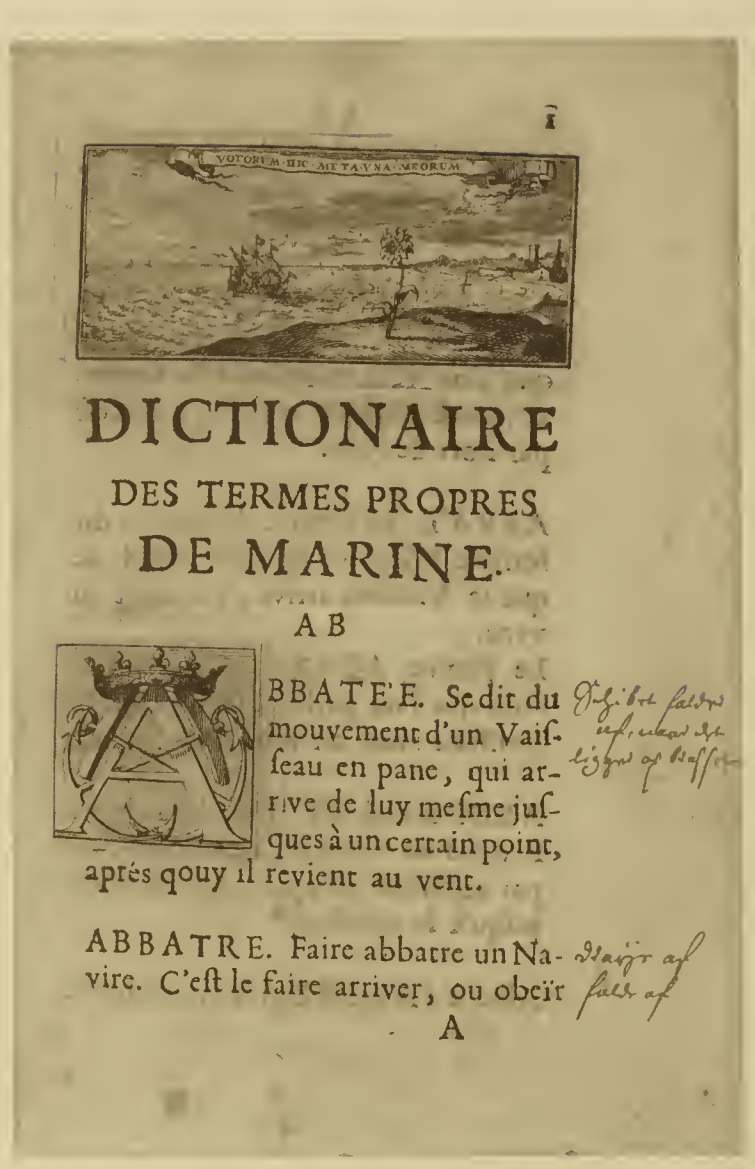
Sir Henry Mainwaring (1587–1653)
Sea-man's dictionary. **London, 1644.**

Captain Sir Henry Mainwaring, who had "developed an insatiable love for adventure on the high seas," compiled the first book in English on nautical terms. He became Lieutenant of Dover Castle and Deputy Warden of the Cinque Ports on his return from a voyage in 1619 that was closer to piracy than to privateering. Between 1620 and 1623 he wrote this manual for the personal use of the Duke of Buckingham, the Lord High Admiral, an office of state that was typically held by courtiers, not experienced seamen. Mainwaring commented, "to understand the art of navigation is far easier learned than to know the practique of mechanical working of ships and the proper terms belonging to them." His book, which explains the latter, was first printed in 1644, after twenty years in manuscript, when Parliament ordered it "imprinted for the good of the Republic."

From this beginning, there followed a succession of maritime dictionaries in English. William Falconer's *An Universal Dictionary of the Marine* went through seven editions between 1769 and 1789. The English genre of maritime dictionaries reached its apogee in the age of sail with the publication in March 1815 of Dr. William Burney's *Universal Dictionary of the Marine*. Begun as a revision of Falconer's work and using the same title, Burney's work extended the dictionary format from an unembellished vocabulary list to an alphabetically arranged, well illustrated, and comprehensive description of British maritime affairs at the end of the Napoleonic wars.

John Smith (1580–1631)
A sea grammar. **London, 1627.**

First published in 1626 under the title *An Accidence or Pathway to Experience. Necessary for all Young Seaman,* John Smith revised, rearranged, and enlarged the volume in 1627 under the title *A Sea Grammar,* using a thematic approach. The first printed work on ships and seamanship written in the English language, it was reprinted several times under this title until 1705, and the publisher continued to advertise it for sale until 1724. Although Smith's work appeared long before Mainwaring's *Seaman's Dictionary* was published, Smith had used Mainwaring's earlier manuscript as a source for his own work.



I

VOTORUM HIC META UNA MEORUM

DICTIONAIRE
DES TERMES PROPRES DE MARINE.

AB

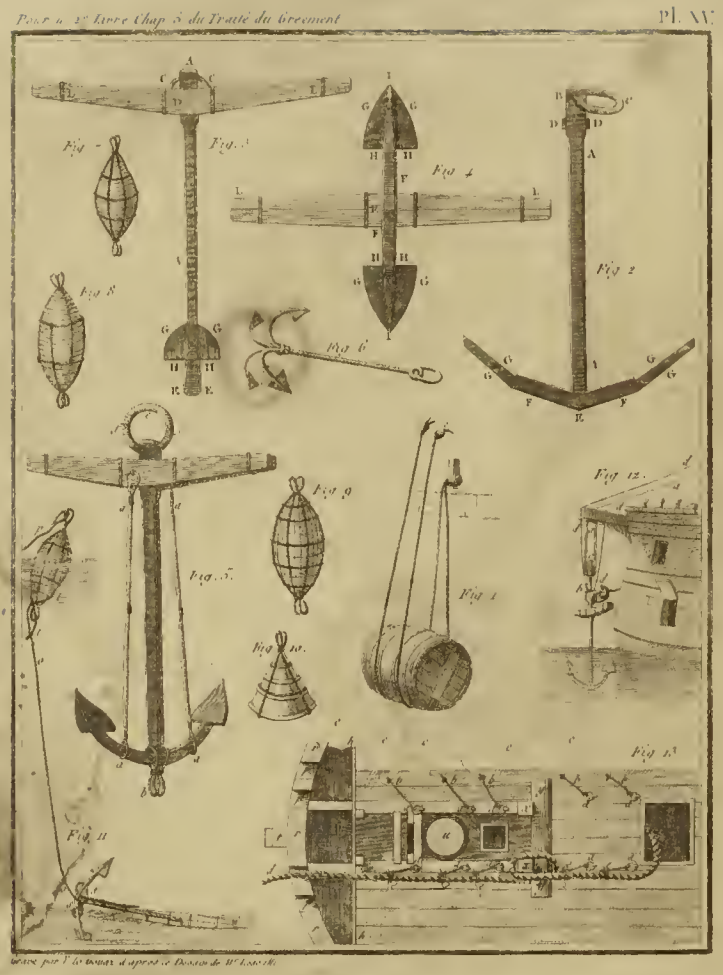
BBATE'E. Se dit du mouvement d'un Vaiſſeau en pane, qui arrive de luy meſme juſques à un certain point, aprés quoy il revient au vent.

ABBATRE. Faire abbatre un Navire. C'eſt le faire arriver, ou obeïr

A

Fig. 4.1 M. Desroches, *Dictionnaire des termes propres de marine*.... Paris, 1687.

This practical French dictionary provides the meanings of naval terms along with identification of ensigns and flags.



Pour le 2e livre Chap. 3 du Traité du Greement

Pl. VI

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5.

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 10.

Fig. 11

Fig. 12.

Fig. 13

Gravé par Tardieu d'après le Dessin de M. Lescallier

Fig. 4.2 Daniel Lescallier, *Vocabulaire des termes de marine anglois et françois*. Paris, 1777.

This volume provides an elementary English-French nautical dictionary, giving very short definitions keyed to illustrations, such as that shown here.

M. Desroches
Dictionnaire des termes propres de marine. Avec les enseignes & pavillions que chaque nation porte à la mer. Paris, 1687.

Every seafaring people have a language with its own specialized vocabulary referring to ships and seamanship. This practical dictionary provides the meanings of naval terms along with identification of the ensigns and flags used at sea. (FIG. 4.1)

Daniel Lescallier (1743–1822)
Vocabulaire des termes de marine anglois et françois. Paris, 1777.

This volume provides an elementary English-French nautical dictionary, giving very short definitions keyed to illustrations. At the time this book was published, Daniel Lescallier was commissary of ports and arsenals. He later served as a commissary in the colonies of Grenada in 1780, Demerary and Guyane in 1782, and Cayenne in 1785. In 1788–1790, he traveled to Holland and England to study naval construction. (FIG. 4.2)

Johann Hinrich Röding (1763–1815)
Allgemeines Wörterbuch der Marine. Hamburg and Leipzig, 1793–1798.

The compiler of this book, J. H. Röding, who was a tea merchant in Hamburg, made a great advance in scale and scope in dealing with the array of European sea languages. The definitions are in German, but all are linked to phrases having the same meaning in Dutch, Danish, Swedish, English, French, Italian, Spanish, and Portuguese. In a valuable preface, Röding listed in chronological order all of the general works on maritime affairs published between 1484 and 1793, along with separate lists of relevant theses and articles published in the journals of the English, Dutch, French, Russian, and Swedish academies of science. Röding's four-volume combination dictionary and encyclopedia became famous as the most comprehensive German work of its kind in the eighteenth century.

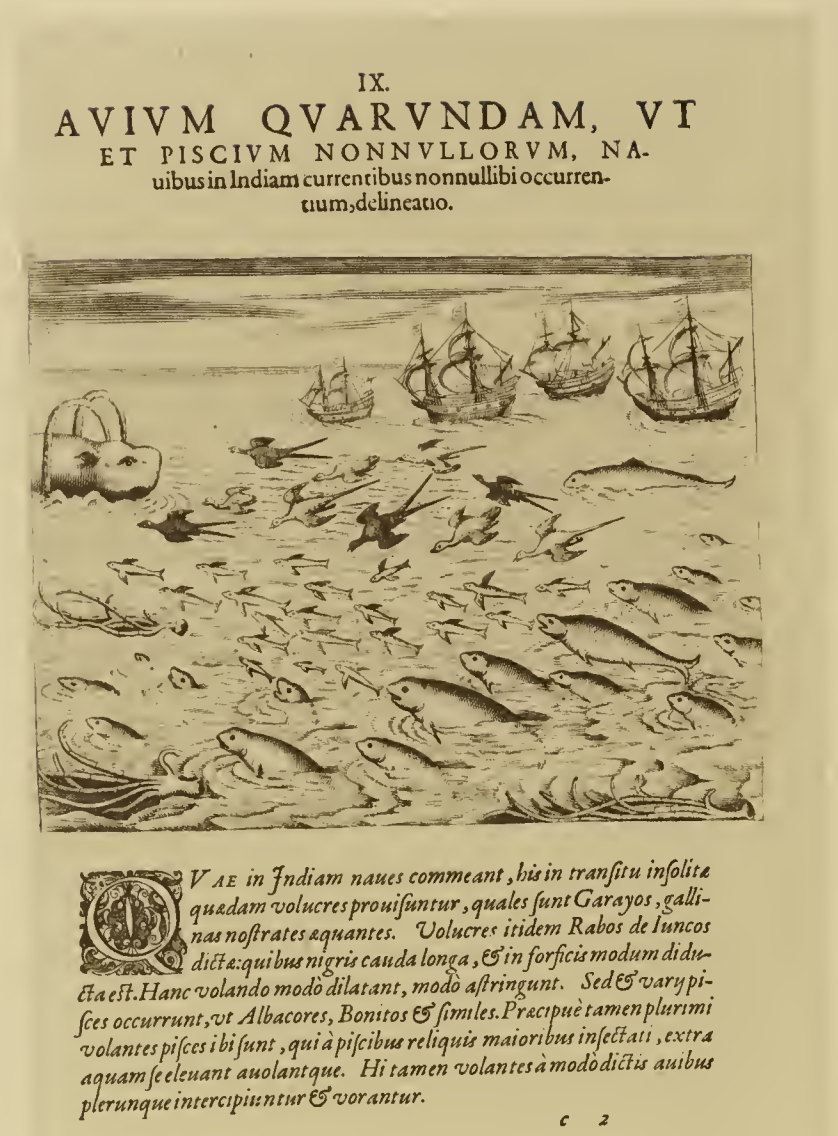
PRACTICAL NAVIGATION

While Europe's leading intellectuals and scientists were working to understand the globe and sky and gaining a scientific understanding of the nature of the sea, ordinary seamen needed to acquire some part of this knowledge and to convert it to practical use. In many cases, the mathematical skills and scientific understanding that were demanded of the common sailor were beyond his comprehension. Nonetheless, information on technical procedures and on the necessary instruments became increasingly available. Such information was initially brought into practice only occasionally, for the purpose of comparing the results of scientific procedures against dead-reckoning navigation. Sailors continued to share their traditional information and experience of navigation with one another by word-of-mouth, but this practice began to be supplemented by a specialized form of printed work that became widely used.

Designed to give instruction on basic practices at sea, books of sailing directions and textbooks on navigation tended to deteriorate quickly, both from regular use and from exposure to the harsh conditions on board ship. Many of these "how to" books have not survived or have become extremely rare.

Theodor de Bry (1528–1598)
Petits voyages. Frankfurt, 1601.

For the navigator, the sea itself provides a variety of indicators that help to point the way from place to place. Close to land, the color of the water can often suggest the depth. Out at sea, the presence of birds and schools of fish may offer important information to the experienced seaman. In the journal of his 1492 voyage, Columbus took particular note of the appearance of birds and fish as signs that he was approaching land. As he knew from experience in the Cape Verde islands, the frigate bird or man-o'war bird rarely ventures more than 200 miles from land in the tropical Atlantic. (FIG. 4.3)



IX.

AVIVM QVARVNDAM, VT ET PISCIVM NONNVLLORVM, NAuibus in Indiam currentibus nonnullibi occurrentium, delineatio.

QVAE in Jndiam naues commeant, his in transitu insolitae quaedam volucres prouisuntur, quales sunt Garayos, gallinas nostrates aquantes. Volucres itidem Rabos de Iuncos dictas: quibus nigris cauda longa, & in forficis modum dilata est. Hanc volando modò dilatant, modò astringunt. Sed & vary pisces occurrunt, vt Albacores, Bonitos & similes. Praecipuè tamen plurimi volantes pisces ibi sunt, qui à piscibus reliquis maioribus infectati, extra aquam se eleuant auolantque. Hi tamen volantes à modò dictis auibus plerunque intercipiuntur & vorantur.

c 2

Fig. 4.3 Theodor de Bry, *Petits voyages*. Frankfurt, 1601.
Out at sea, the presence of birds and schools of fish may offer important navigational information to the experienced seaman.

Questa e vna opera necessaria tutti li naviga[n]ti chi vano in diverse parte del mondo. Venice, 1490.

This volume is the earliest printed book of sailing directions, and as such it is the ancestor of all modern coast pilots. Printed in Venice in 1490 by Bernardino Rizo, it is an anonymous compilation from the voyages of many seamen and from a variety of sources "by a Venetian gentleman who had seen all this region." The book became a great commercial success and was reprinted a number of times. Most of the volume is devoted to describing sea routes within the Mediterranean, such as the route from Venice to the Levant; however, about one-fifth of the book is devoted to areas outside the Mediterranean. In the eighteenth century, the volume was attributed to the Venetian trader Alvise da Cà da Mosto (1433–1477), but there is little convincing evidence that he was the author. The oldest surviving work of this genre is an anonymous Greek manuscript, *The Periplus of the Erythraenean Sea,* from ca. C.E. 95–130, which was not printed until modern times.

Pierre Garcie, called Ferrande (ca. 1435–ca. 1520)
The rutter of the sea: with the hauens, rodes, soundings, kennings, windes, floods and ebbes, daungers and coastes of divers regions with the lawes of the Ile of Anleron. London, ca. 1567.

Descriptive guides or sailing directions for finding one's way between ports at sea were called "*Seebuch*" in German, "*portolani*" in Italian, "*derroteros*" in Spanish, "*roteiros*" in Portuguese, "*routiers*" in French, and "*rutters*" in English and Dutch. The first printed book of sailing directions for the French and English coasts was Garcie's *Le routier de la mer*, originally published at Rouen, ca.1502–1510. The volume cited here is Robert Copland's (fl. 1508–1547) translation into English of Garcie's work, which first appeared in 1528. Editions published after 1555 also included Richard Proude's *A Rutter of the North.* (FIG. 4.4) (See page 56, below).

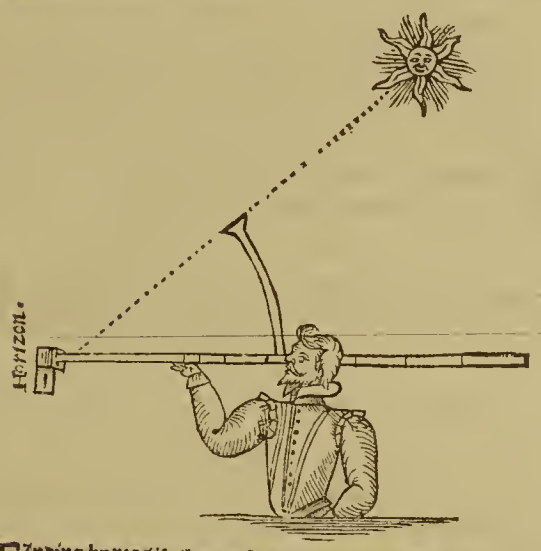
Thomas Blundeville (fl. 1561–1602)
M. Blundeville his exercises, containing eight treatises, the titles whereof are set downe in the next printed page. London, 1597.

Blundeville first published this fat volume of exercises in 1594. It became so popular that it eventually went on to eight known printings by the end of 1634. The book is important in that it encapsulates the way a novice Elizabethan seaman came to understand practical navigation. Blundeville was the first Englishman to describe the earlier work of Peuerbach and Regiomontanus on the use of trigonometric tables for astronomical calculations. His final section, "Navigation, what it is, and in what order the principles thereof are," provided some

The Seamans Secrets.

How is the vſe of this ſtaffe?

The vſe of this ſtaffe is altogether contrary to the other, for the center of this ſtaffe where the braſſe plate is faſtned, muſt be turned to that part of the Horizon which is from the Sunne, & with your backe toward the Sunne, by the lower edge of the halfe croſſe, & through the ſlitte of the plate you muſt direct your ſight onely to the Horizon, & then moving the tranſuerſary as occaſion requireth, vntill the ſhadow of your vpper edge of the tranſuerſary doe fall directly vpon the ſame ſlitte or long hole, and alſo at the ſame inſtant you ſee the horizon through the ſlitte, and then the tranſuerſary ſheweth the height deſired.



FInding by practiſe the excellency of the Croſſe ſtaffe aboue all other inſtruments, to ſatisfie the Seamans expectation, and alſo knowing that thoſe inſtruments whoſe degrées are of largeſt capacitie, are inſtruments of moſt certainty. I haue very carefully laboured to ſearch a good and demonſtrable meane how a Croſſe ſtaffe might be protected, not only to containe

The Seamans Secrets.

taine large degrées, but alſo to auoyd the vncertaintie of the ſight, by diſorderly placing of the ſtaffe to the eye, which demonſtration I haue found, & haue had the inſtrument in practiſe, aſwell vnder the Sun as in other climates, but becauſe it hath a large demonſtratiõ, with manifold vſes, I here omit to manifeſt the ſame, purpoſing to write a particular treatiſe thereof, notwithſtãding his forme & vſe, by picture I haue thought good to expreſſe.

This ſtaffe is a yard long, hauing 2. halfe croſſes, the one circular, the other ſtraight, the longeſt not 14 inches, yet this ſtaffe doth contain the whole 90. degrées, the ſhorteſt degrée being an inch & ¼ long, wherein the minuts are particularly & very ſenſibly laid down, by which ſtaffe not regarding the parallar of your ſight, nor looking vpon the Sunne, but onely vpon the Horizon, the Suns height is moſt preciſely knowne, as well and as eaſily in the Zenith, as in any other part of the heauen. Then which inſtrument (in my opinion) the Seaman ſhall not finde any ſo good, & in all Climates of ſo great certainty, the inuention & demonſtration where of I may boldly chalenge to appertaine vnto my ſelfe (as a portiõ of the talent which God hath beſtowed vpõ me) I hope without abuſe or offẽce to any.

F Of

Fig. 4.5 John Davis, *The seamans secrets ... wherein is taught the three kindes of sayling.* London, 1633.

John Davis is credited with inventing the back-staff. This illustration demonstrates one of several ways to use it to observe the sun.

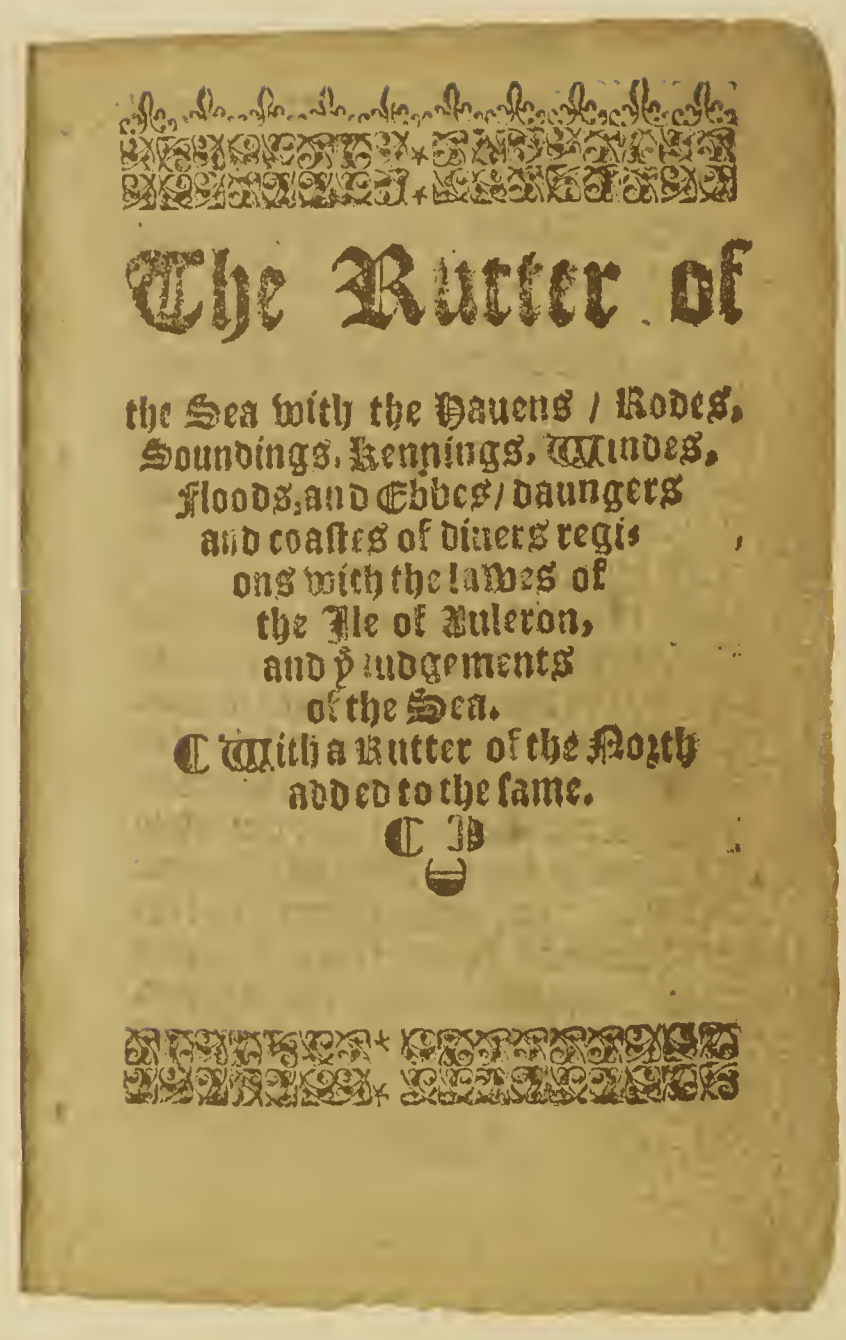

The Rutter of
the Sea with the Hauens / Rodes,
Soundings, Kennings, Windes,
Floods, and Ebbes / daungers
and coastes of diuers regi-
ons with the lawes of
the Ile of Ruleron,
and ỹ iudgements
of the Sea.
¶ With a Rutter of the Nozth
added to the same.
¶ Þ

Fig. 4.4 Pierre Garcie, called Ferrande, ***The rutter of the sea: with the hauens, rodes, soundings, kennings, windes, floods and ebbes....*** London, ca. 1567.

The first printed book of sailing directions for the French and English coasts was Garcie's *Le routier de la mer*, originally published at Rouen, ca. 1502–1510. The volume displayed here is Robert Copland's translation into English of Garcie's work, which first appeared in 1528.

of his own insights while drawing on all the key continental writers on navigation. Among his suggestions, he hinted that a new way of drawing charts was in progress, and he presaged the use of tide tables, an idea not fully realized until the nineteenth century.

John Davis (1550?–1605)
The seamans secrets . . . wherein is taught the three kindes of sayling. London, 1633.

John Davis was one of the most experienced seamen in Elizabethan England. Associated with such well-known figures as Sir Humphrey Gilbert and Sir Walter Ralegh, Davis served as captain and chief pilot on voyages to find the Northwest Passage in 1585–1586, exploring the coasts of Greenland, Baffin Island, Cumberland Sound, and Davis Strait, which bears his name. In 1591, he joined Thomas Cavendish's enterprise in the hope of finding the Pacific end of the Northwest Passage, but he failed to get past the Strait of Magellan. Informed by his extensive practical experience on these voyages, Davis's book first appeared in 1595; the copy shown here is from the fifth of eight known editions. (FIG. 4.5)

Antonio de Maris Carneiro
Roteiro da India Oriental. Lisbon, 1666.

Portuguese navigators were the first to find a sea route to India by circumnavigating the southern tip of Africa at the end of the fifteenth century. For the next hundred years the Portuguese monopolized trade with India by sea. The passage between Lisbon and Goa, known as the "*Carreira da Índia,*" typically required a passage of five to seven months. Carneiro's *Roteiro da India Oriental* is a revised version of an earlier work by him first published in Lisbon in 1642, *Regimento de pilots e roteiro das navegações da India Oriental.* His writing reflected many years of Portuguese navigational experience. By the seventeenth century, however, competition from the Dutch and the English greatly weakened Portuguese commerce with Asia. The number of vessels arriving in Lisbon from the East Indies fell from an average of 3.2 a year during the first decade of the seventeenth century to 1.8 a year in the 1630s.

Georges Fournier (1595–1652)
Hydrographie contenant la théorie et la pratique de toutes les parties de la navigation. Paris, 1667.

Père Fournier was among a group of Jesuits in the seventeenth century who were interested in the problems of navigation and dedicated to the education of naval officers. At the Jesuit house in Dieppe, Fournier had become a naval chaplain and first served at sea under Cardinal Sourdis from 1633 to 1641. In 1640 he became professor of mathematics at Hesdin. This

book, which is dedicated to Louis XIII, is recognized as the first attempt to create an encyclopedia of contemporary maritime practice. In it, Fournier summarized information on matters ranging from naval architecture to ports. He treated the principles of navigation, tides, charts, winds, naval organization and operations, and prayers for seamen. After publishing the first edition in 1643, Fournier revised and expanded the work for a second edition, which eventually appeared posthumously in two printings in 1667 and 1669.

Fournier's book was widely used by mariners—sometimes in unexpected ways. The privateer Nicolas Gargot reported in a 1668 pamphlet that seventeen years earlier, when the crew of his privateer *Léopard* mutinied and attacked him at sea, he skillfully used a copy of Fournier's folio as a shield to protect himself.

On loan from the Colonel George Earl Church Collection, The John Hay Library, Brown University.

Benjamin Hubbard (1608–1660)
***Orthodoxal navigation.* London, 1656.**

This book is the earliest published contribution to navigation by someone who had been a resident of England's American colonies. Describing himself as a "late student of the Mathematiks in Charls Towne in New-England," Hubbard wrote this book to advance the method of using a Mercator chart for great circle sailing. While he did not claim to be original in this, it was an important practical matter for seamen that had been omitted in the usual textbooks of the time. Little is known about Hubbard, who is believed to have arrived in Massachusetts in 1633 and lived for a time in Charlestown, where he owned property. He apparently returned to England by 1644, serving as a non-conformist minister there.

John Seller (fl. 1658–1698)
***Practical navigation; or an Introduction to that whole art.* London, 1680.**

John Seller became one of the most prominent teachers and writers on practical navigation in late seventeenth-century England. Originally apprenticed in the Merchant Taylor's Company, he was freed in 1654 and eventually, as an instrument maker, became a brother in the Clock-Maker's Company in 1667. In 1671, Charles II appointed him hydrographer to the king, and in 1686 the Navy Board appointed him to supply ships' compasses. In addition, he taught mathematics at Christ's Hospital, London. From his house and shop at the Hermitage Stairs, Wapping, London, Seller pursued an active business selling both new and used navigational instruments, maps, and globes. His *Practical Navigation* first appeared in 1669; the copy shown here is from the fourth edition. (FIG. 4.6) (See page 50, above).

Nathaniel Colson
***The mariner's new kalendar.* London, 1711.**

First published in 1676, Colson's *Mariner's New Kalendar* remained a standard reference for working seaman until the end of the eighteenth century. Following many reprintings and revisions, the last edition appeared in 1785. The John Carter Brown Library owns editions from 1750, 1758, 1760, 1761, and 1762, in addition to this from 1711. Typically, the hard use given these books has taken its toll, leaving few surviving copies and these often in poor condition.

From a list opposite the title page, one can see the range of books produced by the famous maritime publishing firm of Mount and Page. Richard Mount purchased the established printing shop owned by William Fisher on Tower Hill, the north side of the Tower of London, in 1676. He had formerly been an apprentice at the shop. Marrying Fisher's daughter, he continued his father-in-law's work, which included publication of such key maritime authors as Colson, Norwood, and Mainwaring, among others. The firm had a long lifetime, and was successively known as Richard Mount, Mount & Page, Page and Mount, and Mount & Davidson, before becoming Smith & Ebbs in the nineteenth century.

Richard Norwood (1590?–1675)
***The seaman's practice*. London, 1712.**

Richard Norwood's book was another of the standard references consulted by working seamen. First published in 1637, it was regularly reprinted until 1732 and was still advertised for sale as late as 1776. An interesting feature of this work is the author's discussion of the length of the nautical mile. In the years 1633 to 1635, Norwood had calculated the length of a degree along the meridian between London and York at 6,120 feet. The accepted value today is 6,080 feet.

"Captain's journal of the ship Arentsbergh, Goddert Cappell and Job Meijnertzhaegen, owners, from Amsterdam to the West Indies, 21 April 1714 to 23 March 1715." [Manuscript].

This journal of the Dutch ship *Arentsbergh* records the events and daily activities of a multinational crew during a six-month period of trading for cacao and tobacco with Spanish settlements in the Caribbean. It was not the first time the ship had plied this trade, since she is also known to have carried cacao from Curaçao to Amsterdam in 1703, 1709, 1710, and 1713. Nevertheless when faced with the difficulty of navigating in uncharted waters, the Dutch captain hired a Jamaican to pilot his vessel in the area off the coast of Panama.

THE

AMERICAN COAST PILOT;

CONTAINING;

The Courſes and Diſtance from *Boſton* to all the principal Harbours, Capes and Headlands included between *Paſſamaquady* and the Capes of *Virginia*——WITH

DIRECTIONS

For Sailing into, and out of, all the principal Ports and Harbours, with the Sounding on the Coaſt——ALSO,

A TIDE TABLE,

Shewing the time of High Water at Full and Change of the Moon, in all the above places——TOGETHER.

With the Courſes and Diſtance from *Cape-Cod* and *Cape-Ann*, to the ſhoal of *Georges*, and from ſaid *Capes* out in the South and Eaſt Channel, and the ſetting of the current to the Eaſtward and Weſtward——

——ALSO——

The Latitude and Longitude of the principal Harbours, Capes and Headlands, *&c. &c. &c.*

BY CAPT. LAWRENCE FURLONG.

ALSO—Courſes, Directions, Diſtances, *&c. &c.* from the *Capes* of *Virginia*, to the *River Miſſiſippi*, from the lateſt Surveys and Obſervations.

(Approved by experienced Pilots and Coaſters.)

THE FIRST EDITION.

PRINTED AT NEWBURYPORT, BY

BLUNT AND MARCH,

Sold by them and the principal Bookſellers in the *United States*——1796.

Fig. 4.7 *The American coast pilot*. Newburyport, 1796.

This is the first book of sailing directions to be compiled and printed in the United States. Published regularly in successive editions beginning in 1796, publication was taken over by the U. S. Government in 1867. The John Carter Brown Library has a complete run of the early editions.

Thomas Haselden (d. 1740)
***Seamen's daily assistant.* London, 1761.**

Thomas Haselden was the first headmaster of the Royal Navy's Academy at Portsmouth. A graduate of Christ Hospital's Mathematical School, he served afloat as a naval schoolmaster, then opened a school at Union Stairs, Wapping, close to another school run by Joshua Kelly, before becoming head of the Naval Academy in 1733. He died in that position, shortly after being elected a Fellow of the Royal Society in 1739.

Haselden's book was first advertised for sale in 1745, five years after his death, and in Philadelphia as early as 1753, but no copies printed before 1757 have been located. The book was reprinted regularly until 1803 and was widely used. The JCB copy carries several manuscript notes recording its sale from one seaman to another, suggesting the multiple readers such a book typically had and the reason why few copies have survived. Daniel Burnard bought it while in Philadelphia on the 5th and 6th of June 1762. Seth Worth apparently bought it in 1766. Another seaman recorded "Henry Satterly, The Seaman's Daily Assistant, bought of Seth Worth in the year of our Lord one thousand seven hundred and seventy four in Davis Straights between Disko and Cape Farewell Between ye Longitude of 40 and 50." Apparently having learned much, Satterly recorded two years later, "But wrote on board ye Brig Ellet August ye 22cond 1776 in Lattitude of 41 41 by observation."

***Gründliche Anweisung zur praktischen Seefahrt-Kunde nach mathematischen Grundsätzen und den besten englischen und holländischen Schriftstellern aufgesetzt.* Stettin, 1783.**

This rare and anonymous German example of a practical guide to basic navigation covers such matters as calculating the ebb and flow of the tide, celestial navigation, piloting, use of sea charts, use of the log line, and calculating metacentric height for loading cargos. As the title suggests, it is based on the work of the "best English and Dutch writers."

***The American coast pilot.* Newburyport, 1796.**

In 1796, Captain Lawrence Furlong published the first edition of *The American Coast Pilot* at Edward March Blunt's printing shop in Newburyport, Massachusetts. This is the first edition of the first book of sailing directions to be compiled and printed in the United States. From the fourth edition in 1804 to the seventeenth edition of 1854, a variety of small-scale charts were also included in the *Coast Pilot*, some of which reflected the work of the U.S. Coast Survey. In 1867, the government took over publication of the book and, today, the National Imagery and Mapping Agency (NIMA) maintains current editions of Furlong's book as *The United States Coast Pilot* in traditional book format and electronically on the World Wide Web. The John Carter Brown Library owns a virtually complete collection of the *American Coast Pilot*, from the first edition to the last. The books were collected by the late Augustus P. Loring and donated to the Library in 1985. (FIG. 4.7)

John Hamilton Moore (d. 1807)
***The new practical navigator.* Newburyport, 1799.**

The tables in Moore's *New Practical Navigator* were a standard source by which late eighteenth-century English and American shipmasters calculated their positions at sea. While on a voyage to the Indian Ocean on board the Salem, Massachusetts, ship *Astrea*, owned by Elias Haskett Derby, the young clerk Nathaniel Bowditch (1773–1838) checked and corrected the tables. On his return to North America, Bowditch and his brother William found thousands of additional errors and in 1799 published this corrected edition of Moore's work. A second edition, with further corrections, appeared the following year. Returning to sea, Nathaniel Bowditch prepared an entirely new book, *The New American Practical Navigator*, which was first published in 1802. As with Blunt's *Coast Pilot*, the government took over publication of the *American Practical Navigator* after the Civil War. The National Imagery and Mapping Agency (NIMA) published the seventy-ninth edition in 1995 on paper and electronically on the World Wide Web. The John Carter Brown Library has a complete collection of all editions through 1883, the gift of Dr. Francis Chafee.

John Jackson
"Book of navigation." [Manuscript]. Providence, 1762.

This personal "Book of Navigation" was kept by John Jackson of Providence and illustrates the navigational exercises that a young seaman did in the mid-eighteenth century. Most of the navigation problems posed in this elaborately inscribed manuscript, and the answers, show a direct connection to the exercises laid out in published books, such as Colson's *The Mariner's New Kalendar* and Haselden's *Seamen's Daily Assistant*, both included in this catalogue. (FIG. 4.8)

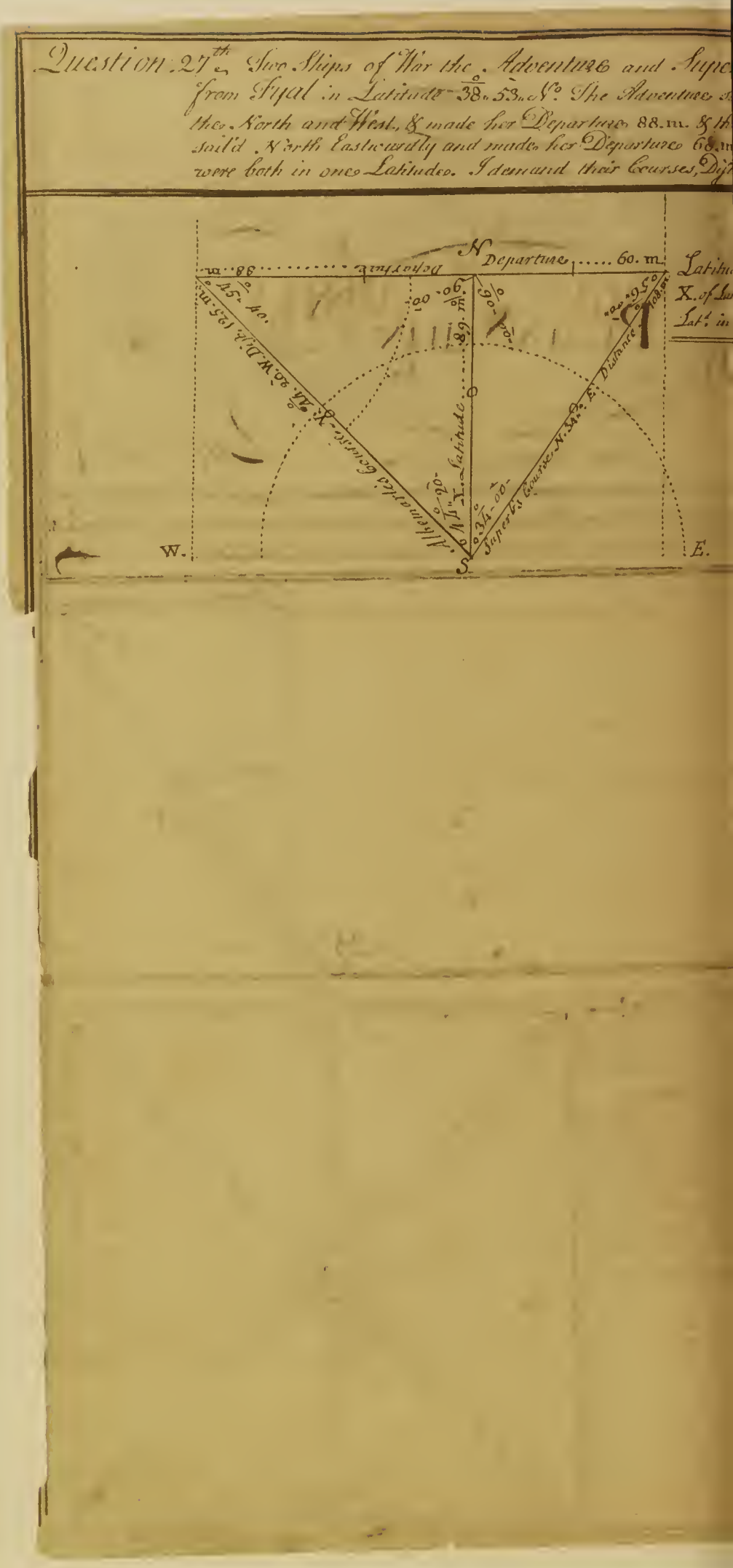


Fig. 4.8 John Jackson, "Book of Navigation." [Manuscript]. Providence, 1762.

Most of the navigation problems and the answers posed in this manuscript notebook, kept by a seaman in Rhode Island, show a familiarity with the exercises laid out in published books, such as Colson's *Mariner's New Kalendar* and Haselden's *Seamen's Daily Assistant.*

(21)

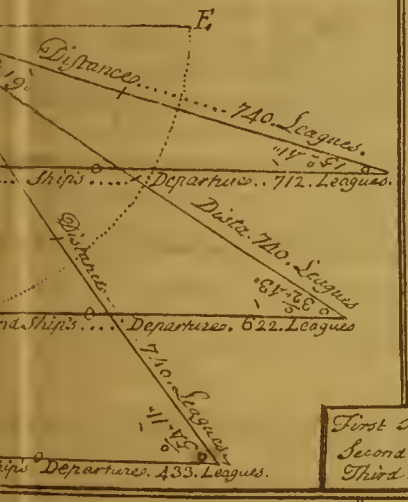
Plain Sailing

Stephanus Jackson scripsit

Question.....

5 thus

Suppose that 3 Ships are all bound to one Port: One Ship is
in Lat.d 20°. N.o the Second in Lat.d 50°. N.o & the 3.d Ship in Lat.d 40°. & 4°. the Port.
& they all sailed one Distance viz.t 740. Leagues. Idem.d their sev.l Courses & Departures



As the Distance.....740. Is to Radius...90°-00'-
So is the 1.st Ship's X. Lat.d 600. L.gs To Sc. of Course. 54°-11'-
Which Subtracted from 90°. Leaves 1.st of Course. 35°-49'

As the Distance.....740. Is to Radius.....90°-00'-
So is the 2.d or Middlemost Ship's X. Lat.d 400. To Sc. Cor. 32°-13'
Which Subtracted from 90°. Leaves 2.d Ships Cor. 57°-47'

As the Distances.....740. Is to Radius. 90°-00'
So is the 3.d Ship's X. of Lat.d 200. To the Sc. of Course 15°-41'
Which Subtracted from 90°. Leaves 3.d Ships Cor. 74°-19'

As Radius.....90°. Is to the Distance. 740. L.gs
So is Sine of the Course 35°-49'. To 1.st Ships Dep.t 433. L.gs

As Radius.....90°... Is to the Distance. 740. L.gs
So is S. of 2.d Ship's Cor.e 57°-47'. To the 2.d Ships Dep.t 622. L.gs

As Radius.....90°-00'... Is to the Distance 740. L.gs
So is S. of 3.d Ship's.....74°-19'. To 3.d Ships Dep.t 712. L.gs

First Ship's Course is. SEbS... & 1.a 34. E.
Second Ship's Course is. SEE.. & 1.a 02. E.
Third Ship's Course is. ESE.... & 1.a 12. E.

Suppose A & C both in Lat.d 55°. N.o A Ship at the
is desirous to sail directly N.o & E. to another Port
ing her Course 90°. or 8 Points, sails as
en the S.o & E. & arrives at the other
or Easting from Port B to Port C. is 48. ra
from A to B, & the Lat.d Port B is in, &
Distance sailed from Port B to Port C.

Two Ships A & B. Sail from two Ports A & B. in the Latitude of 30°. North.
A Ship sails from A. between the N.o & E.t a certain
Distance, & then arrives at another Port D. in Lat.d 30°. 18'. N.
& then altering her Course 90°. sails
between the S.o & the E.t a certain
Distance to another Port C. I demand her Course
Distance & Departure from Port A to Port D. & her
Course. Distance & Departure from Port D. to Port C.

Course from A to D. N. 53°. 7'. E. Dist.e 30. m. Depart. 24. m
Course from D to C. 36°. 53'. E. Dist.e 22°. 2'. Departure 13 m.

TOOLS OF NAVIGATION

As the science of navigation was put to practical use, instruments were invented or adapted to go along with it. The oldest instrument for gathering information at sea was the lead line, with which seamen were able to determine the depth of water and which also could be used to bring up samples from the sea floor as an additional aid to determining location. Next came the magnetic compass, which became the fundamental tool in deepwater navigation along with the nautical chart. Over centuries of practice, Mediterranean sailors became skilled navigators by use of the compass alone. As shown on the *Carta Pisana* made about 1275, the basics for dead reckoning —charts, compass directions, and a scale of distance— were clearly in use at the outset of the period when sailors from Amalfi, Genoa, Pisa, and Venice were moving outward in the western Mediterranean and beyond to the eastern Atlantic islands.

Through the eighteenth century and after, dead reckoning continued as a means of finding one's way, but as practices in navigation slowly became more sophisticated, the chart, lead line, and compass were joined by the parallel rule; the protractor; the mechanical compass used to measure a distance on sea charts; the ship's log and line to estimate speed; and a variety of instruments, from astrolabe and cross-staff to octant and sextant, required to measure the angles between the horizon and celestial bodies.

Peter Apian (1495–1552)
***Instrument Buch.* Ingolstadt, 1533.**

Most famous for his *Cosmography* (1524), Peter Apian was also a pioneer in astronomical and geographical instrumentation. In this work that is profusely illustrated with woodcuts, he examined the range of instruments available to astronomers and navigators, including quadrants and dials. His investigation starts with a discussion of the ways that the human body can be used as a measuring device, with an illustration of a hand. More importantly, this book also contains Apian's calculation of sines for every minute of arc, with the radius decimally divided. These were the first such tables ever published. (FIG. 4.9)

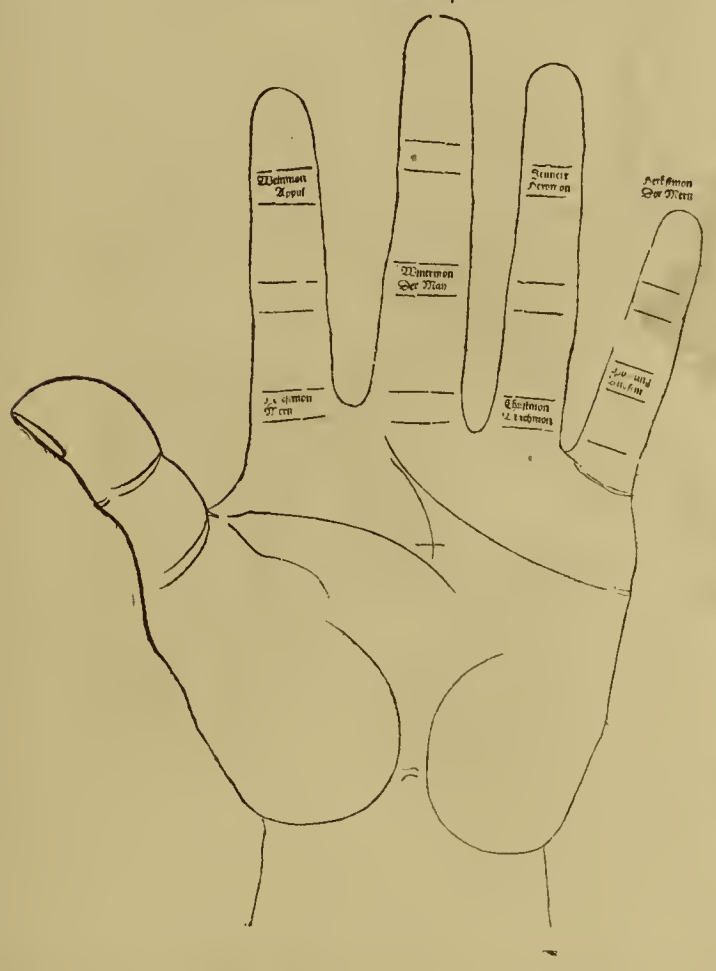
Lucas Janszoon Waghenaer (1533 or 4–1606)
***Mariners mirrour.* London, 1588.**

This English translation of Lucas Jansz. Waghenaer's *Spieghel der Zeevaerdt* is often considered one of the most beautiful books of the sixteenth century. The title page illustrates the variety of instruments and tools of navigation available to a seaman, including the lead line, the cross-staff, and dividers. First published in Leiden in 1584, some twenty-four different editions were eventually printed in Dutch, French, German, Latin, and English. The original Dutch edition brought together for the first time a treatise on navigation, a description of instruments, and a collection of detailed sailing directions keyed to a set of accompanying charts. So influential was this book that the name of the Dutch compiler became widely used in English, from the late sixteenth to the late eighteenth century, as a generic term for such manuals: "waggoners."

