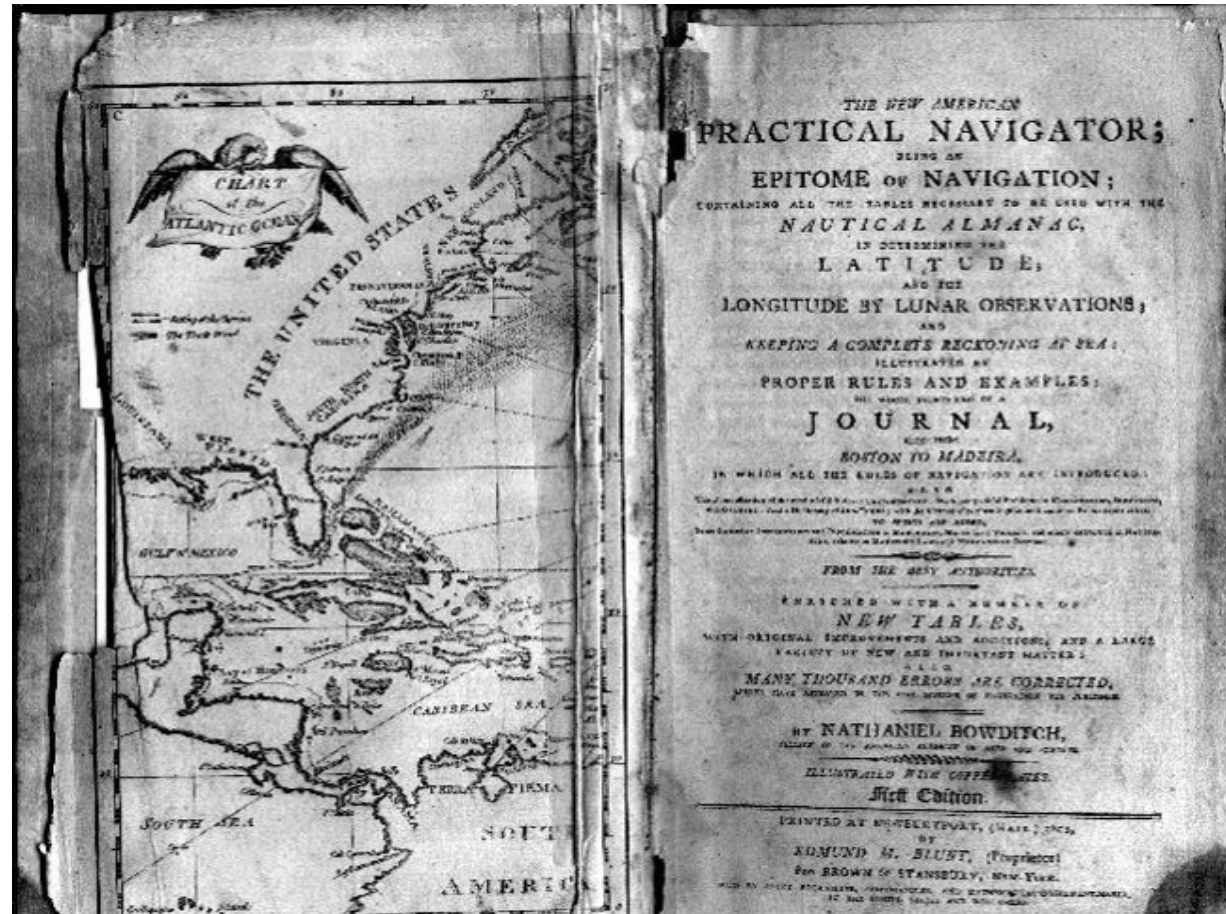# Nathaniel Bowditch

Three Myths

and

Three (Even More Interesting) Realities

Bowditch's *New American Practical Navigator* (Newburyport, 1802)

