

WINTER QUARTER / DECEMBER 2005
MOUNT WILSON OBSERVATORY ASSOCIATION
R E F L E C T I O N S

THE Amazing MISTER Carnegie

"How much did you say I had given away, Poynton?"

"\$325,657,399" was the reply.

"Good heaven! Where did I ever get all that money?"

Andrew Carnegie very much enjoyed playing the role of the affable millionaire who jested with his personal secretary about "all that money," but his intentions were quite serious. Indeed, Carnegie aimed for nothing less than the uplifting of humankind. Through his generosity in funding public libraries and educational and research institutions, a legacy of education and support for scientific research was seeded, blossomed, and continues to grow today.

Carnegie was a complex individual whose life was intertwined with contradictions. His formal education ended when he was 12; yet he had a profound understanding of the importance of education to personal success. He wrote that workers have a right to organize into unions, yet he prevented union activity in his steel mills. He thundered against inherited privilege, but he saw his own vast wealth as the straightforward product of his hard work, a democratic society that allowed its accrual, and, perhaps, as evidence of his superior character. Carnegie devoted most of his life to amassing large amounts of money, yet he viewed the possession of it as a "stewardship," and later in life his real pleasure was in giving it away.

Andrew Carnegie was the product of a radical environment. He was born in 1835 in Dunfermline, Scotland, the center of a thriving linen industry and a hotbed of revolutionary ferment. His father Will, his grandfather Tom Morrison, and his uncle were political radicals who wanted to abolish the monarchy and do away with inherited privilege. Will was a master damask weaver who co-founded a library for weaver families, and he spent what little free time he had reading. Formal education was then voluntary, and Andrew's indulgent parents promised that he would not have to go to school until he wanted to. Finally at age 8, Andrew agreed to be enrolled, and he

Andrew Carnegie and George Ellery Hale in March 1910, photographed by the 60-inch telescope on Mount Wilson. Mount Wilson Observatory was built through the generosity of Carnegie in partnership with Hale's leadership and astute planning.



proved to be a diligent student for the few years of his formal education.

The industrial revolution changed everything for the family. The steam-powered looms that came to Dunfermline in 1847 put hundreds of weavers out of work. The family, like many others, was faced with the prospect of literally starving to death. Carnegie's mother Margaret — a pivotal force in his life — took over, opening a shop in their cottage and mending shoes. Carnegie later wrote, "I began to learn what poverty meant. It was burnt into my heart then that my father had to beg [for work]."

THE MOVE TO AMERICA

The Carnegie family — Will, Margaret, Andrew, and his younger brother Tom — left Scotland in 1848 for Pittsburgh, Pennsylvania, where Margaret's sisters lived. They settled in nearby Allegheny. Will Carnegie quickly found that his fine hand-made linens were too expensive compared with factory-made versions, but finally found work in a cotton mill. He obtained a position for 13-year-old Andrew at \$1.20 a week, 12 hours a day, 6 days a week, as a bobbin boy. The work was monotonous, but Andrew was proud to be a breadwinner for the family. Soon he took another job at \$2 a week, where he had to keep the factory boiler properly fired and also was given the task of bathing newly made bobbins in stinking vats of oil.

...TO PAGE 4

CALENDAR

Tuesday, January 3, 7:00 P.M.
MWOA Board Meeting

★ Call Don Nicholson for meeting location: (310) 476-4413.

Sunday, January 22, 2:30 P.M.
MWOA Public Lecture

★ MWOA trustee **Jed Laderman** on *Space Camp Turkey: A Space-Age Experience at the Site of Ancient Troy*. Refreshments at 2:00 P.M.

MWOA 2006
Public Lecture Schedule

★ Sundays, 2:30 P.M. at the Altadena Library: January 22, February 26, March 26, April 23, May 28, June 25, July 23, August 27, September 24, October 22, and November 26.



More information in future newsletters, or visit our website at www.mwoa.org.

The Mount Wilson Observatory Association (MWOA) is a support group made up of friends of the Mount Wilson Observatory. MWOA is a nonprofit California corporation, independent of the Mount Wilson Observatory and the Mount Wilson Institute, which operates the Observatory. MWOA's goals include increased public awareness of the Observatory's unique history and continuing scientific contributions, as well as improvement of the quality of public access at Mount Wilson.



INFORMATION

Don Nicholson, President
(310) 476-4413
donna@mwoa.org

Or write to:
MWOA, P. O. Box 70076
Pasadena, CA 91117

MWOA WEBSITE
www.mwoa.org

MOUNT WILSON INSTITUTE WEBSITE
www.mtwilson.edu

REFLECTIONS

A QUARTERLY PUBLICATION OF MWOA

Executive Editor
Bob Eklund
beklund@sprynet.com

Editor/Designer
Marilyn Morgan
memorgan99@earthlink.net



For the use of historical photographs of Mount Wilson, MWOA thanks the Observatories of the Carnegie Institution of Washington, the Huntington Library, and Don Nicholson.

