



Dibner Library **NEWS**

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

KEN ALDER GIVES THE 2003 DIBNER LIBRARY LECTURE



Ken Alder discussing Jean Delambre's role in defining the length of the meter.

The 2003 Dibner Library Lecture was held on November 5th and featured Dr. Ken Alder of Northwestern University's History Department as the speaker. The lecture was "The Measure of the World," about the seven-year mission of two French astronomers to measure a part of the Earth in order to establish the length of a new universal unit, the meter. A fine historian and an excellent storyteller, Ken gave a marvelous presentation to the audience in the National Museum of American History's Carmichael Auditorium.

Despite threats of severe weather, some eighty people arrived by five o'clock for the lecture. Ken talked about the plan of the new French republic in 1792 to standardize the over 250,000 different local measurement systems used in France and to extend the new system throughout the world by using a natural unit of length as its basis. Only the World itself was universal enough to supply this standard, so the French Academy of Sciences

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Resident Scholar Program 2006

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 2006. Deadline **March 1, 2005**.

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** libmail@sil.si.edu to request the form.
- ❖ **Call** (202) 633-3872 to request the form.



Smithsonian Institution Libraries

2003 Dibner Library Lecture, continued...

decided to measure the distance from the North Pole to the Equator and make the meter one ten-millionth of this amount. Thus in 1792, during the height of the Revolutionary Wars, two astronomers, Mechain and Delambre, set out to measure the distance from Dunkirk to Barcelona and then extrapolate that to the North Pole and Equator. Ken then talked about how their work resulted in an official meter but also discussed the long-kept secret that cast a shadow over the fundamental basis of the metric system.

Ken illustrated the lecture with visuals from books and manuscripts in the Dibner Library, including the great publication that announced the results of the expedition, *Base du système métrique décimal, ou, Mesure de l'arc du méridien : compris entre les parallèles de Dunkerque et Barcelone, exécutée en 1792 et années suivantes* (Paris: 1806-1843), and a letter from Delambre in 1796 asking for more money to complete the measurements.



Borda repeating circle used by Mechain and Delambre, from *Base du système métrique*.

The Lecture ended at 6 PM and was followed by a reception in the museum's Presidential Reception Suite where the newly published paperback copy of Ken's book, *The Measure of All Things : the Seven-Year Odyssey and Hidden Error That Transformed the World*, (Free Press, 2002) was available for people to buy. Everyone enjoyed the tasty food and great conversation while Ken answered more questions about the meter and signed copies of his book.

Dibner Library Resident Scholars for 2004

Mr. Daniele Cozzoli is a Ph.D. candidate at the Department of Philosophical and Epistemological Studies of the University of Rome "La Sapienza." For his dissertation, titled "Descartes' concept of proof," he has been working closely with the faculty of the noted Centre Koyré of the Ecole des Hautes Études en Sciences in Paris. For his BA thesis on revolutions in mathematics, he spent three months at King's College London. His proposed research at the Dibner Library is "Optics and Scientific Method in Britain from Hobbes to Newton." He is particularly interested in looking at the role the study of optics played in the development of the scientific method. His dissertation on Descartes looked at the beginning of the debate on optical theories between Descartes and Fermat and their use in the development of the Cartesian scientific method. Mr. Cozzoli proposes to extend the study he began in his dissertation by moving from the French theoretical debates on optics to the British experimental research on optics. He will be spending six months with us using the rich resources in the field of optics present in the Dibner Library's collections, including works by Kepler, Gassendi, Hobbes, Molyneux, and Newton.

Dr. Cibelle Celestino Silva is currently a postdoctoral fellow at the Group of History and Theory of Science of the Gleb Wataghin Physics Institute of the State University of Campinas, Brazil. She has published a number of papers with her advisor, Dr. Roberto de Andrade Martins, and is a promising young scholar in the history of physics. Her dissertation, produced at the State University of Campinas in 2002, was "From Force to Tensor: Evolution of the Physical Conception and Mathematical Representation of the Electromagnetic Field." At the Dibner Library she proposes to extend her studies back to the eighteenth century in her project, "Unraveling the Hidden Electrical Fluids: The Debate

Between Nollet, Dutour, and Franklin." She is particularly interested in studying the details of the debate between Nollet and Franklin on whether electricity was the product of the action of one or two fluids. During her four months in residence, she will be studying the printed works of Beccaria, Dutour, Franklin, Nollet, Priestley, William Watson, and Benjamin Wilson, and the voluminous correspondence between Dutour and Nollet, consisting of some 100 letters on electrical experimentation written between 1742 and 1770.

