

CRAIG B. WAFF

Air Force Research Laboratory - History Office (AFRL/HO)
2130 Eighth St. – Bldg. 45, Room 030
Wright-Patterson AFB, OH 45433-7003
937-255-5095 (direct work phone)
785-5095 (DSN work phone)
craig.waff@wpafb.af.mil (work e-mail)

2340 Mallard Lane – Apt. 4
Beavercreek, OH 45431-3624
937-431-1919 (home phone)
cbwaff@sbcglobal.net (home e-mail)
410-858-0945 (cell phone)

Historian, writer, and editor with 40 years of experience producing publications dealing with the development of science and technology in present and past times.

- Historian who has conducted research in numerous archives in the United States and foreign countries, interviewed major government scientific officials, consulted for a public-television film producer, and won major historical essay awards.
- Writer of numerous articles on scientific and technical topics for popular-level science magazines (*Physics Today*, *Astronomy*, *IEEE Spectrum*, *Scientific American*, *Air Power History*), general reference works, and history-of-science academic journals.
- Senior editor for such major reference works as the *Encyclopedia Americana*, *Collier's Encyclopedia*, *the Concise Columbia Encyclopedia*, *the Academic American Encyclopedia*, and the *New York Public Library Desk Reference*.

EXPERIENCE:

AIR FORCE RESEARCH LABORATORY (AFRL/HO), Wright-Patterson AFB, OH 2004-2005, 2007-present **Senior Historian, AFRL History Office**

- Researched and wrote chapters of AFRL Annual History concerning current projects in all of AFRL's nine technical directorates
- Researched and wrote the 170-page essay "Training as They'll Fight: A History of the Distributed Mission Training Concept" for AFRL/HO's "*Breakthrough*" *Technologies Developed by the Air Force Research Laboratory and Its Predecessors*, vol. III (February 2009) (this volume received the Air Force Material Command's Excellence in Historical Publications 2010 award)

89TH AIRLIFT WING, Andrews Air Force Base, MD 2005-2007 **Wing Historian, 89th Airlift Wing History Office**

- Researched and wrote the Annual History of the wing that operates and maintains *Air Force One* and other aircraft that transport the U.S. President and other high federal government officials
- Responded to historical queries from wing staff and general public concerning the wing and its aircraft
- Wrote three historical articles for the *Capital Flyer* base newspaper

SCHOLASTIC LIBRARY PUBLISHING, Danbury, CT 1998-2003 **Physical Sciences Senior Editor, Encyclopedia Americana**

- Identified articles in the physical and earth sciences, mathematics, and technology requiring replacement, major revision, or updating in this 30-volume general-reference encyclopedia (electronic and print versions)
- Solicited and contracted authors for new articles and reviewers for articles needing revision
- Updated articles in-house where necessary
- Edited (for style, content, and length) all such new, revised, and updated articles
- Specified new or revised illustrations to accompany articles
- Major projects included the replacement of an extensive number of articles in military technology and the insertion (with revised captions) of new 4/C maps of astronomical constellations

MACMILLAN GENERAL REFERENCE, Indianapolis, IN 1997-1998 **Senior Editor, The New York Public Library Desk Reference, 3rd Edition (freelance)**

- Reviewed and edited all text additions, changes, and deletions to this work
- Reviewed all rendered illustrations against rough art

COLLIER-NEWFIELD, INC., New York, NY 1994-1997 **Managing Editor for Physical Sciences, Collier's Encyclopedia**

- Annually identified articles in the physical and earth sciences, mathematics, and technology requiring replacement, major revision, or updating in this 24-volume general-reference encyclopedia
- Solicited and contracted authors for new articles and reviewers for articles needing revision
- Updated articles in-house where necessary
- Edited (for style, content, and length) all such new, revised, and updated articles
- Specified new illustrations to accompany articles
- A major project was the replacement of a single long and outdated "Space Exploration" article with several shorter but more focused and heavily illustrated articles on such topics as space shuttle, space station, space probe, early manned spaceflight, and military space operations

JET PROPULSION LABORATORY (a NASA field center)
CALIFORNIA INSTITUTE OF TECHNOLOGY, Pasadena, CA **1985-1993**
Technical Writer Specialist, TDA/DSN Documentation Group (1992-1993)

- Wrote and edited technical documents (e.g., annual reports, detailed mission requirements, subsystem functional requirements, compatibility test reports) concerned with JPL's Telecommunications and Data Acquisition Office and NASA's Deep Space Network (DSN). (The DSN is the JPL-operated worldwide communication system by which NASA communicates with unmanned solar-system exploration spacecraft.)