The Lord High Admiral, Lord Charles Howard of Effingham, encouraged this translation into English, which appeared in print in October 1588, just after English forces defeated the Spanish Armada. Theodore de Bry, then located in England, engraved its title page. Only two years before, he had been working in Frankfurt, where he began to publish his famous illustrated series of voyage narratives. Since January 1911, an adaptation of this title page has served as the front cover of a leading British academic journal, *The Mariner's Mirror: The Journal of the Society for Nautical Research*. (FIG. 4.10)

Das Siebend Tayl diſes Buchs

Von der Nacht vhr/ das ein natürlich Inſtrument iſt/ Dann alhie gelernt wirdt/ wie man zu nacht/on alle Inſtrument/ allein durch die finger der hände die Stund erkennnen ſoll.



Das Erſt Capitel/ wie man den Stern erkhennen ſoll/ dardurch diſe nachtuhr der finger gebraucht wirdt.

ICh byn noch ingedenck/ das ich dich im vij. Capittel des Andern Tayls habe erkennen lernen den Stern/ den man nent den Polus. Desgleichen auch die ſyben Stern des Herwagens. Derhalben wil ich der selbigen leer vnd erkäntnus geſchweygen/ ſonder wil dich allein den aingen ſtern erkennen lernen/ den du zuſambt dem Polo/ zu diſer Handtuhr brauchen muſt. Darumb/ vnnd dieweyl du die gelegenhayt der geſtirn daſelbſt haſt erkennen lernen/ habe ich dir die figur in aller maſſen (wie vor) hieher geſetzt. Vnnd habe die Stern (die dir am nötigiſten zu erkennen nützlich ſint) mit diſen büchſtaben A/C/D/E/F/G/H/I/ genendt. Vnd vnder diſen Sternen iſt dir khainer nützlich dann der Polus der mit dem A/ vnd ainer der mit dem C bezaichent iſt. Der das C genendt wirt/ iſt ainer auß den zwayen fördern rädern des Herwagens. Iſt vnder den selbigen der gröſt: dann der bey dem F ſtehet iſt etwas klainer dann die andern ſechß diſes wagens: allein wil ich allhie außgenomen haben/ das klain ſternlein/ das da ſtehet bey dem mittlern Roß/ das iſt bey dem büchſtaben H. Dieweil daſſelbig klain Sternlein nit wol oder gar ſelten geſehen wirt/ wirdt das von den Aſtronomus nit in die zal der ſtern des Herwagens geſchriben/ wirt aber von den Paiwen vnd gemainem volck das Reütterlein genendt. Etliche nennens auch knecht finck. Vnd ich kan wol gedencken vnd abnemen/ das es von dem Arabiſchen volck herkombt: die weyl Azophi ein Arabs/ bald im anfang ſeines Büchs/ darinne er die geſtirn beſchreybt/ meldung thůt/ von diſem klainen ſternlein/ vnnd ſpricht/ das die Arabiſchen kindt zu nacht/ ſo ſie zuſammen khoſſen/ ains zu dem andern ſpricht vnd ſich ſeines ſcharpffen geſichts berümet/ Ich hab das Reütterlein geſehen. Antwort der ander vnd ſpricht/ Du haſt aber nit den Vollen mon geſehen. Als wolt der erſt ſagen Ich hab ein ſcharpff geſicht/ die weil ich das klain ſternlein (das das Reüterlein genendt wirt) ſehen kan. Der ander aber maint/ ob du ſchon das Reüterlein geſehen haſt/ iſt aber dein geſicht nit ſo ſcharpff/ das dů das Reüterlein vnd den Volmon miteinander ſiechſt. Als wolt er ſagen/ Der Volmon tempfft mit ſeinem hellen vnd liechten ſchein das klain Sternlein/ das man es nit wol/ oder aber/ gar nit ſehen mag: das nennen ſie mit Arabiſcher zungen Alcor.

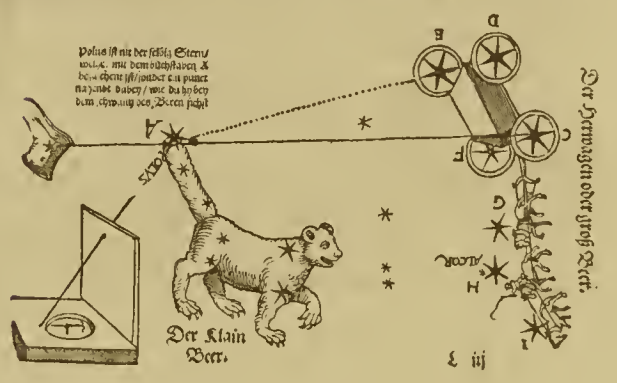


Fig. 4.9 **Peter Apian**, ***Instrument Buch.*** Ingolstadt, 1533.

This study of scientific instruments begins with the usefulness of the human hand as a basic measuring device.

Fig. 4.10 Lucas Janszoon Waghenaer, *Mariners mirrour*. London, 1588.

The English translation of *Spieghel der zeevaerdt* is regarded as one of the most beautiful books of the sixteenth century. The title page illustrates the variety of instruments and tools of navigation available to a seaman, including the lead-line, the cross-staff, and dividers.

Thomas Blundeville (fl. 1561)
A briefe description of universal mappes and cardes, and of their use: and also of Ptolemy his tables. **London, 1589.**

Thomas Blundeville was a country gentleman from Newton Flotman, Norfolk, who became fascinated with astronomy, navigation, and mathematics. In this his first work, he described an instrument that seems to have been his own original invention: the nautical protractor. Reporting its usefulness, Blundeville wrote, "I would use none other instrument of direction then halfe a Circle divided with lines like a Mariner's Flie. Truly I do thinke the use of this flie a more easie and speedy way of direction, than the manifold tracing of the Maps or Mariners' Cards, with such a number of crosse lines, as commonly are drawn therein."

John Good (fl. 1706–1733)
The art of shadows: or, universal dialling. **London, 1721.**

Until the invention of reliable mechanical watches in the late eighteenth century, sundials were regularly used to determine time. Popular among scientists as well as wealthy estate owners, fine examples may still be seen in the quadrangles at Oxford and Cambridge colleges and at country houses in England. Instrument makers repeatedly tried to make sundials that were practical for use at sea. Despite their efforts, the various designs all failed because the dial must be aligned accurately on a north-south axis, adjusted for latitude, and kept steady when it is being read.

Nathaniel Colson
Mariner's new calender. **London, 1762.**

This widely used manual contains illustrations of various instruments including a cross-staff, originally called the "Baculus Jacob" or "Jacob's staff," which was in regular use from the beginning of the sixteenth century to the end of the eighteenth century. It was the basic instrument by which sailors of all countries determined their latitude by measuring the altitude of the sun above the horizon, of the sun at noon, or of the North Star at night. Despite improvements in instruments during the eighteenth century, the simplicity and low cost of the cross-staff encouraged its continued use.

John Collins (1625–1683)
The description and use of a general quadrant. **London, 1658.**

One of the key disadvantages of the cross-staff was that it required the observer to look directly at the sun while taking measurements. In the fifteenth century, a Portuguese Jew, Levi Ben Gerson, invented a prototype back-staff, but it was not adopted for general use. In England at the end of the sixteenth century, a number of experts began to work on the problem of developing an improved instrument. They included Edward Wright of Cambridge and Thomas Hariot from Oxford. However, it was John Davis who hit upon the most successful solution to the problem about 1594, with an instrument for measuring the sun's altitude by the angle of the shadow that it cast. Known alternatively as the "Back Staff," "Davis's Staff," or the "English Quadrant," it quickly came into widespread use and remained popular, particularly with American seamen, through the end of the eighteenth century.

Manuel Pimentel (1650–1719)
Arte de navegar, emque se ensinam as regras practices. **Lisbon, 1712.**

Pimentel's textbook is often considered the culmination of the classic books in Portuguese on the practical use of nautical instruments and on navigation. Manuel Pimentel's father, Luis Serrão Pimentel (1613–1679), had been royal cosmographer in Portugal and, sometime before his death, had completed writing the text of a navigation manual, *Arte pratica de navegar e regimento de pilots*. His son Manuel, who also became royal cosmographer, edited this text and published it in 1681 under his father's name. Eighteen years later in 1699, Manuel Pimentel published another book, this time under his own name and with the new title, *Arte de navegar,* although he based the work on his father's 1681 book. A few years later, Manuel Pimentel revised the 1699 work and published a new version in 1712. Manuel died in 1719, but the work was reprinted in 1746 and in 1762. From this series of publications, the John Carter Brown Library lacks only a copy of the 1699 edition. (FIG. 4.11)

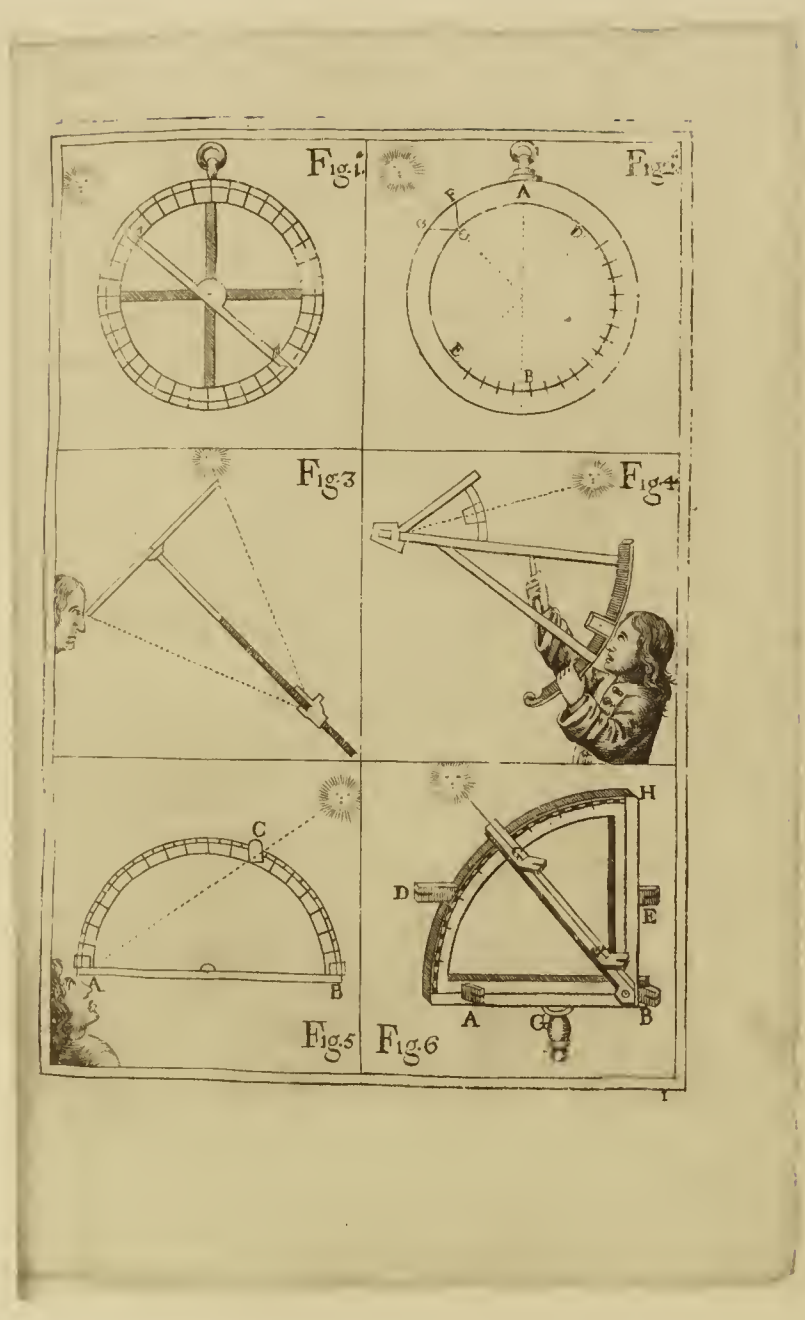


Fig. 4.11 **Manuel Pimentel,** ***Arte de navegar, emque se ensinam as regras practices.*** Lisbon, 1712.

The engraving illustrates a variety of the instruments used for celestial navigation in the seventeenth century.

The nature and use of Hadley's quadrant. London, 1790.

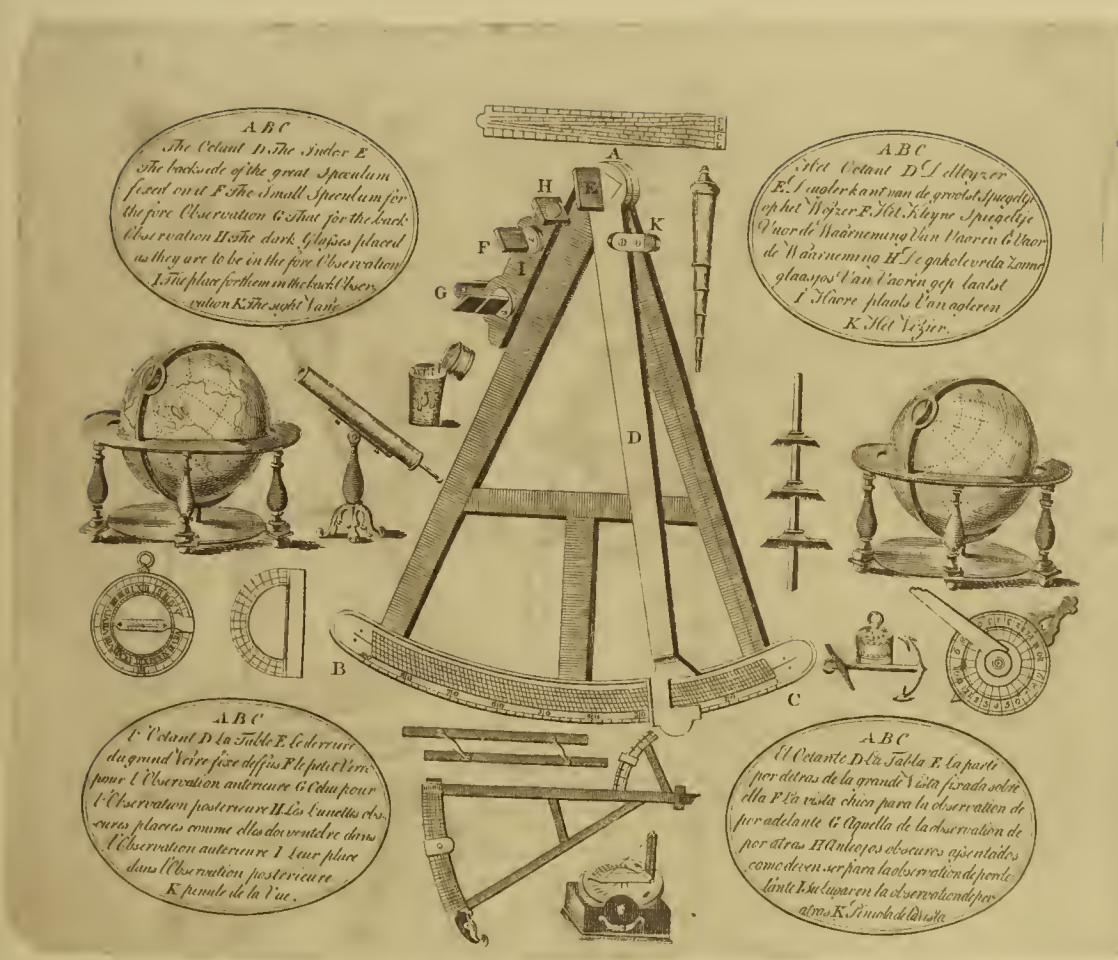
In 1731, John Hadley invented an instrument for measuring the altitude of the sun and stars above the horizon. It had a moveable index arm and two mirrors. Because of the reflecting mirrors, the frame needed only to extend to 45 degrees—or one eighth of a circle. Although popularly called a quadrant, Hadley's instrument was actually an octant as distinguished from a quadrant that had a frame that spanned a 90-degree angle. Initially the octant was seldom used but by the mid-eighteenth century it had become quite common on shipboard. This book was published anonymously in 1738 and reprinted in 1769, 1775, 1790, and 1800. A manuscript note in one known copy of the first printing suggests that the author was John Gilbert.

The most significant modification of the octant had already appeared when this 1790 volume was published. In 1747, the Admiralty had ordered Captain John Campbell of H.M.S. *Chatham* to test Hadley's quadrant for its usefulness in measuring lunar distances. A dozen years later in 1759, Campbell asked the London instrument-maker John Bird to modify one of Hadley's instruments by extending its arc from 45 degrees to 60 degrees, thus, turning his octant into the first sextant. With this extended arc, the attached mirrors allowed an observer to measure angles up to 120 degrees. (FIG. 4.12)

The nautical almanac and astronomical ephemeris, for the year 1768. London, 1767.

The Nautical Almanac was first published in 1766 for the years 1767 through 1769 by Britain's Astronomer Royal, Nevil Maskelyne. Its annual appearance from that time forward included tables that the German astronomer Tobias Mayer had originally compiled in 1752 for use in finding longitude through measuring the distance between the moon and certain fixed stars. With these tables, a navigator could more readily find longitude by measuring lunar distances, but since the distance between a fixed star and the moon was often more than 90 degrees the appearance of these tables gave an impetus to the use of the newly devised sextant.

Captain James Cook was among the first to use the tables for exploration when he determined the position of several places in New Zealand during his first voyage to the Pacific. The French counterpart of the British *Nautical Almanac*, *Connaissance de temps,* which had been published since 1690, included the British lunar distance tables in 1774 and thereafter. Similarly, the British example influenced the first Dutch almanac, Pybo Steenstra's *Zeemans almanach* of 1787 and its successor, *Almanach ten dienste der zeelieden* from 1788 onwards, as it did the 1786 Spanish *Almanak náutico y estado general de marina* and its successor, the *Almanque náutico y efemérides astronómicas* from 1791 onwards.



THE

NATURE and USE

OF

Hadley's QUADRANT,

WITH A

PREFACE,

CONTAINING

The THEORY on which that *Noble* and *Useful* INSTRUMENT is founded:

AND A

DESCRIPTION

OF THE

NONIUS.

LONDON:

PRINTED in the YEAR 1790.

Fig. 4.12 ***The nature and use of Hadley's quadrant***. London, 1790.

Depicted here are navigational instruments in use during the eighteenth century, following John Hadley's invention of a reflecting octant in 1731.

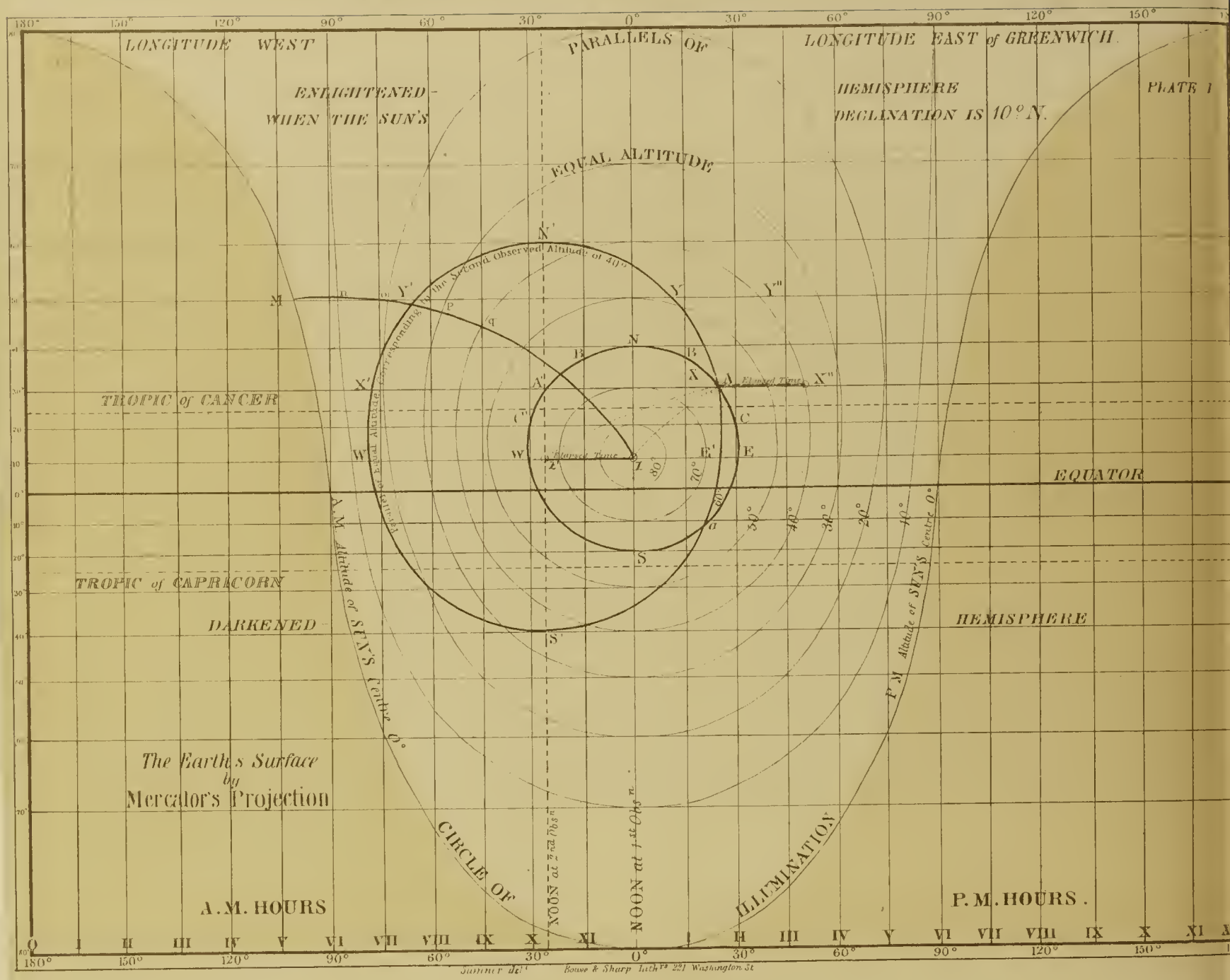


Fig. 4.13 Thomas H. Sumner, ***A new and accurate method of finding a ship's position at sea, by projection on Mercator's chart.*** Boston, 1843.

In 1837, an American sea captain, Thomas Sumner, made the first major contribution in several centuries to the practice of celestial navigation. The frontispiece map shown here explains his discovery of the innovative method of position-line navigation that he made known for the first time in this publication.

A

NEW AND ACCURATE METHOD

OF

FINDING A SHIP'S POSITION AT SEA,

BY PROJECTION ON MERCATOR'S CHART.

WHEN THE LATITUDE, LONGITUDE, AND APPARENT TIME AT THE SHIP ARE UNCERTAIN; ONE ALTITUDE OF THE SUN, WITH THE TRUE GREENWICH TIME, DETERMINES,

FIRST,

THE TRUE BEARING OF THE LAND;

SECONDLY,

THE ERRORS OF LONGITUDE BY CHRONOMETER,
CONSEQUENT TO ANY ERROR IN THE LATITUDE;

THIRDLY,

THE SUN'S TRUE AZIMUTH.

WHEN TWO ALTITUDES ARE OBSERVED, AND THE ELAPSED TIME NOTED, THE TRUE LATITUDE IS PROJECTED; AND IF THE TIMES BE NOTED BY CHRONOMETER, THE TRUE LONGITUDE IS ALSO PROJECTED AT THE SAME OPERATION.

The Principles of the Method being fully explained and illustrated by Problems, Examples, and Plates,

WITH RULES FOR PRACTICE, AND EXAMPLES FROM ACTUAL OBSERVATION

BY CAPT. THOMAS H. SUMNER.

BOSTON:
PUBLISHED BY THOMAS GROOM & CO., 82 STATE STREET.
1843.

Thomas H. Sumner
A new and accurate method of finding a ship's position at sea, by projection on Mercator's chart. Boston, 1843.

An American sea captain, Thomas Sumner, made the first major contribution in several centuries to the practice of celestial navigation. In December 1837, while sailing from Charleston, South Carolina, to Greenock, Scotland, he discovered the method of position-line navigation, by which he fixed a ship's position at sea by taking cross-bearings on two or more celestial bodies. Sumner made known his discovery for the first time in this pamphlet. In 1875, a French naval officer, Marq St. Hilaire, introduced an improvement to Sumner's method. (FIG. 4.13)

SEAMANSHIP

The true sign of an accomplished sailor is skill at seamanship. Seamanship demands extensive knowledge of how a ship at sea will react to changing natural conditions. It is the art of handling a ship or boat whatever the challenges of wind, weather, and tide. Competence in steering, in handling sails and lines, in the use of anchors, capstans, and other equipment is part of seamanship as is whatever else may be necessary to move, moor, and load a vessel.

Nathaniel Boetler (fl. 1640)
***Six dialogues*. London, 1685.**

Six Dialogues by Nathaniel Butler was titled in its original manuscript form, "A dialogical discourse concerning maritime affairs between the high admiral and a captain at sea." Presented as a series of questions and answers, the book treats many aspects of the seamanship of the time.

A prominent member of the Virginia Company that sponsored the Jamestown colony and a member of the Council for Virginia, Butler served a three-year term as Governor of Bermuda from 1619 to 1622 and wrote a history of the island. From 1638 to 1640, he was "governor and admiral" of the beleaguered Puritan settlement on Providence Island off the coast of Nicaragua, where he supervised privateering operations. Butler began writing this volume in 1634 and revised it while at Providence Island, incorporating information from Mainwaring's *Sea Dictionary* with his own original observations. He probably wrote the book mostly for his own amusement, but he may also have intended to give it to his friend Lord Treasurer Weston, who headed the Admiralty Board in 1634. It was first printed in 1685 and reprinted in 1688. In the process, the printer, Moses Pitt, used a medieval form of Butler's surname, which the author himself never used.

Henry Bond
***The boate swaines art*. London, 1781.**

Henry Bond was a well-known teacher of navigation, but like many others skilled in navigation, he also taught the associated skills of seamanship, as he did in this book. From about 1633, Bond held the title "Reader of Navigation to the Mariners in Chatham Dockyard," a position that was established before 1631 and lapsed during the English Civil War. From the time it first appeared in 1642, his book became one of the standard texts, and it was regularly reprinted under the same title until 1787. From 1726 onwards, it was usually issued with Andrew Wakely's *Mariner's Compass Rectified*, a book that dated from about the 1660s.

Fig. 4.14 **William Hutchinson, *Treatise on practical seamanship*.** Liverpool, 1777.

Illustrated here is a technique needed in practical seamanship, turning a ship to windward in a narrow channel.

William Hutchinson (1715–1801)
***Treatise on practical seamanship*. Liverpool, 1777.**

William Hutchinson deplored the quality of seamanship and navigation he witnessed and complained in this volume that mariners typically learned these skills through the "slow progress of experience" and through "their own and other people's misfortunes." Recognized as "a work of great merit, written by a real seaman," this late eighteenth-century work was widely used and appeared in an enlarged, second edition in 1787. An expanded fourth edition was published in 1794 as part of Hutchinson's *A Treatise on Naval Architecture*.

Hutchinson's *Treatise* on seamanship was not superseded in quality until Darcy Lever (1759–1839) published his highly illustrated manual, *The Young Sea Officer's Sheet Anchor, or a Key to the Leading of Rigging and to Practical Seamanship* (1808) and, at the end of the period, William N. Brady (d. 1887), *The Naval Apprentice's Kedge Anchor* (1841). (FIG. 4.14)

GUNS AND GUNNERY

The placement of guns on maneuverable and multi-purpose sailing ships, and their increasingly effective use, was one of the major advances in European technology during the period 1450 to 1840. The introduction of guns required sophisticated understanding of metallurgy, ballistics, and explosives. Gunners first appeared as specialists on English warships in the 1470s and became common within twenty years. The earliest guns fired stone shot and were built from wrought iron staves formed into a tube and fastened with iron rings.

Gradually more guns were cast in bronze. With the transition to bronze, guns became heavier and more expensive. An extreme example of this was the "cannon-royal," which weighed 8,000 pounds and fired a 66-pound shot. Such large guns were initially used ashore for siege operations and were gradually transferred to sea use, but were more often used for attacking shore positions rather than other ships. During the sixteenth century iron shot gradually replaced stone shot, while at the same time guns cast of iron replaced the wrought iron and expensive bronze guns. Simultaneously, the methods of mounting guns on board ship changed typically to a low wooden carriage on wheels.

The introduction of cast iron guns in the 1540s revolutionized gunnery at sea by making them cheaper and more readily available on board merchant ships. While some navies continued to prefer bronze guns because of their comparative safety, the proliferation of iron weapons at sea required greater circulation of information and specific training in their use. Along with improvement in the quality of gunpowder, gun barrels could be made shorter and larger shot fired. In the late sixteenth century, the sides of ships were opened with gun ports, increasing the number of large guns that could be used in an engagement. By the 1650s, iron guns had become the dominant weapons in battles between naval fleets. From this time until the industrial revolution, guns used at sea changed little and were generally classified by the weight of the shot fired. The only major innovation in the later period appeared in about 1779 with the advent of the carronade, a relatively light gun that used a small charge to fire a large projectile a short distance.

William Mountaine (d. 1779)
The practical sea-gunner's companion; or an introduction to the art of gunnery. London, 1747.

Many merchant ships were armed in wartime for their self-protection, some only minimally, while others, depending on their destinations, might be heavily armed. Some merchant ships might carry a letter of marque authorizing a more aggressive defense, even if they did not fully take up privateering as an occupation. William Mountaine was an instructor in mathematics. His manual for shipboard gunnery was an expansion of two earlier works, one by Captain Thomas Binney, *A Light to the Art of Gunnery* (1676) and the other by Captain Francis Povey, *The Sea Gunner's Companion* (1702), both of which expanded on the information from the early seventeenth century in Boetler's *Six Dialogues* (1685). By the beginning of the nineteenth century, Mountaine's work had been superseded by works such as Robert Simmons's, *Sea-gunner's Vademecum* (1812).

FLAGS

Flags play a role in seafaring that is often different from their use on land. In some languages, the difference is reflected in a specific word for sea flags as distinguished from other flags: *pavillons* in contrast to *drapeaux* in French, and *flaggen* in contrast to *fahnen* in German. In English, as in other languages, there are a variety of additional words used to describe maritime flags when they have particular uses or shapes, such as "ensign," "jack," "pennant," or "burgee." At sea and in a maritime context, flags served as identification, a means of communication, and even decoration. Throughout most of the sailing ship period, when seamen moved beyond shouting distance of one another, flags were the most practical and versatile means of communicating from one ship to another at sea or between ship and shore. The process of developing a language through the use of flags was slow and difficult, however. Eventually, single flags came to have specialized meanings that explained at a glance a vessel's national identity, function, and role. In attempting to communicate information or orders for action, an early method was found in the placement of particular flags at specific points in a ship's rigging. But it was not until the late eighteenth and early nineteenth centuries that a standard code was established.

Carel Allard (ca. 1648–1709)
Nieuwe Hollandse scheeps bouw. **Amsterdam, 1695.**

This is one of the earliest books on sea flags. It first appeared as an appendix to a volume on shipbuilding, as here, and was later published separately. Among its illustrations is the flag that William III flew from the mainmast of *Den Briel*, which carried him and a large force westward on a fair "Protestant Wind" from Holland to Torbay, England, to take the English throne in November 1688. Under the motto "For the Protestant Religion and the Liberties of England," the flag showed the arms of the Prince of Orange impaled with those of his English wife, Mary II. (FIG. 4.15) (See page 48, above).

Signaux de jour a l'aucre et sous voiles, pour la division commandée par Monsieur de Tronjoly, captaine de vaissseau. **Isle de France, 1779.**

The problem of finding an efficient and practical method of communicating information between ships at sea and between ship and shore was one of the most difficult of the period. This pamphlet was printed on the island of Mauritius in the Indian Ocean, where Captain Tronjoly was based with a small squadron of French frigates. On 10 August 1778, Tronjoly, in the 64-gun *Brillant* with four other warships under his command, had succeeded in relieving Pondichéry, which had been besieged by the British since 5 July. Wounded in the action, Tronjoly temporarily returned to Mauritius, then put to sea again on 21 August, having prepared for a major action against the British. Inexplicably, he abandoned this plan and returned to port, leaving Pondichéry to capitulate in October 1778. Tronjoly remained in command of *Brillant* in 1779, but by the time the supplementary manuscript signals were added to this volume in 1780, Commandant Saint-Félix was probably in command of *Brillant,* remaining in her during Admiral Suffren's campaign in the Indian Ocean in 1781 and 1782.

Vincenzo Scotti
Tavola delle più esatte ed usitate Bandiere che si alberano.
Livorno, 1796.

This 1796 sheet illustrates 110 different flags flown at sea, showing the typical differentiations used by naval and merchant ships as well as royal standards, flags of office, and regional flags. Seven flags from the United States are included (FIG. 4.16)

Fig. 4.16 Vincenzo Scotti, ***Tavola delle più esatte ed usitate Bandiere che si alberano.*** Livorno, 1796.

Just as Napoleon was leading the Directory's army into central Italy, this flag chart was published at Livorno. It shows a wide variety of maritime flags from the period.

John Barry (1745–1803)
A set of signals presented to the Navy of the United States. **Norfolk, 1800.**

Captain John Barry's 1800 signal book was designed to improve on the first set of signals issued to the newly established United States Navy in 1797, which had been prepared by Captain Thomas Truxton. On Barry's order in June 1800, Captain James Barron had printed 150 copies of this signal book at Norfolk, Virginia, "furnishing three copies for each vessel in the Navy and a few in reserve." This copy contains some manuscript notes on blank p. xii, followed by four plates of flag and night signals inserted, the first of which has a manuscript note, "engraved by a silver smith in Norfolk and painted by my own hand. James Barron." (FIG. 4.17)

José Maria Dantas Pereira (1772–1836)
Systema de signaes para a communicação dos navios entre si, e com a terra. **Rio de Janeiro, 1817.**

In 1808, the Portuguese royal family relocated from Lisbon to Rio de Janeiro, fleeing the Napoleonic invasion of their country. Brazil thus suddenly became the center of the Portuguese empire. At the time this signal system appeared, Rio was rapidly growing as a port city and capital. This volume is a continuation of Pereira's 1816 *Escritos maritimos* and provides a system of signals to communicate between ships and shore for use in Brazil.

Confederate States of America. Navy Department.
Signals for the use of the Navy of the Confederate States. **Richmond, 1861.**

This small pamphlet demonstrates the way in which a sophisticated and detailed system of signals had developed by the mid-nineteenth century. In this case, the signals are for steering specific compass courses and ordering or responding to specific actions in particular situations. It also includes a four-digit number code that was keyed to a vocabulary of words.

Personal Life

Finding detailed and specific information on the personal lives of seamen is one of the most challenging tasks for modern scholars. Few ordinary seamen wrote down their impressions, and their contemporaries tended to dismiss the day-to-day routine of life at sea as uninteresting. In the past half-century, modern underwater archaeologists have contributed many new insights through the examination of artifacts that they have recovered from shipwreck sites. When such items of material culture are linked to the surviving contemporary documents, a better understanding may be gained of the nature and character of a seaman's personal life on board ship.

RELIGION

Life at sea inescapably confronts the overpowering elements of nature. The vastness of the ocean, along with both its remarkable beauty and its terrifying power, has always been part of the consciousness of sailors. The dangers of life at sea, and man's inherent powerlessness, made religious faith a prominent feature of the sailor's mentality. At the same time, while sailors are often acutely conscious of their dependence upon a supernatural or divine power, this characteristic contrasts starkly with the rough and tumble, often amoral, character of maritime society.

Hans Staden (16th cent.)
Warhaftige Historia. **Marburg, 1557.**

This woodcut shows two seamen on deck, one using a cross-staff and the other an astrolabe, while the caption asks the central question: "What use is the watchman to the city and the navigator to the safety of the mighty ship in its voyage at sea, if God does not protect them both." It appeared in this very popular book by Hans Staden, a German who had been shipwrecked on the coast of Brazil early in the sixteenth century, captured by Indians, and held for nine and a half months in captivity before being ransomed and returning home to write this narrative. The deeply religious element of life at sea is also reflected in Psalm 107: "They that go down to the sea in ships and occupy their business in great waters; these men see the works of the Lord and his wonders in the deep." (FIG. 4.18)

Fig. 4.17 John Barry, ***A set of signals presented to the Navy of the United States.*** Norfolk, 1800.

The U.S. Navy's second signal book was compiled by Captain John Barry, who had 150 copies printed for the Navy's use, with additional manuscript notes. Capt. James Barron colored the flags by hand.

Fig. 4.18 **Hans Staden,** ***Warhaftige Historia.*** Marburg, 1557.

This woodcut shows two seamen on deck, one using a cross-staff and the other an astrolabe, while the caption asks the central question: "What use is the watchman to the city and the navigator to the safety of the mighty ship in its voyage at sea, if God does not protect them both."

Church of England
The book of common prayer. London, 1662.

The Church of England's *Book of Common Prayer* first appeared in 1549 and has long been celebrated for the beauty of its prose. During the Commonwealth period, Parliament replaced it with *A Directory of Prayer* in 1641. Not entirely satisfied, Parliament then ordered a supplement to it published in 1645, *A Supply of Prayer for the Ships of This Kingdom,* which was the first set of English prayers designed specifically for use at sea. Following the Restoration, a similar set of supplemental devotions was included in the 1662 *Book of Common Prayer* and has been in use since that time. (FIG. 4.19)

A sermon, on the present situation of the affairs of America and Great-Britain. Written by a Black. Philadelphia, 1782.

Passing references in religious works and sermons provide a valuable barometer of the changing attitudes of clergymen and ministers to warfare. In this large group of materials, Anglican as well as nonconformist ministers are well represented and help to give a fascinating general insight into the religious climate of the Revolutionary War period and the prevalent attitudes in society toward war at sea. The author of the sermon cited here dedicated his tract to the citizens of South Carolina and signed it anonymously as "A Black Whig." Britain's military and naval forces could not prevent American independence, the author believed, and he referred to the success of the French fleet in the Battle of the Chesapeake Capes on 5 September 1781, when he wrote of "the navy of our ally met with here of late on the southern coast."

Jonas Hanway (1712–1786)
The seaman's faithful companion; being religious and moral advice to officers in the Royal Navy, masters in the merchants service; their apprentices, and to seamen in general. London, 1763.

Jonas Hanway was a successful eighteenth-century English philanthropist who is best known for having founded the Marine Society in 1756 to raise orphaned boys for the Royal Navy. The first imperial and secular British charity, it supplied more than 55,000 recruits for the Navy between 1756 and 1805. Among other achievements, Hanway played a leading role in establishing the Magdalen Hospital for Penitent Prostitutes and other institutions that combined the principles of Christian charity with secular public and social policy.

Forms of Prayer

The Collect.

PRevent us, O Lord, in all our doings, with thy most gracious favour, and further us with thy continual help; that in all our works begun, continued, and ended in thee, we may glorifie thy holy Name, and finally by thy mercy obtain everlasting life, through Jesus Christ our Lord. Amen.

Prayers to be used in Storms at Sea.

OMost powerful and glorious Lord God, at whose command the winds blow, and lift up the waves of the sea, and who stillest the rage thereof; We thy creatures, but miserable sinners, do in this our great distress cry unto thee for help: save, Lord, or else we perish. We confess, when we have been safe, and seen all things quiet about us, we have forgot thee our God, and refused to hearken to the still voice of thy Word, and to obey thy commandments: But now we see how terrible thou art in all thy works of wonder, the great God to be feared above all: And therefore we adore thy divine Majesty, acknowledging thy power, and implying thy goodness. Help, Lord, and save us for thy mercies sake in Jesus Christ thy Son, our Lord. Amen.

Or this.

OMost glorious and gracious Lord God, who dwellest in heaven, but beholdest all things below; Look down, we beseech thee, and hear us, calling out of the depth of misery, and out of the jaws of this death, which is ready now to swallow us up: Save Lord, or else we perish. The living, the living shall praise thee. O send thy word of command to rebuke the raging winds, and the roaring sea, that we being delivered from this distress may live to serve thee, and to glorifie thy Name all the dates of our life. Hear, Lord, and save us, for the infinite merits of our blessed Saviour thy Son, our Lord Jesus Christ. Amen.

The

to be used at Sea.

The Prayer to be said before a Fight at Sea against any Enemy.

OMost powerful and glorious Lord God, the Lord of hosts, that rulest and commandest all things; Thou sittest in the throne judging right, and therefore we make our address to thy divine Majesty in this our necessity, that thou wouldst take the cause into thine own hand, and judge between us, and our enemies. Stir up thy strength, O Lord, and come and help us, for thou givest not always the battel to the strong, but canst save by many or by few. O let not our sins now cry against us for vengeance, but hear us thy poor servants begging mercy, and implying thy help, and that thou wouldst be a defence unto us against the face of the enemy. Make it appear that thou art our Saviour and mighty deliverer, through Jesus Christ our Lord. Amen.

Short Prayers for single persons, that cannot meet to joyn in Prayer with others by reason of the Fight, or Storm.

General Prayers.

LOrd, be merciful to us sinners, and save us for thy mercies sake.
Thou art the great God, that hast made and rulest all things: O deliver us for thy Names sake.
Thou art the great God to be feared above all: O save us, that we may praise thee.

Special Prayers with respect to the Enemy.

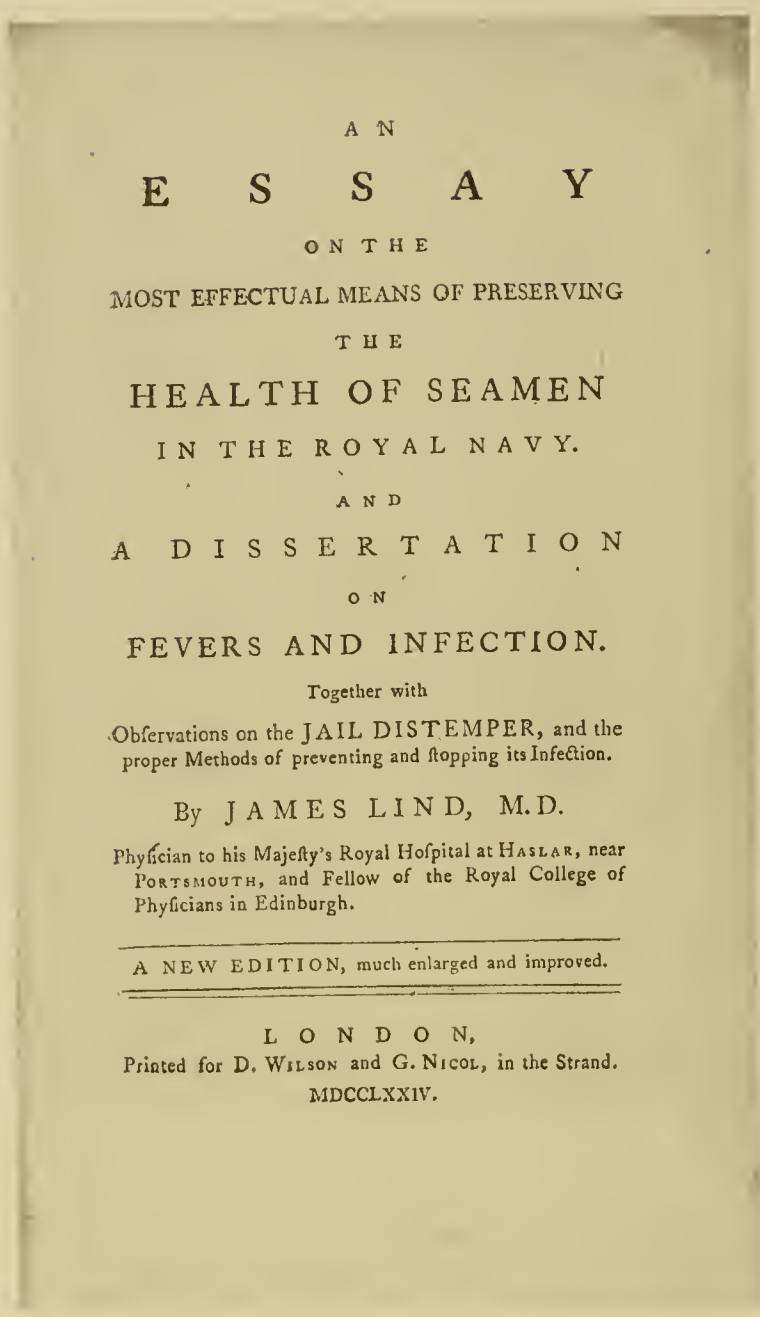
THou, O Lord, art just and powerful, O defend our cause against the face of the enemy.
O God, thou art a strong tower of defence to all that flee unto thee: O save us from the violence of the enemy.
O Lord of hosts, fight for us, that we may glorifie thee.
O suffer us not to sink under the weight of our sins, or the violence of the enemy.
O Lord, arise, help us, and deliver us for thy Names sake.

Short Prayers in respect of a Storm.

THou, O Lord, that stillest the raging of the sea, hear, hear us, and save us, that we perish not.
O blessed Saviour, that didst save thy disciples ready to perish in a storm, hear us and save us, we beseech thee.
Lord, have mercy upon us.
Christ, have mercy upon us.
Lord, have mercy upon us.
O Lord, hear us.
O Christ, hear us.

Fig. 4.19 **Church of England**, *The book of common prayer.* London, 1662.

Following a Parliamentary initiative of 1645 in issuing *A Supply of Prayer for the Ships of this Kingdom,* the Church of England introduced these prayers for use at sea. They were first included in the 1662 *Book of Common Prayer.*



AN

ESSAY

ON THE

MOST EFFECTUAL MEANS OF PRESERVING

THE

HEALTH OF SEAMEN

IN THE ROYAL NAVY.

AND

A DISSERTATION

ON

FEVERS AND INFECTION.

Together with

Obſervations on the JAIL DISTEMPER, and the proper Methods of preventing and ſtopping its Infection.

By JAMES LIND, M.D.

Phyſician to his Majeſty's Royal Hoſpital at HASLAR, near PORTSMOUTH, and Fellow of the Royal College of Phyſicians in Edinburgh.

A NEW EDITION, much enlarged and improved.

LONDON,

Printed for D. WILSON and G. NICOL, in the Strand.

MDCCLXXIV.

Fig. 4.20 James Lind, *An essay on the most effectual means of preserving the health of seamen in the Royal Navy.* London, 1774.

Lind is regarded as the founder of naval hygiene in England, and a pioneer in the prevention of scurvy. This book addressed the harsh conditions under which sailors were forced to live.

HEALTH AND LIVING CONDITIONS

Maintaining the health of seamen who for long periods of time had to live in the confined conditions of a ship without fresh food was one of the greatest challenges to the conquest of the oceans. It was not until the end of the eighteenth century that effective measures were taken to achieve this end. Success required a combination of medical knowledge, hygiene, diet, and adequate supplies of proper food and drink. Along the way, numerous false theories and ideas were tried, most famously as supposed cures for scurvy. While this disease was a major problem, it was not the only health problem that seamen faced.