Mr. Michael E. Chauvin is currently the director of the Hawaiian Skies program, an astronomy education program aimed at promoting and teaching the richness of Hawaiian-based astronomy to school children and tourists. He received an M.Phil. from the Department of the History and Philosophy of Science at Cambridge University in 1988 with his thesis, "Issues in 20th-century Cosmology: Closing Pandora's Box." He has published several works on the history of astronomy with an emphasis on Hawaiian-based astronomy. One of his works-in-progress is a book, *Before Mauna Kea: Astronomy in Hawaii from Ancient to Modern Times*, and his research project at the Dibner Library will form a part of this larger work. With his residency project, "Before Mauna Kea: Astronomy in Hawaii in the 19th-century," he will work on a period of Hawaiian astronomy that has not received much attention until now. Part of his two months in residence will be spent in looking at the works that were instrumental in astronomy education on the islands, such as the works of Denison Olmsted and Nathaniel Bowditch. Additional time may be spent with the Library's collection of the correspondence of G. B. Airy and other British astronomical works on fleshing out the details of the 1874 British expedition to Hawaii to view the transit of Venus, a subject on which Mr. Chauvin has written extensively.

A New Look and a New Neighbor for the Dibner Library



In November 2003 the Archives Center of the National Museum of American History moved into its new home right next to the Dibner Library in the museum's first floor west wing. We are certainly happy to have our new neighbors in what was formerly space used for storage, especially as this consolidates the primary document-based research activities in the museum into one area. The adjacency of the Dibner Library, Archives Center, and the Jerome and Dorothy Lemelson Center for the Study of Invention and Innovation now strengthens the identity of research at the museum and will enable us to present to the general public a more coherent view of the importance of research at the Smithsonian.

As a result of the renovation to the space that now holds the Archives Center, the main traffic area for the public was upgraded and the Dibner Library now finally has an appropriate sign alerting everyone to the presence of the library in that space. The large 3-D letters, matching the Archives Center signage, provides a bold identity for the library while drawing the public into the Exhibition Gallery that is in the space in front of the library proper.

William Gilbert, 1544-1603

William Gilbert was a major figure in English science and medicine during the Elizabethan period. He was appointed physician to Elizabeth I in 1601 and upon her death became physician to James I in 1603. In the history of science Gilbert is best remembered for his remarkable work on magnetism, *De magnete, magneticisque corporibus, et de magno magnete tellure* (On the Magnet, Magnetic Bodies, and the Great Magnet of the Earth). Published in London in 1600, *De magnete* was an extraordinary work containing the details of Gilbert's research on the properties of the lodestone and how it interacted with the magnetic properties of the Earth. He valued experiment over traditional teachings and did much to further contemporary knowledge of magnetism. Gilbert's work had a profound impact on experimental science, and he is generally regarded as the father of the sciences of electricity and magnetism.

In honor of the quadricentennial of the death of Gilbert, it seems appropriate to spend some time looking at the Dibner Library's holdings of his printed works. *De magnete* is number fifty-four of Bern Dibner's 200 "Heralds of Science," the books and pamphlets in the Dibner Library that mark the greatest achievements in the history of science and technology. Our copy of the first edition of 1600 printed by Peter Short in London, is in fine condition, a folio bound in contemporary morocco leather with four small scallop shells stamped in gold on the extreme corners of the front and back covers. The spine has six panels with gold-stamping and the second panel has "GILBER / DE / MAGNET" stamped in gold on red morocco. Our copy was at one time owned by the scholar and statesman, Chancellor of France to Louis XIV, Henri François d'Aguesseau (1688-1751). In his 1901 English translation of *De magnete*, S. P. Thompson notes that "all known copies except one have ink corrections in several pages, particularly pp. 11, 22, 47"; the Dibner Library copy does indeed contain these corrections. Duane H. D. Roller, in his *The De magnete of William Gilbert* (1959), wrote that the corrections indicate that "Gilbert saw the edition through the press in Peter Short's Bread Street shop, near to Wingfield House." *De magnete* was printed twice more in the 17th century under the direction of Wolfgang Lochmann, a judge in Stettin, now Szczecin, Poland. These two quarto editions came out in 1628 and 1633 and the Dibner Library has copies of both, each bound in contemporary vellum. The 1628 edition has an elaborately engraved title page of which our copy, like a number of others, has the word "Authoris" instead of "Ioh: Hallewordij." According to Roller, Lochmann remaindered the pages of this edition to Johann Hallervord, a Rostock book dealer who altered the engraving. The 1633 edition is very similar to the 1628 edition, and has been mistaken for a simple reissue, but on close examination it is obvious that the 1633 version was completely reset. The engraved illustrations and preliminary matter are also quite different. There are reports of other editions of the work during this time, including editions of 1600 and 1636 from Amsterdam,

