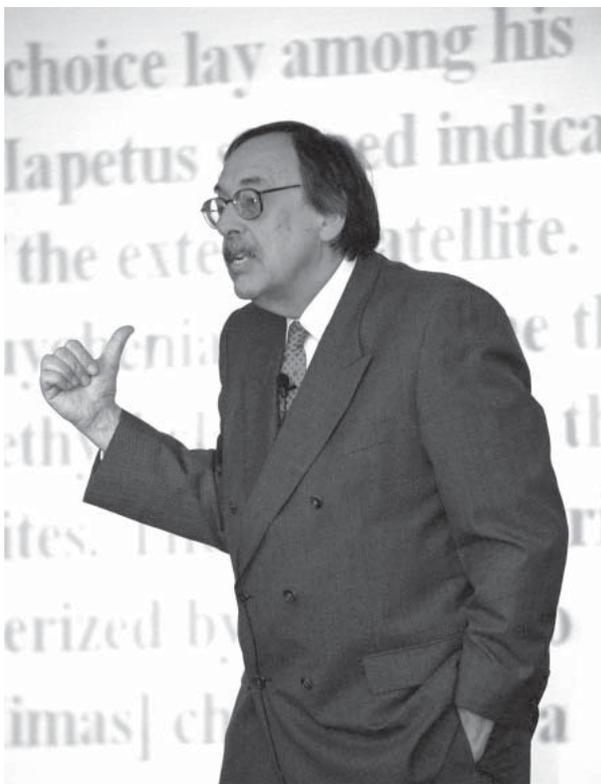


Dibner Library **NEWS**

Spring-Summer 2005
Vol.5, No.2

A NEWSLETTER FROM THE DIBNER LIBRARY OF THE HISTORY OF SCIENCE AND TECHNOLOGY

Albert Van Helden and the 2004 Dibner Library Lecture



On October 27, Dr. Albert Van Helden, author and professor of history of science at Utrecht University, Netherlands, delivered the 2004 Dibner Library Lecture, "Huygens' Rings, Cassini's Division, and Saturn's Family: The First Explorations of the Solar System." It was a particularly timely lecture as the Cassini-Huygens spacecraft had gone into orbit around the planet Saturn in July, and the day before the lecture, the Cassini craft made its first close pass by

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Resident Scholar Program 2007

The Smithsonian Institution Libraries' Dibner Library Resident Scholar Program awards stipends of \$2,500 per month for up to six months to individuals working on a topic relating to collections in the Dibner Library of the History of Science and Technology. Historians, librarians, doctoral students, and post-doctoral scholars are invited to apply for calendar year 2007. Deadline **March 1, 2006**.

The strengths of the Dibner Library collection are in the fields of mathematics, astronomy, classical natural philosophy, theoretical physics (up to the early twentieth century), experimental physics (especially electricity and magnetism), engineering technology (from the Renaissance to the late nineteenth century), and scientific apparatus and instruments.

Successful applicants for the Dibner Library Resident Scholar Program must make substantial use of the materials housed in the Dibner Library of the History of Science and Technology. Scholars are expected to be in residence at the Smithsonian Institution in Washington, D.C. full-time during their award tenures.

Three Ways to Obtain an Application Form

- ❖ **Download** the form from the Smithsonian Libraries' Web site (www.sil.si.edu)
- ❖ **Email** SILResidentScholars@sil.si.edu to request the form.
- ❖ **Call** (202) 633-3872 to request the form.