James Lind (1716–1794).
An essay on the most effectual means of preserving the health of seamen in the Royal Navy. London, 1774.

Dr. James Lind took his medical degree at Edinburgh and joined the Royal Navy as a surgeon's mate in 1739. By 1747, he had become surgeon in H.M.S. *Salisbury*, a 60-gun ship. There, he made the first controlled experiments on the diet of sailors to prove that oranges and lemons were the best cure for scurvy, a disease that had hindered long sea voyages since the beginning of the era of European expansion. He published a full treatise on scurvy in 1753, which he followed in 1757 with the first edition of this *Essay*, dealing with the broader issues of health, food, and living conditions on board ship. The table of contents shows, among other things, Lind's recommendation for using distilled water at sea.

In a recent new evaluation of Lind's medical understanding, however, Michael Bartholomew, a researcher at the Open University, has argued that Lind's reputation derives only from hindsight. While Lind's experiments uncovered the cure for scurvy, he still did not see in theory or in practice the unique importance that fruit and vegetables had for treatment of this disease. (FIG. 4.20)

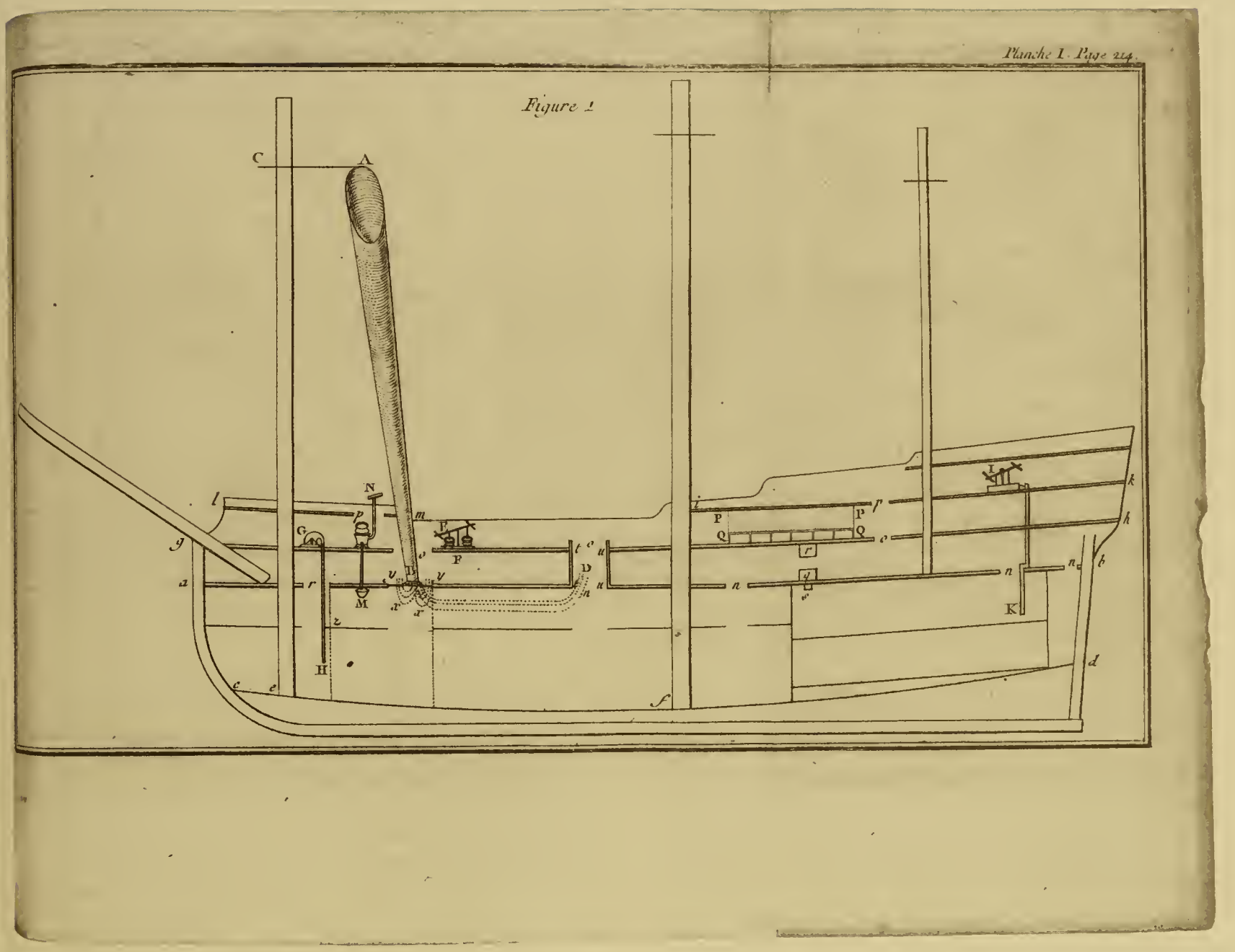
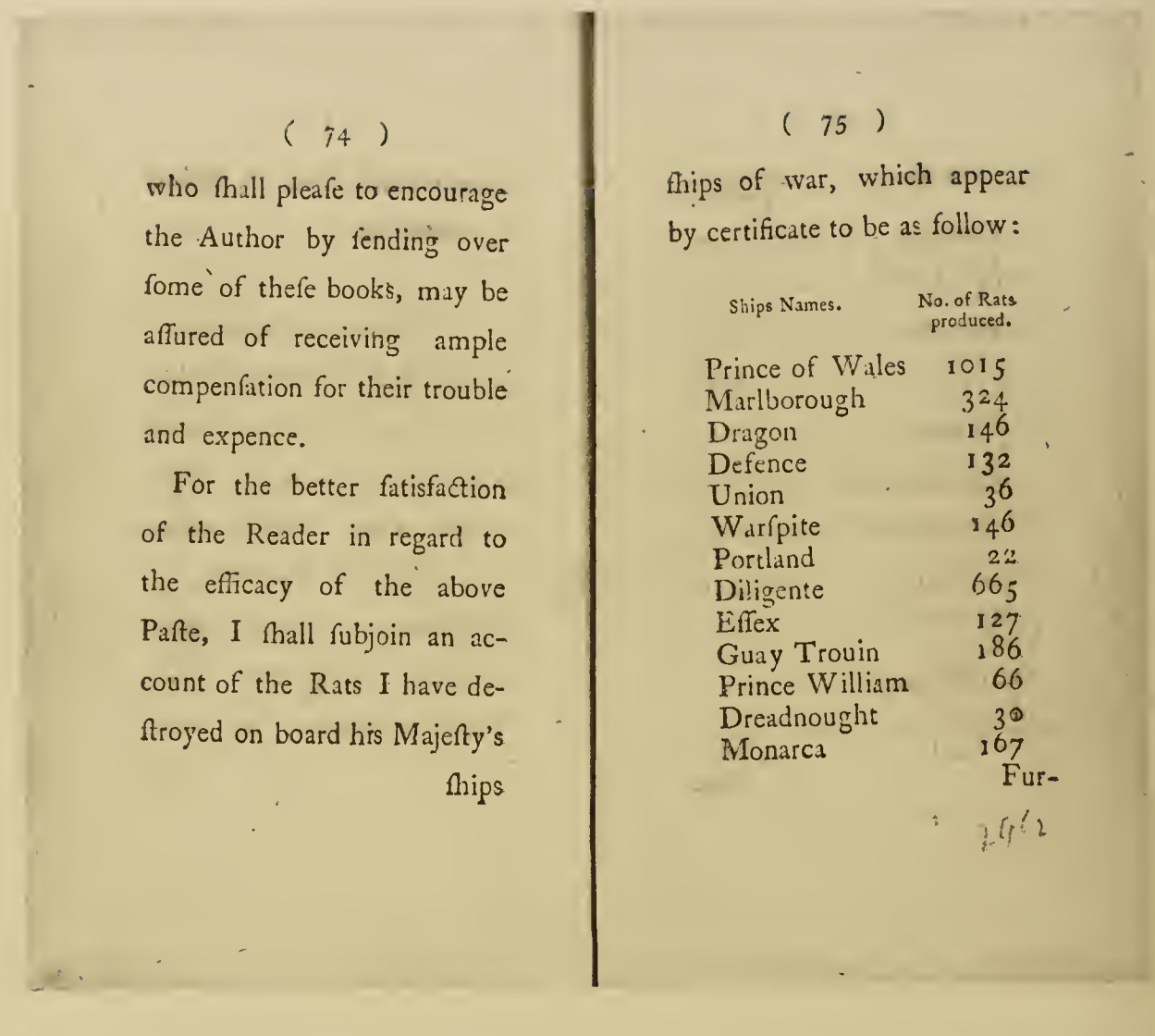


Fig. 4.21 **Henri Louis Duhamel du Monceau,** ***Moyens de conserver la santé.*** Paris, 1759.

The image is of a wind-sail, a funnel made of canvas used to ventilate a ship by conveying a stream of fresh air below decks. In hot climates, several of these were often rigged when a ship was moored.


(74)

who ſhall pleaſe to encourage the Author by ſending over ſome of theſe books, may be aſſured of receiving ample compenſation for their trouble and expence.

For the better ſatisfaction of the Reader in regard to the efficacy of the above Paſte, I ſhall ſubjoin an account of the Rats I have deſtroyed on board his Majeſty's ſhips

(75)

ſhips of war, which appear by certificate to be as follow:

Ships Names.	No. of Rats produced.
Prince of Wales	1015
Marlborough	324
Dragon	146
Defence	132
Union	36
Warſpite	146
Portland	22
Diligente	665
Eſſex	127
Guay Trouin	186
Prince William	66
Dreadnought	30
Monarca	167

Fur-

Fig. 4.22 Thomas Swaine, ***Universal directory for taking alive, or destroying rats and mice, by a method hitherto unattempted.*** London, 1783.

This book by "the Ratcatcher to His Majesty's Royal Navy, Victualling Office, &c.," reports the numbers of rats he destroyed through his efficient applications of an arsenic and sugar paste.

Henri Louis Duhamel du Monceau (1700–1782).
Moyens de conserver la santé. Paris, 1759.

Duhamel du Monceau was a botanist and agronomist who had been received into the French Academy of Science in 1728. In 1732, he was named inspector of construction for the French Navy, and became inspector-general in 1739, a post created for him by Minister Phélypeaux de Maurepas. In 1741, Duhamel du Monceau had created the basis for the future École du Génie Maritime, with the establishment of the "Petit École de Construction," which in 1748 became the "Grande École de Construction." Although the school closed temporarily in 1758, Choiseul reopened it in 1765 with Duhamel du Monceau remaining as director until his death in 1782. He is most famous for his 1752 volume *Les elémens de l'architecture navale,* which revealed for the first time publicly some of the secrets of French ship construction. His discussion of shipboard health appeared in France just at the time that Lind was making his contributions in England, affording the possibility of a direct comparison of the situation in the two countries. (FIG. 4.21)

John Clark
Observations on the diseases of long voyages to hot countries. London. 1773.

John Clark's book was intended for those who were employed by the East India Company or who, for one reason or another, were making a voyage to live and work in Asia. In it he describes the health hazards to be expected afloat and ashore.

Thomas Swaine
Universal directory for taking alive, or destroying rats and mice, by a method hitherto unattempted. London, 1783.

Thomas Swaine of Greenwich, who styled himself "Ratcatcher to his Majesty's Royal Navy, Victualling Office, &c.," developed a recipe for a rat catching paste, "Swaine's Paste," made from arsenic, sugar, and wheat flour. He claimed to have used it to rid naval vessels of rats, and to show his efficient method, he listed seventy-nine ships by name with a total of rats destroyed in each. The numbers ranged from a high of 2,475 in H.M.S.

Duke to as few as 17 in *Prothée* and in his second visit to *Dreadnought.*

Having respect for his quarry, Swaine noted, "The infinite wisdom of the great Creator is as conspicuous in a mole as in a camel, in an ass as in a lion." In a twenty-five-year career in fifteen counties of southern and eastern England, Swaine wrote from close observation of the various types of rats found in England, and with a political overtone described the way in which the brown or "Hanover" rat overran the black "genuine English house rat." (FIG. 4.22)

"Matheus Potier vende em Leilaõ publico o Navio Portuguez denominado Grasa Divina com as Condicoens Seguintes." [Manuscript]. 1789.

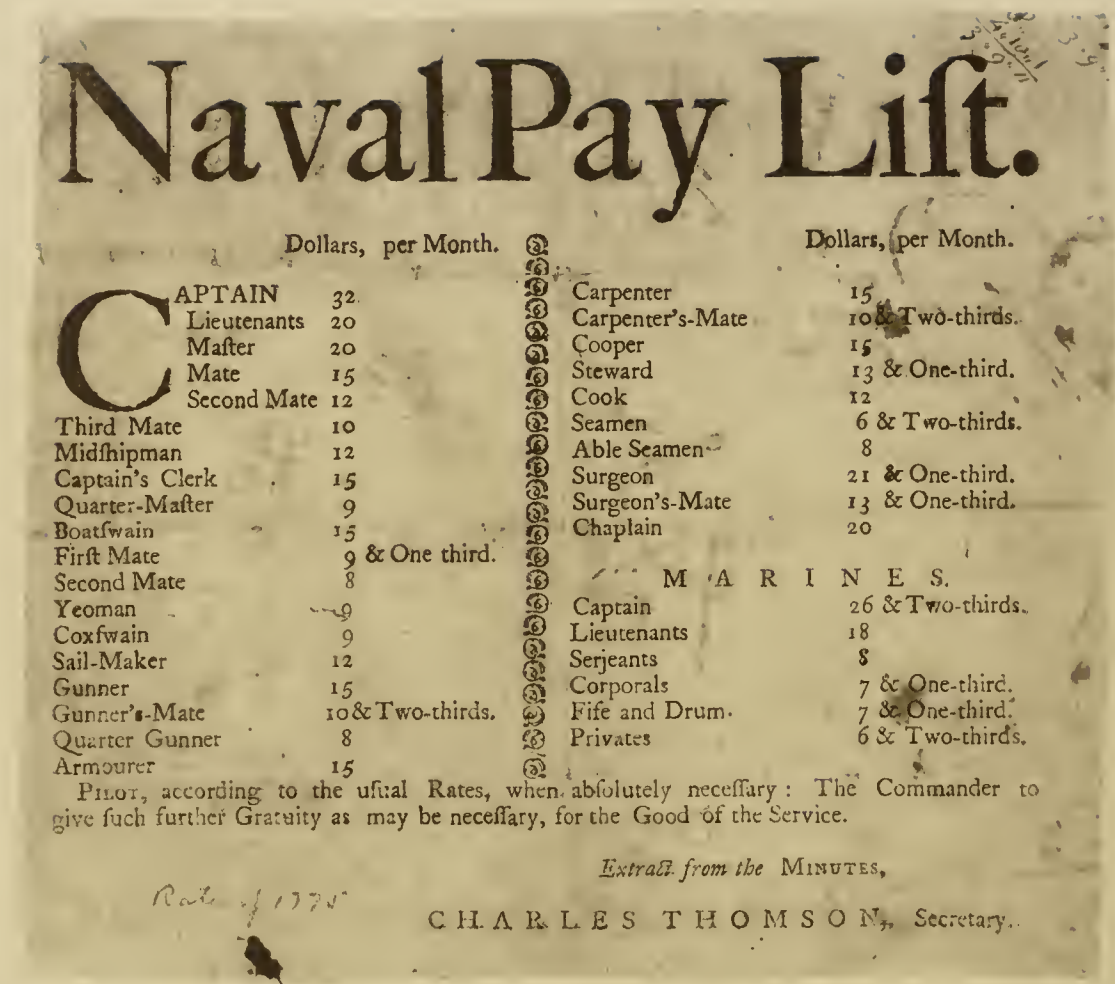
This unusual document records an auction of the Portuguese merchant ship *Graça Divina* in Lisbon on 16 March 1789. In addition to the details of the auction itself, in which her owner, Matheus Potier, sold the ship immediately following her return from a voyage to Rio de Janeiro, the document includes a complete inventory of the ship's equipment made four days before the sale, listing the items with which it was fitted out, including cables, chains, anchors, masts, sails, gunnery equipment, small arms, barrels, boats, furniture, tools, flags, surgeon's instruments, and the chaplain's belongings. Such lists provide additional clues to the daily personal lives of seamen, complementing the information provided by the artifacts that archaeologists have brought up from the deep.

Thomas Masterman Winterbottom (1765–1859)
***Medical directions for the use of navigators and settlers in hot climates.* London, 1803.**

The directors of the Hon. Sierra Leone Company commissioned Dr. Thomas Winterbottom, M.D., as the physician to the colony of Sierra Leone at Freetown, to write these medical instructions for their merchant vessels that were trading on the West Coast of Africa and had no surgeon on board. Included is a section on how to care for seamen that have been rescued from a shipwreck and have endured a long period in a small boat.

Usher Parsons (1788–1868)
***Sailor's physician containing medical advice, for seamen and other persons at sea, on the treatment of diseases and on the preservation of health in sickly climates. Second edition.* Providence, 1824.**

Usher Parsons studied medicine under Dr. John Warren in Boston, and in 1812 the Massachusetts Medical Society licensed him to practice. Unable to find a place to start his practice, he obtained an appointment as a surgeon's mate in the U. S. Navy. He answered a call for volunteers to serve on Lake Erie, where he was assigned to the brig *Niagara.* There he saw action and treated the wounded during Oliver Hazard Perry's victory over the British fleet at Put-in-Bay in September 1813. Because of Parson's skillful performance, Perry recommended him for promotion to surgeon, which became effective in April 1814. After the war, he served with Perry in USS *Java* in the Mediterranean, where he found himself treating an average of 22 patients a day over the next two and a half years. While on the Mediterranean station, Parsons was granted leave to visit hospitals and medical schools in Italy, Switzerland, and France. In 1819, he returned to the United States and was assigned to duty with the Marine Guard at the Boston Navy Yard. While there, Parsons published the first edition of this book in 1820. In 1823, Parsons married, resigned from the Navy, and settled in Providence, Rhode Island, where he practiced medicine. He revised and expanded the book for third and fourth editions in 1842 and 1852, re-titling it *Physicians for Ships.* Parsons' manuscript journals are in the Rhode Island Historical Society, and his papers are in the John Hay Library at Brown University.



Naval Pay Liſt.

	Dollars, per Month.
CAPTAIN	32
Lieutenants	20
Maſter	20
Mate	15
Second Mate	12
Third Mate	10
Midſhipman	12
Captain's Clerk	15
Quarter-Maſter	9
Boatſwain	15
Firſt Mate	9 & One third.
Second Mate	8
Yeoman	9
Coxſwain	9
Sail-Maker	12
Gunner	15
Gunner's-Mate	10 & Two-thirds.
Quarter Gunner	8
Armourer	15
Carpenter	15
Carpenter's-Mate	10 & Two-thirds.
Cooper	15
Steward	13 & One-third.
Cook	12
Seamen	6 & Two-thirds.
Able Seamen	8
Surgeon	21 & One-third.
Surgeon's-Mate	13 & One-third.
Chaplain	20
MARINES.	
Captain	26 & Two-thirds.
Lieutenants	18
Serjeants	8
Corporals	7 & One-third.
Fife and Drum	7 & One-third.
Privates	6 & Two-thirds.

PILOT, according to the uſual Rates, when abſolutely neceſſary: The Commander to give ſuch further Gratuity as may be neceſſary, for the Good of the Service.

Extract from the MINUTES,

CHARLES THOMSON, Secretary.

Fig. 4.23 **United States. Continental Congress. *Naval Pay List*.** Philadelphia, 1775.

This is the first pay scale for the American navy. On the back of this copy, Lieutenant John Paul Jones has doodled and practiced his signature.

PAY

The maritime world of early modern Europe lacked a standard system for paying seamen, but there were three main approaches, which varied somewhat from country to country. Compensation could consist of a percentage or share of the profits or produce of a fishing voyage, the system that had been used in the Mediterranean during the Ancient and Medieval periods. Such arrangements began to be phased out in the sixteenth century and by the eighteenth century was typical only of privateers, pirates, fishermen, and whalers. In Northern Europe, sailors were often paid a set amount for a single and fairly predictable voyage. A third approach, which became common in the eighteenth century, was a monthly wage, paid in increments at the first port of call, then every second port visited, and on completion of the voyage. Typically, sailors in merchant vessels were free to negotiate with their employers their level of pay and method of payment and to obtain advances on it. However, ship owners and masters sometimes attempted to deny sailors their wages, by making unjustified deductions of various kinds. The typical able seaman in English merchant service during the first half of the eighteenth century earned an average wage of about £1.66 a month in peacetime and about £2.20 monthly during wartime. In contrast, the pay of sailors in the navy was based on an established wage scale that was usually below the market value of merchant service. Moreover, wages in the navy were often bureaucratically delayed for long periods. In the English navy, the ordinary seaman received between 5 and 10 shillings a month during the fifteenth and sixteenth centuries. By the 1640s, the figure was standardized at 19 shillings a month and remained unchanged until 1797, when it was raised to 23 shillings 6 pence. In Spain, Armada sailors in the first part of the sixteenth century earned about 35 *maravedis* a day, including rations. By 1600, this figure rose to 100 *maravedis* a day.

United States. Continental Congress. *Naval pay list*. Philadelphia, 1775.

In considering the rules and regulations for the Continental Navy, the predecessor of the U. S. Navy, Congress established these basic pay tables in 1775. Among the calculations on the back of this broadside, there are several signatures of John Paul Jones, who on 7 December 1775 had been appointed a first lieutenant in the Continental Navy. For a month or more before this, Jones had been in temporary charge of the 20-gun *Alfred* at Philadelphia, while awaiting the arrival of her assigned commanding officer, Captain Dudley Saltonstall. (FIG. 4.23)

DISCIPLINE AND PUNISHMENT

Sailors are famous for having an independent spirit and for rejecting servility and submissiveness to authority. In this they are similar to miners, who work in teams ashore under dangerous and difficult conditions. In both merchant and naval ships of the early modern period, strict discipline and correspondingly harsh physical punishments were characteristic ways of maintaining order. Nathaniel Boetler's (Butler's) *Dialogues* provides an early seventeenth century description of punishments at sea, but the most famous document in maritime history that laid down an official code of discipline and punishment is the Royal Navy's 1661 *Articles of War,* which remained in effect until superseded in 1749 by another set that remained in use until 1866. These regulations had their origins in a period when it was difficult to maintain discipline in battle. The punishments that the *Articles* prescribed were typical of those meted out to seventeenth- and eighteenth-century working men, but, by the end of the eighteenth century, the punishments began to seem out of step with more liberal humanitarian thinking. In the mid-nineteenth century, a major reform movement arose and continued throughout the century with the goal of abolishing harsh physical punishment at sea. Although flogging was abolished in the Royal Navy and the United States Navy in 1850, Congress did not formally abolish flogging and corporal punishment on American merchant ships until 1898.

William Spavens
The seaman's narrative. **Louth, 1796.**

Spavens's book is one of the very few accounts by an ordinary sailor describing his own experiences at sea. Written in his old age to earn some money, Spavens vividly described his life in the Royal Navy and in the East India Company's service during and immediately after the Seven Years' War. In one of several passages in the book relating to punishments, Spavens showed that physical abuse was not inflicted on sailors only. During a visit to English Harbour, Antigua, Spavens reported "we were presented with a very uncommon sight, viz. a Negro woman having been guilty of some small misdemeanor on board the *Bristol* of 50 guns, they first whipped her, then stript her quite naked, besmeared her with tar from head to foot, sprinkled feathers thereupon, and sent her ashore."

[Alexander Tweedie]
Naval achievements of Admiral George Lord Brydges Rodney. **Edinburgh, 1782.**

The colorful plate that accompanied this book depicted Rodney's flagship H.M.S. *Formidable* at the battle of the Saintes in 1782. The print was intended to send a political message, arguing that Lord Rockingham and his "New Whig" government were throwing away Rodney's great victory by trying to forge a peace with the Americans. A small section of the plate includes an image of keelhauling, which are very hard to find. In this case it is Rockingham and Charles James Fox who are allegorically punished, not miscreant sailors. Nevertheless, this type of visual tongue-in-cheek political satire was the precursor to the more serious-minded reform attempts of the 1840s, some of which became works of literature in the hands of writers such as Herman Melville. (FIG. 4.24) (See page xviii, above).

Fig. 5.16 **Jan Huygen van Linschoten,** ***Itinerario.*** Amsterdam, 1596.

The South Atlantic island of St. Helena was the way station that often marked the beginning and end of English naval convoy for East India Company ships in the Atlantic. (See page 112, below).

CHAPTER 5 PATHS ACROSS THE SEA

Once a vessel left port, fully manned and ready for a long voyage across the oceans, there were myriad possible destinations. Some were bustling established ports; others were fishing waters or newly built piers on the rivers and bays of newly found lands. To reach them, sailors began to follow similar paths, creating established routes across the sea. Along with these, they came to use a variety of islands and ports as way stations. Sometimes, opening new areas of the sea and charting new waters were part of this process.

Fig. 5.18 Hendrick Doncker, ***The sea-atlas of the watter-world, shewing all the sea-coasts of y known parts of y earth.*** Amsterdam, 1660.

The eastern Indian Ocean and the China seas were important destinations for the rival East India companies. The chart of that region in this volume is particularly interesting for the information it includes from Dutch exploration of the western and northern coasts of Australia. (See page 115, below).

Charting New Waters

The first paths across the sea were exploratory, creating the necessity of charting new waters. Yet the process of charting was ongoing during the age of oceanic conquest that stretched from the fifteenth to the nineteenth century. The development of marine cartography, along with the associated sciences of hydrography and marine surveying, is among the major achievements associated with the conquest of the oceans. Charts actually used at sea for navigation were often destroyed, damaged, or merely worn out, with the result that few originals survive. Nevertheless, the information acquired by mariners was recorded and transmitted to chart, map, and globe makers, who used it in producing atlases and presentation copies of their work, many of which have well survived. In some of the earliest cases, narrative reports of voyages are missing, and only the anonymous visual evidence found on maps and charts reveals the discoveries achieved by a voyage. Later, charts and maps printed in multiple copies ensured preservation of new information, while charts complemented narrative accounts.

Johannes Ruysch (d. 1533)
Universalior cogniti orbis tabula, from Ptolemy, ***Geographia***. Rome, 1508.

This edition of Ptolemy included a map of the known world drawn by the cartographer Johannes Ruysch, who claimed to have made a voyage to North America. He may have been on one of the undocumented voyages that sailed from Bristol in England to the region near Nova Scotia sometime between 1501 and 1505. Alternatively, some speculate that his information derived from the now lost document, *"inventio fortunatae,"* which is believed to have been the report of a voyage in the Baffin Bay and Davis Strait region by an English Minorite friar about 1360–1364. Whatever its source, Ruysch's map exemplifies the first stage in which oceanic voyages were beginning to widen the understanding that Europeans had of geography. (FIG. 5.1)

Vesconte de Maggiolo (fl. 1504–1549)
Portolan atlas. [Manuscript]. Naples, 1511.

The world map shown here is from an atlas made in 1511 by Vesconte de Maggiolo, a Genoese cartographer working in Naples. Although at first glance it appears to focus on Africa, the map is one of the earliest representations of the results of several voyages to the New World in the preceding nineteen years. Among its place labels are "The Lands Found by Columbus," "Land of the English," and "Land of the Corte Real and the King of Portugal." In contrast to this fresh depiction of the expanding world, Maggiolo's charts of the Mediterranean and the newly explored western coast of Africa are drawn in a conventional manner. (FIG. 5.2) (See page 90, below).

Hercules O'Doria
Portolan atlas of Europe, Africa, and America. [Manuscript]. Marseilles, 1592.

As the cartography of the sea developed, and before widely standardized graphic conventions were in use, distinctive approaches and schools of cartography emerged. Little is known of the Irish cartographer Hercules O'Doria, but his work in this 1592 chart of the Caribbean, Cuba, and the coast of North America is in a style typical of cartographers working in Marseilles at that time. (FIG. 5.3) (See page 92, below).

Fig. 5.1 Johannes Ruysch, *Universalior cogniti orbis tabula.* Map in Ptolemy, *Geographia.* Rome, 1508.

Ruysch's map exemplifies the first stage in which oceanic voyages were beginning to widen the understanding that Europeans had of geography. (See page 87, above).


TABVLA
ITI ORBIS
SEPTIMVM CLIMA
SEXTVM CLIMA
QVINTVM CLIMA
QVARTVM CLIMA
TERTIVM CLIMA
CIRCVLVS CANCRI
SECVNDVM CLIMA
PRIMVM CLIMA
CIRCVLVS AEQVINOCTIALIS
PRIMVM CLIMA
SECVNDVM CLIM
TERTIVM CLIMA
QVARTVM CLIMA
CIRCVLVS CAPRICORNI
SEYLLAN OCEANVS
PELAGVS
INDICVM
CAPRICORNI
CIRCVLVS
AETHIOPIA INTERIOR
AGISIMBA REGIO
SCYTHIA INTRA MONTEM
SCYTHIA EXTRA MONTEM
ARABIA FELIX
INDIA INTRA GANGEM
INDIA EXTRA GANGEM
SINVS GAGETICVS
SINVS AGISIMBA
PERSICVS SINVS
ARABICVS SINVS
MARE MEDITERRANEVM
PROMONTORIVM BONAE SPERANZE

Fig. 5.2 Vesconte de Maggiolo, Portolan atlas. [Manuscript]. Naples, 1511.

Employing an unusual projection that gives the sense of an expanding world, Vesconte de Maggiolo's place names reflected the new discoveries: "The Lands Found by Columbus," "Land of the English," and "Land of the Corte Real and the King of Portugal." (See page 87, above).


Mare Indicum
Sinus Persicus
Sinus Arabicus
Mare meridionale
Mare Rubrum
Babylonia
Assia minor
Turchia
Ethiopia sub Egypto
Terra Sancta
Mesopotamia
Armenia
Tartaria
Scythia
Persia
India intra Gangen
R. Gyon
R. Nilus
R. Tigris
R. Euphrates
R. Indus
R. Ganges
R. Caspius
Arabia deserta
Arabia felix
Palestina
Egyptus
Africa
Europa

Fig. 5.3 **Hercules O'Doria, Portolan atlas of Europe, Africa, and America.** [Manuscript]. Marseilles, 1592.

This atlas by an Irish cartographer working in Marseilles at the end of the sixteenth century represents one of the distinctive schools of maritime cartography that arose in this period. The chart here is of the Caribbean.

Sir Robert Dudley (1574–1649)
***Dell'arcano del mare.* Florence, 1646.**

Robert Dudley was the namesake and illegitimate son of the Earl of Leicester (ca. 1532–1588), the politician and one-time favorite courtier of Elizabeth I. In 1594 the young Dudley had led an expedition to the mouth of the Orinoco River in Guyana on the northern coast of South America. In 1605 Dudley left England, outraged that he was unable to prove his legitimacy and his claim to his father's title. When he arrived in Florence in 1607, the Grand Duke of Tuscany, Ferdinand I, employed him to help build up his navy against the Turks and Barbary corsairs. After many years of labor, Dudley published this huge and remarkable atlas compendium, entitled "Secrets of the Sea," only shortly before his death. It was the first sea atlas that included charts for the entire world based on the Mercator projection. More than simply a collection of charts, the work contains instruction in navigation techniques, drawings and diagrams on ship architecture, and even naval tactics for use in warfare. The Florentine engraver Antonio Francisco Lucini spent twelve years engraving the plates, which required 5,000 pounds of copper. (FIG. 5.4)

Louis Jolliet (1645–1700)
"Nouvelle decouverte de plusieurs nations dans la Nouvelle France, en l'année 1673 et 1674." [Manuscript]. 1674.

The conquest of the oceans was the essential bridge that made possible land exploration in distant areas. Exploration of rivers and straits was to some degree driven by the search for routes to the Far East. In the case of North America, inland exploration of the continent revealed unexpected benefits, vast fresh water seas that soon developed their own maritime activities and trade.

Born in Quebec, Jolliet joined the Jesuit Père Jacques Marquette to open the way for trade and missionary work in the Great Lakes and Mississippi River valley. In May 1673, the two explorers left the fort at Michilimackinac in canoes and crossed the upper portion of Lake Michigan to Green Bay, up the Fox River to the Wisconsin River, then down the Mississippi until they reached the site of Arkansas City, Arkansas. At that point, they turned northward, following the Illinois River back to Lake Michigan. (FIG. 5.5) (See page 97, below).

William Hack
"An accurate description of all the harbours rivers ports islands sands rocks and dangers between the mouth of California and the straits of Lemaire in the south sea of America." [Manuscript]. London, after 1698.

Basil Ringrose, an English buccaneer, was sailing with Captain Bartholomew Sharpe in the ship *Trinity* when they captured the Spanish ship *Rosario* off the coast of Ecuador in 1681. On board, they found an original set of sea charts that the Spanish had compiled in 1669 for the use of ships sailing off the Pacific coast of the Americas. A Sephardi friend of Sharpe's, Philip Dassigny, translated the text into English; Basil Ringrose added additional information from his own experience; and William Hack, a London map and chart maker, copied the charts. At least fourteen copies were made, one of which was presented to King Charles II in 1682. The copy shown here has the bookplate of John Clevland, a Secretary of the Admiralty from 1746 to 1763. (FIG. 5.6) (See page 98, below).

***Le neptune françois.* Paris, 1693.**

In the 1680s, the French statesman Jean-Baptiste Colbert (1619–1683) commissioned mathematicians and astronomers from the Académie Royale to join with the French navy's hydrographers to produce, under the supervision of royal geographer Alexis Hubert Jaillot (1632–1712), an atlas of nautical charts covering the European coast from Norway to Gibraltar. The result was a seminal work for French maritime cartography. In Holland, a cartographer named Pieter Mortier (1661–1711), the son of a French political refugee, had earlier acquired the right to distribute French maps and charts in the Dutch Republic. Unable to obtain multiple copies from France and wanting to compete with the monopoly that Johannes van Keulen had held since 1681, Mortier had the French charts newly engraved and printed in Amsterdam, but he sold them with the Paris imprint on the title page. Mortier published the work in French, Dutch, and English, and it is widely acknowledged to be one of the most attractive atlases published in seventeenth-century Holland. (FIG. 5.7) (See pages 100 and 118, below).

Fig. 5.4 **Sir Robert Dudley, *Dell'arcano del mare*.** Florence, 1646.

One of the most expensive books published in its time, this magnificent production was the first sea atlas to include charts for the entire world based on the Mercator projection. The chart shown here reflects Dudley's personal experience in leading an expedition to the mouth of the Orinoco River in Guyana on the northern coast of South America in 1594–1595.


Vccelli bianchicci
egno dell'auuicinar
I. de S. Bernardo
Li Venti fi lli ſono Grecali
Il Corr^te ſegue la Coſta uerſo Maeſtrale
La Var: M. è poco, & uerſo Maeſtrale
L'aere non è mal ſano to ſon da Giugno sino
al fine di Settembre, ma ſempre è cald ſſimo
I. Chima
Arquacchi
Demorali
Wacawai
Caribi
Caribi, ò
Wabari
Panapi
Shebai
Eppari
Arwacchi
Paruviani
Caripini
Neheari
Shuremi
Vaperi
R. Mapuera
Mapueri
R. Vapero
La Coſta è baſſa & è piena di
Boſchi, e di Fiumi d'acqua dolce
Li Fiumi della Coſta di Guiana


Nouvelle Decouverte de plusieurs Nations
Dans la Nouvelle France
MER GLACIALE
LA
Riviere des Iroquois ou St Laurent
Le Mexique
La Nouvelle Grenade
Le Perou
Le Japon
La Chine

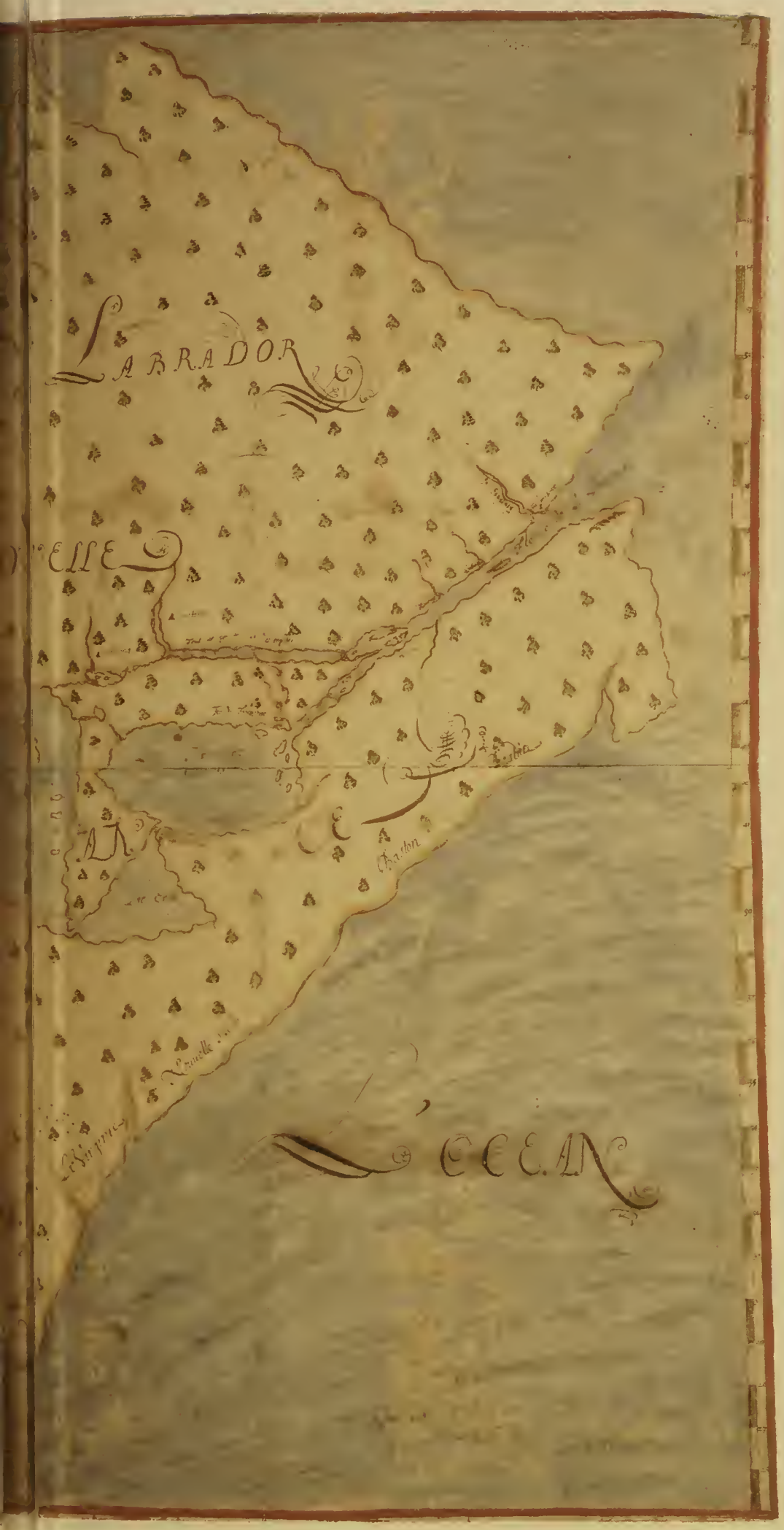


Fig. 5.5 **Louis Jolliet, "Nouvelle decouverte de plusieurs nations, dans la Nouvelle France, en l'année 1673 et 1674."** [Manuscript]. 1674.

Just as he was returning to Montreal after having explored America's great inland seas and the Mississippi River, the French explorer Louis Jolliet lost all his records when his boat overturned in the St. Lawrence River. Shortly afterwards, he drew this map from memory and sent it to the governor of New France, Count Frontenac, in November 1674.

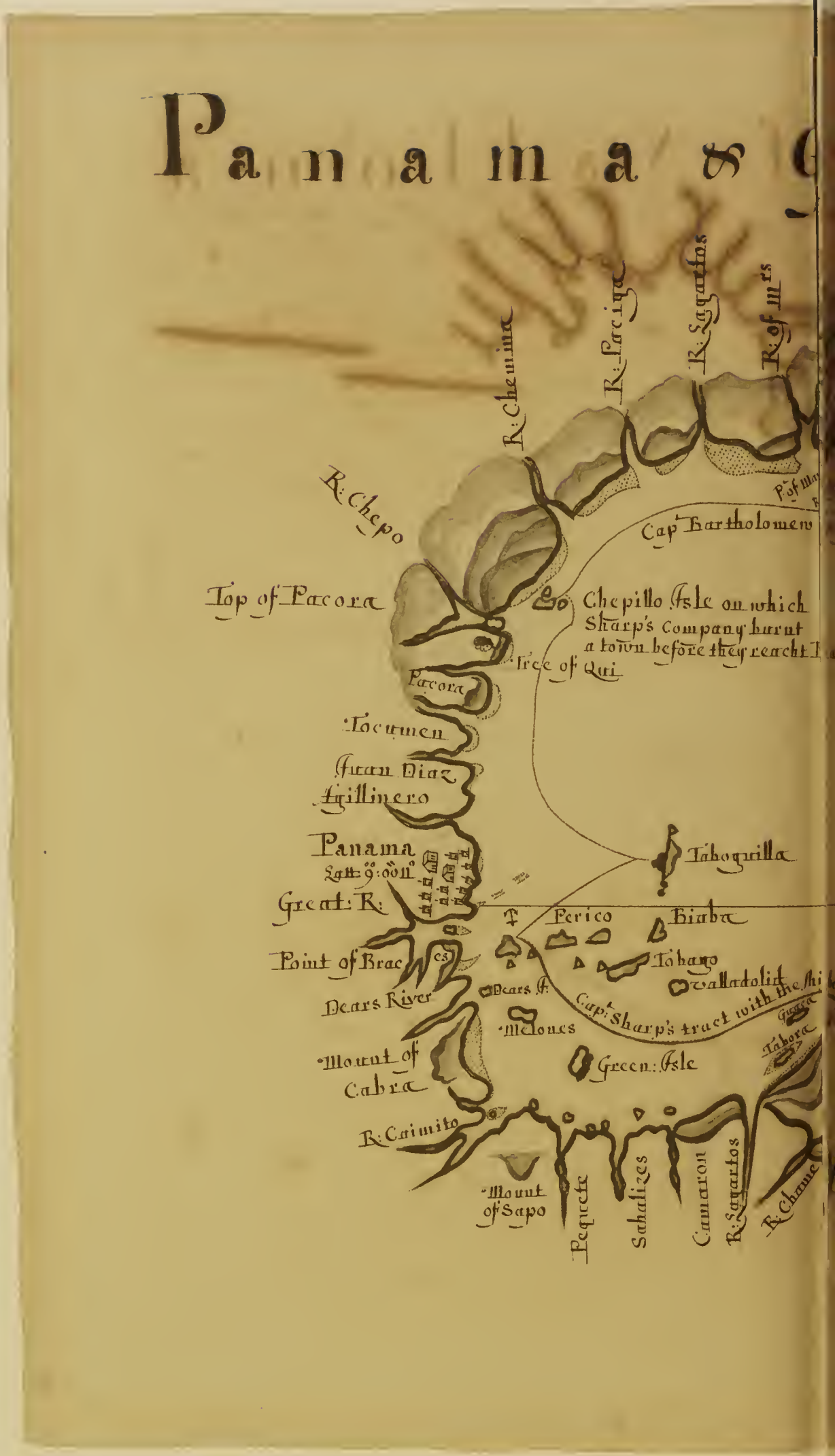


Fig. 5.6 **William Hack, "An accurate description of all the harbours rivers ports islands sands rocks and dangers between the mouth of California and the straits of Lemaire in the south sea of America."** [Manuscript]. London, after 1698.

This is one of at least fourteen manuscript copies that William Hack, a London map and chart maker, made from a collection of captured Spanish charts. Captain Bartholomew Sharpe had seized the charts when he captured the Spanish ship *Rosario* off the coast of Ecuador in 1681. This chart shows the Pacific coast of Panama and Gulf of Vallona, with Sharpe's track in the ship *Trinity*.

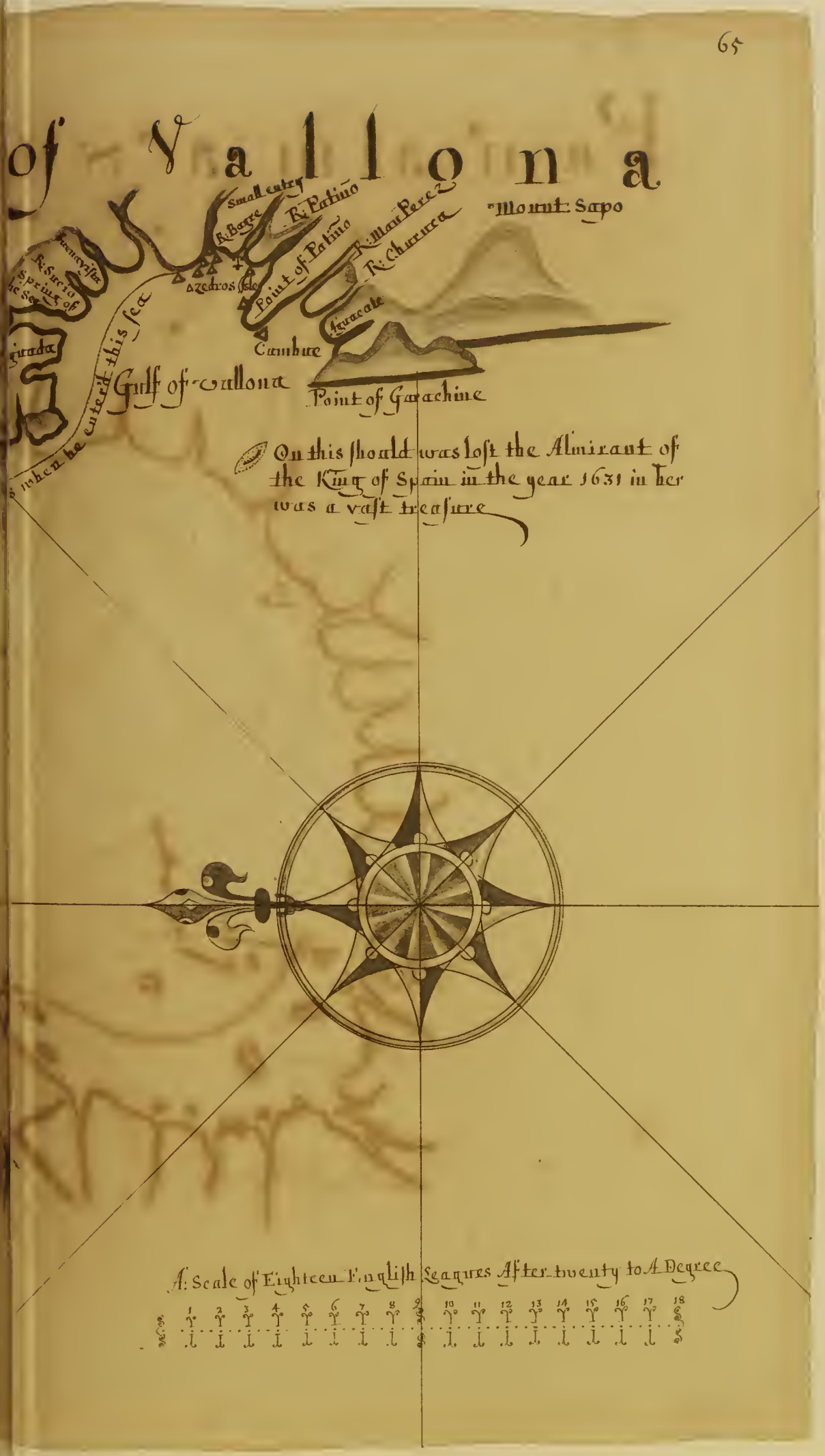

65
of Vallona
small entry
R. Patino
R. Mar Perez
Mount Sapo
R. Churuca
Point of Patino
Azedros Isle
Cumbre
Gulf of Vallona
Point of Garachine
On this shoald was lost the Almirant of the King of Spain in the year 1631 in ther was a vast treasure
A Scale of Eighteen English Leagues After twenty to A Degree

Fig. 5.7 ***Le neptune françois.*** Paris, 1693.