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1629 from Ferrara, and 1629 and 1638 from Frankfurt. These latter are probably either reporting errors or versions of the three known editions altered for sale at various European book fairs. No other printings of *De magnete* were done until 1892 when a facsimile of the 1600 edition was produced in Berlin through a photozincograph process. Since then two English translations have appeared, one by P. Fleury Mottelay in 1893 and Thompson's translation of 1900, and one Russian translation in 1956. The Smithsonian Libraries have all but the Russian translation.



from *De magnete* (London, 1600).

There is an interesting history to one of the more well-known illustrations in *De magnete*: the blacksmith striking a piece of iron while aligning it in a north-south direction, thus magnetizing it. William Ashworth has already written about the origins of this image in his article, "Marcus Gheeraerts and the Aesopic Connection in Seventeenth-Century Scientific Illustration," *Art Journal*, 1984, v. 44, no. 2, p. 132-138, but it is worth looking at this again to see how the



from *Viridarium moralis philosophiae* (Cologne, 1594) as reproduced in Thompson's *Notes on the De magnete* (London, 1901).

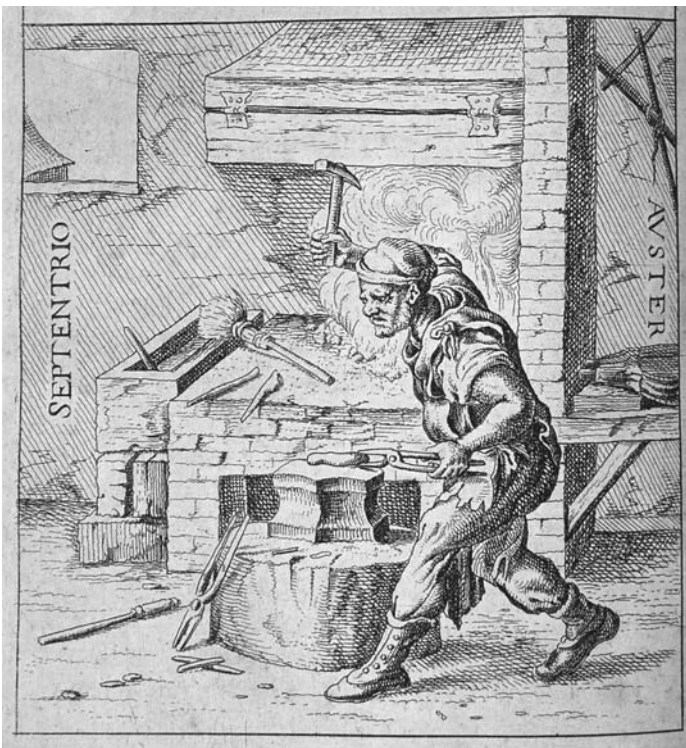
image changed over time. The famous image on page 139 in the 1600 edition is a woodcut and is reproduced here. In the 1903 notes to his 1901 translation, Thompson says that the origins of the image can be traced to a 1594 book of fables by Cornelius van Kiel, *Viridarium moralis philosophiae* (illustrated by Gheeraerts). There are some 120 copper engravings in this work and on page 133 of this book can be seen the precursor of the 1600 Gilbert image describing the fable of the industrious smith and the lazy dog. The woodblock artist for the 1600 image has just reversed the position of the smith, removed the dog, and added the Latin words for north (Septentrio.) and south (Auster). While all of the illustrations for the 1600 edition were woodcuts and printed in with the body of the text, the 1628 edition took twelve of the images and reproduced them as separate engravings to be bound in at the appropriate place in the text (although some copies appear to have all twelve engravings bound together near the front of



from *De magnete* (Stettin, 1628).

the book). The 1628 engraving of the smith is now reversed completely from the 1600 version, is extended vertically, and a compass rose is used in place of the words for north and south.