Smithsonian Institution Libraries

Van Helden, *continued*

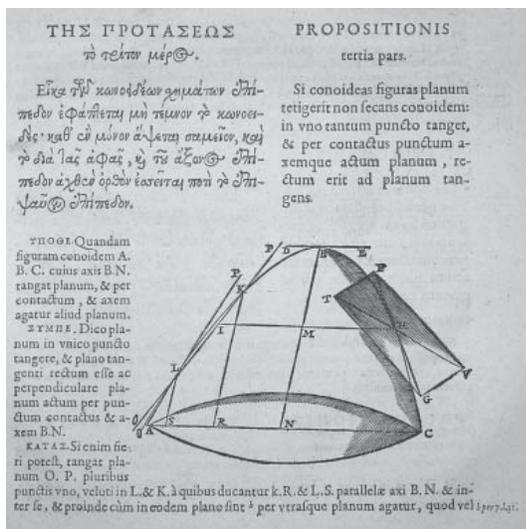
Saturn's largest moon, Titan. Cruising by at a distance of only 1,200 kilometers (750 miles), the spacecraft's radar provided the first detailed glimpses of the moon's mysterious surface. The publicity of the NASA mission may have helped bring in the crowds as nearly one hundred people came to the Carmichael Auditorium in the National Museum of American History's Behring Center to hear Dr. Van Helden's lecture. In his talk and illustrative presentation, Dr. Van Helden told the story of early telescopes and also discussed the eyes and brains behind these new and powerful instruments. Human emotions of ambition, pride, envy and prejudice were involved in a community in which reputation was everything. As knowledge of the planets developed, individual personalities of the explorers on Earth were, and continue to be, equally fascinating. Christiaan Huygens (1629–1695) discovered Saturn's first satellite, Titan, in 1655, and three years later published his celebrated ring-hypothesis to explain Saturn's enigmatic appearances. Giovanni Domenico Cassini found four more satellites of Saturn and discovered the gap in

the ring named after him. Today, Cassini and Huygens are honored internationally as namesakes of the NASA space probe to Saturn. The lecture was videotaped and is now available at the Smithsonian TV web site at http://smithsonian.tv/videos/SIL/2004-10-27_SIL_Huygen.htm. The lecture will also appear in published form later in 2005.

Begun in 1992, the Dibner Library Lecture is held annually and features a distinguished scholar who has made significant contributions to his or her field of study. Previous lecturers include: Ken Alder, author and professor at Northwestern University, Anthony Grafton of Princeton University and contributing editor to *The New Republic*, and Steven J. Dick of the U.S. Naval Observatory. Copies of the lectures are available from the Director's Office, Smithsonian Institution Libraries, P.O. Box 37012, National Museum of Natural History, Room 22, MRC 154, Washington, D.C. 20013-7012. Telephone: (202) 633-2240. They are also posted online at www.sil.si.edu/digitalcollections/browse.htm. The lecture series and its publications are made possible by the generous support of The Dibner Fund.

Selected New Acquisitions

The Dibner Library obtained a number of new items for the collection last year. Here are a few examples to illustrate the wide variety of topics represented in the Library.



From Archimedes' work on conoids and spheroids in his *Opera quae extant* (1615)

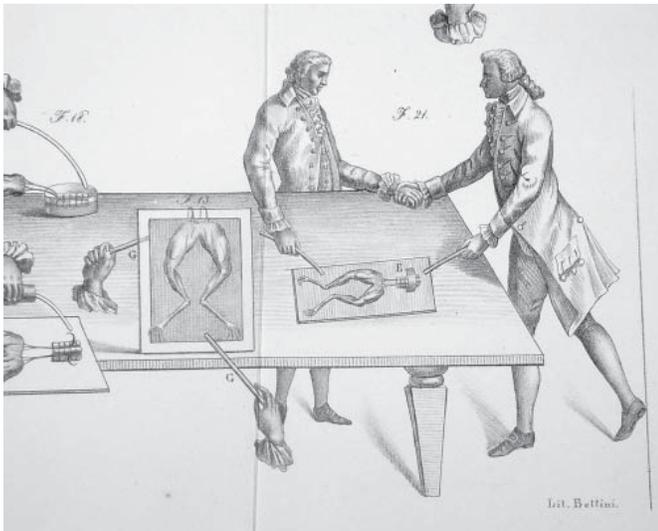
Archimedes is widely regarded as the greatest mathematician of ancient Greece. He lived in the Greek city-state of Syracuse on the island of Sicily and became quite famous

for his mathematical and engineering skills and not just, as the story goes, for running down the street naked shouting “Eureka!” Unfortunately, many of his works did not survive over the centuries and only a handful of them were known to exist by the time the printing press revolution came about. Nevertheless, those few works were enough to resurrect Archimedes’ fame and influence and they had a great impact on the development of the scientific revolution. The Dibner Library has a fine set of the works of Archimedes including the 1543 incomplete works edited by Niccolò Tartaglia, the exceptional 1544 Latin and Greek edition of the *Opera, quae quidem extant, omnia* edited by Thomas Venetorius, the 1558 Latin edition produced by Federico Commandino, the 1670 German translation by Johann Sturm, and the 1675 Latin edition produced by Isaac Barrow. The obvious missing link here is David Rivault’s important 1615 Latin and Greek edition of the *Opera quae extant* (printed in Paris by Claude Morel), which was extremely influential as well as being a nicely illustrated work. We now have purchased for the Library a copy of Rivault’s edition, a work that was used by such notable mathematicians as René Descartes (1596–1650) and Pierre de Fermat (1601–1665) and had a major impact

