THE UNITED STATES LIGHT-HOUSE BOARD - 1860

Fourth in a Series

(Alexander Dallas Bache)

By John T. Graham

Preface: *This is the fourth in a series of articles that examine the lives of the men who served on the Light-House Board in the year 1860. This moment in time was selected because of a seal installed at the Montauk Point, New York, lighthouse at the time of its 1860 renovation, which lists the then-current members of the board.*

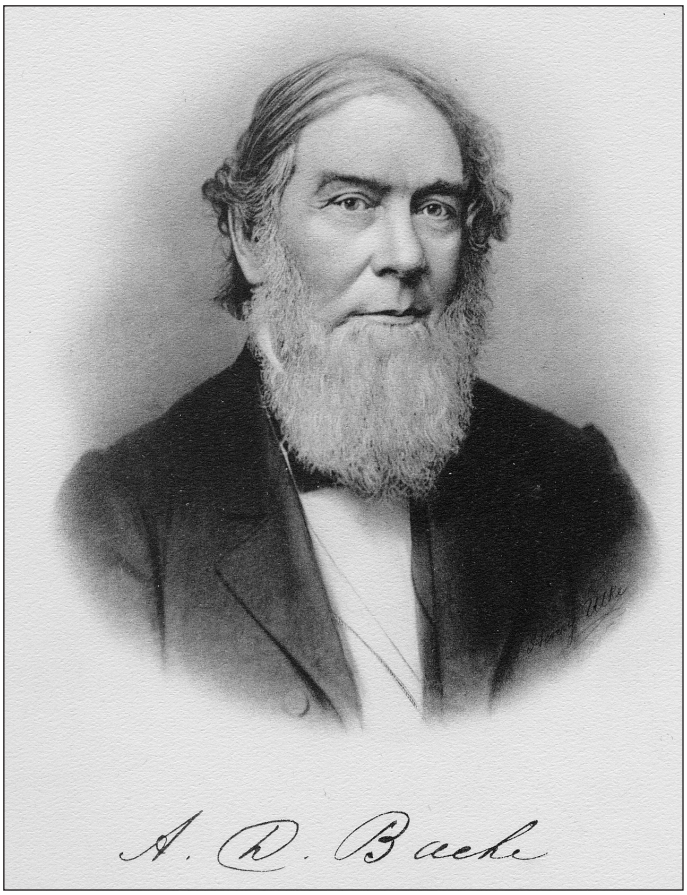
Alexander Dallas Bache (pronounced Bay-sch) was, at the time of his appointment to the Light-House Board, perhaps the pre-eminent American scientist of his time. The legislation that created the board called for it to include two "civilians of high scientific attainment," and Bache clearly met this qualification. Had the board been created some 60 years earlier, the nation's then-premier scientist, Benjamin Franklin, undoubtedly would have been appointed; it is appropriate then that his great-grandson, Alexander Bache, assumed this important duty. Bache was a member of the 1851 investigative committee authorized by Congress to review and report upon aids to navigation, and he would serve on the permanent board from its inception on October 9, 1852, until his death 15 years later.

Born in Philadelphia on July 19, 1806, Alexander was the eldest of nine children—six girls and three boys—of Richard Bache Jr. (1784-1848) and Sophia Burrell Dallas Bache (1785-1860). He was the grandson of Sarah Franklin Bache, the daughter of Benjamin and Deborah Franklin. He was most likely named for his maternal grandfather, Alexander J. Dallas (1759-1817), a noted colonial political figure who served as treasury secretary under President Madison. His mother's brother, George Mifflin Dallas, was the vice president of the United States under President Polk. Dallas, Texas, is named for this family.

