

NEWSletter

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of the History of Science Society

Notes from the Inside

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Some five years ago, I spoke with members of the Executive Committee about the possibility of moving to an electronic Newsletter. They scotched the idea, stating that they liked to be able to carry the print edition to sundry places, having it with them to peruse on the train or the plane, for those rare free moments when they could flip through its pages. I, too, like the print Newsletter – seeing it not only as a tool to reach our membership but as a tangible thing that could be given to potential donors and others interested in the history of science. So we kept the print version.

With the global financial crisis, the print question is now renewed. HSS members may not realize that nearly a third of our operating income (as late as last year) came from our endowment, raised during the heroic days of Gerry Holton. Having lost a prodigious amount of this endowment, we must now scramble to find ways to cut expenses. The printed Newsletter seemed to be a good place to begin because its demise would not mean a cut in services, only a change in medium. In fact, an electronic Newsletter offers a richer forum for sharing news in the profession, opening up expected and unexpected avenues. For example, in this issue is a poignant remembrance of Chen Meidong, who died this past year. A print Newsletter would have limited notice of his death to a few sentences, but in the electronic version, we devote hundreds of words to a life lived in the history of science, revealing a scholar whose work many of you have never encountered but has nonetheless altered the current of our profession. There are other benefits, as well.

Much of the content in the Newsletter first passes through the Web site. To create printed versions of these Web items we would edit them to space and spend hours trying to fit the puzzle pieces together to make our page allotment. Now, we face a different kind of editing task in which our measure is not paper, but time. Digital texts have no real boundaries other than the effort

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that it takes to produce and edit them. We welcome longer pieces but also recognize that a 2,000 word article involves much more labor than a 200-word piece. Fortunately, the e-version of the Newsletter provides us more time in that, rather than retrieving and editing information on the Web site for inclusion in the Newsletter (the jobs for example), we can now just provide the link to jobs, fellowships and postdocs and use the time saved for expanded content. Articles themselves will take on a different appearance, in which readers can follow links for further information, or click back to an earlier Newsletter article for reference. The possibilities stretch to the horizon.

But time is still precious and one shortcoming we have discovered is our inability to prepare an electronic version and a full version suitable for printing. The April Newsletter is written in html, which makes it easier to format and to download. A pdf version, which would be printer friendly, would require a separate preparation and enormous amounts of labor but, as a compromise, we do offer a pdf version for separate articles and hope that these printer friendly alternatives will help those who want a more portable document.

Finally, the e-version, as you all know, saves paper (the countless drafts proofed in the office, the bluelines, the tens of thousands of printed pages) and energy (issues are mailed throughout the world). Best of all, no longer will those in Cambridge, Massachusetts receive their Newsletter weeks ahead of members in Cambridge, England – copies will hit the electronic doorstep in both places at the same time. So when you phone an overseas colleague and ask, “Have the seen the latest Newsletter?” the answer will be “Yes.”

As always, I welcome your feedback and hope that we can provide a Newsletter that all of our members will enjoy.

Jay Malone, Executive Director

History of Science Society

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Moving?

Please notify both the HSS Executive Office and the University of Chicago Press.

EDITORIAL POLICIES, ADVERTISING AND SUBMISSIONS

The *History of Science Society Newsletter* is published in January, April, July, and October, and sent to all individual members of the Society; those who reside outside of North America pay an additional \$5 annually to cover a portion of airmail charges. The *Newsletter* is available to nonmembers and institutions for \$25 a year.

The *Newsletter* is edited and desktop published in the Executive Office. The format and editorial policies are determined by the Executive Director in consultation with the Committee on Publications and the Society Editor. All advertising copy must be submitted in electronic form. Advertisements are accepted on a space-available basis only, and the Society reserves the right not to print a submission. The rates are as follows: Full page (7 x 9.25"), \$625; Horizontal or Vertical Half page (7 x 4.6"), \$375; Quarter page (3.5 x 4.6"), \$225. The deadline for insertion orders is six weeks prior to the month of publication and should be sent to the attention of the HSS Executive Office. The deadline for news, announcements, and job/fellowship/prize listings is firm: Six weeks prior to the month of publication. Long items (feature stories) should be submitted eight weeks prior to the month of publication. Please send all material to the attention of the managing editor, Michal Meyer: michal@hssonline.org.

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NEWS AND INQUIRIES

A Call for Proposals to House the HSS Executive Office

The History of Science Society seeks proposals for the next site for its Executive Office, with occupancy to begin in the summer of 2010 or 2011 [date is open]. The Executive Office is the main administrative office of the History of Science Society. The HSS, established in 1924, is an international organization and an affiliate of the American Council of Learned Societies, the American Association for the Advancement of Science, the American Historical Association and numerous other organizations. The Society enjoys an endowment in excess of two million dollars U.S. Presently located on the campus of the University of Florida, the HSS Executive Office coordinates all day-to-day Society business, all annual HSS functions, and all activities that involve the Society in scholarly pursuits on the national and international level. Its activities include supervision of the HSS annual meeting and the biennial meeting of the Philosophy of Science Association (PSA), management of the HSS Web site, production of the HSS *Newsletter*, maintenance of the Society's records and finances, and oversight of HSS programs and grants. The Office is supervised by an Executive Director who is a salaried employee of the History of Science Society and a ¼ time UF employee with benefits paid via both entities. At present, the Executive Director is assisted by a full-time office coordinator and four part-time employees – the coordinator is a UF employee and the part-time workers are students at the University of Florida, all paid through the UF payroll system.

The University of Florida has generously provided the Society with office space (890 square feet), including a furnished conference room, file cabinets, office furniture, computers, and space for bookshelves/library and some document storage; funding for a part-time graduate assistant (12-month appointment); tuition waivers for two students; internet connectivity and technical support; and has waived administrative overhead. The History Department also has given the current HSS Executive Director an appointment, currently at the rank of Associate Scholar, and the opportunity to teach undergraduate and graduate courses contingent on the needs of the Department. The Society wishes to secure similarly favorable terms under any new contract. Preference will be given to proposals that demonstrate support from a Dean or equivalent position or higher, the existence of active communities in the history and philosophy of science, the existence of a flourishing graduate program in STS, and the availability of technical support.

In addition to information about the applicant's history and/or philosophy of science program(s), details about the applicant's city and local/state advantages and disadvantages would be welcome.

Expressions of interest, due 29 May 2009, should be directed to the HSS Secretary, Margaret Osler: mjosler@ucalgary.ca. Margaret J. Osler, Department of History, University of Calgary, Calgary, Alberta T2N 1N4, CANADA,

Work: 1-403-220-6414, Home: 1-403-244-3277

FAX: 1-403-289-8566

A final proposal deadline will be set for late summer 2009.

Call for Manuscripts: Bucknell University Press

In 2009, Bucknell University Press is celebrating the 200th anniversary of Charles Darwin's birthday and the 150th anniversary of *The Origin of the Species* by welcoming manuscripts, either critical essay collections or monographs, on Darwin and the humanities and social sciences. Prospective authors and editors are asked to send inquiries and/or a proposal by July 2009 to the Director, Greg Clingham, at University Press, Bucknell University, Lewisburg, PA 17837, or clingham@bucknell.edu. Please visit our Web site for more information about the press.

American Astronomical Society's Historical Astronomy Division

Members of the HSS are invited to join the American Astronomical Society's Historical Astronomy Division, as Affiliate Members. The HAD exists for the purpose of advancing interest in the history of astronomy through its meetings, publications, and awards. Dues are only \$10 per year. Please visit our Web site and "click" on Membership.

Darwin Festival in Cambridge, July 2009

Events celebrating the life and work of Charles Darwin will be held at Cambridge 5-10 July 2009. The festival program includes:

Morning Talks and Debates sessions

Darwin's impact on modern science, medicine, social sciences, human nature, belief and the arts will be presented and challenged.

Afternoon Focus sessions

Four sessions are dedicated to science, two to theology, two to philosophy, two to social science, two to the arts and one to communications.

Explorer sessions: Tours exhibitions and workshops

These sessions will include guided tours of the Cambridge museums, many of which are mounting especially dedicated exhibitions for the Festival. Christ College (where Darwin was a student), the Botanic Gardens, the Darwin Correspondence Project, at the University Library and the Wellcome Trust Sanger Centre will also be hosting events. Each venue will be running workshops, hands on activities and discussions.

Lunch Time and Evening Events

There will be an opening reception at the Botanic Gardens hosted by the Festival sponsors with a welcoming address by Alison Richard, anthropologist and Vice Chancellor of the University. Through the week the lunch time and evening program will include keynote lectures, debates, theatrical and musical events. There will be a Festival Dinner at Kings College on the penultimate evening with an after dinner speech by Sir David Attenborough.

Fringe

The Festival program will extend to the streets, community rooms, bars and cafes, with informal theatre, music, soap box talks, comedy and gigs.