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PAGE ONE BANNER PHOTOGRAPH

Edwin Hubble at the Newtonian focus of the 100-inch Hooker telescope, circa 1922.

MWOA NOTES



MWOA Elections

MWOA is governed by a nine-person Board of Trustees, whose 3-year terms are staggered so that three Board seats are up for election each year. At MWOA's Annual Meeting on November 7, incumbents Gale Gant, Jane Lewis, and Mike Simmons were re-elected by the membership. The other members of MWOA's nine-person Board are Shirley Burt, Bob Eklund, Jed Laderman, Don Nicholson, Greg Smith, and Tim Thompson.

MWOA's officers are elected by the Board of Trustees. At the December 6 Board meeting, the incumbent officers were re-elected, as follows: Don Nicholson, President; Mike Simmons, Vice President; Gale Gant, Secretary; and Greg Smith, Treasurer.

In Memorium: Chris Farmer

Long-time MWOA member Christopher Lee Farmer died unexpectedly of a heart attack on November 21. He was 61. Services were held on December 1 at the Westwood Presbyterian Church.

Chris's expansive circle of friends, which included several current and former Mount Wilson residents, knew him as a tireless social being who continually forged new friendships. He was as passionate about such subjects as theology, philosophy, opera, and symphonic music as he was about popular culture. A long-time resident of Highland Park, Chris had been employed by the Los Angeles Unified School District as an adult education teacher since 1984. He was born in Abilene, Texas, and attended the University of Texas at Austin, where he received B.A. degrees in geography and English before continuing his formal education at U.C. Berkeley.

A celebration of Chris's life will be held on January 8, noon–3:00 P.M., at the home of Sherwin H. Sloan, M.D., 3332 Deronda Dr., Los Angeles, CA 90068. Potluck, RSVP to (323) 467-4725, or to operaowl@earthlink.net. In addition, a Christopher Farmer Memorial Website is being created, and photos and other information about Chris would be welcome. Contact: gjlehmann@gmail.com, phone (760) 375-4239, 219 E. Upjohn Ave., Ridgcrest, CA 93555-4173.

Has Your MWOA Membership Expired?

Please check the mailing label on this issue of *Reflections* to see when your MWOA membership expires. If your label says "2005/09," your membership expired on September 30, 2005. Use the renewal form on page 8. Renew promptly to assure continuing member benefits.

Erratum

In the November *OverView*, we mistakenly gave the birth date of Mount Wilson astronomer Seth B. Nicholson as November 2, 1891. The correct date is November 12, 1891.



A membership form may be found on page 8.

MWOA Membership Benefits

Associate, \$20 — Includes newsletters (*Reflections* and *OverView*) plus participation in MWOA member events such as tours, star parties at Mount Wilson, and lectures.

Family, \$30 — Permits family members in your household to participate in MWOA events.

Sustaining, \$100 — Includes all of the above, plus invitations to participate in special events, such as observing nights on the 60-inch telescope.



PHOTO BY EDISON R. HOGE

This 1920 photo shows the 100-inch dome framed with icy branches.

BOOKS OF INTEREST *for your winter reading pleasure*



— *by* Bob Eklund

A Few Flakes of Snow (Before They Melt)

On a snowy day in 1609 (the same year in which Galileo first pointed a telescope at the heavens), Johannes Kepler, astronomer and Imperial Mathematician to the court of Rudolph II in Prague, pushed aside his computations to compose a letter:

I am well aware how fond you are of Nothing...and so I can readily guess that the closer a gift comes to Nothing the more welcome and acceptable it will be to you...

In such anxious reflections as this, I crossed the bridge, embarrassed by my discourtesy in having appeared before you without a New Year's present, except in so far as I harp ceaselessly on the same chord and repeatedly bring forth Nothing: vexed too at not finding what is next to Nothing, yet lends itself to sharpness of wit. Just then by a happy chance water-vapour was condensed by the cold into snow, and specks of down fell here and there on my coat, all with six corners and feathered radii. 'Pon my word, here was something smaller than any drop, yet with a pattern; here was the ideal New Year's gift for the devotee of Nothing, the very thing for a mathematician to give, who has Nothing and receives Nothing, since it comes down from heaven and looks like a star.

Back to our patron while the New Year's gift lasts, for fear that the warm glow of my body should melt it into nothing.



Kepler, then 36 years old and at the height of his career, had just finished a 6-year grind of calculations leading to the understanding of elliptical planetary motion. The bridge referred to is the ancient Karlsbrücke over the Muldau in Prague, linking palace and town. The patron, from whom Kepler had just come and to whom he hurries back with his ephemeral gift, is Johan Matthäus Wacker von Wackenfels, Counsellor at Rudolph II's court. The letter quoted above became the opening of Kepler's wonderful essay on the problem of the shape of snow crystals entitled "A New Year's Gift or On the Six-Cornered Snowflake."