When Bowditch first went to sea, "a system of determining longitude by 'lunar distance,' a method which did not require an accurate timepiece, was known, but this product of the minds of mathematicians and astronomers was so involved as to be beyond the capabilities of the uneducated seamen of that day."
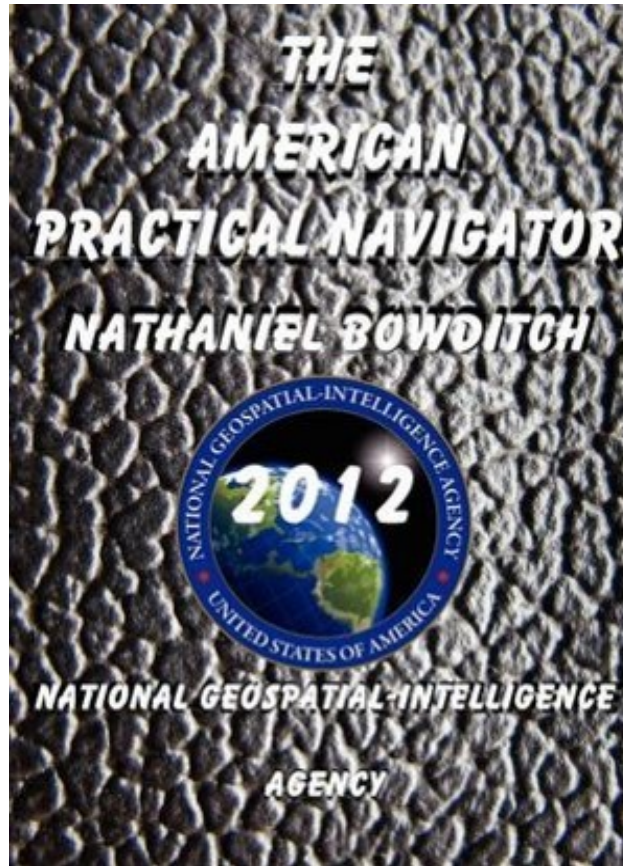
The plot: Bowditch's modern science vs. sailors' hidebound practices
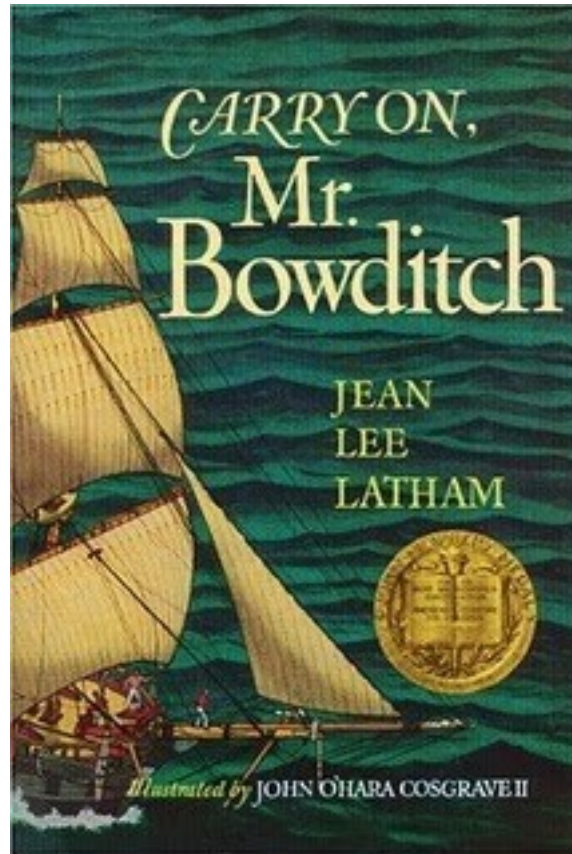
"An American original means something better . . . Nathaniel Bowditch gave the world something better in the science of navigation" (Seagram's advertisement, 1948)
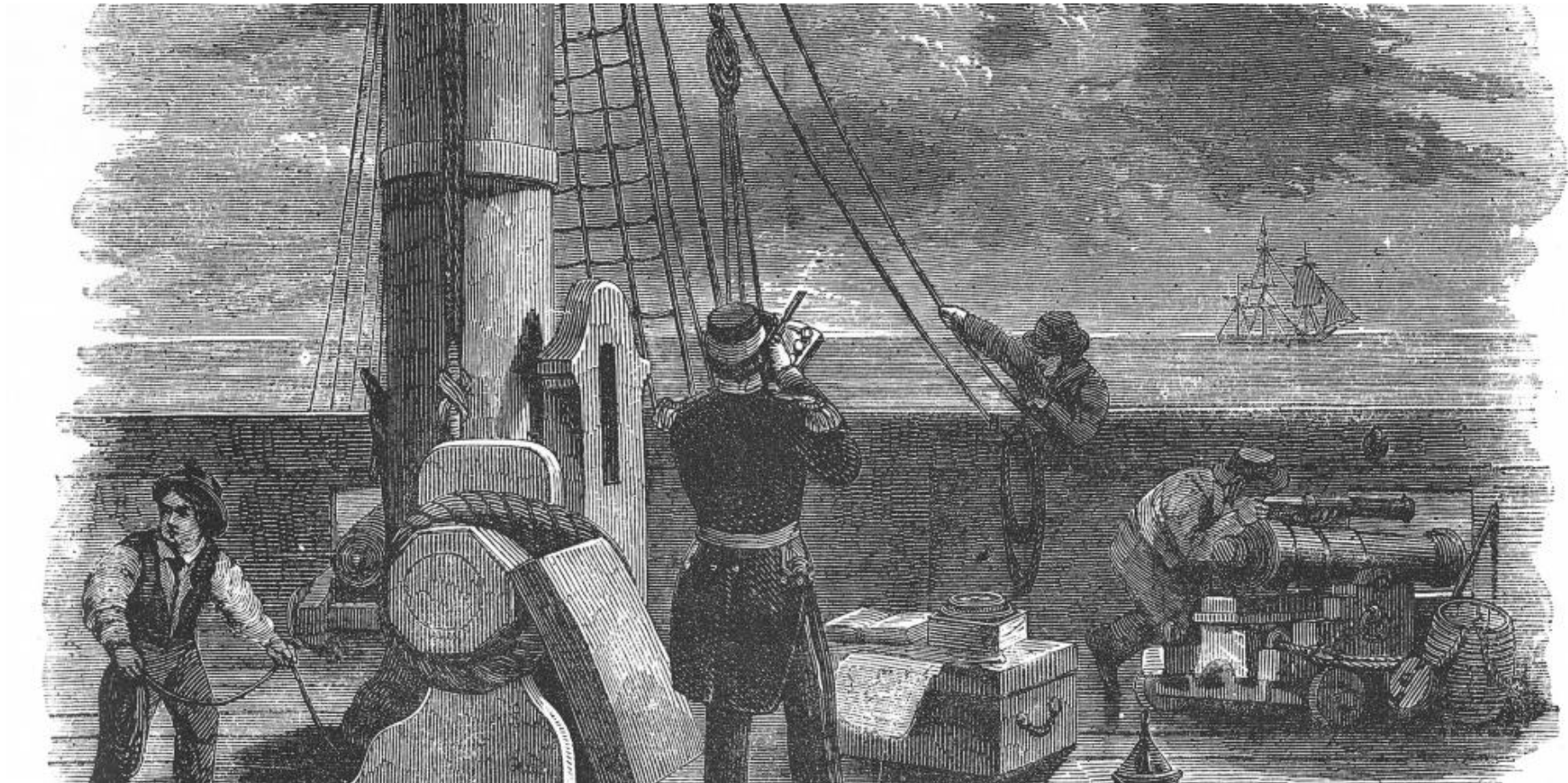
Myth #1

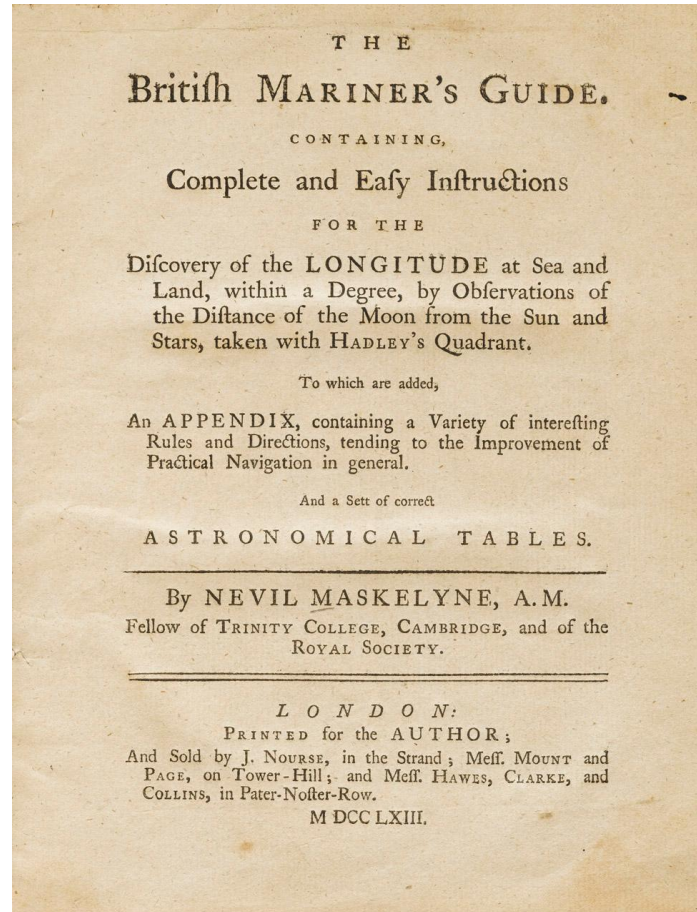**Bowditch invented the lunar method of establishing longitude at sea**