Highlighted speakers include Richard Dawkins, David Attenborough, Daniel Dennett, Ian McEwan and A. S. Byatt.

Women in Digital Science Collection

A new Web site, Women in Science Digital Collection, is seeking images and text to expand its collection. Now adopted by the Department of History at Michigan State University, Women in Science Digital Collection was established by Judith Zinsser and previously located at the University of Ohio-Miami.

The goal of the new Women in Science Digital Collection is to expand the collection to feature documents, (including Du Chatelet's papers) with introductions wherever possible, for women who made significant contributions to a range of sciences and in a range of time periods. Do you have PDFs, JPEGs, or TIFF files of important documents, illustrations, and/or photos which could be displayed on the Web site? Is your university willing to share documents in their special collections? Such collaboration would of course result in a credit line, links to your libraries, links to your publications about the featured scientist, and other mutually beneficial arrangements. For further information, e-mail Georgina Montgomery

Annals of Science Prize

Submit your unpublished paper to *Annals of Science* for a chance to win US\$500 and a year's free subscription to this Journal! This prize is offered every two years to the author of an original, unpublished essay in the history of science or technology, which is not under consideration for publication elsewhere. The prize, supported by Taylor & Francis, is intended for those who are currently doctoral students, or have been awarded their doctorate within the past four years. Essays should be submitted to the Editor in a form acceptable for publication in *Annals of Science*. See the Journal's Web page for a style guide. Papers should be submitted by 30 September 2009, with the winner being notified by 31 December 2009. The Editor's decision is final.

Past Winners of the prize

"Natural Philosophical Contention Inside the Accademia del Cimento: the Properties and Effects of Heat and Cold" (Luciano Boschiero) Volume 60, Issue 4, Pages 329 - 349.

"Rudolph Koenig's Workshop of Sound: Instruments, Theories, and the Debate over Combination Tones" (David Pantalony) Volume 62, Issue 1, Pages 57 - 82.

"Life of μ : The Observation of the Spontaneous decay of Mesotrons and its Consequences, 1938-1947" (Daniela Monaldi) Volume 62, Issue 4, Pages 419 - 455.

Authors Guild v. Google Settlement

The following is a message sent by the Authors Guild to its members. "At least \$45 million will be paid to authors and publishers to release claims for books that are scanned by Google by 5 May of this year. But that's not the most significant part of the settlement, in our view. We expect the licensing that this settlement would enable, particularly of out-of-print books, will result in far more revenues for authors over the coming years.

The settlement covers essentially all in-copyright books that were published by 5 January 2009. (Some authors have told us that they think of the settlement as covering only books for adults or nonfiction books. This is incorrect. Books of all types are covered by the settlement.) We think it's in the strong interest of authors of all books, whether in print or out of print, to go to <http://www.googlebooksettlement.com> and claim their books. Here are some of the benefits of doing so:

1. If you file your claim by 5 January 2010, and a book in which you have a copyright interest is scanned by Google before 5 May 2009, you will be entitled to a small share (at least \$60 per book, but up to \$300, depend-

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ing on the number of claims) in a pool of at least \$45 million that Google is paying to release claims for works that were scanned without rights holder permission.

2. By registering, you'll be able to share in potential revenues for uses of your works under several new licensing programs that the settlement enables. Here are examples of licensing revenues you may be entitled to share in:

- A. Revenues from printing out pages from your works at terminals in public libraries.
- B. Revenues from ads that may appear near "previews" of your works at books.google.com.
- C. Revenues from sales of special online editions of your works.
- D. Revenues from institutional subscriptions that may include your works.

Important note: Only out-of-print books will be included in these programs by default. In-print books will be included only where rights holders affirmatively elect to do so.

3. By registering, you'll automatically enroll in the new Book Rights Registry, which will give you a considerable amount of control over the rights to your works, including your right to withdraw your work from the licensing programs described above.

The important thing is to assert your rights. It's easiest to do so by setting up an account at <http://www.googlebooksettlement.com>, the official settlement Website. Once you're logged in, it's generally most efficient to claim your works by searching the database of titles by your name."

Recent Dissertations in the History of Science

This past month's dissertations on the history of science and medicine research can be found at : <http://tinyurl.com/yw5ape>

Science Museum Web site

Colleagues may be interested to see the new history of medicine Web site that went live recently, which includes 2,500 newly-made images of objects from the Science Museum's history of medicine collection together with historical interpretations, interactives and thematic introductions.

Euler, Extrasolar Planets, and the History of Science at the 2009 AAAS Meeting

This past February Ronald Calinger (Catholic University of America) brought the life and research of Leonhard Euler to Chicago, which hosted the 2009 AAAS Annual Meeting. Calinger proposed and organized the symposium "From Enlightenment Lunar Theories to the Discovery of Extra Solar Planets." Nobel laureate Leon Lederman moderated the symposium, which brought together many of the latest findings on the life and astronomical research of the Swiss-born mathematician and physicist Leonhard Euler (1707 – 1783), along with his legacy from recent observations using the Swiss Euler telescope. The symposium consisted of three papers and discussions of each. The speakers came from Switzerland, the Russian Federation, and the United States.

Siegfried Bodenmann, who edited some of Euler's correspondence for the Euler-Archive Basel and is a doctoral candidate at the University of Bern, began with a paper titled "Alexis Clairaut, Jean d'Alembert, and Euler on Lunar Theory." Bodenmann examined the mid-18th century development of mathematical techniques that made it possible to give an approximate solution of the three-body problem sufficiently

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accurate to account for the observed motion of the moon, especially its precession and at perigee. At first a sufficiently accurate solution of the motion of the moon at perigee based solely on Newtonian inverse-square law eluded Clairaut, d'Alembert, and Euler, as it had Newton, and they believed that Newton's dynamics needed a small correction. But Clairaut later found the error in his calculations. This was the first major step in the development of mathematical tools that made it possible to infer the existence of an invisible object. Bodenmann traced the story of this breakthrough through the correspondence among the three natural philosophers and Gabriel Cramer. Bodenmann probed the central ideas in this episode: the effect of improving instruments on observations, tensions in the Paris Academy, networking, the nature of publications, and personalities. The discussant, Robert Bradley of Adelphi University, an editor of *Leonhard Euler: Life, Work and Legacy* (2007), elaborated on the mathematics that Clairaut employed in his solution and further examined the role of d'Alembert and Euler in the discovery process.

The second speaker, Calinger, presented new interpretations of aspects of Euler's second St. Petersburg stay from 1766 to 1783. He reviewed Euler's interactions with Catherine the Great, his struggles with two directors of the Imperial Russian Academy, and the emphasis on his third lunar theory, which Euler felt would be most crucial to his future reputation. Euler's planning of the Russian expeditions to observe the transit of Venus in 1769, his improvement of telescopes with achromatic lenses, and the achievement of Euler's research circle that Nicholas Fuss came to lead were outlined. Calinger corrected a misconception that often circulates, especially among mathematicians, that Euler insulted Denis Diderot. Instead the two men greatly respected each other. This set Euler more in the mainstream of the Enlightenment. The paper closed with Euler's role in the inauguration of Princess Ekaterina Dashkova as director of the St. Petersburg Academy, Euler's election to the American Academy of Arts and Sciences, and the eulogy of Fuss.

Alexey Lopatukhin, an independent scholar from St. Petersburg State University, was a discussant of the Calinger paper. He stressed the new facts that Calinger had uncovered, shared pictures of the Euler house today, and recounted several legends about Euler's grave and remains. Since Lopatukhin was unable to attend, Dr. Dominic Klyve of Carthage College, the director of the electronic resource, the Euler Archive, read his comments and added some of his own. Among other things, he stressed the landmark nature of Calinger's biography scheduled with Princeton University Press, and its expected impact on our understanding of Enlightenment science, its role in advances in the general culture, and the early modern history of science.

Christophe Lovis of the University of Geneva presented "The Swiss Euler Telescope and the Search for Extrasolar Planets." The discovery of the first extrasolar planet in 1995 revolutionized astronomy and created an entirely new field of study. Over 300 such planets are known, and these have completely upset our notions about how planetary systems form and what they should look like. As summarized by Lovis, this revolution has been led by the radial velocity technique, and many of the discoveries were made with the Swiss Euler telescope in La Silla, Chile.

Scott Gaudi of Ohio State University put these discoveries and the continuing search for extrasolar planets in the context of the greater search for life in the universe, describing how the radial velocity and other methods have demonstrated that low-mass planets are common, suggesting that Earth analogs might be quite common as well. These discoveries point the way to the discovery of another Earthlike planet, a "pale blue dot," on which we can search for signs of extraterrestrial life.

Astronomers searching for extra-solar planets have had little exposure to the history of science, a situation they now plan to change. The launching of the Kepler satellite and its results should be one important source promoting fruitful exchanges. During the symposium, Lederman was busily taking notes. The participants were pleased to learn his one word assessment of the symposium later in the day, "Wow!" The symposium grew largely out of the activities of the Euler Society. Anyone wishing further information on it, including its archives and annual meetings, should consult <http://www.eulersociety.org>.