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New Acquisitions, *continued*

on the spread of Archimedes' ideas in the 17th century. It contains the Greek text with a Latin "trot" running alongside and has extensive exegetical notes. It was still regarded as the best edition in 1670 when Sturm made his translation. Mathematician, courtier as well as man of letters, Rivault (1571–1616) was an intimate of the great classical scholars Casaubon and Scaliger. He was tutor to the young Louis XIII but lost his job when he beat the King's dog for continually interrupting their lessons (good for Louis!).



Two men and a frog's legs completing an electric circuit from Galvani's *Opera* (1841).

Luigi Galvani is a major figure in the history of electricity, due to his research into what he called "animal electricity" which led to the development of the electric pile, or battery, by Alessandro Volta. Galvani studied comparative anatomy in Bologna and in the 1770s began to do research on the effects of electrical stimulation on the muscles of animals. He had success in getting frogs' legs to twitch and eventually came to the conclusion that there was a special form of electricity that was produced in the brain and conducted through the nerves to the muscles and organs allowing them to move and perform their vital functions. He finally announced the results of his work in 1791 in his publication *De viribus electricitatis in motu musculari commentarius* (Commentary on the effect of electricity on muscular motion). Galvani had some twelve special copies of this work printed for private distribution to others and the Dibner Library has one of these, the copy that Galvani sent to Volta. While his colleagues accepted Galvani's concept of animal electricity, Volta felt differently and concluded that Galvani's use of dissimilar metals created the electric current that caused the frogs' muscles to twitch, and this led to his

development of the battery. While the Dibner Library has a number of Galvani's important publications, we lacked the important volume of his *Opera edite ed inedite* (Bologna, 1841), an odd thing considering the strong collection in electromagnetic works in the library. We are happy to report that we have now obtained this posthumous collection of his published and unpublished works and it is now happily ensconced in our air-conditioned rare book vault. Our new copy is a particularly nice one in a well-made contemporary binding. The paper is in excellent condition with the pages in an uncut state and many of the sheets still unopened.



The grim countenance of Giuseppe Alberti from his *Trattato* (1757)

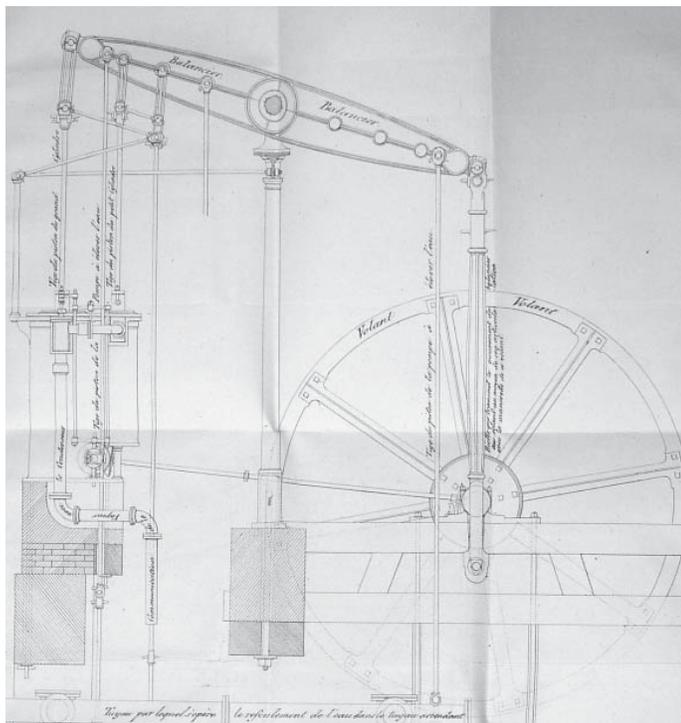
To add to our mathematical and engineering holdings, the Dibner Library obtained an exceptional copy of Giuseppe Antonio Alberti's *Trattato della misura delle fabbriche* (Treatise of measurement in construction) (Venice, 1757). Alberti was an important engineer for the Vatican in the 18th century and in this position he had an enormous influence on Italian civil engineers. The book is a significant work on stereometry, which is about the measurements of the volume of various solid figures, such as cylinders, spheres, and wine casks. In it he demonstrates various methods for measuring and estimating the quantities and

