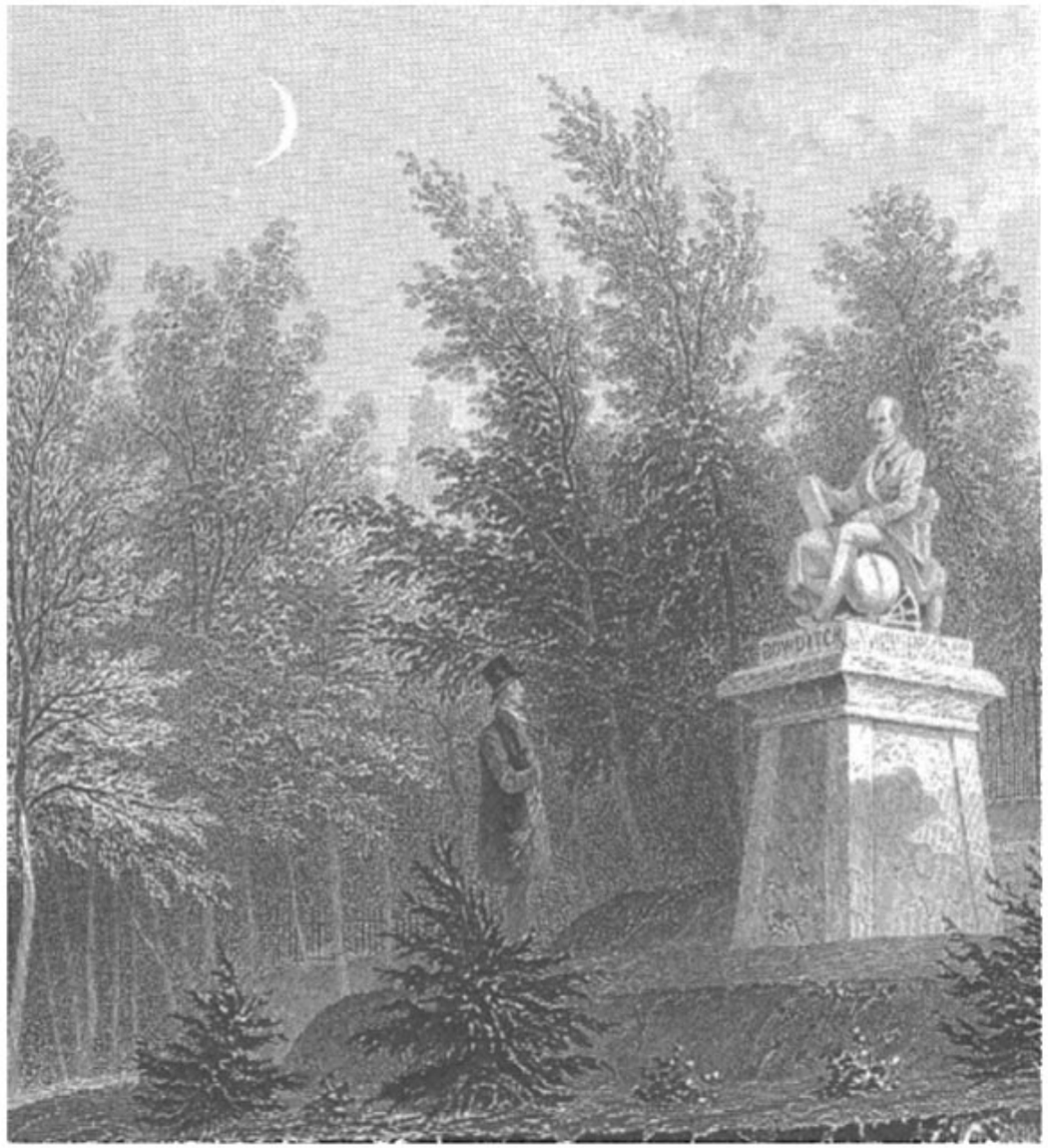
Notable Astronomers at Mount Auburn



Friends of Mount Auburn Cemetery

America's First Garden Cemetery Consecrated in 1831

Friends of Mount Auburn

580 Mount Auburn Street | Cambridge, MA 02138

We invite you to participate in the programs of the Friends of Mount Auburn Cemetery. Membership information is available at the Gatehouse information rack, the Visitors Center, and the Office.