MEMBER NEWS

2009 George Sarton Memorial Lecture in the History and Philosophy of Science at the AAAS

This year's Sarton Lecturer at the annual meeting of the American Association for the Advancement of Science was **Ken Alder**, Professor of History and Milton H. Wilson Professor in the Humanities at Northwestern University, where he also directs the Science in Human Culture Program. At the Chicago meeting in February, attended by approximately 5,000 people from around the world, Ken's title was "A History of the International Scientific Conference."

The audience of around 75 persons appreciated how Ken brought the topic to life with his usual historical insight spiced with dashes of humor. Ranging from Isaac Newton's international correspondence to the politics of today's global-warming congresses, Ken focused on the topic explored in one of his recent books, *The Measure of All Things: The Seven-Year Odyssey and Hidden Error that Transformed the World* (New York: Free Press, 2002), which won HSS's Watson Davis and Helen Miles Davis Prize in 2003. The book and the lecture are the story of how the meter was established as an international standard of measure. Supposedly based on nature (one ten-millionth of the distance from North Pole to equator), the meter turns out to be the product of political and economic twists and turns, compromises, and shocking discoveries—in short a product of intense negotiation, sometimes continued by military means. Only historians could suspect that a supposedly straightforward measure of nature could be so full of intrigue! That Napoleon himself was an active participant in the Paris Congress of 1798 is one tip off. Even today, as Ken remarked in his lecture, critics question the national loyalties of scientists participating in international gatherings that examine such issues as climate change and nuclear disarmament.

So is "the messy work of science—like the making of laws and sausages— . . . best kept out of public view"? Most of us in the science studies professions would surely agree with Ken Alder that, quite to the contrary, the public needs to be better educated about how science is done, and that we need to combat chauvinistic nationalism in science and technology policy by trying to convince members of the general public that they, too, should have multiple loyalties, like those good cosmopolitans of old. By the way, the AAAS is really an international organization engaged in just such activities, so HSS members are encouraged to join!

By Tom Nickles, Retiring Chair, AAAS, Section L (History and Philosophy of Science)

Jeffrey Barrett, Professor of Logic and Philosophy of Science at the University of California, Irvine, has been selected as the next Editor in Chief of the Association's journal, *Philosophy of Science*. He succeeds Michael Dickson, current editor, on 30 June 2009.

Richard Healey, University of Arizona, has been awarded this year's Lakatos Award for his book *Gauging What's Real: The Conceptual Foundations of Contemporary Gauge Theories* (Oxford University Press, 2007). The prize of £10,000 is awarded by the London School of Economics and Political Science for an outstand-

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ing contribution to the philosophy of science. Healey will visit LSE to receive the award and give the Award Public Lecture during summer term, 2009. Gauge theories have provided our most successful representations of the fundamental forces of Nature. How, though, do such representations work to tell us what kind of world our gauge theories reveal to us? Professor Healey's book describes the representations provided by gauge theories in both classical and quantum physics. The Lakatos Award is given for an outstanding contribution to the philosophy of science, widely interpreted, in the form of a book published in English during the previous five years. It was made possible by a generous endowment from the Latsis Foundation. The Award is in memory of the former LSE professor, Imre Lakatos, and is administered by an international Management Committee organized from the LSE.

David A. Hollinger, University of California, Berkeley, has been elected President-Elect of the Organization of American Historians, and will become President of that 9,000-member professional association in March of 2010.

Trevor H. Levere, University Professor Emeritus at the Institute for the History and Philosophy of Science and Technology (IHPST) at the University of Toronto, has been awarded the 2009 Sidney M. Edelstein Award for Outstanding Achievement in the History of Chemistry. Starting as an undergraduate chemistry major at Oxford in 1962, Levere changed his focus to the history of chemistry. Levere received his D.Phil. in 1969 with a thesis that appeared in 1971 as *Affinity and Matter: Elements of Chemical Philosophy 1800–1865*. His *Transforming Matter: A History of Chemistry from Alchemy to the Buckyball*, appeared in 2001, and is often considered one of the best histories of chemistry in several decades, presenting the subject in a readable style to a large audience beyond the specialist. The Edelstein Award is supported by HIST and the Chemical Heritage Foundation of Philadelphia and will be presented to Levere at the fall national meeting of the American Chemical Society in Washington, D.C. in August 2009.

Svante Lindqvist has been appointed President of the Royal Swedish Academy of Sciences for a three-year period, beginning in July 2009. Svante Lindqvist is Director of the Nobel Museum and a former Professor of History of Technology at the Royal Institute of Technology, Stockholm. The Royal Swedish Academy of Sciences awards the Nobel Prizes in Physics and Chemistry and the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel. The Academy was founded in 1739 and its first President was Linnaeus.

Ekmeleddin Ihsanoglu, winner of the 2008 Koyré Medal (the highest award given by the International Academy for the history of science) is pictured here with **Ron Numbers**, winner of the 2008 Sarton Medal (the highest honor given by the HSS) visiting during a meeting of the Division of the History, Science, and Technology in Amsterdam, December 2008.

Michael J. Neufeld has been awarded the Richard W. Leopold Prize of the Organization of American Historians, the Eugene M. Emme Astronautical Literature Award from the American Astronautical Society, and a Secretary's Research Prize from the Smithsonian Institution, all for *Von Braun: Dreamer of Space, Engineer of War* (New York: Knopf, 2007). He was also a finalist for the Los Angeles Book Prizes in the category of biography. Von Braun has now appeared in a Vintage paperback edition and in spring 2009 will appear in Danish and German translations.

IN MEMORIAM

Chen Meidong

Chen Meidong, Professor Emeritus and former director of the Institute for the History of Natural Science of the Chinese Academy of Sciences (IHNS/CAS), passed away on 30 December 2008, in Beijing. Chen was a prolific historian of Chinese astronomy and made substantial contributions to the reconstruction of the logarithms used in making traditional Chinese calendars.

Chen Meidong was born on 19 February 1942 in Lianjiang, a county in China's coastal province, Fujian. Admitted to the College of Geodesy and Geomatics in Wuhan (now part of Wuhan University) in 1959, he studied astro-geodetic surveying. After graduating in 1964, he joined the research unit on the history of natural science, created in Beijing in 1957. Later this expanded to the IHNS/CAS in 1978, where Chen was admitted as a graduate student to study history of astronomy under the supervision of Ye Qisun (also known as Chi-sun Yeh), a Harvard-trained physicist who wrote his dissertation in 1923 under the guidance of the Nobel Laureate in Physics Percy W. Bridgman. After returning to China, Ye became a pioneer in physics and an ardent advocate for research on the history of science in China. With Ye, Chen systematically studied the history of science, especially the history of Chinese astronomy.

*Completing his graduate work in 1967, Chen was immediately employed in the same research unit, where he served until retirement in 2002. His career as a historian of Chinese astronomy, however, did not begin until the end of the Cultural Revolution in 1976. In the 1980s, Chen devoted himself to reconstructing logarithms employed in designing some of the major Chinese calendars from the seventh to the fourteenth centuries. In 1995, Chen published a book entitled *Guli Xintan (New Investigations on the Old Chinese Calendars)*, Liaoning Education Press), which discusses in detail how different mathematical methods were used in various calculations of the calendars, as well as their relationships to other methods. The book also estimates the precision of data recorded in the calendars by using contemporary Western methods. In the book, Chen presents a series of logarithms used in calendar making, until then unknown to scholars. Chen's work represents a major advance, improving on *Research on the Chinese Calendars Compiled during the Sui and Tang Dynasties* by the Japanese historian of Chinese science Yabuuti Kiyosi (1906-2000) in 1944.*

Besides his own research, Chen actively promoted research on the history of Chinese science. When Joseph Needham's on-going, gigantic project, "Science and Civilisation in China," received wide attention in the early 1970s, Chinese historians of science began to think seriously about writing a history of Chinese science and technology on a scale even larger than Needham's. Chen was one of a group of historians who made such a proposal to the Chinese Academy of Sciences in 1975. As Vice President of the Chinese Society of the History of Science and Technology and in his capacity as Director of the IHNS (1988-1992), he contributed substantially to the proposal eventually approved by the Academy in 1992. Over the next 16 years, Chen oversaw the publication of the col-

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lection: *Zhongguo Kexue Jishu Shi* (History of Chinese Science and Technology, 30 volumes, published by Science Press in Beijing). Chen himself contributed the volume on astronomy (published in 2003). The set represents interpretations by Chinese scholars of the development of science and technology in China and, together with Needham's *Science and Civilisation in China*, will be long studied.

Chen published some 120 papers and book chapters, and authored or co-authored 20 books. The importance of his work has been recognized both at home and abroad. He was made a member of the Division of History of Science and Technology of the International Union of the History and Philosophy of Science in 1990, and was elected Vice President of the International Society for History of East Asian Science, Technology, and Medicine, also in 1990.

