

# HISTORY of Physics NEWSLETTER

## Proposed History Award

—Laurie M. Brown, Forum Chair

We are probably becoming a bit weary these days of being reminded of all the centennials, millenniums, etc., but I would like to point out that Forum itself will soon celebrate a modest two-decade anniversary, as its inaugural session was held in Baltimore on April 22, 1981. I noted this in a brief history of the Forum in the last *History of Physics Newsletter*, which I concluded by mentioning that the Executive Committee has been working on establishing the first APS Award for outstanding work in the field of history of physics. To be more specific, our proposal reads: “The award is for professional achievement in the history of physics through research, writing and/or other scholarly presentations. The Award is granted without restriction. Nominations will remain active for three years.”

The description of the award is intended to be sufficiently broad to allow the selection committee to be flexible enough to include, for example, historical-based philosophical writing. Some committee members felt that an award directed toward younger historians would be very valuable in advancing the profession, but as we have yet to launch even one award, we retained the overall achievement criterion, which points to a longer-term involvement.

The main sticking point so far has been the question of finding a source of funding. APS staff tell us that an estimated \$100,000 is needed to endow an annual award of \$5,000, or \$50,000 for a biennial award. Of course, the recognition itself could be quite gratifying, but still, some more tangible prize should accompany it. Obviously

some physicists are much better than others in securing funding, and we would be grateful for any suggestions from our members for possible sources. We would also like to hear what you think would be appropriate criteria for selecting awardees. Please let us know.

### FORUM ELECTIONS

**Forum Elections information is contained in this Newsletter.** Please vote for Vice Chair, Secretary-Treasurer, and two Members at Large of the Executive Committee. If you have email registered with APS, you will have received a message inviting you to vote on the internet, as authorized by the FHP Executive Committee last year. If not, you should have received a paper ballot by mail. If you want a paper ballot but have not yet received one, please email your request, including your mailing address, to [fhp\\_ballot@byu.edu](mailto:fhp_ballot@byu.edu) or contact Prof. Bill Evenson, Department of Physics, Brigham Young University, Provo, UT 84602, 801 378-6078. **Ballots must be returned so they can be received by March 26** in order to notify winning candidates and invite them to the April Executive Committee meeting. Brief resumes and statements from the candidates are printed later in this *Newsletter*.



Lawrence Radiation Laboratory, courtesy  
AIP Emilio Segrè Visual Archives

We celebrate this year the centenary of birth of both of the celebrated physicists shown in this photo taken in 1940. E. O. Lawrence (left) was born August 8, 1901, and Enrico Fermi (right) was born September 29, 1901.

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# Forum News

## Forum Program at March and April APS Meetings

At the APS March Meeting in Seattle, the Forum on History of Physics is cosponsoring two symposia. “**NIST at the Millenium: Condensed Matter and Measurement Science,**” cosponsored with the Topical Group on Instrument and Measurement Science, will be held on Tuesday afternoon, March 13, at 2:30. Chaired by *Robert Duncan*, University of New Mexico, the following talks will be presented: “Spin-Polarized Electrons: How Measurement Development Advances Science and Technology,” *Daniel T. Pierce* (NIST), “Adjustment of the Fundamental Constants at NBS/NIST,” *Peter Mohr* (NIST), “Polymer Research at NBS-NIST,” *Charles Han* (NIST), “Neutron Research at NIST-NBS,” *J. J. Rush* (NIST), and “Electrical Measurements of Fundamental Constants at NBS/NIST,” *Edwin Williams* (NIST).

“**History of Electronic Structure Theory in Atoms,**” is scheduled for Wednesday afternoon, March 14, at 2:30, cosponsored with the Division of Materials Physics. This session will be chaired by *John P. Perdew*, Tulane University. The speakers and topics will be “A Personal Account of the History of Density Functional Theory,” *Walter Kohn*

(UC Santa Barbara), “Impact of Band Theory: Past, Present and Future,” *A. J. Freeman* (Northwestern U.), “Why I Love Pseudopotentials,” *Leonard Kleinman* (U. of Texas-Austin), and “Density Functional Calculations of Molecules: History and Outlook,” *Bernard Delley* (Paul Scherrer Institut, Switzerland).

At the April APS Meeting in Washington, DC, the Forum is sponsoring another contributed session, following last year’s successful session, as well as cosponsoring three symposia. The contributed session will be held on Saturday, April 28, 2:30 -5:30 pm.

The first invited symposium, cosponsored with the Forum on Physics and Soci-

ety, is “**Perspectives on Large High Energy Physics Projects.**” It will be held on Sunday, April 29, 2:30 - 5:30 pm and chaired by Forum Chair Laurie Brown (Northwestern U.). The speakers and topics are *Herwig Schopper*, “LEP, the LHC and European Perspectives on the SSC,” *Michael Riordan*, “The Rise and Fall of the Superconducting Super Collider,” *Thomas Kirk*, “Success Factors in Management of Large Projects,” and *David Goldston*, “Congressional Perspectives on the SSC and LHC.”

A second symposium, “**History of Atomic Collision Physics,**” will be chaired

*continued on next page*

## Reports

### History of Physics Project Notes

**William A. Edelstein**, GE Research Center, suggests that the history of the development of MRI has both important and fascinating stories to be pursued by an interested historian of physics. He has materials he would share for such a project.

**The fifth annual Seven Pines Symposium** will be held in May, 2001, on the subject, “The Quantum Nature of Gravitation, Space, and Time.” A report will appear in the next issue of this *Newsletter*.

## Editor’s Note

### History of Physics in All its Complexity

There seems to be increasing acceptance of the complexities of history in the physics community. Symposia that, along with the grand successes, also note the false starts and their lessons in the sometimes tortuous process of discovery are well received at national meetings. The theoretical physics group at my university read and discussed Allan Franklin’s article, “Selectivity and the Production of Experimental Results,” last fall in which Franklin analyzed five cases of handling experimental data: three that turned out to be erroneous physics inferred from artifacts of data analysis and two that led to important physical insights but for which the data analysis was controversial. The faculty and students in this group (10-12 of us) learned some important lessons about the subtleties of data analysis, the power of our biases, and the ability of science to sort out complex problems. The journal *Physics in Perspective* has been remarkably successful in publishing readable articles that deal with physics history on a level beyond the superficial and oversimplified. Perhaps we can’t yet hope that an understanding of the importance of “warts and all” history is widespread in the physics community, let alone the broader community of educated people, but I believe the work of the Forum is contributing to a more sophisticated view and that science is the better for it. I urge that we make use of history of physics in all its complexity in our courses and in our work as physicists, both to increase understanding of the development of the discipline and to increase the sophistication with which we all view science, its strengths and weaknesses and contributions to our worldview. —Please send me your thoughts on this issue and others related to history of physics to share in this newsletter, and send updates on your current history of physics activities.

## HISTORY of Physics NEWSLETTER

The *History of Physics Newsletter* is published twice each year by the Forum on History of Physics of the American Physical Society. It is distributed free to all members of the Forum. The Forum also has reciprocal arrangements with History of Science Society, Philosophy of Science Association, and HOPOS. Others who wish to receive it should make a donation to the Forum of \$5 per year (+\$3 additional for air mail). Each 3-year volume consists of six issues.

### Editor:

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by Forum Chair Elect Ben Bederson (NYU) and is cosponsored by the Division of Atomic, Molecular and Optical Physics, the Group on Few Body Systems, and the Group on Fundamental Constants. Speakers and topics are *Michael Nauenberg*, "Development of the concept of electron orbits in atoms," *Alex Dalgarno*, "The history of atomic collision physics in astrophysics," *Timothy Gay*, "The quest for the perfect collision experiment," and *Thomas Gallagher*, "History of the use of lasers in atomic collision experiments."