Deep Space Network Contract Historian (1989-1992)

- Researched and wrote book-length history of NASA's DSN from conception in 1958 to 1992
- Wrote photo captions for extensive wall display depicting history of the DSN

Project Galileo Contract Historian (1985-1989)

- Researched and wrote a book-length history of NASA's Project Galileo from conception to the period of the *Challenger* space shuttle accident (1986) (*Galileo* is a Jupiter orbiter/entry probe spacecraft now studying Jupiter.)
- Served as historical consultant for "The Rocky Road to Jupiter", a film on Project Galileo produced by Geoffrey Haines-Stiles and originally broadcast on the PBS science series "NOVA" in 1987
 - Provided a basic historical outline of the project to the producer
 - Supplied potential questions to be asked of interviewees
 - Checked several versions of the script narration for historical accuracy

RANDOM HOUSE, New York, NY **1984-1985**

Freelance Editor and Writer

- Selected and defined new astronomy and aerospace word entries (and corrected & revised old entries) for unabridged edition (1987) of *The Random House Dictionary of the English Language*

COLUMBIA UNIVERSITY PRESS, New York, NY **1982-1984**

Assistant Executive Editor

- Served as first book-manuscript acquisitions editor for physical, earth, and space sciences and for history, philosophy, and sociology of science and technology

Senior Editor, The Concise Columbia Encyclopedia

- Supervised selection, condensing, and updating of science and technology articles derived from *The New Columbia Encyclopedia* (1975)
- Wrote or commissioned/edited new articles

ARETE PUBLISHING COMPANY, Princeton, NJ **1979-1982**

Supervisory Editor for Science and Technology (1980-1982)

- Supervised three editors in revision and updating of the science and technology articles in 20-volume *Academic American Encyclopedia* (AAE)
- Revised existing articles and edited newly commissioned articles in physics, mathematics, astronomy, space exploration, transportation, and electronics
- Served as project editor for proposed *Encyclopedia of Astronomy and Space Exploration*
 - Developed (A-head) list of articles (about 1,100 in number)
 - Secured an advisory board of recognized authorities
 - Supervised revision and updating of AAE articles to be incorporated into work
 - Commissioned and supervised editing of all new articles

Earth Sciences Editor (1979-1980)

- Edited all articles on geology, meteorology, hydrology, geophysics, and related sciences for first edition (1980) of AAE

AMERICAN INSTITUTE OF PHYSICS, New York, NY **1977-1979**

Assistant Editor, Physics Today newsmagazine

- Researched and wrote news articles for "State and Society" section
- Interviewed major government science officials in Washington, D.C.
- Solicited and edited book reviews for "Books" section

UNIVERSITY OF MISSOURI-KANSAS CITY, Kansas City, MO **1976**

Assistant Professor, Physical Science Department

- Taught two semesters of history-oriented general-science course
- Assisted in running astronomical observatory for weekly open-house sessions

EDUCATION:

Ph.D., History of Science, June 1976, The Johns Hopkins University, Baltimore, Maryland

- Woodrow Wilson Foundation Dissertation Fellowship, 1972-74

B.S., Mathematics, June 1969, University of Florida, Gainesville, Florida

PROFESSIONAL AFFILIATIONS:

History of Science Society, 1969-Present

- Forum for the History of Science in America special interest group, 1985-present
- History of Astronomy special interest group, 1990-present

Society for the History of Technology, 1981-present

- Albatrosses (aeronautics and space historians) special interest group, 1989-present

Historical Astronomy Division, American Astronomical Society, 1983-present

Euler Society (for historians of 18th-century mathematical science), 2002-present

Astronomical Society of the Pacific, 1977-present

- History Committee, 1992-1998

Writers Club, Jet Propulsion Laboratory, 1989-1993

- Treasurer, 1990-93

Society for American Baseball Research, 1992-present

- Nineteenth Century Committee, 2007-present
- Origins Committee, 2007-present

PROFESSIONAL AWARDS:

Dudley Observatory's 2008 Herbert C. Pollock Award (\$5000 grant) for an innovative project in the history of astronomy or astrophysics (am researching the popular astronomy lecture tours [1842-1861] of Ormsby MacKnight Mitchel, director of the Cincinnati and Dudley observatories and later a Union general during the U.S. Civil War)

Second Prize, 2006 Boeing Science Writing Contest, conducted by the Griffith Observatory in Los Angeles (for the essay " 'Providence ... will send us a fitting telescope ... just at the right time': The Founding of Amherst College's Lawrence Observatory and the Postponed Acquisition and Installation of Its 7.25-Inch-Aperture Clark Refractor")

Co-winner, National Space Club's 1989 Robert H. Goddard Historical Essay Award (for the essay "Planetary Exploration at the Brink: The Administration Debate over the FY 1983 NASA Budget") (co-winner, for a separate essay, was former Secretary of the Air Force Edward Aldridge)

RESEARCH PUBLICATIONS:

- "Negotiating a Worldwide Space Communications Network: NASA's Discussions with the Australian and South African Governments for the Establishment of Overseas Deep Space Instrumentation Facilities, 1958-1960," *Antenna: Newsletter of the Mercurians, Special Interest Group, Society for the History of Technology*, vol. 21, no. 1 (October 2008), 6-11
- "Providence ... will send us a fitting telescope ... just at the right time": The Founding of Amherst College's Lawrence Observatory and the Postponed Acquisition and Installation of Its 7.25-Inch-Aperture Clark Refractor," *The Griffith Observer*, August 2007
- "Going to the Moon instead of just going into orbit," *Air Power History*, 54, no. 1 (Spring 2007), 22-37 (on the origins of the U.S. solar-system exploration program, particularly the Pioneer lunar-probe attempts in 1958-1959)
- "Astronomy and Geography vs. Navigation: Defining a Role for an American Nautical Almanac, 1844-1850," pp. 83-128 in *Proceedings, Nautical Almanac Office Sesquicentennial Symposium, U.S. Naval Observatory, March 3-4, 1999*, ed. by Alan D. Fiala and Steven J. Dick (Washington: U.S. Naval Observatory, 1999)
- "Project Echo, Goldstone, and Holmdel: Communications as Viewed from the Ground Station," pp. 41-51 in *Beyond the Ionosphere: Fifty Years of Satellite Communication*, ed. by Andrew J. Butrica (NASA SP-4217) (Washington: US Government Printing Office, 1997) [available online at <http://history.nasa.gov/SP-4217/ch5.htm>]
- "A History of Project Galileo, Part 1: The Evolution of NASA's Early Outer-Planet Exploration Strategy, 1959-1972," *Quest: The Magazine of Spaceflight*, 5, No. 1 (1996), 4-19 (on the origins of the Pioneer and Voyager outer-planet space probes)
- "Clairaut and the Motion of the Lunar Apse: The Inverse-Square Law Undergoes a Test," chapter 16 in *The General History of Astronomy*, vol. 2 (Planetary Astronomy from the Renaissance to the Rise of Astrophysics), part B (The Eighteenth and Nineteenth Centuries), ed. by René Taton and Curtis Wilson (Cambridge, New York, and Melbourne: Cambridge University Press, 1995)
- "Predicting the Mid-Eighteenth-Century Return of Halley's Comet," chapter 19 in *The General History of Astronomy*, vol. 2 (Planetary Astronomy from the Renaissance to the Rise of Astrophysics), part B (The Eighteenth and Nineteenth Centuries), ed. by René Taton and Curtis Wilson (Cambridge, New York, and Melbourne: Cambridge University Press, 1995)
- "Designing America's Initial 'Deep Space Networks': The Choices of Antenna Design, Operating Frequency, and Antenna Location for Supporting the Pioneer Lunar-Probe Attempts of 1958-59," *IEEE Antennas and Propagation Magazine*, **35**, no. 1 (February 1993), 49-57; also in *Wescon/92 Conference Record* (Ventura, California: distributed by Western Periodicals Company, 1992), pp. 813-19 [available online at <http://ieeexplore.ieee.org/iel4/74/5479/00210830.pdf>]
- "The Origin of the Goldstone Complex," *TDA Tracker*, **1**, no. 3 (Autumn 1991), 4-5
- "The First International Halley Watch: Guiding the Worldwide Search for Comet Halley, 1755-59," pp. 373-411 in Norman J.W. Throver (ed.) *Standing on the Shoulders of Giants: A Longer View of Newton and Halley* (Berkeley, Los Angeles, and Oxford: University of California Press, 1990)
- "Tales from the First International Halley Watch (1755-59): 2. Thomas Stevenson of Barbados and his Two-Comet Theory" (with Stephen Skinner), *International Halley Watch Newsletter*, no. 10 (1 September 1987), pp. 3-9
- "Tales from the First International Halley Watch (1755-59): 1. Boston Waits for and Watches the Comet," *International Halley Watch Newsletter*, no. 9 (1 September 1986), 16-26
- "Comet Halley's First Expected Return: English Public Apprehensions, 1755-58," *Journal for the History of Astronomy*, **17**, pt. 1 (February 1986), 1-37
- "Charles Henry Davis, 'The Foundation of the American Nautical Almanac, and the Establishment of an American Prime Meridian,'" *Vistas in Astronomy*, **28** (1985), 61-66
- "Isaac Newton, the Motion of the Lunar Apogee, and the Establishment of the Inverse-Square Law," *Vistas in Astronomy*, **20** (1976), 93-103
- "Alexis Clairaut and his Proposed Modification of Newton's Inverse-Square Law," pp. 328-35 in Centre International de Synthèse (ed.), *Avant, Avec, Après Copernic: La représentation de l'Univers et ses conséquences épistémologiques* (Paris: Librairie Scientifique et Technique Albert Blanchard, 1975)