Chen was diagnosed with colon cancer in 2005. By the end of 2007 the cancer spread to his lungs, lymphatic system, and eventually to his bone marrow. During this painful time, he wrapped up his life-long project, correlating the texts in the sections on calendars in the Twenty-Four Histories of China from legendary times down to the Ming dynasty (-1644 C.E.). He saw his last book, *Lidai Lüli Zhi Jiaoding (Correlations on the Annals Music of Calendars of All Dynasties)*, through publication. The book was released in January, 2009.

—by Xu Yibao, Borough of Manhattan Community College, The City University of New York. The author is grateful to Joseph Dauben for his comments on an early draft of this obituary and to Xu Fengxian, Chen Meidong's former Ph.D. student, for providing Chen's portrait.

Allen G. Debus

One of the pioneers in the history of chemistry, Allen Debus died quietly at his home from cardiac arrest on 6 March. He was 82. Appointed in 1970 as the first director of the Morris Fishbein Center for the History of Science at the University of Chicago, Debus took a scientific route to the history of science. He majored in chemistry at Northwestern University and during his time at Abbott Laboratories, while monitoring lengthy experiments, he read the history of chemistry and decided to pursue history of science as a profession. He studied under I.B. Cohen at Harvard and went on to write or edit more than 20 books. His scholarship earned him the Sarton Medal in 1994. A quiet and authoritative voice, Debus helped the career of countless students and scholars. An eulogy on Professor Debus will appear in *Isis*. (Adapted from the *Chicago Tribune*)

A. Rupert and Marie Boas Hall

It is with sadness that the History of Science Society says goodbye to two of its most prolific and pioneering members through the deaths of A. Rupert Hall on 5 February and Marie Boas Hall on 23 February.

Marie Boas was born in New England in 1919. In 1936 she went to Radcliffe College where she studied chemistry, graduating AB in 1940. In 1944, she took a post in the Radiation Laboratory at MIT, where she assisted Henry Guerlac in writing the history of the laboratory and of the operational use of radar during World War II. She wrote her Ph.D. dissertation at Cornell under Guerlac's supervision, which she completed in 1949. She was the first recipient of the History of Science Society's Pfizer Award in 1958 for her work, *Robert Boyle and Seventeenth-Century Chemistry*.

Alfred Rupert Hall was born near Stoke-on-Trent in England in 1920. He joined the Army in 1941 and served in the Middle East, North Africa, and Italy. After the war he returned to Cambridge, obtaining his degree in history in 1946. His book *The Scientific Revolution* (1954) established the use of that term to denote the changes in investigations of the natural world that took place between about 1450 and 1750.

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They met during a trip of Marie's to England in 1951 to do research in the Boyle papers at the Royal Society. They were married in 1959. Subsequently they moved together to Indiana University in 1961 and then, in 1963, to Imperial College, London, where they both remained until they retired in 1980. Both Halls stayed active and productive throughout their retirement, jointly winning the History of Science Society's Sarton Medal for lifetime scholarly achievement.

Xi Zezong

Xi Zezong, an outstanding historian of science, astronomer and academician of the Chinese Academy of Sciences, and former director of the Institute for the History of Natural Sciences, passed away of a brain hemorrhage on 27 December 2008. He was 82.

Xi Zezong was born in 1927 in Yuanqu County, Shanxi. In 1951, he graduated from Zhongshan University's Department of Astronomy and later participated in the establishment of the Research Office of the History of Natural Sciences, the predecessor of the Institute, where he served as director from 1983 to 1988. In 1991, he was selected as an academician of the Chinese Academy of Sciences. He was a member of the International Academy of the History of Science and the International Eurasian Academy of Sciences. He also acted as President of the Chinese Society for the History of Science and Technology and a member of the Steering Committee of the National Program for the Compilation of Ancient Books. He was also principal investigator for the Ministry of Science and Technology's "95" program on the chronology of the Xia, Shang, and Zhou dynasties and vice director of the editorial committee of the Great Compendium of Chinese Culture led by the General Administration of Press and Publication.

In 1955, Xi Zezong published *A New Catalogue of Ancient Novae*. In cooperation with associates in 1965 he also published *Ancient Novae Records of China, Korea and Japan and its Significance for Radio Astronomy*, which proved influential for historical research on the mechanism of star evolution and nova-supernova burst. In the 1970s, Professor Xi finished a critical philological study on the silk manuscript "Five Planets' Divination from the Han." He later systematically studied star charts, astrological texts, and star poetry in the Dunhuang manuscripts. In 1981, he published *Gan De and His Discovery of Jupiter's Satellite, Two Thousand Years before Galileo*. Based on experimental observations, he demonstrated that it is possible that Gan De from the Warring States Period (403 BC - 221 BC), observed Jupiter's third moon with the naked eye.

A founder and leader of the field of Chinese history of science, Xi Zezong also helped establish the Institute for the History of Natural Science. As Director of the Institute, he devoted himself to promoting research on the history of science and technology, the training of future generations of scholars, and international academic exchange. In 1983, he became the first doctoral supervisor in the field of the history of Chinese astronomy. He also greatly supported the establishment of history-of-science departments at Shanghai Jiaotong University and the University of Science and Technology of China. In his last years he led a research project on the "Compilation of the Astronomy and Calendar Section of the History of the Qing Dynasty."

Under his editorship, *The History of Science and Technology in China · Scientific Thought* won second place in the third Guo Moruo Award for Chinese History in 2007. In the same year, the Nomination Committee for Small Celestial Bodies of the International Astronomical Union named a small planet after Xi Zezong, honoring the significant contributions he made in research on astronomical history.

OGILVIE CELEBRATION AND REUNION AT OU

At the end of 2008, Marilyn B. Ogilvie retired from the University of Oklahoma as Curator of the History of Science Collections and as Professor in the History of Science Department. In addition to her prolific scholarship, as Curator Marilyn increased the Collections' holdings from 79,000 to 94,000 volumes, inaugurated a support group – the OU Academy of the Lynx – and expanded access to the Collections under an Andrew W. Mellon Travel Fellowship Program. Marilyn served on numerous masters and doctoral committees and inspired students for over four decades, receiving several undergraduate teaching awards. Alumni from the last five decades treasure memories of Marilyn as a fellow graduate student, teacher and mentor, for no other person has been involved in the OU history of science program over as many years in as many roles.

On 22-24 January 2009, the OU history of science program combined an alumni reunion with a celebration of Marilyn's career. The well-attended events kicked off with a public lecture by Kenneth L. Taylor exploring "Volcanology before Darwin"; this lecture also inaugurated a year-long series of special events at OU to celebrate the Darwin year.

At a round-table discussion the next afternoon, panel participants offered reflections on the historiography of women and science and Marilyn's contributions to the field. Speakers were Joy Harvey, Sally Gregory Kohlstedt, and Margaret W. Rossiter. JoAnn Palmeri, the new Acting Librarian of the Collections, moderated the discussion. Although Marilyn's six published books received frequent mention over the weekend, the most memorable reference was Sally Gregory Kohlstedt's suggestion that the title of Marilyn's biography of Alice Boring, an American geneticist in Beijing, most aptly describes Marilyn herself as "A Dame Full of Vim and Vigor."

Another major event was a Saturday luncheon featuring tributes to Marilyn Ogilvie offered by Robert Henry (Chief Justice, Federal Court of Appeals for the Tenth Circuit), Kerry Magruder (former Librarian and the new Curator of the Collections), Martha Ogilvie (daughter), Marcia Goodman (former Librarian), JoAnn Palmeri (alumna and Acting Librarian), and Kenneth L. Taylor (Professor emeritus). Steven J. Livesey, Chair of the Department, announced that the Marilyn Bailey Ogilvie Alumni Graduate Fellowship had already reached the halfway mark toward its goal of \$100,000 to provide student scholarships.

The weekend concluded with an open house in the History of Science Collections featuring some of the significant acquisitions of Marilyn's tenure as Curator. These included works by Maria Merian, Hildegard of Bingen, Paracelsus, the Salusbury English translation of Galileo, the natural history of Mexico by Hernandez, Darwin's *Zoology of the Voyage of the H.M.S. Beagle*, the *Epitome* by Regiomontanus of Ptolemy's *Almagest* and works by Tycho, Adrian Metius, Guidobaldo Monti and members of the Accademia dei Lincei. In recognition of Marilyn's distinguished efforts in building the Collections and of her acclaimed scholarship in the history of women and science, Sul Lee, Dean of University Libraries, placed the *Urania Propitia* (1650) of Maria Cunitz in the Collections.

HISTORY BY NUMBERS

Ron Numbers, historian of science, medicine, and religion, and winner of the 2008 Sarton Medal, discusses his work, gives a glimpse of a fascinating historical character, and tells of the difficulty in predicting the future.