The third symposium is "**100 Years at NBS-NIST**," chaired by Charles Clark (NIST) and cosponsored by DAMOP. Speakers and topics are *David DeVorkin* (National Air Space Museum), "H. N. Russell and atomic spectra," *Lewis Branscomb*, "Political controversy and scientific integrity at NBS-NIST," *Barry Taylor*, "The history of fundamental constants," *Mitio Inokuti*, "The scientific legacy of Ugo Fano," and *Eric Cornell*, "The story of Bose-Einstein condensation."

### New APS Fellow from the Forum

Congratulations to **Anne Jacob Kox**, newly elected Fellow of the American Physical Society. Kox was nominated by the Forum on History of Physics. Currently at the University of Amsterdam, he was recognized

*"For his original contributions to the history of physics, especially in the Netherlands, and for his extraordinary contributions to the edition of Albert Einstein's papers."*

### APS Fellow Nominations

Fellow nominations are due by March 31, and the Forum Fellowship Committee must review those who are proposed, make a recommendation, and complete the nomination file before that time. Hans Frauenfelder is chair of the Forum's Fellowship Committee for 2000-01. 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 candidate's achievements in history of physics. Mail suggestions well before March 31 (as soon as possible now) to Dr. Hans Frauenfelder, CNLS, Los Alamos National Laboratory, MS B258, Los Alamos, NM 87545, or email frauenfelder@lanl.gov.

### Forum Business and Executive Committee Meetings

The annual Forum Business Meeting will be held on Sunday, April 29, at 5:30 pm at the April APS meeting in Washington, DC. It will immediately follow the Forum-sponsored symposium on large high energy physics projects. All Forum members and other interested persons are invited to attend. The

Forum Executive Committee will also meet at the April APS meeting on Sunday, April 29. This meeting is for members of the Executive Committee and guests.

### Newsletter Sharing with Related Organizations

We have made contact with the History of Science Society (HSS), the Philosophy of Science Association (PSA), and the History of Philosophy of Science Working Group (HOPOS) to offer our *Newsletter* to their members and to inquire about interested FHP members getting access to their newsletters. These contacts have been received enthusiastically.

We are working out arrangements with HSS and will have more information soon.

The *PSA Newsletter* is only published electronically, and our members can subscribe by sending email to [elam@philosophy.umkc.edu](mailto:elam@philosophy.umkc.edu) and asking to be put on the PSA e-list. Note that this was authorized by George Gale.

The *HOPOS Newsletter* is, for the most part, an electronic publication (in pdf format), so you can go to the website, at [scistud.umkc.edu/hopos/](http://scistud.umkc.edu/hopos/) and then go to the *Newsletter* section.

This is an experiment right now, but we hope to continue it indefinitely. We hope this effort can bring various scholars interested in history and philosophy of physics into closer contact.

# APS AND AIP NEWS

### Major New Research Tools in the History of Physics, Astronomy, Geophysics and Related Fields

The Center for History of Physics at the American Institute of Physics announces two important resources for researchers: a more powerful online version of the **International Catalog of Sources (ICOS) for History of Physics and Allied Sciences** and the brand new **Physics History Finding Aids Website**. Both the International Catalog of Sources (ICOS) and the Physics History Finding Aids Website are created and maintained by the AIP Center for History of Physics. For access to these resources, and to learn about their other programs and resources, visit their website at [www.aip.org/history](http://www.aip.org/history), or contact Center for History of Physics, American Institute of Physics, One Physics Ellipse, College Park, MD 20740, phone: (301) 209-3183, fax: (301) 209-0882, email: [chp@aip.org](mailto:chp@aip.org)

*The International Catalog of Sources* ([www.aip.org/history](http://www.aip.org/history)) is a unique resource for scholars, that lists and briefly describes archival materials, such as unpublished correspondence and institutional records and oral histories, worldwide. The catalog now contains records for over 7,000 collections, and the new online version is more reliable and allows more sophisticated queries, including boolean searches. Many science historians and other scholars check ICOS routinely for resources in physics and related fields, especially when planning new research.

*What information goes into the ICOS?* We list information about papers of scientists working in physics and related fields, such as astronomy, acoustics, optics, geophysics, medical physics, and the other fields covered by the AIP's Member Societies. We also list information on records of major institutions such as academies of science, academic physics departments, and

research laboratories. Our period of interest is chiefly from about 1890 to the present, but we include 19th century collections of interest and even earlier ones of major importance. In addition to collections that are in libraries and archives, the ICOS has information on papers in private hands and information on papers of significant scientists that have been destroyed. The ICOS records provide a concise description which lists the name of the collection and usually includes the span dates, kinds of materials (correspondence, notebooks, minutes of meetings, etc.), and other information. In addition, records are thoroughly indexed (names and subjects); topical index terms are assigned as specifically as possible to enable focussed searching.

*How can I get information from the ICOS?* The ICOS database is available online through our new web catalog. The Center's Niels Bohr Library staff will also search the ICOS database for any researcher on request

(send an inquiry to the Niels Bohr Library by mail, fax, or e-mail). In addition, the majority of the existing ICOS records have been uploaded into the AMC file of RLIN's bibliographic database, and uploads of new information will continue periodically. (There is a free gateway to RLIN's AMC file via the Library of Congress/National Union Catalog of Manuscript Collections website.)

*How can I add new information to the ICOS?* The Center is always on the lookout for new collections to add to ICOS, and we learn about new materials through annual surveys of major science archives, information from researchers, and other sources. We strongly encourage users to contact us about new resources that they find.

**The Physics History Finding Aids Website** ([www.aip.org/history/ead](http://www.aip.org/history/ead)) is a brand new resource that the AIP History Center has created in the past year with a consortium of nine other leading science repositories and with financial support from the National Endowment for the Humanities. The Physics History Finding Aids Website, which is a continuation and expansion of the ICOS, is the largest subject-based consortium of finding aids on the web. Researchers can use it to get detailed information on a wide variety of important resources in 20th century American science and science policy. The more than 60 collections now represented cover a broad variety of fields centered around physics, astronomy and geophysics, with information on some of the most significant topics in modern science. The finding aids describe major collections at the ten institutions that are currently members of the consortium: American Institute of Physics, California Institute of Technology, Harvard University, Massachusetts Institute of Technology, Northwestern University, Rice University, University of Alaska-Fairbanks, University of Illinois Urbana-Champaign, University of Iowa, and University of Texas-Austin. Plans are underway to expand the database to include more collections and additional repositories such as the Library of Congress.

*What's in a finding aid?* Finding aids contain an introductory essay describing the main features and subjects of the collection and a listing of box and folder contents, sometimes running to hundreds of pages. They are fully encoded in SGML-EAD format, the emerging archival standard. A search engine allows users to search across the full texts (or, if preferred, only the introductions or other portions) of the entire set of finding

aids. Having identified a particular finding aid, users can call up its text and search it using their own browser's search engine, and download and print out parts of interest. In addition to locating relevant collections, access to the full finding aids facilitates advance preparation and makes visits to archives more efficient. In some cases it may even allow users to get materials relevant to their research by correspondence without the expense of a visit.

## **Grants-in-Aid for History of Modern Physics and Allied Fields (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 \$2,500 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 our website, [www.aip.org/history](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; phone: 301-209-3174, fax: 301-209-0882 e-mail: [sweart@aip.org](mailto:sweart@aip.org). Deadlines for receipt of applications are June 30 and December 31 of each year.

## **AIP State Department Science Fellowship Program**

This newly-established program represents an opportunity for scientists to make a unique and substantial contribution to the nation's foreign policy. Under this new pro-

gram, AIP will sponsor one fellow annually to spend a year working in a bureau or office of the State Department, providing scientific and technical expertise to the Department while becoming actively and directly involved in the foreign policy process. Fellows are required to be US citizens and members of one or more of the 10 AIP Member Societies at the time of application. Qualifications include a PhD in physics or closely related field. In exceptional cases, the PhD requirement may be waived for applicants with equivalent research experience. Applicants should possess familiarity with, or experience in, scientific or technical aspects of foreign policy. A stipend of \$49,000 per year, plus allowances toward relocation, in-service travel, and health insurance premiums. Applications should consist of a cover letter, indicating names of references, PhD status, society memberships, and where you learned of the fellowship; letter of intent providing reason for applying, scientific training and professional experience, foreign policy interest; resume; and three letters of reference sent directly. All application materials must be postmarked by April 15, 2001 and sent to: AIP State Dept. Science Fellowship, American Institute of Physics, ATTN: Audrey Leath, One Physics Ellipse, College Park, MD 20740-3843. For additional information, please contact Audrey Leath at [aleath@aip.org](mailto:aleath@aip.org) or 301-209-3094.

