History of Physics Newsletter Volume VII, No. 3, Aug. 1998

Forum Chair Urges APS Centennial Participation

The American Physical Society celebrates its 100th anniversary in Atlanta, Georgia, at an expanded six-day meeting from March 20-26, 1999, which will be jointly sponsored by the American Association of Physics Teachers. This will be the largest meeting of physicists ever held, and the APS Forum on the History of Physics will play a central role in making it a truly memorable event.

The 20th century has been the Century of Physics. The startling discoveries of X-rays, radioactivity, and the electron at the end of the 19th century opened up vast new territories for exploration and analysis. Quantum theory and relativity theory, whose consequences are far from exhausted today, formed the bedrock for subsequent developments in atomic and molecular physics, nuclear and particle physics, solid state physics, and all other domains of physics, which shaped the world in which we live in times of both peace and war. A large historical wall chart exhibiting these developments, to which members of the Forum contributed their expertise, will be on display in Atlanta. Also on display will be the well-known Einstein exhibit prepared some years ago by the American Institute of Physics Center for History of Physics.

Two program sessions arranged by the Forum at the Atlanta Centennial Meeting also will explore these historic 20th-century developments. The first, chaired by Ruth H. Howes (Ball State University), will consist of the following speakers and topics: John D. Norton (University of Pittsburgh), "Einstein and the Canon of the Mathematically Simple"; David C. Cassidy (Hofstra University), "Quantum Mechanics: Origins and Development"; John S. Rigden (American Institute of Physics), "The Hydrogen Atom: The Atom of the Century"; and Lillian Hoddeson (University of Illinois), "The Big Band Era."

The second, chaired by Michael Riordan (SLAC), will include Wolfgang Panofsky (SLAC), "The Evolution of Accelerators and Colliders for High Energy Physics"; Robert W. Seidel (University of Minnesota), "What did You do in the War, Daddy? Physicists' Experience in World War II"; Peter L. Galison (Harvard University), "High Energy Physics Experiments"; and Steven Weinberg (University of Texas), "Theory since World War II."

The 20th century also was the century during which physics in America grew from a backwater into the surging river with many tributaries that leads the world today. One American physicist, I. I. Rabi, was a central figure in this enormous transformation and can stand as a symbol for it, representing the many others in all parts of the country who brought it to fruition. The Forum thus will sponsor a special session in Atlanta on Rabi's life, work, and influence on American physics and society. This session will be chaired by John S. Rigden (American Institute of Physics), and will include Norman F. Ramsey (Harvard University), "Magnetic Resonance"; Dudley R. Herschbach (Harvard University), "Molecular Beams"; William D. Phillips (National Institute of Standards and Technology), "Atomic Clocks"; Daniel Kleppner (Massachusetts Institute of Technology), "Precision Measurements"; Martin

L. Perl (SLAC), "Advocate for Physics"; Neal Lane (National Science Foundation), "Science Education"; and Hans A. Bethe (Cornell University), "Science Policy and International Affairs."

In addition to the above three program sessions, the Forum will co-sponsor sessions with the APS Instrument and Measurement Science Topical Group and with the APS Committee on the Status of Women in Physics. The Atlanta meeting will constitute a unique opportunity to celebrate the 100th anniversary of the American Physical Society and 100 years of physics in America. It will itself be a historic event of major proportions that our Forum has played a significant role in realizing. I invite all members of the Forum to join me in Atlanta to celebrate this wonderful and historic event.

- Roger H. Stuewer, Forum Chair

From the Editor: Publication Schedule / History Symposia

Regular readers of this Newsletter will notice that this issue is earlier than it has been most years. Our winter issue comes out in February with the Forum ballot, while the publication schedule for the AIP Center for History of Physics Newsletter is May and November. Since many of our members receive both Newsletters, we have moved our fall issue from October to August. This allows us to provide our two annual issues six months apart and staggered by three months with the AIP Newsletter, and hopefully provide more timely notice of history activities through the two Newsletters. I hope you find the new schedule convenient.

One of the most appreciated activities of the Forum on History of Physics is the regular sponsorship of history sessions of general interest at national APS meetings. This Newsletter attempts to extend the audience for these symposia to all Forum members and other subscribers by providing reports of the history sessions each year. This coming year, with the APS Centenary Celebration, the Forum is doing even more symposia than usual. We will try to give you a full report next August. A symposium on the "History of Critical Phenomena" was organized by the Forum at the 1998 APS March Meeting in Los Angeles. That session attracted great interest at the meeting. It is hoped that the reports here will be of similar interest to our readers. We also have reports on the two symposia held at the April APS Meeting: "Science and Its Critics" and "Teaching Physics a Century Ago."

- Bill Evenson, Editor

Forum News

Forum Officers:

Roger H. Stuewer, School of Physics and Astronomy, University of Minnesota (rstuewer@physics.spa.umn.edu), became Chair in April 1998 at the end of Stewart Gillmor's term. Allan D. Franklin, Department of Physics, University of Colorado (Allan.Franklin@colorado.edu), became Chair-elect and will succeed to Chair in April 1999. Laurie M. Brown, Department of Physics and Astronomy (emeritus), Northwestern University (brown@nuhep.phys.nwu.edu), was elected Vice-Chair and will succeed to Chair-Elect in April 1999.

Bill Evenson, Department of Physics and Astronomy, Brigham Young University (evenson@byu.edu), was elected Secretary-Treasurer, succeeding David Cassidy. Alanna Connors, Department of Physics, University of New Hampshire (aconnors@christa.unh.edu), and Martin C. Gutzwiller, IBM Yorktown Heights (retired)

(MoonGutz@aol.com), were elected to three-year terms on the Executive Committee. The remaining members of the Executive Committee are Ruth H. Howes, Department of Physics and Astronomy, Ball State University (00rhhowes@bsuvc.bsu.edu), and Bertram Schwarzschild, Physics Today (bschwarz@aip.org), whose terms expire April 1999; and Dudley Herschbach, Department of Chemistry, Harvard University (herschbach@chemistry.harvard.edu), and Abner E. Shimony, Department of Physics, Boston University (shimony@bu.edu), whose terms expire April 2000.