In his essay, Kepler posed with exceptional clarity the problem of why snowflakes form in such intricate and varied shapes, but he was unable to come to a satisfactory answer beyond saying that "snowflakes are hexagonal because it is in their nature to be so."

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Ken Libbrecht, a physicist at Caltech and a former solar researcher at Mount Wilson Observatory, has taken up the study of "next to Nothing" where Kepler left off — and with the help of nearly four centuries of progress in physics he is able to shed considerably more light on the science behind the snowflake's formation. He is aided by 21st-century photographic techniques that allow the beautiful pattern of a snowflake to be imaged and preserved beyond the few seconds it remains unmelted on one's overcoat sleeve.

At MWOA's Annual Meeting November 27, Dr. Libbrecht treated members and guests to a veritable blizzard of such images — allowing us to glimpse, for a few minutes at least, some of the most beautiful sights nature has to offer. For those who would like a longer-lasting view, Dr. Libbrecht has published three books and a 2006 wall calendar, available from amazon.com or the Caltech bookstore:

- *The Snowflake: Winter's Secret Beauty* — text by Kenneth Libbrecht, photography by Patricia Rasmussen. Hardcover, \$20.00 list price (\$13.60 on amazon.com). 2003, Voyageur Press, P.O. Box 338, Stillwater, MN 55082, www.voyageurpress.com.
- *The Little Book of Snowflakes* — by Kenneth Libbrecht. Hardcover, \$7.95. Includes literary quotes from observers of nature from Aristotle to Thoreau. 2004, Voyageur Press.
- *The Magic of Snowflakes: A Postcard Book* — by Kenneth Libbrecht, \$7.95. Contains 22 full-color, ready-to-mail postcards. 2005, Voyageur Press.
- *Snowflakes 2006 Wall Calendar* — by Kenneth Libbrecht. \$11.99 (\$9.59 on amazon.com). Features snowflake photos by the author and literary quotes relating to nature and snow.

An In-Depth History of Mount Wilson Observatory

For those wanting a thorough understanding of the work of Mount Wilson astronomers, Allan Sandage's long-awaited history lives up to all expectations. This 647-page volume, published in 2004, is ideal background reading for MWOA tour guides and others needing to know just who did what during the Observatory's most productive years. Dr. Sandage, a staff member at the Observatories of Carnegie Institution of Washington, has written a much-needed — and more detailed and comprehensive — successor to Helen Wright's fine biography of George Ellery Hale, *Explorer of the Universe*.

- *Centennial History of the Carnegie Institution of Washington: Volume 1, The Mount Wilson Observatory: Breaking the Code of Cosmic Evolution*, by Allan Sandage. Hardcover, \$80.00. Cambridge University Press, 40 W. 20th St., New York, NY 10011-4211. Available from amazon.com.

Yerkes Observatory: A Look Back

Astrophysicist and historian Donald E. Osterbrock has written a comprehensive and highly readable history of Yerkes Observatory from its genesis in 1892 to the mid-20th century. Published in 1997 (the centennial year of Yerkes' dedication), the book narrates the Observatory's changing fortunes under its first three directors: founder George Ellery Hale; Edwin B. Frost, who succeeded Hale in 1904 and is still remembered with affection in the Williams Bay community; and the Russian-born "boy director" Otto Struve, who energized Yerkes' research in the 1930s and 1940s.



- *Yerkes Observatory 1892–1950: The Birth, Near Death, and Resurrection of a Scientific Research Institution*, by Donald E. Osterbrock. Available from amazon.com: paperback \$30.00, hardcover \$39.22. University of Chicago Press, Chicago, IL 60637.

Andrew spent many long hours of confinement in the dungeon-like boiler room and the dreadful-smelling oil-vat chamber.

Hoping to leave the boiler and oil vats behind, Andrew interviewed for a job as a telegram delivery boy, boldly asking for a trial even though he was completely inexperienced. Soon his skills and industriousness were recognized, and he was given a raise to \$13.50 per month, about half the amount needed by his family to live reasonably well. He dreamed of starting a firm with his brother Tom, and making vast sums of money to reward his hard-working parents.

At age 17, Andrew was offered a job with the Pennsylvania Railroad where he learned management skills. The job enabled him to finish work at 6 P.M. instead of 11 P.M., and he used the free time for self-improvement by visiting the Mechanics' and Apprentices' Library. He invested in the stock of a company associated with the railroad, and realized something important: "It gave me the first penny of revenue from capital — something that I had not worked for with the sweat of my brow," he wrote later.