## **APS/AIP Congressional Science Fellowship Programs**

The American Institute of Physics and the American Physical Society offer Congressional Science Fellowship Programs each year. Fellows serve one year on the staff of a Member of Congress or congressional committee, learning the legislative process while they lend scientific expertise to public policy issues. Qualifications include a PhD or equivalent research experience in physics or a closely related field. Fellows are required to be U.S. citizens and, for the AIP Fellowship, members of one or more of the AIP Member Societies. A stipend of up to \$49,000 is offered, in addition to allowances for relocation, in-service travel, and health insurance premiums. Applications should consist of a letter of intent, a 2-page resume, and 3 letters of recommendation. Please see the websites: [www.aip.org/pubinfo](http://www.aip.org/pubinfo) or [www.aps.org/public\\_affairs/fellow.html](http://www.aps.org/public_affairs/fellow.html), for detailed information on applying. If qualified,

# NOTES AND ANNOUNCEMENTS

***Physics, the Human Adventure: From Copernicus to Einstein and Beyond***, by Gerald Holton and Stephen G. Brush, has just been published by Rutgers University Press. This is the third edition of the classic text *Introduction to Concepts and Theories in Physical Science*. Both earlier editions were landmark titles in science education, as the first to make full and effective use of the history and philosophy of science in presenting for both the general and the science-oriented student an account of the nature of physical science. In this third edition, each of the chapters has been reworked to further clarify the physics concepts and to incorporate recent physical advances and research. The book shows the unifying power of science by bringing in connections to chemistry, astronomy, and geoscience. In short, the aim of the new edition is to teach good physics while presenting physical science as a human adventure that has become a major force in our civilization. New chapters discuss theories of the origin of the solar system and expanding universe; fission, fusion, and the Big Bang-Steady State controversy; and thematic elements and styles in scientific thought. There is also a discussion of the debate about whether we see by sending rays out to an object or receiving them from the object.

Gerald Holton is Mallinckrodt Professor of Physics and History of Science, Emeritus, Harvard University. Stephen G. Brush is Distinguished University Professor of the History of Science, University of Maryland, College Park. Both authors are Fellows of the American Physical Society, and each has served as President of the History of Science Society.

The book is about 550 pages, double-column. List price is \$39 (paperback), \$75 (cloth). To order, or to request examination

copies for class adoption (\$5 per copy for shipping & handling), contact Rutgers University Press at (800)446-9323, fax (888) 471-9014, or write to the Press at 100 Joyce Kilmer Avenue, Piscataway, NJ 08854.

## **Preserving the Archives of Contemporary British Scientists**

In 1973 an archives project was established in Oxford to locate, catalogue and find permanent places of deposit for the archives of contemporary British scientists. This project was unique in that it “was not itself an archive repository requiring expensive buildings and equipment, but a resource-effective processing centre whose staff, expert in the cataloguing of scientific materials, would hand over the completed collections to established national, university or institutional repositories for permanent preservation and supervised access to researchers. Margaret Gowing, the distinguished historian of the British atomic bomb project and Oxford University’s first Professor of the History of Science, was the Director, and it was on her retirement that the archives project moved to the University of Bath in 1987.” Since 1973 the archives have dealt with the archives of over 200 British scientists, predominantly Fellows of the Royal Society, 21 Nobel laureates, and five Presidents of the Royal Society. Records of all the scientists whose archives have been catalogued by the project can be found on the project website: [www.bath.ac.uk/Centres/NCUACS](http://www.bath.ac.uk/Centres/NCUACS). The current director of the National Cataloguing Unit for the Archives of Contemporary Scientists is Dr. Peter Harper ([lispbh@bath.ac.uk](mailto:lispbh@bath.ac.uk)). He and his colleagues are available for advice about archives and will send their twice-yearly Progress Reports to interested scholars.

***History and Technology*** is an international journal which encourages submissions from both graduate students and more established scholars interested in the mutual shaping of technology and society in an historical perspective. To date considerable emphasis has been given to work dealing with the 20th century. Papers published are included in the *Isis* bibliography. A special subscription price is available for members of SHOT. The journal comes out four times a year and usually includes three articles and a small book review section. Guest editors sometimes take responsibility for a single number dealing with a coherent theme. The time to publication is relatively brief as the journal works on a flow system, i.e. when there is enough material available they proceed to publication. Interested authors should submit articles to the Executive Editor, Dr. John Krige, Kranzberg Professor, School of History, Technology and Society, Georgia Institute of Technology, Atlanta, GA 30332-0345, phone +(404) 894 7765, fax +(404) 894 0535.

**An encyclopedia of American Industrial History** is in planning stages with publisher M. E. Sharpe. Dr. Thomas Heinrich, Baruch College, is looking for contributors. This 3-volume project will cover major periods in industrial history, industries from textiles and steel to automobiles and computers, business and labor leaders, and key technologies from the spinning jenny to the semiconductor. Although it focuses primarily on the U.S., the encyclopedia examines American industrialism in international/global perspective. Anyone interested in writing any entries for the encyclopedia may contact Dr. Thomas Heinrich, Assistant Professor, Baruch College, 17 Lexington Ave., New York, NY 10010, [Thomas\\_Heinrich@Baruch.Cuny.Edu](mailto:Thomas_Heinrich@Baruch.Cuny.Edu)

## **The Melvin Kranzberg Dissertation Fellowship 2001**

The Society for the History of Technology announces the competition for its Melvin Kranzberg Dissertation Fellowship, which is presented annually to a doctoral student engaged in the preparation of a dissertation on the history of technology, broadly defined. This award is in memory of the co-founder of the Society, and honors Melvin Kranzberg’s many contributions to developing the history of technology as a field of scholarly endeavor and SHOT as a

applicants will be considered for both programs. Application materials are generally due by January 15 and sent to APS/AIP Congressional Science Fellowship Programs, One Physics Ellipse, College Park, MD 20740-3843.

## **“This Month in Physics History”**

*APS News* now has a regular column, “This Month in Physics History.” Alan Chodos, editor of *APS News*, welcomes suggestions for this column ([chodos@aps.org](mailto:chodos@aps.org)).

## **History Items in *Physical Review Focus***

*Physical Review Focus* is a web and email publication highlighting new developments in physics as found in *Physical Review*. David Ehrenstein, editor of *Physical Review Focus*, would like to do occasional historical stories highlighting work published in *Physical Review* in earlier decades. He would welcome suggestions and other offers of assistance: [ehrenste@aps.org](mailto:ehrenste@aps.org) (301) 209-3201.

professional organization. The \$2,000 award is unrestricted and may be used in any way that the winner chooses to advance the research and writing of his or her dissertation. Possible uses include underwriting the costs of travel to archival collections; photocopying or microfilming; translation of documents; and so on. The award may not be used for university tuition or fees. Students from institutions of higher learning anywhere in the world who are working on projects in the history of technology are eligible to apply; doctoral candidates from outside the United States are especially encouraged to submit application materials. Applicants must have completed all requirements for their doctorate except for the dissertation by 1 September 2001. See [www.press.jhu.edu/associations/shot/awards/kranz.htm](http://www.press.jhu.edu/associations/shot/awards/kranz.htm) for complete information. All application materials must be received by 1 April 2001. The committee's decision will be announced at the Society's annual meeting, which will be held in San Jose, CA, October 4-7, 2001.