Gloria Lubkin, Physics Today (gbl2@aip.org), continues as Forum Councillor until 2002, and Spencer R. Weart, Director of the AIP Center for History of Physics (sweart@aip.org), continues to serve as Ex Officio member of the Executive Committee. Many thanks to David Cassidy, Natural Science Program, Hofstra University (dcassidy@pppmail.nyser.net), for his excellent service as Secretary-Treasurer; to C. Stewart Gillmor, Department of History, Wesleyan University (sgillmor@wesleyan.edu) for his good work as Chair during 1997-98; and to Gordon A. Baym, Department of Physics, University of Illinois (gbaym@uiuc.edu), for his continued help as Past Chair this year. Thanks also to Peggy A. Kidwell, Smithsonian Institution, and K. C. Wali, Department of Physics, Syracuse University (wali@suhep.phys.syr.edu) for their help for the last three years on the Executive Committee.

Forum Committees

For 1998-99, the Standing Committees of the Forum are:

Program Committee: Allan Franklin (chair), Ruth Howes, Roger Stuewer

Nominating Committee:Laurie Brown (chair), Hans von Baeyer (APS), Stewart Gillmor, Gloria Lubkin, Alanna Connors

Fellowship Committee:Stewart Gillmor (chair), David Cassidy, Martin Gutzwiller

Publications Committee: Bill Evenson (chair), Spencer Weart

Membership Committee: Bill Evenson (chair), Abner Shimony

APS Centennial Liaison: Dudley Herschbach (chair), Bert Schwarzschild, Roger Stuewer

APS Centennial Meeting Sorting Committee Representative: Roger Stuewer

Executive Committee

The annual meeting of the Executive Committee was held on April 18, 1998, in conjunction with the Columbus, OH joint APS-AAPT annual meeting. It was chaired by Stew Gillmor. Considerable attention was given to plans for the APS Centennial Meeting and to program plans for the coming year. It was announced that two Forum nominees for APS Fellowship were approved by Council: Daniel Siegel and Sylvan S. Schweber.

The Executive Committee unanimously approved in principle a proposal by Abner Shimony and the membership committee to recommend to APS Council the creation of an associate membership category in APS to make Forum (or other APS unit) membership more widely available. Work is going forward on this proposal.

Program Plans for the APS Centennial Meeting in Atlanta, March 1999

Forum Chair Roger Stuewer has outlined our plans for the APS Centennial Meeting in Atlanta in March in his note at the opening of this Newsletter. The session to be co-sponsored with the Committee on the Status of Women in Physics will include a talk by Maurice Goldhaber on "A Student at the Cavendish Laboratory in the 1930's," and a talk by Robert Sachs on "Maria Goeppert Mayer: Nuclear Physicist," in addition to others still being finalized.

APS Fellow Nominations

Stew Gillmor is chair of the Forum's Fellows Sub-Committee for 1998-99. Any Forum members who wish to nominate a candidate for Fellow in APS are invited to send him their suggestion(s), along with a c.v. and letter describing the achievements of the candidate in History of Physics. Mail suggestions to C. Stewart Gillmor, Wesleyan University, 238 Church St., Middletown, CT 06459-0002, or email sgillmor@wesleyan.edu.

A Call for News

Forum members would like to know what others are doing in history of physics activities. This could include news of future, present or past participation in conferences, seminars, workshops, etc., announcements and/or programs for such events, mention of recent publications by members, or other items you think might be of interest to our audience. Please send suggestions to the Newsletter editor (evenson@byu.edu).

APS and AIP News

AIP Center for the History of Physics

New Grants to Archives

The Center for History of Physics of the American Institute of Physics has announced a new program of grants to archives to make accessible records and papers which document the history of modern physics and allied fields (such as astronomy, geophysics, and optics). Grants can be up to $10,000 each and can be used only to cover direct expenses connected with preserving, inventorying, arranging, describing, or cataloging appropriate collections. Expenses may include acid-free storage materials and staff salary/benefits but not overhead.

The AIP History Center's mission is to help preserve and make known the history of modern physics and allied fields, and this new grant program is intended to help support significant work to make original sources accessible to researchers. Preference will accordingly be given to medium size or larger projects for which the grant will be matched from other sources or by the parent organization. Application deadline for this year was July 1, but the program will be offered annually if funds permit. For grant guidelines or for more information on the Center and its programs, check their Web site at http://www.aip.org/history/grntgde.htm, or call (301) 209-3165.

Grants-in-Aid for History of Modern Physics and Allied Sciences (Astronomy, Geophysics, etc.)

The AIP Center for History of Physics has a program of grants-in-aid for research in the history of modern physics and allied sciences (such as astronomy, geophysics, and optics) and their social interactions. Grants can be up to $2500 each. They can be used only to reimburse direct expenses connected with the work. Preference will

be given to those who need funds for travel and subsistence to use the resources of the Center's Niels Bohr Library (near Washington, DC), or to microfilm papers or to tape-record oral history interviews with a copy deposited in the Library. Applicants should name the persons they would interview or papers they would microfilm, or the collections at the Library they need to see; you can consult the online catalog at http://www.aip.org/history, and please feel free to make inquiries about the Library's holdings. Applicants should either be working toward a graduate degree in the history of science (in which case they should include a letter of reference from their thesis adviser), or show a record of publication in the field. To apply, send a vitae, a letter of no more than two pages describing your research project, and a brief budget showing the expenses for which support is requested to: Spencer Weart, Center for History of Physics, American Institute of Physics, One Physics Ellipse, College Park, MD 20740, tel. (301) 209-3174, fax (301) 209-0882, e-mail sweart@aip.org . Deadlines for receipt of applications are June 30 and December 31 of each year.

History of Physics Bibliography

The annual bibliography of recent books in the history of physics, produced by the AIP Center for History of Physics in cooperation with the Forum on the History of Physics, is now entering its fifth year. Among other uses, the list can help readers to suggest books for purchase by their institutional libraries. Stephen Brush, who inaugurated and diligently compiled the bibliography, is turning over the reins to Per and Eleanor Dahl, who have generously agreed to carry on this valuable task. The bibliography is published each Fall in the Center's free AIP History of Physics Newsletter, and is available on its Website at http://www.aip.org/history/web-news.htm#bibl.

Notes & Announcements

The Seven Pines Symposium

The Seven Pines Symposium is dedicated to bringing historians, philosophers, and physicists together for several days in a collaborative effort to probe and clarify significant foundational issues in physics, as they have arisen in the past and continue to challenge our understanding today. The symposium takes its name from Seven Pines Lodge, located near Lewis, Wisconsin, which was built in 1903 as a trout-fishing camp and since 1978 has been on the National Register of Historic Sites. In the past, President Calvin Coolidge and other notables vacationed there. Today, its idyllic setting and superb cuisine make it an ideal location for small informal meetings.