The copy of the *Neptune François* shown here is a counterfeit of the original, made by Pieter Mortier in Amsterdam in 1693 and sold as if it were the Paris imprint. Romeyn de Hooghe, a Dutchman then working in the service of King William III of England, designed and engraved the map of England's south coast. It was one of nine charts by de Hooghe that Mortier added to the French work he had otherwise so precisely copied.

de la TAMISE jusques a PORTLAND, & des Isles Voisines.
AGE des ARMÉES DE SA MAJESTE BRITANNIQUE. *Dreßé sur les Mémoires les*
leur Et Nos Seigneurs les Etats. 1693

Captaine Millaud
"Remarques sur la navigation des isles de l'Amerique par Millaud, pilotte sur les vaissaeux du Roy." [Manuscript]. ca. 1710.

Printed charts and sailing directions for the West Indies in the early eighteenth century tended to be very general in character. Because of this deficiency, sea officers typically kept private notes on essential information needed for piloting. Although many such books were kept, only a few survive. Captaine Millaud, a pilot serving in the French navy, made these notes and drawings on a voyage from La Rochelle to Martinique in 1710 during the War of the Spanish Succession. He used a printed Dutch chart by Pieter Goos for the ocean passage and was apparently familiar with the approaches to many of the French colonies in the West Indies.

Cyprian Southack (1662–1745)
***A new chart of the English Empire in North America.* Boston, 1717.**

This is the first engraved map to be published in the colonies that later became independent as the United States of America, and the oldest copper engraving produced in America that still survives. While it is significant as an example of an American-made chart, it is also an example of a chart that makes a political statement, designed to warn Englishmen of the growing danger from the nearby French colonies. Cyprian Southack was commissioned a lieutenant in the Royal Navy in 1673 and was promoted to captain in 1696, serving until 1722. He first came to Massachusetts in 1685, where he spent much of the remainder of his career on coastal patrols and in surveying North American waters. In 1729, he published his *New England Coasting Pilot.* (FIG. 5.8) (See page 104, below).

***The English pilot. The fourth book.* London, 1706.**

In 1671, John Seller began to publish *The English Pilot* series with a book for "Northern Navigation." This was followed by the "second book" on "Southern Navigation" (1672), and the beginnings for additional books including the "third book" for "European and Mediterranean navigation" (1677), the "fourth book" for "America and the West Indies" (1676), and the "fifth book" for "Oriental Navigation" (1675). Seller ceased to be involved after about 1679, and the plates and rights to publication eventually passed to Richard Mount and William Page, whose firm came to dominate English maritime publishing. In 1701, they added a sixth book, on "West Africa." As a *de facto* series, the *English Pilot* appeared in more than 111 editions in 133 years, becoming the most widely used English hydrographical publication until the beginning of the nineteenth century. It perpetuated a simplified version of the Dutch "waggoner" style of charts supplemented by coastal views, which became increasingly outdated in contrast to the sophisticated work done by 1780 in *The American Neptune*. The section on the Caribbean port of Cartagena from the 1706 edition was still the same forty years later in the 1745 edition.

Antonio de Matos
"Descripcion de las costas de tierra firme de la America Septentrional . . . por el theniente de fragata y piloto de la Real Armada Dn. Antonio de Matos año de 1740." [Manuscript]. 1740.

Drawn on vellum, this chart with its wind roses, odd shape, and decorative colors, gives the impression of dating from the age of exploration. In fact, Lieutenant Antonio de Matos of the Spanish navy drew it in 1740 on the modern Mercator projection for the use of ships and pilots of his navy at the opening of the 1739–1748 War of the Austrian Succession. In terms of detail, it is much more accurate than the commonly available charts that his British counterparts had in the *English Pilot. Fourth Book.* Other examples of Antonio de Matos's charts made between 1740 and 1745 are in the Museo Naval de Madrid, Archivo General de Indias, and the Bibliothèque Nationale de Paris. (FIG. 5.9) (See page xii, above).

Joseph Smith Speer
***The West India pilot.* London, 1771.**

Little is known about Speer except that for more than twenty years he served on ships in Caribbean waters. This work, which first appeared in 1766 and was reprinted in 1771 and 1776, underscores the great interest that Englishmen had in the West Indies. The author's notice "To the Public" bears a manuscript note that this copy was "examined and corrected by the author" and several insertions and corrections have been made in the same hand in the sailing directions. (FIG. 5.10)

Fig. 5.10 Joseph Smith Speer, ***The West India pilot***. London, 1771.

In the eighteenth century, Kingston, Jamaica, was a major trading port as well as the base for the larger of the two Royal Navy squadrons assigned to the West Indies. It was founded in June 1692 when more than 400 people died at nearby Port Royal after an earthquake caused the town to be half-submerged by the sea.

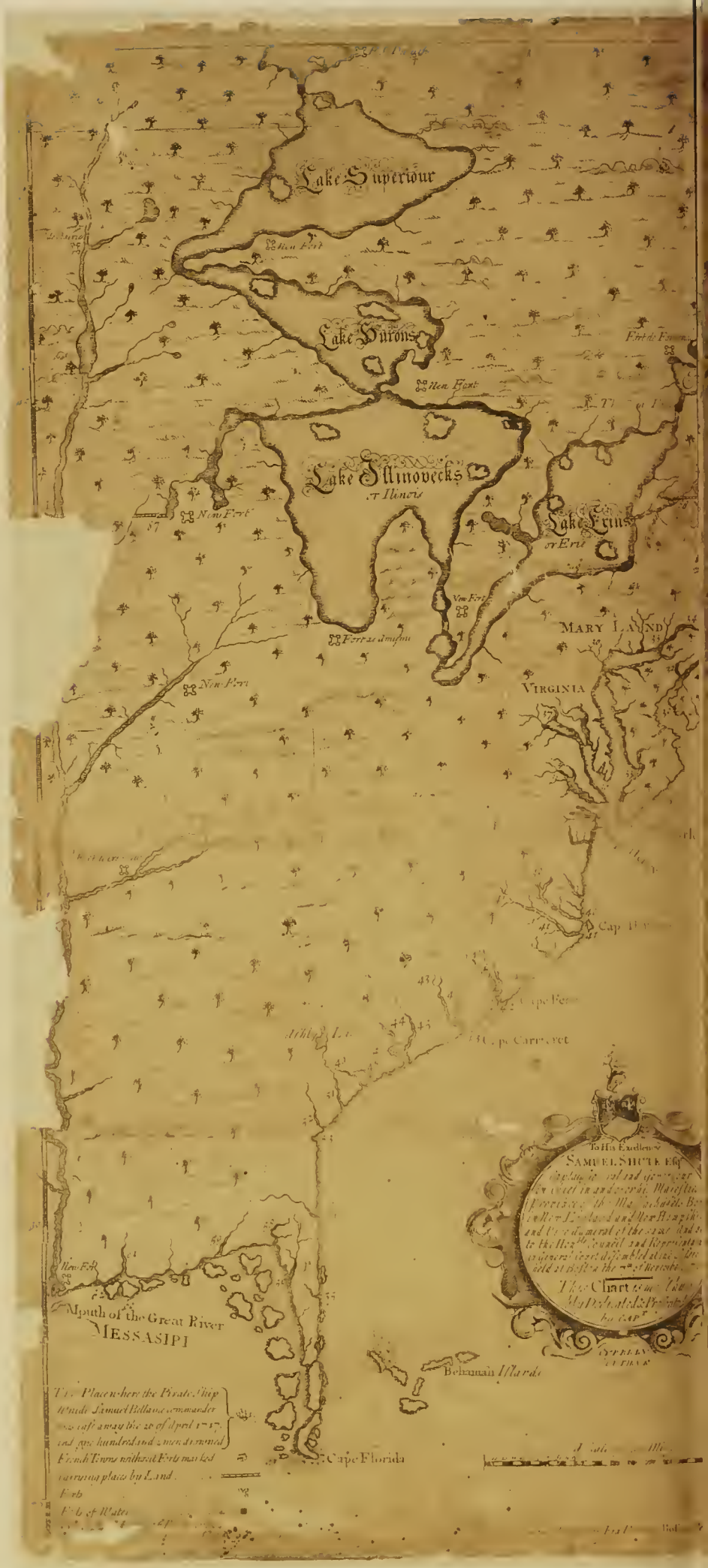
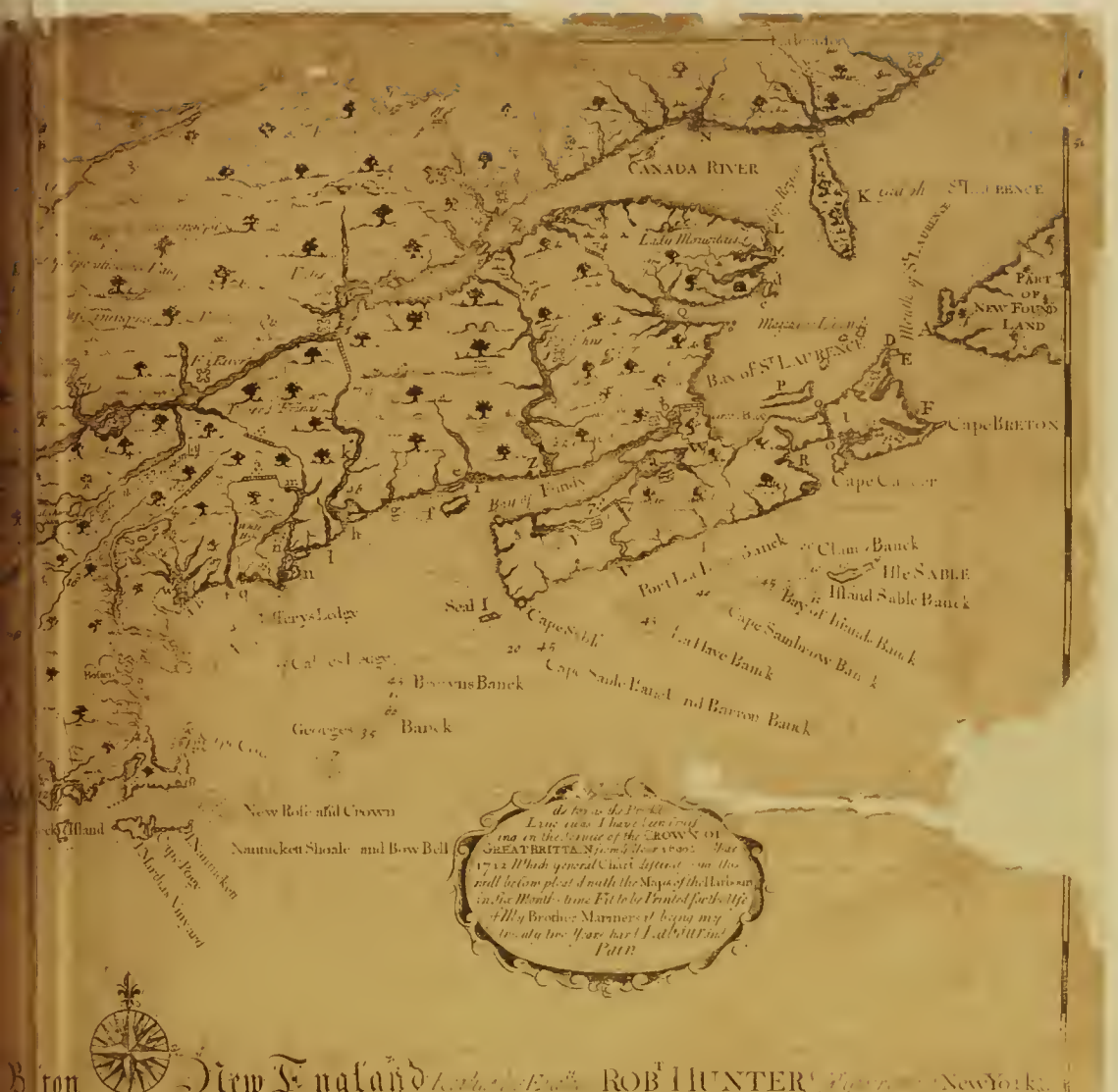
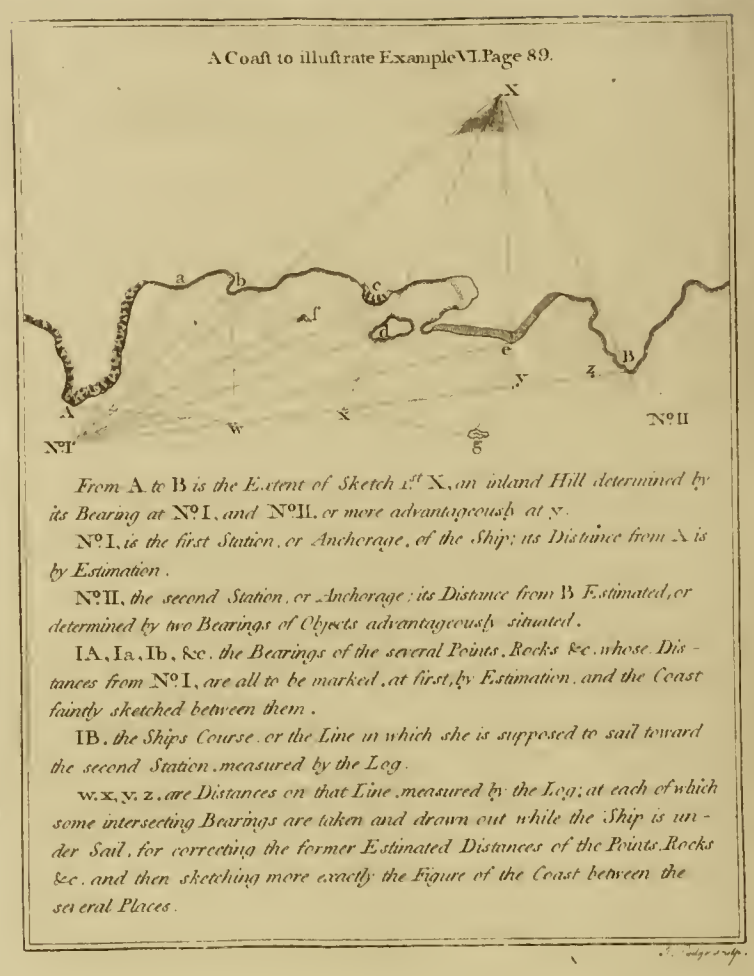


Fig. 5.8 Cyprian Southack, *A new chart of the English empire in North America.* Boston, 1717.

This was the first engraved chart or map to be published in the English American colonies, and indeed the oldest copper engraving produced in America of which copies are still extant. Captain Southack of the Royal Navy knew the waters off New England particularly well.



1	York River & Branches	From head of Shallop River Branch	of Pisiaquid to Mount Royal	Cap Ray	
2	James River & Branches	to Connecticut River Branch	in 7 Days from Mount Royal	cape Lawrence	
3	Albemarle River & Branches	From Chiquate Lower Road	to the city Quebek in 2 Days	Island St Paul	
4	Pantage River	to Green Bay	la Jeune Marquis De Vaudreuil	Island Gaspe	
5	Carolina River & Branches	From upper Branch of St	villages of Indians from city Que	Gaspe Rock and Harbour	
6	Wateree River & Branches	John River to Canada River	take to gether Nicholson Charlevoix	The 7 Islands	
7	Charles Town	Branch where Mr Nelson call	Wood track & took all Prisoners they	Island St Johns	
8	Cooper River	Flying & Capt Alden when take	carried him from Wood Creek to	Bay Chaleurs	
9	Ashley River	in Prisoners by the French in	champlain to Mount Royal & to	Cape Gambremont	
10	Point Royal	in the Year 1690 were carried	city Quebek in 11 days	La Hare River & Branch	
11	Gambale River	Prisoners to Quebek	From Lappen y Elo Branch	Peninsula	
12	Stone River	From La Have Branch to	in Pisiaquid River to Merri	Almapolis Royal	
13	Wallis River	Mines Branch	mack Branch at End	St Johns River & Branches	
14	St Mathews River	From Mines branch to Cumb	From a Branch intermediat	Mines River	
15	Pisiaquid or Bay	polis Royal branch	River of Pisiaquid in Lake Chi	Island Bonaventure	
16	Pisiaquid Bay		plain	Island Percé	
17	Canadian River	From upper branch of Pisiaq		Rivers of Pesiamaquoddy River	
18	St Lubaine River	uot Riv to canada River wate	From Hudsons River branch to	great Manans Islands	
19	Dais River	General Nicholson sent Coll	branch of Lake Champlain	Makises River	
20	Dmaijnes River	Livingston to the Marquis de	From Lake Ilinoways to Senaki	Mount Desart Island	
21	River De quatani	Vaudreuil gave Quebek in	into great River Mississippi	Wolves Island	
22	Island St George	Year 1710	From branch in Hudsons River	Penobscot River	
23	River Bafe	From Branch of Kennebek Ri	ion Indians Lake or River	St Georges River	
24	Bafe Islands	ver to Branch of Ri St Francis	From the Branch Cadenaqui	Kennebec River & Branches	
25	Bay de Espirito Santo	From Branch of this River to	River to the Branch of Hud	Sagadahoc River & Branches	
26	Tadousac River	Branch of Kennebec River	sons Bay	drowned Island New Settle	
27	Islands St Louis	From Quebecka Branch in to	Fort Massinibas	Parkers Islands	
28	Red Island	Pisiaquid River to Lake Sherin Merri	Fort St Anne	Casco Bay & Branches	
29	Island Lavern	mack River to a Branch of	Fort Louis Burnt	Lake Pelsaulagamu	
30	Island Condrie	Frames were in Marquis De Vau	Fort St Peter	Lake Taboleb	
31	Island Orleans	carried to Indians to take all of	Fort Mount Royal & city	Lake Pasen	
32	Island Rene Robineau	and Quebek in Year 1711	Falls of St John River	Lake Penopscott	
33	Patacouns Islands	Year were from Mijnas Hister	The Falls of Penobscot River	Lake Pensaquis	
34	Plymouth Bank & Banks	Mines Head were taken at	Falls of Ice River	Island Androsta	
35	Port Royal Harbour	Acadie conquered in	to all point Navigate	cape Gaspe	
				York River	
				Pisiaquid River and Branches	


A Coaſt to illuſtrate Example VI. Page 89.

From A to B is the Extent of Sketch 1st X, an inland Hill determined by its Bearing at N°I, and N°II, or more advantageously at y.

N°I, is the first Station, or Anchorage, of the Ship; its Diſtance from A is by Eſtimation.

N°II, the second Station, or Anchorage; its Diſtance from B Eſtimated, or determined by two Bearings of Objects advantageouſly ſituated.

IA, Ia, Ib, &c. the Bearings of the ſeveral Points, Rocks &c. whoſe Diſtances from N°I, are all to be marked, at firſt, by Eſtimation, and the Coaſt faintly ſketched between them.

IB, the Ships Courſe, or the Line in which ſhe is ſuppoſed to ſail toward the ſecond Station, meaſured by the Log.

w, x, y, z, are Diſtances on that Line, meaſured by the Log; at each of which ſome interſecting Bearings are taken and drawn out while the Ship is under Sail, for correcting the former Eſtimated Diſtances of the Points, Rocks &c. and then ſketching more exactly the Figure of the Coaſt between the ſeveral Places.

Fig. 5.11 **Murdoch Mackenzie, *A treatise of maritime surveying, in two parts with a prefatory essay on draughts and surveys.*** London, 1774.
Mackenzie's *Treatise* laid the practical foundation for British hydrographic surveying for a century.

Murdoch Mackenzie (d. 1797)
***A treatise of maritime surveying, in two parts with a prefatory essay on draughts and surveys.* London, 1774.**

Although preceded by Alexander Dalrymple's more theoretical *Essay on the Most Commodious Methods of Marine Surveying,* which had appeared in 1771, Mackenzie's *Treatise* laid the practical foundation for British hydrographic surveying for the century that followed. Early in his career, Mackenzie had made a survey of the Orkney Islands, and in 1751 the Admiralty first employed him as a civilian surveyor to chart the coasts of Ireland and western Britain. In 1771, Mackenzie retired from active survey work. His nephew and namesake (1749–1829) succeeded him as Admiralty surveyor, while the elder Mackenzie began work on his *Treatise.* While writing this work, Mackenzie came up with the idea of an instrument, the station-pointer, to help in finding a position using two observed angles. Captain George Vancouver took such an instrument with him on his voyage to the northwest coast of North America in 1791. When James Horsburgh, the hydrographer of the East India Company, edited a new edition of Mackenzie's *Treatise* in 1819, Horsburgh noted that most instrument makers were selling the station-pointer that Mackenzie had designed. (FIG. 5.11)

Joseph Frederick Wallet Des Barres (1721–1824).
***The Atlantic neptune.* London, 1780.**

In 1774, the Admiralty ordered Colonel J. F. W. Des Barres of the Engineers, who had been surveying on the American coast with naval volunteers since 1763, to compile an atlas of charts for the Royal Navy to use in American waters. Published in huge folio volumes with a total of 247 plates of charts and colored views of the coastline, it included the composite work of many other surveyors as well as his own. The Admiralty paid him about £4,000 of the £13,000 of his own funds that he claimed to have spent on the project. It was certainly one of the most magnificent publishing projects of that time, or of any time, and resulted in an incomparable book. (FIG. 5.12)

Fig. 5.12 J. F. W. Des Barres, *The Atlantic neptune*. London, 1780.

Among a set of views of Louisburg harbor and nearby locations, this view shows a survey ship and a surveyor in action on the west coast of Richmond Isle, near the entrance to the Gut of Canso.

Charles Blaskowitz
A topographical chart of the Bay of Narragansett.
London, 1777.

Charles Blaskowitz (d. ca. 1835) served as a surveyor under Samuel Holland between March 1764 and December 1775. From May 1777 until 1783, he served as a captain in the Guides and Pioneers. He probably began the work for this chart in 1764, when the Admiralty ordered the Hon. Robert Melville, Governor of the West Indian colony of Grenada, to study Newport and Narragansett Bay as a possible site for a naval dockyard.

At that time, Melville sent back to London a large map by Blaskowitz, which was eventually included in J. F. W. Des Barres, *Atlantic Neptune*, published between 1777 and 1780, for the use of the Royal Navy during the War for American Independence. The *Neptune* represents the first systematic survey of the New England coast.

William Faden published a slightly smaller version of the same chart in 1777, shown here, adding a few place names, and he reissued it again in 1794. French cartographers copied it in a still smaller format for publication in the *Pilote Américain Septentrional* (1778–1779) and the *Neptune Americo-Septentrional* (1780). (FIG. 5.13)

Charles Blaskowitz, *A topographical chart of Narragansett Bay*, from J. F. W. Des Barres, *The Atlantic neptune.*
London, ca. 1780. [Copperplates].

In 1949, the Admiralty in London deaccessioned from its hydrographic collections the original copper plates for the *Atlantic Neptune* and presented them to various institutions in the United States. The John Carter Brown Library received the two plates from which the chart of Narragansett Bay was printed along with the plate for Newport harbor.

Charles Blaskowitz, *Newport harbor*, from J. F. W. Des Barres, *The Atlantic neptune.* London, ca. 1780. [Copperplate].

In 1949, the Admiralty in London deaccessioned from its hydrographic collections the original copper plates for the *Atlantic Neptune* and presented them to various institutions in the United States. The John Carter Brown Library received the plate for Newport along with the plates for Narragansett Bay.

Osgood Carleton (1742–1816)
A new chart of the N.W. coast of America. Boston, ca. 1799.

This is the only surviving example of the chart that Osgood Carleton produced of the northwest coast of North America. It is based on George Vancouver's original surveys made in 1795. Carleton dedicated this chart to "teachers and underwriters in the United States of America" and intended it for those in Boston who were promoting New England trade to this recently opened portion of the Pacific coast. Carleton was born in 1742 in New Hampshire. As a young man he learned how to survey while serving in the British army during the French and Indian War. He fought on the colonial side in the American Revolution, and served at the Battle of Bunker Hill. After independence, he kept a shop in Boston on Oliver's Dock and established a school to teach cartography, navigation, and mathematics.

Carleton first appeared in connection with marine cartography when Matthew Clark (1714–1798) published the first maritime atlas to be produced in America: *Charts of the Coast of America from Cape Breton to the Entrance to the Gulf of Mexico* (Boston, 1790). The Boston Marine Society asked Carleton to approve the charts in this atlas by signing the plates and the proof sheets of each chart. Following completion of this project, Carleton was closely associated with John Norman (ca. 1748–1817) and his son, William (d. 1807), in producing a number of maps of New England, Massachusetts, and Boston as well as the charts in two different pilots for the West Indies (1795 and 1803) and *The New East India Pilot* (1804). (FIG. 5.14)

Charles Wilkes (1798–1877)
Narrative of the United States exploring expedition during the years 1838, 1839, 1840, 1841, 1842. Philadelphia, 1845.

The U.S. Exploration Expedition, or the Wilkes expedition as it is more commonly known after the name of its commander, was the first great American national scientific enterprise. Carried out in the tradition of the major European exploring voyages to the Pacific that had preceded it, such as those of Cook, Ross, Dumont d'Urville, and Krusenstern, the Wilkes expedition charted the Fiji Islands, verified that Antarctica was a continent, and charted the Columbia River area of North America. Over a period of four years, the expedition collected anthropological, botanical, geological, oceanographical, and zoological specimens, which eventually found a home in the newly established Smithsonian Institution.

Fig. 5.13 **Charles Blaskowitz, *A topographical chart of the Bay of Narragansett.*** London, 1777.

The survey for this chart of Narragansett Bay was probably begun in 1764, when thought was being given to developing Newport as a site for a possible British naval dockyard.

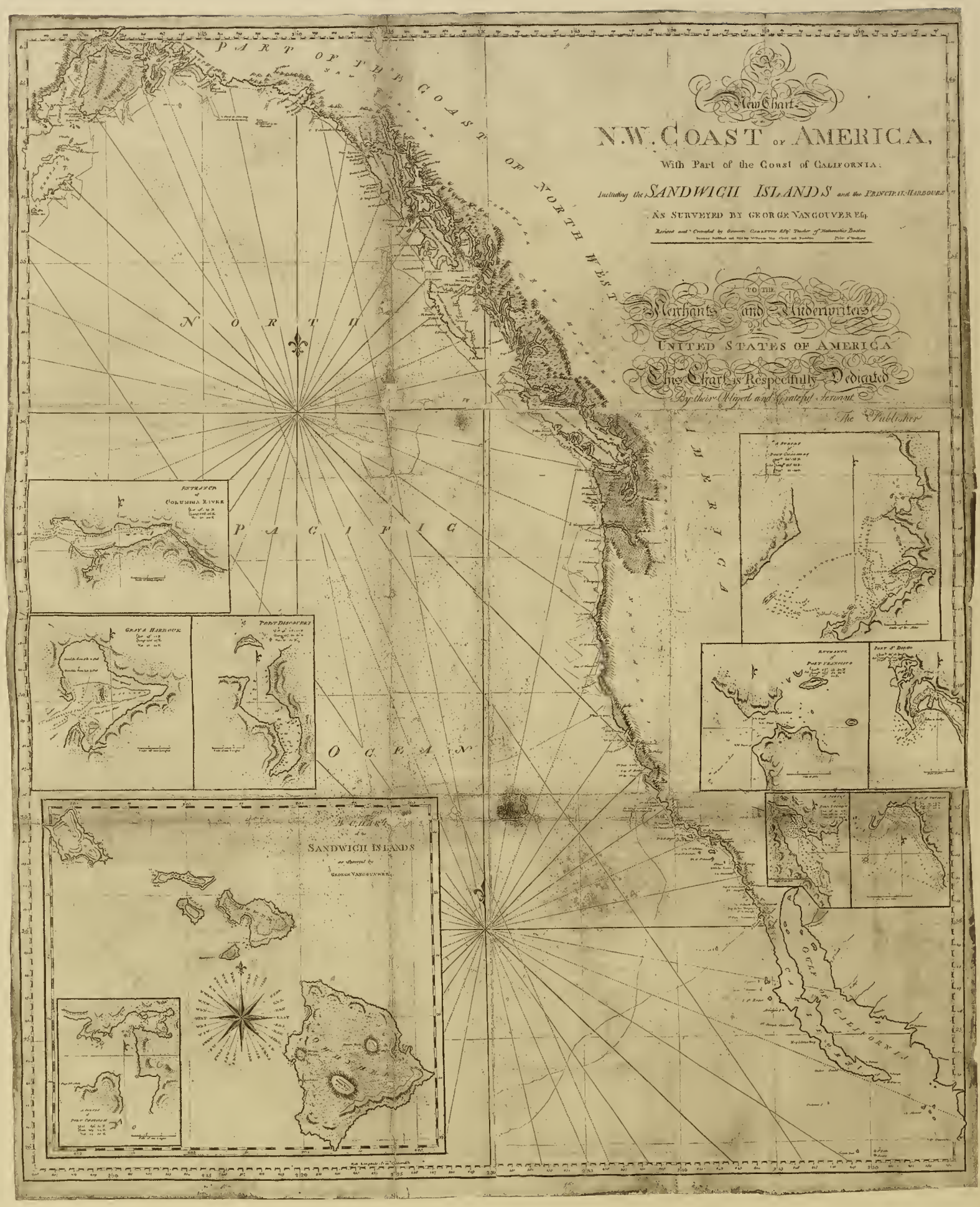


Fig. 5.14 Osgood Carleton, *A new chart of the N.W. coast of America*. Boston, ca. 1799.

This is the only surviving example of the chart that Osgood Carleton produced of the northwest coast of North America. It is based on George Vancouver's original surveys made in 1795.

Sea Routes

The world's sea routes in the age of oceanic conquest were determined by broad global patterns of winds and currents. These patterns were not well understood until the mid-nineteenth century, but seamen slowly built up knowledge of them as science progressed and through trial and error, exploiting them to advantage.

Fracanzano da Montalboddo (fl. 1507–1522)
Itinerarium Portugallensium e Lusitania in Indiam & inde in occidentem & demum ad quilonem. Milan, 1508.

Perhaps the greatest of all European efforts to establish a new sea route came early, namely Portugal's success in finding a way to reach India by circumnavigating the southern tip of Africa. The first Portuguese ventures along the west coast of Africa began in the first quarter of the fifteenth century. Hundreds of voyages followed, systematically probing southwards, until Bartolomeu Dias in 1488 rounded what we now call the Cape of Good Hope. By 1498, Vasco da Gama arrived in Calicut. The *Itinerarium Portugallensium* contains the first separately printed map of Africa, and it reveals that the Atlantic and Indian oceans are connected. (FIG. 5.15)

Bowles's new one-sheet chart of the Atlantic or Western Ocean. London, ca. 1794.

In most respects this chart is typical of the cartography being produced in London at the end of the eighteenth century. Unusually, however, this one shows the main trans-Atlantic routes. Passages from England to America are labeled upside down, while the return routes are labeled right side up. Among the returning routes, there is a line showing the passage of the Spanish silver *flota* to Cádiz. The suggested passages to America include the northern route, and the northern limits for a passage to New York, Virginia, and the Carolinas.

Fig. 5.15 Fracanzano da Montalboddo, ***Itinerarium Portugallensium e Lusitania in Indiam.*** Milan, 1508.
This is the first separately printed map of Africa, and it revealed that the Atlantic and Indian oceans are connected.

Way Stations

In the era of oceanic conquest, way stations to more distant destinations were often islands in mid-ocean whose geographic location fit conveniently into wind patterns. Often providing a safe anchorage and a natural water supply, some of these islands developed commercially to the point of being able to supply food and wine, while others remained important solely for their role as navigational markers.

Benedetto Bordone (d. 1539)
Isolario di Benedetto Bordone nel qual si ragiona di tutte l'isole del mondo. **Venice, 1534.**

Bordone's book was among the first to go beyond the century-old Italian *isolario* literary tradition of describing Mediterranean islands, by including in his work more distant islands in the world's oceans. His focus on the Atlantic islands underscores their great importance to the initial European venture into the unknown seas. The Canary, Madeira, and Azores islands became extensions of Europe in the fourteenth century, and the Cape Verde Islands in the mid-fifteenth century. The Canaries provided supplies to Columbus. In the seventeenth and eighteenth centuries, the Azores and Madeira played important roles as way stations for shipping between England and North America as well as a way station for Spanish treasure fleets returning from the West Indies. Because of their key strategic position, the islands were the site of many naval battles.

Jan Huygen van Linschoten (1563–1611)
Itinerario. **Amsterdam, 1596.**

The South Atlantic island of St. Helena was an important way station. The Portuguese explorer João da Nova Castella had discovered the island on 21 May 1502, the anniversary of St. Helena, the mother of the Roman Emperor Constantine, but for some years it remained otherwise unknown until English and Dutch ships encountered it on the passage to and from the East Indies. The Dutch may have occupied the island for a time between 1645 and 1651, but the English East India Company took possession of it in 1659. The Dutch captured it in 1672, but Captain John Munden in H.M.S. *Assistance* retook it the following year, re-establishing English control. During the eighteenth century, it was the way station that often marked the beginning and end of naval convoy for Asian-bound ships in the Atlantic.

The illustration of St. Helena is from one of the greatest of maritime books, Linschoten's *Itinerario*. In the realm of seafaring literature, it is the foundation stone of the Dutch maritime empire. A Dutchman, Linschoten gathered valuable information about the Portuguese empire while traveling in Asia and, in this book, urged his countrymen to compete in the commercial world of the Indian Ocean. Not long after, in 1602, the Dutch East India Company (V.O.C.) was established. (FIG. 5.16)
(See page 84, above).

Fig. 5.17 John Seller, ***Atlas maritimus***. London, 1675.

Among the world ports in the seventeenth century, Tangier was dramatically different in being man made. Seller probably took this view of the mole from one made in 1669 by Wenceslaus Hollar. In contrast to Seller's larger and more ambitious work, his series of *English Pilot* books, the charts and views in his *Atlas maritimus* were typically copied from earlier Dutch material. (See page 115, below).

Fig. 5.19 Pieter Goos, ***De zee-atlas ofte water-wereld.*** Amsterdam, 1675.

Pieter Goos was one of Amsterdam's most prominent booksellers. He published his first pilot book in 1650, *Lichtende columne ofte zee-spiegel.* Goos first published his *Zee-Atlas* in 1659 and reprinted it about sixteen times, with a number of variations. (See page 117, below).

Destinations

The destinations of sailing ships in the age of oceanic conquest were as varied as their activities. Some destinations were large world-class ports, while others were regions of island-filled seas, or clusters of small coastal trading posts. In many cases, Europeans created destinations by either founding new settlements or by developing existing local settlements into destinations that could serve shipping and trade. At the same time, the home port to which a vessel returned following a naval expedition or a trading voyage was also an important destination and one that historians sometimes forget to consider.

John Seller (fl. 1658–1698)
Atlas maritimus. London, 1675.

The conquest of the oceans was the means by which Europeans extended their influence to distant parts of the world. Once they had crossed the ocean, they had to get ashore to establish their presence, start settlements, or promote trade. In most cases, Europeans took advantage of local geography in doing this, but in some rare cases a natural harbor was absent, which was the fundamental requirement for a port. One extreme example of this problem existed in Tangier, where Englishmen went to extraordinary lengths to construct a suitable harbor for their ships.

In the early seventeenth century, corsairs from the North African regencies of Algiers, Tunis, and Tripoli regularly attacked English shipping in the Mediterranean. When England acquired Tangier as part of the treaty with Portugal that accompanied Charles II's marriage to Catherine of Braganza in 1661, the acquisition was hailed as a major step toward protecting English trade at the entrance to the Mediterranean. Tangier lacked a natural harbor, however, and to remedy the deficiency the English constructed an artificial port by building a mole, or breakwater—an engineering project that was on a scale never before attempted. When the English abandoned the colony in 1684, the mole was, with great difficulty, destroyed. (FIG. 5.17) (See page 113, above).

Hendrick Doncker (1626–1699)
The sea-atlas of the watter-world, shewing all the sea-coasts of y known parts of y earth. Amsterdam, 1660.

The eastern Indian Ocean and the China seas were important destinations for the rival European East India companies. The chart of that region in this volume is particularly interesting for the information it includes from Dutch exploration on the western and northern coasts of Australia. Another chart in this atlas relates to the other side of the world, "Nieu-Nederland, Virginia and Nieu-Englandt." It was the first to show the place-name "Providence" on a printed map, spelled "Profedens." Farther down the bay is "Rood eylant" known today by a form of its Indian name, Aquidneck Island.

Hendrick Doncker, a book and chart seller in Amsterdam, published a pilot guide in 1655 and then, in 1660, this sea atlas. He was particularly respected for his efforts to keep his charts up to date. A faulty chart at any time could expose a ship to mortal danger. One of the most prolific publishers in the late seventeenth century, Doncker issued his maps and charts in atlases in which the title page and frontmatter had been translated into English, French, or Spanish, but typically the contents were the original Dutch maps. (FIG. 5.18)
(See page 86, above).

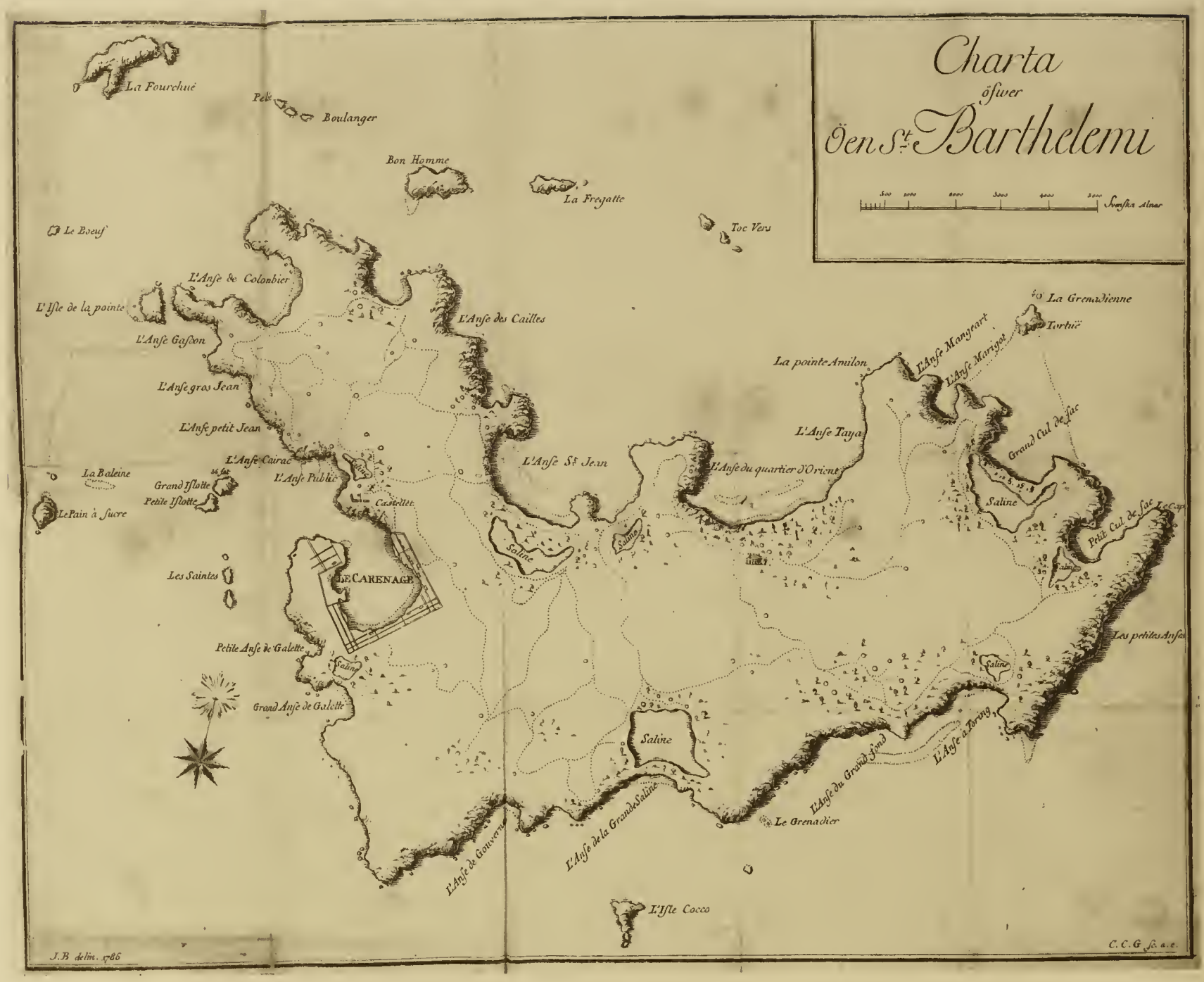


Fig. 5.20 **Sven Dahlman,** ***Beskrifning om S. Barthelemy, Swensk Ö uti Westindien***. Stockholm, 1786.

After King Gustav III of Sweden declared the West Indian island of St. Barthélemy a free port in September 1785, the harbor of Gustavia (shown here as "Le Carenage," a place to careen ships for repair) quickly became a major center for circumventing British navigation laws, temporarily providing a place for Americans to trade with English merchants in the West Indies without entering a British port.

Pieter Goos (ca. 1616–1675)
***De zee-atlas ofte water-wereld*. Amsterdam, 1675.**

The African coast on the Bight of Benin and the Gulf of Guinea was an important destination for seafarers and a region of frequent maritime trade for many European merchants. From 1515 onwards, a number of European states, including Brandenburg-Prussia, Denmark, the Dutch Republic, England, Portugal, and Sweden, maintained fortified trading posts on the so-called "Gold" and "Slave" coasts.

Pieter Goos was a prominent Amsterdam bookseller. He published his first pilot book in 1650, *Lichtende columne ofte Zee-Spiegel*. His *Zee-Atlas* first appeared in 1659, and it was reprinted about sixteen times, with a number of variations. It was not an original work, and was designed for "gentlemen and merchants" as well as "sailors and pilots." (FIG. 5.19)

Arnoldus Montanus (1625?–1683)
***De nieuwe en onbekende weereld: of beschryving van America en 't zuid-land*. Amsterdam, 1671.**

The islands of the Caribbean presented a wide range of differing types of destinations for sailors. Columbus discovered St. Martin in the Leeward island chain on St. Martin's Day, 11 November 1493. French pirates used the island in 1638, but the Spanish established a small settlement in 1640. After the peace of 1648, French and Dutch prisoners, who had been held on the island during the war, reputedly met and divided it between them, resulting in the dual nationality that continues today with the French side of the island known as Saint Martin and the Dutch, Sint Maarten.

The maker of this atlas, Arnoldus Montanus, came from a family of Flemish cartographers working in Amsterdam. His father was Petrus Montanus, or Pieter van den Berg, and his mother's father was Jodicus Hondius the elder, the Flemish cartographer who had acquired Mercator's plates. The text in the book has been attributed to Olfert Dapper (1639–1689), who, two years later in 1673, published a version of it under the title *Die unbekante Neue Welt, oder Beschreibung des Welt-Theils Amerika und des Sud-Landes darinnen vom Uhrsprunge der Ameriker und Sudländer.*

Sven Dahlman
***Beskrifning om S. Barthelemy, Swensk Ö uti Westindien*. Stockholm, 1786.**

Not far from St. Martin in the Leeward islands, the island of St. Barthélemy had a quite different history as a maritime destination. Following the loss of its North American colony on the Delaware River, *Nya Sverige*, in 1655, Sweden persistently attempted to establish another colony. Immediately after the war for American Independence, Sweden used her long-standing alliance with France to obtain the island of St. Barthélemy in the West Indies. Although she had seriously hoped to obtain Tobago, Sweden accepted this smaller island in 1784. The previous year, Sweden had been the first neutral state in Europe to sign a treaty of commerce and friendship with the newly independent United States. King Gustav III immediately declared the island a freeport, and the harbor of Gustavia quickly became a major center for circumventing British navigation laws, temporarily providing a place for Americans to trade with English merchants in the West Indies without entering a British port. The author of this book, Sven Dahlman, was a naval chaplain in the Swedish frigate *Sprengtporten*, which visited the new Swedish possession for several months in early 1785. (FIG. 5.20)

Jacques Nicholas Bellin (1703–1772)
***Le petit atlas maritime*. Paris, 1764.**

Cartagena in Spain's Murcia province is one of the finest natural harbors on the east coast of Iberia. It serves as a destination for returning vessels, both as a great commercial port and also, since the time of Philip II, an important Spanish naval base. The compiler of this atlas, J. N. Bellin, at age eighteen became the first hydrographic engineer of the French navy when France established its hydrographic service in 1720. He held the post for his entire adult life and was responsible for three major maritime atlases and a large number of charts.

Fig. 6.15 ***Le neptune françois.*** Paris, 1693.

A "First Rate" (*premier rang*) was the largest type of warship and would have often served as an admiral's flagship, as this image depicts. The French navy built twenty-six ships of this size between 1694 and 1700. (See page 93, above).

CHAPTER 6 ACTIVITIES

Sailing ships were not simply a form of transportation easily moving from port to port and uniform in activity. Life at sea encompassed a wide range of activities. Normally, ships' officers and men had prepared for some initial purpose and plan, be it exploration, trade, fishing, or fighting. Whatever their purpose and wherever they planned to go, they were necessarily subject to the hazards and vicissitudes of all maritime operations in the age of sail. They could, as easily as not, find themselves in some unexpected place or be involved in some unexpected type of activity.

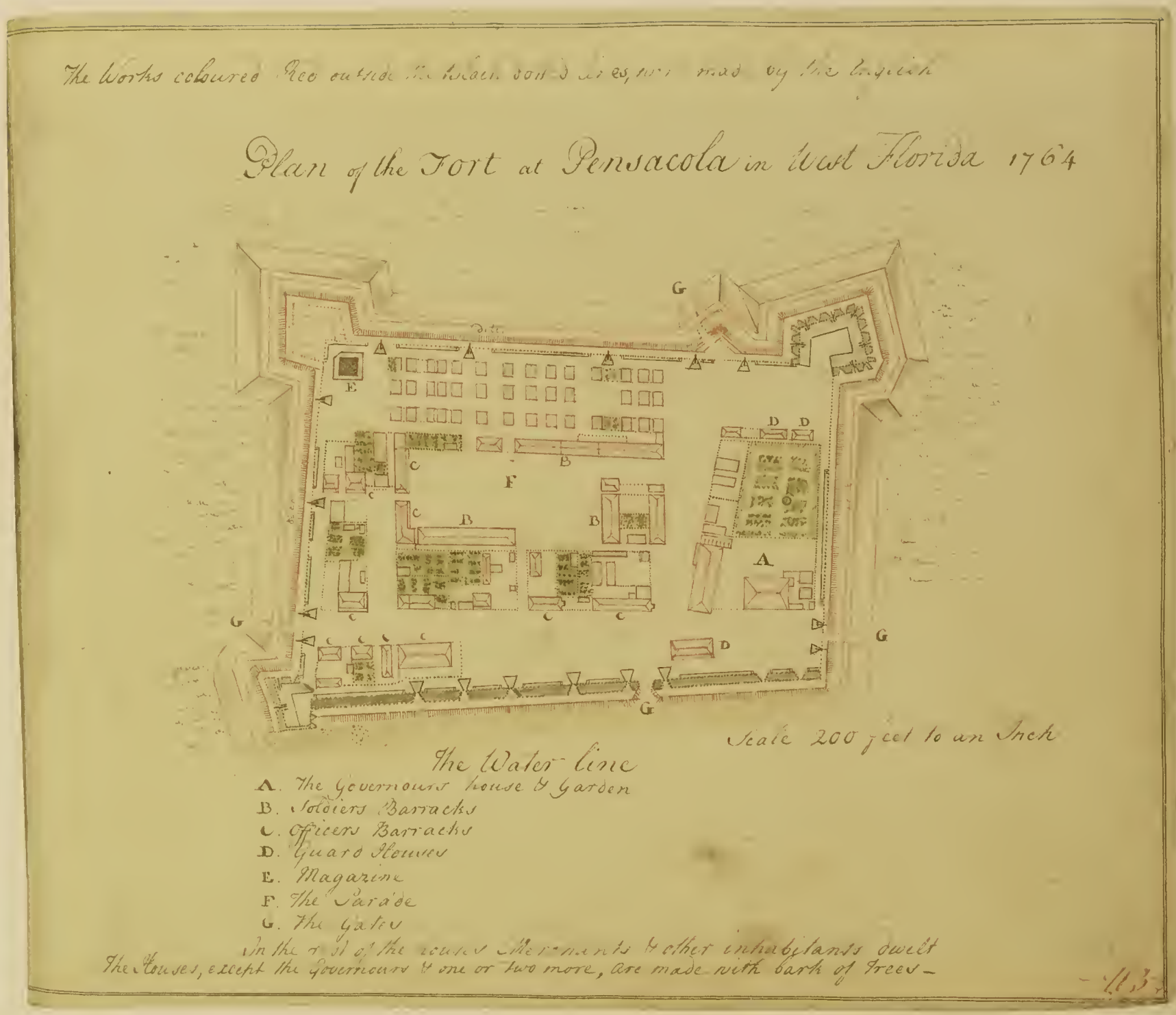


Fig. 6.2 **Diary of a British army officer of the 35th foot in America, 1757–1765.** [Manuscript].

