



Principle Approach Education

NATHANIEL BOWDITCH (1773–1838): CHRISTIAN SELF-GOVERNMENT & SELF-EDUCATION IN THE FIELD OF MATHEMATICS

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INTRODUCTION

Verna M. Hall observed that, “Each religion has a form of government, and Christianity astonished the world by establishing self-government. With the landing of the Pilgrims in 1620, Christian self-government became the foundation stone of the United States of America . . .”¹ Along with a form of government, each religion, or view of God and man, has an associated type of education. From the same soil in which the seed of local self-government was planted sprang America’s distinctive type of education—self-education.

Americans often learned to read with nothing more than the Bible, the works of William Shakespeare, and the *New England Primer* or Webster’s “blue-backed” speller; for these were the books that were carried across the continent as families took up the responsibility to educate their children.

Webster’s *American Spelling Book* appeared in 1783—the year in which the American Revolution ended.

It was a declaration of independence from European ideas of education and it provided the principles for spelling, pronunciation and grammar to be learned in school or out of school . . . The “blue-backed” speller might be found in log cabins, on flatboats travelling the rivers and canals and on the prairie-schooners—the covered wagons creaking west. And with the spelling lessons were many short stories teaching moral precepts, many Biblical admonitions, and examples of Christian character. It also contained in some of its editions a short question and answer section on the United States Constitution . . .²

In studying an individual, one must consider four areas significant to his life:

1. Christian History – when and where Providence has placed him in history;
2. Christian Influence – what is responsible for his character development and training;
3. Christian Character – the attributes possessed by the individual which distinguishes him from others;



4. Christian Contribution – the contribution the individual has made to help forward the Gospel or the Chain of Christianity® Moving Westward.³

The life of Nathaniel Bowditch, the Father of American Mathematics, exemplifies how an individual enjoying liberty and practicing Christian self-government was able to translate this philosophy of education into the field of mathematics. To understand his love of learning and his quest for mastery of his subject is to understand how many Americans approached education in the early days of our Republic.

CHRISTIAN HISTORY

Nathaniel Bowditch was literally and spiritually a child of America's Christian Revolution, having been born in Salem, Massachusetts, March 26, 1773. As a child, he was witness to the long years of war which followed America's Constitutional Debate with Great Britain; and his later life shows that he had accepted the distinctive principles upon which the American Republic was based.

Salem, his home, was one port that escaped British occupation during the war and became a center of shipbuilding and privateering. Privateering, or capturing enemy trading vessels in time of war, was an important aid to the American cause in the Revolution. From 1776 to 1782, Salem averaged fifty vessels at sea, preying on British shipping, and was more actively engaged in privateering than any other port in the colonies. With the conclusion of the war came a burst of economic activity. No longer under British embargo, ship owners were free to send their vessels to any port where they were welcomed, and they traded at ports in all of the great oceans. The success of these enterprises led to the prosperity that made possible the beauty of the town which may still be seen represented in its many examples of federal architecture.

It was in this active, maritime setting, when the ideas of liberty were the subject of public discussion, that Nathaniel Bowditch commenced his lifework.

CHRISTIAN INFLUENCE

In early America, there were three institutions that influenced individuals. These were the Home, the Church and the School.

Home

Nathaniel Bowditch's connection with the sea came through his home. His family had been in the shipbuilding business for several generations; and his father was a cooper or barrel-maker, supplying barrels for packing goods for the sea trade.

It appears that the leading members of his family were his grandmother and his mother—they seemed to provide the strength of character upon which all the other family members relied. His father was a



source of instability in the family and credited his station in life to misfortune. Nathaniel lived at home until he was sent out to work at the age of twelve.

Church

The Bowditch family church, and the church of Nathaniel Bowditch's youth, was St. Peter's Episcopal Church in Salem. The grave of one of his sisters, who died as a result of a fall, may be seen today in the yard of the church near the door. The church itself still maintains a "Bowditch Pew" and some memorabilia of his life.

The Scriptures were part of the fabric of his home, as they were in many homes in early America. Nathaniel Bowditch was a life-long reader of the Bible; and at his death his son wrote of him, "He dwelt often upon the fitness of the gospel to purify the heart and elevate the soul; and preferred to rest its authority upon these views, rather than any other."⁴ In these sentiments Dr. Bowditch recognized that real change must begin within the individual before there can be an external change in society.