The second annual Seven Pines Symposium was held from May 13-17, 1998, on the subject, "Historical and Philosophical Perspectives on the Interplay of Physics and Mathematics." Twenty-five historians, philosophers, physicists, and mathematicians were invited to participate in it.

Each day four speakers set the stage for discussion by addressing major episodes in the interplay of physics and mathematics. Saunders Mac Lane (Chicago) and George Mackey (Harvard) spoke on "The Effectiveness of Mathematics in Physics Puzzle," with Mark L. Wilson (Ohio State) as commentator. Jesper Lützen (Copenhagen) and Thomas Archibald (Acadia) spoke on "Physical Mathematics in the 19th Century," with Jed Z.

Buchwald (MIT) as commentator. Leo Corry (Tel Aviv) and David E. Rowe (Mainz) spoke on "Hilbert and the Physics-Mathematics Tradition at Göttingen, with Karin Reich (Hamburg) as commentator. Jeremy Gray (London) and Geoffrey Hellman (Minnesota)

spoke on "Continuity and Discreteness," with Ned Hall (MIT) as commentator. Michael L. Friedman (Indiana) and John D. Norton (Pittsburgh) spoke on "Disentangling Physical and Mathematical Structures," with David B. Malament (Chicago) as commentator. A closing roundtable discussion was led by Don Howard (Notre Dame) and Miklós Rédei (Eötvös). Unlike the typical conference, twice as much time was devoted to discussions following the talks as to the talks themselves, and long mid-day breaks permitted small groups to assemble at will. As preparation for the talks and discussions, the speakers prepared summarizing statements and selected appropriate background reading materials, which were distributed in advance to all of the participants.

Lee Gohlike, the founder of the Seven Pines Symposium and owner of Seven Pines Lodge, has had a life-long interest in the history and philosophy of physics, which he has furthered through graduate studies at the Universities of Minnesota and Chicago. To plan the symposia, which will be held annually, he established an advisory board consisting of Roger H. Stuewer (Minnesota), Chair, Jed Z. Buchwald (MIT), John Earman (Pittsburgh), Geoffrey Hellman (Minnesota), Erwin N. Hiebert (Harvard), Don Howard (Notre Dame), and Alan E. Shapiro (Minnesota). Also participating in the second annual Seven Pines Symposium were Diana Barkan (Caltech), Joseph D. Harris (Dartmouth), Goran Prstic (Minnesota), and Serge Rudaz (Minnesota).

The third annual Seven Pines Symposium will be held from May 5-9, 1999, on the subject, "The Field Concept in Physics."

Conference on the History and Heritage of Science Information Systems:
The Chemical Heritage Foundation, the American Society for Information Science (ASIS), and the ASIS Special Interest Group/History and Foundations of Information Science (SIG/HFIS) announce a call for papers for the Conference on the History and Heritage of Science Information Systems, to be held Oct. 23-25, 1998 (immediately prior to the annual meeting of ASIS) in Pittsburgh, PA. Address inquiries to Robert V. Williams, Conference Chair, College of Library and Information Science, University of South Carolina, Columbia, SC 29208, Phone 803-777-2324, Fax 803-777-7938, email: bobwill@sc.edu.

History of Science Society Annual Meeting

The History of Science Society will hold its annual meeting in Kansas City on 21-25 October 1998. Contact the History of Science Executive Secretary's Office, Box 351330, University of Washington, Seattle, WA 98195-1330, 206-543-9366, fax 206-685-9544.

History of Philosophy of Science Association Biennial Meeting

The History and Philosophy of Science Association will hold its biennial meeting on 21-23 October 1998 in Kansas City, MO. Contact Don Howard, Chair, PSA 1998 Program Committee, History and Philosophy of Science Association, 346 O'Shaughnessy, University of Notre Dame, Notre Dame, IN 46556, email: Don.A.Howard@nd.edu .

Science, Technology and the Rise of Nature Conference

A conference on "Science, Technology and the Rise of Nature," will be hosted by the Society for the Social Studies of Science and the Environmental Studies Association of Canada in Halifax, Nova Scotia on 28 October - 1 November 1998. Contact Gary Bowden, Chair 4S/ESAC Conference, Department of Sociology, University of New Brunswick, Box 4400, Fredericton, New Brunswick, Canada E3B 5A3, fax 506-453-4659,

email: glb@unb.ca.

American Historical Association Annual Meeting

The American Historical Association will hold its annual meeting in Washington, DC on 7-10 January 1999. Contact the American Historical Association, 400 A Street, SE, Washington, DC 20003, 202-544-2422.

R & D Investment Conference

A Conference on R&D Investment and Economic Growth in the 20th Century is planned for March 26-28, 1999 at Haas Business School, University of California - Berkeley. This is a jointly sponsored conference of the All-UC Group in Economic History and the Center For Studies in Higher Education, University of California, Berkeley. Paper proposals are due October 30, 1998. Proposals by graduate students as well as faculty are welcomed. Conference attendees will be provided with round trip airfare to the Bay Area, or auto mileage for Northern California participants; lodging for those who do not live in the immediate Bay Area; lunch and a dinner banquet on Saturday, and a continental breakfast on Saturday and Sunday mornings. Proposals should be no more than four pages, doubled-spaced. Graduate students should include a letter of endorsement from your faculty advisor. Please submit your proposal by email, or send four hard-copies on or before October 30, 1998 to John A. Douglass, Center for Studies in Higher Education, South Hall Annex, #4650, University of California, Berkeley, CA 94720-4650, john.douglass@ucop.edu.

Organization of American Historians Meeting

The Organization of American Historians will meet in Toronto, Ontario Canada on 22-25 April 1999. Contact Organization of American Historians, 112 Bryan Street, Bloomington, IN 47408, 812-855-7311, fax 812-855-0696, email: oah@oah.indiana.edu.
International History, Philosophy and Science Teaching Group's Fifth International Conference

The International History, Philosophy and Science Teaching Group will hold its 5th international conference at Pavia University on 15-19 September 1999. The meeting will contribute to the local celebrations of the bicentenary of Alessandro Volta's creation of the battery in 1799. Contact Dr. E. A. Giannetto, Dipartimento di Fisica 'A. Volta', Universita di Pavia, Via A Bassi 6, 27100 Pavia, Italy, email: volta99@pv.infn.it. www.cilea.it/volta99.