Since its founding in 1831, Mount Auburn Cemetery has retained its original purpose of being a natural setting for the commemoration of the dead and for the comfort and inspiration of the bereaved and the general public. Its grounds offer a place for reflection and for observation of nature—trees, shrubs, flowering plants, ponds, gentle hills, and birds both resident and migrant. Visitors come to study our national heritage by visiting the graves of noted Americans and enjoying the great variety of monuments and memorials. Mount Auburn Cemetery began the "rural" cemetery movement out of which grew America's public parks. Its beauty and historic associations make it an internationally renowned landscape. Designated a National Historic Landmark, Mount Auburn remains an active, non-sectarian cemetery offering a wide variety of interment and memorialization options.

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The Friends of Mount Auburn Cemetery is a nonprofit charitable trust promoting the appreciation and preservation of the cultural, historic and natural resources of America's first landscaped cemetery, founded in 1831.

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   3a. Nathaniel Bowditch Statue
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Solon Irving Bailey (1854 - 1931)
Lot #6628, Buttercup Path

Solon Irving Bailey was the headmaster of a private school in Concord when he first volunteered to assist Edward Pickering (Lot #3041, Maple Avenue) at the Harvard Observatory in 1887. Bailey specialized in mapping the skies of Central and South America. He recommended a Peruvian site for the location of an auxiliary Harvard observatory and established a network of meteorological stations in the region. He was a pioneer in the study of globular clusters, dense groupings of millions of stars, and the first to detect individual stars within these clusters in 1895. Bailey became acting director of the Observatory in 1919, and was a respected astronomy professor at Harvard until his death in 1931.

William Cranch Bond (1789 – 1859)
Lot #1814, Geranium Path

In 1811 William Cranch Bond discovered a comet from his home observatory. Bond's interest and knowledge of astronomy led Harvard President Josiah Quincy (Lot #396, Sweetbrier Path) to ask him to establish an observatory for the college in 1838. The Harvard Observatory was completed in 1847; Bond's efforts produced a place to train the first generation of professional American astronomers. He led studies that disproved the theory that Saturn's rings were solid. Together with his son, George Bond, he pioneered the use of daguerreotypes to record images of the sky and developed astronomical equipment.

Nathaniel Bowditch (1773 – 1838)
Lot #1206, Tulip Path

Nathaniel Bowditch quit school at the age of ten to work in his father's cooper shop, but continued reading and taught himself advanced mathematics. He served as a shipmaster and continued his studies. His book *The New American Practical Navigator*, first published in 1802, is still an authority on navigation today. His translation of *Celestial Mechanics* by Pierre Simon de Laplace was an important resource for early English-speaking astronomers. After his death, sailors and other admirers donated money to memorialize the "great navigator." The bronze statue of Bowditch by sculptor Robert Ball Hughes was installed at Mount Auburn Cemetery in 1847. It was the first life-size bronze statue cast in the United States.

Seth Carlo Chandler (1846 – 1913)
Lot #3243, Walnut Avenue

Seth Carlo Chandler graduated from Harvard in 1861 and became an assistant to astronomer Benjamin Gould (Lot #213, Beech Avenue). After studying astronomic longitude for the U.S. Coast Survey and working as an insurance consultant, he returned to the Harvard Observatory in 1881. He helped develop a telegraphic code to distribute astronomical news and designed the almucantar, a tool to detect time by equal-altitude observations. Chandler was a respected authority on variable stars. His greatest contribution was his research on polar motion and the variation of latitude, the complex wobble of the earth on its axis of rotation. He took over Gould's position as editor of the *Astronomical Journal* and was the president of Boston's Amateur Astronomers' Club for many years.