THE MASTER STRATEGIST

Carnegie was appointed superintendent of the Pittsburgh Division of the railroad at the age of only 24. He did an outstanding job, perfecting the railroad's cost-accounting system and introducing efficient management innovations. In 1865, he left the railroad to concentrate on a new business providing iron and steel bridges. Carnegie had a keen ability to discern, and then pounce on, a viable opportunity for advancement or investment, and he was unfailingly optimistic and confident. Scrappy and bold, daring and forceful, he was the perfect new American for the expanding economy. He became a master strategist in an era of unregulated big business.

By 1868, Carnegie's assets were \$400,000 — at the mere age of 33 — and his income



A very serious-looking Andrew Carnegie at a young age.

was \$50,000 per year. In that year, he wrote a letter to himself in which he questioned the purpose of his existence. He proposed to "resign business at age thirty five" and then "make no effort to increase [my] fortune, but spend the surplus each year for benevolent purposes." But in another two years he was making more than \$100,000 annually, and his appetite for wealth and success had seemed not to diminish.

One of the hallmarks of Carnegie's business practices was a concern with efficiency and cost accounting that he learned at the Pennsylvania Railroad. Carnegie applied these principles to the iron and steel business — the first time it had been done. Technology also played a role in efficiency: with prescience of thought, he brought the Bessemer converter to America from Britain to install in his steel plants. He always hired top management and technical people and demanded their best efforts.

Carnegie realized that American railroads had to switch from iron to steel rails — the difference in strength and longevity was on the order of 15 to 20 times better. Carnegie decided to build a new plant devoted to making Bessemer steel rails. This was to be the Edgar Thomson ("E.T.") works, completed in 1875 and named after the president of the Pennsylvania Railroad (a major customer). Carnegie knew most of the railroad leaders and worked tirelessly to convince them to purchase the new steel rails. With his personal energy, the firm's expert management, good cost accounting, and the hard work of the mill men (they worked 12 hours a day, 7 days a week, with only the Fourth of July off), E.T.'s output steadily rose while overall costs fell by nearly a half and profits increased. E.T.'s share of the steel rail market grew to 30 percent. In 1883, Carnegie bought the Homestead steel works. He expanded the plant and installed new open hearth furnaces, switching from rails to steel beams for buildings.

In 1886, Andrew's younger brother Tom died; then his mother Margaret fell ill and died. Andrew had been secretly engaged to Louise Whitfield for several years — his mother had demanded that he not wed until after her death — and the next year they were finally married. Andrew was 51 and Louise was 30.

Carnegie relied on his expert managers for information about how the businesses were running. He decided to hire a single top manager to oversee everything, and brought Henry Clay Frick into the partnership. Frick was an intense, highly successful businessman, and his abilities enabled considerable increases in profits for Carnegie. Though at first the relationship was cordial and productive, Frick and Carnegie later came into grievous conflict.

In 1896, Carnegie Steel produced about 30 percent of all the steel in the United States. By 1900 the firm was an efficiently integrated colossus, controlling ore, coke, limestone, and shipping facilities.

Still intensely competitive in his mid-60s, Carnegie intended to take on J. P. Morgan, who was also in the steel business. Morgan did not have the degree of vertical integration that Carnegie did, and when Carnegie made plans to build a new steel-tube making plant and beat Morgan's price by \$10 a ton, Morgan decided to offer to buy him out. An open-ended offer was made in early 1901. Told to name the price, Carnegie asked for \$480,000,000. Morgan immediately accepted the figure, thereby capturing about two-thirds of the steel market. On confirmation of the deal, Morgan shook Carnegie's hand and said, "Mr. Carnegie, I want to congratulate you on being the richest man in the world."

THE GOSPEL OF WEALTH

In 1889, Carnegie had written an essay, "The Gospel of Wealth," describing the responsibilities of philanthropy and the duty of the "man of wealth." He felt that the wealthy entrepreneur should distribute his fortune before dying. Carnegie spoke of creating opportunities for the beneficiaries to better themselves, so that the gift would produce even greater wealth throughout the society. Carnegie famously stated that the man who dies rich, dies disgraced.

Libraries were Carnegie's true passion, representing a vital tool for self-improvement. In 1881 he made his first major library donation, to Dunfermline, and in 1887 the cornerstone for a second Scottish library was laid in Edinburgh. He funded libraries in his home town of Allegheny (opening



Carnegie was a natural target for satirical cartoonists. Here he startles his fellow millionaires by demanding they give away their money.

1890), in Braddock (opening 1889), and other steel mill towns. The Carnegie Library of Pittsburgh opened in 1895, sharing a building with the Carnegie Institute. Carnegie saw the building as a place to bring together literature, science, art, and music (what he called “The Noble Quartet”).