International Bogoliubov Conference

The International Bogoliubov Conference on Fundamental Problems in Theoretical and Mathematical Physics will be held in Moscow, Dubna, and Kiev (successively) 27 September to 6 October 1999. This conference will have a significant historical component. Conference deadline is 15 April 1999. Contact A. N. Sissakian, JINR, 141980 Dubna, Moscow Region, Russia, phone: 7 09621 63448, fax: 7 09621 65599, email: bog1999@thsun1.jinr.ru ; or A. G. Zagorodny, Bogolyubov Institute for Theoretical Physics NASU, Metrolohichna Str., 14-b, Kiev, Russia, phone: 38044 266 53 62, fax: 38044 266 59 98, email: azagorodny@gluk.aps.org or bog1999@gluk.aps.org ; or O. I. Zavialov, Steklov Mathematical Institute, Gubkin St., 8, Moscow, 117966, GSP-1, Russia, email: bog1999@mi.ras.ru.

International Congress of Historical Sciences

The International Congress of Historical Sciences will be held in Oslo, Norway on

6-13 August, 2000. Contact Renate Bridental, Ph.D. Program in History, Graduate School and University Center, City University of New York, 33 West 42nd Street, New York, NY 10036-8099.

On-Line NASA Books

NASA Book Available On-Line: First Among Equals: The Selection of NASA Space Science Experiments (NASA SP-4215) is now available on-line. It was written by John E. Naugle, former NASA Chief Scientist, and published in 1991. This book describes the sometimes contentious process established in the first years of NASA's existence to prioritize space science projects and experiments for flight. It can be found at URL http://www.hq.nasa.gov/office/pao/History/SP-4215/titlepg.html

NASA History Publication Wins Prize

To See the Unseen: A History of Planetary Radar Astronomy (NASA SP-4218) by Andrew J. Butrica was recently awarded the prestigious Leopold Prize. The prize, awarded bi-an the Organization of American Historians (OAH), is given for the best book written by historians outside academe. To See the Unseen explores the development of radar astronomy within the context of the larger community of scientists, a unique capability brought about over the past 50 years. This history was published by the NASA History Division in 1996 and is for sale for $26.00 (domestic postpaid), $32.50 (non-U.S.).

Reports of 1997 Conferences on History of Space and Geophysics Available
Three international conferences were held in 1997 on topics in the history of space and geophysics. The first conference was held in March at the German Geophysical Society meetings in Potsdam and treated the theory of relativity and gravitation in geophysics, Michelson, Foucault and Mach, the work of Helmholtz, physical applications and geophysical evidence in Heisenberg's research, and other historical topics. The second conference was held in Vienna at the European Geophysical Society in April. It dealt with solar and terrestrial physics during the 19th and 20th centuries. The third conference was held in Uppsala at the IAGA meeting and dealt with the history of geophysics and aeronomy and global change. Papers were given on Helmholtz, Gama, Bjerknes, the development of theoretical meteorology, and the development of geophysical sciences in various parts of the world. Information on the conference papers and a fuller report can be obtained from Wilfried Schröder, Hechelstrasse 8, D-28777 Breman, Germany.

Dibner Institute for the History of Science and Technology: Fellows Programs 1999-2000

The Dibner Institute for the History of Science and Technology invites applications to its two fellowship programs for 1999-2000: the Senior Fellows program and the Post-Doctoral Fellows program. The Dibner Institute expects to have twenty-one Fellows each term. Candidates for Senior Fellowships should have advanced degrees in appropriate fields and offer evidence of substantial scholarly accomplishment and professional experience. Scholars may apply to the Senior Fellows Program for the Fall (Term 1), the Spring (Term 2), or both. Post-Doctoral Fellowships are awarded to outstanding young scholars of diverse countries of origin who have obtained the Ph.D. or equivalent within the previous five years. Post-Doctoral Fellowships run for one year, from September 1 through August 31, and may be extended for a second and final year at the discretion of the Dibner Institute. The Dibner Institute is an international center for advanced research in the history of science and technology, established in Massachusetts in 1992. It includes the Burndy Library as its scholarly library resource and enjoys the participation in its programs of faculty

members and students of consortium-member institutions including MIT, as host institution, Boston University, Brandeis and Harvard. All Dibner Fellows are expected to reside in the Boston area during the terms of their grants, to participate in the activities of the Dibner Institute community and to present their current work at appropriate occasions during their fellowship appointments. Fellowships provide office space, support facilities and full privileges at the Burndy Library and at the libraries of consortium universities. Fellows will have access to the entire spectrum of activities that take place at the Dibner Institute, where they will be able to collaborate in an atmosphere of collegiality and find the resources and appropriate settings to carry on their work. Funds are available for housing, living expenses and return travel costs. Estimates of costs, as well as the average stipend for 1998-1999, are provided with the application forms. The deadline for receipt of applications for 1999-2000 is December 31, 1998. Fellowship recipients will be announced in March, 1999. Please send requests for further information and for application forms directly to Trudy Kontoff, Program Coordinator, Dibner Institute for the History of Science and Technology, Dibner Building, MIT E56-100, 38 Memorial Drive, Cambridge, Massachusetts 02139, 617. 253.6989, Fax: 617. 253.9858, email: dibner@mit.edu.

Dibner Institute Names Resident, Visiting and Postdoctoral Fellows for 1998-1999
The Dibner Institute for the History of Science and Technology is pleased to announce the appointments of the Dibner Institute Fellows for 1998-1999. The Institute has appointed thirteen Resident, one Visiting, and seven Postdoctoral Fellows. They come from several nations and pursue many different aspects of the history of science and technology.

The following thirteen persons have been appointed as Dibner Institute Resident Fellows:

Xiang Chen, California Lutheran University, working on "Instruments as Material Paradigms: Experimental Apparatus in the Optical Revolution."

Kelly DeVries, Loyola College, Maryland, working on "Devils from Hell: Gunpowder Weaponry During the Hundred Years War."

Moritz Epple, University of Mainz, Germany, doing research on the emergence of topology.

Juliet Floyd, Boston University, plans to complete a book on the historical and philosophical significance of Ludwig Wittgenstein's discussions of mathematics and logic.

Allan Franklin, University of Colorado, working on "Death by a Thousand Cuts: Selectivity and the Production of Experimental Results."

Kostas Gavroglu, University of Athens, working on the final stages of a book on the history of quantum chemistry and research for a project entitled, "The Sciences in the European Periphery during the Enlightenment."

Alexander Jones, University of Toronto, exploring Ptolemy's Geography, the only book on cartography to have survived from classical antiquity.

Andrew Pickering, University of Illinois at Urbana-Champaign, working on a book titled "History of Cybernetics."

Nicolas Rasmussen, University of New South Wales, Australia, will study American

plant physiologists in the 1920s-1940s and their links to the biotechnology industry.