Alvan Clark (1804 – 1887)
Lot #3411, Sumac Path

Alvan Clark was a portrait artist when he decided to build telescopes with his son. He taught himself how to grind and polish glass to create 6 to 8 inch lenses. His achromatic lenses were among the first produced in the United States and allowed people to view space without color distortions. He established Alvan Clark & Sons in 1846, but the firm did not become profitable until after Clark discovered a faint double star through his telescope and spoke at the American Association for Advancement of Science in 1856. He closed his portrait studio and opened a workshop in Cambridge in 1860 after receiving a large commission to create an 18-1/2 inch lens. Clark helped set and break the world record for the largest telescope lens several times before his death in 1887.

Alvan Graham Clark (1832 – 1897)
Lot #3411, Sumac Path

Alvan Graham Clark became a partner of Alvan Clark & Sons at twenty. In 1862 he found the companion star of Sirius, the brightest star in the sky, while testing an 18-½ inch telescope. He was awarded the Lalande gold medal by the French Academy of Sciences for his find that was the first of his fourteen binary star discoveries. In 1870 he traveled to Spain and in 1878 to Wyoming as part of a total-eclipse expedition team. He continued the family firm after the death of his father and brother. With the help of Carl Lundin (Lot #5703, Vinca Path), Clark installed the world's largest refractor telescope with a 40-inch lens for Yerkes Observatory in Chicago in 1897.

George Bassett Clark (1827 – 1891)
Lot #5271, Celastrus Path

George Bassett Clark decided to melt down a broken dinner bell from Phillips Academy, where he was an engineering student, to build a reflector telescope in 1843. He learned how to create mirrors and lenses before introducing the idea of telescope building to his father. After graduating from Phillips, he became a civil engineer and traveled to California during the gold rush. He returned to Cambridge and opened an instrument repair shop. In 1846 he created Alvan Clark & Sons with his father and was later joined by his younger brother. George was responsible for mounting the lenses and made all the metallic parts. He suffered from poor health and died in 1891.

John Farrar (1779 – 1853)
Lot #2267, Hibiscus Path

John Farrar graduated from Harvard and spent two years at Andover Theological Seminary. He tutored Greek at Harvard in 1805. He earned his masters degree from the institution and became a professor of mathematics and natural philosophy. Fluent in French, Farrar translated works of European mathematicians like La Croix and astronomers like Biot for American audiences. He was an active member of the American Academy of Arts and Science and wrote many articles on meteorology and astronomy.

Williaminia Paton Stevens Fleming (1857 – 1911)

Lot #6188, Maple Avenue

"Mina" Fleming worked as a maid for Edward Pickering (Lot #3041, Maple Avenue) after moving to Boston from Scotland. In 1879 Pickering hired her to be an assistant at the Harvard Observatory. She was later put in charge of the photographic library, where she indexed and classified plates of star images. Fleming classified 10,351 stars using the Draper method and formed a new classification scheme, the Pickering-Fleming System, to classify other stars including 222 variable stars, 24 novae stars and 59 gaseous nebulae she independently discovered. In 1898 she became the first woman to receive an official appointment from the Harvard Corporation when she was named Curator of Photographs. She supervised a team of female assistants and was a catalyst for observatories to hire women.

Benjamin Apthorp Gould (1824 – 1896)

Lot #213, Beech Avenue

Benjamin Gould was the first American to earn a Ph.D. in astronomy at Gottingen in Germany. Upon his return, he founded the *Astronomical Journal* in 1849 and continued to edit the journal until his death. He supervised the U.S. Coast Survey between 1852 and 1867. In 1866 he determined the longitude difference between England and Washington, D.C. using the first transatlantic telegraph cable. In 1862 he published the first catalog that combined and correlated stellar and other observations. Gould's greatest contribution to the field was his observations and documentation of over 70,000 stars visible from the Southern Hemisphere.