### *Physics in Perspective*

Most journals are targeted to a small group of scholars. That is not the case for the journal *Physics in Perspective*, which has now been published since early 1999 for a wide audience of historians, philosophers, physicists, and the interested public. The editors believe that scholarly papers written by historians of physics, philosophers of physics, and physicists themselves can be an effective means for bringing the ideas, the substance, and the methods of physics to non-specialists, provided jargon is avoided and care is taken in the writing.

*Physics in Perspective* is published quarterly. Besides articles and book reviews, the journal has two regular features: first, "The Physical Tourist," identifies sites for the traveler whose interests include artifacts from the history of physics, laboratories with historical significance, birthplaces of well-known physicists, and the like; second, "In Appreciation" is written about a physicist by a student, first-hand acquaintance, or colleague. *Physics in Perspective* is available to members of the American Physical Society at the special subscription rate of \$35 per year plus \$10 shipping and handling. Additional information can be found at the Birkhäuser Verlag website, [www.birkhauser.ch/journals/1600/1600\\_tit.htm](http://www.birkhauser.ch/journals/1600/1600_tit.htm).

First-hand accounts of participants in interesting and important research projects – experimental, theoretical, or computational

– often become documents of historical import. The editors of *Physics in Perspective* welcome such first-hand accounts and hereby extend an invitation to physicists, and particularly to members of the Forum on History of Physics, to submit manuscripts for publication. (John S. Rigden, American Institute of Physics, One Physics Ellipse, College Park, MD 20740, [jsr@aip.org](mailto:jsr@aip.org) and Roger H. Stuewer, Tate Laboratory of Physics, University of Minnesota, 116 Church Street SE, Minneapolis, MN 55455, [rstuewer@physics.spa.umn.edu](mailto:rstuewer@physics.spa.umn.edu)).

**The Project on Contributions of 20th Century Women to Physics** issued two reports last year: a "Final Report" as the project winds down and moves its materials to the UCLA Digital Library collection, and a "Diagrammatic Website Visit" that outlines the structure of the website and includes a few sample visits. Although the Project has issued a "Final Report," it is still active and adding citations and names at least this year. Visit the website if you have not done so previously ([www.physics.ucla.edu/~cwp](http://www.physics.ucla.edu/~cwp)), and watch for the archive's move to a new address at the UCLA Library.

**National Endowment for the Humanities Programs: NEH OUTLOOK**, an email newsletter of the National Endowment for the Humanities ([www.neh.gov](http://www.neh.gov)) can be obtained by sending an email to [newsletter@neh.gov](mailto:newsletter@neh.gov); type the word "subscribe" in the body of the message. NEH offers summer programs for professors and school teachers and supports Chautauquas around the country in addition to summer stipends for research and other programs.

**NASA History: News and Notes** is published quarterly by the NASA History Division, Office of Policy and Plans, Code ZH, NASA Headquarters, Washington, DC 20546. You can receive *NASA History: News and Notes* via email. To subscribe, send a message to [domo@hq.nasa.gov](mailto:domo@hq.nasa.gov). Leave the subject line blank. In the text portion simply type "subscribe history" without the quotation marks. You will receive confirmation that your account has been added to the list for the newsletter and to receive other announcements that may interest you. The latest issue of this newsletter is also available on the web at [www.hq.nasa.gov/office/pao/History/nltrc.html](http://www.hq.nasa.gov/office/pao/History/nltrc.html).

**An NEH Summer Institute, "Experience and Experiment in Early Modern Europe,"** will be held at the Folger Shakespeare Library, Washington, DC, 25 June to 3 August, 2001 for college faculty. See [www.folger.edu/](http://www.folger.edu/)

[institute/nintro.html](http://institute/nintro.html).

**Stanford Linear Accelerator Center's Beam Line** issue for Summer/Fall 2000 (Vol. 30, No. 2) was a Special Quantum Century Issue with several articles on the history of the development of quantum theory, from its origins, through lasers, cosmology, and superconductivity, and a brief essay on "The future of the quantum theory." See [www.slac.stanford.edu/pubs/beamline](http://www.slac.stanford.edu/pubs/beamline).

**"One Hundred Years of Quantum Physics,"** an article by Daniel Kleppner and Roman Jackiw, appeared in the August 11, 2000 issue of *Science* (Vol. 289).

**John Rigden's biography of I. I. Rabi** was recently reprinted by Harvard University Press. Rigden's new book of essays on the hydrogen atom and its influence in the development of 20th century physics will be published by Harvard University Press this year.

## Web Resources

### Physics Internet Resources

The American Physical Society has a collection of useful physics internet links on its website. Go to the APS home page ([www.aps.org](http://www.aps.org)) and follow the "Physics Internet Resources" link.

### Physics Central

Physics Central ([www.physicscentral.com](http://www.physicscentral.com)) has been established by APS to help communicate the excitement and importance of physics broadly. You are invited to visit their site every week to find out how physics is part of your world. They answer questions on how things work and provide daily updates on physics in the news. They describe the latest research and the people who are doing it, along with web links for more information.

### Links to Science History Journals

John Agar of the University of Manchester has put together a page of links to 44 journals for history of science, philosophy of science, sociology of science, history of technology, history of medicine. It can be found at [www.man.ac.uk/Science\\_Engineering/CHSTM/journals.htm](http://www.man.ac.uk/Science_Engineering/CHSTM/journals.htm)

**Centennial of Flight Commission Website** has information for aviation enthusiasts, educators, students, and all those who may be planning projects and activities to help the country celebrate the Wright Brothers' first powered flight centennial on and around December 17, 2003. See [centennialofflight.gov](http://centennialofflight.gov).

**Back issues of Science magazine** (Janu-

ary 1895 to December 1994) are now available online through the Journal Storage Project at [www.jstor.org](http://www.jstor.org). While the site requires a subscription, this service may be available at university or regional libraries.

**Theuth, the French history of science group**, can be found on the web at [www.sigu7.jussieu.fr/hpr/theuth-index.html](http://www.sigu7.jussieu.fr/hpr/theuth-index.html).

**Online French bookshop** specialized in second-hand books on history and philosophy of science: [www.philoscience.com](http://www.philoscience.com).

**Florence Center for the History and Philosophy of Science**: [associazioni.comune.firenze.it/florenceCHPS](http://associazioni.comune.firenze.it/florenceCHPS).

**Philosophy of Science Society of Japan**: [wwwsoc.nacsis.ac.jp/pssj](http://wwwsoc.nacsis.ac.jp/pssj)

## Upcoming Conferences

**The Second Conference on Laboratory History** will be held April 19-21, 2001, at Jefferson Laboratory in Newport News, Virginia, near Colonial Williamsburg. It will address all aspects of laboratory life, including various fields of research and eras from the eighteenth century to the present. The conference follows a similar meeting held in 1998 in New York. For more information contact Catherine Westfall at [Westfall@JLab.org](mailto:Westfall@JLab.org).

On 26-29 April 2001 the **Organization of American Historians** will hold its annual meeting at the Westin Bonaventure Hotel in Los Angeles, CA, with the theme, "Connections: Rethinking our Audiences." Contact the 2001 Program Committee, Organization of American Historians, 112 North Bryan Avenue, Bloomington, IN 47408-4199. For further information on the conference visit the OAH web page: [www.indiana.edu/~oah/meetings/2001program/call.html](http://www.indiana.edu/~oah/meetings/2001program/call.html).

**The Southern California Colloquium in the History of Science, Medicine and Technology** will host a conference on Saturday, 28 April 2001, entitled "Science, Technology and Economic Development: How Tight is the Fit?" It will be held in Room 314, Royce Hall, UCLA. To reserve your seat, please e-mail Margaret C. Jacob, moderator: [mjacob@history.ucla.edu](mailto:mjacob@history.ucla.edu).

**Congress on the History of Science and Engineering**, Lille, France, 24-26 May, 2001, sponsored by Société Française d'Histoire des Sciences et des Techniques. For information see [wwwrc.obs-azur.fr/cega/hdsn/SFHST.html](http://wwwrc.obs-azur.fr/cega/hdsn/SFHST.html) or email [SFHST.2001@free.fr](mailto:SFHST.2001@free.fr).