Leonard S. Reich, Colby College, will work on a book about transportation in American history titled "On Wheels, Wings, and Waves."

Katherine Rinne, University of Virginia, continuing an interdisciplinary study of hydrology, topography and urban form that explores Rome's 2800-year water history.
Friedrich Steinle, Max-Planck Institute for the History of Science, Berlin, working on a book titled "The Formative Period of Electromagnetism 1820 - ca. 1833."

Nicolas Wey-Gomez, MIT, working on "The Old Science in the New World: Scholastic Science and Moral Philosophy in the Spanish Colonial Americas."

Lis Brack-Bernsen has been appointed as a Dibner Institute Visiting Fellow. She has taught at the Universities of Copenhagen and Aarhus in Denmark and will work on interpreting Babylonian lunar text TU 11. The Dibner Institute has made the following seven Postdoctoral Fellowship appointments:

Arne Hessenbruch, University of Pennsylvania, working on a book titled "Reception of the Theory of Radioactive Disintegration."

Christophe Lecuyer, Stanford PhD, will work on a project titled "From the Lab to the Fab: Physics Research, Manufacturing Practice, and Ion Implantation at High Voltage Engineering Corporation and Fairchild Semiconductor, 1962-1978."

Reviel Netz, Cambridge University, UK, will study theoretical issues arising from his book on Greek mathematics with the expectation of writing a brief volume, "An Introduction to Cognitive History."

Richard Sorrenson, Indiana University, will continue work on his manuscript, "Visible Technicians. The Pursuit of Natural Philosophy by Mathematical and Optical Instrument Makers in 18th Century England."

Klaus Staubermann, Cambridge PhD, will analyze the debate between two leading astrophotometrists, G. Müller in Potsdam and E. Pickering at Harvard College Observatory. John Michael Steele will investigate the lunar and planetary records contained in the "Astronomical Diaries," kept by Babylonian astronomers from mid-eighth century B.C. to the beginning of the Christian era. He also plans to study East Asian, European and Babylonian records of meteors.

Benno van Dalen, Institut für Geschichte der Naturwissenschaften, Frankfurt am Main, Germany, will begin work on a manuscript tentatively titled "The Activities of Muslim Astronomers in China During the Mongolian Yuan Dynasty (1260-1368)."
The Dibner Institute has reappointed the following persons to a second year as Postdoctoral Fellows: Noah Efron, Tal Golan, David McGee and James Voelkel.
Dibner Institute Names Eleven Graduate Student Fellows for 1998-1999
The Dibner Institute for the History of Science and Technology is pleased to announce that fellowship awards have been made to eleven PhD candidates enrolled in programs at three Dibner Institute consortium-member institutions: the Dibner Institute's host institution, MIT, Boston University; and Harvard. The Dibner Graduate Fellowship program is open to students writing their doctoral dissertations. Selection is based on excellence and scholarly promise, without regard for need.

Peder Anker on "The Ecological Empire: A History of Global Ecology."

Babak Ashrafi, on "Relativistic Electrons: Victor Weisskopf, and a Theory of Kinds." Rosalind Carey will explore Bertrand Russell's revision of his theory of types in the 1920s.

Edward A. Eigen on "The Sea Seen from the Shore: The Development of French Marine Stations (1862-1896)."

Gregory J. Galer on "Forging Ahead: The Ames Family of Easton, Massachusetts and Three Centuries of Industrial Enterprise."

Diane Greco will focus on Friedrich Gauss's work in terrestial magnetism, his search for unifying principles through the construction of new instruments, and the role Gauss played in the Göttingen scientific community early in the 19th century.

Hannah Landecker on "Technologies of Living Substance: A History of Tissue Culture in 20th Century Experimental Biology."

Robert Martello on "Paul Revere's Last Ride: The Road to Rolling Copper."

Andrew Robertson compares the development of feedback technologies in the United States and Japan during the prewar, wartime, and postwar periods.

John Symons writing a conceptual history of experimental psychology entitled "Recollecting and Representing: Historical Perspectives on the Scientific Explanation of Memory."

Gerald A. Ward on "Francis Bacon and the Trading Companies: How Travel, Commerce, and New World Colonization Helped Make the Great Instauration."

Books of Possible Interest

Sputnik, NASA, and the Origins of the Space Age (Monographs in Aerospace History, No. 10)

This book will appear in August 1998. This monograph, containing a narrative and key documents on the origins of the Agency, will be issued in conjunction with the fortieth anniversary of NASA.

Ronald A. Schorn's Planetary Astronomy From Ancient Times to the Third Millennium This book is due out in September 1998. Published by Texas A&M University Press, this book discusses the history of ground- and space-based astronomy, with a focus on the twentieth century.

Reports

History of Critical Phenomena, March APS Meeting in Los Angeles, 20 March 1998. This symposium, organized by Allan Franklin (University of Colorado) drew great interest at the March Meeting. There were more than 300 people in attendance, and by common agreement, the speakers' time was extended to 45 minutes each plus generous discussion time. This was history as seen through the eyes of the protagonists, each speaker having made significant contributions to the development of the field. In addition to the three scheduled speakers, Johanna Levelt Sengers, Michael Fisher, and Pierre Hohenberg, Levelt Sengers had arranged for Mikhail Anisimov to use a few minutes of her time to review Russian/Soviet contributions to the understanding of critical phenomena. This was supplemented by an extended comment by Valery Pokrovsky from the audience. The report that follows includes these extra contributions.

"Fluid Criticality from Van der Waals to the Present" by Johanna M.H. Levelt Sengers (NIST. Gaithersburg).

Levelt Sengers introduced the early history of the study of critical phenomena, modern developments, and present status. A mean-field-level understanding of fluid criticality was obtained in the period of 1870-1900, thanks to the fundamental work by Gibbs, the experiments of Andrews, the equation of state formulations by Van der Waals, and the experiments of the Leiden School. In 1893 critical exponents were invented by Van Laar and Van der Waals and the Landau expansion was invented by Van Laar. In 1894, Van der Waals found the Landau-Ginzburg expansion for mean field criticality. Already in the 1890s and first decade of the present century, it became clear that fluid critical behavior was not mean field. Verschaffelt (1896-1900) and Goldhammer (1910) showed that the liquid-vapor coexistence curve has a cubic relationship between density and temperature, but this was overlooked or forgotten until Guggenheim rediscovered it in 1945. The conventional wisdom did not progress beyond mean field theory for several decades.