John Harrison's H4

"Taking a Lunar Distance," from Edward Dunkin's Midnight Sky (1869)

"Complete and Easy Instructions for the Discovery of the LONGITUDE at Sea and Land, within a Degree, by Observations of the Distance of the Moon from the Sun and Stars, taken with Hadley's Quadrant" (1763)

Teaching the "method of finding the longitude at sea by lunar observations," Boston, 1788

Ofgood Carleton

RESPECTFULLY informs his friends and others, that his EVENING-SCHOOL is opened at Mrs. PULLING's near Oliver's Dock, where he teaches (both days and evenings) Navigation, with the method of finding the longitude at sea by lunar observations. Also, Writing, Arithmetick, Book-Keeping, Surveying, Gauging, Gunnery, Mensuration, Algebra, Geography, Astronomy, Dialing, Ufe of the Globes, &c. on the moft moderate terms.

Gentlemen who ftudy the Lunar Obfervations, will have a feparate room.

He attends on pupils any hours which are moft convenient for them, either days or evenings.

He has had feveral years experience in the practice of navigation at fea, furveying land, &c. the latter of which he now practices occafionally.
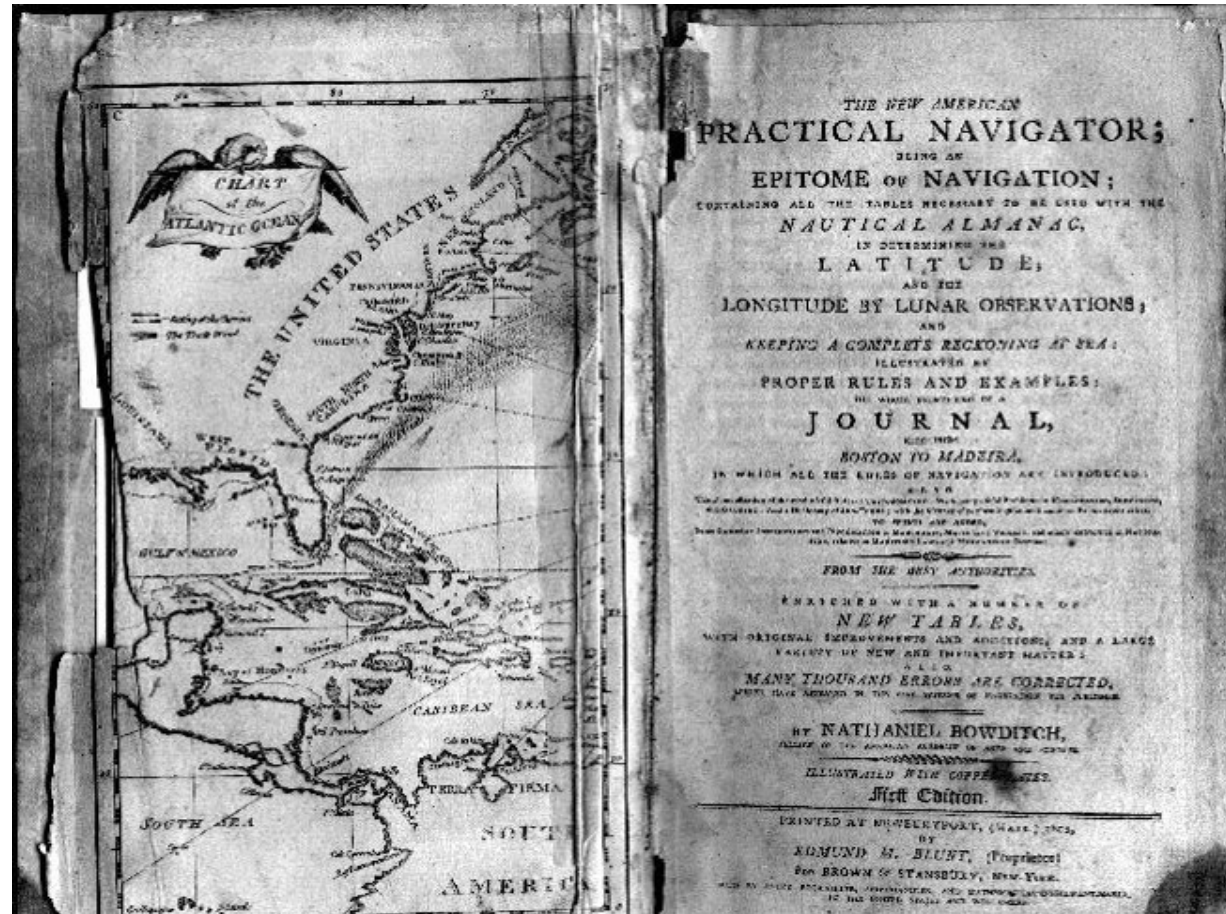
Bofton, Sept. 27. 1788.   (f.)

Josef de Mendoza y Rios. The Royal Society of London published his method of working lunars in 1797.