DOCTORAL DISSERTATION:

- "Universal Gravitation and the Motion of the Moon's Apogee: The Establishment and Reception of Newton's Inverse-Square Law, 1687-1749," The Johns Hopkins University, 1976; abstract in *Dissertation Abstracts International*, **37**, no. 4 (1976), 2388A-2389A

MAGAZINE-ARTICLE PUBLICATIONS:

"The Case of the Pilfered Planet: Did the British Steal Neptune?" (with William Sheehan and Nicholas Kollerstrom), *Scientific American*, **291**, no. 6 (December 2004), 92-99 [available online at <http://www.sciam.com/article.cfm?articleID=000CA850-8EA4-119B-8EA483414B7FFFE9F>]

"The road to the Deep Space Network," *IEEE Spectrum*, **30**, no. 4 (April 1993), 50-57

"The Struggle for the Outer Planets," *Astronomy*, **17**, no. 9 (September 1989), 44-52

REFERENCE-WORK PUBLICATIONS:

Updated article on "Airy, George Biddell" for the *New Dictionary of Scientific Biography* (Charles Scribner's Sons, 2007)

Articles on "Baldwin, Ralph Belknap," "Fixmillner, Placidus," "Shakerley, Jeremy," and "Wing, Vincent," in *A Biographical Encyclopedia of Astronomy*, ed. by Thomas Arnold Hockey (Kluwer Academic Publishers, in press)

Articles on "Adams, John Couch," "Baily, Francis," "Challis, James," and "Glaisher, James," in *Dictionary of Nineteenth-Century British Scientists*, ed. by Bernard Lightman (Thoemmes Continuum, 2004)

Article on "Jet Propulsion Laboratory," in *The History of Science in the United States: An Encyclopedia*, ed. by Marc Rothenberg (New York: Garland Publishing Company, 2001)

Articles on "Almanacs, Astronomical", "Jet Propulsion Laboratory, Astronomy at", and nine 18th-century astronomers, *Encyclopedia of the History of Astronomy*, ed. by John Lankford (Garland Publishing Company, 1997)

Articles on "Adams, John Couch," and "Constellation" in *Collier's Encyclopedia*, ed. by Bernard Johnston (New York, Toronto, and Sydney: Collier's, 1997)

Articles on "Nautical Almanac," "Nuffield Radio Astronomy Laboratories," "Titius-Bode Law," "Voyager," and 14 other topics in the *Academic American Encyclopedia* (originally published in print by Arete Publishing Company [Princeton, N.J., 1980]; later published online as the *Grolier Multimedia Encyclopedia*)

BOOK REVIEWS:

Mary Terrall, *The Man Who Flattened the Earth: Maupertuis and the Sciences in the Enlightenment* (2002), *Journal for the History of Astronomy*, **35**, pt. 3 (August 2004)

"Selling Time in the United States," *Journal for the History of Astronomy*, **33**, pt. 4 (November 2002), 398-399 [review of Ian R. Bartky's *Selling the True Time: Nineteenth-Century Timekeeping in America* (2000)]