After the liquefaction of helium in 1908, interest waned, to revive only in the late 1950s. By then, nonanalytic behavior had been found in models, and the analogy of the Ising model and the lattice gas was known. The weak divergence of the heat capacity of argon discovered by Voronel in 1962 was quickly linked with that of the Ising model. At the Conference on Critical Phenomena, organized by Green at NBS in 1965, many disciplines converged, and an explosion of research resulted. After the Conference, Vicentini, and Straub who had measured near-critical fluid stratification, became guest scientists at NBS. Green, Vicentini and Levelt Sengers described Straub's density profiles, together with PVT data, within the context of scaling as proposed by Widom (1965). They found fluid critical exponents distinctly different from mean field values, but also somewhat different from Ising values from series expansions. Further experiments close to the critical point by Hocken and Moldover and by Greer at NBS, and by Sengers et al. at the University of Maryland, yielded exponent values close to those from renormalization group calculations. Modern theory began with Fixman's 1965 work on mode coupling, and the ideas of scaling and homogeneous functions introduced and developed by Widom (1965), Kadanoff (1966), and Griffiths (1967). Then Kadanoff introduced universality in 1967.

Tricriticality was proposed by Efremova in1961, then independently by Lang and Widom in 1975, with subsequent work by Griffiths, Scott, Knobler, and others.
Current challenges include the study of crossover from Ising-like to mean field behavior in its dependence on the type of interactions as one leaves the very narrow critical region. Nonuniversal features and the introduction of additional length scales are issues that come up in these current studies. Critical phenomena of complex fluids is another area of current research: liquid crystals, polymers, surfactants, micels, and ionic fluids. Finally, supercritical fluids, which are widely applied in engineering, still present many challenges to science.
References for the history of critical phenomena include J. M. H. Levelt Sengers, Physica 73: 73 (1974) and Physica 82A: 319-351 (1976), and C. Domb, The Critical Point (Taylor and Francis, 1996).

At the invitation of Levelt Sengers, Mikhail Anisimov (now University of Maryland) reported on the contributions of Soviet/Russian scientists to the understanding of critical phenomena.

Anisimov pointed out that because the Soviet Union was a society isolated from the West for many decades, many novel ideas and concepts in physics of critical phenomena as well as in other fields of natural sciences were formulated by Soviet scientists originally and independently of western scientists. While Soviet work in

theoretical physics (e.g. by Landau's school) was more or less familiar in the West, many outstanding experimental physicists and their discoveries were known only within the USSR. He told about two great experimentalists, Alexander Voronel and Isaac Krichevskii. Voronel was an experimental physicist who discovered the heat capacity divergence at the critical point in 1962. Krichevskii was an experimental physical chemist who pioneered investigations of critical phenomena in mixtures in the 1960s. Highlights of the theoretical contributions of Russian scientists include Landau's introduction of the concept of the order parameter and the Landau expansion (1937), the Ginzburg criterion (1960), Patashinskii and Pokrovskii's introduction of scaling (1966) and mixing of the field variables (1971), and the field theory approach introduced by Polyakov and Migdal (1968).

Experimental milestones were the discovery of the divergence of Cv in fluids by Voronel (1962), the discovery of the divergence of Cp,x in binary mixtures by Anisimov, Voronel, and Ovodova (1968), and the renormalization of Cv,x in binary mixtures by Anisimov, Gorodetskii, and Shmakov (1972). Meanwhile, Krichevskii pioneered studies of critical mixtures, introducing the Krichevskii parameter in 1967. Krichevskii discovered that along the critical line the solution can never be treated as dilute!

Additional comments on the contributions of Russian scientists were given extemporaneously during the comment period by Valery Pokrovsky who has provided a fuller report below.

Michael E. Fisher (University of Maryland) on "Exponents, Scaling, Renormalization Groups and Flows." [See Reviews of Modern Physics 70 (2): 653-681 (1998).] Fisher began by sketching the foundations of renormalization group theory (RGT). Landau's invention of the order parameter in 1937 was a crucial early step leading to the later development of the theory. Then Onsager, in 1944, computed exactly the partition function and thermodynamic properties of the 2D Ising model, the simplest model of a ferromagnet or a fluid. The critical singularities in this model disagreed with all the earlier theories (mean field theories). From this work grew the critical exponent relations and scaling concepts of Kadanoff, Widom, and Fisher (1963-66), and finally Wilson's RGT (1971) and Wegner's clarification of the foundations of RGT (1972). The expansion was then developed in 1972 by Wilson and Fisher.

After sketching the origins of RGT, Fisher reviewed the development of the RG theory of critical phenomena, emphasizing "critical exponents and scaling, relevance, irrelevance and marginality, universality, and Wilson's crucial concept of flows and fixed points in a large space of Hamiltonians." He explored the breadth and generality of the theory, pointing out its independence from quantum field theory. The power of RGT is most strikingly demonstrated in its application to critical behavior. None of the early theories (essentially mean field) could account for the actual experimental singularities at the critical point. RGT describes a flow in a large space of Hamiltonians, with the critical point associated with a fixed point of that flow. The RG transformation can be thought of as the flow operator, and it can be linearized about that fixed point. This linear operator has a spectrum of discrete, nontrivial eigenvalues that are asymptotically proportional to the critical exponents.

"Critical Dynamics," by P. C. Hohenberg (Yale University)

Hohenberg described the history of critical dynamics over the past 40 years, noting that the advent of the renormalization group theory a quarter century ago would seem to be an example of a scientific revolution in the sense of Thomas Kuhn. However,

upon closer examination, it is found that the Kuhnian model of such revolutions, involving a paradigm shift and the overthrow of one scientific community by another, does not accurately describe this case.

Our understanding of critical dynamics went through the same three phases of development that occurred for static critical phenomena: mean field theory, a phenomenological theory of scaling and universality, and the elucidation of underlying structure via the renormalization group. In all three phases, experiment was closely coupled to theoretical advances, and we have now attained a basic understanding of the phenomena. The mean field or "conventional theory" was based on the assumption that singularities in dynamical quantities resulted from the underlying static singularities appearing in systems as they approach the critical point. When experiments and approximate "mode coupling" calculations revealed deviations from the conventional theory, a phenomenological theory known as "dynamic scaling" was developed (Ferrell, Menhard, Schmidt, Schwabl, and Szepfalusy, 1967, and Halperin and Hohenberg, 1967), which led to well-defined predictions for the behavior of time-dependent correlation functions and the corresponding transport coefficients and relaxation rates. The scaling theory is based on dynamic universality classes which can be identified by analysis of the long-wavelength, low frequency hydrodynamic behavior of the system. An important consequence of the theory is that the same static universality class can lead to different dynamic classes, since statically identical systems can obey different conservation laws and hence display different hydrodynamic behavior.