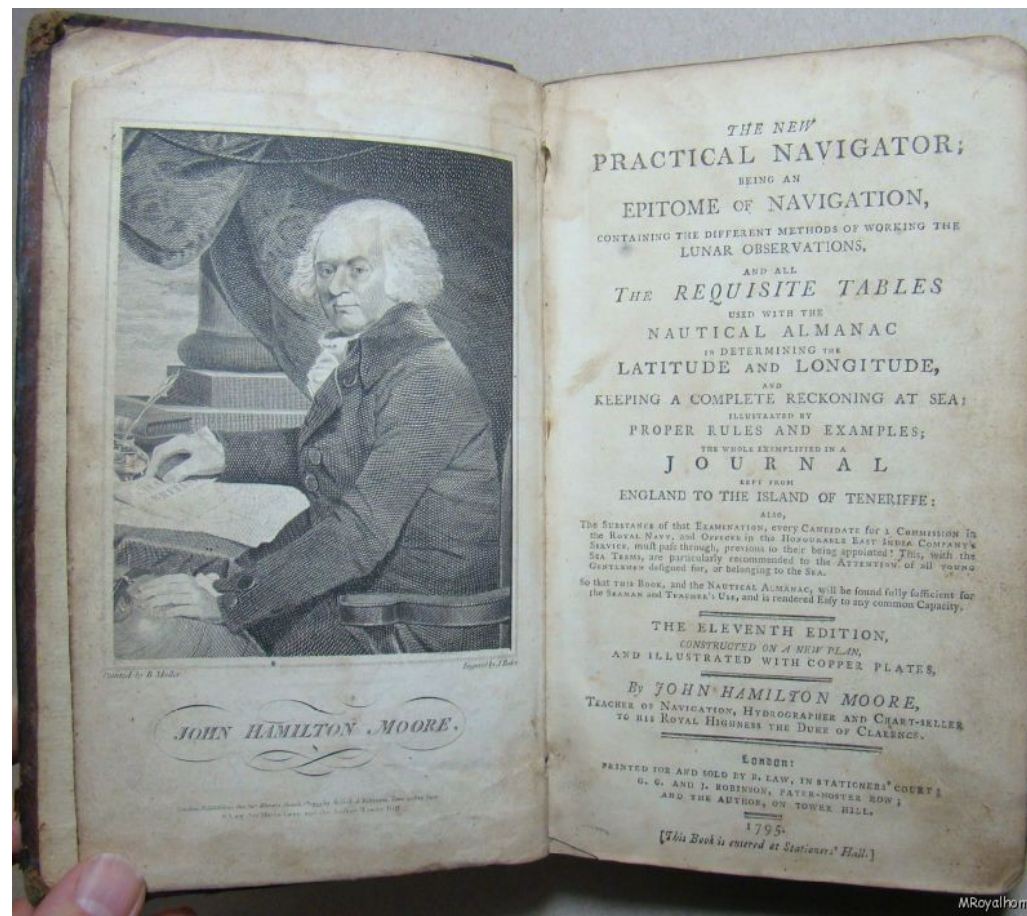# Myth #2

Bowditch's *New American Practical Navigator* (1802) was the first practical navigation manual

Bowditch's *New American Practical Navigator* (Newburyport, 1802)

John Hamilton Moore's *New Practical Navigator* First edition, London,1772. (Below, 11th ed., 1795).

Moore's *Navigator,* in a catalog of books for sale, Boston, 1773.

(27)

Moore's practical Navigator, 8vo. (new)
Marshall's Travels through Holland, Fland-
ers, Germany, Sweden, Lapland, Russia,
the Ukraine and Poland, in 1768, 1769,
and 1770. 3 vols. 8vo.

Moore's *Navigator*, in a catalog of books for sale, Philadelphia, 1789

(9.)
Montesquieu's Spirit of Laws
Mair's Introduction to making Latin
—— Sallust
Melmoth's Translation of Cicero's Letters to his
  Friends
Moore's Navigator's Assistant
Milton's Paradise Lost
Millar's Gardener's Dictionary

Moore's *Navigator*, in a catalog of books for sale, Salem, 1791

M.

Millot's Elements of Ancient and Modern History.	5
Ditto's Elements of England.	4
Minot's History of Insurrection in Massachusetts.	1
Minute Philosopher.	2
Melmoth's Universal Story Teller, or a Modern Picture of Human Life—consisting of a great variety of valuable matter.	1
M'Fingal, an epic poem, by Trumbull.	1
Man of Feeling.	1
Moore's Practical Navigator.	1

Myth #3

Bowditch was a self-taught mathematical genius

Vermonter Zareh Colburn, age 8, "Remarkable for solving arithmetical questions"(1813)

Zerah Colburn,
Aged 8 years,
Remarkable for solving Arithmetical questions.
Copied by permission from the original.

Colburn's mental math problems (e.g., How many seconds in eleven years?)

A LIST OF QUESTIONS ANSWERED BY THE AUTHOR
WHEN A CHILD.

In order to furnish those who never saw the writer while exhibited with a further opportunity to understand the nature of his gift, the following questions, answered by him, are inserted. They are not all, nor perhaps the most extraordinary ones that he has solved; but they are such as he can say were proposed to him. They are given as specimens of the character of the questions proposed to him, and the time employed in answering them. Other questions will be found interspersed through the Memoir, particularly on pp. 37, 38, 39, from the London Prospectus.

In Boston, on his first visit, in the fall of 1810.

The number of seconds in 2000 years was required.
730,000 days.
17,520,000 hours.
1,051,200,000 minutes.
63,072,000,000 seconds—Answer.

Allowing that a clock strikes 156 times in 1 day, how many times will it strike in 2000 years? 113,880,000 times.

What is the product of 12,225 multiplied by 1,223? 14,951,175.

What is the square of 1,449? 2,099,601.

Supposing I have a corn field, in which are 7 acres, having 17 rows to each acre; 64 hills to each row; 8 ears on a hill, and 150 kernels on an ear; how many kernels on the corn field? 9,139,200.

In Portsmouth, New-Hampshire, June, 1811.

Admitting the distance between Concord and Boston to be 65 miles, how many steps must I take in going this distance, allowing that I go three feet

at a step? The answer, 114,400, was given in ten seconds.

How many days and hours since the Christian Era commenced, 1811 years? Answered in twenty seconds.
661,015 days.
15,864,360 hours.

How many seconds in eleven years? Answer in four seconds; 346,896,000.

What sum multiplied by itself will produce 998,001? In less than four seconds, 999.

How many hours in 38 years, 2 months, and 7 days? In six seconds; 334,488.

At one time in London he was requested to square 888,888. He gave it correctly, 790,121,876,544; and afterwards multiplied this product by 49, making 38,715,971,950,656, being the square of 6,222,216.

True Story #1

Bowditch's book was a nautical best-seller, the "seaman's Bible"

1799, 1st <u>American</u> (from the 13th English) edition of Moore, "Revised and Corrected by a Skilful Mathematician and Navigator"

THE NEW
PRACTICAL NAVIGATOR;
BEING AN
EPITOME OF NAVIGATION,
CONTAINING
THE DIFFERENT METHODS OF WORKING THE
LUNAR OBSERVATIONS,
AND ALL THE REQUISITE TABLES USED WITH THE
NAUTICAL ALMANAC,
IN DETERMINING THE LATITUDE AND LONGITUDE AND
KEEPING A COMPLETE RECKONING AT SEA;
ILLUSTRATED BY PROPER RULES AND EXAMPLES.
THE WHOLE EXEMPLIFIED IN A
JOURNAL
KEPT FROM
ENGLAND TO THE ISLAND OF TENERIFFE:

ALSO,

The Substance of Information every CANDIDATE for the AMERICAN NAVY
ought to be acquainted with, previous to his being appointed: This, with the SEA
TERMS, is particularly recommended to the attention of all YOUNG GENTLEMEN
designed for, or belonging to, the SEA.