**The Canadian Society for History and Philosophy of Science (CSHPS)** will meet at Université Laval, Quebec City, 24-26 May, 2001. See [www.ukings.ns.ca/cshps](http://www.ukings.ns.ca/cshps).

**The Fifth Biennial History of Astronomy Workshop** will be held July 5-8, 2001 at the University of Notre Dame. The workshop is sponsored by Notre Dame's Graduate Program in History and Philosophy of Science, Notre Dame's Reilly Center for Science, Technology, and Values, the History of Astronomy Special Interest Group of the History of Science Society, and the Historical Astronomy Division of the American Astronomical Society. Steven Dick and Marc Rothenberg are program co-chairs.

This year's invited guest from overseas is Helge Kragh, who will head a stellar panel on "How astronomy and cosmology became physical sciences." Other invited sessions include the use of instruments in teaching history of astronomy; astronomy and the arts; astronomy and religion; historiography, and more. The contributed papers will cover an even wider range of periods, cultures and topics than usual. For information contact Matt Dowd, Graduate Program in History and Philosophy of Science, Univ. of Notre Dame, Notre Dame, IN 46556, [Matthew.F.Dowd.11@nd.edu](mailto:Matthew.F.Dowd.11@nd.edu). The conference website is [www.nd.edu/~histat4](http://www.nd.edu/~histat4).

**The XXIst International Congress of History of Science** will be held in Mexico City from 8-14 July 2001. Prof. Juan José Saldaña, conference chair, has provided a new congress website and email address: [www.smhct.org](http://www.smhct.org), email: [xxiichs@servidor.unam.mx](mailto:xxiichs@servidor.unam.mx).

In August 2001, there will be a symposium on **History of Geomagnetism, Solar-Terrestrial Physics and Space Physics and Related Disciplines** in Hanoi, Vietnam. For further information contact Dr. Wilfried Schröder, Hechelstrasse 8, D-28777, Bremen, Germany.

**The Society for the History of Technology** will hold its Annual Meeting in San Jose, California, October 4-7, 2001. Call for Papers Deadline: March 23, 2001. The program committee welcomes proposals for individual papers or complete sessions on topics related to all facets of the history of technology. In particular, the committee will welcome non-US and/or pre-1800 topics, works-in-progress from researchers of all stripes (including graduate students, chaired professors, and independent scholars), and papers from those new to SHOT who believe that an engagement with history can help their own work, regardless of discipline. Because the 2000 meeting took place outside the U.S., those who presented at SHOT-Munich are eligible to give a paper at

San Jose. Details are available at [www.press.jhu.edu/associations/shot/annual.htm](http://www.press.jhu.edu/associations/shot/annual.htm)

**The 12th Biennial International Conference of the Society for Philosophy and Technology** will be held at the University of Aberdeen in Aberdeen, Scotland, July 9-11, 2001. Contact: Andrew Light, SPT Conference, Int'l Center for Advanced Studies, New York University, 53 Washington Square South, Rm 401E, New York, NY 10012, e-mail: [alight@binghamton.edu](mailto:alight@binghamton.edu), or see [www.spt.org](http://www.spt.org).

On 22-25 October 2001, The First Flight Centennial Commission is holding a **conference commemorating the Wright Brothers** entitled "They Taught the World to Fly: The Wright Brothers and the Age of Flight". Inquiries should be directed to Dr. Larry Tise at [ltise@ibm.net](mailto:ltise@ibm.net) or to (919) 733-2003 or (919) 715-8959.

On 8-11 November 2001 the **History of Science Society** will hold its annual meeting in Denver, Colorado. Contact: History of Science Society Executive Office, University of Washington, Box 351330, Seattle WA 98195-1330, 206-543-9366, e-mail: [hssexec@u.washington.edu](mailto:hssexec@u.washington.edu).

The 116th annual meeting of the **American Historical Association** will be held in San Francisco, 3-6 January 2002. The Program Committee invites proposals from all members of the Association (academic and nonacademic), from affiliated societies, and from scholars in foreign countries and in related disciplines. In planning the program, the committee seeks presentations that address the entire community of historians and provide opportunities to examine the larger concerns of the profession. Information on proposing may be obtained from the AHA office at 2002 Materials, AHA, 400 A St., SE, Washington, DC 20003-3889. (202) 544-2422, ext. 104, fax (202) 544-8307, [aha@theaha.org](mailto:aha@theaha.org). All materials may also be found on the AHA's website: [www.theaha.org](http://www.theaha.org).

**A Robert Hooke Tercentenary Conference** will be held in London, 7-9 July, 2003. Contact [julie.jones@btinternet.com](mailto:julie.jones@btinternet.com).

# BOOK REVIEWS

**Richard Helsham, *A Course of Lectures in Natural Philosophy*, published by Bryan Robinson, reprint of the fourth edition, 1767.**

With an introduction by D. Weaire, P. Kelly, and D. A. Addis. (Dublin: Trinity College, Department of Physics, and Institute of Physics Publishing, 1999). 18 + x + 404 pp., 11 plates of figures. \$59 (£35)

*Reviewed by J. L. Heilbron, Worcester College, Oxford*

Galileo wrote his *Two chief systems of the world* (1632) for all the world who knew Italian to read. Its accessibility to the layman magnified its menace to the Inquisition. Descartes expected everyone to understand his *Principles of philosophy* (1644), in French or in Latin; and anyone who experienced a difficulty to surmount it by reading the book twice. But Newton's *Mathematical principles of natural philosophy* (1687), which set the foundations of the modern universe, remained for thirty years in the Latin and mathematics in which it was composed. It might as well have been written in Chinese and hieroglyphics for almost everyone to whom Galileo and Descartes were open books. Richard Helsham, M.D., a fellow student of George Berkeley's and physician to Jonathan Swift, occupies an honorable place in the van of writers who undertook the useful and demanding task of dumbing down Newton.

Helsham began lecturing on Newtonian natural philosophy in 1711, in the then new medical school of Trinity College, Dublin. He seems to have had no official position there until 1722, when he took up a lectureship in mathematics. Two years later he received a gold plate for his uncompensated lectures and appointment to Trinity's newly established professorship in "natural and experimental philosophy." He did not bother to publish his lectures. The volume under review here was put together from his papers by his student and successor Bryan Robinson.

Helsham's lectures cover general mechanics (central forces, composition of motion, collision, center of gravity, friction, projectile motion), hydrostatics (Archimedean principles, specific gravity, flow through pipes and orifices), pneumatics (general principles, atmospheric pressure, sound), and light (vision,

colors, reflection, refraction). The lectures include applications to simple machines, water wheels, carriage wheels, pumps, hypsometry, meteorology, acoustic devices, time measurement (cycloidal pendulums), ballistics, and optical instruments. The presentation uses little mathematics beyond conic sections and elementary algebra except for a discussion of the decline of atmospheric pressure with height, which requires logarithms. The mathematical arguments are strict and clear, almost always operating on proportions rather than equations. Sometimes, however, as in Helsham's treatment of collisions, the method divided the problem into several cases and provoked unnecessary repetition and complication. Throughout, the lectures stay close to Newton's work, augmented by experiments performed under his direction at the Royal Society by Francis Hauksbee and J. T. Desaguliers.

Helsham's coverage of Newtonian themes lies between that of Roger Cotes' *Hydrostatical and pneumatical lectures* (1738) and W. J. 'sGravesande's *Mathematical elements of natural philosophy, confirmed by experiments; or, An introduction to Sir Isaac Newton's philosophy* (several editions beginning in 1720). 'sGravesande's text, the most widely used survey of Newton's ideas during the 1720s and 1730s, includes an account of the gravitational theory and the system of the world as well as the subjects Helsham offers. Discoveries about heat, electricity, and magnetism from the 1740s made 'sGravesande as well as Helsham, who mentions electricity and magnetism only as examples of attraction and repulsion, obsolete as surveys of natural philosophy. Nonetheless Helsham's *Lectures* were reprinted (all the "editions" seem to be the same) six times during the eighteenth century (five times in London, lastly in 1777, and once in Dublin, in 1793), and once early in the nineteenth century in backward Philadelphia (1802). The text's longevity was no doubt owing to the clarity of the presentation and the excellent illustrations of physical principles in practical applications.