Continued on page 4

New Acquisitions, *continued*

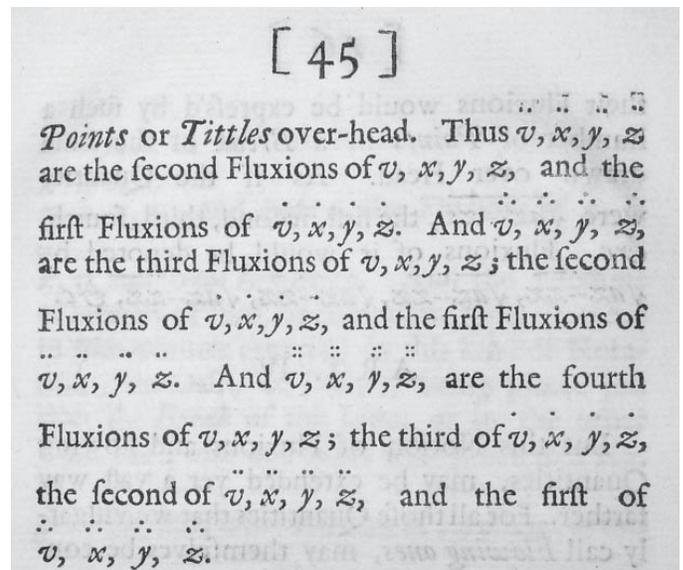
costs of materials for various spaces and structures, including the many intricate vaults and domes of buildings of the period. The book is a fine example of the increasing importance of sophisticated mathematics to the development of civil engineering.

We have been quite active in building up the Dibner Library's collection of early works on steam engineering in recent years and one of our most recent purchases is a book by Gaspard Riche who later became Baron de Prony (1755–1839). As a student, Prony came to the attention of the great engineer Perronet, who brought Prony to Paris to be his assistant. Over the years Prony produced several important works including the *Nouvelle architecture hydraulique* (1790–1796) and the *Mécanique philosophique* (1800), both of which are in the Dibner Library. Prony lived during turbulent times in France and survived the Revolution thanks primarily to his friendship with Lazare Carnot, the engineer and a leading member of the Committee for General Defense, the Committee of Public Safety (1793–94) and the Directory (1793–97). In 1794 Prony became professor of analysis at the newly established École Polytechnique and in 1798 he also became the director of the famed engineering school, the École des Ponts et Chaussées, from which he had graduated in 1780. In those positions Prony helped shape and develop the curriculum



Edwards' lambasted steam engine in Prony's *Rapport* (1826)

for future French engineers and became the leading engineer from 1800 to 1840. After the restoration of the monarchy, Prony remained in favor with the authorities and Charles X made him a baron. The work we obtained is his late (1826) study, *Rapport ... sur la nouvelle et l'ancienne machines à vapeur, établies à Paris, au Gros-Caillou* (Report on the new and older steam engines established in Paris at Gros-Caillou). This report was commissioned for use in the lawsuit Lecour vs. Edwards, wherein Edwards was being sued for providing a steam engine that apparently did not conform to Lecour's expectations. For this work Prony developed in full his method for determining the work produced by a machine. Prony provides us with the details of his interesting experiments and calculations, so it is quite a seminal work in the field of mechanical engineering. By the way, Prony used his method to prove that Edwards' machine performed beautifully but the masonry foundation did not allow it to perform as well as it could and it needed to be repaired and upgraded.