THE *FIRST* AMERICAN, FROM THE *THIRTEENTH* ENGLISH EDITION
OF
JOHN HAMILTON MOORE,
IMPROVED BY THE INTRODUCTION OF SEVERAL NEW TABLES, AND BY LARGE
ADDITIONS TO THE FORMER TABLES, AND REVISED AND CORRECTED BY
A SKILFUL MATHEMATICIAN AND NAVIGATOR,

ILLUSTRATED WITH COPPER-PLATES.

TO WHICH ARE ADDED,

Some GENERAL INSTRUCTIONS and INFORMATION to MERCHANTS,
MASTERS of VESSELS, and others concerned in NAVIGATION, rela-
tive to the MERCANTILE and MARITIME LAWS and CUSTOMS.

PUBLISHED AS DIRECTED BY ACT OF CONGRESS.

Printed at Newburyport by EDMUND M. BLUNT (Proprietor) 1799.
Sold by Messrs. Thomas and Andrews, Samuel Hall, Caleb Bingham, Ebenezer Larkin,
David West, James White, John Boyle, W. P. and L. Blake, John West, William T. Clap,
W. Pelham, Boston; and by other Booksellers and Ship-Chandlers throughout the Union.

Rival *Navigator*s at William Sawyer's bookstore, Newburyport, 1807

CHARTS and PILOTS of all parts of world : Navigators by Bowditch and Mackay : Quadrants : Glaffes : Scales and Dividers : cafes of Inftruments : Writing Defks : Slates and Pencils : Blank Books of all kinds : Writing Books : Wafers and Wafer Seals, and Sealing Wax : gentlemen's and ladies' Pocket Books Purfes and Thread Cafes, &c. &c. and a general affortment of Fancy Articles.

Four rival *Navigators* at T. & J. Swords Nautical Bookstore, New York, 1808

Mackay's complete navigator.
Bowditch's new American practical navigator.
Moore's practical navigator.
Norie's complete epitome of practical navigation.
Norie's complete set of nautical tables.
Requisite tables for finding the latitude and longitude at sea.

Bowditch wins the day: Baltimore, 1815

NAUTICAL BOOKS, &c.

Blunt's American Coast Pilot,
Bowditch's Navigator,
Seamanship in Theory and Practice,
Nautical Almanacs for 1816,
Charts of various coasts, &c. &c.
May be had on application at
WILLIAM WARNER'S,
BOOK & STATIONARY STORE,
No. 37, corner of south Gay and Market-st

Bowditch's *New American Practical Navigator* (Newburyport, 1802) with map of American coast opposite title page

Bowditch's recalculated *Navigator* tables

True Story #2

Bowditch taught himself the math that put him on the cutting-edge of mathematical knowledge in the English-speaking world

Newtonian calculus, in the collections of the Salem Philosophical Library
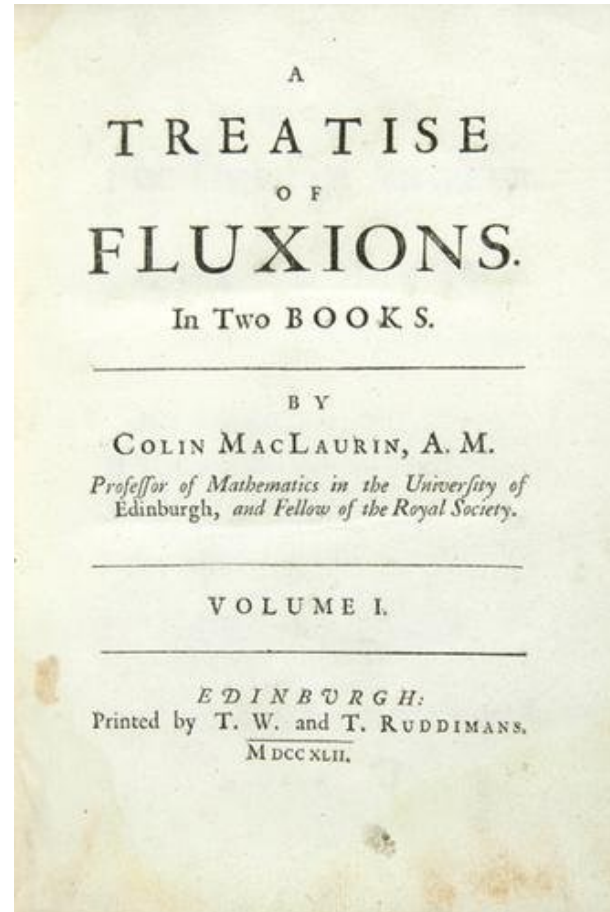
The master work of Enlightenment science: Laplace

TRAITÉ

DE

MÉCANIQUE CÉLESTE,

PAR P. S. LAPLACE,

Membre de l'Institut national de France, et du Bureau des Longitudes.

TOME PREMIER.

DE L'IMPRIMERIE DE CRAPELET.

A PARIS,

Chez J. B. M. DUPRAT, Libraire pour les Mathématiques, quai des Augustins.