School

In early America, education was never confined to the classroom. There was a great diversity of educational settings; and many children were home educated. Many Americans, including signers of our state papers, although well educated, had very little or no formal education, yet the literacy in America was extremely high, as testified to by visiting foreigners:

Moreau was surprised that everyone could read and write, "although almost no French sailor is able to do so." It was noted that newspapers and gazettes were numerous and kept the people well informed; in the country they appeared weekly, in town twice a week, and in large cities twice a day—"morning, noon and night," wrote a Frenchman. From his lodgings in a small Massachusetts town, La Rochefoucauld wrote that the people in the house "busied themselves much with politics, and from the landlord to the housemaid they all read two newspapers a day."⁵

Nathaniel Bowditch went to school until he was ten years of age, at which time he was put to work in his father's cooperage. When he was twelve, he received a few month's instruction in bookkeeping from a local teacher, Michael Walsh, before he was sent as an indentured servant to a local business.

Indenture was a common practice of the day in which a person would agree to work for a business for a set period of time for room, board, and clothing. In one sense, indentured servitude was part of the diverse educational structure in that it provided the opportunity for one to learn the trade in which he was employed.

The business to which he was indentured from the age of twelve to the age of twenty-one was Ropes and Hodges Ship Chandlery in Salem. A chandlery was a supplier of all sorts of necessities for a sea



voyage “from hardtack to copper nails—from sextants to coffeepots.”⁶ In the chandlery, Nat worked as a bookkeeper and began the course of self-education which he would continue for the rest of his life. At first he was helped by a retired seaman, Sam Smith, who taught him the rudiments of seamanship and navigation; and later he directed his own studies. His talent as a mathematician soon became apparent. At the age of sixteen he devised a lunar almanac for the years 1789 to 1823.⁷

His study of mathematics was to be continued after he left the chandlery at the age of twenty-one to begin his seafaring career.

CHRISTIAN CHARACTER

Throughout Christian History, the people of God have been faced with fightings without and fears within [II Corinthians 7:5] allowed by Providence to test and develop character and to prepare them for the outworking of His plan. These conflicts come to every individual, and how they are met and overcome is determined by how well the lessons of past trials are learned.

From childhood, Nat’s love of learning inspired in him the hope of one day attending Harvard. This hope was thwarted, however, by the financial circumstances of the family, which necessitated his entering the cooperage and later indentured service. He rose to this challenge from “without” with diligence and industry. While in the chandlery he taught himself algebra, geometry, trigonometry, navigation, surveying, and the elements of seamanship. His efforts may be seen today, recorded in notebooks he prepared from his studies a practice common among students of his time.

He was encouraged in his studies by Drs. Prince and Bentley, ministers in Salem, who made it possible for him to have access to the Salem Philosophical Library, one of the better libraries in the United States. This collection of books had been enlarged during the war when a cargo of books belonging to the Irish scientist Dr. Richard Kirwan was captured by a privateer. This library contained the transactions of the Royal Society of London. Nat copied the mathematics articles in these transactions by hand, thus acquiring works through his labor which he could never have purchased.

One day a copy of Newton’s *Principia* was placed in his hands. This copy of *Principia* was in the original Latin, a language he did not know. Rather than be stopped in his studies, he taught himself Latin and eventually made an English translation of this work.

When he concluded his time of service at the chandlery, he began his career at sea, as clerk on his first voyage. He advanced to positions of greater and greater responsibility until he sailed as captain on his last voyage. It was during the long days and months on these voyages that he began to relate his knowledge of mathematics to other members of the crew, and it was during these sessions that he met and overcame the conflict “within”—a short temper. He answered this challenge with patience as he explained and re-explained the intricacies of celestial navigation to the crew:



The men gathered round to listen . . .

But teaching wasn't so easy. Time and again Nat explained something in the simplest words he could think of—only to see a blank look on the man's face. Time and again he would shout, "Can't you see? Can't you understand anything?" . . .

He would bite back his impatience. Slowly, carefully, he explained again—and again. At last he'd see the man's eyes brighten. He'd hear the happy, "Oh, yes! Simple, isn't it?" Nat would grin. "Yes—simple."⁸

His life was a series of tests met and overcome. His son wrote of him, "Dr. Bowditch never considered that the obstacles in his path had the slightest tendency to retard his progress. On the contrary, he felt that they afforded him a foothold by which that progress was rendered more sure and steady."⁹ These tests were preparation for the great contributions he would make in his chosen field.

His life exhibited the Christian Care and Brotherly Love typical of many Americans of his day:

One day Captain Prince called Nat to his cabin. The captain's grimness had not relaxed. "Tell me, Mr. Bowditch, just what are you trying to do with the men during the dog watch?"