Although well outmoded as a whole before 1800, Helsham's *Lectures* continued to guide instructors and students at Trinity until his book reached its centennial. "Select parts" were issued by the College's printers in 1818, 1827, and 1834. Comparison of the selections with the parent text is a quick way to identify advances in physics as perceived

in Dublin. Thus the selections of 1818 omit the general principles of mechanics, perhaps because of their emphasis on Newtonian central forces and their cumbersome and incomplete treatment of collisions, and also friction and the account of carriage wheels, but retain the sections on simple machines. Hydrostatics and pneumatics remain, but highly edited; the typical advanced Newtonian topics – the flow through orifices and pipes, the theory of the cataract, the speed of sound, and the law of force between gas particles – are discarded altogether, as, indeed, they deserved to be. The editors also dropped the superseded sections on light and colors, which were based on a particulate theory of light, in their entirety. By 1834, nothing was left of mechanics; only the bowdlerized hydrostatics and pneumatics survived.

The progressive removal of obsolete and erroneous pieces from the *Lectures* may have something to say to the physicists of our time. Is there not an anticipation of the over-confidence of "modern naturalists" (as Helsham called his colleagues) in his congratulatory opening? It reads: "it is of no small suprise to think how inconsiderable a progress the knowledge of nature had made in former ages, when compared with the vast improvements it has received from the numberless discoveries of later times; insomuch, that some of the branches of natural philosophy, which at this day is almost compleat in all its parts, were utterly unknown before the last century."

The reprint is accompanied by a brief introduction by D. A. Addis, P. Kelly, and D. Weaire. Their biographical sketches of Helsham and Robinson, and their gestures toward placing Helsham's *Lectures* in historical context, did not require the efforts of three persons.

**Louis Brown, *A Radar History of World War II*, (Bristol and Philadelphia: Institute of Physics Publishing, 1999). c584 pp. \$38 (£27.50)**  
*Reviewed by Robert W. Seidel, University of Minnesota*

The concept of a radar history of World War II seems as incongruous to the historian as, say, a refrigerator history of the kitchen. Just when we thought technological determinism had been thrown on the



dustheap of historiography, if not history, Brown's book, subtitled "Technical and Military Imperatives," comes along to resuscitate the genre. This first impression is reinforced by the illustrations, which are overwhelmingly pictures of World War II radar apparatus. While antiquarians prize such things, and the hardware history of war is replete with lovingly assembled and encyclopedic volumes that say very little of history, it might be thought that those with a more serious interest in history might better turn to Robert Buder's *The Invention that Changed the World: How a Small Group of Radar Pioneers Won the Second World War and Launched a Technological Revolution*, the focus of which seems to be artists rather than artifacts.

Yet this would be a mistake, for Brown has sought to explore the human aspects of radar's development, and has uncovered and catalogued a large number of events in the history of science and technology that have been ignored or discounted by other historians. He grasps at the generalizations that will make historical sense of his subject, and, although he fails in many cases to come to grips with substantial issues, he is clearly seeking a contextualized understanding of the hardware, and he brings a great deal of information to light in the process.

Historical patterns, however, require more than such an attempt. If a man's reach must exceed his grasp, still he can increase both by standing on the shoulders of those who have gone before. The problems of historical scholarship do not elude him, and some of his conceptions, i.e. that one must rely on oral histories only at one's peril, are clear insights into the hazards of that comfortable form of "research."

On the other hand, historical patterns are not the result of Platonic forms, but, like the radar patterns that are grappled with in the book, require careful resolution and filtering of the data to distinguish the signal from the noise, and to identify the signal with its referent. That sort of focus is never quite achieved in the 500 pages of the narrative. The technical density of the material presented is not the problem. Brown believes that any one with a good high-school science education can understand radar, and does his best to make it intelligible both in his narrative and his helpful appendix. It is rather the space and time coordinates which are unstable. The use of radar is no more helpful as a signifier than, say, the use of the bazooka. And, in many of the battles Brown examines in detail, he finds no evidence that

radar played an essential determining role, and is honest enough to admit it. What, then, are the "technical and military imperatives" of which he writes?

The technical imperatives arise from the increasing understanding of potential applications of electromagnetic radiation: after Hertz and Marconi showed the potential of radio, and it was observed that radio waves were reflected from ships and airplanes, most of the primary participants in World War II developed some form of radar in the 1930s. The secrecy of these efforts and the absence of evidence of successful espionage suggests that these were independent developments. The author traces British, American, French, German, Soviet and Japanese efforts along these lines, and compares their technical success in terms of achieving successful detection, ranging, and position of targets. The evidence shows that although this was accomplished using different technologies in different countries, there is a common thread of development.

The technical development, however, was subject to military imperatives, e.g. interservice rivalries, the degree of integration of the air arm into the army and navy, the rank and assignment of its sponsors, and the prevailing attitudes toward the use of aerial bombardment. Those who followed the view that the bomber would always get through thus took a different tack than those who thought of aviation in a supporting role to the army and navy. On one extreme, General Billy Mitchell asserted that the airplane had made both naval and military targets vulnerable. On the other, the Luftwaffe discounted strategic bombing in developing tactical air support for the blitzkrieg. No one could anticipate the actual utility of aviation, since no one could understand the effect that radar would have upon both air defense and offense.

Brown attempts to work these imperatives into a narrative that shows the effects radar had upon the battles in all of the theaters of the war, and comes to the conclusion that radar contributed to, but did not in and of itself win the war. He tirelessly examines the evidence relating to the deployment, tactical employment, and enhancement of radar during the course of the conflict. His narrative casts radar – in its multifold manifestations and acronymic noms de guerre – as the leading character in a drama that does not lack human characters from Luis Alvarez to Robert Watson-Watt, whom he captures with the same force and economy that he depicts the technical characters of radar sets:

"Watt was a Scot, a tribal attribute that gave him satisfaction almost as great as his conviction that he had invented radar, two pieces of information that seldom escaped the attention of others. He was descended from the inventor of the external-condenser steam engine yet wanted that illustrious name improved by adopting a double-barrelled version on receiving honours." [446]

The details of technology and tactics demand more of the reader than the casual military buff or historian of technology may wish to expend, but for those who have plumbed the depths of Guerlac's wartime history of radar or soldiered through Buder's more prosaic account without exhausting their curiosity about the technology, Brown's account will provide a worthwhile read.

**Andrew Pickering, *Constructing Quarks*, (University of Chicago Press, 1984, new paper edition, 1999) 468 pp. \$26  
Reviewed by Lawrence Rees, Brigham Young University.**

In 1984, Andrew Pickering created a bit of a stir in the high energy physics community with his work, *Constructing Quarks*, published by the University of Edinburgh Press. The University of Chicago Press has reissued this book in a paperback version. While the paperback version has made Pickering's work more financially accessible, it has done nothing to change the original text. The book is identical, right down to the typographical errors, to the original publication. Although it would be interesting to read Pickering's view of the last decade or two of particle physics to see if his philosophies have changed in the passage of time, Pickering's description of the birth pains of the Standard Model remains an accurate and informative standard in the history of high energy physics.