In 1894, two Pennsylvania municipalities merged to become the town of Carnegie. Andrew Carnegie offered to build a library building and to provide \$10,000 for books. It was the fourth of only five libraries built by Carnegie to receive an endowment (the others were in Dunfermline in Scotland and the Pennsylvania steel mill towns of Braddock, Homestead, and Duquesne).

The official dedication for the library in Carnegie was on April 22, 1902. Accompanying Carnegie to the dedication ceremony was his good friend John A. Brashear. A self-taught optician, Brashear became a foremost producer of telescopes and precision scientific optics for a number of facilities, including the Mount Wilson 150-foot solar tower. Brashear was also a lifelong friend of George Ellery Hale, who as a teenager had purchased a dispersion grating from Brashear.

Carnegie continued to finance thousands of library buildings in the United States and around the world.* He did not require that

*Carnegie attached two conditions to his offers of money for a public library building — the local community had to provide a suitable site and agree to continuously support the library through local tax funds.

his last name be a part of a library’s name (of course he was pleased when it was), but many of the early libraries were required to have the words “Free Library” or “Free to the People” inscribed on the front of the building. By having the words engraved in stone, Carnegie hoped to ensure that no library would ever charge an admission fee.

In California, San Diego captured the first Carnegie library, opening in 1902. Nineteen years later, in Orosi, the last of California’s 142 Carnegie libraries was completed. Only 85 of the original Carnegie public library buildings in California are still standing. Carnegie and his foundations would establish 2,811 libraries at a cost of over \$60 million. Carnegie’s support for free public libraries had long-term effects — many a youngster first encountered the pleasure of reading through a Carnegie library — and encouraged others to provide bequests to keep the nation’s library system vigorous.

BEYOND LIBRARIES

In addition to libraries, Carnegie made various other bequests. Many people don’t know that Carnegie donated thousands of organs to churches in the United States and other countries, “to lessen the pain of the sermons,” he joked. The number grew to a total of 7,689 organs costing \$6.2 million. He donated funds to various universities and technical schools, favoring smaller colleges and trade schools. He supported the Tuskegee Institute and donated annually to other black institutions and colleges as well. When he found that blacks in the south would be barred from entering his libraries because of segregation, he created libraries

The handsome facade of the Carnegie Library of Pittsburgh. The words “Free to the People” are actually larger than the name of the library.



specifically for them. When he learned that many teachers had no pensions, he founded the Teachers Insurance and Annuity Association (TIAA) to help teachers survive old age without becoming destitute.



Cartoonists loved to poke fun at Carnegie. He must have enjoyed this one.

One of the most interesting of Carnegie’s efforts is the Carnegie Hero Fund Commission. Established in 1904, this foundation recognizes outstanding civilian heroism in the United States and Canada. The commission was founded following a terrible explosion in a coal mine near Pittsburgh that killed 181 individuals, two of whom had entered the mine attempting to rescue injured miners. Carnegie eventually gave more than \$10 million to create 11 hero foundations in various countries.

Carnegie became deeply concerned about the continual viciousness and waste of war. He had made money from investments during and after the American Civil War, and supported the war against Spain in 1898 (his factories built armor plating for vessels), but continuing international conflicts alarmed him. The Peace Palace, located in the Hague, Netherlands, was one result. He founded the Carnegie Foundation in 1904 to construct it. In 1910, Carnegie founded the Carnegie Endowment for International Peace, now the oldest public policy institution in the United States concentrating on issues of war and peace. When the Great War broke out in 1914, the normally optimistic Carnegie became profoundly depressed. He had expended an estimated \$25 million toward peace, yet the Great War would generate 13 million military deaths.

In 1902, Carnegie created a national research institution, the Carnegie Institution of Washington. Carnegie believed that the

best science came by providing exceptional individuals with the resources they need in an environment that is free of needless constraints. To this end, Carnegie would identify the “exceptional man” and permit him to work freely on scientific, literary, or artistic projects of his own choosing. The Board of Trustees was given the mandate to follow through on Carnegie’s vision. According to Allan Sandage, the Institution’s first “Year Book” in 1902 was a blueprint for the development of 20th-century astronomy.

The Institution supported J. W. Hussey of Lick Observatory in an expedition to search for possible sites in the United States, Australia, or New Zealand for a “southern and solar observatory.” In June 1903, Hussey brought his 9-inch telescope to Mount Wilson to test the suitability of telescopic viewing at the site. With him was none other than the indefatigable George Ellery Hale. On the basis of Hussey’s report, the Carnegie Institution chose the peak as the site for a solar observatory, and, Hale hoped, a future 60-inch telescope.