AN VII.
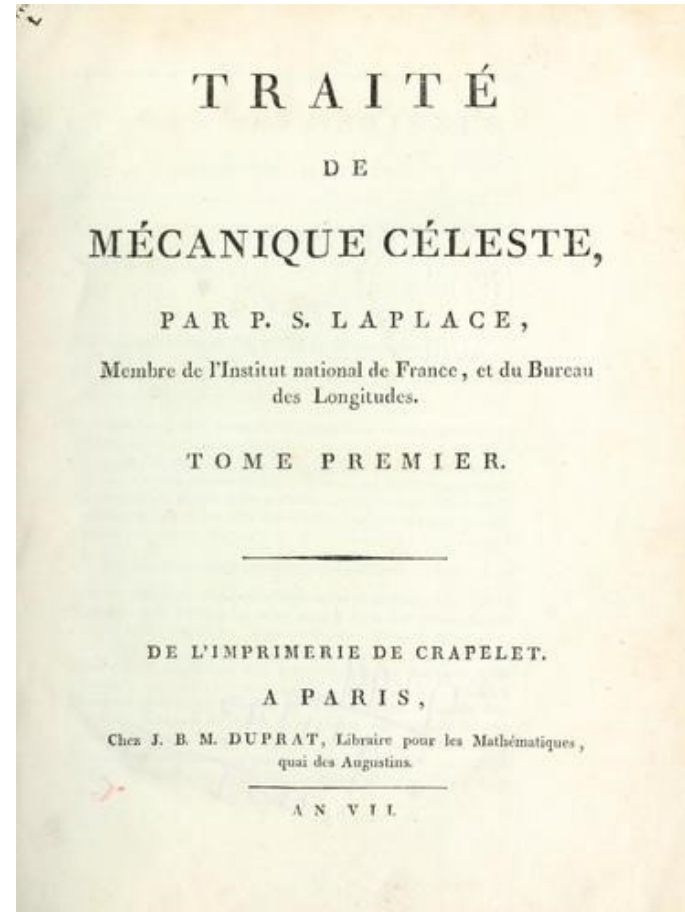
Newton's fluxions: geometrical figures
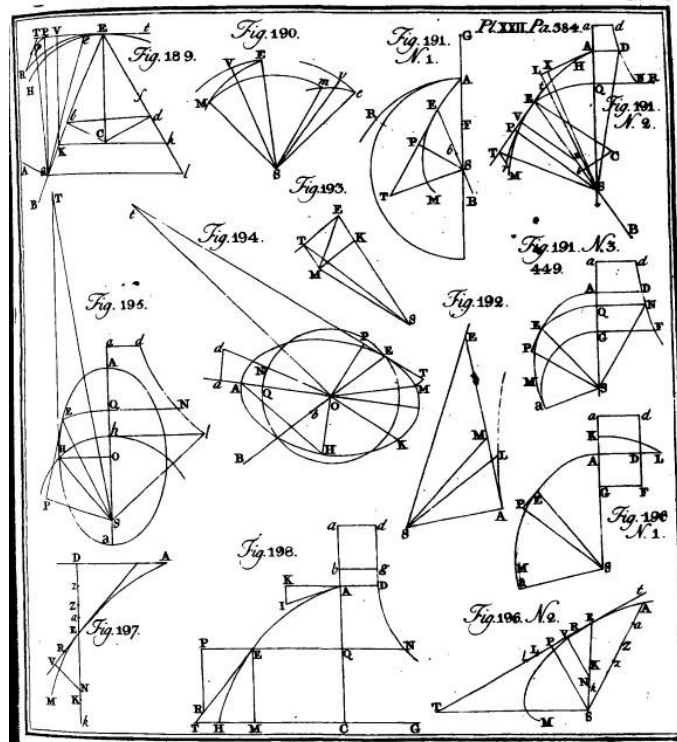
Laplace's differential calculus: numbers and symbols

$$0 = x \cdot \left(\frac{dU'}{dx'}\right) + y \cdot \left(\frac{dU'}{dy'}\right) + z \cdot \left(\frac{dU'}{dz'}\right);$$

$$
\left.
\begin{aligned}
x' \cdot \left(\frac{dU}{dx}\right) + y' \cdot \left(\frac{dU}{dy}\right) + z' \cdot \left(\frac{dU}{dz}\right) &= \frac{\mu}{r^3} \cdot \left\{ x \cdot \left(\frac{dU''}{dx'}\right) + y \cdot \left(\frac{dU''}{dy'}\right) + z \cdot \left(\frac{dU''}{dz'}\right) \right\} \\
x' \cdot \left(\frac{dU'}{dx}\right) + y' \cdot \left(\frac{dU'}{dy}\right) + z' \cdot \left(\frac{dU'}{dz}\right) &= \frac{\mu}{r^3} \cdot \left\{ x \cdot \left(\frac{dU'''}{dx}\right) + y \cdot \left(\frac{dU'''}{dy'}\right) + z \cdot \left(\frac{dU'''}{dz'}\right) \right\} \\
x' \cdot \left(\frac{dU''}{dx}\right) + y' \cdot \left(\frac{dU''}{dy}\right) + z' \cdot \left(\frac{dU''}{dz}\right) &= \frac{\mu}{r^3} \cdot \left\{ x \cdot \left(\frac{dU^{iv}}{dx'}\right) + y \cdot \left(\frac{dU^{iv}}{dy'}\right) + z \cdot \left(\frac{dU^{iv}}{dz'}\right) \right\}
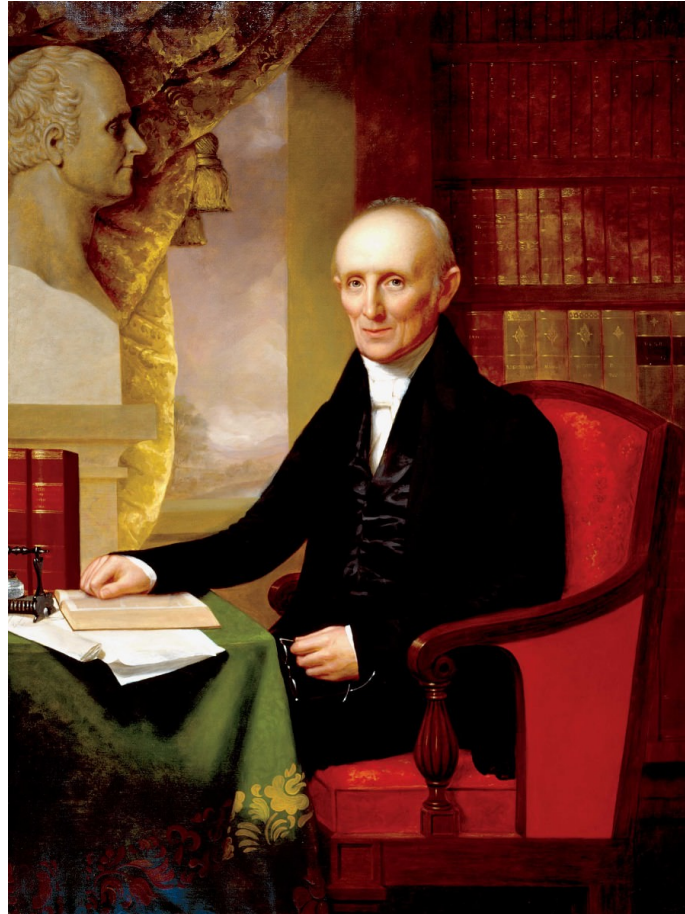\end{aligned}
\right\} ; (I')
$$

&c,

DR. BOWDITCH'S STUDY IN EARLY LIFE.