"Teach them what they want to know, sir."

Captain Prince cocked an eyebrow. "And can learn?"

"They finally get it, sir," Nat told him, "if I just find the right way to explain it."

"But, Mr. Bowditch, why are you doing it?"

Nat was silent for a moment. "Maybe, sir, it's because I want to pay a debt lowe to the men who helped me; men like Sam Smith and Dr. Bentley and Dr. Prince and Nathan Read. Maybe that's why. Or maybe it's just because of the men. We have good men before the mast, Captain Prince. Every man of them could be first mate—if he knew navigation."¹⁰

Every man who sailed with him learned navigation—even the cook and cabin boy. In his first voyage there were twelve crewmen. "Every one of those twelve sailors subsequently attained, at least, the rank of first or second officer of a ship. It was a circumstance highly in favor of a seaman, that he had sailed with Dr. Bowditch, and was often sufficient to secure his promotion."¹¹

It is only through the influence of Christ and Christianity that the worth of the individual is realized. It was this Christian view of man that inspired Nathaniel Bowditch to exert his efforts for the betterment of the crew members. "Living in a republic, he respected in others, and aspired himself to no aristocracy, but that of character and talents—that which results from useful and honorable labors either of the hands or of the head."¹²



Nat's dream of one day attending and graduating from Harvard was never realized in the way he hoped it would be; but in 1802, when he was twenty-nine years of age, the College bestowed upon him the honorary degree of Master of Arts for his accomplishments in mathematics and in service to his fellow man.¹³ For the last twelve years of his life, he was one of the seven governors of the College.¹⁴

CHRISTIAN CONTRIBUTION

Nathaniel Bowditch's contributions to Christian History were both mathematical and commercial. His mathematical contributions were also educational in that his goal through his writings was to render mathematical studies comprehensible to the independent student. By doing so, he aided the development of American trade by making ocean-going travel more secure. In a similar way, his contribution in the field of marine insurance helped to give sea-trade a secure financial basis.

Working Lunars

At the time Nathaniel Bowditch went to sea, navigators were forced to find longitude by one of three methods:

The first method was *Dead Reckoning*, or finding the speed of a ship by using a half-minute sand glass and a chip log. The chip log was a triangular piece of wood, weighted on one side and designed to stay in place in the water when thrown over the side of the ship. It was attached to a reel of knotted line, and the speed of the ship was determined by how many knots followed the log over the side during the thirty seconds measured by the sand glass. Direction was determined by using an ordinary magnetic compass. This method is suitable for short voyages but is hardly accurate enough for a long trip at sea.¹⁵ Using the dead reckoning method, long voyages were accomplished by "plane sailing." A ship sailed north or south to the latitude of its destination, then east or west along this latitude.

A second method was the use of a *chronometer*, a very accurate, but costly, mechanical clock. The chronometer was set to the time of some particular location—the ship's port, for example—and longitude from this location was determined by comparing solar noon with the time on the clock. Every hour of difference in time represented fifteen degrees of longitude east or west of the chosen location. However, "the Salem navigator was not able to use this method, because he had no chronometer. True enough, an accurate marine chronometer had been invented early in the eighteenth century by a Yorkshire carpenter turned clockmaker. However, even in Bowditch's day a chronometer was a rare thing and was worth far more than any Yankee shipmaster was willing to pay."¹⁶

Because expense prohibited most ships from possessing a chronometer, a third method might be employed called "*Working a Lunar*." In this method, longitude was found by comparing the moon's position with the position of a bright star or planet. Jean Lee Latham describes this method in *Carry On, Mr. Bowditch*:

"But we don't have one of those – uh – uh – special clocks, do we?" "No, Johnny. So I'm going to check our position by the moon. You see, we know by the nautical almanac



exactly where the moon will be every hour, every minute, every second. And we know where a great many of the brightest stars will be. So, if we can catch the moon as it crosses in front of a certain star—we call it ‘occulting’ the star—we can figure how far away from London we are when we see it happen.”

“That sounds easier,” Johnny declared.

Nat grinned. “Most people don’t think so. There’s quite a little figuring to do. But the big problem is to catch the moon crossing in front of a star that is bright enough for us to still see the star when it’s that close to the moon. There ought to be some better way to work a lunar but we don’t have it—yet”¹⁷

Even assuming the navigator was capable, it could take days by the above method to determine a longitude due to the complexity of the mathematics. In the meantime, the ship would have sailed hundreds of miles from the location where the sightings had been made.