Robert S. Kraemer, *Beyond the Moon: A Golden Age of Planetary Exploration 1971-1978* (2000), *Quest: The History of Spaceflight Quarterly*, **9**, no. 4 (2002), 62

"A Prime Meridian for the United States?," *Journal for the History of Astronomy*, **32**, pt. 2 (May 2001), 157-159 [essay review of Silvio A. Bedini's *The Jefferson Stone: Demarcation of the First Meridian of the United States* (1999)]

William Lowell Putnam and others, *The Explorers of Mars Hill: A Centennial History of Lowell Observatory* (1994), *Sky & Telescope*, **87**, no. 7 (July 1994), 62-64

Joseph N. Tatarewicz, *Space Technology and Planetary Astronomy* (1990), *Isis*, **83**, no. 4 (December 1992), 690-91

"How the Space Telescope Came to Be," *Journal for the History of Astronomy*, **22**, pt. 3 (August 1991), 250-52 [review of Robert W. Smith's *The Space Telescope: A Study of NASA, Science, Technology, and Politics* (1989)]

"Bibliographies of Halley's Comet," *Journal for the History of Astronomy*, **17**, pt. 1 (February 1986), 60-62 [review of Ruth Freitag's *Halley's Comet: A Bibliography* (1984) and Bruce Morton's *Halley's Comet, 1755-1984: A Bibliography* (1985)]

"Einstein books," *Physics Today*, **33**, no. 9 (September 1980), 70-71, 74-76 (collective review of eight books published during the centennial of Albert Einstein's birthyear)

"Newton and the Motion of the Moon," *Centaurus*, **21** (1977), 64-75 [essay review of I. Bernard Cohen's *Isaac Newton's Theory of the Moon's Motion (1702)* (publ. in 1975)]

Eric G. Forbes (ed.), *The Euler-Mayer Correspondence (1751-1755): A New Perspective on Eighteenth-Century Advances in the Lunar Theory* (1971), *Isis*, **64** (December 1973), 552-54

BOOK MANUSCRIPT ACQUISITIONS (all for Columbia University Press in 1982-1984):

Richard Berendzen, Richard Hart, and Daniel Seeley, *Man Discovers the Galaxies* (Morningside Book reprint) (history of early 20th-century galactic research)

Eric Burgess, *Venus: An Errant Twin* (history of U.S. & U.S.S.R. space exploration of Venus)

David Fisher, *The Creation of the Earth* (history of theories of the origin of the Earth and the solar system)

Richard S. Lewis, *The Voyages of Columbia: The First True Spaceship* (history of the development and early missions of the space shuttle)

James E. McClellan III, *Science Reorganized: Scientific Societies in the 18th Century*

Alcestis Oberg, *Spacefarers of the '80s and '90s: The Next 1000 People into Space* (shuttle astronaut experience)

John Allen Paulos, *I Think, Therefore I Laugh: An Alternative Approach to Philosophy* (humor and philosophy, especially logic)

Derek J. de Solla Price, *Little Science, Big Science, and Beyond* (2nd expanded edition of *LSBS*) (social studies of science)

Bas Van Frassen, *An Introduction to the Philosophy of Time and Space* (Morningside Book reprint)

George Wise, *Willis R. Whitney and the Origins of American Industrial Research* (biography of first director of America's first industrial research laboratory, at General Electric)

SCIENCE-NEWS PUBLICATIONS (all in *Physics Today*):

"Japan and US seek joint coal and fusion efforts," May 1979, p. 116

"DOD budgets for 13% boost in research," May 1979, pp. 114 & 116

"NASA budget has no new programs," April 1979, pp. 79-80

"APS March Meeting in Chicago," March 1979, pp. 56-58

"Administration pushes alternative nuclear fuel cycles," February 1979, pp. 85-87

"DOD signals interest in more innovative research," January 1979, pp. 117-20

"APS & AAPT meet in New York," January 1979, pp. 54-58

"DOE uses science-court concept; Minnesota does not," November 1978, pp. 93-94 & 96

"US and Japan discuss joint fusion projects," November 1978, pp. 93 & 96

"Field heads NAS study of astronomy, astrophysics," October 1978, p. 95

"Galt panel urges DOD to support basic research," October 1978, pp. 93 & 95-96

"Foster group urges more engineering, more physics of fusion," September 1978, pp. 85-86