The connection between fortified ports and maritime trade is indicated on this sketch map of the interior of the British fort at Pensacola, Florida, with the homes of merchants inside the fort. (See page 122, below).

Commerce

Trading among human societies exists both for profit and necessity. Commerce across the Indian Ocean and the Mediterranean Sea is as old as human memory. The European conquest of the oceans made possible commerce across astonishing distances, such as the trade from New England to China, which began in the late eighteenth century and could be extremely profitable. Voyaging for purposes of trade included many types of commodities, including enslaved human beings. Whatever the commodity—fish or timber or Madeira wine—each raised particular and material problems requiring solution. Moreover, no commercial voyage was possible without arrangements for financing.

TRADE AND SHIPPING

In the era of oceanic conquest, conflict often centered on the rights of chartered companies and on the granting of monopolies. Related concerns affected individual merchants and small merchant shipping houses as well. Markets and prices were matters of basic interest, but, at the same time, the fortunes of merchants and their shipping activities were deeply affected by such factors as weather, war, peace, and piracy, which could determine the profitability of their trade.

Het groote tafereel der dwaasheid. Amsterdam, 1720.

Joint stock companies provided the funding for a variety of maritime activities, including exploration and colonization as well as trade. Such organizations ranged from the several national East India companies to newer organizations, such as the South Sea Company established in 1711 in the hope that it could play a role in trade with Spain's overseas possessions. In the early decades of the eighteenth century, investment in trading companies, some with only a precarious commercial basis, sometimes became highly speculative.The resulting collapse of such financial "bubbles" created scandal and had serious consequences. This Dutch caricature, relating to John Law and "The Mississippi Bubble," visually connects that financial crisis with the sea. The Dutch town of Enkhuisen is in the background. (FIG. 6.1) (See page 123, below).

Peleg Peckham
"A jornell of a pasage by Gods permission from Rhod Island ... to the Island of Barbados, 1742." [Manuscript]. 1742.

During the colonial period, Rhode Island was well-known for breeding horses and supplying them to other areas. In the entry for 5 January 1741/42, written in the sloop *Ranger* on a twenty-nine-day passage from Newport to Barbados carrying horses for the British army, the master Peleg Peckham describes the risks and difficulty of shipping horses in heavy weather. Apparently, Peckham was not using slings for his cargo of horses, although certainly the Spanish had long been using them.

> This last twenty four hours stormy weather began: with the wind at the East and since has shifted to the SW & SSW. Blows very hard with a very large Sea. The weather is so bad that we have had ten horses down at a time and I am doubtful if this weather holds any time we shall loose the greatest part of them.... Indeed there is one of Master Cory's that I fear we shall loose [unless?] the weather break up as soon as it will for he has got hurt by some others when they were all down in heaps trampling on one another, but if the weather breaks up some I shall do my possible to raise him and in deed to them all if it lays in my power. I have a very good parcel of men and a tite vessel otherwise I should have lost some of them before this time but I am in great hopes we shall carry all or near all of them but that horse that I mentioned that was hurt and there is two more that can stand but a little while at a time.

Case of the British merchants who traded to America previous to the late war. [London? 1787].

The anonymous author of this pamphlet is occupied with the obstacles that faced British merchants in their attempts to recover the property lost or seized during the American War for Independence. A table in this work shows average annual values of pre-war maritime exports for various commodities that totaled £3,296, 983. As the author argues, the table "gives the reader a tolerable idea of the resources of America, in her natural productions and it will also show that there can be no excuse for with-holding the payment of the British debts on the score of poverty."

Diary of a British army officer of the 35th foot in America, Pensacola, Florida, and elsewhere, 1757–1765. [Manuscript].

This plan suggests the relationship between maritime trade and military protection. While the English officer who kept this diary and drew this plan was naturally interested in showing the key military points for the waterfront fort, many of the buildings were the homes of merchants and ship-owners. (FIG. 6.2) (See page 120, above).

Four typical business documents relating to maritime trade and commerce:

1. Letter from Wall, Tardy & Co., in Haiti, to Nicholas Brown, 4 March 1784. [Manuscript].
2. *Prices current, Cape François, 28th July 1792.* [Haiti, 1792].
3. "Compte de vente de la cargaison du bateau Le George parlementaire de Rodisland Capt. Sieur William Earl . . . à Jacmel, 16 Avril 1760" [Manuscript]. 1760.
4. Portage bill of sloop *Speedwell*, Jos. Kinnicott, Master, 1761. [Printed form with manuscript notations].

This array of four examples of specialized, maritime business papers captures the mechanics of oceanic trade in the eighteenth century. Shown here are (1) a letter from a firm in Cap François, Haiti, telling Nicholas Brown that the markets there "are daily growing favourable for northern produce" including such items as "good staves, young hares, & cod fish." Next is (2) a typical printed list of current commodities with prices written in. The fluctuating prices of goods and of the exchange value of money were the major business factors that a merchant had to contend with on a voyage. Another common document was (3) an account of the sale of cargo, at Jacmel in Haiti, of the *George* from Rhode Island. Finally, on display is (4) a portage bill from the Rhode Island sloop *Speedwell* in 1761, showing the agreement between a captain, crew, and owner on their wages;

Such materials are the traditional types of documents that merchant masters encountered and used. Beginning in the eighteenth century, summaries of much similar information began to be regularly published in business newspapers, of which the best known is *Lloyds List,* the British shipping newspaper that has been published since 1734.

"Journal of the Ann and Hope, Benjamin Page, Jr., 17 July 1798–14 June 1799." [Manuscript]. 1799.

The American China Trade, that is, the commercial voyages from the eastern ports in the new United States to China, was scarcely fourteen years old when the Providence, Rhode Island, firm of Brown and Ives outfitted a vessel for this purpose. In 1797, Benjamin Tallman built a ship to undertake such a voyage for the newly formed partnership between Nicholas Brown and Thomas P. Ives, and they named her for their two wives, Ann Brown and Hope Ives.

A journal of the firm's first voyage to Canton was kept by Benjamin Page, Jr., son of the master of the *Ann and Hope*, Capt. Benjamin Page. On her return passage to Rhode Island with a cargo of specie, china goods, and tea, she visited Australia, and Page's journal contains the earliest description of the Botany Bay area by an American. *Ann and Hope* made five successful voyages for the firm before she was wrecked on Block Island as she was returning from her sixth voyage in January 1806. (FIG. 6.3)

Samuel Marshall (d. 1823)
A treatise on the law of iusurance. In four books.
I. *Of marine iusurances.*
II. *Of bottomry and respondentia.*
III. *Of insurance upon lives.*
IV. *Of insurance against fire.*
Boston, 1805.

This volume is the first American edition of a British work, originally published in 1802, and based on legal cases involving insurance. This work was reprinted four times before 1861 and became a standard resource on the subject. The issues surrounding the business of maritime insurance provide a valuable guide to the nature of the risks involved in merchant shipping. Until the early nineteenth century, for example, slaves were insured as merchandise, but under the new laws designed to halt the slave trade, or at least improve the treatment of slaves, an owner could no longer insure slaves against all risks in transportation, but only against death or injury by natural causes, with no evidence of negligence.

The author, Samuel Marshall, was a serjeant-at-law, that is to say he had received the significant honor in the English legal profession of having been awarded a coif, a round piece of white cloth that the leading lawyers wore on top of their wigs. Until 1837, judges in England were appointed only from among those who were serjeants-at-law.

De MEERMAN van't NOORDER GEWEST
als Opper Directeur der Zee-plaat verkruyers van het verkeerde Pampus
beslaande de Achterhoede van het Papiere Actie-Schouburgs-regiment.

Vrouw Fama bézig met de Meerman te bekranssen.
Huld hem met Haring in zyn ampt als Directeur
Der Meereminnen en des Landtnimfs naar de keur
Van t Wind-en Water-recht gestyft door actie-kanssen
t Schip veerd de schilden van Westvrieslands zeven Steên;
Ook elke Vis-nimf, en de Land-maagd 't Hoofd van alle.
Maar kenbaar merk draagd: t zy van actie-tyd gevallen
Of wapenteekenen. Zy veeren algemeen
De Zeegenwagen aan de voorste zuet me in't boetse.
Door Triton voor gespaan om dat Neptuun is boos:
't Zyn twee Landtnimfen daar men t schuitje voor verkoos.
Doch Juffer Parmerents Meermin raakt hier in't setse.
In plaats van Juffrouw zelf. die't werk zig minst trekt aan
(Schoon ze in't gezicht roemd van de groote stad gelegen
Te wesen) ze is nochtans haar zeevenspan genegen
Om't avrechts Pampus voor de Buysenstad van daan

Te krabblen. Duikt dan ov gezwinde Meereminnen
Gy Modder-mullevs. Zand verkruvers, graavers stoet.
(Zo spreekt de Directeur) zwoeid met geluke moed
Maar wild u, als in't Stiot het Dom-Volk niet verzuinen
Laat haar gelyk een schip gestrand een baak in zee.
U strekken. Zo gy niet kund wis doen afjureeren
Dat als de plaat is weeh, zy nooit zal wederkeeren
Of acht dit liever als iets groots aan uwe vee.
Dus zult ge u voor de ontzaglyke Pampus stad doen heuren
Zo, hoe komt Heeren dus de man zeer (als men zeet)
Die voor Enkhuisen laag, zal menig dan te recht.
In twyfeling u haast voor A.....m aanschouwen
Want zulk journaasement als ge uitgeschreeven hebt.
In cassa zende, een som van deird halff millioenen:
Ze dit maar yaarlyks quam, hoe vast stond ge in uw schoenen
Daar nu Fortunas vloed van u haast weder ebt.

Fig. 6.1 ***Het groote tafereel der dwaasheid.*** Amsterdam, 1720.

This volume of Dutch caricatures ridiculing speculative trading companies was directed specifically at John Law and "The Mississippi Bubble." The image visually connects such financial crises with the sea. The town of Enkhuisen is in the background.

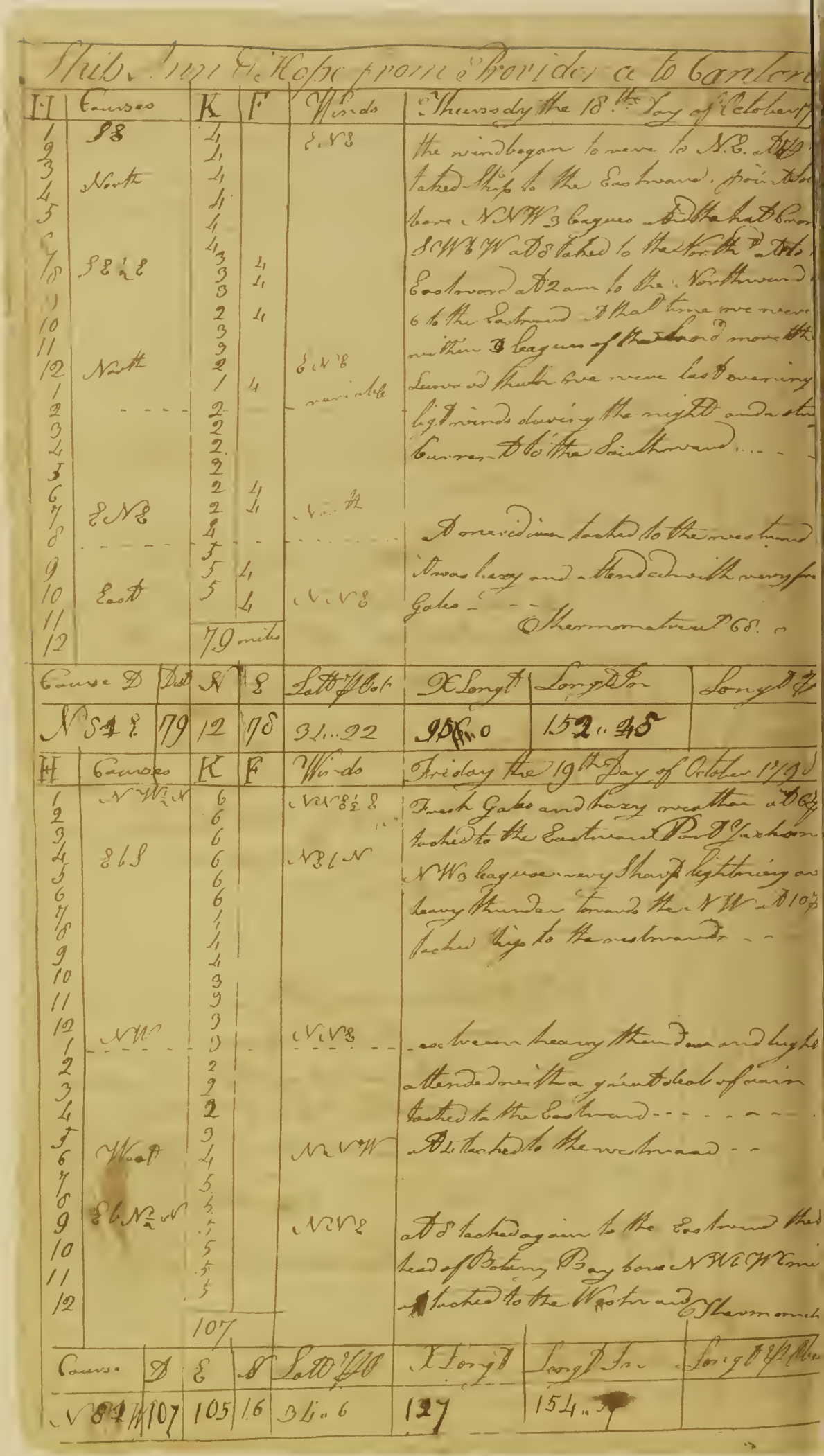
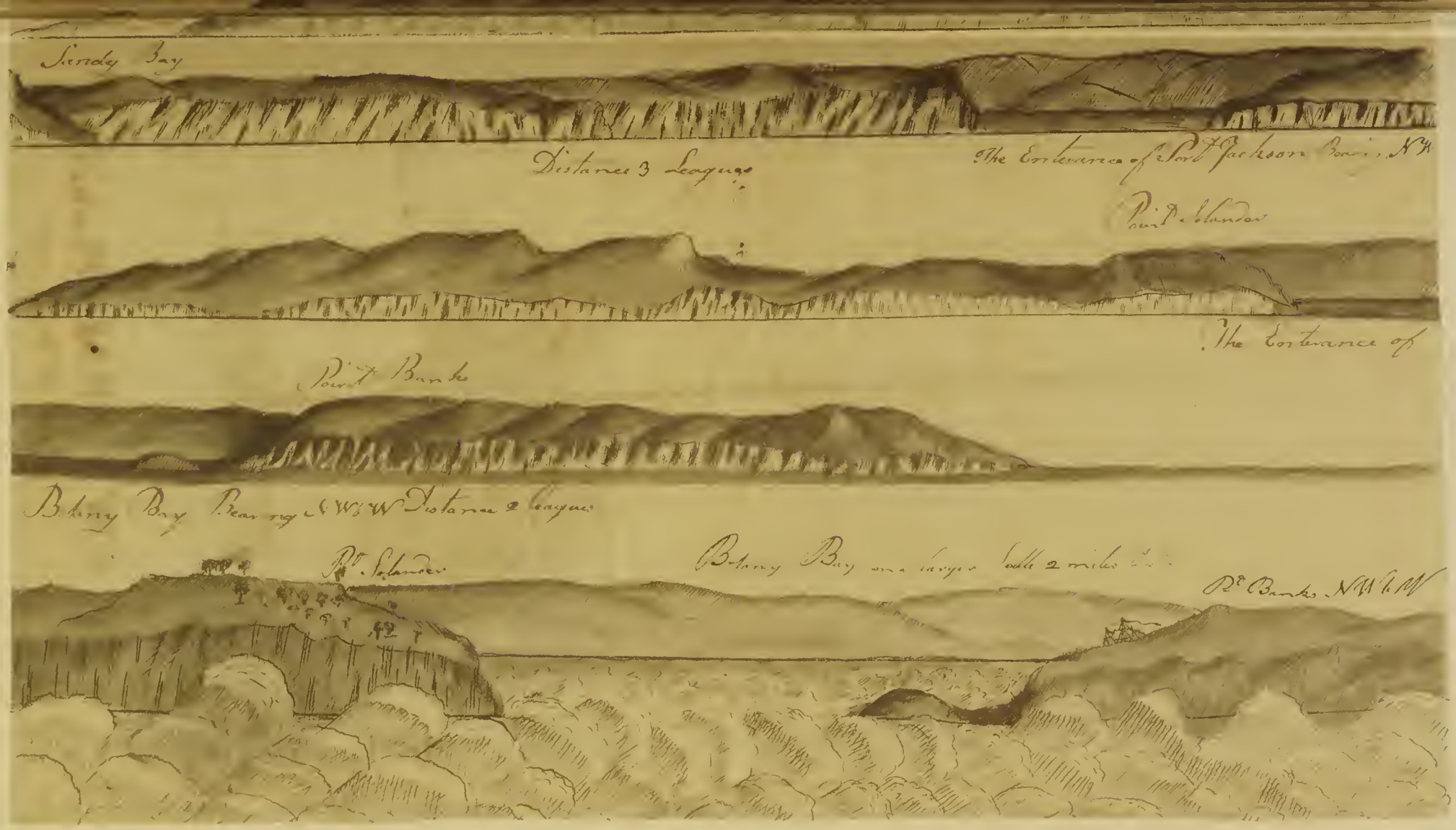


Fig. 6.3 **"Journal of the Ann and Hope,... Benjamin Page, Jr., 17 July 1798–14 June 1799."** [Manuscript]. 1799.

The sea journal of Benjamin Page, Jr., is open to 18–19 October 1798, showing young Page's sketches of the Australian coast at the entry to Port Jackson (modern Sydney Harbour and, to the South, Botany Bay).


Sunday Bay
Distance 3 Leagues
The Entrance of Port Jackson Bearg N.W.
Point Solander
The Entrance of
Point Banks
Botany Bay Bearing N.W. by W. Distance 2 Leagues
Pt. Solander
Botany Bay one League wide 2 miles
Pt. Banks N.W. by W.

THE SLAVE TRADE

The commercial trade in African slaves was one of the oldest and most profitable forms of oceanic commerce, dating back to the fifteenth century. Not only was the Atlantic trade in slaves vast in size and scope, with as many as twelve million Africans having been forcibly brought across the ocean to America in a little over three centuries, it also underlay the development of the Atlantic economy in tobacco, sugar, rice, and other commodities. Thousands of European and American ship owners, ship builders, and seamen were involved in building slave ships and transporting Africans across the ocean to provide the cheap labor that was a major common feature of the competing economic empires in America.

About 3 million slaves were brought to the Americas prior to 1700, predominantly to Brazil, and also to the Spanish colonies and to the British, French, and Dutch islands in the Caribbean. Between 1701 and 1810, another 6 million were imported, again predominantly to Brazil and to the French islands, but with a significant number taken to the colonies that would make up the future United States. The peak of importation into the United States occurred between 1790 and 1800, a decade when an estimated 150,00 slaves were brought into the United States. The horrifying fact about the institution of slavery, and even the trans-Atlantic trade in slaves, is that until late in the eighteenth century it was rarely condemned as an evil, either in America or in Europe. Although the oceanic commerce in slaves was sharply curtailed after 1808, it was not until 1888 that slavery in the Americas was totally abolished.

François Froger (b. 1676)
Relation d'un voyage fait en 1695, 1696, & 1697. **Paris, 1698.**

François Froger de Marennes was an engineer, serving as a volunteer on board the 46-gun vessel *Le Faucon Anglois* in a six-ship French privateering expedition. With 784 men under the command of Jean-Baptiste, comte de Gennes (ca. 1656–1705), the expedition had sailed from La Rochelle and intended eventually to establish a colony at the Strait of Magellan. When those plans failed, the French privateers eventually attacked Portuguese settlements in Brazil before returning to France in 1697. A map in this account shows Fort St. James in the River Gambia on the West African coast, an important entrepôt for slave trading, which de Gennes captured from the English on 27 July 1695. (FIG. 6.4)

T. Aubrey
The sea-surgeon or the Guinea man's vade mecum. In which is laid down, the method of curing such diseases as usually happen aboard, especially on the coast of Guinea; with the best way of treating Negroes, both in health and in sickness. **London, 1729.**

Preserving the health of slaves, who were a capital investment carried as cargo, was an obvious financial interest to merchants and ship captains. Nevertheless, the conditions that slaves endured at sea were of the worst sort imaginable. Mortality was high because of sins both of omission and commission.

Phillippe Fermin
Nieuwe algemeene beschryving van de colonie van Suriname. **Harlingen, 1770.**

This volume describing the Dutch colony of Suriname includes a plate showing slaves rowing a "tent-boat" as a typical means of transport between plantations along the banks of the Suriname and Commewijne rivers and the coastal city of Paramaribo. Slavery associated with the cross-Atlantic slave trade is generally thought of in terms of cheap labor for agricultural work on the sugar cane, tobacco, and indigo plantations. At the same time, images of slaves at work often have a misleadingly benign aspect. The unusual image in this volume provides a rare visual reminder of the maritime dimension of slavery, bringing to mind the slaves and prisoners who rowed galleys in the Mediterranean as well as the fact that numerous African-Americans worked at sea. In a northern town such as Newport, Rhode Island, where 18 percent of the population of the town were African-Americans in 1755, slaves were extensively involved in various aspects of the maritime trade. Certainly in the United States during the early nineteenth century, many freed blacks went to sea. In the period between 1815 and 1850, the number of African-Americans sailing from

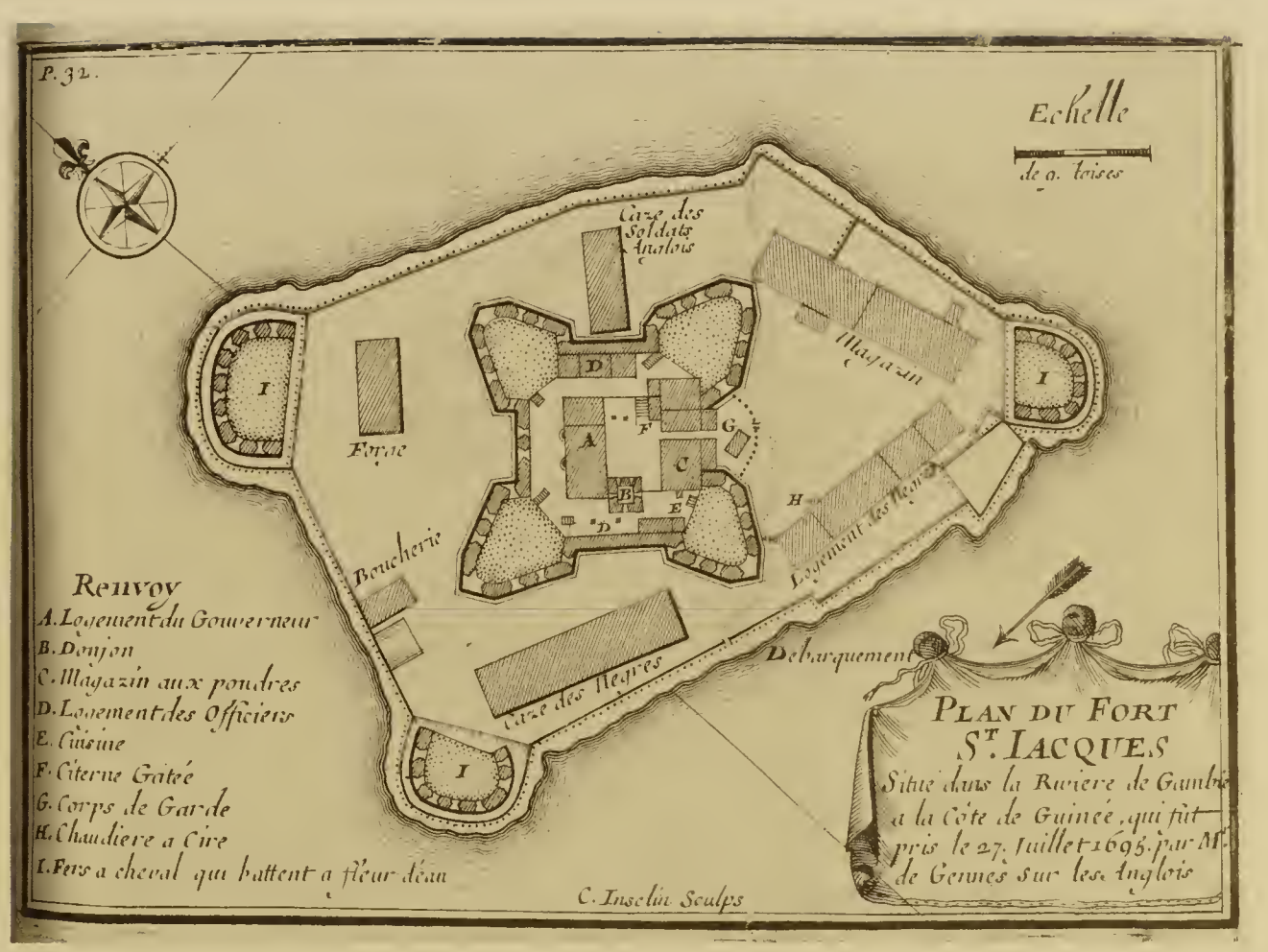
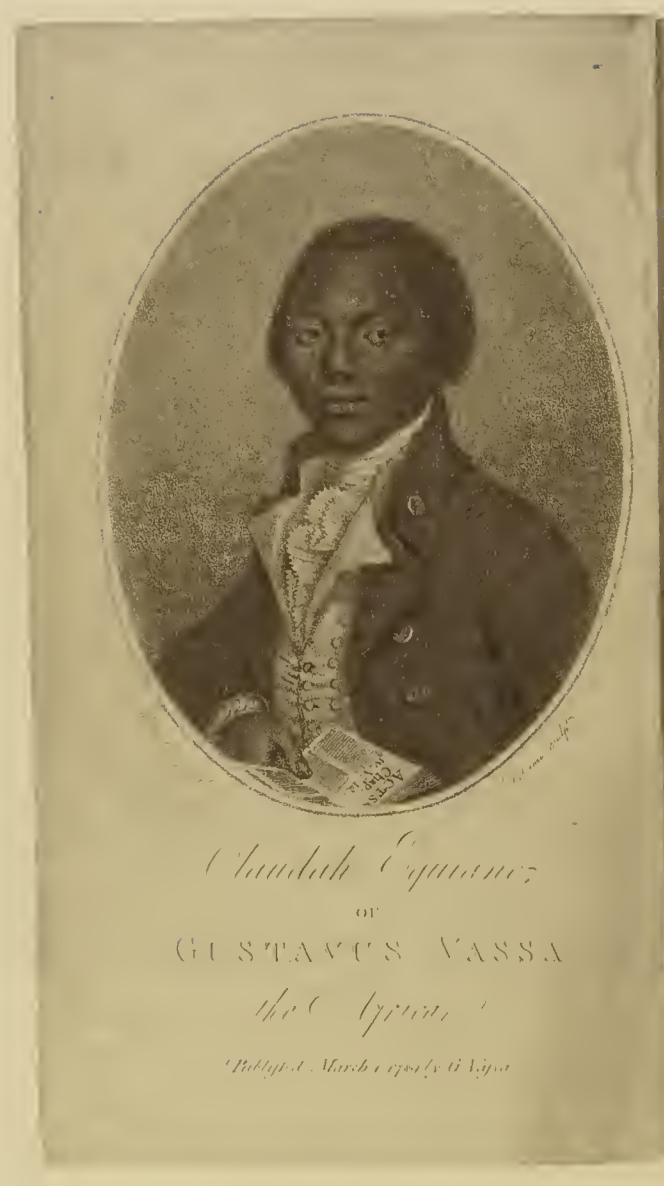


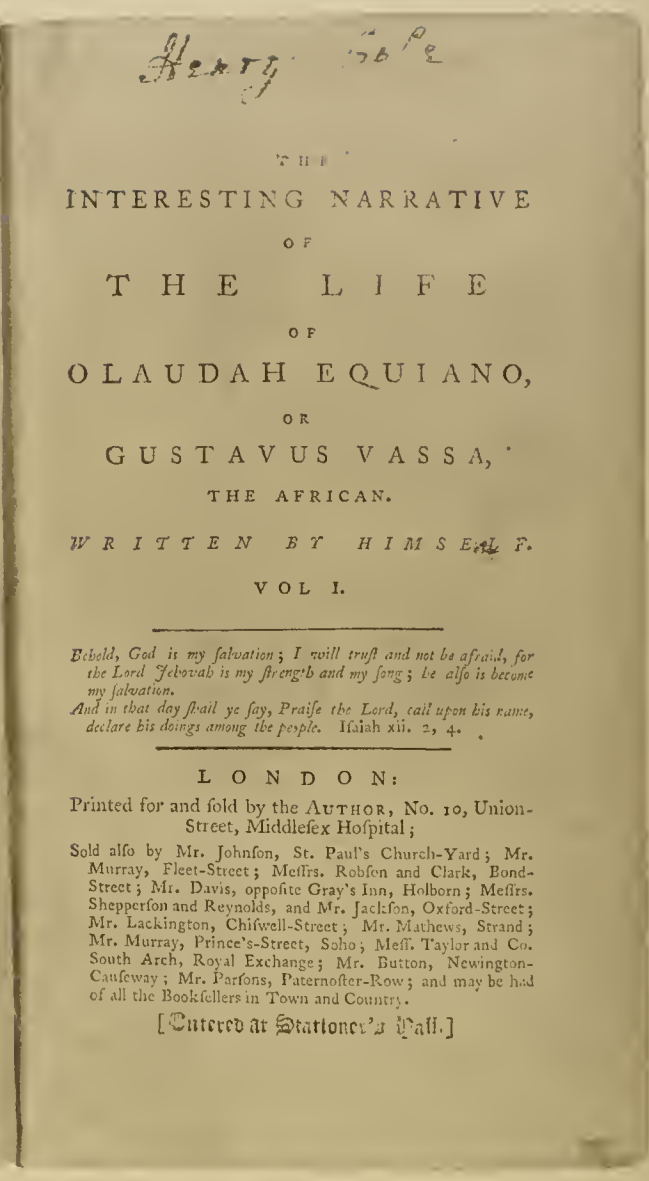
Fig. 6.4 François Froger, ***Relation d'un voyage fait en 1695, 1696, & 1697.*** Paris, 1698.

This map of Fort St. James in the River Gambia identifies the buildings used to confine slaves while awaiting sale and loading on board ships.

Fig. 6.5 Phillippe Fermin, ***Nieuwe algemeene beschryving van de colonie van Suriname.*** Harlingen, 1770.

Reminiscent of the galleys in the Mediterranean, this illustration shows slaves in Suriname rowing a "tent-boat" as a typical means of transport between the plantations along the banks of the Suriname and Commewijne rivers and the coastal city of Paramaribo.





THE

INTERESTING NARRATIVE

OF

THE LIFE

OF

OLAUDAH EQUIANO,

OR

GUSTAVUS VASSA,

THE AFRICAN.

WRITTEN BY HIMSELF.

VOL I.

Behold, God is my ſalvation; I will truſt and not be afraid, for the Lord Jehovah is my ſtrength and my ſong; he alſo is become my ſalvation.
And in that day ſhall ye ſay, Praiſe the Lord, call upon his name, declare his doings among the people. Iſaiah xii. 2, 4.

LONDON:

Printed for and ſold by the AUTHOR, No. 10, Union-Street, Middleſex Hoſpital;

Sold alſo by Mr. Johnſon, St. Paul's Church-Yard; Mr. Murray, Fleet-Street; Meſſrs. Robſon and Clark, Bond-Street; Mr. Davis, oppoſite Gray's Inn, Holborn; Meſſrs. Shepperſon and Reynolds, and Mr. Jackſon, Oxford-Street; Mr. Lackington, Chiſwell-Street; Mr. Mathews, Strand; Mr. Murray, Prince's-Street, Soho; Meſſ. Taylor and Co. South Arch, Royal Exchange; Mr. Button, Newington-Cauſeway; Mr. Parſons, Paternoſter-Row; and may be had of all the Bookſellers in Town and Country.

[Entered at Stationer's Hall.]

Fig. 6.6 **Olaudah Equiano,** ***The interesting narrative of the life of Olaudah Equiano or Gustavus Vassa, the African.*** London, 1789.

Equiano's autobiography, which includes extensive sea experiences, became a literary model for later slave narratives as well as an abolitionist document.

northern ports reached a peak of some 15 to 20 percent of merchant seamen, even though Spanish Cuba and six of the southern states had laws that prohibited African-American seamen from coming ashore while in port out of fear that they might promote slave rebellion. (FIG. 6.5)

Samuel Hopkins (1721–1803)
A dialogue, concerning the slavery of the Africans.
Norwich, Connecticut, 1776.

With this pamphlet and other works, the Rev. Dr. Samuel Hopkins, pastor of the First Congregational Church of Newport, Rhode Island, emerged as an important clerical activist in opposition to slavery. A disciple of the great Calvinist theologian Jonathan Edwards, who was a slave owner, Hopkins interpreted British attacks on American liberty as God's punishment of Americans for upholding the institution of slavery. He perceived the irony of English colonists wanting liberty for themselves while simultaneously denying it to African-American slaves.

When Hopkins began his Newport pastorate in 1770, the city had already earned the dubious distinction of being the most active English slave trading port on the North American mainland. During the 1760s and early 1770s, some 70 percent of American vessels sailing to African waters were from Newport, although the slave trade made up only a tiny part of Newport's total commerce at the time.

From the time of his arrival in Newport, Hopkins preached against the slave trade and became one of its strongest opponents. As a result of Hopkins's criticism, joined by that of the Quaker elder, John Woolman, and the Baptist minister, Gardiner Thurston, the Rhode Island General Assembly passed "An Act Prohibiting the Importation of Negroes into this Colony" in June 1774. While this was the first act passed by any legislature in the British Empire that attempted to restrain the slave trade, Rhode Islanders were so heavily involved in the trade that this and subsequent acts passed in 1784 and 1787 were disregarded by local businessmen.

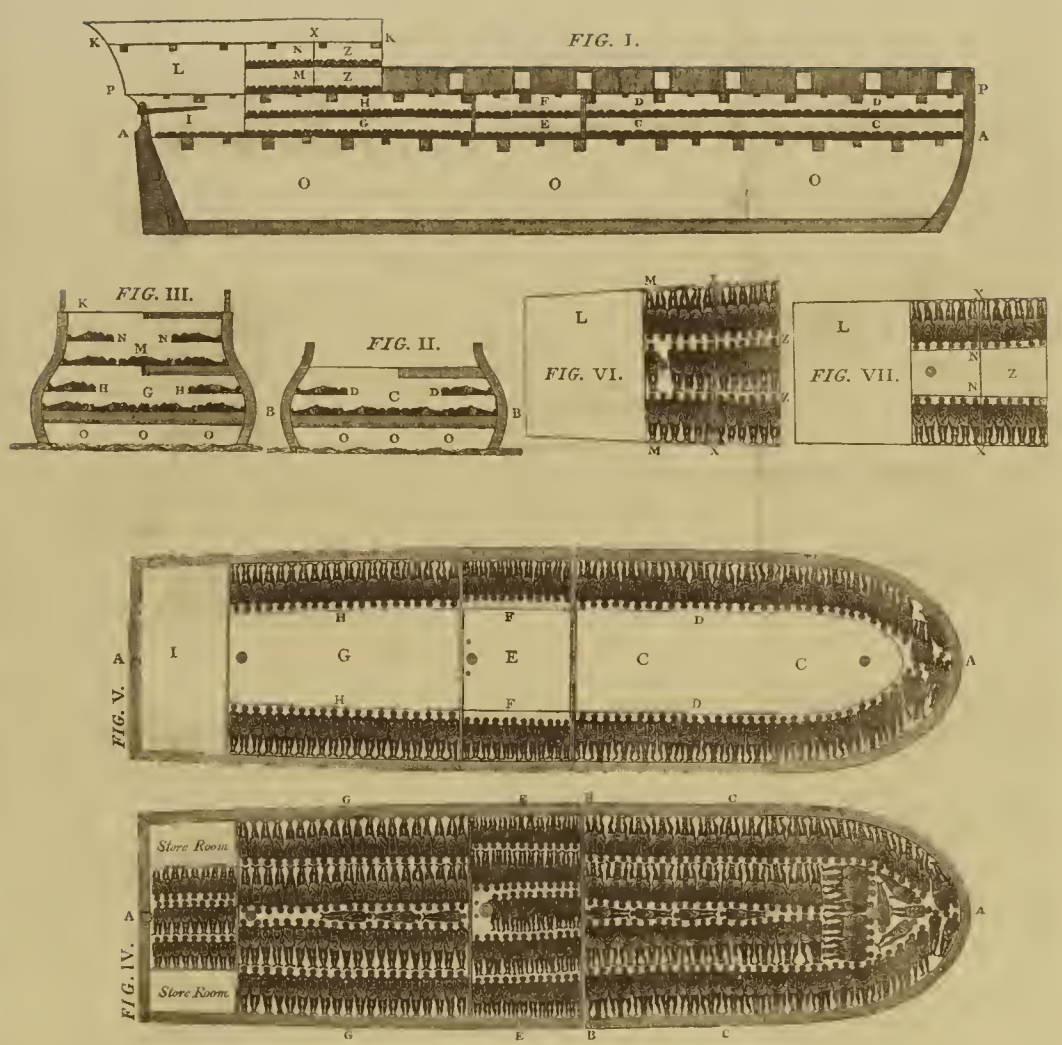


Fig. 6.7 John Clarkson, *Le cri des Africains contre les Européens.* London, 1821.

These diagrams of the way slaves were treated as human cargo in their trans-Atlantic passage were originally created by English abolitionists in 1789. The image soon became an icon of the Africans' terrible ordeal on the Middle Passage.

Olaudah Equiano (b. 1745)
The interesting narrative of the life of Olaudah Equiano or Gustavus Vassa, the African. London, 1789.

Although designed as an autobiographical statement of his faith, this volume by Olaudah Equiano includes the relation of a voyage on a slave ship bound from Africa to Virginia. As an American slave, Equiano was taken by his master to England aboard a British warship, where he subsequently observed Admiral Boscawen's attack on Louisburg in 1758 and then the action between Admirals Boscawen and de la Clue off Cape Lagos in August 1759. Obtaining his freedom, Equiano joined the crew of a vessel that was shipwrecked in the Bahamas from where he was taken to Martinique.

Becoming very popular during the abolitionist fervor of the late eighteenth century, the book appeared in nine editions in Britain between 1789 and 1794, with pirated editions appearing in the United States in 1791, and unauthorized translations into Dutch in 1790, German in 1792, and Russian in 1794. It became both a literary model for other slave narratives as well as an abolitionist document.

In the 1960s, Professor Paul Edwards of the University of Edinburgh and Arna Bontemps, the African-American poet, brought the work to the attention of modern scholars. Recent work has suggested that Equiano may have been born in South Carolina, which would mean that his graphic description of being transported on a slave ship from Africa was not based on his own experience, although not necessarily for that reason lacking in authenticity. (FIG. 6.6)

John Clarkson (1760–1846)
Le cri des Africains contre les Européens. London, 1821.

This volume includes a diagram of slaves packed tightly in the hold of a ship in what one scholar, Cheryl Finley, has called "the slave ship icon." Reprinted repeatedly by modern historians and exhibition designers, this, and its variants, is the only known

graphic representation of how slaves might have been carried across the Atlantic from Africa to the Americas. In Plymouth, England, the local chapter of the Society for Effecting the Abolition of the Slave Trade conceived and first published this image in January 1789, at a time when there was an annual average of approximately 60,000 slaves being exported to the Americas from Africa. Within half a dozen years, the image was copied and reproduced in at least ten different versions in Britain, France, and America. From that point forward, it appeared often in abolitionist books, pamphlets, and broadsides, as well as in government documents. The particular version of the image in this book, printed in French, was taken from an English language text that was translated by Benjamin La Roche. Curiously, the French translation appeared in 1821, while the original English text from which it derived did not appear until the following year. (FIG. 6.7)

Great Britain. Admiralty.
Authorization for British vessels to visit and search French vessels suspected of being engaged in the slave trade.
London, ca. 1833.

Beginning in the late eighteenth century, the abolitionist movement and other factors eventually succeeded in forcing governments to ban the slave trade, but despite the laws that were on the books, the profitable maritime trade in slaves continued as long as there were countries that continued to allow slavery. In Britain, the slave trade was abolished in 1807. The practice of slavery was abolished in all British territories, except India and St. Helena, in 1833. As early as 1811, slave trading was declared a felony in British law, and in 1824 it became a capital offence equivalent to piracy. Shortly thereafter, the Royal Navy began to cruise actively to suppress the slave trade, but the question of British authority to deal with the illegal slave trading activities of ships under foreign flags became a difficult problem that took many years of diplomacy to solve. France and Britain signed conventions to cooperate in this matter in November 1831 and March 1833, but the area involved was strictly limited to the West African coast between Cape Verde and Luanda. To avoid capture, slave traders shifted to using the Spanish flag, and then, when a treaty was signed with Spain in 1835, the slavers sought the protection of the Portuguese flag. In 1839, this loophole was stopped, but many slavers then attempted to misuse the U.S. flag and America's policy of freedom of the seas as protection from British warships. Even after the United States Navy established a regular cruising station on the West African coast in 1843, it proved difficult not only to capture a slave ship, but also to counter the use of false documents and false colors.

Harvesting the Sea

Fishing and whaling are among the oldest and most fundamental maritime activities of human societies. Specialized types of vessels as well as distinctive patterns in social organization and trade developed from fishing. Even before Columbus reached the Americas, the rich fishing off the North American coast may have attracted Europeans to sail in that direction. In the sixteenth century, fleets made annual trips to North American waters to exploit the natural supply of fish as cheap food for Europe's growing population. Later, North American fish provided a major food source for the slave population in the West Indies. As competition between European empires grew, nations began to regulate and control fishing as a resource. These trends also brought rich fishing areas within the sphere of war and imperial competition.

Giacomo Gastaldi
***La Nuova Francia*, from Giovanni Battista Ramusio,**
***Terzo volume delle Navigationi et viaggi*. Venice, 1556.**

In creating the first printed map focused on the area of New England and the Canadian Maritime Provinces, Giacomo Gastaldi decorated the sea areas with interesting vignettes that illustrate contemporary fishing practices. The cartography derives from the maps and reports that Giovanni de Verrazanno made during the first European exploration on these coasts in 1524. (FIG. 6.8)

Fig. 6.8 Giacomo Gastaldi, *La Nuova Francia,* from Giovanni Battista Ramusio, *Terzo volume delle Navigationi et viaggi.* Venice, 1556.

This first printed map of New England shows a variety of fishing activities. Note also on the southern New England coast, the name "Port de Refuge." This is Verrazanno's "Refugio," somewhere close to Newport harbor in Narragansett Bay, where he spent a week. Some scholars believe that Ramusio meant to indicate Newport by the adjoining place name: "Port Reale."

Tobias Gentleman
Englands way to win wealth, and to employ ships and marriners. London, 1614.

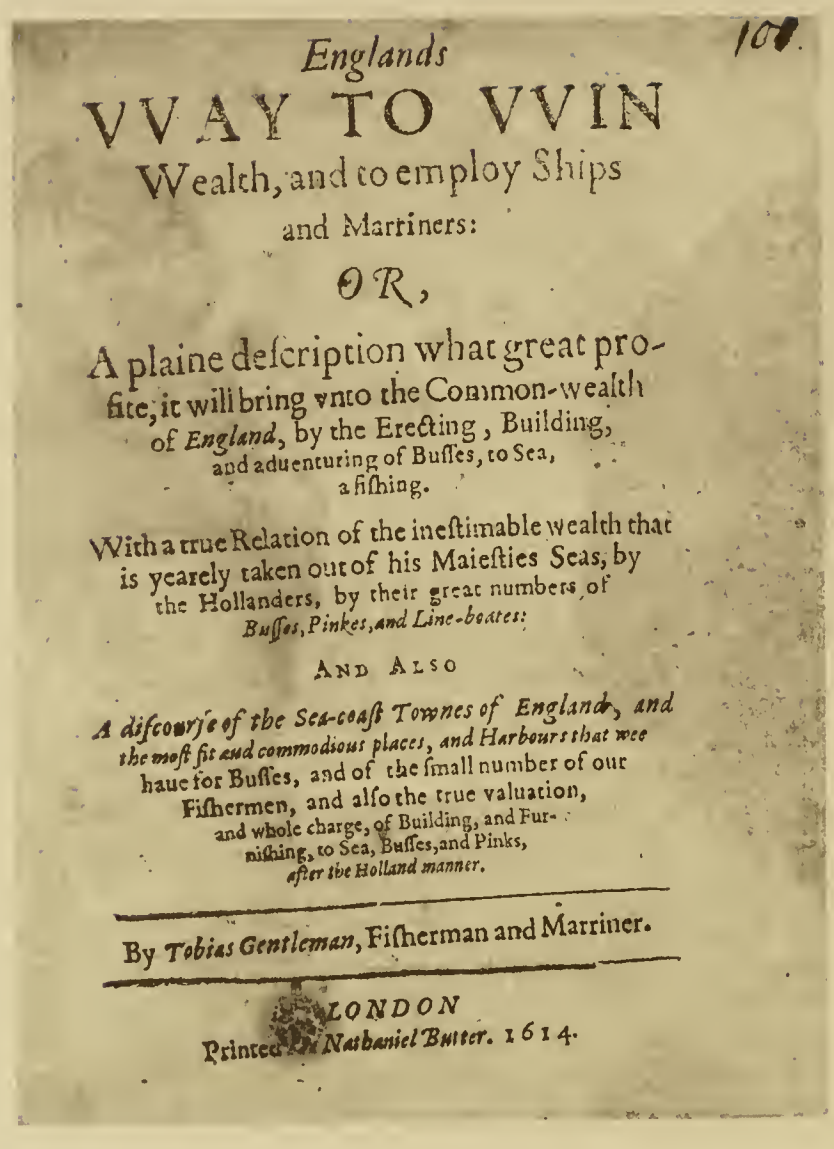
Tobias Gentleman set out the argument that the best way for England to become prosperous was not to seek gold and silver, in emulation of the Spanish, but to follow the Dutch example by gaining wealth through trade, in particular to promote the English herring industry. Little is known of Tobias Gentleman other than that he spent most of his life in the North Sea fishing area off Great Yarmouth, Norfolk. This is his only known writing. The pamphlet's publication in 1614 stimulated a public debate on issues surrounding the herring industry and the best means of building national wealth. (FIG. 6.9)

[Robert Kayll]
The trades increase. London, 1615.