Several other members of the Bache family were involved with lighthouse affairs. His brother George Mifflin Bache, a U.S. naval lieutenant, prepared an 1837 report on aids to navigation, one of several such inspections and reports that eventually led to the creation of the Light-House Board. Brother Richard Bache, along with fellow naval lieutenant Thornton Jenkins, inspected and reported upon the conditions of European lighthouses during the years 1845-46. Tragically, both brothers were lost at sea in separate incidents, or they too may have eventually served on the board. Alexander's cousin, Hartman Bache, was also a noted lighthouse engineer and served on the Light-House Board from 1862 to 1870.

In 1821, at the age of 15, Bache entered the United States Military Academy at West Point. He graduated from the academy in July 1825, at which time he was commissioned a second lieutenant in the Corps of Engineers. "I knew," he later told his protégé Joseph Henry, "I had nothing like genius, but I thought I was capable by hard study of accomplishing something, and I resolved to do my best, and if possible to gain the approbation of the teachers, and, above all, to make myself respected by my classmates."

Bache remained at the academy after graduation, serving as an assistant professor of mechanical engineering for the next academic year. From 1826 until 1829, he served as an assistant engineer on the construction



Right: Portrait of Alexander D. Bache in his later years. National Academy of Sciences.



Portrait of Sarah Franklin Bache, daughter of Benjamin and Deborah Franklin, grandmother to Alexander Bache. Painted by artist John Hoppner. Library of Congress image.

of Fort Adams, Rhode Island, under the tutelage of Joseph Gilbert Totten. Totten and Bache served together years later on the Light-House Board. While still on active Army duty, Bache was appointed professor of natural philosophy and chemistry at the University of Pennsylvania in Philadelphia. In June of 1829, he resigned his Army commission to devote full time to these teaching duties, which he would continue until 1836.

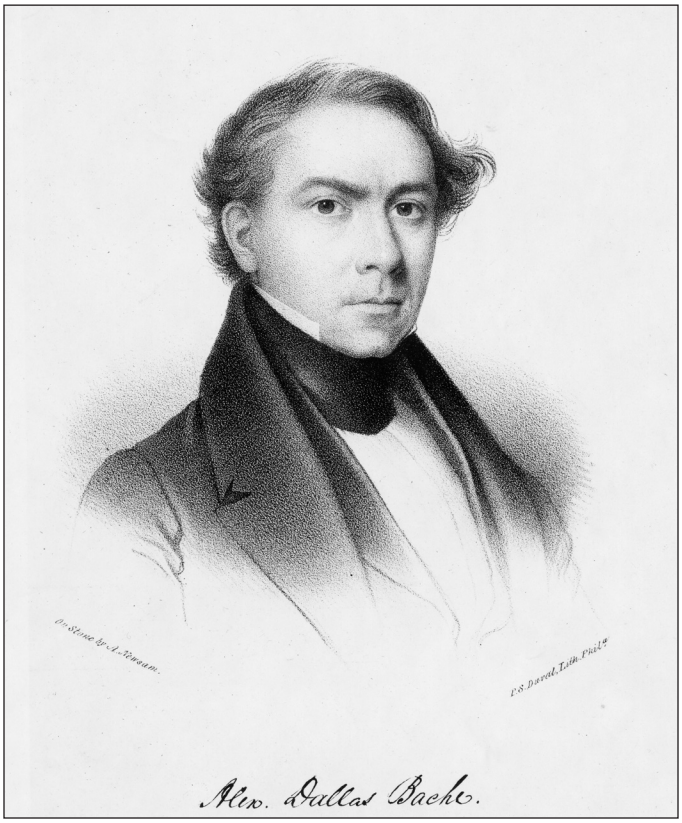
From 1836 until 1841, he was the president of Girard College, established in Philadelphia by the will of wealthy industrialist Stephen Girard for the education of orphan children. Bache was hired to establish the college. He traveled to Europe to study methods of instruction and discipline, and returned in 1838 to produce an elaborate 600-page report on European systems of scientific and literary education that influenced not only Girard College but many other American colleges as well. He resigned from the college in 1841 and was soon appointed as the superintendent of public schools in Philadelphia. Bache only held that position for one year, but his *Report to the Controllers of the Public Schools on the Reorganization of Central High School* remained an influential document to urban school systems of the time.