The 1633 edition's image is also a separate engraving and it is once again quite different from the others, with the smith and his tools reversed again to return to the 1600 orientation, but the forge and the background retain the 1628 orientation. Together, these four images have probably covered all the possible ways of arranging their con-



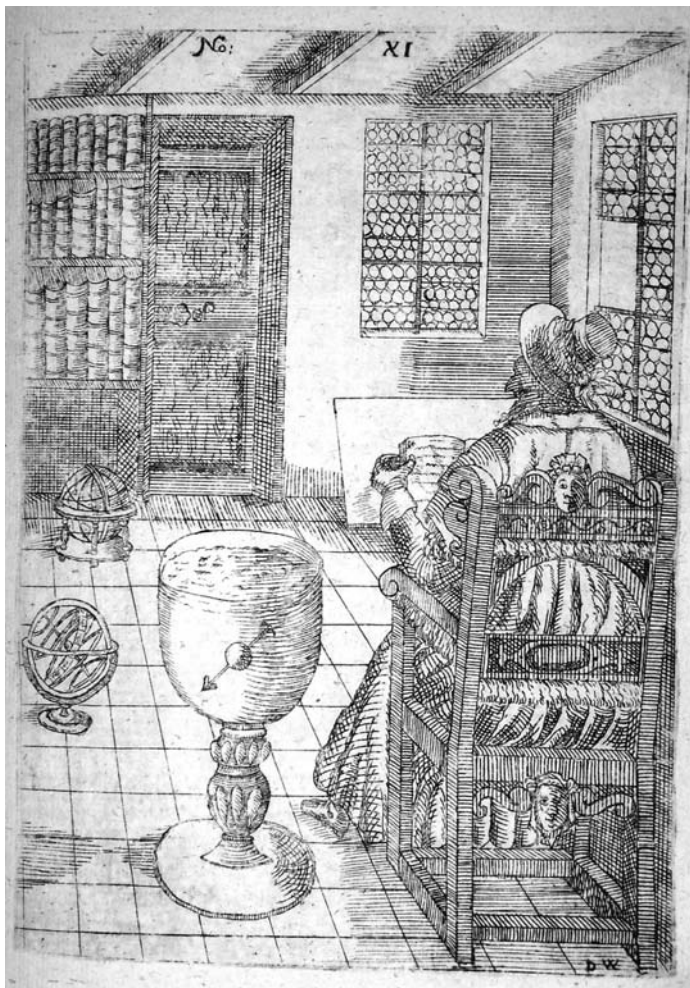
from *De magnete* (Stettin, 1633).

stituent elements. Interestingly, the 1633 image looks more like the 1594 original than any of the others.