Taking up Tobias Gentleman's argument, the author of this anonymously published work supported Gentleman's view on expanding the herring industry and argued that English merchants should promote free trade as opposed to chartered monopolies. In the course of his argument, the author attacked the East India Company and ridiculed it for the loss of the 1,100-ton company ship, *Trade's Increase,* using the ship's name in the title as a pun. This criticism led the government to discover the identity of the author, Robert Kayll, and to imprison him.

Sir Dudley Digges (1583–1639)
The defence of trade. London, 1615.

Sir Dudley Digges was a powerful and influential supporter of the English East India Company. He rebutted Kayll's attack by using detailed information from the East India Company's records to argue that the Company's trade resulted in a substantial net gain.



Englands
VVAY TO VVIN
Wealth, and to employ Ships
and Marriners:
OR,
A plaine deſcription what great profite, it will bring vnto the Common-wealth of *England*, by the Erecting, Building, and aduenturing of Buſſes, to Sea, a fiſhing.

With a true Relation of the ineſtimable wealth that is yearely taken out of his Maieſties Seas, by the Hollanders, by their great numbers of *Buſſes, Pinkes, and Line-boates:*

AND ALSO

A diſcourſe of the Sea-coaſt Townes of England, and the moſt fit and commodious places, and Harbours that wee haue for Buſſes, and of the ſmall number of our Fiſhermen, and alſo the true valuation, and whole charge, of Building, and Furniſhing, to Sea, Buſſes, and Pinks, after the Holland manner.

By *Tobias Gentleman*, Fiſherman and Marriner.

LONDON
Printed by *Nathaniel Butter*. 1614.

Fig. 6.9 Tobias Gentleman, ***Englands way to win wealth, and to employ ships and marriners.*** London, 1614.

Gentleman's pamphlet stirred up a public debate on issues surrounding the herring industry and its role in the amassing of national wealth.

Edward Sharpe (17th cent.)
Britaines busse. Or, A computation as well of the charge of a busse or herring-fishing ship. As also of the gaine and profit thereby. With the States proclamation annexed unto the same, as concerning herring fishing. London, 1615.

This pamphlet appeared only six weeks after Dudley Digges's defence of the East India Company, and it also directly referred to the earlier pamphlets by Gentleman and Kayll. Little is known about the author, identified as Edward Sharpe, but in his arguments to support Gentleman's defense of the herring fishery, Sharpe shows extensive knowledge about it and underscores Anglo-Dutch rivalry in this area.

England and Wales
A commission for the well governing of our people... in Newfound-land. London, 1633 [i.e., 1634].

Newfoundland was the part of America that Englishmen knew first. Its fabulously wealthy offshore fisheries may have been known and exploited even before Columbus and Cabot, while the trade to Newfoundland certainly became the first regular trade between America and Europe. The Newfoundland trade flourished independently of the settlements in Newfoundland that first appeared in 1610. While the settlements were closely tied to exploitation of the fisheries, they were also involved in other activities, including attempts to find iron, to grow food, and to manufacture glass and soap.

"An account of the colony and fishery of Newfoundland and ye present state thereof." [Manuscript]. London, ca. 1678.

This manuscript was probably written in 1678 and gives a brief account of the history of Newfoundland since its discovery in 1496. It includes a list of the chief harbors from Trepassy to Cape Bonavista, with the numbers of inhabitants, their boats, and the size of their catch in 1677. In 1671, the Council for the Plantations had ordered that the naval commanders who accompanied the annual fishing fleet compile information about Newfoundland. This manuscript, based largely on information from the 1677 voyage, was probably made in compliance with that directive. A manuscript note states, "This MS is perfect, bought in Feb 1742 of the collection of Mrs. Catherine Bridgeman."

The map associated with the manuscript is drawn in the style of the Thames school of cartographers, but cannot be linked to any particular cartographer. It is particularly interesting for its distortion of the actual shape of Newfoundland, exaggerating the known harbors on the western coast, listed on the map, ignoring the interior, and minimizing the eastern coast. (FIG. 6.10)

Fig. 6.10 **"An account of the colony and fishery of Newfoundland and ye present state thereof."** [Manuscript]. London, ca. 1678.

The location of the main fishing ports of Newfoundland are shown on this map drawn in the style of the Thames school of cartography.

Fig. 6.11 **Herman Moll, *Map of North America.*** London 1730. (Detail).

The vignette at the side of this map provides a detailed view of the Newfoundland fishing industry, showing a stage and cod curing. The map contains additional maritime information, including small harbor charts for ten different American ports.

The seas magazine opened: or, the Holander dispossest of his usurped trade of fishing upon the English seas. **London, 1653.**

This anti-Dutch tract, written in the context of events leading to the outbreak of the First Anglo-Dutch War, contains much information on English maritime affairs and interests, including matters in Newfoundland and the West Indies, and about timber in North America. The three Anglo-Dutch wars of 1652–1654, 1665–1667, and 1672–1674 gave rise to a wide literature on both sides of the North Sea, which criticized, explained, or celebrated many of the maritime aspects of these conflicts. Some works, such as *The Seas Magazine Opened,* were anonymous political tracts; others ranged from satire to poetry and included even contributions by major literary figures of the day.

Henry Elking
A view of the Greenland trade and whale-fishery with the national and private advantages thereof. **London, 1722.**

Henry Elking argued the case for promoting and protecting English whaling activities in the Arctic, along with the associated Greenland trade. He describes the crew needed to man a 300-ton whaling ship and the opportunity to find whales among the ice flows in May through July.

Herman Moll (d. 1732)
Map of North America. **London, 1730.**

The vignettes on Herman Moll's *Map of North America* include images of the cod-fishing industry. Moll became one of England's most prolific cartographers, producing a large variety of maps over more than half a century. Probably born in Bremen about 1654, he left his native city during the northern European wars of the 1670s and was in London working as an engraver by 1678. His earliest published work included maps for Jonas Moore's *A New Systeme of the Mathematicke . . . Containing a New Geography* (1681). Moll created the best atlas of his time, *The World Described,* and his maps illustrated a number of maritime books, including Josiah Burchett's naval history, *A Complete History of the Most Remarkable Transactions at Sea,* voyage accounts by William Dampier and William Funnell, and the maps of imaginary islands and mythical lands in Daniel Defoe's *Robinson Crusoe* and Jonathan Swift's *Gulliver's Travels* His most famous single cartographic work is his so-called "Beaver Map" of North America, published in 1715, with an inset of beavers working industriously downstream from Niagara Falls. (FIG. 6.11)

Violence at Sea

The nature of war at sea changed dramatically in the period between the mid-fifteenth and the mid-nineteenth centuries. Until about 1650, war at sea was highly varied, typically governed by local and particular issues rather than by national policies and national fleets. Small groups, warlords, and local and regional authorities were the protagonists of warlike activities at sea. Their activities ranged from individual plundering raids and robberies to the on-going rivalries of factions that were independent of larger governmental authority. By and large, armed vessels that were not part of "state" navies undertook most such activities. This reflected the fact that it was not until the nineteenth century that government navies were able to acquire a nearly complete monopoly on the use of violence at sea.

WAR, BATTLES, AND TACTICS

By the mid-seventeenth century, following the formation of nation-states in early modern Europe, permanent navies began to come into existence. These were bureaucratic organizations that were fully financed and maintained by a national government, using vessels that were designed to fight other similar vessels. These developments paralleled technological advances in ship construction and in weaponry that led to the employment of large guns at sea, which in turn led to the development of formalized tactics designed to maximize the effectiveness of the large guns in battle.

Álvaro de Bazán (1526–1588)
Il succeso de l'armada del Re Filippo. Florence, 1582.

Don Álvaro de Bazán, Marquis of Santa Cruz, was captain-general of Spain's Atlantic fleet from 1584 until his death in 1588, when the Duke of Medina Sidonia succeeded him. Before serving as King Philip II of Spain's captain-general, Bazán had commanded galley squadrons in many Mediterranean naval campaigns, including the battle of Lepanto in 1571. He organized the naval operations of the conquest of Portugal in 1580 and commanded the combined operations in the Azores in 1582 (the subject of this report) and at Terceira in 1583.

Baptista Boazio (fl. 1589–1603)
The famouse West Indian voyadge made by the Englishe fleet. London, 1589.

Sir Francis Drake was the most famous seaman in Elizabethan England. Adventurer, privateer, naval commander, circumnavigator, and explorer, he has long been of interest to the John Carter Brown Library, whose Drake collection is equaled in the United States only by that of the Library of Congress. This engraved map was issued separately to illustrate Drake's predatory voyage across the Atlantic, and probably it preceded the narrative accounts that participants published. It shows the track of Drake's fleet from its departure at Plymouth in September 1585 until its return to Portsmouth in July 1586. Elizabeth I ordered Drake to undertake an attack on Spain's American colonies as a preemptive strike to divert Spanish plans to invade England. During the voyage, Drake attacked Santiago in the Cape Verde Islands and Santo Domingo, Cartagena, and St. Augustine in the Americas. On his return voyage, he called at Roanoke, Virginia, where the mathematician Thomas Hariot and the artist John White embarked for the return passage, carrying with them their unique views and descriptions of America.

Baptista Boazio drew the map from first-hand knowledge. Attached to Captain Christopher Carleill, commander of the *Tiger* and the expedition's lieutenant-general and chief military officer, Boazio is mentioned in several accounts as a page or messenger sent to the Governor of Santo Domingo during Drake's attack. This map is Boazio's first known work. Another uncolored version of the map has six printed columns of text pasted along the bottom edge of the map. (FIG. 6.12)


THE Famouse West Indian voyadge made by the Englishe fleete of 23 shippes and Barkes wherin were gotten the Townes of S. IAGO: S. DOMINGO, CARTAGENA and S. AVGVSTINES the same beinge begon from Plimmouth in the Moneth of September 1585 and ended at Portesmouth in Julie 1586 the whole course of the sayde Viadge beinge plainlie described by the pricked lines Newlie come forth by Baptista
Florida
Virginia
Norumbega
The Ware Homwarde
The Ware Outwarde
Mexico
Baye de Mexico
C. Antonio
Cuba
Iamaica
Hispaniola
S. Iohns Ilande
Ilandes of Capo Verd
Panama
WEST INDIA
The Ocean comonlie called the South Sea
Brasill
Sea Conye
Scale of 300 Leagues
Seuentien or 15 Degrees to the Southwarde of Rio de la Plata lye the Straites of Magellanus
Rio de la Plata

Fig. 6.12 **Baptista Boazio, *The famouse West Indian voyadge made by the Englishe fleet*.** London, 1589.

This engraved map was issued separately to illustrate Sir Francis Drake's voyage across the Atlantic to attack Spanish colonies in 1585–1586.

Beschreibung/von Eroberung der Spañischen Silber Flotta/wie solche/von dem General Peter Peters Heyn. In Nova Hispania/in der Insul Cuba im Baia Matanzetha/ist erobert worden Anno 1628.

NAch dem die Westindische Compagny in Hollandt den Nutzen vnd Vortheil/so sie ein theils auff der See von den Spannischen Schiffen bekommen/verspüret/hat sie mit allem Fleiß abermal in diesem 1628. Jahr ein trefflich Flotta an wolgemannten dreyen Schiffen zugerüst/mit aller Notturfft/vnd insonderheit mit einem wol außstaffierten/vnverzagten vnd Hertzhafften Volck/vnd dem Commendo deß Mannhafften Generals Pietri Peters Heyn/vnd Heinrichen Cornelij Lonq/als Admirals auß Texel gesegelt/vnd kamen den 21. Junij in die Insul Palma/welchs ein orth von den Canarischen Insuln/von dannen segelten sie in die Insul S. Vincentij/wie auch nach der Insul genannt I. Blanco/vnd gelangten den 4. Augusti bey S. Antoni an das West-Ende der Insul Cuba/zum bestimpten Ort da die Silber-Flotta zusammen kommen solte/Aber mittlerzeit ward die Holländische Flotta von den Spanjern verkundschafft/daß selbige mit 23. Segeln etliche tage vmb Hanana sich verhielte/verhoffende die Silber Flotta auß nona Hispania anzutreffen/es ward aber dem Gubernenr selbiges Orts Don Lorenzo de Cabreso/den 23. Dito solches entdecket/welcher denselben Tag Bieckene Admirschehlen außsandte/gemelte Silber Flotta von dannen auß solchs zuadvisiren. Als nun dem Generall Peters Heyn eine von diesen Admirsbircken zu handen kommen/hat er darauß verstanden/daß noch keine Schiff zu Havana angelange/aber doch täglich nun verlangen erwartet würden/vnd damit in dieser Eröffnung desto sichrer gegangen werde/ist der General dahin hart bey das Geschütz zu Hanana gesegelt/auff daß er selbsten alles gewiß besehen möchte/allda erbefunden/das wahr gewesen/was ihme angebracht worden. Von dannen segelet er ohngefehr drey oder vier Meilen/der gemelten Silberschiff wahr zunemen/weiln sie gemeiniglich allda ans Landt setzen/aber der Südwindt kam den 3. Septemb. t o. der 4. Tag lang/trieb die Flotta gegen Nort-Ost von der Hanana/darzu der Seroom gegen Ost/dapffer hauff. Den 7. Dito kam der Vice Admiral Pangraz bey diser Flotta mit 6. Schiffen. Als Neptunus Gülden Sonn/Mennickendam/Delphin/Gülden Löw/vnd die Jagt/das Post-Pferd genannt/welche 6. Schiff sich vffhielten an der Canal Matanzas vermög ihrer Ordonanz/doch liesse sie gemelter General so ihme gehen/weil ihme wee vorgemelt/alles offenbahret war. Den 8. Dito bey der Sonnen vffgang/wirder der Flotta in Norden gewahr/12. Segeln/vermeinete/daß es die Silber Flotta sey/ihren alles was sie konden/dieselbe vffzuhalten/darmen sie 9 Schiff klein vnd groß erobern/sahen auch noch weiter/in dem Winde von ihnen/8. Schiff so feern als man mit dem Gesicht sehen kondte/warauff sie dapffer zuführen/vnd bestellen sich ihnen das Landt der Hanana abzuschneiden/gleichwol liessen z. von den Spanischen Schiffen vor der Flotta vorüber in Hoffnung ans Landt zukommen/denen 3. Holländische Schiff nachjagten/vnd jagten 2. von den Spanischen Schiffen an den Wser/vnder dessen theile der General mit dem Rest seiner Flotten sein bestes/die restierende Spanische Schiff/welche vber dem Winde von ihme waren prasumirent/daß es die Galleen seyn möchten/wie sie bey den eroberten Schiffen vernommen hatten. Die Spanische kamen elends/vermeineten an das Landt zu Matanca zusegeln/hatten an ihren Stangen daran sie die Fahnen führen/braun Segel/desto geschwinder fort zu eilen/kamen ohngefehr gegen Abend vor die gemelte Baye oder Wser/aber die Holländ ische Flotta folgete ihnen vff dem Fuß hernach/vnd waren vffgehalten/biß daß die Sonn in der Baye Matanca vndergangen/nemblich mit dem Schiff der gülden Falck Hollandt la/der Delphin/vnd die Jagt/der Tiger/im einkommen lessen sie die Segel nieder/Admls von ihrem General zuerwarten: der Vice Admiral Pangraz aber/kam vnd brichte alles zur desension/vnd als vor berichtet beneben etlichen andern Schiffen solches sahen/sind sie nachgefolgt/hierauff kam der General Peters Heyn vor die Baye Manteca/vnd schoß ein Stück 2. oder 4. hierauff/zur Losung nach den vordersten Schiffen/seine Advis damit zuerwarten/vnd daß die andere so noch zurück waren/desto ehe solten nachfolgen/aber von Furien kondte sein Volck schwerlich solchem nachkommen/daran man einen trefflichen Willen gespühret/es lagen etliche so sich bereits zu drey vnd vieren auff den Grundt/mitten in der Baye gelegen/) verschantzt/der General segte hart vnter die Spanischen biß an den grundt/etliche schossen vff sie zu/entzwischen kam das Bodschiffgen von dem Holländischen Schiff Thuyn/Schuy bey nacht/oder Wachtmeister/vnnd das Schiff Harlem wolgemanne mit Mußquetierern an dem Bord bey den Generals/fürters ward das kleine Schiffgen deß Holländischen Löwen von dem General mit Volck gemanne/vnd der er General zieng selbst mit frischem gemüt in das Schiffgen von Holländischen Thuyn/vnd begaben sich alsbald an den Wser/zu dem Spanischen Vice Admiral so sich eben allda befunden/bey ihme Generalm waren im Schiffgen/als Hanye Officirer vnd Rähte der Wachtmeister oder Schuy bey Nacht/Cornelius Claisi/Capitain Albert Heinrichs/von dem roten Löwen/Capitain Franz Claus vom Schiff Harlem/mit etlichen Beseichs. haben vnd Sergeanten/die Spanischen wolten sich ernstlich ein wenig zur Wehr stellen/aber als die Holländische mit Mußqueten vff sie brenneten/vnd fürters sich nahreten/liessen sie den Spanischen zu. Bonne Garre/das ist ein Spanisch Wort/bedeutende/gute Quartier: Als die Spanischen dieß sahen vnd höreten/legten sie zur Stundt ihre Gewehr von ihnen/vnd giengen vnden ins Schiff/weiln nun der General darauff alles in gute Ordnung gerichtet/begabe er sich mit den andern Schiffen die vnder dessen ihme gefolgt waren/nach dem Spanischen Admiral/vnd zu ihrem Schiff/Schuy bey der Nacht/vnnd nach einem andern grossen Schiff/nach gethanem schiessen hat der Spanisch Admiral als er das Quartier angenommen/selbsten mit gerussen Bonne Garre/die andere Spanische in diesem grossen Scheff aber stelleten sich erst frey dapffer zur Wehr/aber wie sie sahen die menge deß Volcks ankommen/gaben sie sich mit dem Spanischen Wort zu frieden/liessen auch hinunter in das Schiff/aber ein Spanier sprang vber Bord/vnd ward bekommen/vnnd von dem General gefragt/wieviel Volck noch vff dem Schiff weren/antwortet er/150. Mann/der General geben ihme wieder hinwer zu steigen/vnnd den Spanischen Quartier anzusagen/mit dem versprechen/daß er sie alle ans Landt wolt seen lassen. Der Spanier fraget den General/was er vor eine Person were? ward ihm zur anewort/er sey der General von der gantzen Flotten/darauff begert der Spanier daß er einen Mann wie ihme möchte haben/auff daß er von deß Generals Volck nit Tode geschlagen würde/welches ihm bewilliget ward/stieg alsbald wieder hinüber/rieff seinen Gesellen zu/der General were am Bord/het ihnen zu Quartier versprochen/vnnd daß er sie ans Landt setzen lassen wolte/darauff sie alle sonder Gewehr hinauff kommen/vnd Quartier angenommen/vnd ward dardurch alles Plutzen vnnd Unordnung verhütet/h erauff ward zur Stundt Ordinang gegeben/alles schiessen wegen der eroberten Preysen auff den Schiffen abzustellen/vnnd vorsichtig zu syn/weil die Nacht eingefallen/damit durch das Fewer vnd ihn wird herlauffen nit Leechtern kein Schaden entstehen möchten. Solchem nach begabe sich der General wiederumb auff sein Schiff vnd dancke nit allen bey sich habenden dem Allmächtigen Gott vor solche grosse Victori/deß andern Tags wurden alle die Schiff sowol Spanische als andere aneinander gehengt/vnd den dritten Tag das eroberte Silber mit aller vorsichtigkeit auß den Spanischen Schiffen genommen vnd die Holländische geladen/welches Silber ohngefehr 46. Last schwer/jede Last zu 4000. Pfundt gerechnet/so zum theil an gemüngten Gute Realen von Achten/vnd zum theil an silbernen Platten gewesen/benebens andern von Silber gemachten Sachen/Silber Geschirr Creutz vnd Kelchen/ꝛc. Item viel Kisten mit Cochenillen/Indigo vnnd andern köstlichen Waheen/wie mit mehrerm in hernachstehenden Caten vnd verzeichnuß zu sehen. Den 17 Dito nach glücklicher verrichtung der sachen/ist der General mit der gantzen Flotten glücklich wieder auffgebrochen/vnd nam mit sich vier von den gemelten Spanischen Galleonen/darunder 2. mit lauter Häuten geladen/der Spanische Admiral war mit 24 Metallen vnd 5. andern grossen Stücken/der Vice Admiral mit 22. Metallen/vnd die andere 2. Schiff jedes mit 20. Eisernen vnd zweyen Metallen Stücken versehen/auch die Schiff vff 3 Monat Proviandire/starck mit Volck besetzt/vnd mit allen andern zur Seereisen auffgefügten Sachen wol auffstaffiert/das sie nimbesser hette seyn können/benebens obgemelten vier Galleonen hat man noch ein ander Schiff von 100. Last mit Häuten vnd Campesin Holtz geladen. Den 26. September ist die gantze Flotta starck 34. Segel bey der Insul Bermonde ankommen/da dann der General Peters Heyn zwey Jagten/als den Fuchs vnd Storck genannt/nach Hollands abgefertiget/alles den Herrn Principalen der West Indischen Compagnyen zu ehren/die eine Jagt der Storck ist zu Rodendam den 15. Novembris dieses Jahrs vnder Commendemene von Capitain Salomon Wittheins angelangt/welcher dem Pensyon von Amstelm alles zum ersten angebracht/dem eine gulden Ketten mit Edlen gesteinen verseht/deßwegen zur Verehrung worden.

Erklärung der Ziffer.

1. Eine Batterey neben einem newen Werck. 2. Der Spanische Admiral. 3. Spanischer Vice Admiral. 4. Spannischer Wachtmeister oder Schuy bey nacht. 5. 2. andere Spannische Schiff. 6. 1 ander klein Spannisch Schiff. 7. Des Generals Peter Peters Heyn. 8. Der Admiral Hendrick Cornelsen Lonq. 9. Der Vice Admiral Pangraz. 10. Zwey kleine Schifflein so die Wacht halten. 11. Das Schiff Sterrenb. 12. Das Schiff Speermonde. 13. Das Schiff Haslem. 14. Der Hollandische Wachtmeister oder Schuy bey nacht. 15. Das Schiff Delphin. 16. Das Schiff Tiger. 17. Das Schiff Hollande. 18. Das Schiff der gulden Falck. 19. Ein brave Vice ander See, da sich die Spanischen nechts zu lieber zogen. 20. Die übrige Schiff so in der Hollandischen Flotten gehören.

Amhsterdam/bey Nicolas Janss Fischer/wohnend in der Kälkstrassen zum Fischer.
ANNO M. DC. XXVIII.

GENERAL CARTE aller eroberten Guter wie sie vndet die Westindischen Compagnyen ausgetheilt.

Vor die Cammer von Amstelsdam oder das Schiff vom General.

30616. *Pfundt Silber.*
5. *Kisten gemacht Silber.*
45. *Kisten Cochenille.*
12. *Ballen Cochenille.*
87. *Kisten Sinvestar.*
94. *Kisten Indigo.*
6. *Ballen Seiden.*
5. *Kisten Seiden.*
5. *Koffer Seiden.*
1. *Koffer Seiden.*
1. *Kist Seiden.*
2 *Koffer Seidenstoff.*
3. *Koffer Seidenstoff.*
1. *Kisten darinn 12. Kostliche Indianische Schreib Tisch.*
2. *Kisten mit Porcellan. sampt noch 30 Kisten und Ballen von allerhandt Waharen.*

Hollandische Thuyn oder das Schiff des Admirals.

24280. *Pfundt Silber sampt 24. Stuck allerley Silbergeschir.*
208. *Realen von achten.*
16. *Pack Cochenille.*
60. *Pack Silvester.*
248. *Casten Indigo.*
7. *Ballen Seiden.*
355. *Kisten, Fas vnd Ballen von allerhandt Specerey, vnd Waharen benebst verschen von Silber vnd Gold gemachten Geistlichen ornaten, des Kuchen damit zuversehen*

Das Schiff Harlem.

9. *Coffer Cochenille.*
16. *Matten Cochenille.*
17. *Ballen Cochenille.*
74. *Casten Indigo.*
49. *Casten Indigo.*
3. *Ballen Indigo.*
4. *Ballen Seiden.*
1 *Caserman ore Wharen.*

3046. *Stuck Haut.*

Schiff Gelderlandt.

1023 *Pfundt Silber*
2 *Pack Cochenille.*
89. *Kisten Indigo.*
7. *Kasten Sanderstoff.*
532 *Stuck Rothlichenholtz.*
240 *Stuck Haut.*
110. *Fas mit Oel, Wein. sampt noch 19 Kisten und Kasten von stucken und nassen Gutern*

Das Schiff Hollandt.

7300 *Pfundt Silber.*
4 *Pack Cochenille.*
126. *Kisten Indigo.*
2 *Kist mit roth Holtz und andern köstlichen Waharen.*
3000 *Stuck Haut.*
147 *Stuck Bockfell.*
17. *Pfeiffen Zucker.*
7 *Eyserne Stuck Geschütz sampt ander Munition und Proviande.*

Das Schiff zum schwartzen Lowen.

2864. *Pfundt Silber.*
24. *Ballen Cochenille.*
68. *Kasten Indigo.*
7. *Ballen Seiden.*
1. *Ballen Lauwwat.*

Das Schiff zu Groten Lewe.

1. *Ballen Cochenille.*
26. *Dito.*
46. *Kasten Indigo.*
4. *Ballen Seiden.*
1. *Ballen Lauwwat.*

Vor die Provintz v. Utrecht.

1098. *Pfundt Silber.*
18. *Kasten Cochenille.*
817. *Kisten Indigo.*
8. *Kasten sonsten verroffet*
1. *Kist so verbrandt.*
1796 *Stuck Haut.*
24. *Pack Dito.*

Das Schiff vergult Falck.

8. *Ballen Cochenille.*
72. *Kisten Indigo.*

Das Schiff schwartz Router

43 *Kisten. Ballen vnd Pfeiffen von allerhandt Specerey Oel vnd Lewwat*

Das Schiff Neptunus.

1446 *Pfundt Silber.*
18 *Kasten Cochenille.*
14 *Ballen Dito.*
38. *Kasten Indigo.*
5. *Ballen Seiden.*
1280 *Stuck Haut.*
100 *Kisten, Ballen vnd Fas allerhandt Waharen vnnd Indianischen Teppichen, sampt kostlichem Lewasch bey der Mes zu gebrauchen.*

Das Schiff Dordrecht.

9767 *Pfundt Silber*
30. *Kasten Cochenille.*
5. *Ballen Dito.*
24. *Kasten Indigo.*
12. *Ballen vnd Kasten Seiden*
2. *Kast n Rieharbara.*
10. *Backen Zimmerholtz.*

1720. *Stuck Campesinholtz.*

Vor die Cammer von Groningen.

Das Schiff zu guldt Leve

11230. *Pfundt Silber.*
12. *Ballen Cochenille.*
9. *Kasten Dito.*
93. *Kasten Indigo.*
4. *Ballen Dito.*
4. *Ballen Seiden.*
675. *Stuck Haut.*
100. *Kisten Zucker.*
39. *Kisten vnd Ballen allerhandt Waharen*

Das Schiff zum gulden Delphin.

6054. *Pfundt Silber.*
400. *Stuck Hauts.*
30. *Kisten Zucker.*

Vor die Cammer im Noorder Quartier.

Das Schiff der Elephant.

6655. *Pfundt Silber.*
139. *Kisten Indigo.*
1535. *Stuck Campech Holtz.*

Das Schiff Munnickedam.

6702. *Pfundt Silber.*
13. *Kisten Indigo.*
60. *Pack von Seiden, Indigo vnd Cochenille.*
1800. *Stuck Campech Holtz.*
67. *Stuck Haut.*
4. *Eyserne Stuck Geschutz.*

Das lagschiff der Storck genannt.

500. *Stuck Haut.*

Noch kompt ein Schiff alle Dinsinger genannt/bringt vor die Cammer in Seeland bereits dem schiff Tiger vor nächst gemelte Cammer.

56. *Kisten Zucker/darbey vnderschiedliche sachen so man zu Schiff pflegt zu gebrauchen.*

NOTA.

In den vier Spanischen Galleonen sind ohn angezeigten Gütern noch gebliben 17175. stuck Häut.

Item in dem Spannischen Admiral sind gebliben 300 Kisten/theils Cochenille oft theils Indigo/auch andere Kisten so noch vnbekandt vnd vneröffnet/auch in dem einem eroberten Schiff ein grosse menge Campechholtz/

Item alles oben angezeigten Gütern mit eingebracht. Diese obbeschriebene eroberte Güter von Silber vnd Waharen sind nunmehr alle in salvo gebracht/vnd ohne das jenige so noch nit eröffnet/im gewissen auff 30. Millionen oder 300. Tonnen Schwer geschetzet vnd wird wegen dieser Victori durch gantz Hollandt vnd vnirte Provintzen ein Triumph vnd dantzfest gehalten.

Fig. 6.13 *Beschreibung von Eroberung der spanischen Silberflotta wie solche von dem General Peter Peters Heyn*.... Amsterdam, 1628.

Piet Hein's capture of the Spanish silver fleet at Matanzas Bay, Cuba, was the first and only time that any enemy of Spain succeeded in seizing this entire fleet and its valuable cargo.

Baptista Boazio (fl. 1589–1603)
Civitas Carthagena in Indiae occidentalis contiente sita, portu commodissimo ad mercaturam inter Hispaniam et Peru exercendam, from Walter Bigges (d. 1586) ***A summarie and true discourse of Sir Francis Drakes West Indian voyage.*** **London, 1589.**

Sir Francis Drake's attack on the Spanish colonial port of Cartagena in 1585 was a dramatic example of the type of raiding activity that was common in sixteenth-century sea warfare. The plan of Cartagena was one of a set of four that Baptista Boazio drew of Sir Francis Drake's 1585–1586 voyage. The others were similar views of Santiago, Santo Domingo, and St. Augustine, and all were specifically designed to illustrate accounts by participants included in *A Summarie and True Discourse*. Captain Walter Bigges, the commander of the land forces under Carleill, began writing the work during the voyage. Following the attack on Cartagena, Bigges died of illness and his lieutenant, Master Crofts, probably completed the work. Having completed the map shown on pages 136–37, above, and the four city plans noted here, Boazio went on to gain a reputation for his work on regional maps, producing one for the Isle of Wight in 1591, and others for Ireland in 1599 and 1602–1603.

Beschreibung von Eroberung der spanischen Silberflotta wie solche von dem General Peter Peters Heyn, in Nova Hispania, in der Insul Cuba im Baia Matanckha ist erobert worden. **Amsterdam, 1628.**

In September 1628, an officer in the Dutch West India Company's fleet, Piet Pieterszoon Hein, with Admiral Hendrick Corneliszoon Lonq, captured the Spanish Mexican silver fleet at Matanzas Bay, Cuba. This was the first and only time that this legendary fleet with its valuable cargo, which crossed the ocean twice annually, had been captured. This victory, along with an earlier successful looting expedition in Brazil in 1627, when he had captured thirty-eight Spanish and Portuguese ships, made Piet Hein the most celebrated Dutch seaman of his era. Upon his return home in January 1629, Hein was named lieutenant-admiral of Holland, the leading naval post in the Dutch Republic. In accepting this appointment, Hein became the first to have been selected for the post entirely on the basis of professional ability. His naval career was short-lived. Five months later, in May 1629, Hein was killed while pursuing a squadron of privateers near Oostend. (FIG. 6.13)

PPaul Hoste, S.J. (1652–1700)
L'art des armées navales. **Lyon, 1727.**

This volume by the Jesuit father Paul Hoste was the first substantial study of naval tactics and naval warfare published since Flavius Vegetius Renatus wrote his brief essay on the topic in the fourth century C.E. In Hoste's era, such a work necessarily included an analysis of tactics involving large sailing ships carrying heavy guns.

A Jesuit at the age of seventeen, Hoste soon became a specialist in mathematics and hydrography and was well-versed in methods of naval construction. Through the patronage of the Duc de Mortemarte, Hoste became chaplain successively to two leading admirals in the French Navy, d'Estrées and Tourville. Over a twelve-year period, Hoste accompanied them at sea and was able to observe naval operations and to obtain insight directly from the officers with whom he served. Following the Marquis de Seignelay's 1685 decision as minister of the navy to employ the Jesuits to teach the higher sciences to naval cadets, Hoste became professor of mathematics at the Royal Naval College in Toulon. During his career, Hoste published a number of important works relating to naval science and began to write on naval tactics as early as 1691. *L'art des armées navales* was first published in 1697; this second edition appeared posthumously.

On loan from the Henry E. Eccles Library, Naval War College, Newport, Rhode Island. (FIG. 6.14)

Le neptune françois. **Paris, 1693.**
(FIG. 6.15) (See pages 93 and 118, above).

Josiah Burchett (ca. 1666–1746)
A complete history of the most remarkable transactions at sea. **London, 1720.**

Josiah Burchett was one of the few individuals before the late nineteenth century who had direct access to official documents and made use of them for historical writing. He began his career as a clerk to Samuel Pepys about 1680, eventually becoming his favorite until he fell out with him in 1687 over an infraction of Pepys's strict household rules. Through the patronage of Admiral Arthur Herbert, and then Admiral Edward Russell, Burchett obtained employment at the Admiralty Office. In 1694, he first became a secretary of the admiralty and was able to be successively reappointed to that post, either jointly or as a sole appointment, for a longer tenure than any other individual in British naval history—until 1741. The first naval history published in English, substantial portions of Burchett's book coincide with his employment at the admiralty, particularly for the period from 1689 to 1714. These are highly accurate summaries, although the book does not attempt to provide an insider's view of events. (FIG. 6.16)

Fig. 6.14 **Paul Hoste, S.J., *L'art des armées navales.*** Lyon, 1727.
This volume by the Jesuit father Paul Hoste was the first serious professional study of naval tactics and naval warfare to be published since Flavius Vegetius Renatus wrote his brief essay on the topic in the fourth century C.E.

Great Britain. Admiralty.
Sailing and fighting instructions. London, ca. 1730.

Official written directives for organizing the fleet for a battle can be found in English as far back as about 1530. The Duke of York's 1673 "Sailing and Fighting Instructions" established the basic form that remained in effect for more than a century and stressed, in particular, the importance of maintaining the line in battle. This plea for disciplined control of the fleet as a unit was much needed at the time, but the over emphasis on this point in later years became a restraint on initiative in combat.

J. Stevens
A view of the landing of the New England forces in ye expedition against Cape Breton, 1745. London, ca. 1760.

In 1720, the French began the construction of a huge fortress at Louisburg on Cape Breton island. This edifice was designed to protect the French fisheries on the North American coast and to guard against any incursions from the newly established British colony of Nova Scotia just to its south. At the same time, Louisburg was intended to protect the entrance to the Gulf of St. Lawrence and the water passage that the St. Lawrence River provided into the interior of French North America. By 1745, Louisburg had become a major French trading center in North America. During the winter of 1744–1745, New Englanders learned that the French garrison in the fortress was undermanned and vulnerable. Massachusetts took the lead in the preparations, but other colonies also participated. A British naval squadron of twelve ships under the command of Commodore Sir Peter Warren provided support for 4,000 colonial troops under the command of Lieutenant-General Sir William Pepperell of Massachusetts. Several colonial vessels joined the expedition, including the Rhode Island colony's 14-gun sloop *Tartar* of Newport, which played a key role in gaining critical intelligence of approaching French naval forces after capturing a small French vessel. Still remembered in Newport today, two of her fourteen guns are on display in front of the Newport Historical Society. In addition to *Tartar*, the government of Massachusetts chartered two Newport privateers, *Fame* and *Caesar.* (FIG. 6.17)

Thomas More Molyneaux
Conjunct expeditions: or expeditions that have been carried on jointly by the fleet and the army, with a commentary on a littoral war. London, 1759.

Although amphibious warfare had been central to English strategy since the sixteenth century, Thomas Molyneaux's 1759 book was the first study in English of joint military and naval operations. During the eighteenth century, the British became the most experienced and successful in this type of war, and a

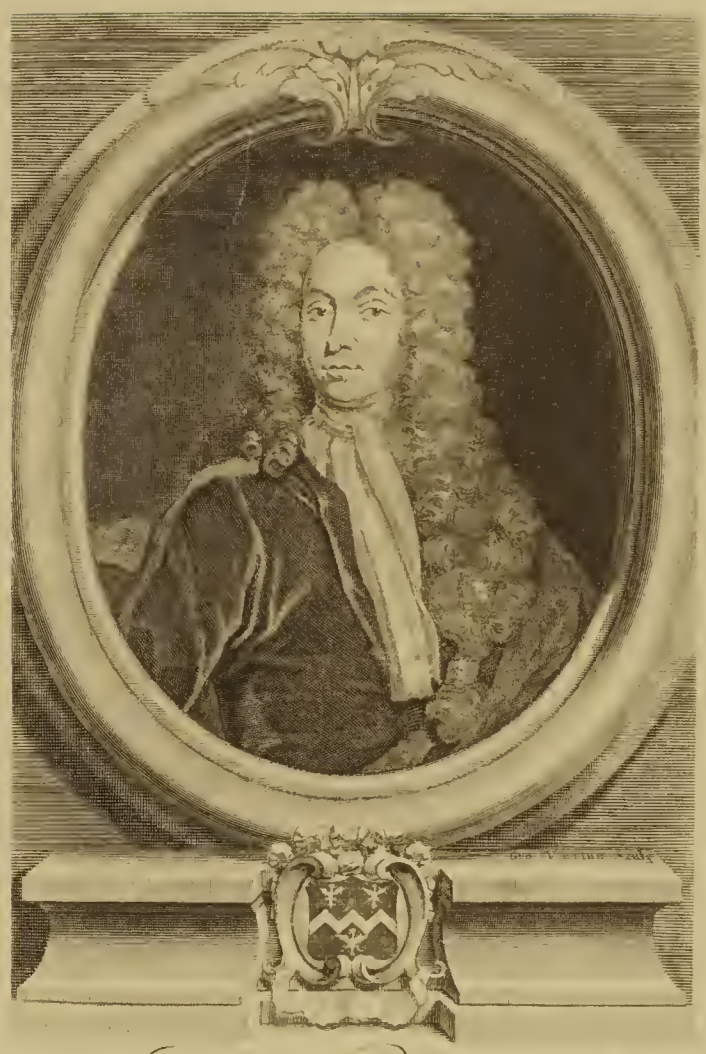


Fig. 6.16 Josiah **Burchett**, ***A complete history of the most remarkable transactions at sea.*** London, 1720.

Burchett's book was the first naval history published in the English language. George Vertue engraved the portrait of Burchett, basing the likeness on an oil painting by James Maubert. The allegorical painting of Neptune presenting Britannia with the world's bounty and a crown has been attributed to John Thornhill, son of the court painter Sir James Thornhill. Gerard van der Gucht produced this engraving for Burchett's book.

Fig. 6.17 J. Stevens, ***A view of the landing of the New England forces... Cape Breton, 1745.*** London, ca. 1760.

The capture of Louisburg in 1745 was the most important military success that Americans achieved before the American Revolution. The conduct of the assault brought out differences between the political viewpoints of New Englanders and the British authorities. The assault was also a good example at the time of what joint naval and military operations could achieve. Thirty years later, the memory of the conquest of Louisburg gave New Englanders confidence that they had the capacity to fight the British.

Fig. 6.18 Thomas More Molyneaux, ***Conjunct expeditions: or expeditions that have been carried on jointly by the fleet and the army, with a commentary on a littoral war.*** London, 1759.

This book is the first study in English of joint military and naval operations.

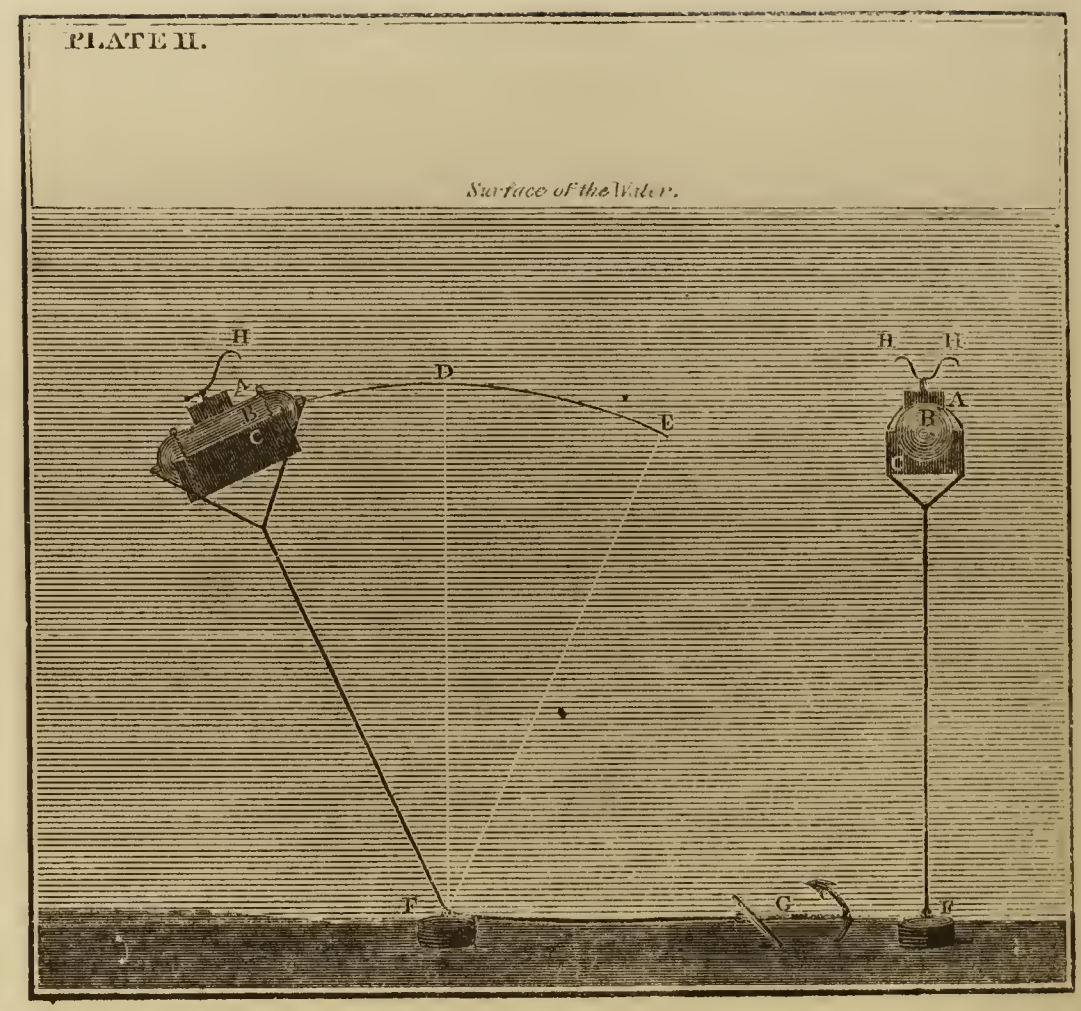


Fig. 6.19 Robert Fulton, ***Torpedo war and submarine explosions.*** New York, 1810.

Fulton's small book was one of the very earliest in a series of publications in the nineteenth century that marked the arrival of new weapons for war at sea.

rich historical and theoretical literature developed over the next two centuries. After being out of fashion for centuries, the use of the word "littoral warfare" has only recently returned to the modern military vocabulary in the twenty-first century. (FIG. 6.18)

Sébastien-François Bigot de Morogues, Vicomte de Morogues (1705–1781)
Tactique navale. **Paris, 1763.**

This volume was the standard French authority on naval tactics for the latter half of the eighteenth century. Its author, Sébastien-François Bigot de Morogues, was the son of an Intendant at Brest and cousin of former naval and colonial affairs minister Louis Phélypeaux, comte de Pontchartrain (1643–1727). Bigot de Morogues entered the royal artillery in 1723 and transferred to the navy in 1736, where he became a specialist in naval gunnery. In the same year, he published his first scientific work on gunnery, which brought him the distinction of being a corresponding member of the Academy of Science. Through his connections with Duhamel du Monceau, Morogues helped to promote studies in areas such as matériel, naval construction, and the health of seamen.

Thomas Lewis O'Beirne, Bishop of Meath (ca. 1748–1823)
Considerations on the principles of naval discipline and courts-martial. **London, 1781.**

Thomas Lewis O'Beirne was an Irish Catholic who was educated at the Jesuit college in St. Omer, France, but took holy orders in the Church of England. In 1775, he accompanied Lord Howe to America as his chaplain and, in 1776, preached a widely distributed sermon in St. Paul's church, New York. He was the Anglican bishop of Ossory from 1796 to 1798, and Bishop of Meath from 1798 until his death. O'Beirne wrote numerous tracts, several of which were designed to vindicate his patrons—the two brothers, General Sir William and Admiral Lord Howe—during the American war. In this volume, Bishop O'Beirne examined the tactics of the naval battles in American waters in the context of the principles of courts-martial and naval discipline, with an underlying argument defending the Howes.

"Marine militaire... événemens pendant les guerres navalles depuis l'année 1740." [Manuscript]. France, ca. 1786.

This manuscript focuses mainly on the naval campaigns of Charles, comte d'Estaing, in the Caribbean during the years 1778–1782, but also includes pages that describe d'Estaing's movements off Newport, Rhode Island, in 1778.

John Clerk (1728–1812).
An essay on naval tactics, systematical and historical. London, 1790–1797.

John Clerk of Eldin, a wealthy Scottish merchant, reflected in his naval writings the widespread feeling in the Royal Navy that a scientific study of naval tactics was needed. Tactical reform was already an issue under wide discussion when he circulated the first draft of this study as early as 1782. This is the first published version of the first part of his study, which initially appeared in 1790 and eventually extended to three parts when it was completed in 1797. Some of Clerk's ideas in the book bore a close resemblance to those that Nelson later used for an attack from windward, with the battle line broken into echeloned divisions. This, among other issues in the book, led to a controversy regarding whether or not Clerk played a direct role in reforming naval tactics. It is generally believed that his work mirrored the general climate of naval discussion rather than serving as its direct inspiration.

This copy contains the bookplate of Admiral Lord Keith, who commanded the Mediterranean Fleet between 1799 and 1802, the North Sea Fleet from 1803 to 1807, and the Channel Fleet from 1812 to 1814.

Robert Fulton (1765–1815)
Torpedo war and submarine explosions. New York, 1810.

Fulton's small book was one of the very earliest in a series of publications in the nineteenth century that marked the arrival of new naval technology. The innovative naval tactical thought that would develop through the nineteenth century eventually replaced the ideas that Père Paul Hoste had launched in print in 1697. The American inventor Robert Fulton began to experiment with underwater weaponry several years before his steamboat *Clermont* first successfully demonstrated the potential for steam propelled commercial shipping on the Hudson River in 1807. As early as 1797, he had attempted to interest first the French and then the British governments in submerged warfare. After returning to the United States in 1806, he resumed work on the subject and, by 1810, was corresponding with U. S. Secretary of the Navy Paul Hamilton on the subject of underwater weapons. This book was part of that campaign, and it played a role in persuading Congress to appropriate $5,000 for testing Fulton's ideas. Secretary Hamilton sent copies of this book to six senior officers in the Navy with instructions for them immediately to advise Commodore John Rodgers on the most effective ways to defeat Fulton's weapons using current knowledge and tactics. As a result, Rodgers was able to undermine Fulton's demonstration, temporarily delaying development of such weapons. (FIG. 6.19)

PRIVATEERING

Piracy and privateering are two such closely related activities that the distinction between them can be blurred, sometimes purposely in order to put the face of legitimate privateering on illegal piracy. The word "privateering" only appeared in English during the seventeenth century; so historians' use of the term for earlier periods has tended to be misleading and inaccurate. During the seventeenth and eighteenth centuries, admiralty courts issued licenses during wartime to privateers—that is to privately armed and outfitted vessels—authorizing such vessels and their crews to attack and to capture the merchant vessels of specific enemies with whom the country was then engaged in a declared war. The privateer was expected to bring captured vessels into specific ports, where an admiralty court could examine the prize with her papers and cargo. If legal requirements were met, the court condemned the ship and cargo as enemy property and sold them at public auction. The proceeds were divided among the government, the capturing officers, and the crew in accordance with an established formula. Privateering was eventually abolished in 1856 by international treaty.