On his first voyage, Bowditch determined a more efficient method of performing this task, freeing it both from the necessity of observing an occultation (a relatively rare phenomenon) and from the arduousness of the calculation required. He did this through observing that the same type of measurement could be made by comparing the moon’s position with the position of three bright stars.

By making a ship’s position more readily obtainable, he rendered a service to his fellow navigators and, through them, to every man who sailed.

The New American Practical Navigator

As clerk in his first voyage at sea at the age of 21 under Captain Henry Prince aboard the *Henry*, which sailed from Salem in the winter of 1795 on a yearlong voyage to the island of Bourbon (now the island of Reunion) in the Indian Ocean, he began his revision of John Hamilton Moore’s book, *The Practical Navigator*, the leading navigational text of the day. In using this work, he discovered many errors in the tables—so many, in fact, that he began a systematic review of the most-of-ten-used tables. This revision was so extensive (he eventually uncovered 8,000 errors) that, at the request of Edmund Blunt, a publisher at Newburyport, Massachusetts, he agreed to edit and correct Moore’s tables. These tables appeared in print as *The New Practical Navigator* in 1799.

There was such a demand for this work, and it had been so altered by his own contribution that in 1802, the first edition of *The New American Practical Navigator* with the name of Nathaniel Bowditch on the title page was produced. In addition to accurate tables, this work included explanations of navigational procedures which he developed in his teaching aboard ship; thus, he knew they could be learned by a seaman with the industry and diligence to make this study his own.

In addition to recalculating the tables and the new, simplified method of working lunars, the work included information on winds, currents and tides, surveying, a glossary of sea terms, mathematics instructions and statistics on marine insurance.¹⁸



Since his day, the work has been kept in print—after his death by a son, Jonathan Ingersoll Bowditch (the 11th through 35th editions), and in 1868, the newly organized United States Navy Hydrographic Office purchased the copyright and the United States Government Printing Office has kept it in print since then. Each new generation of navigators has made a contribution to it as the science of navigation has developed (as Dr. Bowditch undoubtedly would have wished), but the work is still familiarly called “Bowditch” by those who use it. By 1975, 850,000 copies in 70 editions had been produced.¹⁹

Mecanique Celeste

From the time *The New American Practical Navigator* was published until 1814, Nathaniel Bowditch expanded his knowledge of mathematics and astronomy through self-study in a number of astronomical topics. In that year he turned his attention to the most comprehensive work on celestial mechanics then available, *Mecanique Celeste* by the Marquis de La Place.

This work in its original form was unintelligible to all but a few mathematicians, because La Place often gave his conclusions without showing the means by which they were obtained. It was said that no more than a dozen people could comprehend this work.

Bowditch now employed his largely self-taught French to make this work available to the English reader. As he translated, he supplied derivations of formulas and commentary to render the mathematics more accessible to the student. Four of the five volumes of this work were printed prior to his death and at his own expense, because he thought that the limited audience to which it was directed could not make its publication a profitable enterprise to a printer.

His work made this information available to American astronomers and enabled them to pursue their studies on the basis of that which was already known. Continuing in the style of writing for the learner, Bowditch presented his English version of *Mecanique Celeste* in such a manner that the student of mathematics could easily trace the steps involved in reaching the most complicated conclusion.²⁰

Marine Insurance

One of the benefits unleashed by Christian Liberty in the American Republic was the free enterprise system. In this system each individual, free to accomplish his own ends, must benefit his neighbors in order to do so: “Our people are busy using their liberties and energies, each for his individual benefit, as is quite right and proper; since the welfare of individuals makes the prosperity of the community.”²¹

Just as individuals benefit from free commerce with one another, so do communities and nations. After the Revolution, the United States became a beehive of commercial activity, particularly in its trade activities with other nations. The port of Salem was, perhaps, the most active trade community in America. Salem ships brought goods from around the world and were so active in the spice trade that the inhabitants of these regions thought the United States was a part of Salem.



In order to facilitate his type of shipping, individual investors formed marine insurance companies to insure shipowners against loss in case of failed voyages. Each investor received dividends on his or her investment provided from the premiums paid to the company by the owners of the ships. By distributing both the risk for unsuccessful voyages and the gain from successful voyages to many investors, ship owners were encouraged in their enterprises.