"Panel advocates more basic research throughout DOE," September 1978, pp. 85-86 & 88

"DOE is funding young high-energy physicists," August 1978, pp. 70-71

"NSF panel urges creation of jobs for young physicists," August 1978, pp. 69-70

"Nuclear-science panel makes recommendations for FY 1980," August 1978, pp. 69 & 71-72

"Deutch wants more DOE support for university research," July 1978, pp. 61-63 (interview of John M. Deutch, director of the Department of Energy's Office of Energy Research)

"Fusion computer center expands at Livermore," July 1978, p. 19

"Krumhansl says NSF underfunds physical sciences," June 1978, pp. 61 & 63-64 (interview of James A. Krumhansl, assistant director of the National Science Foundation)

"New NBS director plans to restore scientific strength," May 1978, pp. 101-02 (interview of Ernest Ambler, director of the National Bureau of Standards)

"Physics research gains in Defense budget," May 1978, pp. 101-04

"Budget for Department of Energy emphasizes construction," April 1978, pp. 77-79

"Panel promotes electron-beam studies of nucleus," April 1978, pp. 18-20

"Lindenbaum sees economic gains from high-energy physics," March 1978, pp. 101-02 (interview of physicist)

"President requests more support for R&D at NSF and NASA," March 1978, pp. 101 & 103-04

"Historic accelerators in show at Smithsonian," February 1978, p. 79

"Panel studies basic research in Department of Defense," February 1978, pp. 77-78

"DOE and NSF set up joint nuclear-science committee," February 1978, pp. 77 & 80

"Panel recommends pulsed high-flux neutron facility," February 1978, pp. 17-18

"NBS problems come under Congressional scrutiny," January 1978, pp. 101-02

PUBLIC SPEAKING - papers connected with research presented at:

Nineteenth Annual Meeting, Antique Telescope Society, University of Virginia, Charlottesville, Virginia, 10-12 September 2010

Annual Meeting, Society for the History of Technology, Pittsburgh, Pennsylvania, 15-18 October 2009 (invited paper)

Ninth Biannual History of Astronomy Workshop, University of Notre Dame, South Bend, Indiana, 8-12 July 2009 (organized, and presented paper in, "Episodes in the Nineteenth-Century Popularization of Astronomy" session)

Sixteenth Annual Meeting, Antique Telescope Society, Roper Mountain Science Center, Greenville, South Carolina, 14-17 September 2007

Eighth Biannual History of Astronomy Workshop, University of Notre Dame, South Bend, Indiana, 25-29 July 2007

Euler 2006 Conference, College of Saint Rose, Albany, New York, 30 July-2 August 2006

"History of Space Science" session, Historical Astronomy Division, 207th Meeting of the American Astronomical Society, Washington, D.C., 8 January 2006

Fourteenth Annual Meeting, Antique Telescope Society, Cincinnati, Ohio, 7-10 October 2005 (keynote speaker)

Euler 2005 Conference, Roger Williams University Residence and Conference Center, Portsmouth, Rhode Island, 7-10 August 2005

Thirteenth Annual Meeting, Antique Telescope Society, Nantucket, Massachusetts, 22-24 October 2004

Euler 2003 Conference, Roger Williams University Residence and Conference Center, Portsmouth, Rhode Island, 10-13 August 2003

Sixth Biannual History of Astronomy Workshop, University of Notre Dame, South Bend, Indiana, 19-22 June 2003

Bowditch Institute Conference: Nathaniel Bowditch and the Art & Science of Navigation, 1802-2002, Salem State College, Salem, Mass., 8-9 November 2002

Euler 2k + 2 Conference: Countdown to the Tercentenary, Rumford, Maine, 4-7 August 2002

"New Views of Historical Research in the 21st Century" session, Historical Astronomy Division, 199th Meeting of the American Astronomical Society, Washington, D.C., 6 January 2002

Fifth Biannual History of Astronomy Workshop, University of Notre Dame, South Bend, Indiana, 5-8 July 2001

Nautical Almanac Office Sesquicentennial Symposium, U.S. Naval Observatory, Washington, D.C., 3-4 March 1999 (invited lecture)

LeRoy E. Doggett Memorial Session, Historical Astronomy Division, 191st Meeting of the American Astronomical Society, Washington, D.C., 6 January 1998 (invited lecture)