How to write fluxions correctly, from Ditton's *An institution of fluxions* (1726)

The Library's holdings in history of mathematics and Newtoniana were strengthened with the purchase of the second edition of Humphry Ditton's *An institution of fluxions* (1726). "Fluxions" is Isaac Newton's term for the derivatives of mathematical functions and the "method of fluxions" is essentially what we call the differential calculus. The first edition of this work appeared in 1706 and was one of the first texts on differential calculus to appear. John Clarke, an accomplished mathematician and later Dean of Salisbury Cathedral, produced this revised, corrected and improved edition twenty years later. Ditton (1675–1715)

Continued on page 6

Dibner Library Resident Scholars for 2005

The Smithsonian Libraries are pleased to have with us the following 2005 Dibner Library Resident Scholars:

Daniel G. Campos is a Ph.D. candidate in the Department of Philosophy of Pennsylvania State University. For his dissertation, “The Discovery and Growth of Mathematical Probability Theory: A Case Study in the Logic of Mathematical Inquiry,” he has been studying the method of inquiry of the early probability theorists and accounting for the origins of their concepts. He has been concentrating on the “emergent” period of probability theory, going up to the 1713 publication of Jacob Bernoulli’s landmark work, *Ars conjectandi*. For his Dibner Library project, “The Development of Mathematical Probability Theory, 1713-1812,” Mr. Campos will examine what he calls the “consolidation” period of probability theory in which calculus is applied to the theory, from Bernoulli’s work up to the appearance of Laplace’s *Théorie analytique des probabilités* in 1812. Besides the works mentioned above, Mr. Campos will examine other works by Arnauld, De Moivre, Legendre, and Gauss, as well as the many articles by Leibniz in our newly-acquired *Acta eruditorum*.

Lesley Cormack is Professor and Chair of the Department of History and Classics of the University of Alberta, Canada. As part of her continuing research, Dr. Cormack’s project is “The Molyneux Globes: Instruments, Mathematical Practitioners, and the Scientific Revolution.” She has been using the Dibner Library’s collection to investigate the complex interconnections between mathematicians, geographers, and globe and instrument makers, particularly in London. She has been using a number of pertinent works at the Dibner Library, including mathematical, geographical, and navigational texts by Varenus, Robert Recorde, Edward Wright, Peter Apian, Rembert Dodoens, Nicolas Bion, Simon Stevin, and Thomas Blundeville, among others.

Tayra Lanuza-Navarro is a Ph.D. candidate at the Institute of the History of Science and Documentation “López Piñero” of the Faculty of Medicine of the University of Valencia, Spain. Her dissertation is “Astrology, Science, and Society in Hapsburg Spain” and she expects to receive her degree later this year. At the Dibner Library Ms. Lanuza-Navarro is extending her research with her project, “Astrology and Religion in 17th-Century Spain.” At the Dibner Library she will concentrate on works that will allow her to delve deeper in the question of astrology

and religion, studying the works of ancient, medieval, and modern authors that were often cited by Spanish astrologers in the ongoing polemic between astrology and religious writers. She will examine the works in the Dibner Library of Cecco d’Ascoli, Claudius Coelestinus, Pico della Mirandola, Pierre d’Ailly, Pietro d’Abano, and Guido Bonati that are cited by Spanish authors in their defense of astrology. She will also look at the works of the Islamic astrologers Massalah, Abenragel, Al Biruni, Alcabitius, and Albumasar that were cited hundreds of times by Spanish Christian authors.

An Smets is currently a Scientific Collaborator in the Unit of Medieval History in the Faculty of Philosophy and Letters at the Catholic University of Louvain, Belgium. She is studying the “vernacularization” of medieval scientific works and her research project for her residency at the Dibner Library is “The *Liber Aggregationis*: A Case Study of Translation of Medieval Scientific Treatises.” The *Liber aggregationis* of Albertus Magnus was a very popular text that covered a variety of topics: astrology, zoology, astronomy, medicine, and physiology. More than 100 manuscript copies survive and it was translated into many vernacular languages, but no critical edition has ever been prepared for this work. For her project here, Dr. Smets will concentrate on the Dibner Library’s manuscript of an Italian translation of *Liber aggregations* for use in a critical edition. In this she will be aided by comparing the manuscript with two printed Latin texts of the same work as well as a modern English translation.

Ian G. Stewart is a Senior Fellow in the Foundation Year Program and Adjunct Faculty in the History of Science and Technology Program of the University of King’s College in Halifax, Nova Scotia, Canada. His research project at the Dibner Library will be “William Gilbert’s ‘New Philosophy Concerning Our Sublunary World’ (1651): A Critical Edition and Translation.” Dr. Stewart has been collaborating with Stephen Pumfrey (University of Lancaster, UK) on a critical edition and English translation of Gilbert’s *De mundo nostro sublunari* and it is expected to be published in 2005-6. At the Dibner Library Dr. Stewart will examine a number of works by Aristotle, Tycho, Cardano, Galen, Cornelius Gemma, Paracelsus, Pliny, Scaliger, Telesio, and others that should help in making clearer Gilbert’s sources of inspiration.