Nathaniel Bowditch's later contributions were made in the field of marine insurance, being engaged in this type of business in Salem after his last voyage and after 1823 in Boston. It was in this pursuit that his Christian view of the sacredness of property led to the establishment of the security of these investment enterprises.

His son wrote of him:

He considered the institution as being morally the guardian of the property entrusted to it belonging to widows, minors and others, and was careful that they should fully understand the contracts made by them, or on their behalf, and that these contracts, when made, should be observed strictly according to their true intent and meanings.²²

This was so much a conviction of his that he would not relax the company's regulations, even for a member of its board:

One of the wealthiest citizens of Boston, himself a member of the Board of Control of the company, wished, upon a Saturday, to deposit ten thousand dollars to be managed in trust. His balance in the bank, however, was less than the sum by three hundred dollars, and he offered to the actuary his check for that part, to be good on the next Monday. Dr. Bowditch said, "I can not, sir, receive any check payable at a future day as cash. It is a rule of the office, which you yourself assisted in making, that I shall never par with the money of the institution, or make any engagement in its name, without an actual payment, or sufficient collateral security received in return. It is my duty to enforce this rule against the most powerful and influential, as well as the most humble individual who deals with the institution." The gentleman was at first a little astonished at such a novelty as the refusal to trust him for three hundred dollars for one day. Bowditch resumed,—"I am happy, sir, that it has become necessary to enforce this rule in an extreme case. Having been once applied to your self, no one else can ever object to a compliance with it. And it is in itself an excellent regulation." A moment afterwards, finding that his own private balance in the bank was more than the sum, he offered to take the gentleman's check himself, giving the company his own check payable that day; which was done accordingly.²³

This is a model of financial integrity much needed in the present-day banking and insurance communities.



SELECTING A BIOGRAPHY AND DEVELOPING A TEACHER'S NOTEBOOK

It is through teaching and learning literature that students learn (1) Who we are as a people, (2) Where our principles come from in God's Word and (3) What our purpose is as a nation.²⁴

Rosalie J. Slater suggests four areas of consideration for selecting a biography to present to students based on (1) how it deals with the subject as a study of character (character should be seen as causative), (2) how it deals with the setting in a philosophy of government, (3) how it deals with the historical setting (in relation to the Chain of Christianity[®]), and (4) how the skill of the author brings these elements together.²⁵

Carry On, Mr. Bowditch

The biography best suited for teaching the life of Nathaniel Bowditch is *Carry On, Mr. Bowditch* by Jean Lee Latham. In this work, Mrs. Latham presents Nat's character and the characters of others in relation to how they met and overcame challenges. She presents his efforts to instruct others through his personal teaching and through his writings, thus "planting the seed" of useful mathematical knowledge. She represents his life against the background of the American Revolution and the American Federal Period.

Mrs. Latham described *Carry On, Mr. Bowditch* as fictionalized biography, but in researching the lives of dozens of Nathaniel Bowditch's contemporaries, she raised it above the level of many non-fictionalized biographies.

In addition to historical research, she studied mathematics, astronomy, oceanography, seamanship and the geography of Salem and other locations presented in the book.

Her skill and understanding of her subject have rendered this an excellent biography to teach children who we are, where our principles and ideals come from, and what our national purpose is.

Other works by Jean Lee Latham are *The Story of Eli Whitney*, *Medals for Morse*, *Trail Blazer of the Seas*, *Dear Bought Land*, *On Stage*, *Mr. Jefferson* and *David Glasgow Farragut*.²⁶

Preparing a Teacher's Notebook

Developing a notebook for a literary classic is the best means for a teacher to record his research in preparation for teaching the classic.

Including these sections would give the teacher a wholistic preparation for learning and teaching the work by retracing, in a sense, the path of researching and reasoning followed by the author. A fuller description of these sections is found in *A Guide to American Christian Education for the Home and School*:²⁷

1. The historical and geographic background of the book – When did the story take place? How does it fit into America's Christian History? Where does it take place? What scientific, cultural, or economic facts are to be learned from the book?



2. Principles of American Christian Character presented in the book – What are these principles and how may they be related today?
3. The Leading Ideas of the book – What are the major themes of the book? May similar themes be found in the Scriptures?
4. Recording the literary elements of the work (Setting, Characterization, Plot, Themes, Style) – One goal of the teacher is to lead students to identify these elements for themselves as they develop an enjoyment of literature.
5. How this book helps us to understand American Liberty and Responsibility – What contrast can be seen to living in the American Christian Republic and living elsewhere?
6. The author of the book – What contribution has this author made to the Literature and Character of Liberty?