From early on, Ron Numbers harbored a personal interest in Creationism. “First grade through college I went to fundamentalist Seventh-day Adventist schools. All my male relatives were ministers, so through college I was taught nothing but what came to be known as Young Earth Creationism, even while majoring in science.”

The 2008 Sarton Medal winner discovered the history of science while earning a master’s degree at Florida State University. After a brief flirtation with mathematics, he turned to history and fell in love with history of science after taking the one course offered in the subject.

A dissertation on Laplace’s nebular hypothesis in America at the University of California, Berkeley, brought science and religion to the fore. “The people I was writing about in the first half of the 19th century were going through experiences similar to mine in the second half of the 20th century. That appealed to me.” The result, *Creation by Natural Law* (1977), was published after *Prophetess of Health* (1976), a book on Adventist founder Ellen G. White. Numbers, then teaching at Loma Linda University, a Seventh-day Adventist school, says of the White study; “What I found was not what they wanted me to find, so they fired me. The only job I could get was at Wisconsin – either dumb luck or providence.” Numbers has been at the University of Wisconsin-Madison since 1974; currently, he is the Hilldale Professor of the History of Science and Medicine.

Religion has always played a role in the history of science, says Numbers, although that role has changed over time. “Most of the historical study in the early years focused on the clash between science and Christianity – I might add that until recently most history of science and religion has been of science and Christianity.” A current project, one of many, is the co-editing with John Hedley Brooke of a book titled *Science and Religion Around the World*, which aims to redress the imbalance, and includes “unbelief” in its remit. This first attempt to look historically at the broad spectrum of science and religion will appear in 2009, and Numbers hopes the work will encourage others to explore the broader picture. “One of the lessons from this book is that outside the Abrahamic faiths there hasn’t been as much concern about reconciling science with religion, so the history isn’t as rich.”

In some circles, Numbers is known as the writer on Creationism, in other circles, he says he’s known as the heretical Ron Numbers. “Those two lives are fairly separate – my former Adventist life and my history of science life.” Numbers traces his academic interest in science and religion to his upbringing. “In fact,” he adds, “most of my friends who work in science and religion have some personal reason for doing so. Many are ex-evangelicals, but the same is true of Jewish and Muslim historians of science and religion. There’s a personal angle to it. Some would like to expose the ignorance and idiocy as they see it. There’s been a long tradition, too, of apologetics in the history of science and religion, of people trying to make Christianity into the driving force of all that’s good. You can often see traces of both, which originate, I think, within individual responses.”

Numbers likes to tell a story that he says, jokingly, shows him to be the only balanced and objec-

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tive historian of Creationism around. In 1982, as part of a court case in Louisiana on the teaching of Creationism alongside evolution, both sides asked him to be an expert witness. During deposition, Numbers, for the first time, publicly described himself as an agnostic. When writing about Creationism, fairness is important, says Numbers. “Some have appreciated that; Henry Morris, the grand old man of the Creationist movement wrote a very nice blurb for my book (*The Creationists*, 1992, updated 2006). Others opened up their records for me. And yet a number of reviewers from that camp just skewered me. By and large, the scientific community and the historical community have been very kind, even scientists who could readily be described as creation bashers have appreciated my approach. It’s not theirs, but they realize that learning about the movement and what motivates people is a useful exercise.”

Numbers claims his knowledge about the history of Creationism gives him no inside track on its future. “My book (*The Creationists*) came out just about the time that Intelligent Design was making its first moves, but you don’t see that phrase in the book. I had no idea Intelligent Design was going to be a big deal – I had to add a chapter for the new edition.” Some things do remain constant in the new edition, though, including a dislike of evolution, geological ages, and the Big Bang, with human evolution the hottest issue of all, says Numbers. “Even pre-human evolution has not in the past generated the excitement and animosity that human evolution has. With the Big Bang, people don’t know what the heck is going on, it’s hard to get emotional. They know they don’t like it and that it’s some sort of godless theory about the origin of the universe, but talk about humans coming from monkeys and you get their attention quickly; they know that’s wrong.”

“No” is a difficult word for Numbers. Harvard University Press has just published his edited volume *Galileo Goes to Jail and Other Myths about Science and Religion*, and he is currently tidying up five more edited collections, including one on ideology and biology, and a second on religious pluralism in modern America. His big project is called “Science and the Americans.” “I want to reach the mythical general reader, but it will be comprehensive enough that I think it will also be used as a textbook. And since there is zero competition, I might be okay.” Numbers will be relieved to finish that book – he’s already contracted for the next project, one that takes him back to the history of medicine – a biography of John Harvey Kellogg.

The history of religion and medicine is under represented, says Numbers, given that religious groups played a key role in the creation of American hospitals, in the history of nursing, and in medical missions. “There’s a wonderful history to be written on the naturalization of diseases down to AIDS. Religion still remains very prominent with debates over abortion and end-of-life issues and stem cell research. All are hot-button issues. If I could live long enough, I could do that, if I could stop the aging process.”

More than an academic connection exists between Kellogg and Numbers. Kellogg was a protégé of White and her husband, who sent him to medical school, twice. On his return from medical training, Kellogg took over a small water cure institute in Battle Creek and created the Battle Creek Sanitarium, which became world famous. “He was arguably the most widely read writer on sex at the turn of the century, with lots of editions of his *Plain Facts for Old and Young*. He invented flaked cereals and revolutionized the breakfast habits of America. He invented peanut butter, too. I’m sure other people had smashed up peanuts, but he was the one who popularized peanut butter as a food product. And he was right on the cusp between respectable medicine and quackery. His notion of autointoxication brought him a lot of fame and notoriety.” Once the germ theory of disease spread, Kellogg decided that bowel

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uncleanliness caused sickness – autointoxication. “He recommended bran foods and five enemas a day.”

When Numbers began his career, many doubted the legitimacy of American science. Earlier in the 20th century, a significant gap existed between historians of science, such as I. B. Cohen – who argued that only those American scientists who had an impact in Europe deserved study – and American historians who looked at the role of science in American culture. “You never hear those arguments anymore. It’s a much richer field than when it was narrowly focused on the progressive, triumphalist story that George Sarton insisted on, that history of science was the only truly progressive history anywhere. We just don’t talk that way anymore.”

Numbers sees his life in multiple parts – historian of science, historian of medicine, historian of religion – which include presidencies of the American Society of Church History and the History of Science Society (he has also served as *Isis* editor). “I have a joke that my presidency of HSS overlapped with my presidency of ASCH for eight days, during which I officially declared an end to the war between science and religion. For eight days there was peace and harmony.”

The past four years have been spent as president of the International Union of the History and Philosophy of Science, which has brought him into contact with historians of science the world over. Being in the United States, says Numbers, means you take so much for granted in terms of institutional support, which is not the case in many other countries.

Spending a career following his nose has paid off for Numbers. “I haven’t tried to anticipate what was going to be hot. I started working on the history of Creationism when it was a backwater; I wasn’t even sure I could get published when I wrote about Ellen White. I’ve been fortunate that other people have turned out to be interested in the same things, but I had no plan at all.”

– by Michal Meyer; image courtesy Sage Ross

BEYOND GRAY BOXES: MAKING HISTORY OF SCIENCE INTEGRAL TO THE TEACHING OF K-12 SCIENCE

Greg Macklem and Erik Peterson are doctoral candidates in History and Philosophy of Science at the University of Notre Dame. Greg is also a veteran of nine years teaching high school math and science and a 2001 Milken National Educator Award recipient.

In her essay in the January 2009 HSS Newsletter, Michelle Klosterman highlights the general lack of history of science in American K-12 science classrooms. Despite greater emphasis on the inclusion of such material recommended by national standards developed by both the AAAS and the National Research Council, science classroom instruction is typically devoid of the history of science.

Ms. Klosterman describes four obstacles to the successful incorporation of historical subjects in the science classroom: (1) the limited time teachers have to engage the students in actual instruction, (2) concerns about standardized testing and the relative lack of history on such exams, (3) student motivation, and (4) a lack of resources, both material and intellectual. She suggests that modifying teacher-education programs to instruct pre-service teaching candidates on the history of science and giving these teachers guidance on how to include history successfully is necessary for the long-term survival of history as a part of the de facto science curriculum.

It is our view that historians of science have a unique opportunity, and perhaps some degree of responsibility—both of which have been under emphasized in the professional practice of our field—to engage two very different, yet extremely important audiences: K-12 science teachers and, indirectly, the students they teach. Such engagement must certainly involve pre-service teacher education programs, as Ms. Klosterman has suggested, but it can, and should, include a variety of other endeavors. These efforts must address the needs of current science teachers as well as future teachers, utilize history of science in a way that supports science teaching while still being responsible to the history itself, and provide concrete tools for teachers to take into the classroom.

While national standards have incorporated historical perspectives as an essential part of a comprehensive science education, history of science still remains largely marginalized. Regardless of the authoritative character of the national standards cited and the standing of the authors and publishing organizations, the standards are not binding documents. It is still the responsibility of each state to determine the curriculum for its students, and consistency regarding history of science is lacking. The standards of some states, such as Indiana, include detailed expectations for student learning of the history of science. On the other hand, some states take an approach similar to that of California, in which history of science is essentially limited to a handful of names attached to key ideas in science in such a way that history of science could be assessed with a simple matching quiz.