John Huchra (1948 – 2010)

Lot #12202, Birch Avenue

John Huchra was a professor of astronomy at the Harvard-Smithsonian Center for Astrophysics. His interest in astronomy came from reading Science Fiction and Cosmology books as a child. He went on to receive a undergraduate degree from MIT, and a Phd from the California Institute of Technology. Huchra biggest accomplishment was a collaboration with Margaret Geller to lead the CfA Redshift Survey — a pioneering effort to map the large-scale structure of the universe. The survey uncovered a "Great Wall" of galaxies extending across 500 million light-years of space. This survey and others showed that we live in a "soap bubble" universe with galaxies clustering as though on the surfaces of giant bubbles separated by huge voids. In addition to his teaching, he was the Senior Advisor to the Provost for Research Policy at Harvard.

Edward Skinner King (1861 – 1931)

Lot #6629, Buttercup Path

Edward Skinner King studied at Hamilton College before his professor sent him to work with Edward Pickering (Lot #3041, Maple Avenue) at the Harvard Observatory. King was appointed director of the Harvard observing station in California. Returning to Cambridge in 1893, he focused his studies on celestial photography and published several books on the topic. He was the first person to photograph the aurora borealis. King is renowned for his work determining the apparent magnitudes of the sun, moon, earth and the brightness of stars. He was an active member in many scientific and astronomical organizations and was a professor at the Harvard Observatory until his death in 1931.

Carl Axel Robert Lundin (1851 – 1915)
Lot #5703, Vinca Path

Born in Sweden, Carl Lundin was a skilled instrument maker who specialized in making chronometers. He moved to Boston in 1873 and took a job crafting fire-alarm equipment in Newton. Alvan Clark (Lot #3411, Sumac Path) learned of Lundin's talent and hired him in 1874 as chief instrument maker for his telescope firm Alvan Clark & Sons. Lundin was personally trained by Clark and crafted many notable lenses for the Lowell Observatory and Amherst College. He helped set three world records for the largest telescope lens including the 40-inch lens for Yerkes Observatory in Chicago. After Clark's death in 1897, Lundin continued Alvan Clark & Sons. Lundin's own son continued the firm until it dissolved in 1958.

Brian Marsden
Story Chapel Columbarium, Alcove H, niche 50

Although born in England, Brian Marsden spent most of his adult life in America, first studying at Yale University and then working at Harvard. He was the longtime director of the Minor Planet Center at the Harvard-Smithsonian Center for Astrophysics and was a proponent of the controversial decision to downgrade Pluto to a minor or dwarf planet. As the director for the Central Bureau of Astronomical Telegrams he also served to publicize new astronomical discoveries.

Janet Akuz Mattei (1943 – 2004)
Lot #11000 C-47, Willow Pond Knoll

In 1969 Janet Mattei participated in a research program at the Maria Mitchell Observatory on Nantucket and became interested in variable stars. Mattei earned two master's degrees in astronomy, one in her native country of Turkey and the other at the University of Virginia in 1972. In 1973 she became the director of the American Association of Variable Star Observers (AAVSO), a position she held until her death in 2004. Mattei coordinated the study of variable stars by monitoring the quality of over 300,000 international observations each year. She promoted the work of amateur astronomers by advocating for their use of NASA's Hubble Space Telescope, encouraging collaboration with professional astronomers and installing 200 observation programs in schools.

Donald H. Menzel (1901 - 1976)
Lot #8798, Honeysuckle Path

Donald Menzel earned his Ph.D. from Princeton and accepted an astrophysics research position at the Lick Observatory in California in 1926. He published an important volume on solar chromosphere using solar eclipse spectra in 1931. The following year Menzel joined the Harvard faculty and studied gaseous nebulae and stellar atmospheres. During World War II he improved radio communication by monitoring solar conditions for the U.S. Navy. His work encouraged the military to establish several solar observatories. As director of the Harvard Observatory from 1952-1966, Menzel helped transfer the Smithsonian's Astrophysical Observatory to Harvard in 1955 and worked to lay the foundation for the National Radio Astronomical Observatory in Charlottesville, Virginia.