Bowditch in his library, 1835. Bust of Laplace, upper left.

True Story #3

Bowditch's perspective as a a navigator and mathematician had a transformative impact on American business and practical affairs
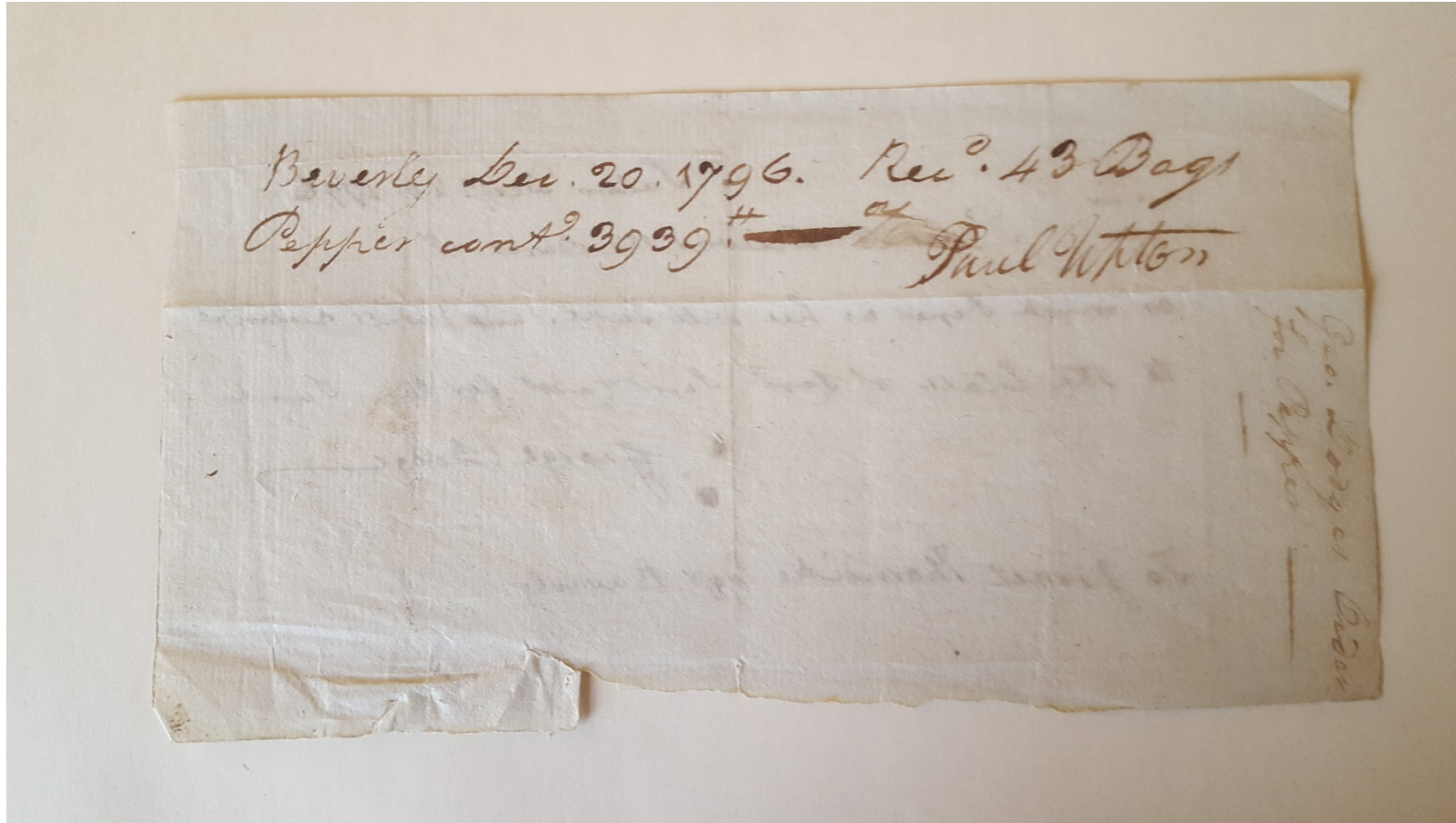
State Street, Boston, circa 1837

STATE STREET, BOSTON.

Merchant's order for pepper, Salem, 1796

Salem Decr 20. 1796

Sir

Pleas to deliver the Bearer n^r as much Peper as hee will Take. and I will accompt to the Estate of Cap^t Saml Cabot for the Same

George Dodge

To Israel Thorndike Esqr Beverly

On reverse: receipt for pepper

Beverly Dec. 20. 1796. Rec.d 43 Bags
Pepper cont.d 3939 ℔ — of
Paul Upton

Receipt, Boston, 1821

An 18th-century merchant's counting house (Hogarth "Industrious Apprentice," 1747)

The INDUSTRIOUS 'PRENTICE a Favourite, and entrusted by his Master.

Matthew CHAP: XXV. Ve: 21.
Well done thou good and faithfull
Servant, thou hast been faithfull
over a few things, I will make thee
Ruler over many things.

Plate 4

Merchant's desk, Boston, 1780-90: office organization, 18th-c. style

Bowditch's printed blank forms: predictable, standardized, systematic

Bowditch's office procedures: Printed blank forms. Numbered loans. Firm due dates. Rule-bound regularity.

Office of the Massachusetts Hospital Life Insurance Company.

BOSTON, June 23 1834.

SIR,

The annual payment of the interest of your NOTE No. 762 of $ 3 oo becomes due on the 13 day of July 1834.

Payment to be made at the Office of the Company, No. 50 State Street, Boston, in Cash or in Bills of either of the Boston Banks.