A quick survey of typical high school science textbooks reveals the inclusion of history of science in nearly all of them, focusing on significant episodes, typically those emphasized in the national standards. This history, however, is found not in the main body of text, but in the margins or as superadded topics, separated in gray boxes, easily ignored by teachers and students alike. There is rarely any effort to incorporate historical topics directly within the text, and the message is clear: these topics can be ignored without harming a student's science education.

These problems are sometimes compounded further by oversimplification, sometimes to the point of distortion. For example, the Indiana biology standards indicate that students will be able to

*[e]xplain that after the publication of *The Origin of Species*, biological evolution was supported by the rediscovery of the genetics experiments of Austrian monk Gregor Mendel, by the identification of genes and how they are sorted in reproduction, and by the discovery that the genetic code found in DNA is the same for almost all organisms.*

While this certainly describes the current view of evolutionary theory, at least as it is described in standards

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and textbooks, it masks any hint of the well-known controversies that arose when Mendel's work was rediscovered. Also gone is any sense that the process of science has been anything other than clean and obvious in its development over time. Do not let the weak texts and mandates deceive, however. As our experience demonstrates, active teachers are interested in history of science and its use in the classroom. This June, the History and Philosophy of Science Program at Notre Dame will be hosting the biennial meeting of the International History and Philosophy of Science Teaching Group as well as its fifth Summer Program for Secondary Science Teachers, giving teachers the opportunity to study topics in the history of science and explore ways to utilize it in their own classes. In presentations at the National Science Teachers Association national conference, as well as at statewide science teacher meetings in Indiana and Illinois, we have spoken to several hundred teachers on the use of history of science in secondary classrooms. Teachers are interested. But interest alone is not enough.

For history of science to emerge from its gray boxes, it must be seen as an avenue for teaching science content. In the current educational climate, we have barely made strides in this direction. With the expansion of standardized testing and concerns over the performance of American students on exams like the Trends in International Mathematics and Science Study, teachers are under tremendous pressure to ensure that their students understand the course content. The time constraints indicated by Ms. Klosterman make it even more difficult for teachers to incorporate history of science. If, however, the history of science is used as a way to teach science content, it is no longer additional material relegated to gray boxes, but a key part of the science classroom. It is our contention that history of science can be used in such a manner to support the understanding of the relevant sciences; it is more than just history of science – it is part of science.

If historians of science want their field to leave gray box marginality, experts in our field must come together on equal terms with experts in educational theory and classroom practice both to design new materials and to create new accessible pedagogical frameworks. And, importantly, we believe that pre-service and in-service teachers alike must be targeted.

We cannot approach educators empty-handed, however. Teachers need to have immediate access to materials that incorporate history of science in meaningful ways if they are to see our appeals as legitimate. Ultimately, historians of science should be involved in textbook writing while advocating for the inclusion of more nuanced history of science in state science standards and acting as resources for curriculum committees from the local to national levels. In the meantime, however, we must develop supplementary materials to complement current textbooks. Even single lesson plans can help teachers incorporate history of science into their classroom with a minimum of difficulty.

Collaborative efforts to affect teaching practice must, of course, be two-way and must extend beyond the walls of the academy. Any experienced teacher will tell you that the high school science classroom is very different from the college classroom – and often different from the science classes in which these teachers were trained. Many teachers remain justifiably skeptical of suggestions from experts who have rarely, if ever, “gotten their hands dirty” in the classroom. Experienced, successful teachers need to be included in the development of new approaches to help ensure suitability and usefulness, as well as to help make these new approaches more palatable to educators. According to the National Science Education Standards, “[t]he challenge of professional development . . . is to create optimal collaborative learning situations in which the best sources of expertise are linked with the experiences and current needs of the teachers.” Who better to help teachers with incorporating history of science than those with the most expertise? And who better to impact the way we communicate to audiences beyond our own disciplinary boundaries than by consulting those who “translate” on a daily basis.

Our own senior colleagues have suggested we could use help in translation anyway. In the June 2008 issue of *Isis*, education is suggested as an important area in which historians of science can wield significant influence. Maienschein and Smith claim that “[i]t is not useful to individuals, to the field, or to the profession for historians of science to retreat to their secure studies and preach about the importance of our field. It is not valuable to dismiss

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popular histories of science that get the details 'wrong' but sell volumes, nor to sit in our tenured positions and complain that discussions of policy about climate change or creationism do not take the history seriously." We contend that these words apply not merely to history of science texts written for a trade audience but to the K-12 educational environment as well.

There is some encouraging news. Aside from the work of ourselves and our compatriots at Notre Dame, several teacher training programs have successfully included history of science as a key component of the educational process, most notably the UTeach program at the University of Texas-Austin. There are hundreds of other colleges and universities that prepare future teachers, each of which could be a place for fruitful and impactful collaboration, were such efforts proposed. By exposing young educators to the history of science and its significance to the classroom, historians can have a lasting impact on these budding professionals and the students they will eventually teach.

The history of science is already part of the K-12 curriculum for many students, often dressed up as the "nature" of science. The need for expertise in history of science is real and pressing; we need to look no further than the continued furor over the teaching of evolution for evidence. But biology classrooms are only the most obvious places for the insertion of the history of science. Ms. Klosterman concludes that "until more practical methods of incorporating history in science instruction are offered, and possibly even required, we will lose the true conceptual understanding of science, the scientific enterprise, and the significance (or insignificance) of our cultural heritage." We concur. But we disagree with the implication that education programs can instigate this change on their own.

It is our assertion that the onus is on we historians of science to extend a hand to colleagues in colleges of education and in the classroom. We must work together not only to create practical methods and materials for instruction, but also to develop a greater appreciation among educators for the history of science and its significance to our cultural heritage. After all, the goal of science education should be to teach students about science, not simply about a collection of facts and theories that this enterprise called science has generated and textualized. Our students will become citizens in a nation and world in which science and technology are already ubiquitous, and in which new problems and opportunities will arise. By preparing teachers to approach science in less rigid and restricted ways, we are giving students a chance to learn and understand science beyond the textbook facts, equipping them to become responsible and thoughtful citizens. Some historians have already undertaken this effort, and they are to be commended and supported, but there is still much that can be done. Thousands of teachers and millions of students can be reached by new collaborations, and it is our view and experience that even our own work as scholars can be changed for the better by the new perspectives such collaborations entail.

If, on the other hand, trained historians of science are either unwilling or uninterested in working with teachers and education programs, history of science will remain at risk of oversimplification and distortion, tucked away in dismissible gray boxes.

The national benchmarks are part of Project 2061. <http://www.project2061.org/publications/bsl/online/index.php?home=true>

http://www.nap.edu/openbook.php?record_id=4962

<http://dc.doe.in.gov/Standards/AcademicStandards/StandardSearch.aspx>

<http://www.cde.ca.gov/BE/ST/SS/documents/sciencestnd.pdf>

<http://dc.doe.in.gov/Standards/AcademicStandards/PrintLibrary/docs-science/2006-science-biologyi.pdf>, B.2.4 (p. 6)

National Research Council, *National Science Education Standards* (Washington: National Academies Press, 1995; 5th printing, 1998), 58.

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HISTORY OF SCIENCE AT YORK UNIVERSITY

The Graduate Program in Science and Technology Studies at York University will be the first English-speaking program of its kind in Canada. It is so new that we have yet to admit a single student. The Program is scheduled to begin in the fall of 2009, with an application deadline of April 1st, 2009. (Depending on the availability of spots, late applications may be accepted after the deadline.) The Program will offer both M.A. and Ph.D. degrees. In the first year we plan to accept about eight M.A. and four Ph.D. students. The Program will grow slowly over the next few years. History of science is an integral component of the faculty's vision of the interdisciplinary study of science and technology studies. But students in the Program will be expected to have an interest in the social studies and philosophy of science, and they will learn about other disciplines in the humanities and the social sciences that are used to study science, past and present.

There are four comprehensive exam fields. The first, *Biosciences and Biotechnologies*, encompasses studies of those sciences and technologies that concern living organisms. Courses in this field will explore the geopolitical significance of epidemics, the use of model organisms as instruments of investigation, and the specific ways in which the ambiguous concept of life is made visible, legible, and tangible in the biological sciences. The second field, *Human-Machine Interactions*, draws on the analytical resources of history, sociology, anthropology, and philosophy to make sense of the historical and contemporary interactions between humans and machines. Courses have been mounted on bodies in technology, designs of war, and technologies of behavior. *Focusing on Public Science*, the third field, explores the interactions of science and the public sphere. Among the courses planned in this field are science and narrative, the sciences in the Enlightenment, science and print culture, and race and racism in the human sciences. Finally, the fourth field on *Physical Systems* features courses on big science, mapping nature, and understanding the oceans. Rather than treat the physical sciences as autonomous domains, this field emphasizes the interconnectedness of astronomy, physics, chemistry, and related disciplines as systems designed for analysis, experiment, and intervention in the inorganic world. Ph.D. students are required to take comprehensive examinations in three fields, one of which can be a specially constructed field within a discipline that does not overlap with the four Program fields.