New Acquisitions, *continued from p.4*

was headed for a career in the church but upon the death of his father he was free to follow his heart and study mathematics. He came to the attention of Newton who liked him enough to recommend him as the master of the Royal Mathematical School at Christ's Hospital in West Sussex. There he would train poor boys in mathematical and scientific skills that would prove useful in navigation and trade, and thus supply apprentices to merchant and trading companies involved in the expansion of the British Empire. As a result of his collegiality with Newton, Ditton met William Whiston, Newton's protégé and successor as Lucasian professor at Cambridge (though Whiston would later be dismissed in 1710 due to his Arian heresy). Together, the two men proposed that Britain should establish a committee in 1714 to judge and award a prize for whomever could determine longi-

tude accurately at sea. That year the Board of Longitude was established and, oddly enough, Ditton and Whiston presented their prescient but impractical solution to the longitude problem: set a sequence of moored lightships along standard shipping routes and at midnight every night the lightships would send up a rocket that would be visible for 85 miles whereby passing ships could correct their watches and adjust their dead-reckoning. However, this method depended on the lightships having accurate clocks and the weather being clear, among other problems, so the Board did not think this method worthy of the prize, which was not awarded until 1773 to John Harrison for his chronometer. Ditton and Whiston's method was soundly ridiculed by Jonathan Swift and others in his Scriblerus Club and some have theorized that this public humiliation led to poor Ditton's untimely death the following year.

Transit of Venus

The Dibner Library has had a great deal of activity in the past year related to the exhibition in the Libraries' gallery outside our door. This exhibition, "Chasing Venus: Observing the Transits of Venus, 1631–2004," opened on March 24, 2004 and was scheduled to coincide with the very rare transit of Venus later that year (the last one occurred in December 1882).

The planet Venus, on rare occasions, passes directly between the earth and the sun, appearing as a small black dot on the sun's disk. Since astronomers first became aware of them in 1631, transits of Venus have fascinated astronomers because of their rarity and their potential to help scientists measure the solar system. The expeditions that set out to observe transits from remote locations paved the way for a new era of scientific exploration—yet never managed fully to unlock the transits' secrets. Chasing Venus tells the story of astronomers' pursuit of this phenomenon, through rare books and scientific instruments from the last four centuries. The exhibition was funded with the generous support of the Peter Gruber Foundation–Cosmology Prize, National Aeronautics and Space Administration, Kintera, Inc., and Fred M. Young, Jr.

Prior to the actual transit in June 2004, we hosted a series of lectures on the history of the transits. They featured a group of distinguished lecturers and all are available as streaming video on the web at www.sil.si.edu/exhibitions/chasing-venus/education.htm:



David DeVorkin and SI Libraries supporter Betty Quirk viewing a projection of the transit of Venus

- "The First Observation of a Transit of Venus: Jeremiah Horrocks and the New Astronomy" by Wilbur Applebaum, Professor Emeritus, Humanities Dept., Illinois Institute of Technology, Chicago, IL
- "Endeavour's Wake: Captain Cook and the Transit of Venus" by Richard Fisher, Director, Sun-Earth Connection Division, NASA Office of Space Science, Washington, DC
- "Transits of Venus and the American Expeditions of 1874 and 1882" by Steven J. Dick, NASA Chief Historian, National Aeronautics and Space Administration, Washington, DC

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Transit of Venus, *continued*

- “Transits of Mercury and Venus and the Solution of the Black-Drop Mystery” by Jay M. Pasachoff, Director of Hopkins Observatory and Field Memorial Professor of Astronomy, Williams College, Williamstown, MA
- “Public Reaction to the Transit of Venus, 1882” by David DeVorkin, Curator of History of Astronomy, National Air and Space Museum, Smithsonian Institution, Washington, DC
- “Between Captain Cook and Mauna Kea: The British 1874 Transit of Venus Expedition to Hawaii” by Michael Chauvin, Director of the Hawaiian Skies Program

In the early morning of June 8th, the day of the actual transit, we collaborated with the Smithsonian’s National Museum of American History and the National Air and Space Museum with a thrilling event held on the American History Museum’s roof. Along with the nearly 50 guests and staff, media representatives were in attendance including producers, reporters, writers, and photographers from CNN, *The Washington Post*, and *The New York Times*. Viewers waited anxiously for a glimpse of the transit, which could be observed starting at approximately 6:15 a.m. when the sun rose over the nearby Environmental Protection Agency building. The transit had started well before sunrise in Washington, so it would last only an hour after clearing the EPA.