In 1904, the Carnegie Institution gave Hale \$10,000 for the founding of the Mount Wilson Solar Observatory (Hale had already invested a considerable sum from his own funds to keep the project going). Hale moved his Yerkes Observatory staff to Mount Wilson, and within a few years they had constructed the Snow solar telescope and the 60-foot solar tower, developed two physics laboratories, and set up scientific offices and machine and optical shops in Pasadena. Hale proceeded in 1906 to pursue the completion of the 60-inch telescope and let a contract for the pouring of a mirror of 100 inches diameter. Mount Wilson Obser-

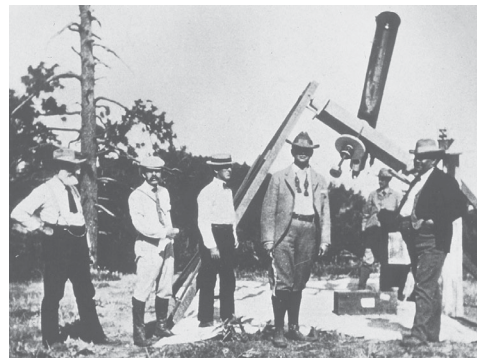
The June 1903 expedition to Mount Wilson to test for suitability of telescopic viewing. George Ellery Hale is second from left; Professor Hussey of Lick Observatory is second from the right, behind the telescope mounting frame.

vatory was well on its way to becoming a premier astronomical facility.

Andrew Carnegie died in 1919, having given \$350,695,653.40 to philanthropic causes. At his death, there was \$25 million left in the vault, of which \$20 million was entrusted to the Carnegie Corporation of New York. (This entity was formed in 1911 with a mandate to “promote the advancement and diffusion of knowledge and understanding” through grants seeking “to do real and permanent good in this world.” A similar entity, the Carnegie United Kingdom Trust, was established in 1913 to act in support of “the people of Great Britain and Ireland.”) Another \$4 million was bequeathed to various individuals identified by Carnegie. He had previously established a relief fund in 1901 to provide pensions for those who were injured and families of those who died in Carnegie steel mills.

In contemporary dollars (multiply dollars in Carnegie’s time by 200 as a rough indicator of modern equivalent dollars), Carnegie would have been worth about \$112 billion at the height of his wealth. This made him the wealthiest individual in the world until eventually bested by John D. Rockefeller. Rockefeller, who died in 1937, gave away about \$500 million (roughly half of his wealth), passing along an equal amount to his heirs — a disgrace according to Carnegie’s principles.

— *by Marilyn Morgan*



ACKNOWLEDGMENT

Special thanks to Glenn A. Walsh for providing perspective and context for this article. Mr. Walsh maintains a number of detailed websites on Pennsylvania history and astronomy topics. Visit www.andrewcarnegie.cc and www.planetarium.cc, then follow the many links.

WEB RESOURCES

- Carnegie Institution of Washington — www.carnegieinstitution.org
- Carnegie Corporation of New York — www.carnegie.org
- Carnegie Foundation Peace Palace — www.peacepalace.nl
- Carnegie Hero Fund Commission — www.carnegiehero.org
- Hear Carnegie reading from “The Gospel of Wealth” at historymatters.gmu.edu/d/5766/ or at www.clpgh.org/exhibit/carnegie.html
- Read an analysis of Carnegie’s business practices — www.voteview.com/carnegie.htm
- Read about and locate the Carnegie Libraries of California — www.carnegie-libraries.org
- Learn how to join the Carnegie Club at Skibo Castle, Scotland — www.carnegieclub.co.uk

BIBLIOGRAPHY

- *The Perfect Machine: Building the Palomar Telescope* by Ronald Florence (Harper Perennial, 1995).
- *Carnegie* by Peter Krass (John Wiley and Sons, 2002).
- *Meet You in Hell: Andrew Carnegie, Henry Clay Frick, and the Bitter Partnership That Transformed America* by Les Standiford (Crown Publishers, 2005).
- *Centennial History of the Carnegie Institution of Washington: Vol I: The Mount Wilson Observatory (Breaking the Code of Cosmic Evolution)* by Allan Sandage (Cambridge U. Press, 2004).



PICTURE A SNOWY DAY ON MOUNT WILSON

Virginia Hoge, who wrote two articles about her grandfather and great-grandfather on Mount Wilson (see Reflections, June and March 2005), has shared a number of family and Mount Wilson photographs taken by her grandfather, Edison R. Hoge. Featured here are mischievous snowball-makers on the catwalk of the 100-inch telescope dome and Edison pulling baby Kenneth on a sled.





NON-MWOA EVENTS OF INTEREST TO ASTRONOMY LOVERS IN GREATER LOS ANGELES

★ Compiled by Laura Woodard Eklund

An expanded version of this column called "On the Event Horizon" can be found online at www.mwoa.org.