Bache married Nancy Clark Fowler in Newport, Rhode Island, on September 30, 1838. They were married 31 years when Nancy died on January 13, 1870, in Philadelphia. She was his associate in the preparation of much of his published material. They adopted a son, Henry Wood Bache, born in 1839. Like his adoptive father, Henry became a scientific researcher with the Coast Survey.

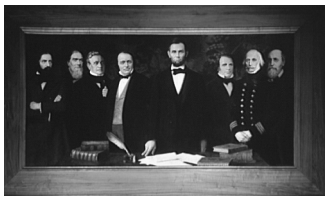
The Smithsonian Institution was founded in 1846 through the beneficence of Englishman James Smithson. Bache was named as a regent in the institution's act of incorporation, and he received congressional reappointment to this position for the rest of his life. His influence was instrumental in shaping the policies of that organization, the many branches of which continue to this day not only as one of our nation's premier scientific research facilities, but also as a treasure trove of American history.

In 1848 Bache was a founder and became the first president of the American Association for the Advancement of Science, the stated purpose of which was to "aid in bringing together and combining the labours of individuals who are widely scattered, into an institution that will represent the whole of the varied scientific disciplines." This organization, which continues to this day, was very influential in supporting congressional appropriations for scientific ventures, and led to the creation in 1863 of the National Academy of Sciences (NAS). Bache, fellow Light-House Board members Joseph Henry, Joseph Totten, and Andrew Humphreys, as well as many other prominent scientists, became "Corporators" of the NAS, an organization chartered by Congress to provide scientific expertise and advice to the government. Still in existence today as part of an even larger "The National Academies," the NAS has the motto "Advisers to the Nation on Science, Engineering, and Medicine." Bache also served on the board of directors of the Franklin Institute in Philadelphia, formed to commemorate his great-grandfather Benjamin Franklin. The institute is still another of the nation's premier scientific research institutions.

Bache served in many capacities during his career, but he is chiefly recognized for his long tenure as superintendent of the Coast Survey. The full name of this agency was the Geodetic and Hydrographic Survey of the Coasts of the United States. Later renamed the Coast and Geodetic Survey, the agency is today a part of the National Oceanic and Atmospheric Administration (NOAA). The concept of studying the coasts of the U.S. had been proposed by Thomas Jefferson in 1807, but no actual work commenced until 1817. Little progress had been made by the time Bache took over the agency in 1843. The agency's goals were not only accurate charting of coastlines, but detailed surveys of reefs, shoals, and harbors. Bache also directed efforts to determine the character of the Gulf Stream and other littoral ocean currents, and early efforts to chart tides and winds. The Office of Weights



Right: Portrait of a younger Alexander D. Bache. National Academy of Sciences.



Founders of the National Academy of Sciences (NAS) with President Abraham Lincoln. Alexander D. Bache is second from left; Joseph Henry is third from left. Photo from NAS website.

and Measures, today the National Institute of Standards and Technology, was created within the Coast Survey in 1836, and Bache served as head of this office also.

Alexander's predecessor as superintendent of the Coast Survey was Ferdinand Hassler. As Hassler lay dying, there were many candidates for the superintendency. The following excerpt from a letter from John Kane, secretary of the American Philosophical Society, to Joseph Henry, spells out reasons for Bache's selection.