Second Biannual History of Astronomy Workshop, University of Notre Dame, South Bend, Indiana, 22-25 June 1995

First Biannual History of Astronomy Workshop, University of Notre Dame, South Bend, Indiana, 24-27 June 1993

"The Political Process in Systems Architecture Design" course, University of Southern California, Los Angeles, 27 April 1993 (guest lecture)

"The Early Days of Computers, Transistors, and Radio Test-and-Measurement, and Space Program Antennas" session, Wescon/92 conference (sponsored by the Los Angeles and San Francisco Bay Area Councils, Institute of Electrical and Electronics Engineers, and the Southern California and Northern California Chapters, Electronics Representatives Association), Anaheim, California, 19 November 1992

Joint Meeting, Historical Astronomy Division and Division of Dynamical Astronomy, American Astronomical Society meeting, Chicago, Illinois, 4 June 1992

Northeast Y's Men's Club, Los Angeles, California, 27 January 1992

Historical Interest Group, South African Institute of Electrical Engineers, Johannesburg, South Africa, 20 November 1991

Public lecture, Royal Society of South Africa, Cape Town, South Africa, 18 November 1991

NASA History Symposium, NASA Goddard Space Flight Center, Greenbelt, Maryland, 8 November 1991

"History of Planetary Science" session, American Astronomical Society Division of Planetary Sciences, 22nd annual meeting, Charlottesville, Virginia, 22 October 1990 (invited paper)

Colloquium, School of Science & Technology Studies, University of New South Wales, Kensington, N.S.W., Australia, 5 October 1990

Australian Association for the History, Philosophy, and Social Studies of Science, annual conference, Lorne, Victoria, Australia, 26 September 1990

Colloquium, Department of Social Studies of Science, School of Humanities, Deakin University, Geelong, Victoria, Australia, 24 September 1990

Colloquium, Department of History and Philosophy of Science, University of Melbourne, Melbourne, Victoria, Australia, 18 September 1990

"National Observatories: Origins and Functions (The American Setting)" session, American Astronomical Society meeting, Washington, D.C., 14 January 1990 (invited paper)

"Are We Asking the Right Questions? (Issues in the History of Space Astronomy)" session, Commission 41, International Astronomical Union, 20th General Assembly, Baltimore, Maryland, 6 August 1988 (invited paper)

Institute for Astronomy and Consortium of Science Humanists Brown Bag Luncheon Colloquium, University of Hawaii, 22 March 1988

NASA History Symposium, NASA Goddard Space Flight Center, Greenbelt, Maryland, February 1988

Historical Astronomy Division session, American Astronomical Society meeting, Pasadena, California, January 1987

Colloquium, Department of Philosophy, University of Western Ontario, London, Ontario, Canada, October 1986 (invited lectures)

History of Science Society annual meeting, Pittsburgh, Pennsylvania, October 1986 (invited paper)

Colloquium, Department of the History of Science, The Johns Hopkins University, Baltimore, Maryland, 26 February 1986 (invited lecture)

NASA History Symposium, NASA Goddard Space Flight Center, Greenbelt, Maryland, February 1986

East Bay Astronomical Society, Oakland, California, January 1986 (invited lecture)

"Newton and Halley, 1686-1986" conference, William Andrews Clark Memorial Library, University of California, Los Angeles, August 1985 (invited paper)

International Union of History and Philosophy of Science international congress, Berkeley, California, August 1985

Astronomical Society of the Pacific annual meeting, Flagstaff, Arizona, June 1985

Historical Astronomy Division session, American Astronomical Society meeting, Tucson, Arizona, January 1985

"Longitude Zero" symposium, National Maritime Museum, Greenwich, England, July 1984

Colloquium, Institute for the History and Philosophy of Science and Technology, University of Toronto, Toronto, Ontario, Canada, April 1984

Midwest Junto meeting, University of Notre Dame, South Bend, Indiana, March 1976

Royal Greenwich Observatory Tercentenary symposium, National Maritime Museum, Greenwich, England, July 1975

Midwest Junto meeting, Indiana University, Bloomington, April 1974

History of Science Society annual meeting, San Francisco, California, December 1973

Colloquium, Institute for the History of Science, University of Aarhus, Denmark, November 1973

Copernicus anniversary conference, Paris, France, June 1973

History of Science Society annual meeting, Washington, D.C., December 1972