Shortly after the renormalization group approach was developed for static critical phenomena, the theory was generalized to dynamics (Halperin, Hohenberg, Ma, and Siggia, 1972-73), thereby explaining and justifying the dynamic scaling phenomenology. The theory was formally close to the earlier mode coupling approach but was on a firmer mathematical and physical basis. Experimental predictions were presented for critical behavior at the superfluid transition in liquid 4He.

The three historical periods in the development of our understanding of critical phenomena correspond to different accuracies in the determination of the exponents: the mean field or conventional theories determined the critical exponents only to an accuracy of the order of the size of the exponents themselves, i.e. of order 1; the scaling theories determined the critical exponents to an accuracy of order 0.1; and the renormalization group theory determined the critical exponents to an accuracy of order 0.01 to 0.001.

Before RGT, in the first two historical phases, "normal science" was the search for a new paradigm. The main physical ideas were discovered in those phases: systematics of exponents, scaling, universality, mode coupling, correction terms. There were many competing ideas: violations of (hyper)scaling, violations of universality, theoretical and experimental uncertainties. Then came RGT, not an overthrow but an evolution from the first two phases of development. RGT provided a systematic formulation of the problem, the authority of the expansion, and both the formulation and answering of many new questions. RGT has led to new perspectives, including a new paradigm on states of matter and transitions, and reliable methods for testing hypotheses and ideas using field theory techniques, Monte Carlo techniques, and series expansions. It has had a profound impact on other fields: other areas of condensed matter physics (Kondo effect, polymers, liquid crystals, disordered systems), QCD, nonequilibrium physics (dynamical systems and chaos, pattern formation, fractals, diffusion-limited aggregation, turbulence), and on scaling behavior outside of physics.

Hohenberg concluded with a metaphor: historical phases 1 and 2 are exploration in a

dimly lit room; RG turns the lights up and opens the windows and doors; but the landscape outside is still dim.

Valery L. Pokrovsky (Texas A&M University and Landau Institute for Theoretical Russia), "Notes on History of Critical Phenomena" [provided after the meeting, and expanding upon his comments during the discussion period].

These notes are my immediate reaction to the presentation by Johanna Levelt Sengers, including the remarks of Michail Anisimov. To a lesser extent they also intended to add to the talk by Michael Fisher. They were not prepared beforehand and do not pretend to be exhaustive, being limited by the reserves of my memory. All three speakers were active participants in this history and they did a brilliant job. Nevertheless, some essential details were omitted. This is natural since history tends to become simplified in the course of time. It is also an effect of a scale transformation which people and events on one continent undergo in view of a person living on another one. Probably my view as a participant from USSR is distorted in a similar way.

The history of the theory of critical phenomena and phase transitions starts with Landau's work [1] of 1937, written just before his arrest. The main achievement of this work is not the mean-field approximation used for calculations, but the fundamental notion of spontaneous symmetry violation and the order parameter as a measure of this violation. It is impossible to exaggerate the impact which this idea had on practically all branches of physics and non-linear mechanics. Due to the concept of the order parameter, phase transition theory became a cross-disciplinary branch of science, much like the theory of oscillations. Landau gave simple prescriptions, how to describe order in terms of irreducible representations of the symmetry group. Here the pioneering work by E. M. Lifshitz [2] must be cited. He was the first to apply group theory to describe specific structural transitions. Since then group-theoretical analysis has become a powerful tool for the study of phase transitions.

The famous Onsager exact solution of the 2-d Ising model [3] shattered the quantitative aspect of Landau theory. It was based on a power series expansion of free energy with respect to the order parameter, whereas Onsager demonstrated a singularity in the free energy at the transition point. This discrepancy was resolved by A. P. Levanyuk [4] and V. L. Ginsburg [5] in 1959-60. They explained that mean field theory neglects fluctuations which grow rapidly near the transition point. Thus, mean field theory works well outside a small vicinity of the transition point and is invalidated by fluctuations within it. In this way the necessity to include fluctuations in phase transition theory was first recognized. Simultaneously Michael Fisher [6] approached the problem by attempting to generalize Onsager's results to non-exactly-solvable problems. By introducing critical exponents he made the decisive step to scaling.

Around 1960 Landau formulated the general problem of fluctuation-driven phase transitions via a calculation of the path integral over all configurations of the order parameter (unpublished). The integrand was the Gibbs-Boltzmann exponent of what was later called the Ginsburg-Landau-Wilson Hamiltonian. Despite serious efforts by Landau and his collaborators, the problem remained unsolved effectively until Wilson's work [7]. (Landau used to say that he spent more time working on this problem than on any other: an entire half-year. No doubt he kept it in mind afterward, but the tragic accident of January 1962 permanently interrupted his scientific work.)

I started to work on this problem in 1962, when I. M. Khalatnikov told me about the

Landau's attempts. Together with Alexander Patashinksii, we formulated the field theory equations and conjectured correctly that the correlation functions of any order should obey scaling laws [8]. However, one of the two principal equations was erroneous, leading to incorrect critical exponents. This mistake was corrected 4 years later by A. M. Polyakov [9] and A. A. Migdal [10]. Their formulation used such physical requirements as causality and unitarity. It permitted, in principle, numerical calculations of the critical exponents. Unfortunately, the equations were too complicated to solve using computers of that time. Only with Wilson's renormalization group approach was the structure of the theory elucidated to the extent that standard methods could be employed.

Michael Fisher gave an excellent presentation of the scaling idea and its history. I would only mention the early work by A. N. Kolmogorov [11], who proposed a scaling approach for hydrodynamic turbulence. V. G. Vaks and A. I. Larkin [12] conjectured the universality hypothesis several years before Kadanoff and Wegner proved it [13]. According to this hypothesis, the critical behavior is determined by symmetry and how it is violated. All phase transitions may be divided into universality classes. An important contribution was made by B. D. Josephson [14], who first understood how to introduce the superfluid density and calculated its critical exponent.

Soon after publication of our work [8], Patashinskii and I recognized that something was wrong, and we tried to determine the consequences of scaling alone, without specifying the critical exponents. In this way we formulated our version of scaling [15], first presented at the International Symposium on Phase Transitions in Dubna, May 1965. The physical picture was that, for critical fluctuations the distribution of the order parameter remains invariant with temperature if the length scale and other observables are adjusted properly. This hypothesis is physically equivalent to L. P. Kadanoff's formulation [16], which was published 4 months later. In addition, in his work Kadanoff first formulated a program of elimination of short-range degrees of freedom by decimation of spin blocks, an embryo of the Wilson Renormalization Group, though still not a practical tool for calculations.