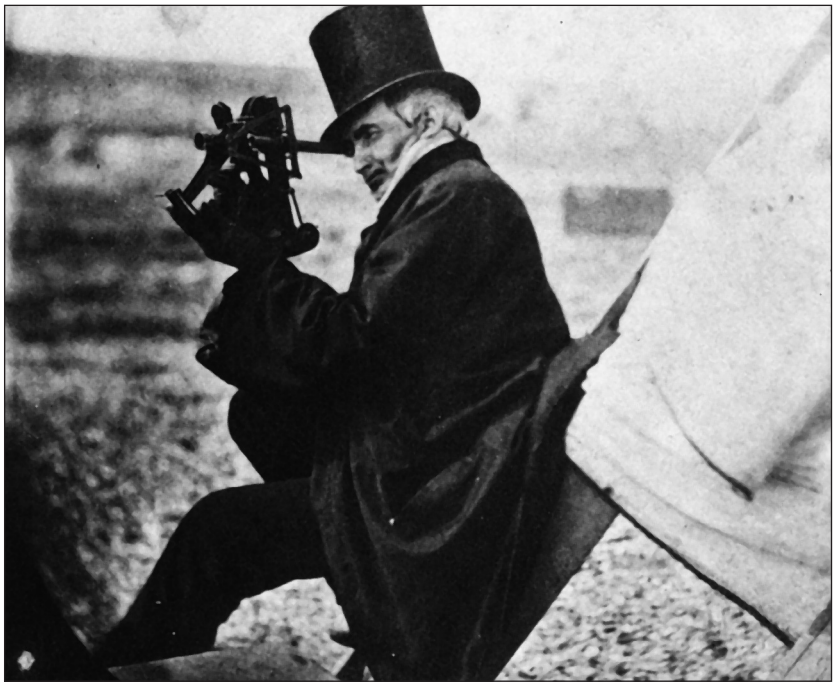
> There is one man singularly fitted to hold the office, your friend and mine, Dallas Bache,—and there is no other in the country, his equal or his neighbour. Besides mind and acquirements a century beyond Hassler, he has that which Hassler wanted so much, the administrative talent, and with it every other recommendation. The descendant of Franklin, a democrat always and of the best sort, allied to our Pennsylvania democrats Dallas and Walker and Wilkins and Irwin, a graduate of West Point and therefore in favour with the Army, professor of our University, president of Girard College while it had the promise of vitality, the leading mind of our Mechanic Institute and Philosophical Society, in a word, the nucleus around which science gathers in Philadelphia, and one of the best known of our Scientific men abroad,—he is withal so gallant a gentleman, and so good a fellow, that every one here will think of him for the place before all others.

President John Tyler appointed Bache as the superintendent on December 11, 1843.

When Bache took over the Coast Survey, it was conducting operations in nine states. Within four years, the Coast Survey was operating in seventeen states, and by 1849 had also sent survey crews to the West Coast. Studies of the Gulf Stream were initiated, as were studies into wind direction at different times of year, and the effects of the earth's magnetic fields on ocean tides. He had a particular fascination with the earth's magnetism, particularly the variations in the declination of the compass needle over time and place. Large-scale soundings were instituted to determine ocean bottom conditions and geography. Besides expanding the research scope and the geographic base of operations of the Coast Survey, Bache also expanded its intellectual base by hiring prominent scientists as assistants in the Coast Survey. Benjamin Peirce of Harvard, the foremost American mathematician of the mid-19th century, Louis Agassiz of Harvard, and astronomer Maria Mitchell of Nantucket, perhaps the first woman hired by the federal government, were among this number. The far-reaching effect of this policy was to make the Coast Survey a vehicle for giving direction and coherence to American physical science.

Always the scientific researcher, Bache published over 130 technical papers between 1829 and 1865. The very first was titled *On the Specific Heat of the Atoms of Bodies*. One of the last was an *Abstract of the Discussion of the Influence of the Moon on Horizontal Magnetic Force*. Although many of those in between dealt with aspects of the earth's magnetism and its influence, as well as of tidal observations, the range of topics illustrates clearly Bache's scope of scientific interests and expertise. A sampling of topics includes the types of Pennsylvania coal, safety equipment on steamboats, observations of several solar eclipses, corrosion rates of different metals in salt water, hardening of lime under water, explosions in steam boilers, heat conduction of different materials, and the velocity of sound waves. That many of these topics were relevant and important to lighthouse operation is unquestionable. A report that was quite relevant in later years, when mercury float systems were used in the revolution of heavy Fresnel lenses, was his 1833 *Translation of Avogadro's Memoir on the Elastic Force of the Vapor of Mercury*.