France
Code des prises ou Recueil des déclarations, ordonnances, arrêts et règlemens relatifs à la course, & au Conseil des Prises. Paris, 1781.

This pamphlet is the 1781 French regulation concerning prizes taken by French privateers operating out of American ports, and prizes taken by American privateers operating out of French ports.

Provincias Unidas del Río de la Plata
Marine laws and regulations of the United Provinces of the River Plate. Translated from the original given in the fort of Buenos-Ayres, May the 15th, 1817. Buenos Aires, 1817.

This is an English translation of the provisional regulations issued by "The Supreme Director of the United Provinces of South America" for privateering under the newly independent United Provinces of Río de la Plata. The goal was to make the war against the Spanish more effective. The head of the revolutionary government writes that "intending to follow the system of warfare in use with civilized nations, and convinced by the progress acquired by the free governments of America, I have resolved to extend as far as possible hostilities by sea...."

Fig. 6.21 Basil Ringrose, ***Bucaniers of America. The second volume. Containing the dangerous voyage and bold attempts of Captain Bartholomew Sharp, and others.*** London, 1685.

The first volume of this book was published in 1684 as the first English translation of Exquemelin's *De Americaensche zee-roovers*; the second volume added new material.

PIRATES AND BUCCANEERS

In its strict legal definition, piracy or buccaneering is nothing more than theft at sea. Yet, the word has gained widespread romantic associations, and a huge popular literature has grown up around the topic, much of it purely fictional and with a very doubtful historical basis. Nevertheless, piracy is a serious subject of study in maritime history. From the mid-sixteenth century, seamen were involved in wartime privateering. In the periods of peace that followed, some seamen continued their wartime habits. In some cases, they established their own small communities in the Caribbean or the Indian Ocean, far from authority, where they became a threat to all merchant vessels. By the end of the seventeenth century, such piracy had become a serious problem that required organized efforts to control.

The grand pyrate: or, the life and death of George Cusack the great sea robber, with an exact narrative of the tryals of the pyrats. London, 1675–1676.

The adventures of the pirates and the details of their trials and executions were matters of great public interest. Pamphlets such as this sold well on the streets of London.

A.O. Exquemelin
De Americaensche zee-roovers. **Amsterdam, 1678.**

One of the most popular books ever written about the West Indian buccaneers, this is the first edition of a volume that first created the romantic image of the pirate and buccaneer. Sixteen editions appeared by 1700. It was translated from Dutch into German in 1679, into Spanish in 1681, into English in 1684, and into French in 1686. The book is still being read and re-published.

Exquemelin was born about 1645 at Honfleur, France, of Huguenot parents, and in 1666 went to the Caribbean island of Tortuga in the service of the French West India Company. He worked on Tortuga for three years, then joined Captain Henry Morgan as a buccaneer, and stayed in the region until about 1674. At that point, he went to the Netherlands as a French Huguenot refugee. (FIG. 6.20)

Philip Ayres (1638–1712)
The voyages and adventures of Capt Barth. Sharp and others, in the South Sea. **London, 1684.**

Bartholomew Sharpe's buccaneering voyage to the Pacific began in December 1679, with two ships, one commanded by John Coxon, the other by Sharpe himself. Departing from Jamaica, they attacked Porto Bello on the Atlantic side of Panama. They then marched with 131 men across the Isthmus of Darien to the Pacific coast, sacked Santa María and captured five ships off Perico Island near Panama. Eventually reduced to only one ship, the *Trinity,* Sharpe attacked ports in Chile, Costa Rica, and Peru. In July 1681 off Cape Padador, Ecuador, *Trinity* captured the Spanish ship *El Santo Rosario,* which carried the charts that were later redrawn for the Hack atlas. Sailing South, *Trinity* rounded Cape Horn and returned to the West Indies at the end of January 1682, where the crew dispersed, many of them eventually returning to London. In May 1682, the leaders were arrested for piracy and murder, but were acquitted for lack of evidence. This volume was published in May 1684, the first of six documents relating to the voyage that appeared over a fifteen-year period. The work contains the journal of John Coxon, *Trinity*'s master, but the publisher and editor, Philip Ayres, presented it in a way that allows the reader to assume it is Captain Sharpe's journal.

Basil Ringrose (d. 1686)
Bucaniers of America. The second volume. Containing the dangerous voyage and bold attempts of Captain Bartholomew Sharp, and others. **London, 1685.**

The first volume of this book was published in 1684 as the first English translation of Exquemelin's *De Americaensche zee-roovers.* It was based on Alonso de Bonne-Maison's translation of Exquemelin's work into Spanish, which had been published in Amsterdam. The second volume, bound here with the first, contains Basil Ringrose's account of Sharpe's voyage. (FIG. 6.21)

Sieur Raveneau de Lussan (b. 1663)
Journal du voyage fait à la mer de sud avec les flibustiers en 1684 et années suivantes. **Paris, 1689.**

Raveneau de Lussan was a French buccaneer who came from an impoverished noble family. He embraced a military career at the age of fourteen and in 1679 embarked for Santo Domingo in search of fortune. There, he joined the buccaneers under Cornelius Laurent, sailing from Petit-Goave in 1684. Going on to start his own band, he attacked a number of Spanish outposts, including El Realejo, Guatemala, Grenada, Guayaquil, Tehuantepec, and Nueva Segovia. Returning to France, Lussan published this book, dedicating it to the minister of the navy. The book was reprinted in 1690 and 1705.

47

Piraticæ Americæ,

Of de

AMERICAENSCHE

ZEE-ROVERS.

TWEEDE DEEL

Behelſende

De opkomſt der vermaerde Zee-Rovers FRANCOIS LOLONOIS, en JOAN MORGAN, nevens der ſelver vermaerdſte Roveryen in AMERICA, op de Spanjaerts gepleegt, als mede het leven en bedrijf van eenige andere Zee-Rovers, die ſich in, en omtrent die Geweſten onthouden hebben.

I. HOOFT-STUCK.

Opkomſt van *Francois Lolonois*, en begin van ſijn Roveryen.

Afkomſt van Lolonois.

FRancois Lononois, was uyt Vrankrijk van geboorte / van een plaets genaemt Es ſables Dolonne, in de boght van Vranckrijck gelegen. Hy wierdt in ſijn jonge tydt naer de Caribiſche Eylanden geſcheept / (als knecht of ſlaef / gelyckt ick in 't Eerſte Deel verhaelt heb / dat ſulcks haer gewoonte is) ende na dat hy al daer ſijn tydt uytgedient hadde / quam hy op het Eylandt Eſpagniola by de Jagers / alwaer hy een tydt langh bleef; daer na begaf hy ſich tot het rooven op de Spanjaerden / alwaer hy groote bunt maeckte / en onuytſpreeckelijcke wreedtheden gepleeght heeft. Ick ſal hier de voornaemſte ſtucken beſchryven / die hy bedreven heeft tot ſijn doodt toe.

Sijn aenkomſt aen het Eylandt Eſpagniola.

Na

A

HISTORY

OF THE

LIVES and EXPLOITS

Of the Moſt Remarkable

Pirates, Highwaymen, Murderers, Street-Robbers, &c.

Interſperſed with ſeveral TALES, and pleaſant SONGS.

Adorned with the Effigies of the moſt Notorious OFFENDERS, Curiouſly Engraven on Copper.

—— *Little Villains oft' ſubmit to Fate,*
That Great Ones may enjoy the World in State.
GARTH.

Publiſhed with the Leave of the PROPRIETOR.

BIRMINGHAM:

Printed and Sold by T. ARIS, near the *Swan*, in the *High-Street*.
M. DCC. XLII.

Fig. 6.20 A. O. Exquemelin, ***De Americaensche zee-roovers***. Amsterdam, 1678.

One of the most popular books ever written about the West Indian buccaneers, this is the first edition of the volume that first created the romantic image of the pirate and buccaneer.

Fig. 6.23 Charles Johnson, ***A history of the lives and exploits of the most remarkable pirates, highwaymen, murderers, street-robbers.*** Birmingham, 1742.

Originally published in 1724, the illustrations in this 1742 edition romanticized even further the image of pirates.

William Dampier (1652–1715)
A new voyage round the world. **London, 1697.**

Dampier has been classified as everything from buccaneer, pirate, and privateer to explorer. As a young man, he managed an estate in Jamaica, then left for the Yucatan on a log-cutting expedition. There he became a buccaneer and from 1679 to 1686, operated along the Spanish Main (the South American coast of the Caribbean), and in the Pacific. In 1686, he gave up buccaneering and began a long voyage back to England across the Pacific via the East Indies and the Cape of Good Hope. After Dampier published narratives of his voyages, the Admiralty placed him in command of an exploring expedition to Australia. On the return passage, his ship sank at Ascension Island, and when he reached England the Admiralty court-martialed him for cruelty to his lieutenant. The court found him guilty and declared him unfit to command in the navy. From 1703 to 1707 he sailed in command of two privateers to the Pacific, and from 1708 to 1711, he served as pilot with Woodes Rogers's expedition.

In addition to the book's connections to a buccaneer explorer, Dampier's *New Voyage Round the World* served as a literary model for later English voyage accounts by alternating a factual narrative of events with a description of distant places. The book proved to be a remarkable success. It was reprinted three times in 1697 and eventually surpassed the publishing success of Exquemelin's *Bucaniers of America*. Following Dampier, Jonathan Swift used the same approach in his novel *Gulliver's Travels,* and Daniel Defoe drew on Dampier's book as one of several sources for his *Robinson Crusoe* (1719) and for his contributions to *A General History of the Pirates* (1724). Defoe even imitated the title for his last novel, *A New Voyage Round the World by a Course Never Sailed Before* (1724). (FIG. 6.22)

William Hacke
A collection of original voyages. **London, 1699.**

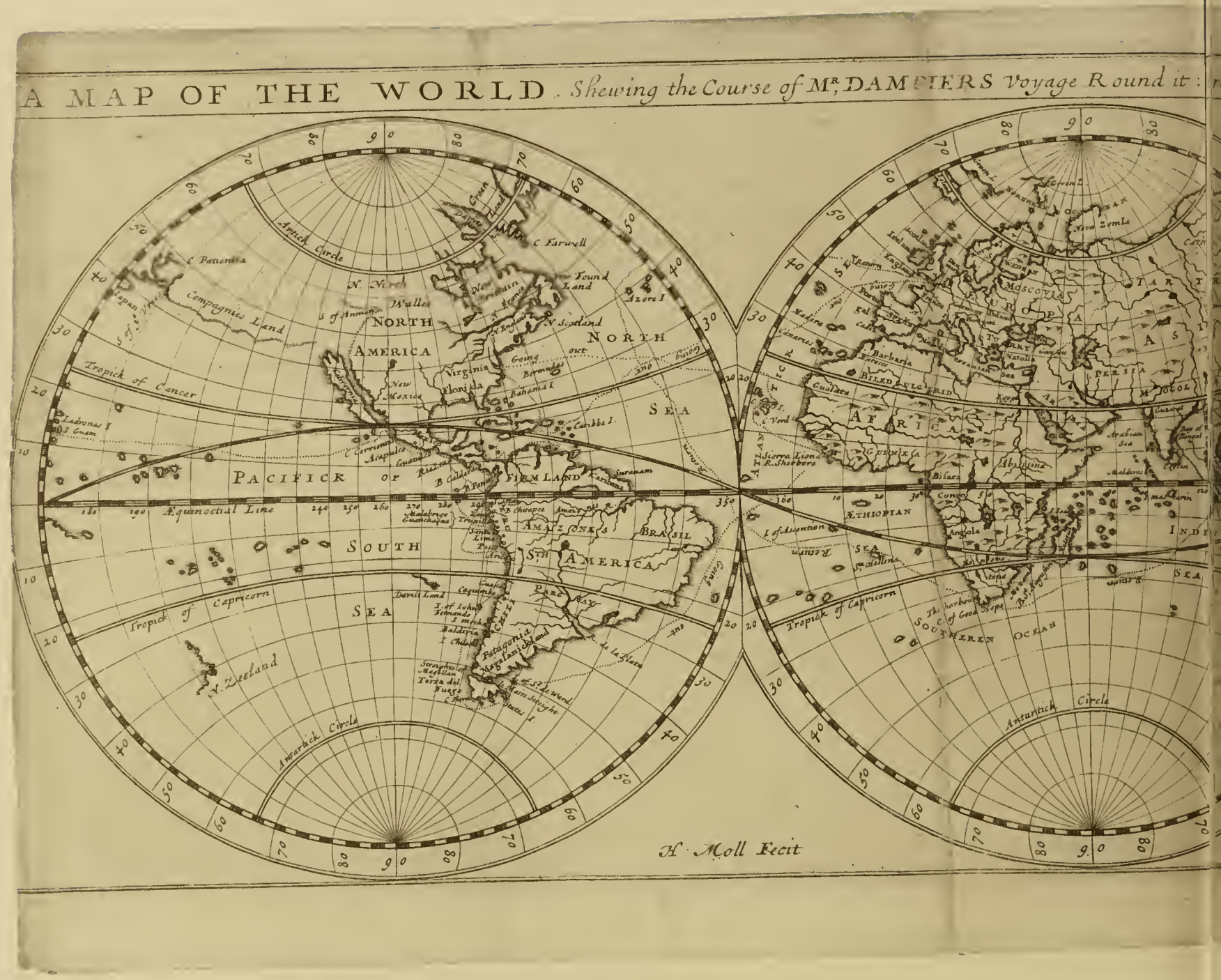
William Hacke's *Collection* (his true name was "Hack") complements the information about buccaneers published by Exquemelin, Dampier, Basil Ringrose, and Wafer, providing additional details and information about the voyages. This small volume contains accounts of voyages by Cowley, Sharpe, and Wood, plus a fourth: Roberts's voyage to the Near East.

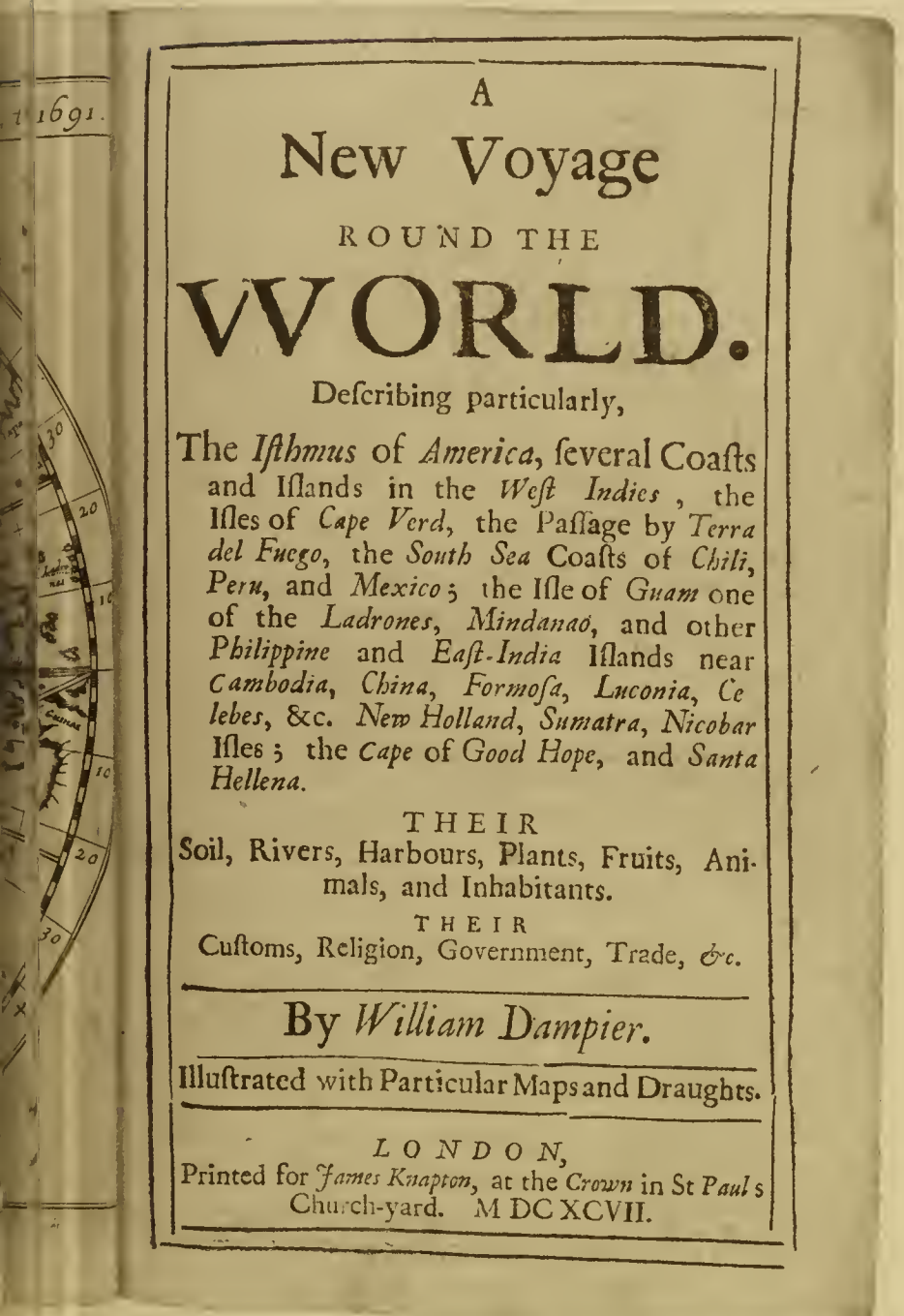
Charles Johnson
A general history of the robberies and murders of the most notorious pyrates and also their policies, discipline and government, from their first rise and settlement in the Island of Providence, in 1717, to the present year of 1724.
London, 1724.

Johnson's book has been one of the most influential volumes on the history of piracy, serving as a source for such works as Robert Louis Stevenson's *Treasure Island* and J. M. Barrie's *Peter Pan,* as well as the famous pirate films starring Douglas Fairbanks, Sr., and Errol Flynn. Nothing is known of Captain Johnson, the author whose name is shown on the title page, but in the 1930s, John Robert Moore made an impressive argument that many passages were clearly the work of Daniel Defoe, who had shown an interest in the subject of pirates in his *Robinson Crusoe* and *Captain Singleton.* In 1988, P. N. Furbank and W. R. Owens argued that Moore's attribution was faulty because he had based it only on internal evidence. Other scholars joined in the debate and noted that the book's use of nautical language could only come from a seaman or from one who had close and direct access to the pirates and their ships, as the author seems clearly to have had. In 2001, James Kelly of Worcester College, Oxford, suggested in his D. Phil. thesis that there is substantial internal and external evidence to show that Defoe contributed to the *General History of the... Pyrates* as part of a collaborative effort.

Charles Johnson
A history of the lives and exploits of the most remarkable pirates, highwaymen, murderers, street-robbers.
Birmingham, 1742.

In contrast to the 1724 edition, this new edition of Charles Johnson's *History of the... Pyrates* shows the way in which the literature on piracy had become even more romanticized in the less than three-quarters of a century since Exquemelin presented the first, already romanticized, account in 1678. (FIG. 6.23)


A MAP OF THE WORLD. Shewing the Course of Mr. DAMPIERS Voyage Round it:
NORTH AMERICA
SOUTH SEA
PACIFICK or
FIRM LAND
SOUTH AMERICA
BRASIL
AMAZONS
AFRICA
ETHIOPIAN
SOUTHERN OCEAN
Tropick of Cancer
Tropick of Capricorn
Equinoctial Line
Antarctick Circle
Antartick Circle
H. Moll Fecit



A

New Voyage

ROUND THE

WORLD.

Deſcribing particularly,

The *Iſthmus* of *America*, ſeveral Coaſts and Iſlands in the *Weſt Indies*, the Iſles of *Cape Verd*, the Paſſage by *Terra del Fuego*, the *South Sea* Coaſts of *Chili*, *Peru*, and *Mexico*; the Iſle of *Guam* one of the *Ladrones*, *Mindanao*, and other *Philippine* and *Eaſt-India* Iſlands near *Cambodia*, *China*, *Formoſa*, *Luconia*, *Celebes*, &c. *New Holland*, *Sumatra*, *Nicobar* Iſles; the *Cape* of *Good Hope*, and *Santa Hellena*.

THEIR

Soil, Rivers, Harbours, Plants, Fruits, Animals, and Inhabitants.

THEIR

Cuſtoms, Religion, Government, Trade, *&c.*

By *William Dampier.*

Illuſtrated with Particular Maps and Draughts.

LONDON,

Printed for *James Knapton*, at the *Crown* in St *Paul*s Church-yard. M DC XCVII.

Fig. 6.22 **William Dampier, *A new voyage round the world.*** London, 1697.

Dampier's extremely popular book established a literary model for later voyage narratives, both factual and fictional.

Regulation of Maritime Activities

One of the principal features of European political development in the period of the conquest of the oceans was the rise of states with extensive bureaucracies, centralized control, and permanent armed forces on land and at sea. This process resulted in each country creating specific offices and numerous national regulations for conducting maritime affairs. At the same time, long-standing practices at sea by the ships of European nations laid the basis for an international understanding that became part of treaties and eventually evolved into international maritime law.

NATIONAL ADMINISTRATION

Every maritime nation established laws regulating the conduct of the ships and seamen that carried its national flag. The laws encompassed the entire range of activities, from commerce and fishing to navies and privateering. The process of drafting and promulgating such laws in each country also led to the establishment of specific offices to enforce the laws. New officials typically issued reports and compiled information for the use of higher officials, and whatever their practical value at the time, such documents have benefited later historical research.

Netherlands (United Provinces, 1581–1795)
Vervolgh van het recueil van alle placaten, ordonnantien, resolutien, instructien, listen en waarschouwingen, betreffende de admiraliteyeten, convoyed, licentien, en verdere zee-saaken. **The Hague, 1701.**

The affairs of the sea concern not only matters of science and technology and of skill and daring on the deep, but also governmental administration. All types of maritime activities came under regulation, from the fishing catch to customs duties. This volume is one of a large compilation that recorded Dutch sea regulations issued between 1597 and 1763. The work was published in a multi-volume series first printed by Paulus Jacobus and, later, by Isaak Scheltus. (FIG. 6.24)

Spain
Ordenanzas de su magestad para el govierno militar. **Madrid, 1748.**

A navy as an instrument of the central government necessarily produces a large number of regulations for managing its own affairs. This volume summarizes the regulations of the Spanish navy at the end of the war of 1739–1748. (FIG. 6.25)

Thomas Pownall (1722–1805)
The administration of the colonies. **London, 1768.**

Thomas Pownall's book appeared in six editions, each larger and more comprehensive than the preceding, from the first anonymous edition in 1764 until the last in 1777. This fourth edition contains Pownall's mature thinking about Britain's North American colonies and the British Atlantic system of maritime trade. Experienced in colonial and overseas affairs, Pownall had been lieutenant-governor of New Jersey, 1755 to 1757, governor of Massachusetts, 1757 to 1760, Commissary for Control of the Combined Army in Germany, 1761 to 1763, and Commissioner for German Demands, 1764. In Pownall's understanding, the term "administration" included the broader features of government policy. Along these lines, Pownall proposed in this edition that Britain create "a grand marine dominion."

United States
Passport for the Elizabeth of Boston, Isaac Hardy, Master. **15 February 1811.**

Passports of this type were issued by the United States government beginning in 1796 and followed the model established by the British government in its long-standing use of the "Mediterranean Pass." Following the signing of a treaty between the United States and Algiers in 1795, passes such as this one verified that the vessel was entirely owned by Americans. The treaty accepted that the United States would pay tribute to Algiers, and in return, Algerian corsairs would not seize vessels carrying this passport.

In Washington, the President signed the blank forms as did the Secretary of State, who also affixed the seal of the United States. The blank forms were then distributed to customs collectors, who signed and issued them to ships' masters on payment of a ten-dollar fee with payment of a bond and verification of the vessel's ownership The distinctive scalloped top edge of the document was a means of authenticating the document. After the documents were signed, U.S. officials sent the top section of the document to American diplomatic representatives on the North African coast, who provided copies to the corsairs to use in identifying American vessels.

PLACAAT
Op den opbef van de
CONVOYEN
EN
LICENTEN,
en verdere 's Lands Middelen
te Waater.

IN 'sGRAVENHAGE,
By JACOBUS SCHELTUS, ordinaris Drukker van
de Hoog Mog. Heeren Staaten Generaal der vereenighde
Nederlanden. Anno 1687. *Met Privilegie.*

Fig. 6.24 Netherlands (United Provinces, 1581–1795), ***Vervolgh van het recueil van alle placaten, ordonnantien, resolutien, instructien, listen en waarschouwingen, betreffende de admiraliteyeten, convoyed, licentien, en verdere zee-saaken.*** The Hague, 1701.

This volume is one of a large compilation that recorded Dutch sea regulations issued between 1597 and 1763.

TRATADO SEGUNDO.

De la Autoridad, Funciones, y Obligaciones de los Oficiales de Guerra.

TITULO PRIMERO.

Del Capitan General de la Armada, Director General de ella.

ARTICULO I.

EL Capitan General, ò Governador General de la Armada, à cuyo cargo quiero que eſtè unido el empleo de Director General de la miſma Armada, tendrà el mando, y direccion de toda ella, y las partes que la componen, hallenſe unidas, ò divididas en Departamentos, ò Eſquadras, y ſe extenderà ſu inſpeccion, y autoridad à qualeſquiera parages en que ſe hallaren Eſquadras,

Fig. 6.25 Spain, ***Ordenanzas de su magestad para el govierno militar.*** Madrid, 1748.

This set of Spanish naval regulations is open to the section on the authority, functions, and obligations of the Captain General and Director General of the navy.

INTERNATIONAL MARITIME LAW

European maritime law may be traced back to the island of Rhodes, whose laws formed the basis of the Eastern Roman Empire's maritime code. These laws dated from the seventh or eighth century and came to be known as "Rhodian Sea Law," although some elements of them derive from the laws of Hammurabi, *The Babylonian Index*, of the eighteenth century B.C.E. Since the barbarian invaders who moved into the Roman Empire were not seamen, Mediterranean port cities continued to use the laws that had developed in earlier times. Some Italian cities, such as Trani, Amalfi, and Venice, began to form their own laws in the medieval period, while others were drawn up in Spain.

The earliest maritime legal code to emerge outside of the Mediterranean was the twelfth century "Roll of Oléron," of French or Anglo-Norman origin, which was compiled on the island of Oléron in the Bay of Biscay and later promulgated in the thirteenth century by King Louis IX of France. The English *Black Book of the Admiralty* also dates from this period. The "Roll of Oléron" later formed the basis for the maritime laws in northern Europe, including the Laws of Wisby, the *Watterecht,* used by the Hanseatic League and established in a conference of league members in 1407. In addition to the development of international law, other types of laws emerged which were dealt with in specialized courts. Among these were admiralty and vice-admiralty courts that dealt with prize matters and naval courts-martial that dealt with discipline on board warships.

One of the underlying issues in the early development of maritime law was the question that arose during the Middle Ages of whether and to what extent a city or country could claim sovereignty over areas of the sea. Venice claimed sovereignty over the Adriatic; Denmark and Sweden vied for the *dominium maris Baltici* until they agreed upon a portioned sovereignty of the Baltic in 1622. England claimed the sovereignty of the "British Seas," extending from Norway to Spain. Some of the claims to maritime sovereignty entailed only ceremonial rituals of deference, such as firing a gun salute, dipping an ensign, or striking topsails to acknowledge another power's sovereignty. The question became more serious when claims to the sovereignty of the seas were extended beyond the ceremonial to the enforcement of exclusive fishing rights, or to the levying of tolls, or to the denial of passage to ships over broad areas of the world's oceans.

The germ of the broader legal dispute was planted when, following the discovery of America, Spain and Portugal attempted to apportion the world's oceans between themselves. At first, the seafaring explorers and traders from England, France, and the Netherlands merely ignored these claims. In 1580, the Spanish ambassador to England formally lodged a diplomatic complaint with Elizabeth I over Drake's incursion into Spanish sovereignty over the Pacific. The Queen's reply was based on the authority of ancient writers, Ulpian and Celsus. Her views also anticipated the scholarly legal argument that arose in the seventeenth century, when she retorted that the use of the sea and air is common to all.

***Libro di consolato.* Venice, 1539.**

The most elaborate and widely accepted new body of maritime law in the Mediterranean in the Middle Ages came from Barcelona, where it was built up from the decisions of the city's magistrates on shipping matters. It was compiled in the thirteenth century and called the *Consolat de Mar*, or Consulate of the Sea. In this form it became widely used in Spain, Provence, and Italy. The code was first printed in Catalan at Barcelona in July 1494 and was reprinted four times in Catalan. It was translated and first printed in Italian in 1519. This is the second Italian printing, which like many later ones, was printed in Venice and reflected Venetian trading interests. (FIG. 6.26)

Hugo Grotius (1583–1645)
***De mari libero.* Leiden, 1633.**

The Dutch humanist and jurist, Hugh de Groot, known more commonly by the Latin form of his name, had begun to consider the subject of maritime law early in his career. In 1604, he wrote a piece on prize law entitled *De jure predea,* which put the subject in the broad context of international and natural law, rather than relying on the traditional basis for law in the Bible and the laws of the Church. Continuing with his studies, Grotius dealt with the legal issues surrounding the Dutch capture of a Portuguese ship in the Strait of Malacca in light of the 1493 papal grant of joint ownership of the sea to Portugal and Spain. Beginning a large study on the subject, Grotius argued that the seas were free for all to use and not the property of any country. In 1609, one chapter of this work was published under the title *Mare librum.*


LIBRO DI CONSOLATO
NOVAMENTE STAMPATO ET RICOR-
retto, nel quale sono scritti capitoli & statuti & buone
ordinationi, che li antichi ordinarono per li casi
di mercantia & di mare & mercanti & ma
rinari, & patroni di nauilii.

M D XXXIX

Fig. 6.26 ***Libro di consolato.*** Venice, 1539.
The most influential maritime law codes in the western Mediterranean are incorporated in this volume.

Fig. 6.27 Hugo Grotius, ***De mari libero.*** Leiden, 1633.
Grotius is renowned in the history of international law for his persuasive arguments in favor of the freedom of the seas.

Before he was able to complete his studies in this area, Grotius was sentenced to life imprisonment in 1618 for his political opposition to Prince Maurice of Nassau. In 1621, he escaped from Loevenstein castle, reputedly hidden in a chest of books, and fled to Antwerp and then to Paris. There, in 1625, he wrote his famous book on the law of war and peace, *De jure belli ac pacis*, which incorporated a revised version of his earlier work. In 1633, the *Mare librum*, originally published in 1609, appeared again in this booklet with a work by Paulus Merula (1558–1607), a legal scholar and historian from Dordrecht and later, Leiden. In the context of the international affairs of the 1630s, this particular edition of Grotius's work provoked widespread interest and discussion. In 1634, Grotius was appointed Swedish ambassador to Paris. While returning to France after a visit to Stockholm, he was shipwrecked in the Baltic and died near Rostock. (FIG. 6.27)

John Selden (1584–1654)
Mare clausum seu de dominus maris. London, 1635.

John Selden's volume was the most famous direct rebuttal to Grotius on the issue of freedom of the seas. He argued quite differently than Queen Elizabeth I had done in 1580 and, following English policy in the reigns of James I and Charles I, held that a nation had the right to control use of the sea within determined areas. Selden wrote this treatise in 1618, but it was not published until 1635 at the command of Charles I.

Trained in the law, Selden wrote a history of government in England before the Norman Conquest, *Analecton Britannicon* (1615), and became a leading figure in the Antiquarian Society, a center for historical research in early seventeenth-century London. He was twice imprisoned for supporting the House of Commons against royal authority, but later became

a monarchist and dedicated this book to Charles I. In 1654, Selden bequeathed his large collection of books and manuscripts to the Bodleian Library at Oxford, where his name is remembered in the extension of the library built to house them: "Selden End."

Johannus Isacius Pontanus (1571–ca. 1639)
Discussionum historicaruu libri duo. **Harderwijk, 1637.**

The debate in which Selden and Grotius engaged did not end with their most famous books. Although Selden's work is a classic source in support of national assertions that exclude foreign commerce and navigation from defined waters, it was neither the first nor the only one. Gentilis defended Spanish and English claims in his *Advocato hispanica* (1613); William Welford wrote on English claims in *De domino maris* (1613). In 1633, Sir John Boroughs wrote *The Sovereignty of the British Seas Proved by Records,* but it was not published until 1651. Echoing the similar views of Venice in regard to the Adriatic, Paolo Sarpi published his *Del dominio del mare Adriatico* (1676).

Representing the opposing side, Johanus Isacius Pontanus (a Dane named Hans Isaksen) was one who took Grotius's side and argued for the freedom of the seas. Pontanus was professor at the Latin School in Harderwijk, one of the old Hanse port towns on the Ijseelmeer in the eastern Netherlands. In a tangential maritime connection, he is also known to have contributed to R. Hues, *Tractatus de globis*, published by Jodocus Hondius in Amsterdam in 1617 and also wrote a history of the Danish kings, *Rerum Danicarum historia,* also published by Hondius in 1631.

Charles Molloy (1646–1690)
De jure maritimo et navali: or a treatise of affairs maritime and of commerce. **London, 1688.**

Molloy's book on maritime and naval law became a standard authority on international law in England. First published in 1676, it was regularly reprinted during the eighteenth century. Earlier, during the Second Anglo-Dutch War, Molloy had written an anti-Dutch tract, *Holland's Ingratitude, or A Serious Expostulation of the Dutch* (1666). In *De jure maritimo,* Molloy made one of the most extreme legal arguments for England's sovereignty of the sea, which he claimed extended from Cape Finisterre to Van Staten in Norway. (FIG. 6.28)

Johan Gröning (1669–ca. 1706)
Navigatio libera seu de jure quod pacatis ad belligerantium commercia. **Leipzig and Rostock, 1693.**

In the late seventeenth century, the German scholar Johan Gröning published this study of international and natural law in the context of the law of the seas. His largely forgotten work focused on commerce in peace and war. Little is known about the author, but he may possibly be the same Gröning who in 1703 published *Staatistische Bücher,* a volume of collected works that included studies on mathematics and naval construction.

Christopher Robinson (1766–1833)
Reports of cases argued and determined in the High Court of Admiralty: commencing with the judgments of... Sir William Scott, Michaelmas Term, 1798. **Philadelphia, 1800.**

This volume is among the most important contributions to prize law during the Napoleonic Wars. It is the first of six volumes of reports that covered the first ten years of Sir William Scott's tenure as Judge of the High Court of Admiralty from 1798 to 1808, including all the judgments in that period that Scott handed down. These judgments substantially clarified or formulated prize law and international maritime law.

Scott, later raised to the peerage as Baron Stowell, was born in County Durham in 1745 and won a scholarship to Corpus Christi College, Oxford, in 1761. Beginning an academic career, he became Camden Reader of Ancient History at Oxford in 1774 and while in that post he earned a doctor of law degree in 1779. Called to the bar in 1780, he became King's Advocate in 1789 and was Judge of the High Court of Admiralty from 1789 to 1828. Well known in London's literary and social circles, Scott was a close friend of Dr. Samuel Johnson and was executor of Johnson's will.

Christopher Robinson, who compiled these law reports, was a noted specialist in prize law and an advocate and member of Doctors' Commons, a group of doctors of law, mainly from Oxford and Cambridge universities, who worked out of buildings that once stood just to the east of present-day Ludgate Circus in London.

Fig. 6.28 Charles Molloy, ***De jure maritimo et navali: or a treatise of affairs maritime and of commerce.*** London, 1688.

This book became the standard English-language interpretation of international maritime law. As its frontispiece illustration suggests, Molloy was one of the strongest promoters of England's claim that its sovereignty extended to the surrounding seas.

Fig. 7.4 **Jan Huygen van Linschoten**, ***Itinerario***. Amsterdam, 1596.

With this pioneering work, Linschoten provided both the incentive and the knowledge that led to the founding of the Dutch East India Company. Many ships carried copies of Linschoten's book on board for the practical information it contained. For example, his map of Goa had detailed information about the harbor and the facilities of a key Asian destination. (See page 166, below).

CHAPTER 7 THE LITERATURE OF THE SEA

The writers who published accounts of voyages during the age of oceanic conquest were working in a tradition that stretched back to Homer's *Odyssey*. Narratives of sea voyages became an increasingly common genre of the European literary scene as more and more Europeans had the experience of travel on the open ocean. Like the visual images of voyages found on early sea charts, which expanded into other forms of artistic and imaginative expression, the written word also took varied forms as imaginative, speculative, and even entirely fictitious narratives.

Fig. 7.5 Gerrit de Veer, *Waerachtighe beschrijvinghe van drie seylagien*. Amsterdam, 1599.

De Veer's account of Willem Barents's three voyages underscored the near impossibility of putting to practical use a northeast passage to Asia. (See page 166, below).

Shipwreck Accounts

One of the earliest literary expressions with a maritime theme are accounts of shipwrecks, part of an extensive literature relating to the sea that extends from the ancient world to the modern novel. The tragic spectacle of shipwreck and death by drowning brought together poignant drama, a view of the perilous and mysterious deep, a profound expression of religious belief, and, sometimes, an adventurous tale of survival. While there are cases of ships sinking or vanishing with little or no trace in mid-ocean, shipwrecks generally occur in coastal waters, where storms, fog, rocks, shoals, and currents create dangers for navigation.

Historia tragico-maritima. Lisbon, 1735–1736.

In the sixteenth century, Portuguese writers began to publish accounts of shipwrecks in pamphlet form. These quickly became a literary genre with a wide audience. In the early eighteenth century, Bernardo Gomes de Brito gathered a number of these accounts and published a collection in Lisbon in 1735–1736. Known in English as the *Tragic History of the Sea,* the British historian Charles R. Boxer wrote of this type of account that it showed the "characteristic improvidence of the Portuguese and their equally characteristic tenacity." In the Portuguese shipwreck genre, the theme had a political undertone, namely opposition to the high cost of maintaining the Portuguese empire and unease with the problems deriving from colonialism. These tales by different writers have widely differing historical and literary qualities. Once thought to be of negligible interest, they have been studied in recent years for what they have to reveal beyond the intentions of their authors.

Jerónimo Corte-Real
Naufragio e lastimoso sucesso da perdiçam de Manoel de Sousa de Sepulveda & Dona Lainor de Sá. Lisbon, 1594.

Jerónimo Corte-Real was born to a noble family in Lisbon about 1530. He saw military service in Morocco and in India. In 1574, he published a poem, *Segundo cerco de Diu,* which celebrated the military feats of Dom João de Castro and Dom João de Mascarenhas at the fortress at Diu half a century earlier. In 1578, he published a similar work on the battle of Lepanto of 1572. *Naufragio* recounts in verse at epic length the story of a wreck off the Cape of Good Hope. Luis de Camões and his 1572 *Os Lusiadas* influenced Corte-Real in bringing a poetical treatment to the shipwreck genre.

Jonathan Dickinson (1663–1722)
God's protecting providence. London, 1700.

The shipwreck described in this volume resulted in the gathering of hard-to-come-by anthropological information. On 23 August 1696, Jonathan Dickinson, a merchant, embarked with his family on board the barkentine *Reformation* from Port Royal, Jamaica, sailing for Philadelphia. Becalmed for a time, the ship was caught in a hurricane off the Florida coast and wrecked on the night of 23–24 September near present-day Jupiter Inlet in Palm Beach County, Florida. Captured by the now-extinct Ais Indian tribe, Dickinson later wrote a rare description of this tribe, which he had an opportunity to observe closely during his negotiations to obtain the party's freedom. After some days, Dickinson and the other survivors were released, and they eventually reached Philadelphia five months later. This book was first published in Philadelphia in 1699 and in London the following year.

Voyage Narratives

The first accounts of oceanic voyages were typically individual reports, often published versions of letters. As these reports began to proliferate, publishers collected them into multi-volume works that became a genre of their own. About the same time, narrative accounts of voyages grew longer and began to reach book length. Some of these books achieved widespread popularity and were translated into a number of different languages. Today, voyage narratives are chiefly valued as either historical accounts of a particular expedition or as literary works. In the past, they sometimes served a practical need. Seamen might study such works before they set sail on new voyages of exploration, and they often took copies with them to sea as practical guides and sources of information on astronomy, navigation, natural history, and cultural encounters.

Christopher Columbus (1451–1506)
***Epistola de insulis.* Basle, 1493.**

The most famous voyage ever undertaken fortuitously occurred after the technology of modern printing was already well established in Europe. The printed version of Columbus's letter to the Spanish court, reporting his discoveries, established the pattern for many other narrative reports that followed. In this early form, there is less about the maritime details and the voyage itself than about what Columbus saw and what possibilities he imagined for the future. Here he describes the islands he had brought under Spain's control as a rich source of gold and populated by peoples ready to receive the word of God. This Basle edition is the first to include illustrations. Only three copies of it are known.

Amerigo Vespucci (1451–1512)
***Petri Francisci de Medicis Salutem plurinam.* Paris, 1503.**

Amerigo Vespucci may be thought of disparagingly as one of the first great self-promoters who, by dint of widespread publication of his book, under the title *Mundus novus,* managed to get his name attached to two continents. While the book is famous for leading Martin Waldseemüller to first put the name "America" indelibly on a map in 1507, it is also notable as the first printed document about Brazil and the first to describe the southern sky with the "Southern Cross" as its dominant constellation. This revealed cross in the sky comforted sailors who at first dreaded being at sea without the North Star as a guide.

Vespucci first served as an agent of the Medici at Seville, then joined Alonso de Ojeda and Juan de la Cosa in obtaining a royal license from Spain to sail to the New World in 1499. In company with Ojeda and de la Cosa, Vespucci reached the northern coast of South America, in the area of present-day French Guiana, then continued on alone, claiming to have gone as far as Cabo São Roque at the eastern tip of Brazil. En route he described passing the mouth of a large river, which was presumably the Amazon. In 1501, he returned again to America, sailing under the Portuguese flag, to explore the east coast of Brazil, purportedly from the area of present-day Salvador da Bahia to Rio de Janeiro. In 1508, King Ferdinand of Spain appointed Vespucci the Pilot Major at the recently established Casa de Contratacíon, a position he held until his death in 1512.

This volume is a Latin translation of a letter that Vespucci originally wrote in Italian to Lorenzo di Pier Francesco de Medici about a voyage in 1501–1502. Vespucci's letter was printed in fifteen editions and five languages between about 1503 and 1507, though most of the editions were undated. This Paris edition was the first to appear. (FIG. 7.1)

***Copia der newen Zeytung auß Presillg Landt.* Nuremburg, ca. 1514.**

In 1514, about the same time that news of Balboa's sighting of the Pacific Ocean arrived in Europe, an agent of the Fugger banking house at Funchal on the island of Madeira sent a letter to the Fugger headquarters in Augsburg, Germany. The writer reported the news that some ships had sailed six or seven hundred miles farther down the coast of South America than any previous vessels and that they had sighted a large strait that might lead into the Pacific and on to the East Indies. One vessel brought back a cargo of valuable wood and reported that gold, silver, and other riches were to be found. The Fuggers circulated this exciting information by means of this pamphlet, which directly inspired others to outfit several more voyages to follow up on the report. Although the specific voyage was not mentioned by name in the document, modern scholars tie the

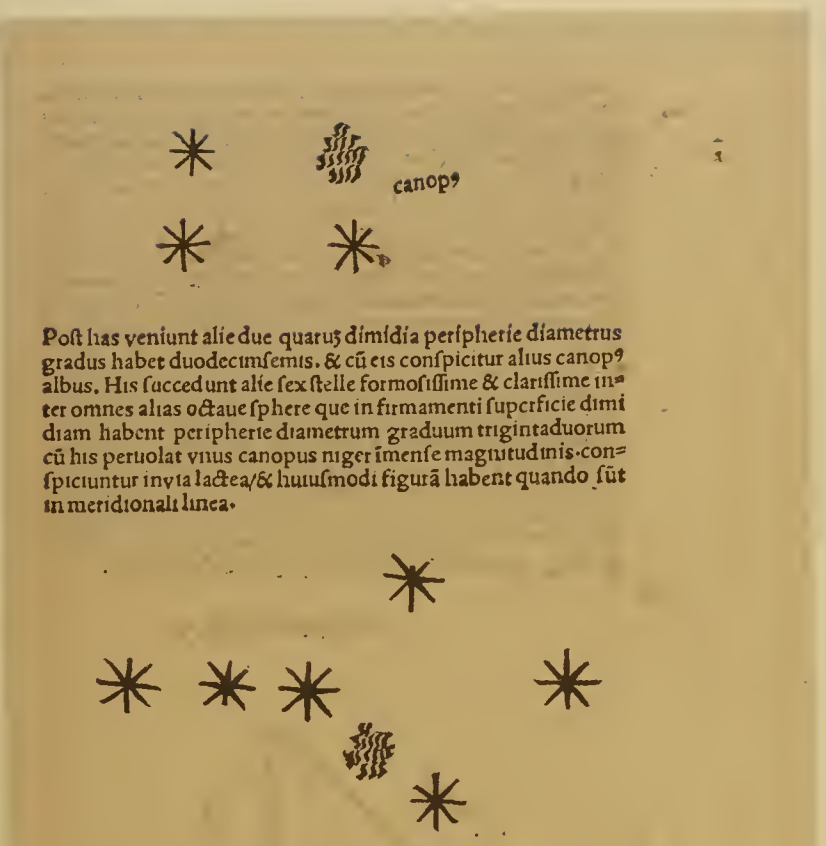


Fig. 7.1 Amerigo Vespucci, ***Petri Francisci de Medicis Salutem plurimam.*** Paris, 1503.

The woodcut is the first depiction of the Southern Cross constellation.

report to the 1511–1512 voyage of two caravels under Estéban Froes, called Flores, and João de Lisboa, who were the first to enter the Río de la Plata estuary in territory allotted to Spain by the Treaty of Tordesillas (1495).

Lodovico de Varthema (15th cent.)
Die ritterlich un[d] lobwirdig Rayss. Augsburg, 1515.

First published in 1510, the account of the Bolognese traveler Ludovico Varthema related his travels to and from India between 1501 and 1508, which included clandestine passage on the Red Sea dressed as a Muslim. Varthema's book appeared at a time when there was already considerable public interest in Asia, stirred up by the first availability of Marco Polo's account in the early fifteenth century. Varthema was reprinted in a Latin edition in 1511, this German edition in 1515, and a Spanish translation in 1518. The German edition is prized for its woodcut illustrations.

Antonio Galvão (d. 1557)
Tratado... dos diuersos & desuay rados caminhos. Lisbon, 1563.

One of the rarest of the early compilations of sea voyages, Antonio Galvão's *Tratado* included not only Spanish and Portuguese ventures but the voyages of Jacques Cartier for France, as well. He was the first to present an account of the voyages of the Corte-Real brothers, Gaspar and Miguel, to the North American coast in 1500–1502. Richard Hakluyt revised and annotated an anonymous translation of the book into English in 1601 under the title *The Discoveries of the World.* Antonio Galvão was the son of Duarte Galvão, secretary to Kings Dom Alfonso V and Dom João II of Portugal, as well as chief chronicler to Dom Manuel I . He joined the army in 1522 and rose to be governor of the Moluccas.

The history of trauayle in the West and East Indies, and other countreys lying eyther way, towards the fruitfull and ryche Moluccaes. London, 1577.