STAR PARTIES & TELESCOPES (weather permitting)

- Fri., Dec. 23: South Bay Astronomical Society hosts a public star party at Ridgecrest School, Northbay Road, Rancho Palos Verdes. Free. Info: www.geocities.com/sbas_elcamino or (310) 217-1512.
- Sat., Jan. 7, late afternoon–10:00 P.M.: monthly public star party at Griffith Observatory Satellite Facility (park in south end of Zoo parking lot in Griffith Park). Free. Info: www.GriffithObs.org or (213) 664-1191.
- Sat., Jan. 7, at sunset: star-gazing with the Riverside Astronomical Society at Barnes & Noble in the Tyler Galleria. Free. Info: www.rivastro.org or (909) 342-2389.
- Every Wednesday, 7:30 P.M.: Los Angeles Astronomical Society hosts a weekly public star party at Garvey Ranch Observatory, Garvey Ranch Park, Orange Avenue, Monterey Park. Free. Info: www.laas.org or (213) 673-7355.

LECTURES & PLANETARIA

- Fri., Jan. 6, 13, & 20, Santa Monica College Planetarium shows: "The Night Sky Show" at 7:00 P.M. followed by feature show "Mars Returns" at 8:00 P.M. in Drescher Planetarium (223 Drescher Hall). Admission: \$4–\$5 (or \$7–\$9 for both shows). Info: <http://www.smc.edu/planetarium/> or (310) 434-4223.
- Sat., Jan. 7, 7:00–9:30 P.M.: Mountain Skies Astronomical Society public program on meteorites at MSAS Astronomy Village, Lake Arrowhead. Tickets: \$0–\$9. Info: www.mountain-skies.org or (909) 336-1699.
- Mon., Jan. 9, 7:30 P.M., monthly meeting of China Lake Astronomical Society at Maturango Museum, 100 E. Las Flores Ave., Ridgecrest. Free. Info: <http://www1.ivvvisp.com/brower/cas.html> or (760) 876-5455. You can hear a pretty electronic song at the home page of this website.
- Wednesdays resuming Wed., Jan. 11, 7:00 P.M., followed by telescope viewing at 8:00 P.M.: UCLA Planetarium and Telescope Show in Mathematical Sciences 8224. Free, but \$8 to park at UCLA. Info: www.astro.ucla.edu/planetarium or (310) 825-4434.
- Fri., Jan. 13 & 20, at Cal State Northridge: Winter Sky Show at 7:00 P.M. in Donald E. Bianchi Planetarium in Citrus Hall; telescope viewing at 8:00 P.M. Tickets (\$3–\$8) available at Associated Students Box Office: (818) 677-2488 (M–F 9:30 A.M.–5:00 P.M.) or at the door if space permits. Info: http://www.csun.edu/phys/announcements_and_planetarium/planetarium.html or (818) 677-5601. Weekly programs resume in February.
- Fri., Jan. 13, 7:00 P.M.: monthly meeting of Antelope Valley Astronomy Club: Alexandre Meier of Heaven Word on "From Einstein to Strings: A Look at Some Ideas of Modern Cosmology" at Sage Planetarium, 38060 20th Street East (at East Avenue R), Palmdale. Free. Info: www.avastronomyclub.org or (661) 718-3963.
- Fridays at 7:30 P.M.: monthly meeting of Santa Monica Amateur Astronomy Club at New Roads School, 3131 Olympic Blvd. (between Stewart Street on the west and Centinela Avenue on the east). Traveling west on Olympic, turn right at the second entrance to New Roads School at the Herb Alpert Campus. The meeting is in the Huerta room in the green building. Free. Info: <http://connect.to/smaac>

or (310) 495-7595. Upcoming meetings:

- Jan. 13: David Meier of JPL on "Cosmic Jets: A New Paradigm"
- Feb. 10: Rosaly Lopes of JPL on "The Exotic Volcanoes of Io and Titan"
- Mar. 10: Nils Turner of Georgia State on "Astronomy with the CHARA Array [on Mount Wilson]: A New View of the Universe"
- Fri., Jan. 13, 7:30 P.M.: monthly meeting of Orange County Astronomers in Hashinger Hall, Chapman University, Orange. Free. Info: www.OCAstronomers.org or (714) 751-6867.
- Sat., Jan. 14, 7:30 P.M.: monthly meeting of "The Local Group" Astronomy Club of Santa Clarita Valley at Newhall Senior Center, 22900 Market Street, Newhall. Free. Info: www.lgscv.org or (661) 297-2612.
- Saturdays at 7:30 P.M., monthly meeting of Riverside Astronomical Society (RAS) in Cossentine Hall (which houses and is labeled "The World Museum of Natural History"), La Sierra University, Riverside. Free. Info: www.rivastro.org or (909) 342-2389. Upcoming meetings:
 - Jan. 14: Simon Balm of Santa Monica College on "Astronomy at the South Pole"
 - Feb. 11: Gary Palmer on "Solving Our Solar Imaging Puzzle"
 - Mar. 11: Gary Peterson of SDSU on "The Problem with Pluto"

TOUR

- Thu., Jan. 26 & Feb. 23, 11:00 A.M.–12:30 P.M., Caltech Architectural Tour: Hear about George Ellery Hale, founder of both Mount Wilson Observatory and Caltech. Meet in the front hall of the Athenaeum (northwest corner of Hill Avenue and California Boulevard). Info: www.its.caltech.edu/~cwclub/cats.htm or (626) 395-6327.