Bache and his associates in the scientific community also found time for less academic pursuits. The circle of friends and colleagues with which he associated came to refer to themselves informally in the 1850s as the "Florentine Academy" and then the "Lazzaroni," the term for the beggars of Naples. The stated purpose of the Lazzaroni was to "eat an outrageously good dinner together." Bache's home served as the headquarters for this informal group, and whenever a member came to Washington, he usually stayed with the Baches or



Alexander Bache out in the field with a sextant during his years with the Coast Survey. National Oceanic and Atmospheric Administration (NOAA) website.



The grave of Alexander Dallas Bache in Congressional Cemetery, Washington, D.C. Creative Commons photo by R. Bowley, 2010.

Henrys. The Baches' hospitality was well known, and fine wines flowed as freely as the ideas of the Lazzaroni.

In 1855, along with fellow board member Joseph Totten and Navy Chief of Navigation Charles Davis, Bache was appointed by the state of New York to study and make recommendations regarding navigation in and the defense of the harbors at New York City. Reports over the next several years were submitted to the legislature regarding the East, North, and Harlem Rivers, Gowanus Bay, Brooklyn and Staten Island, and the Hell's Gate Passage, among other harbor areas. Following this project, the three were engaged by the Commonwealth of Massachusetts to conduct similar evaluations of the harbor at Boston. Over 20 detailed reports were prepared in all by the committee for the New York and Massachusetts legislatures.

During the Civil War, Bache served as vice president of the U.S. Sanitary Commission. The mostly women volunteers of this government agency raised millions of dollars for funds and supplies, gathered and distributed food, served as nurses, and operated hospital ships in support of Union armies, as the Army's own Medical Bureau was simply overwhelmed. In existence until May 1866, the commission aided wounded veterans and help them apply for pensions. The invasion of Pennsylvania by General Lee's Confederate Army caused great concern for the safety of northern cities; thus Bache was appointed in 1863, by the governor of Pennsylvania, as the chief engineer to design and construct defensive works around Philadelphia. After the Civil War, he was elected a 3rd Class Companion of the Military Order of the Loyal Legion of the United States (MOLLUS) in consideration of his contributions to the war effort. This patriotic organization of Civil War officers, much like the Society of the Cincinnati formed by officers after the Revolution, was founded in 1865 to maintain the memories and associations of the war.

Bache passed away on February 17, 1867, in Newport, Rhode Island, and is buried in the Congressional Cemetery in Washington, D.C. Noted architect Henry Hobson Richardson was commissioned to build a tomb in 1868. It is one of only three examples of a monument designed by Richardson and a rare example of a Richardson structure lacking Romanesque design points. Among many tributes and remembrances offered after Bache's death, the following two give an excellent account of his influence in life. Treasury Secretary Hugh McCulloch, the ex-officio head of the Light-House Board stated: "No man within the present generation was more widely known in the walks of practical science; none has been so closely identified with collateral service in the various public departments." A resolution adopted by the staff of the Coast Survey on February 18, 1867, had this to say: "That, in the death of Professor Alexander Dallas Bache, Superintendent of the United States Coast Survey, the country has lost an eminent and faithful public servant, science its highest representative in America, and the Coast Survey its wise, prudent, and energetic chief, under whose careful administration and guardianship it has attained and maintained its present vigorous existence."

In his final memoir, Joseph Henry states: "On the whole, if we would seek the real secret of his influence over his fellow men, it would be found to have consisted in the great abnegation of self which pervaded his whole conduct, his great practical wisdom, his honesty of purpose, and his genial though quiet and unobtrusive manner."

Alexander Dallas Bache epitomized the person of "high scientific attainment" that was sought to complement the military engineering expertise of other Light-House Board members and to put our American lighthouses and navigational aids on a firm and professional footing. He was yet another excellent choice to serve.

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