To begin with, I'd like to make it clear that this book is not a textbook about high energy physics, nor is it a popular guide to particles and interactions. The purpose of the book is not to teach physics, but to describe the often-winding road that led to our present idea of matter at its most fundamental level. Pickering suggests that the reader need not be fluent in the mathematics or language of particle physics. He does keep the number of equations to a minimum and defines rather simply the host of physical definitions needed to present the topic with any degree of rigor. In spite of that, this work

# FORUM ELECTIONS

Please vote for Vice Chair, Secretary- Treasurer, and two Members at Large of the Executive Committee. If you have email registered with APS, you will have received a message inviting you to vote on the internet, as authorized by the FHP Executive Committee last year. If not, you should have received a paper ballot by mail. If you want a paper ballot but have not yet received one, please email your request, including your mailing address, to [fhp\\_ballot@byu.edu](mailto:fhp_ballot@byu.edu) or contact Prof. Bill Evenson, Department of Physics, Brigham Young University, Provo, UT 84602, 801 378-6078. **The closing date of the election is March 26 – ballots must be received by that date to be valid.** Brief resumes and statements from the candidates begin on this page. The candidates on the ballot are

## Vice Chair:

**Elizabeth Garber**  
**Michael Riordan**

## Secretary-Treasurer:

**Bill Evenson**  
**Ken Ford**

## Executive Committee:

**Lawrence Badash**  
**Daniel Greenberger**  
**Elizabeth Paris**  
**K. C. Wali**

## Nominees for Vice Chair

**Elizabeth Garber** is an historian of physics at the State University of New York at Stony Brook whose latest book is *The Language of Physics: The Calculus and the Development of Theoretical Physics, 1750-1914*. She has also published on Maxwell and the kinetic theory of gases and statistical physics with Stephen G. Brush and Francis Everitt.

*Statement:* History can give us a perspective of the discipline within which we work that is unique. It can demonstrate that much we take for granted is not inevitable and the conditions of the field more contingent than we may be comfortable with. However, it also can deepen our appreciation of what it has taken for physics to develop as a discipline and profession. History also makes the discipline accessible to the general public. This alone makes the history of a disci-

pline an important aspect of that discipline. The one place where historians and physicists can meet is in the Forum, to our mutual benefit. On the board I would hope to strengthen interactions between members and historians and encourage discussions of issues critical to understanding the place of physics in an era of immense structural changes.

**Michael Riordan** is the Assistant to the Director at the Stanford Linear Accelerator Center, a Lecturer in the History and Philosophy of Science Program at Stanford University, and Adjunct Professor of Physics at the University of California, Santa Cruz. After earning his Ph.D. in physics from MIT in 1973, he did research in particle physics at MIT, the University of Rochester and Stanford before turning to the history of physics in the 1980s. He is author of *The Hunting of the Quark* (Simon & Schuster, 1987), which won him the 1988 Science Writing Prize of the American Institute of Physics, and coauthor with Lillian Hoddeson of *Crystal Fire: The Birth of the Information Age* (W. W. Norton, 1997). For this history of the invention and development of the tran-

would easily lose readers who do not have at least a working knowledge of elementary modern physics and of the Standard Model. To a reader who is somewhat familiar with the discipline, however, the work presents a fascinating unfolding of events that cannot be found in textbooks.

The subtitle of *Constructing Quarks is A Sociological History of Particle Physics*. This subtitle reflects the two main, yet somewhat disparate, themes of this work: the history of the development of the Standard Model, and the sociological effects at play in that development.

As a history, Pickering has done a remarkable job of following the developments of high energy physics from its earliest years through the very early 1980s. The book is carefully researched and is accurate in its details. His personal contact with many of the key players brings insights into the thoughts and motivations of those who were most influential in the field. What makes the book most worthwhile is Pickering's choice to carefully avoid the "scientist's approach" that portrays high energy physics as an inexorable march

toward the truth. Instead, Pickering discusses the ebb and flow of ideas that eventually led to what James Bjorken described as the "new orthodoxy" of high energy physics: the gauge theory of the electroweak interaction, quantum chromodynamics, and the SU(5) theory of grand unification.

It is significant that Pickering did not entitle his book *Discovering Quarks*. His premise, providing one thread of continuity throughout the book, is that quarks were constructed, not discovered. That is, the Standard Model was developed by a synergistic relationship between experiment and theory, with theorists guiding the experiments being done and the methods of interpreting them, and experimental evidence leading theorists in their work. This is demonstrated well by the fact that the "old science," as Pickering calls it, was dominated by measurements of the most probable interactions, but the "new science" was an art of pulling very unlikely exotic events cleanly out of the background. There is a subtle indictment in Pickering's writing that high energy physics practitioners had a tendency to apply a

different standard to results that promoted the community consensus as opposed to those that detracted from that consensus. The book gives the impression that the Standard Model is a house of cards, ready to topple at any instant. It is this insinuation that made Pickering's work controversial when it was first published. Although it is philosophically compelling to ask what sort of standard model would have evolved if history had unfolded a little differently, the process which gave birth to the Standard Model was neither unusual nor unique to high energy physics. Pickering's objections, therefore, seem somewhat melodramatic in places. Pickering, however, is not asking us to throw away the Standard Model, only to be cautious in canonizing it. Even then, Pickering is more successful when he is narrating history – even from a sociological perspective – than when he is standing on a soapbox.

All in all, *Constructing Quarks* is a very interesting portrait both of high energy physics and of contemporary science at work. I see it as a valuable history that will be used for generations to come.

sistor, they were awarded the inaugural Sally Hacker Prize of the Society for History of Technology in 1999.

Riordan was principal organizer of the Third International Symposium on the History of Particle Physics, held at Stanford in June 1992, and an editor of the associated volume, *The Rise of the Standard Model: Particle Physics in the 1960s and 1970s* (Cambridge University Press, 1997). A Fellow of the American Physical Society, he currently teaches a course on the history of twentieth-century physics at Stanford and leads a group of scholars researching and writing a history of the Superconducting Super Collider. In connection with this project, he received a John Simon Guggenheim Memorial Fellowship in 1999.

*Statement:* The Forum already does an excellent job of sponsoring sessions on the history of physics at annual meetings of the American Physical Society. Recent sessions have attracted hundreds of participants, demonstrating the interest in the subject that exists among APS members. And our newsletter serves the important need of maintaining communications among APS members who are involved in the history of physics. Both efforts are fundamentally sound, but they can benefit from improvement. The Forum can do substantially *better* in two other areas of endeavor: promoting the use of history of physics in broader educational efforts, and fostering scholarly work on the subject. The proposed APS History of Physics Award will certainly help to encourage individual efforts in both areas. If elected Vice Chair of the Forum, I will devote a good portion of my available time to making this Award a reality and to getting it fully funded.

### Nominees for Secretary-Treasurer

**Bill Evenson** is Professor of Physics at Brigham Young University. He was formerly Associate Academic Vice President, Dean of the College of Physical and Mathematical Sciences, and Dean of General Education at BYU. He received his BS in physics at BYU and PhD from Iowa State University, followed by postdoctoral research at the University of Pennsylvania. His research has been in theoretical and computational condensed matter physics. He has a long-standing interest in history of physics and served as FHP program chair in 1995-96 and on the committee for the centennial of the discovery of the electron in 1997. Since

Fall 1997, he has been editor of this *Newsletter*. He was a Fulbright Senior Scholar in Germany 1998-99 and is the current FHP Secretary-Treasurer.

*Statement:* The programs of the APS Forum on History of Physics increase awareness in the physics community of historical issues and help deepen perspective on current activities in physics. I am committed to broadening the discussion of history in our community, including meaningful interaction between physicists and historians. I believe the Forum should help to expose both the complexities and the beauty of science, with its sophisticated interplay of intellectual and social elements. In particular, the Forum provides an opportunity to educate physicists about challenges to the credibility of science that are fashionable in some intellectual circles these days and to improve the ability of physicists to discuss these issues in settings that can affect public understanding of and support for science. I want to continue helping the Forum be effective in meeting the challenges of informing physicists about their history and of providing a foundation for more sophisticated discussion of science in the broader community.

**Ken Ford** received his Ph.D. from Princeton University in 1953, and has held faculty positions at Indiana University, Brandeis University, the University of California, Irvine, and the University of Massachusetts at Boston. He also served as president of New Mexico Tech, vice president of the University of Maryland, and director of the American Institute of Physics. After retiring from AIP, he was director of science programs at the David and Lucile Packard Foundation, and taught (and is currently teaching) high-school physics. His research was in theoretical nuclear physics and field theory. His books include *The World of Elementary Particles* (1963), *Basic Physics* (1968), and, with John Wheeler, *Geons, Black Holes, and Quantum Foam: A Life in Physics* (1998). He served as president of the American Association of Physics Teachers in 1972 and was part of an APS summer study on energy efficiency in 1975.