EXHIBITS

- Ongoing: "No One May Ever Have the Same Knowledge Again: Letters to Mount Wilson Observatory, 1915–1935" at the Museum of Jurassic Technology, 9341 Venice Blvd, Culver City. Hours: Thu. 2:00–8:00 P.M. and Fri.–Sun. noon–6:00 P.M. Donation: \$0–\$4. Info: www.mjt.org or (310) 836-6131.
- Ongoing: Air and Space Gallery at California Science Center in Exposition Park, Los Angeles. Free exhibits, but \$6 to park. Info: www.casiencectr.org or (213) 744-7400.
- Ongoing: "Explore the Universe" exhibition at Smithsonian's National Air and Space Museum, Washington, D.C. Includes Newtonian cage from the 100-inch telescope on loan from Mount Wilson Observatory. Free. Info: www.nasm.si.edu or (202) 357-2700.

SCIENCE ON THE RADIO

- "Talk of the Nation: Science Friday" — KPCC (89.3 FM): Fri. 8:00–10:00 P.M.
- "Exploration" hosted by Michio Kaku (science & science policy) — KPFK (90.7 FM): Sat. 11:00 A.M.–12:00 noon.



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Mount Wilson Observatory Association
P. O. Box 70076
Pasadena, CA 91117



FIRST-CLASS MAIL

Best wishes



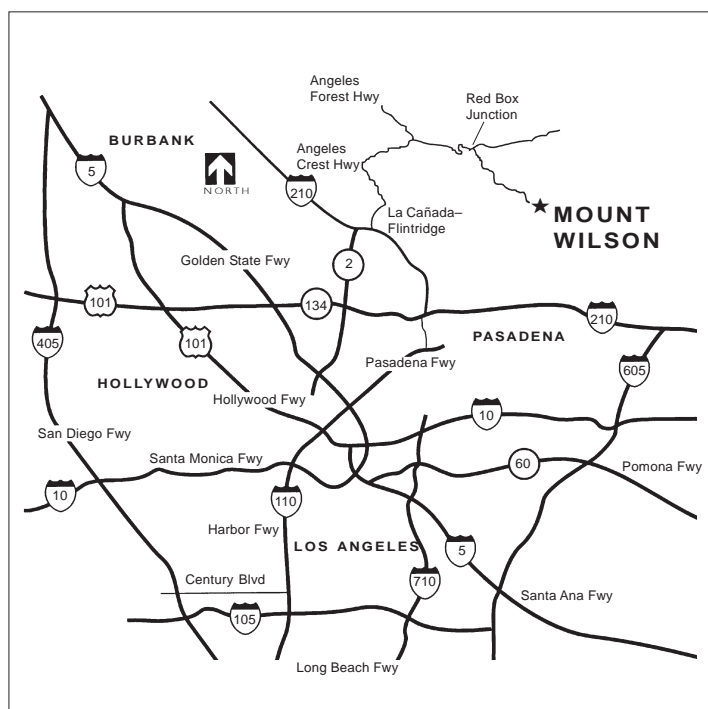
for the holidays
and the new year—
may all your skies
be clear

OBSERVATORY CLOSED FOR THE WINTER

The U.S. Forest Service has closed Skyline Park for the winter, so public access to the Observatory is also affected. The grounds will be again accessible to visitors in the spring. The regular docent-led walking tours will resume then.

DIRECTIONS TO MOUNT WILSON

From the 210 freeway, follow the Angeles Crest Highway (State Highway 2 north) out of La Cañada–Flintridge for 14 miles to Red Box–Mount Wilson Road; turn right, and go another 5 miles to the Observatory gate, marked Skyline Park. Walk in on the Observatory access road (far left side of parking lot) about 1/4 mile to the Observatory area. The Museum is opposite the 150-foot solar tower. During warm weather, the Skyline Park–Observatory area is usually open to the public daily from 10:00 A.M. to 4:00 P.M. The U.S. Forest Service requires those parking within the Angeles National Forest to carry a “Forest Adventure Pass.” It can be purchased for \$5 (one day) or \$30 (season) at Clear Creek Ranger Station or Red Box Ranger Station, at the Shell Station at the foot of Angeles Crest Highway (open 24/7), and at major sporting goods outlets such as Sports Chalet.



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 *Membership Benefits—see page 2*

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