Edward Charles Pickering (1846 – 1919)

Lot #3041, Maple Avenue

Edward Pickering, as an MIT physics professor, established America's first student physics laboratory and wrote a textbook to guide student experiments. Pickering, noted for his physics background, replaced Joseph Winlock (Lot #4478, Raven Path) as director of the Harvard Observatory in 1876. As the "dean of astronomical research," he furthered the field of stellar photometry, developed the photographic collection, encouraged the identification and classification of variable stars, opened an auxiliary observatory in Peru, and improved methods for measuring the brightness of stars. He invested his own salary to further the research of the observatory staff. He pioneered the hiring of women staff members.

Harlan Smith (1924 – 1991)

Lot #6867, Fir Avenue

While a student at Harvard, Harlan Smith took a year off to study meteors in the Southwest under the direction of Fred Whipple (Lot #8013, Sumac Path). In 1955 Smith earned his Ph.D. from Harvard; he wrote his dissertation on short period variable stars, specifically Delta Scuti stars. As a Yale University professor, Smith relocated the Yale Observatory, developed a program in planetary radio astronomy and conducted research on optical variability and ultra-luminous objects. In 1963 he became the director of McDonald Observatory at the University of Texas at Austin. He modernized and expanded the Observatory facilities, creating a first ranking Observatory and Astronomy department. He was an active member in the professional astronomical community and an advocate of public outreach. Smith retired as director in 1989 to focus on teaching.

Fred Lawrence Whipple (1906 – 2004)

Lot #8013, Sumac Path

Fred Whipple helped compute the first orbit of Pluto while he was a graduate student at University of California at Berkeley. He joined the faculty at Harvard Observatory in 1931, specializing in comets and meteors. During World War II, he co-invented a means to disrupt radar and protect airplanes. In 1946 he invented the "Whipple Shield" to protect spacecraft from meteors, a system still in use. He directed the Smithsonian Astrophysical Observatory from 1955 until it merged with Harvard Observatory in 1973 to create the Harvard Smithsonian Center for Astrophysics. In 1950 he formulated a theory of the composition and behavior of comets, the "dirty snowball" theory, that was confirmed by observations of Halley's Comet in 1986. He discovered six comets and helped track the first man made satellites.

Joseph Winlock (1826 – 1875)

Lot #4478, Raven Path

Joseph Winlock taught mathematics and astronomy at Shelby College in Kentucky before he moved to Cambridge in 1852. He worked to produce the *American Ephemeris and Nautical Almanac*, a yearly publication on the location of celestial bodies, and also served as a mathematics professor at the United States Naval Academy. In 1866 he was appointed director of the Harvard Observatory. He also became a professor of astronomy and geodesy at Harvard. As director, Winlock improved the Observatory with the purchase of new instruments and equipment.

The Light of Stars

By Henry Wadsworth Longfellow (Lot # 580, Indian Ridge Path)

The night is come, but not too soon;
And sinking silently,
All silently, the little moon
Drops down behind the sky.

There is no light in earth or heaven
But the cold light of stars;
And the first watch of night is given
To the red planet Mars.

Is it the tender star of love?
The star of love and dreams?
O no! from that blue tent above,
A hero's armor gleams.

And earnest thoughts within me rise,
When I behold afar,
Suspended in the evening skies,
The shield of that red star.

Within my breast there is no light
But the cold light of stars;
I give the first watch of the night
To the red planet Mars.

The star of the unconquered will,
He rises in my breast,
Serene, and resolute, and still,
And calm, and self-possessed.

And thou, too, whosoe'er thou art,
That readest this brief psalm,
As one by one thy hopes depart,
Be resolute and calm.

O fear not in a world like this,
And thou shalt know ere long,
Know how sublime a thing it is
To suffer and be strong.

Originally published in *Knickerbocker Magazine*, 1838.

Cover: Engraving by James Smillie, from *Mount Auburn Illustrated*, 1847.

Sponsored by public subscription, sculptor Robert Ball Hughes created a life-size bronze statue of Nathaniel Bowditch (Lot #1206, Tulip Path) to be placed at Mount Auburn Cemetery. The statue features Bowditch with his globe and sextant. Located near the entrance of Mount Auburn, visitors are still greeted by this important statue as they enter the Cemetery today.