M L Hale Secretary.
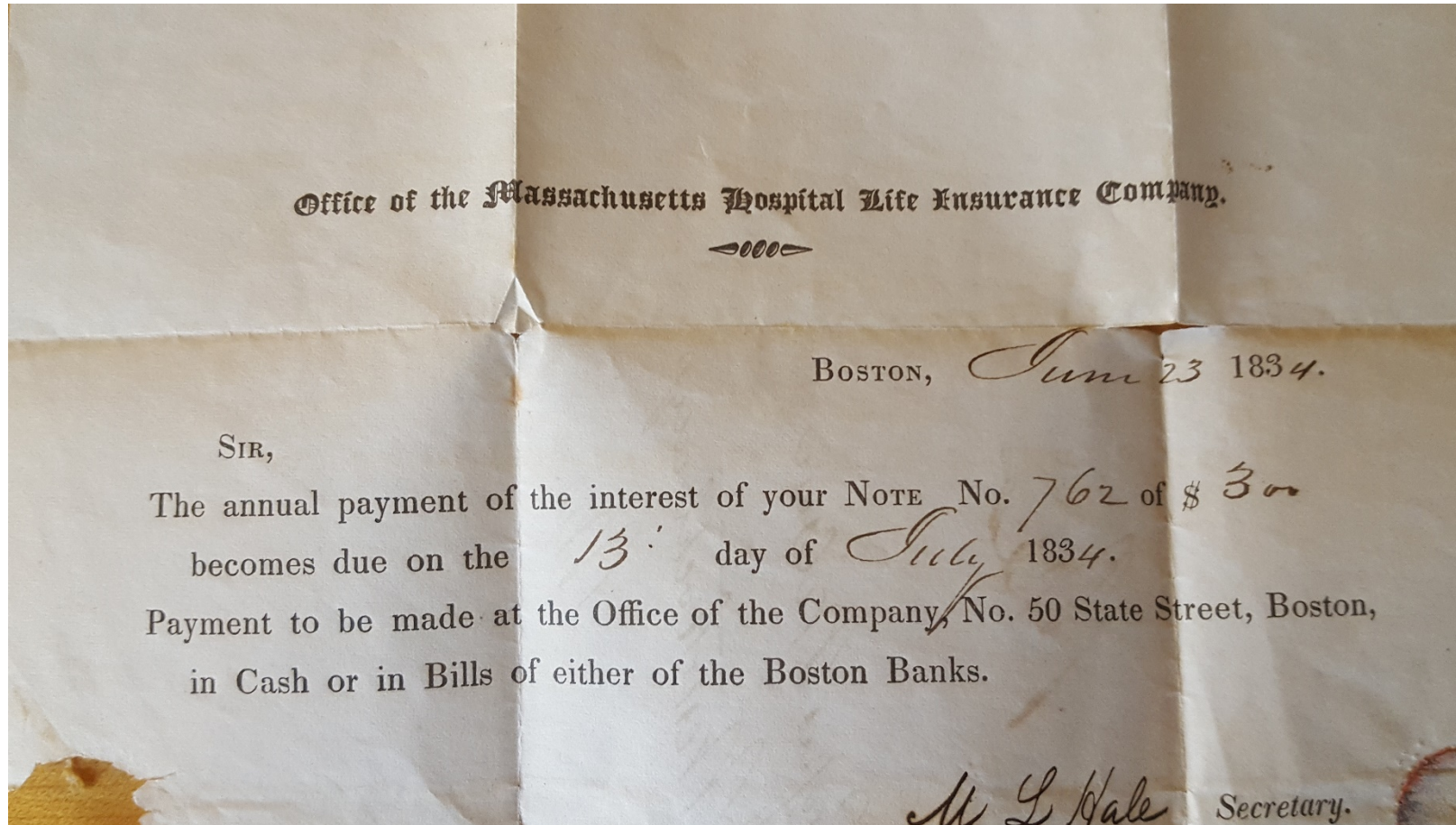
Bowditch's 1821 East India Marine Society collections catalog: <u>numbered</u> objects
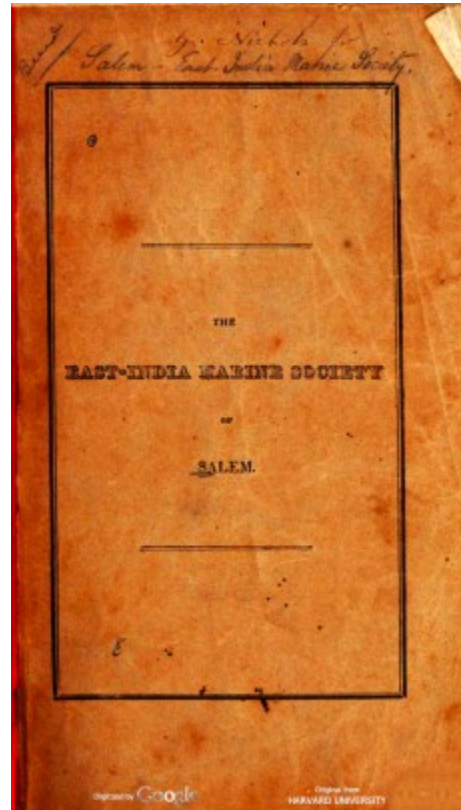
51

Catalogue of the Museum.

694, An Iron Arrow-head, and case of Wood.
696, A Stone Chisel, from the Marquesas, Wm. P. Richardson.
697, Stone Chisel, found in Salem, Rev. Dr. Wm. Bentley.
698, A Spear-head, of Stone, made by N. A. Indians, John Rust.
699, 709, A Stone Chisel, and Arrow-head, found in Danvers, do.
                                                        Nathan Reed.
700, A Stone Chisel, from New Zealand, Wm. P. Richardson.
701, 704, Stone Gouges, made by the Indians in New England.
702, 707, 708, Stone Arrow-heads, do. Miss King.
703, Stone Axe, found in New England, do.
705, A Grey Gull, (Larus Naevis) Dr. Bass.
710, 711, Heads for Arrows, made of Stone.
712, 713, The two Valves of a Chama Gigas, from Sumatra,
          (the largest species of bivalve shells,) Jonathan Carnes.
714, 717, Chama Hippopus.
715, 716, Chama Gigas, (small size.)
718, A Chinese Angling Rod, C. Crowninshield & M. Folger.
719, A Specimen of Rhode Island Coal.
720, 721, Do. Carbonate of Lime, or Marble.
722, Do. Mica, with Feldspar.
723, Do. Free, or Sand-stone, from the Bay of Chaleur,
                                                        R. Foster.
724, 725, Do. Carbonate of Lime.
726, 728, 729, Petrifactions from Ohio, E. Hathorne.
727, A Specimen of Basalt, from Owhyhee, Wm. Fairfield.
731, Do. Greenstone, (Grunstein, G.)
          with petrified Scallops embedded in it, from
          Montville, Maine. Nathan Reed.
732, Specimen of a variety of Pitch-stone, from Laconia.
733, Do. Lava, from Owhyhee.
734, 736, 737, Petrifactions, and Petrified Wood, from Ohio,
                                                        E. Hathorne.
735, A fragment of Sienite, broken from one of the
          Pyramids in Egypt,
738, 739, Specimen of the Norfolk Island Pine,
                              John F. Jeffrie, by Capt. Holman.

Navigator table: the power of numbers

18th-century orrery: the clockwork solar system, and the inspiration for Bowditch's clockwork institutions

Bowditch's grave: the navigator in 18th-century breeches