Among the works which prepared Wilson's revolution, a special place belongs to that of Larkin and Khmelnitskii [17]. Considering the Ising magnet with weak dipolar interaction in 3 dimensions, they showed that its critical behavior is the same as for the standard Ising magnet in 4 dimensions, where the mean field theory almost works. This choice of dimensionality enabled them to find the asymptotically exact solution, a direct predecessor of the Wilson-Fisher -expansion [18]. A. A. Migdal in 1970 [19] was the first to construct a fluctuation theory of the tricritical point in 3 dimensions.

A new symmetry of critical phenomena, the conformal symmetry, was discovered by Polyakov in 1970 [20]. It can be understood as a local scale transformation which does not violate local rotational invariance. This deeper level of scaling symmetry was especially fruitful in two dimensions. Many years later, in 1983, the three Sashas, Belavin, Polyakov and Zamolodchikov, constructed their famous Conformal Field Theory [21], which enabled them and others to determine all universality classes in two dimensions, and to calculate the complete algebra of fluctuating operators and their critical exponents. This work also had a deep impact on Field Theory. The permanent exchange of ideas between Statistical Physics and Field Theory is quite remarkable. It would not have existed without Landau's fundamental concept of the order parameter.

A new notion of topological excitations (vortices) and phase transitions driven by them was first introduced by V. L. Berezinskii in 1971 [22], two years before Kosterlitz and Thouless [23]. He did not find, however, their simple relation

between the transition temperature and the transverse stiffness. As it was with the order parameter, the idea of topological excitations and phase transitions had a deep impact on field theory.

In conclusion, I cite two works which elucidated the nature of the order parameter in systems with macroscopic quantum coherence. The first is the famous work by N. N. Bogolyubov [24] on superfluidity in weakly interacting Bose gases. The second is the no-less-famous Ginsburg-Landau theory [25] in which the condensate wave-function was first introduced.

[Note: A complete list of references can be found associated with this article on the web at http://www.aps.org/FHP/news.html]

Science and Its Critics, Joint APS-AAPT Meeting in Columbus, 18 April 1998.

This session brought together a professor of literature, George Levine, a sociologist of science, Ullica Segerstrale, and a physicist, Kurt Gottfried, to discuss the so-called "science wars." The symposium and discussion were notable for the mutual respect reflected in the exchanges.

George Levine (Rutgers), "What's Really at Stake in the Science Wars?" Levine noted two disturbing aspects of the conflict over science: "first, the frequently casual disregard of the disciplinary integrity of scientific work by many (but not all that many) humanists, and second the general indifference of scientists to work in philosophy, history, and sociology of science, transformed now not into concerned debate but into hostility and contempt." He argued that most cultural study of science is not hostile, and he warned of three related errors: "First, the view that cultural study of science is invariably designed to attack science, second, that such study is an intellectually irresponsible sort of work , and third, that it somehow represents a serious threat to science." In fact, Levine views the greatest threats to science as coming from "traditional American anti-intellectualism shaped now by new-agers, creationists, and politicians who hate postmodernism more than you do." In his talk he argued that anti-realism is not the real problem, that any serious thought about scientific knowledge will inevitably and necessarily link cultural issues with science, that the science wars are "a dangerous diversion from the real problem of public support for intellectual work," and that "the most difficult public problem the sciences face is how to negotiate democracy: how to honor your obvious commitment to a free and open society by allowing and encouraging citizens to discuss and make responsible decisions about scientific matters that deeply affect them but that they can't possibly understand." Levine suggested that "one of the most fruitful debates that might be developed between scientists and theorists of science is precisely over the degree to which it might be possible to argue that many (or all, or some) scientific results are decided by entirely (or partially, or marginally) epistemological grounds, and the degree to which cultural, ostensibly non-scientific forces come into play." In fact, he pointed out that "developments in modern theory, sanctioned some argue by developments in scientific theory, make it virtually impossible for a responsible humanist intellectual to ignore the role played in knowledge by the perceiver."

Finally, Levine suggested that the greatest threat to responsible debate about the complicated intellectual issues raised in studies of science and "to the pursuit of knowledge that may not issue ultimately in practical results, is not the irrationality of postmodern critics but the corporatizing of the university." "Scientists and Sociologists of Science - Friends or Foes?" by Ullica Segerstrale (Illinois Institute of Technology).

The Science Wars may have made it falsely appear as if sociologists and scientists were somehow natural enemies. In fact, relations between sociology of science and scientists have typically been mutually supportive. For instance, the initiative to STS (Science and Technology Studies) came from scientists. It is the recent constructivist and relativist approach of the Sociology of Scientific Knowledge (SSK) that has seemingly redefined the relationship.

Two points need to be made. 1) The SSK-type criticism of science is basically epistemological and has little connection with the current "postmodernist" and "cultural" critique of science. 2) SSK's approach represents a quite unusual type of sociology, which does not recognize scientists' own scientific convictions as legitimate factors in explaining their behavior. (Mainstream sociologists typically try to reconcile actors' and analysts' accounts).

I argue that, ironically, one reason for the rift between SSK sociologists and scientists is that leading members of SSK (the Edinburgh School, Collins and Pinch) have an over strong desire to present their activity as science and themselves as scientists. Again, the reason why they believe that "scientificalness" in social sciences requires this kind of external, behaviorist-type explanation may be their own earlier training in natural science.

At the same time, however, practicing scientists typically disagree with the results of case studies by leading SSK sociologists (see recent polemics in Physics Today and Noretta Koertge's A House Built on Sand, just out). What does this mean? Do "scientific" SSK scholars and practicing scientists have different views of science? Is this acceptable? The matter could conceivably be resolved by some kind of reasoned meta-discourse about the nature of science, signs of which are already emerging. Indeed, an unexpected positive effect of the Science Wars is that "regular" scientists (rather than pro-science activists) have recently got involved (see Physics Today).

My advice to SSK sociologists is to speedily bring the scientist back in. It is hard to see how an approach that produces results that appear obviously incorrect to practicing scientists could pass for "good science" (cf. Schmaus, Segerstrale and Jesseph, 1992).

References: Koertge, N. (ed.) (1998) A House Built on Sand. Oxford University Press.
Schmaus, W., Segerstrale, U., and D. Jesseph (1992). "The Hard Program in the Sociology of Scientific Knowledge: A Manifesto." Social Epistemology 6(3)243-265. (With peer commentaries and authors' response).