Excitement at the event was heightened thanks to David S. DeVorkin, curator of astronomy at the National Air and Space Museum, who generously offered the aid of his vintage telescope. This telescope was used in one of eight American expeditions sent to observe the 1874 transit and allowed Tuesday’s observers to safely examine an indirect image of Venus by projecting it from the eyepiece onto paper. The awestruck guests watched the small black dot of Venus cross the Sun’s bright surface for more than an hour. A modern telescope and live NASA webcast were also made available so that observers could get a convenient look at Venus traversing the Sun. Refreshments were provided to the viewers including a new drink, the “transitini,” a combination of sparkling wine, tropical fruit juice, and a blueberry (to represent the black dot of Venus).

Transits of Venus occur in pairs separated by 8 years. The transit pairs happen on a cycle alternating between every 121.5 and 105.5 years. The next transit will take place on June 6, 2012. Unless we develop longevity drugs soon

after, that will be the last transit we will see, since the next one will not take place until December 11, 2117. The exhibition is planned to end after Labor Day, 2005, but it will live on long after through its web site at www.sil.si.edu/exhibitions/chasing-venus/.

Recent Gifts

The Dibner Library, like all of the other facilities in the Smithsonian Institution Libraries, has felt the pressures of having to provide its usual high quality services and programs while also caring for and augmenting its collections during difficult financial times. The Federal government’s funding of the Smithsonian Libraries has eroded over the years due to inflation, alterations in Federal spending priorities, and market fluctuations, among other factors. Fortunately there have been several very generous donations in the last year that have allowed us to engage in important programs and to take care of some of our basic needs. Our major gifts in 2004-05 related to the Dibner Library are as follows:

The Dibner Fund has continued support by funding our Resident Scholar Program, Dibner Library Lecture, and Dibner Library publications.

Fred M. Young, Jr. provided funding that we used to enhance our acquisitions budget and provide travel and training support for Dibner Library staff.

David and Frances Dibner gave the library a donation to provide support for the Dibner Library’s acquisitions.

Robert and Julie Bailey provided a gift to support the Dibner Library.

Gifts of books for the Dibner Library’s collections:

David H. DeVorkin, curator at the National Air and Space Museum, gave us some three hundred books on astronomy and cosmology from his personal library. These are presently awaiting cataloging.

Douglass F. Adams, M.D. gave us a dozen medical books that had previously belonged to Jane Blake, an American Civil War-era physician of whom Dr. Adams is a descendant. Dr. Adams also donated Dr. Blake’s diploma, medical kit and instruments to the National Museum of American History. The books are currently being cataloged.

Continued on page 8

Recent Gifts, *continued*

Ronald Wilkinson gave several books to honor the memory of Ellen Wells, a former Head of Special Collections at the Smithsonian Libraries.

Other books came from the United States Naval Observatory, Myron and Judith Kaller, Laurel Beth Stephenson (“in Memory of America’s Fallen Soldiers”), Dr. William W. Kirby-Smith, and Mrs. Agatha B. Harper.

If you would like to support the collections and the programs of the Dibner Library we would be most appreciative and you would provide major benefits for the history of science and technology at the Smithsonian Institution. Gifts can be in the form of an annual membership in the Smithsonian Libraries’ Spencer Baird Society, an unrestricted gift, an endowment, a planned gift, or a gift-in-kind of rare books. All these gifts could provide significant tax benefits for the donors in addition to being important for the future health of the Dibner Library. There are many opportunities available to help support us; for more information please contact our Development Officer, Gwen Leighty at 202-633-2875 or via email at leightyg@si.edu.

For all this and more information about us, be sure to visit the Dibner Library’s website:

www.sil.si.edu/libraries/Dibner/

Dibner Library News is published twice yearly by the Special Collections Department of the Smithsonian Institution Libraries. If you would like to be included on the mailing list for the DLN, please email us at DibnerLibrary@si.edu or send a note to:

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