*Statement:* I am a cheerleader for the history of science (and for the Forum on History of Physics), not a historian of science. At AIP, I did what I could to support the important work of the Center for History of Physics and its Niels Bohr Library. I have used history to try to enrich my teaching, and in my writing I have tried to get the history straight. In service to the Forum, in addition

to doing whatever a secretary-treasurer is supposed to do, I would join in promoting better history in textbooks and in teaching, and would support more good history sessions at APS meetings.

### Nominees for Members at Large of the Executive Committee

**Lawrence Badash** (BS in physics, Rensselaer Polytechnic Institute, 1956; PhD in history of science, Yale University, 1964) is Professor of History of Science, in the History Department, University of California, Santa Barbara, where he has taught since 1966. He has been a NATO Postdoctoral Science Fellow at Cambridge University, a Guggenheim Fellow, a Visiting Professor of International Studies at Meiji Gakuin University, Yokohama, and is a Fellow of the American Physical Society and of the American Association for the Advancement of Science. His research is centered on the physical sciences of the past century, especially the development of radioactivity and nuclear physics, on the role of scientists in the nuclear arms race, and on the interaction of science and society. These interests are shown by the six books he has authored or edited, which include *Radioactivity in America: Growth and Decay of a Science* (1979), *Kapitza, Rutherford, and the Kremlin* (1985), *Scientists and the Development of Nuclear Weapons* (1995), and *Reminiscences of Los Alamos, 1943-1945* (1980). At present, he is completing a book on the science and politics of the nuclear winter phenomenon, after which he plans to turn his attention to books on Ernest Rutherford and on the effect of McCarthyism on science.

*Statement:* The Forum's large membership testifies to the interest that practicing physicists have in the history of their profession. I believe that we are well beyond the time when, as a gesture towards the past, many physics texts contained an introductory chapter to identify Galileo, Newton, and Maxwell. Now, physicists join with professional historians to ask questions about the history of science, not merely to glorify its luminaries. The results appear in both physics and history journals, and in well attended sessions organized by the Forum, where the audiences also show their own sophistication by the questions posed. I had the privilege of being chair of this Forum (in 1988-1989, when it was a Division), and believe that its newsletter and sessions are valuable means of serving historical schol-

arship and the larger physics community.

**Daniel Greenberger** is a graduate of the famous Bronx HS of Science class of 1950, (which included Steven Weinberg, Sheldon Glashow, Myriam Sarachik-- VP elect of the APS, and other well-known physicists) he got his BS at MIT, and his MS and PhD at the U. of Illinois. Originally trained as a high energy physicist, his research interests have over the years become more heavily centered on foundational problems in quantum theory. His best known work (done with Mike Horne and Anton Zeilinger) is the introduction of three particle "entangled" states (GHZ states), on which a single set of measurements would yield one effect, while a local, realistic theory would yield exactly the opposite effect. He is an APS fellow, and has been a Fulbright fellow, and a Humboldt Foundation senior fellow. He has been on the editorial or advisory boards of a number of journals, including some with a historical or philosophical bent, such as the *American Journal of Physics*, *Foundations of Physics Letters*, and *History of Modern Physics*. He recently co-edited a yearbook of the Vienna Circle, devoted to the memory of Erwin Schrödinger and last year was honored by having a two issue festschrift dedicated to him by the *Foundations of Physics*. He has also organized and chaired two major international conferences on the foundations of quantum mechanics, and has been on the organizing committee of many others.

*Statement:* I have always been interested in the history and philosophy of physics. Not only is my research centered on the more philosophical side of the subject, but I also think that courses in physics should include interesting philosophical and historical material far beyond a few biographical comments about famous men (for example: fields, like the electric field, should be presented as the amazing intellectual innovation they are, not just as useful tools!) I think that removing the historical and philosophical framework from the subject, effectively dehumanizing it, has been a major culprit in creating the lack of interest in physics by both the general public and bright young students. And yet, in most universities it is impossible to find a course in the physics department devoted to the history of the subject. I think the potential interest is out there, and I think that besides promoting professional work in the field, the Forum should actively make a major effort toward proselytizing both our colleagues and the general public, making them

aware of just how fascinating the subject is.

**Elizabeth Paris** received her Ph.D. in history and philosophy of science from the University of Pittsburgh in 1999. Also that year, she helped to organize the revival of the Joint Atlantic Seminar in the History of the Physical Sciences in Washington, DC. In addition to research in solar physics, Elizabeth's teaching experience has ranged from physics and chemistry at a Los Angeles high school to history of science at Harvard University. Currently at the Dibner Institute for the History of Science and Technology at MIT, she is exploring issues related to 1960s Italian particle physics. Her most recent article, "Lords of the Ring: The Fight to Build the First U.S. Electron-Positron Collider," is scheduled to appear in the Spring issue of *Historical Studies in the Physical and Biological Sciences*.

*Statement:* I believe the results of investigations nurtured within our community can have a role in both education and policy. Historical enquiries ask distinctly different questions from those of physics. Rather than search for an understanding of physical phenomena, we here concern ourselves with the intellectual, social, and/or cultural situations motivating and affecting such questions. It is an opportunity to emphasize the distinctly human dimension of scientific investigation. No equipment, no theory, no experiment creates itself. Only a small fraction will ever be realized, attempted, or even conceived of by human actors. The historian of physics has the opportunity and the tools with which to examine the evolution of these processes. The Forum has the opportunity to bring these examinations to a place where historical understanding and the physics community interact. In the realm of education, acknowledging the human actors in scientific practice can help to make physics less mysterious to the public and more accessible to students -- who are all, then, perhaps better able to appreciate the exquisite beauty and incredible challenges that have been presented in connection with the natural world. In the realm of policy, studies of more recent episodes provide an invaluable resource. To deny the political activities of the APS would be at best naive, at worst, dishonest. If we truly believe that physics has been and continues to be a worthy endeavor, it behooves us to be aware of and to learn from the past, as well as to encourage those engaged in contemporary political negotiation to utilize our work. Additionally, I hope my candidacy

will encourage the next generation of scholars to participate in the excellent work being done by the Forum.

**Kameshwar C. Wali** did his undergraduate and graduate work for Masters degrees in India. He received his Ph.D. in physics at University of Wisconsin (with Robert G. Sachs) in 1959. After two years of Post-Doctoral work at The Johns Hopkins University, he was at the Argonne National Laboratory in the High Energy Physics Division from 1962-69, when he joined Syracuse University. He is now Professor Emeritus and Research Professor in the Physics Department. At Syracuse, he received Chancellor's Citation for Academic Excellence and was named J. Dorman Steele Professor before his retirement. He was a Senior Fulbright Scholar in 1995 to visit Australia. He is a Fellow of the American Physical Society and was one of the founding members of the Forum on History of Physics. He is the author of *CHANDRA: A Biography of S. Chandrasekhar*. His area of research is in theoretical elementary particle physics and with primary interests in symmetries and dynamics of elementary particle interactions. He has contributed significantly in the areas of Grand Unified Theories. His current interests include the application of the techniques of non-commutative geometry to elementary particle interactions including gravity and the study of magnetic monopoles in curved space-time.

*Statement:* I have been interested in the history of physics throughout my career and believe strongly that it should be an important part of the physics curriculum at all levels. Particularly while teaching elementary physics courses, I found to my great distress a total disregard on the part of students for the historical background of great discoveries and the men and women responsible for them. As a member of the executive committee, besides doing my best to promote the scholarly activities of our forum in APS meetings and other conferences, I would like to explore how best our forum can help make history a part of physics education, providing encouragement and support for a new genre of books on histories and biographies suitable at high school and undergraduate college levels. I would also like to build on the success of the play *Copenhagen* and similar efforts to extend the boundaries of physics to the humanities by extending the activities of our forum beyond the confines of APS to the public at large.