Mounting a new graduate program in Science and Technology Studies at York made sense for two reasons. York University has had tremendous success in the past launching interdisciplinary graduate programs, such as Environmental Studies, Social and Political Thought, Communications and Culture, Women's Studies, Interdisciplinary Studies, and Humanities. The STS Program continues in that tradition. But the other reason had to do with the unusually large number of scholars, over 30, working in all areas of STS at the University. The Graduate Program builds on the strengths of the undergraduate STS Program, which began in the fall of 2006, when two separate undergraduate programs at York, Atkinson's Science and Technology Studies program and the Faculty of Arts' Science and Society Program, amalgamated into a single program in STS open to students in both the Faculty of Arts and the Faculty of Science and Engineering. Currently, the new undergraduate program has over 50 majors and is growing quickly. In addition to forming a vibrant student STS club, which has planned a number of successful social events, the undergraduate students have made an important contribution to the formation of the graduate program. Last fall two eminent scholars in science and technolo-

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gy studies came to York on behalf of the provincial body that approves new graduate programs. Their task was to draft a report evaluating the new program. Since there were no graduate students to talk to, we arranged a meeting between them and the undergraduate majors in STS. About a dozen students showed up for the meeting. Their enthusiasm for science and technology studies impressed the scholars evaluating the program and played no small role in the positive report that was later written.

The creation of the new undergraduate program unified several groups of faculty and made possible the construction of a new graduate program. The Graduate Program is fortunate to have anthropologists of science (Naomi Adelson, Kathryn Denning, and Natasha Myers), sociologists of science (Pat Armstrong, Aryn Martin, Eric Mykhalovskiy, Peter Vandergeest, and Lorna Weir), and others working on the social studies of science and technology (Myles Ruggles and Ana Viseu). The Program also benefits from the participation of a strong group of historians of the social sciences, including Alexandra Rutherford, Michael Pettit, Thomas Teo, Marlene Shore, and Christopher Green. Faculty with research interests in science, technology, and culture include Katharine Anderson, Steven Bailey, Jody Berland, Tina Choi, Leslie Korrick, Bernard Lightman, Joan Steigerwald, and Nell Tenhaaf. Faculty from the Natural Science program who specialize in the philosophy and history of science, medicine and technology are Ernst Hamm, Jagdish Hattiangadi, Richard Jarrell, Edward Jones-Imhotep, Kenton Kroker, and Byron Wall. We also have faculty from Education (Steve Alsop), Environmental Studies (Leesa Fawcett and Bonnie Kettel), and Law (Joan Gilmour and Roxanne Mykitiuk). This collection of scholars represent an enormous breadth of expertise, and they can offer courses and supervision to a broad range of students, whose interests will vary in terms of historical period, scientific disciplines and methodology.

In addition to breadth and depth in its faculty, York has a number of strengths that render it an excellent place for graduate training in STS. For 13 years, the STS community at York has hosted a colloquium, at which scholars from York, Canada, the U.S., the U.K., and Europe, have presented their research and have been engaged in lively discussion by the audience. Nearly 300 such seminars have been given since they first began in 1994. York is also home to two prominent journals in the field – *ISIS* and *Journal of Theoretical and Philosophical Psychology*. York is one of six regional nodes in the SSHRC-funded Strategic Knowledge Cluster in STS/HPS. As a regional node, scholars at York will develop and secure funding for collaborative research projects, and hold small conferences and summer workshops. Activities such as these will provide rich opportunities for graduate students to build networks, develop their own projects, and share their insights with the STS community outside of York. Finally, STS faculty have developed a proposal to create a new research institute in Science and Technology Studies at York, which would provide a focal point for undertaking a series of exciting new research projects that would involve graduate students. More information on the Graduate Program is available on the Program Web site at: <http://www.yorku.ca/gradsts>.

– by *Bernard L. Lightman*

PHOTOESSAY: MAKING THINGS INVISIBLE

By Staffan Bergwik, Center for Gender Research, Uppsala University

Back in 1960, Ebba Hult (1882-1969) reminisced about working with her husband, Swedish geology professor Gerard De Geer (1858-1943). On sunny Sundays they made excursions to geologically interesting sites on the outskirts of Stockholm. Hult brought paper and pencil, and De Geer dictated a couple of pages while they enjoyed a cup of coffee in a park.(1)



Image 1: Gerard De Geer dictating to Hult.

Hult's work rarely appeared under her own name – it was incorporated into De Geer's books and scientific papers. Several pictures of the couple exist in Ebba Hult's archive at the Royal Academy of Sciences in Stockholm. I do not know the origin and purpose of these pictures, but they stage the couple's collaboration in interesting ways. The images indicate a certain texture of knowledge, order and authority, illustrating the nature of the partnership and Hult's work as an assistant, but also, partly, her role as a researcher in her own right. Furthermore, the visual representations display processes of making things invisible. Speaking about invisibility when discussing pictures might appear contradictory, nonetheless, the photos reveal Hult's geological research and how it was hidden.(2)

Gerard De Geer and Ebba Hult met in 1907 when she took his class – they married the following year. For the next 35 years she worked as his assistant.(3) During the early 20th century, De Geer, born into an aristocratic family, had a salient and highly visible position in Swedish society. His father, Louis, and older brother both served as prime ministers, while De Geer served as a member of parliament between 1900 and 1905.(4) His scientific career began with the Swedish Geological Survey, where he worked from 1878 to 1897. Subsequently, he accepted a professorship at the Geology Department at the University College in Stockholm (Stockholms högskola), where he worked until his retirement in 1924.



Between 1902 and 1924 he also served as the vice chancellor of the college. He was both an influential geological researcher and a spokesman for geology.

Image 2: De Geer at his desk.

The picture of De Geer at his desk with a map of Sweden in the background (image 2) elucidates an important link between geology and the nation. He was part of a generation of researchers that mapped the geological

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history of Sweden. His field of quaternary geology and, more specifically, geochronology led him to study late quaternary deposits and landforms. Above all, his research on layers of clay, called “clay varves,” proved most influential. Since varves – laminated sediments deposited in glacial lakes at the margin of the retreating Scandinavian ice sheet during the end of the last ice age – closely resembled tree-rings, De Geer argued that they were annual deposits. Using varves as a vehicle to determine the passage of time since the melting of the inland ice, he formulated a geological dating method with the year as a unit. The resulting varve chronology, called the Swedish time scale, became influential.

A powerful figure in contemporary academic settings, De Geer was also visible in a more literal sense. He received several prizes and medals, and was elected a member of geological societies around the world. In 1930 he was selected as a foreign member of the Royal Society, only the fifteenth Swede in 250 years. At the turn of the century, an interest in the ice age dominated geology and geology itself became a public science, formative for Sweden’s self image. Furthermore, the eleventh International Geological Congress was held in Sweden in 1910, presided over by De Geer. In his inaugural speech in front of 700 attendees, De Geer announced his dating method under the title “Geochronology of the last 12,000 years.”(5) Sweden’s mass media reported on geological studies and events like this, strengthening notions of Sweden as the land of the ice age, and reinforcing a northern identity.

In a newspaper article from 1928, the leading daily paper in Stockholm stated that every Swedish school child had heard of Gerard De Geer and his clay varves. But, the newspaper asked rhetorically: “how many know something about the great professor’s able assistant, the most loyal guardian of his work – in short about his wife.”(6) Ebba Hult held no academic degree, but she proved a crucial help in collecting data on clay varves during excursions. She also assisted in synthesizing observations and provided secretarial as-

sistance. Between 1910 and 1930, the couple mapped annual deposits of clay as empirical groundwork of the geochronological dating method and the Swedish time scale. They went on excursions around Sweden and Scandinavia, but also to the Swiss Alps and the U.S.(7)