This volume is the revised and enlarged second edition of Richard Eden's 1555 translation of the work by the historian Peter Martyr Anghiera, which Eden had originally titled *The Decades of the New World or West India.* Born in Arona on the shore of Lago Maggiore, Peter Martyr obtained a church appointment in Spain as court chronicler and eventually received the title Bishop of Jamaica. With access to original documents, he was able to compile a history of the twenty years of Spanish oceanic exploration that followed Columbus's first voyage. Originally published in 1516 at Alcalá de Henares under the title *De orbo novo decades,* it was the first detailed


ILLVSTRI VIRO, DOMINO PHILIPPO SIDNÆO
MICHAEL LOK CIVIS LONDINENSIS
HANC CHARTAM DEDICABAT :. 1582.
Arcticus. 90. Polus.
Circulus Arcticus
Occidens. 50
Nauis carualino, quæ ratione huc a moluccis, hincque vicissim ad moluccas alternis. 50. diebus. nauigauit. an. 15[illegible]
A. Galuano. G. Frissius.
Hucusque nauigationes Lusitanorum. 1520.
Hispanorum. 1540.
Anglorum. 1580.
Nauis.
Sierre Neuada
Quiuira
C. Ingenmas
Cedri. Ins.
S. Croc
C. Rosso
Cuola.
CVLIACAN
GALICIA.
Mare de Verth
Rana. 1524
Montes S. Johannis
Sagahnay
Hochelaga
Canada
Jac. Cartier 1535
Norombega
J. Gabot. 1497.
C. Breto
Corte Real.
Grand. bay
Gamma ba
Labrador
Frobysher
LOK
R. ELIZABETH
Anglia 1576
Friland.
Groenland.
Jac. Scolvus
Claudia
Carenas
Apalchen.
R. Jordan
Emperada
Bermuda
Bahama
Mexico
Tesuco. Ins.
Incoton
Isabella
hispaniole
Meridies. 310
240
250
260
270
280
290
300

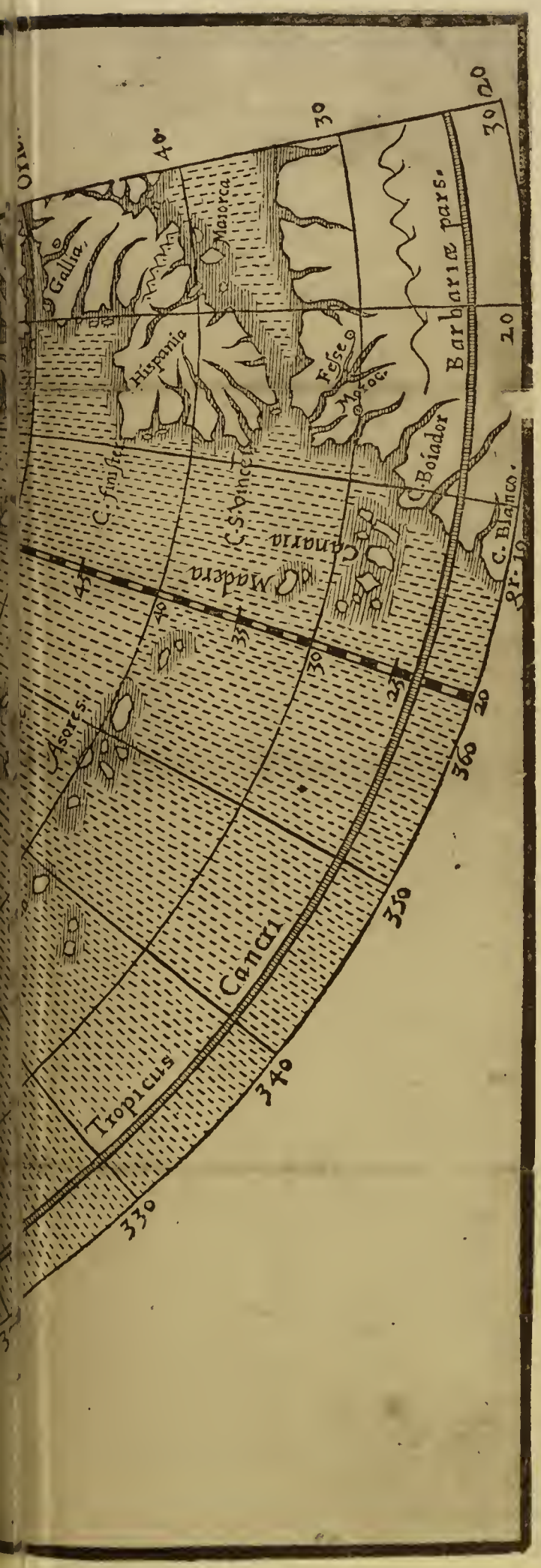


Fig. 7.2 **Richard Hakluyt.** ***Divers voyages.*** London, 1582.

Michael Lok prepared this map specifically for Richard Hakluyt's first collection of voyage narratives. While Hakluyt published his book in the hope of encouraging English colonization in places like "Norombega," shown prominently, Lok's map also put forth his own ideas about finding a water route to the Pacific. He included the sea (Mare de Verrazana) that Verrazzano thought he saw across the North Carolina banks in 1524.
(See page 166, below).

account of the discovery of the New World. In Eden's translation, Peter Martyr's work constituted only the first half of the volume. Eden added excerpts from the 1547 work *Corónica de las Indias* by Gonzalo Fernández de Ovieda y Valdés, as well as other material. Taken together, the details in these narratives are the first practical sailing directions for the oceans.

Richard Hakluyt (1552?–1616)
Divers voyages touching the discoverie of America, and the ilands adiacent unto the same, made first of all by our Englishmen, and afterwards by the French-men and Britons. London, 1582.

Richard Hakluyt was the greatest of all prophets and promoters of English maritime enterprise. The first of his compilations, which the compiler himself described as "this hastie work," is a mixture of narratives, selected maps, propaganda pieces, and advice to would-be explorers. Its purpose was to draw attention and interest to North America. In 1570, Hakluyt had gone to study at Christ Church, Oxford, where he eventually became a lecturer in geography and cosmography. In this position, he was instrumental in introducing globes for teaching in schools. This book apparently helped Hakluyt obtain the post of chaplain at the English embassy in Paris in 1584, where he gained access to new sources of information and became aware of the secrecy surrounding new explorations and the value to England of publishing information about them. While he was in Paris, Hakluyt wrote his "Discourse of Western Planting," a confidential state paper presented to Elizabeth I in 1584. (FIG. 7.2)

Richard Hakluyt (1552?–1616)
The principall navigations, voiages and discoveries of the English nation, made by sea or ouer land, to the most remote and farthest distant quarters of the earth at anytime within the compasse of the earth of these 1500 yeers. London, 1589.

On Hakluyt's return to England in 1588, he began to collect material for what would be a much more scholarly piece of work than his earlier *Divers Voyages*, covering English voyages to all parts of the globe and drawing upon all available sources, some of which "tumbled in while the book was in press." The account of Sir Francis Drake's circumnavigation became available only after the book was entirely printed. The text for it was printed separately and inserted when the volume was bound. (FIG. 7.3)

Jan Huyghen van Linschoten (1563–1611)
Itinerario. Amsterdam, 1596.

Linschoten traveled to the Portuguese colony of Goa in India on a Portuguese ship in 1583 and returned in 1589. During the voyage and his stay in Asia, he acquired such an abundance of practical maritime knowledge concerning the Portuguese empire that it amounted to espionage. He found and translated a large number of Portuguese sailing directions, along with information on currents, islands, sandbanks, and other details, publishing them in his *Itinerario*. While the book is justly famous for the author's observations of the peoples and customs of India, more importantly it facilitated the establishment of a Dutch overseas empire in Asia. His information added the missing links that other Dutch pilots had not previously found in their research and practice. The view of Goa is particularly interesting for the information it contains on that Asian port's facilities in the late sixteenth century. (FIG. 7.4) (See page 158, above).

Gerrit de Veer
Waerachtighe beschrijvinghe van drie seylagien. Amsterdam, 1599.

Gerrit de Veer sailed as a co-pilot on the last two of the three Arctic voyages commanded by the Dutch navigator Willem Barents. The goal of their voyage was to find a Northeast passage to China. In 1596, the final expedition reached as far as Svalbard and Spitzbergen before the ship was locked in the ice and sank to the east of Novaya Zemlya. The expedition members stayed on Novaya Zemlya through the winter and in 1597 sailed southwards in two open boats. Willem Barents died on this journey. The surviving expedition members managed to reach the Kola Peninsula where a Dutch vessel rescued them. Information from Barents's survey was printed on a chart in 1599 and showed Barents Island and the Barents Sea, both named after him. Jan Huyghen van Linschoten sailed with the first two voyages, and his account complements de Veer's description of the final two voyages. (FIG. 7.5) (See page 160, above).

Richard Hakluyt (1552?–1616)
The principal navigations. London, 1599–1600.

The second edition of Hakluyt's *Principal Navigations* was a greatly revised and enlarged version of the work that had first appeared in 1589. For this edition, he carefully reviewed the text, replacing some accounts with better ones, while revising and editing the text with greater care. With this volume, Hakluyt earned his reputation as a great compiler and editor of maritime narratives. Some copies of this edition included the Wright-Molyneaux world map. (See page 9, above).

The first printing of this edition featured a detailed account of the Earl of Essex's expedition to Cádiz in 1596, but when

THE PRINCIPALL NAVIGATIONS, VOIAGES AND DISCOVERIES OF THE English nation, made by Sea or ouer Land,

to the most remote and farthest distant Quarters of the earth at any time within the compasse *of these 1500. yeeres: Deuided into three* seuerall parts, according to the positions of the Regions whereunto they were directed.

* * *

The first, conteining the personall trauels of the English vnto *Iudæa, Syria, Arabia,* the riuer *Euphrates, Babylon, Balsara,* the *Persian* Gulfe, *Ormuz, Chaul, Goa, India,* and many Islands adioyning to the South parts of *Asia:* together with the like vnto *Egypt,* the chiefest ports and places of *Africa* within and without the Streight of *Gibraltar,* and about the famous Promontorie of *Buona Esperanza.*

The second, comprehending the worthy discoueries of the English towards the North and Northeast by Sea, as of *Lapland, Scrikfinia, Corelia,* the Baie of *S. Nicholas,* the Isles of *Colgoieue, Vaigats,* and *Noua Zembla* toward the great riuer *Ob,* with the mightie Empire of *Russia,* the *Caspian* Sea, *Georgia, Armenia, Media, Persia, Boghar* in *Bactria,* & diuers kingdoms of *Tartaria.*

The third and last, including the English valiant attempts in searching almost all the corners of the vaste and new world of *America,* from 73. degrees of Northerly latitude Southward, to *Meta Incognita, Newfoundland,* the maine of *Virginia,* the point of *Florida,* the Baie of *Mexico,* all the Inland of *Noua Hispania,* the coast of *Terra firma, Brasill,* the riuer of *Plate,* to the Streight of *Magellan:* and through it, and from it in the South Sea to *Chili, Peru, Xalisco,* the Gulfe of *California, Noua Albion* vpon the backside of *Canada,* further then euer any Christian hitherto hath pierced.

Whereunto is added the last most renowmed English Nauigation, round about the whole Globe of the Earth.

By Richard Hakluyt Master of Artes, and Student sometime of Christ-church in Oxford.

Imprinted at London by GEORGE BISHOP and RALPH NEWBERIE, Deputies to CHRISTOPHER BARKER, Printer to the Queenes most excellent Maiestie.

1589.

Fig. 7.3 Richard Hakluyt. ***The principall navigations.*** London, 1589.

In this two-volume work, Hakluyt made his first attempt to counter foreign criticism of English seamen. He specifically documented in it "the maritime record of our own men."

PVRCHAS HIS PILGRIMES.

IN FIVE BOOKES.

The first, Contayning the Voyages and Peregrinations made *by ancient* Kings, *Patriarkes*, Apostles, *Philosophers*, *and* others, to and thorow the remoter parts of the knowne World: *Enquiries also of Languages and Religions, especially of the* moderne diuersified Professions of CHRISTIANITIE.

The second, *A Description of all the Circum-Nauigations* of the GLOBE.

The third, Nauigations and Voyages of *English-men*, alongst the Coasts *of* Africa, *to the Cape of* Good Hope, *and from thence to the* Red Sea, *the* Abassine, *Arabian*, Persian, *Indian*, Shoares, Continents, and Ilands.

The fourth, English *Voyages beyond the East* Indies, *to the Ilands of* Iapan, *China*, *Cauchinchina*, the *Philippine* with others, and the *Indian* Nauigations further prosecuted: Their iust Commerce, nobly vindicated against *Turkish* Treacherie; victoriously defended against *Portugall* Hostilitie; *gloriously aduanced against* Moorish *and* Ethnike *Perfidie*; hopefully recouering from *Dutch* Malignitie; iustly maintayned *against ignorant and malicious Calumnie.*

The fifth, Nauigations, Voyages, Traffiques, Discoueries, of the *English* Nation *in the Easterne parts of the World: continuing the* English-Indian *occurrents*, and contayning the *English* Affaires with the *Great Samorine*, in the *Persian* and *Arabian* Gulfes, and in other places of the Continent, and Ilands of and beyond the *Indies*: the *Portugall* Attempts, and *Dutch* Disasters, *diuers Sea-fights with both; and many other remarkable* RELATIONS.

The First Part.

Vnus Deus, Una Veritas.

LONDON
Printed by *William Stansby* for *Henrie Fetherstone*, and are to be sold at his shop in *Pauls* Church-yard at the signe of the Rose.
1625.

Fig. 7.6 **Samuel Purchas.** ***Purchas his pilgrimes.*** London, 1625.

A portrait of the 48-year-old Samuel Purchas is shown at the bottom between the two hemispheres on this elaborate engraved title page made by either Renold Elstrack or William Hole. Apparently the printer completed the book in late 1624 before the engraved title page was ready, with the result that many copies do not include it.

Essex lost favor with Elizabeth I, his name was removed from the volume and the account suppressed. Hakluyt made a new title page dated 1599 that did not mention Essex's expedition.

Among the new material in this volume was "the valiant fight of the *Centurion*" against the Spanish galleys in the Strait of Gibraltar in April 1591 and Sir Walter Ralegh's account of the *Revenge*'s action against a Spanish fleet in the Azores during August 1591.

Samuel Purchas (1577?–1626)
***Purchas his pilgrimes*. London, 1625.**

After 1600, Hakluyt continued his work of collecting manuscripts and voyage narratives for a third edition of his *Principal Navigations*, but he died before he could publish it. The Rev. Samuel Purchas had studied at St. John's College, Cambridge. In 1614, he became rector of the London church of St. Martin's Ludgate. After Hakluyt's death in 1616, Purchas acquired Hakluyt's manuscript collection and added many new and valuable accounts, to create four large folio volumes that made up the largest single work printed in England up to that time. Scholars of exploration literature have often criticized Purchas for his sloppy and irresponsible editing, which led him to include apocryphal accounts, such as Juan de Fuca' s supposed discovery in 1592 of a large inlet on the northwest coast of America between latitudes 47° and 48° N, that supposedly led into a huge sea surrounded by rich countries. (FIG. 7.6)

Willem Ysbrandsz. Bontekoe (1587–1647?)
***Die vier und zwantzigste Schiffahrt*. Frankfurt, 1648.**

One of the most popular voyage accounts in seventeenth-century Dutch literature, Bontekoe's *Journael ofte gedenckswaerdige beschrijvinghe vande Oost-Indische reyse* appeared in more than thirty-five separate editions in the Netherlands between 1646 and 1860. The Hoorn Chamber of the Dutch East India Company was the sponsor of Bontekoe's voyages, which took place between 1618 and 1625. Sailing from the Texel for India, his ship *Nieuw Hoorn* was damaged in a storm, and he had to put in at the Cape Verde Islands for repairs. Continuing on around the Cape of Good Hope, the crew contracted scurvy, and Bontekoe took an unusual course and sailed to Madagascar to revictual his ship. While there in November 1719, the ship caught fire and blew up, killing half the 206-man crew. With the ship's boats, Bontekoe led the survivors across the Indian Ocean, without any navigational instruments or charts, to Bantam in the Sunda Strait, where a Dutch fleet rescued the remaining fifty-seven survivors.

This rare German translation appeared as part 24 of Levinus Hulsius's *Sammlung von Schiffahrten*. Hulsius, or Lieven Hulse, had been born in Ghent and eventually moved to Amsterdam and then Nuremberg, where he was a language teacher. In 1600, he began to collect materials for a series of books on voyages and travel and moved to Frankfurt am Main, following the example of his contemporaries and countrymen Jean-Théodore and Jean-Israel de Bry. By the time Hulsius died in 1606, his press had produced eight volumes for his series of voyages. His wife and children continued to publish the material he had gathered until 1632, when the firm became inactive. With this volume, Christopher Le Blon resumed the series in 1648, but only published two additional volumes, stopping with the twenty-sixth volume. Le Blon engraved the plates in this volume, basing them on the originals in an earlier Dutch edition.

Lionel Wafer (1660?–1705?)
***A new voyage and description of the isthmus of America*. London, 1699.**

Lionel Wafer was the surgeon who sailed with Captain Bartholomew Sharpe in the *Trinity*. His report of the buccaneers' voyage to the Pacific begins with the sailors' crossing of the Isthmus of Darien. One illustration in the book, "The Indians in their robes in council and smoking tobacco after their way" is a good example of the value of European seaman's accounts for the transmission of ethnographical details and for information on inter-cultural encounters.

Awnsham Churchill (d. 1728)
***A collection of voyages and travels, some now first printed from original manuscripts. Others translated out of foreign languages, and now first publish'd in English*. London, 1704.**

This series of volumes is often known as "Churchill's Voyages," after the well-known London booksellers, Awnsham and John Churchill, who published it. These two Churchills were distant relations of John Churchill, the first duke of Marlborough. Awnsham was particularly close to Marlborough's younger brother, Admiral George Churchill, a key figure at the Admiralty as a member of the Lord High Admiral's Council and a member of the household of Queen Anne's consort, Lord High Admiral Prince George of Denmark. The collection probably originated from this Churchill family connection, since Awnsham (whose name seems to derive from an old pronunciation of "Anselm") served as executor of the estate of Admiral George Churchill on his death in 1710.

In 1745, Thomas Osborn republished the collection along with a two-volume supplement to Churchill's voyages that is sometimes called the "Harleian" or "Oxford" collection, since many of the manuscripts derived from the famous library that Robert Harley, first Earl of Oxford, had collected and which eventually became part of the British Library. In 1752, it was reprinted as *Churchill's Voyages* in an eight-volume set with many additional illustrations. (FIG. 7.7)

Fig. 7.7 Awnsham Churchill. *A collection of voyages and travels.* London, 1704.

Many voyage accounts included information on plants, as suggested by this illustration of dates, "water-lemons," and pineapples from John Nieuhoff's description of the first Dutch attempt to develop trade with China in 1655 and his subsequent travels in the East Indies.

Fig. 7.8 **Richard Walter.** ***Viaggio attorno al mondo....*** Livorno, 1756.

The relation of George Anson's voyage around the world in 1740–1744 was one of the most popular English voyage narratives of its time and was translated into many languages, including this version in Italian.

John Harris (1667?–1719)
Navigantium atque itinerantium bibliotheca: or, A compleat collection of voyages and travels. **London, 1705.**

First published in 1705 as a competitor to Churchill's Voyages, this two-volume work was an attempt to provide a synopsis of the previously published works by Hakluyt, Purchas, Ramusio, De Bry, and others, although scholars have judged that Harris's work lacked the originality and editorial selection of Churchill's Voyages. The second volume gathers together a number of previously unpublished accounts. With the idea of encouraging merchants to undertake overseas ventures, John Campbell produced a second and enlarged edition in 1744–1748, and a third edition appeared in 1764. The changing selection of voyage narratives in the various editions of this work, and the different regions of the world they focused on, reveal that different editors had different ideas about the readership, the purposes, and the commercial demands for such collections.)

Richard Walter (1716–1788)
Viaggio attorno al mondo fatto negli anni MDCCXL.I.II.III.IV. dal Giorgio Anson. **Livorno, 1756.**

In 1740, following the outbreak of war between Spain and England, the Admiralty ordered Captain George Anson with a squadron of six ships to sail for the Pacific Ocean. As Professor Glyndwr Williams has described it, the voyage has "a unique and terrible place" in maritime history. In 1744, Anson returned home with only one remaining ship and fewer than two hundred men, after a voyage that had circled the globe in three years and nine months. Nevertheless, Anson's voyage won great popular acclaim because he succeeded in capturing a Spanish ship carrying thirty-two wagon loads of treasure, a rare victory in a period of few British successes.

The account of the voyage, first published in 1748, became one of the most popular books in English and was widely translated. Anson followed the model that William Dampier's 1697 *New Voyage Around the World* had established for the genre. By 1776, fifteen editions of Anson's book had appeared. In all, the book has been reprinted about one hundred times, including translations into French, Dutch, Italian, Spanish, German, Polish, Swedish, and Russian.

Although the original title page announced that the book was "Compiled from Papers and other Materials of the Right Honourable George Lord Anson and published under his direction by Richard Walter, chaplain of his Majesty's Ship the *Centurion*," there is some doubt as to whether Walter was Anson's sole compiler. As early as 1749, suggestions were made that Benjamin Robins wrote the major part of the work, although later evidence suggested that Walter corrected the final proofs of Robins's work. Nevertheless, Anson was clearly in overall control of the contents, since the book clearly promotes Anson's own interpretation of events. That Anson employed

Fig. 7.9 Louis-Antoine de Bougainville. ***Voyage autour du monde***.... Paris, 1771.

In the course of his voyage around the world, Bougainville visited an island in 1768 that he claimed for France and named New Cythera, after the Greek goddess of love and beauty. Known today as Tahiti, Bougainville described the island and its people in a way that led his readers to imagine a natural paradise that contrasted starkly with the life they knew in Europe.

assistants to make the characteristically blunt and plain narrative of a sailor into a more acceptable literary work became an example for future explorers. Mid-eighteenth-century literary critics even demanded that editors improve the structure, style, and grammar to meet contemporary literary standards. Among other legacies of Anson's account, his improved description of himself in battle helped to project the image of the cool and stoic naval officer in the face of danger, an image that James Cook and Horatio Nelson later personified in their very different ways.

Hambly Pope translated the book into Italian for this 1756 edition. (FIG. 7.8)

Alexander Dalrymple (1737–1808)
Account of the discoveries made in the South Pacifick Ocean, previous to 1764. London, 1767.

Alexander Dalrymple gave Joseph Banks a copy of this book before Banks sailed with Captain James Cook on board *Endeavour*. It is one of the few books that Cook and Banks explicitly mentioned as a reference used at sea during Cook's first voyage to the Pacific. When he was only fifteen years old, Dalrymple had joined the East India Company and spent his next thirteen years in India and southeast Asia. After returning to England in 1765, he wrote this book in an effort to draw the Admiralty's attention to his knowledge and experience, hoping to be appointed the commander of the expedition to observe the transit of Venus in 1769. Even though the Royal Society had recommended Dalrymple for this key assignment, the Admiralty chose James Cook. Nevertheless, the argument that Dalrymple made in this book for the existence of "a great southern continent" led the Admiralty to make that geographical question a major objective for Cook to answer.

In 1769, Dalrymple's *Account* was reprinted and later in the same year he published the first volume of a much larger new work, *An Historical Collection of the Several Voyages and Discoveries in the South Pacific*. To encourage sales in anticipation of the second volume that appeared the following year, Dalrymple allowed the purchasers of the *Account* to turn in their copies for credit against the new volumes. Many readers took advantage of this opportunity, inadvertently turning this book into a rare volume. A recent census revealed that only 22 copies of the 1767 printing of this influential book are known to have survived.

Although Dalrymple failed to get the position he wanted to command the expedition to the Pacific, he was hydrographer of the East India Company from 1779 to 1795, and then served as the first hydrographer of the Admiralty from 1795 to 1808.

Louis-Antoine de Bougainville (1729–1811)
***Voyage autour du monde par la frégate du roi* La Boudeuse, *et la flûte* l'Étoile *en 1766, 1767, 1768 & 1769*. Paris, 1771.**

Under the command of Louis-Antoine de Bougainville, the French naval vessels *Boudeuse* and *Étoile* became the first French ships to circumnavigate the globe. Departing from Brest in 1767, Bougainville passed through the Strait of Magellan, visited Tahiti in April 1768, and surveyed the islands of the New Hebrides, the Solomon Islands, New Ireland, and the coast of New Guinea, returning to St. Malo, France, in 1769 by way of the Moluccas and the Indian Ocean. The reports of Bougainville's expedition and its visit to Tahiti, along with those of Wallis and Cook, had a major impact on the European cultural imagination and merged with the ideas of Jean-Jacques Rousseau to create a vision of a new Eden in the South Pacific.

On his return from his circumnavigation, Bougainville brought with him a Tahitian named Aoutouru, whose presence in France attracted so much public attention it tended to overwhelm and obscure the scientific and political objectives of the voyage. These included France's transfer to Spain of its tiny South Atlantic colony in the Malouines (Falkland Islands), and the goal of increasing the agricultural productivity of the French colony on Ile de France (Mauritius) in the Indian Ocean. (FIG. 7.9)

Peter Carl Zimmerman (18th cent.)
***Reise nach Ost- und West-Indien*. Hamburg, 1771.**

Peter Carl Zimmermann's narrative was originally written as a letter to his brother-in-law and friends in Hamburg in 1743 from the West Indian Island of St. John. The letter described Zimmerman's shipwreck on the west coast of Africa in the Dutch East India Company ship *Blijdorp* ten years before, in 1733. It recounted his survival and ordeal on the beaches and in the forests of Gambia before reaching the French slave trading center at Gorée, and then his subsequent voyage and adventures in the West Indies at St. Eustatius and in the Virgin Islands on St. John's. There are only four known surviving copies of this narrative.

James Cook (1728–1779)
***Sammandrag af Capitain Jacob Cooks Tredje Resa i Soderhafwet och emot Norra Polen med Charta ofwer de af Cap. Cook Uptäckte och Namngisne Orter*. Uppsala, 1787.**

James Cook was the greatest maritime explorer of the era. In three voyages, he made an unparalleled contribution to geographic knowledge through his mapping of the Pacific Ocean. In the course of this work, he disproved the centuries-old myth of *terra australis* and replaced it with an accurate view of Australia and New Zealand. He demonstrated the way to determine longitude routinely and accurately at sea. Equally important, Cook gathered an enormous amount of scientific information about the Pacific region, not only its geography, but its peoples, plants, and animals. For his countrymen, Cook became a hero who had opened to the world a vast region of the globe without the violence and loss of life that had accompanied the voyages of earlier explorers. As a result of this, John Hawkesworth's official account of Cook's first voyage was one of the most widely read books of the late eighteenth century.

Cook's third voyage drew worldwide attention, and when the official account of it first appeared in English in 1784 the world had a fuller understanding of the range of possibilities existing in the Pacific. Like the official accounts of his two earlier voyages, the account of the third voyage was a major publishing success. The first English edition sold out in three days in 1784, and by 1801 the publisher reported making a £4,000 profit on the book. For many, this book was the opening of an entirely new era in European expansion, rather than the end of the age of exploration marked by Cook's death in 1779 during the third voyage.

A businessman, Johan Edman, printed this Swedish summary translation of *Cook's Third Voyage* at his own expense.

J. Webber (1751–1793)
"A View of Karakakooa, in Owyhee," from James Cook and James King, *Cook's third voyage*. London, 1785.

John Webber's prolific artistic work provided the fullest illustration of any of Cook's voyages. The son of the Swiss sculptor Abraham Wäber, Webber was born in London, where his father had started to use the anglicized form of his name. As a youth, John was sent back to Berne, where he was apprenticed to a leading Swiss artist, Johann Ludwig Aberli, from whom he learned landscape painting. After three years, he continued his training in Paris and earned a reputation as an engraver of Hyacinthe Rigaud's portraits. Webber returned to London in 1775 to study at the Royal Academy, where he exhibited his work. After seeing Webber's work exhibited at the Royal Academy, the Swedish botanist Daniel Solander, who with Joseph Banks had accompanied Cook on his first voyages, suggested to the Admiralty that Webber accompany Cook on his third voyage with *Resolution* and *Discovery*. (FIG. 7.10)

Jean-François de Galaup, comte de Lapérouse (1741–1788)
***Voyage de La Pérouse autour du monde*. Paris, 1797.**

Hoping to complete the work of Captain Cook in the Pacific, Lapérouse sailed from France with two ships in August 1785. His route took him past Tenerife, along the coast of Brazil, and into the Pacific. Passing along the coast of Chile, he visited Easter Island, Hawaii, and California, and then crossed the Pacific to the Philippines, Formosa, China, North Korea,

Fig. 7.10 **J. Webber. "A View of Karakakooa, in Owyhee," from James Cook and James King, *Cook's Third Voyage*.** London, 1785.

Cook's three voyages were the first major exploring expeditions that deliberately included professional artists for documentation of what was seen. His third voyage was the most extensively illustrated. This view shows Kealakekua Bay, the best anchorage on the west coast of Hawaii.

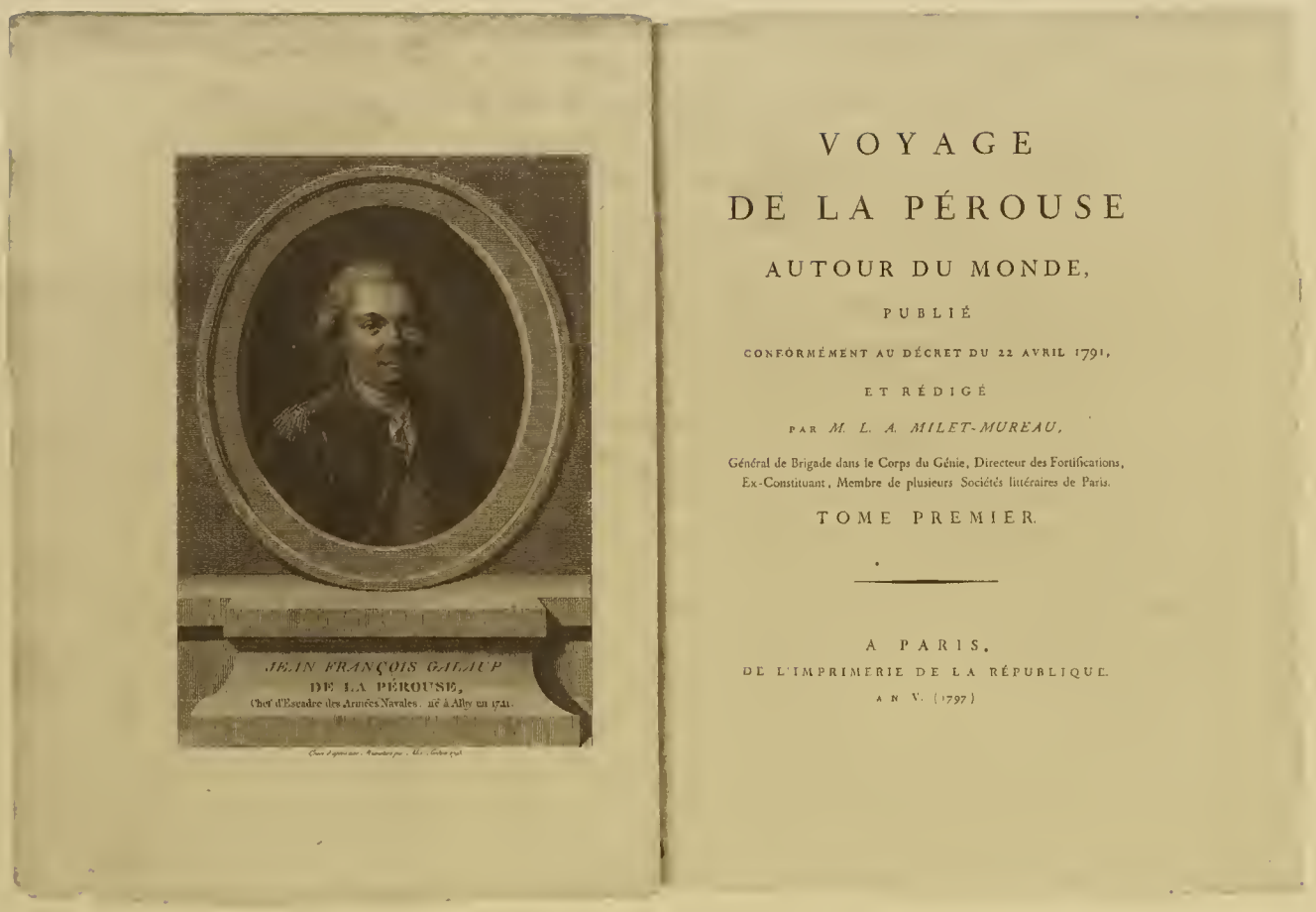


Fig. 7.11 **Jean-François de Galaup, comte de Lapérouse.** ***Voyage de La Pérouse autour du monde.*** **Paris, 1797.**

Attempting to complete Cook's unfinished work in the Pacific, Lapérouse and his ships disappeared in 1788. Their fate remained a mystery for nearly forty years until the wreckage of his ship was found on Vanikoro Island.

Sakhalin, and Kamchatka. After receiving new instructions, Lapérouse sailed south to Samoa and Australia. Departing from Botany Bay on 10 March 1788, Lapérouse and his two ships vanished. Although a subsequent expedition to the South Pacific and New Guinea area, led by Admiral Bruni d'Entrecasteaux, searched for survivors in 1791, Lapérouse's disappearance remained a mystery for nearly forty years until wreckage from his two ships was found on the island of Vanikoro in 1827. Meanwhile, General Louis-Marie-Antoine Milet-Mureau, an army officer with no maritime knowledge, took on the job of editing the official account of Lapérouse's voyage, using the documents and journals that Lapérouse had sent home before his disappearance, and adding his own commentary. The documents that Milet-Mureau used were lost shortly after the publication of this book and were not found again until 1978. Lapérouse's original journals were finally published in 1994. (FIG. 7.11)

Charles Wilkes. (1798–1877)
Narrative of the United States exploring expedition during the years 1838, 1839, 1840, 1841, 1842. **Philadelphia, 1845.**

The Wilkes expedition, sponsored by the government of the United States, was the last great oceanic exploring voyage undertaken in the age of sail. Its leader, Charles Wilkes of the United States Navy, was a blunt, self-righteous, and abrasive man, whose difficult personality created all manner of problems, some of which resulted in courts-martial at the end of the voyage. Two ships were lost to shipwreck and several lives lost in other accidents, but despite such misadventures, the Wilkes expedition succeeded in charting the Fiji Island group, mapping the Columbia River region, and adding to the understanding of Antarctica as a continent. In addition, the expedition's numerous botanical, geological, and zoological specimens formed some of the earliest collections of the newly established Smithsonian Institution.

Alejandro Malaspina (1754–1809)
The Malaspina expedition, 1789–1794. **Andrew David, Felipe Fernández-Armesto, Carlos Novi, Glyndwr Williams, eds. London: The Hakluyt Society, 2001.**

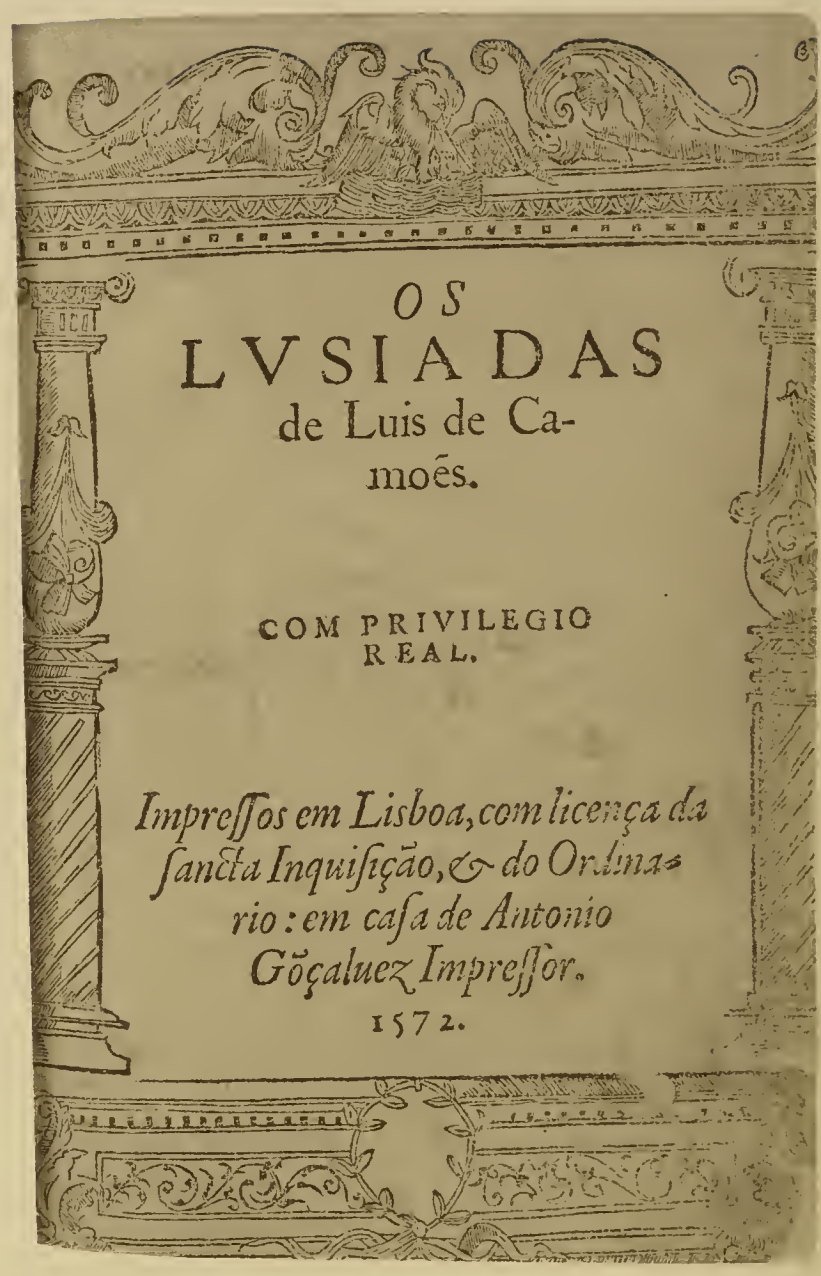
The Spanish navy's expedition to the Pacific Ocean, commanded by the Italian-born Alejandro Malaspina, with José Bustamante y Guerra (b. 1759) as his second in command, was the most ambitious and successful exploring voyage that Spain undertook in the eighteenth century. Unlike any other voyage of comparable scope, virtually no contemporary accounts of its accomplishments were published. The only related account from the time was *Relacíon del viage hecho por las goletas* Sutil *y* Mexicana *en el año de 1792*, published in Madrid in 1802. It reported on a subsidiary voyage to explore

the Strait of Juan de Fuca but does not even mention the main expedition of which it was a part.

The first publication of an account of Malaspina's full contribution appeared in Russian in 1824, and it was not until 1987–1999 that a comprehensive edition of its documents and reports appeared in Spanish. This Hakluyt Society volume is the first publication of Malaspina's journal in English.

Filling such gaps in the published record and making new and important contributions to maritime scholarship, the Hakluyt Society, founded in London in 1846, has become the world's foremost scholarly organization devoted to publishing primary source materials on the history of navigation, worldwide voyages, and geographical exploration. Also in Britain, the Navy Records Society, established in 1891, has published naval documents on voyages along with volumes on varied aspects of the history of the Royal Navy.

In the Netherlands, the Linschoten Vereniging, established in 1909, publishes volumes on Dutch voyages, while other scholarly societies, such as the Instituto de Historia y Cultura Naval in Spain, the Champlain Society in Canada, and the van Reebeck Society in South Africa, publish similar maritime source material as well as other types of documents. Since its founding in 1882, the U.S. Navy's Naval Historical Center in Washington, D.C., has published several series of documents on American naval operations in the period from 1775 to 1865, covering the American Revolution, the Barbary Wars, the Quasi-War with France, the War of 1812, and the Civil War.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COM PRIVILEGIO
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Gõçaluez Impreſſor.
1572.

Fig. 7.12 **Luis de Camões, *Os Lusiadas*.** Lisbon, 1572.
This is the first edition of the most famous work of Portuguese literature, an epic poem celebrating above all the Portuguese sea voyages of the fifteenth century.

Maritime Fiction and Poetry

Luis de Camões (1524?–1580)
***Os Lusiadas*. Lisbon, 1572.**

This epic poem from the sixteenth century established the author, Luis de Camões, as Portugal's greatest national poet. *The Lusiads* has had an enormous cultural impact in Portugal and has been translated into numerous other languages. It describes the voyage of Vasco da Gama to India, but it is not a history in verse; rather, this is poetic fiction inspired by an historical event. Little is known of the poet's life, although it appears that after a wild youth he spent sixteen years in India and China. After being shipwrecked and enduring much suffering, he eventually returned to Portugal in 1570. The copy shown here is from the first edition. (FIG. 7.12)

William Falconer (1732–1769)
***The shipwreck, a poem*. Philadelphia, 1788.**

William Falconer's work, in its successful blending of nautical terminology and neoclassical phrases, anticipated the romantic maritime literature of the nineteenth century. In this narrative poem, Falconer describes seamanship as a well-developed technology and the ship as a complex technological system. This eighth edition, published in Philadelphia twenty-five years after Falconer first published his poem in London in 1762, testifies to the wide appeal of the work on both sides of the Atlantic.

***The history of Constantius & Pulchera: or constancy rewarded*. Norwich, Connecticut, 1796.**

This anonymous, popular romance was the first attempt by an American writer to make extensive use of maritime elements in prose fiction. In the story, first published in Boston in 1794, the hero is snatched from the arms of his lover by a British press gang off the coast of Delaware. Relieved to hear of this, the father of the heroine sends his daughter to France to find a better and wealthier suitor. En route to France, a British ship, indeed the very ship on which the impressed hero serves, captures her ship. The two lovers are momentarily reunited, but two shipwrecks, capture, escape, and subsequent rescue follow before the pair finally have their "constancy rewarded."

The recent bibliographical studies of James Raven and Antonia Forster on the English novel between 1770 and 1799 show that maritime material was increasingly exploited during this period as a new direction to revive the novel form and to provide the context for a range of new adventure tales. It was a moment when some literary critics feared that the novel had exhausted its attraction. Some of the new popular fiction in this period, such as *The History of Constantius & Pulchera,* featured heroines and lovers caught in the turmoil of world events while others used fiction to tell age-old stories against the background of exotic lands in the distant corners of the British empire.

Philip Morin Freneau (1752–1832)
***The poems of Philip Freneau, written chiefly during the last war*. Philadelphia, 1786.**

Philip Freneau was the first important American writer to use nautical elements in serious poetry. A shipmaster and a journalist, Freneau was also the first writer since Falconer to narrate maritime events in English verse. In his twenty-page poem, "The British Prison Ship," written in 1780, Freneau tells of the capture of his ship and his subsequent experience in a British prison ship anchored in the Hudson River. Freneau wrote a number of other poems on maritime topics, including "Columbus to Ferdinand," "On the New American Frigate *Alliance*," "On Paul Jones's Engagement with the *Serapis*," "Captain Jones's Invitation," "Verses Made at Sea in a Heavy Gale," and "Song on Captain Barney's victory over the ship *General Monk*."

James Fenimore Cooper (1789–1851)
***The Red Rover*. Philadelphia, 1828.**

James Fenimore Cooper was the first writer in America to make extensive use of maritime materials in his novels. According to the literary scholar Margaret Cohen, Cooper was the inventor of the literary genre of sea fiction, which went on to international fame and endured across the nineteenth century. Joseph Conrad was a great admirer of Cooper, whose works he preferred to those of Capt. Frederick Marryat (1792–1848), the pioneer of sea fiction in Great Britain who was also inspired by Cooper.

Experienced at sea from his service as a midshipman in the U.S. Navy, Cooper also was the author of the first serious history of the Navy. The success of Cooper's sea novels derived partly from the fact that until the 1840s, Americans were as interested in the open sea as a source for adventure as they were in the opening of the West of the continent. Ironically, Cooper is most widely remembered today for his "Leatherstocking tales" of backwoods adventure.

In *The Red Rover,* Cooper builds on a characterization of the superstitions of the crew of the *Royal Caroline* and descriptions of the townspeople in Newport, Rhode Island, to create an image of his hero.

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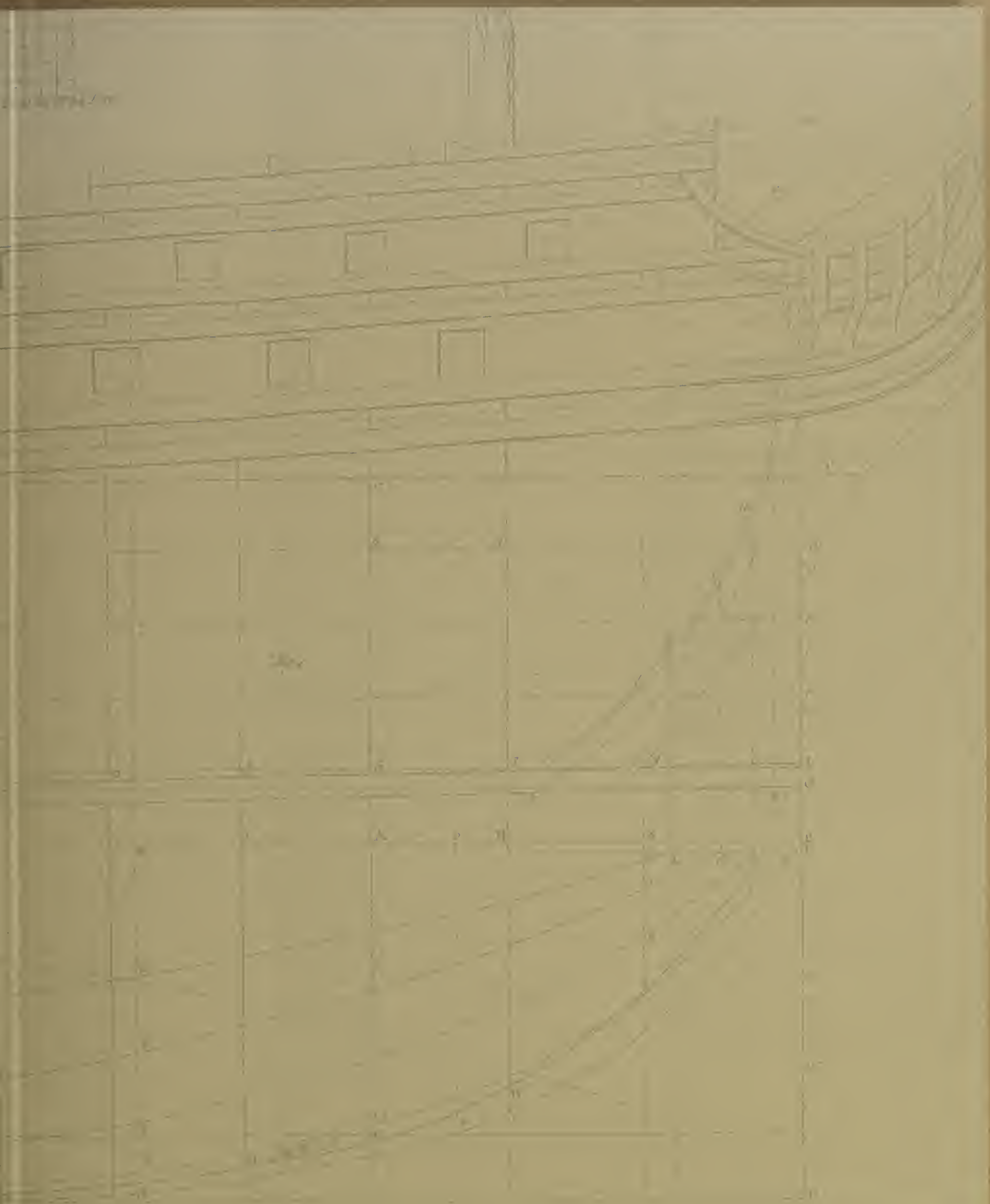

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