CONCLUSION

In the days when our Lord walked upon the earth, a woman came to him with a box of costly ointment to anoint him against his burial [Matthew 26]. His disciples complained at the waste of so valuable an item; but Christ commended her for her deed and said that wherever the Gospel would be preached, her story would be told as a memorial of her.

Individuals enjoy only a short life upon the earth, but their deeds live on in the remembrance of all who are benefitted by them. It is appropriate to remember the great deeds of past individuals who have made contributions through all fields to the progress of Christian Liberty, for they inspire us to similar good works.

In remembering Dr. Bowditch at his passing, his associates in the Salem Marine Society said of him:

In his death a public, a national, a human benefactor has departed. Not this community, nor our country only, but the whole world, has reason to do honor to his memory. When the voice of Eulogy shall be still, when the tear of Sorrow shall cease to flow, no monument will be needed to keep alive his memory among men; but as long as ships shall sail, the needle point to the north, and the stars go through their wonted courses in the heavens, the name of Dr. Bowditch will be revered as of one who helped his fellow-men in a time of need, who was and is a guide to them over the pathless ocean, and of one who forwarded the great interests of mankind.²⁸



- ¹ Verna M. Hall, *The Christian History of the Constitution of the United States of America: Christian Self-Government*, Volume I (San Francisco: Foundation for American Christian Education, 1960), p. III.
- ² Rosalie J. Slater and Verna M. Hall, *Rudiments of America's Christian History and Government: Student Handbook* (San Francisco: Foundation for American Christian Education, 1968), pp. 4-5.
- ³ Katherine Dang, "Senior High American History," *A Guide to American Christian Education for the Home and School: The Principle Approach*[®] by James B. Rose (Palo Cedro, California: American Christian History Institute, 1987), p. 310.
- ⁴ Nathaniel Ingersoll Bowditch, *Memoir of Nathaniel Bowditch* (Boston: Charles C. Little and James Brown, Publishers, 1839), p. 152.
- ⁵ Catherine Drinker Bowen, *Miracle at Philadelphia* (Boston: Little, Brown and Co., 1966), p. 158.
- ⁶ Jean Lee Latham, *Carry On, Mr. Bowditch* (Boston: Houghton Mifflin Company, 1955, 1983), p. 47.
- ⁷ *Ibid.*, p. 59.
- ⁸ *Ibid.*, p. 110.
- ⁹ Bowditch, p. 26.
- ¹⁰ Latham, p. 34.
- ¹¹ Bowditch, p. 34.
- ¹² *Ibid.*, p. 107.
- ¹³ *Ibid.*, p. 37.
- ¹⁴ *Ibid.*, p. 38.
- ¹⁵ Darold Booton, jr., *Of the Log-Line and Half-Minute Glass* (Oklahoma City: Christian Heritage Academy, 1977).
- ¹⁶ Robert Elton Berry, *Yankee Stargazer: The Life of Nathaniel Bowditch* (New York: Whitelesey House, 1941), p. 108.
- ¹⁷ Latham, pp. 108-109.
- ¹⁸ Nathaniel Bowditch, *The New American Practical Navigator* (New York: Edmund Blunt, 1826), *passim*.
- ¹⁹ Nathaniel Bowditch, original ed., *American Practical Navigator*, Vol. II (Washington, DC: Defense Agency Hydrographic Center, 1975), p. iv.
- ²⁰ *Ibid.*, p. v.
- ²¹ Hall, p. 6.
- ²² Bowditch, *Memoir...*, p. 85. ²³ *Ibid.*, pp. 86-87.
- ²³ *Ibid.*, pp. 86-87.
- ²⁴ Rosalie J. Slater, "The Christian History Literature Program," *A Guide to American Christian Education for the Home and School: The Principle Approach* by James B. Rose (Palo Cedro, California: American Christian History Institute, 1987), p. 327.
- ²⁵ Rosalie J. Slater, *American Men of Science and Invention: Nathaniel Bowditch...*, a syllabus notebook study teaching the classic, *Carry On, Mr. Bowditch* (San Francisco: Foundation for American Christian Education, n.d.), p. 2.
- ²⁶ Ruth Hill Viguers, "Jean Lee Latham," *World Book Encyclopedia* (Chicago: World Book-Childcraft, International, Inc., 1978), Vol. 12, p. 83.
- ²⁷ Slater, "The Christian History Literature Program," p. 363.
- ²⁸ Bowditch, *Memoir...*, p. 72.