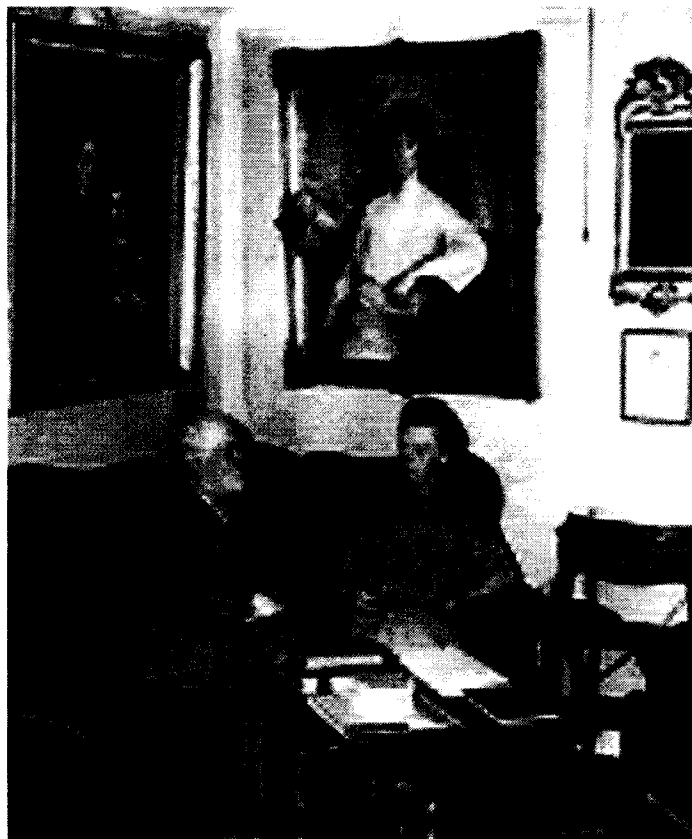


Image 3: De Geer and Hult in their home

Among the pictures found in Hult’s archive, some clearly frame their collaboration within private settings (image 3). Indeed, home was of great importance and also provided a place for geological research, especially after 1924. At that time De Geer retired from his professorship and created a geochronological institute located in the family apartment in Stockholm. Their home became a place for living and an international center for geochronology. Hult and De Geer worked together at the institute and received visitors and also data from field workers in Europe, the Americas, Asia, and Africa. The institute interwove domestic and scientific life, and its

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semi-private character enabled Hult to do geological work despite being a woman without formal scientific credentials.

Marriage propelled Hult into scientific work, though she labored in the background while De Geer received official acknowledgements. Her work in drawing clay varves, gathering data in the field, and taking notes was invisible to a great extent. Of course, assistants collecting large quantities of data in the field for their geology professors was business as usual at the time. De Geer used several assistants, primarily his students, and there was an uneven distribution of influence. However, the working order between him and his wife was also structured by contemporary gendered norms about family life. Early 20th-century society, especially the bourgeois context in which Hult and De Geer lived, was founded on a sharing of labor, with the wife in the domestic domain and the man in the public.



Image 4: De Geer and Hult before a cross section of a tree trunk.

In a picture portraying the couple in front of a cross section of a trunk, De Geer appears to instruct Hult about tree rings – an elaboration of their dating method (image 4). Even though the picture frames a partnership, it also suggests how the collaboration was structured. De Geer's authority and work subsumed Hult's labor. In fact, both entered the marriage with already articulated ideas about her working

in the shadow of her husband. In his marriage proposal, De Geer explicitly asked Hult if she wanted to help him. She replied that she "wanted to help the professor," and spoke of a five-year plan, which entailed an academic degree. Because of De Geer's heavy workload, these plans never materialized.(8)

This distribution of authority and influence repeated itself in other kinds of representations of their work. In an article on Hult, the Swedish newspaper *Svenska Dagbladet* reported that the empirical results obtained by the couple on excursions in the U.S. were to be published by "Professor De Geer" in a "scientific forum" and that "his theories" were confirmed by the empirical findings.(9) De Geer had the position and credibility to represent the scientific results; Hult's work was incorporated into the work of her husband.

Between 1927 and 1929, De Geer's health deteriorated; a cataract made an eye operation necessary. In the meantime, Hult did her own work, e.g. on clay varves in Iceland. On her own, she worked towards maintaining the geochronological method and her husband's research program. In her paper on Icelandic clay varves she emphasized that "Professor De Geer entrusted me with the problem of teleconnecting some clay telegrams from Iceland."(10) Indeed, their partnership – as well as Hult's work – was defined by De Geer's research orientation.

In the 1930s, De Geer's research opportunities diminished because of his age (he was now in his seventies). After his death in 1943, Hult continued their joint work. As suggested by image 5, Hult now became a researcher in her own right, building on articles she published in the 1920s and 1930s, in, for example, the *Scottish Geographical Magazine* and the annals of the Swedish geological association.(11)

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Image 5: Hult as independent researcher?

In 1933 the Science Association in Stockholm elected Hult as its first woman member. This event received some attention in the Swedish newspapers, which described the election as recognition of Hult's work as her husband's "untiring assistant" and also of her own "published scientific findings."⁽¹²⁾ Collaboration with her husband had generated enough scientific merit to give her access to an important part of the scientific infrastructure of the Swedish capital.

Women in early 20th-century Swedish science were typically marginalized outsiders. Held back by laws, scientific ideals, and academic mores, they occupied a position in the outer circles of the male community of academe.⁽¹³⁾ The scientific family provided a resource in the face of these difficulties and obscured the border between private and public. The partnership with De Geer partly gave Hult access to official contexts, such as the science association, from which she would otherwise have been barred. She stated that her position as De Geers's wife enabled her to conduct science in a way that would have been impossible otherwise.⁽¹⁴⁾

Nonetheless, Hult's work was made invisible through norms about family and scientific collaborations, and she gained limited recognition in the official system of science. After her husband's death in 1943 she tried to pursue her own research, with little success, and throughout her life in academic science her research was placed squarely in the tradition created by him. Women like Hult had gendered trajectories through academic institutions. Her position entailed tensions and was not static. On the one hand the family partnership advanced her work, making her temporarily part of geology. On the other, through the gendered structures of science, she remained an outsider, and her work was included in that of her husband.

The photos of the De Geer-Hult partnership display some of these issues through the way they are framed. They do not literally obscure Hult's work. She is present, but the images reproduce the hierarchies and cultural schemes involved in the partnership. Other representations of their work added to Hult's ambiguous status. Reporting on her entry into the Science Association in 1933, one of the Swedish newspapers claimed that "The wife of the professor is herself a 'Professor.'" The quotation marks indicated the difference between Hult and a regular professor. In a congratulatory remark the newspaper also claimed that she was a type of "professor's wife who in an ideal way combines the virtues of being a house wife and a scientist."⁽¹⁵⁾ Being both meant working in a gendered order whose processes simultaneously emphasized and obscured Hult's work and blurred her scientific status.

Notes

1. "Gerard och våren" [Gerard and the spring], unpublished manuscript by Ebba Hult, December 6, 1960. The manuscript is found in Ebba Hult's archive at the Center for History of Science at the Royal Academy of Science in Stockholm. This research is part of a larger project titled "On the outskirts of science: Women as outsiders within early twentieth-century science," which is funded through a grant from the Swedish Research Council. The images are reproduced with the permission and courtesy of Anne

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Miche de Malleray, archivist at the Center for History of Science, Royal Academy of Sciences in Stockholm.

2. The topic of invisibility in the history of science has been addressed in influential books on women in the history of science. See Margaret Rossiter, *Women Scientists in America. Before Affirmative Action, 1940-1972*. Baltimore: Johns Hopkins University Press, 1995; Londa Schiebinger, *The Mind has No Sex? Women in the Origins of Modern Science*. Cambridge, Mass.: Harvard University Press, 1989. In this essay I draw heavily on Steven Shapin's work on invisible technicians. Steven Shapin, *A Social History of Truth: Science and Civility in Seventeenth-century England*. Chicago: Chicago University Press, 1994.

3. *Stockholmstidningen*, March 3, 1933. The newspaper articles referred to here are collected in Ebba Hult's archive.

4. Christer Nordlund, *Det upphöjda landet: Vetenskapen, landhöjningsfrågan och kartläggningen av Sveriges förflutna, 1860-1930*. Umeå: Umeå University, 2001, pp. 72 och 99-105.

5. *Ibid.*, pp. 148-155

6. *Stockholmstidningen*, March 16, 1928

7. Nordlund, pp. 72 och 99-105. See also *Stockholmstidningen* March 3, 1933 and *Svenska Dagbladet* March 3, 1933.

8. Draft to an autobiography by Ebba Hult. The draft is found in her archive, vol. F:3.

9. *Svenska Dagbladet* March 3, 1933; *Stockholmstidningen* May 16, 1928

10. Ebba Hult, "Late Glacial Clay Varves in Iceland," in *Geografiska Annaler* (1928), vol. 10, p. 297.

11. Ebba Hult, "Prehistoric Bulwark in Gotland Biochronologically Dated," in *Geografiska Annaler*, (1935) vol. 17, pp. 501-532; Ebba Hult, "Jahresringe und Jahrestemperatur," in *Geografiska Annaler*, (1936) vol. 18, pp. 277-297.

12. *Stockholmstidningen*, March 3, 1933.

13. Hanna Marklund, *Som isolerade öar: de lagerkransade kvinnorna och akademien under 1900-talets första hälft*. Eslöv: Symposion, 2003.

14. *Svenska Dagbladet*, March 3, 1933; *Stockholmstidningen* May 16, 1928 and March 3, 1933.

15. *Svenska Dagbladet*, March 3, 1933