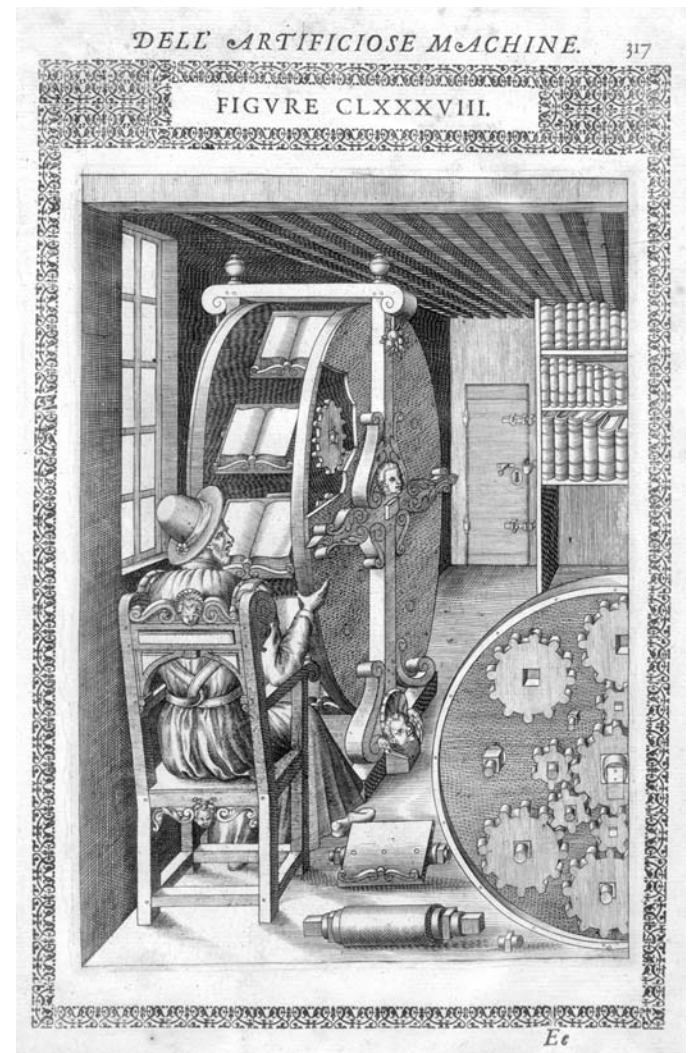
Before we leave *De magnete*, there is one other image worth noting due to its relation to another famous 16th-century engraving. If we look at the eleventh engraved plate of the 1628 edition we see an elaborate image with a simple dipping-needle immersed in a goblet of water at the lower left. By examining the rest of the image we can see that the goblet is in a room with bookshelves and a man reading a book in an elaborately decorated chair facing away from us. Now look at the famous image of the book wheel in Agostino Ramelli's *Le diverse et artificiose machine* (Paris 1588), and you will see where the 1628 engraver got the inspiration for his image. Although it is unclear why he used the Ramelli image for his model, it is essentially the same image except with the image reversed the book wheel removed.

As a final note, there is a remarkable web site devoted to Gilbert and *De magnete* that you should take some time to examine. Produced by Dr. David P. Stern, emeritus staff member at NASA's Goddard Space Flight Center, it was started in 2000 to mark the 400th anniversary of the printing of the first edition of Gilbert's great work. The URL is <http://www-istp.gsfc.nasa.gov/earthmag/demagint.htm>.

- Ronald Brashear



from *De magnete* (Stettin, 1628)

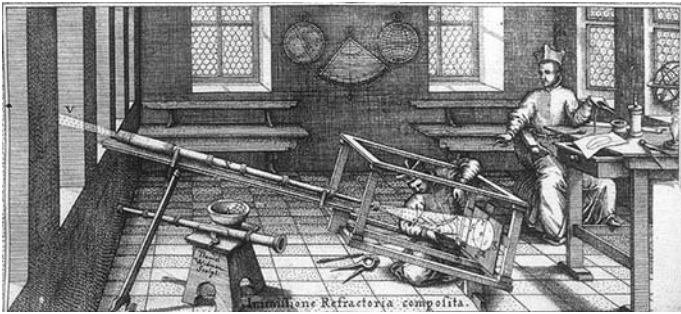


from Ramelli's *Le diverse et artificiose machine* (Paris, 1588).

Chasing Venus:

Observing the Transits of Venus, 1631-2004

The Smithsonian Libraries will open its new exhibition, *Chasing Venus*, on March 24, 2004 in its Gallery outside the Dibner Library in the National Museum of American History, Behring Center. The exhibition tells of the astronomical events known as transits of Venus and the fascinating history of astronomers' attempts to observe Venus crossing in front of the Sun. Transits of Venus are exceedingly rare. No one alive today has witnessed such an event; the last transit occurred in 1882 and the next one will take place on June 8, 2004. Since 1700, the transits teased astronomers with the



Astronomers observing the Sun, from Christoph Scheiner, *Rosa ursina* (Bracciani, 1626-30).

possibility of knowing exactly how far the Earth is from the Sun. The exhibition will use the occasion of the 2004 transit to look at what earlier transits have meant to our perception of the universe and the shaping of modern science. The exhibition uses the marvelous illustrations in the rich collection of books from the Dibner Library, supplemented by appropriate artifacts from the National Museum of American History and the United States Naval Observatory. *Chasing Venus* will close on April 3, 2005.

Be sure to visit the Dibner Library's website:
www.sil.si.edu/Libraries/Dibner/index.htm

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