

History of Physics Newsletter

Volume V, Number 2

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FORUM/DIVISION NEWS

HISTORY DIVISION VOTES TO BECOME FORUM

In May, the members of the Division of History of Physics voted to approve the revised bylaws and to change the subunit from a Division to a Forum. The APS Council had approved the change in status at their November 1991 meeting. The new status will become effective January 1st, 1993. The activities will remain essentially the same, namely organizing historical symposia at APS meetings, cosponsoring commemorative meetings, working with technical divisions on history programs, publishing the History of Physics Newsletter, and being supportive of the AIP Center for the History of Physics. The change in status and the revision of the bylaws was a consequence of the 1990-91 changes in the constitution and structure of the American Physical Society. The divisions are devoted to technical subspecialties; the forums are of interest to all members of the society. The activities of the forums are supported by general membership funds; members of the divisions have to pay annual dues to the division. However on your annual APS dues form your membership in the Forum on the History of Physics should be checked.

APS INVITED SESSIONS

The Forum on the History of Physics will sponsor sessions of invited papers at two APS meetings in 1993:

Seattle, WA, "Radar, World War II, & Post-war Physics" during 22-26 March 1993. The session is being organized by Lillian Hoddeson; the session will be chaired by Gerald Holton. The speakers include: *Bredek Bleaney*, *Robert Pound*, and *Henry Torrey*.

Washington, DC, The topic will be World War II Physics, 12 or 13 April 1993. The session is being organized by Allan Needell:

Cosponsored Chicago Commemorative Symposia

The APS and the Forum on the History of Physics are cosponsoring commemorative symposia at the University of Chicago. On December 1st, 1992 just after the centennial anniversary of the University, there will be a **Conference on the History of the Physical Sciences at Chicago**. The theme of this symposium will be the physical sciences during the first 50 years of the physics department. It has been organized by Max Dresden, and the invited speakers are: *Elizabeth Garber* "Science at the Time of the Origin of the University of Chicago," *John L. Michel* "Michelson and Millikan, The Chicago Connection," *Saunders Maclane* "Mathematics at the University of Chicago," *Daniel Siegel* "One of the Major-Minor Figures (Professor Harkins)," *Alexi Asmus* "Mulliken and the U.S. Acceptance of Molecular Quantum Theory," and *Max Dresden* "An Impressionist View of the Scientific Impact of the University of Chicago." A dinner at the Adler Planetarium on December 1st will be followed by a sky show on the history of astronomy in Chicago. (Prepaid dinner reservations will be required.)

The Symposium on December 2nd takes place on the fiftieth anniversary of the experiment at Chicago of Fermi and his colleagues demonstrating the first controlled self-sustaining nuclear chain reaction. Roger Hildebrand and James Cronin have been organizing the talks most of which will deal with Fermi and with the chain reaction. The speakers for December 2nd are: *Martin Kamin* "Out of the Darkness," *Donald Osterbrock* "The Birth, Near-Death, and Resurrection of Astronomy at the University of Chicago," *Glen Seaborg* "The Plutonium Story," *Jack Steinberger* "Recollections

The History of Physics Newsletter (HPN) is published by the Forum on the History of Physics of the American Physical Society. It is distributed free to all members of the Forum. Others who wish to receive it should make a donation to the Forum of the History of Physics of \$10 per volume (\$5 additional for airmail). Each volume consists of 5 issues, Editor: Albert Wattenberg, Department of Physics, University of Illinois, Urbana, IL 61801. Associate Editors: Stephen G. Brush, Department of History and Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742, and Elizabeth Garber, History Department, SUNY at Stony Brook, Stony Brook, NY 11794.

of Fermi as a Teacher;" *Valentine Telegdi* "Physics and Physicists at Chicago;" and *Albert Wattenberg* "Fermi's Experiment of December 2, 1942."

For more information contact: Roger H. Hildebrand or James W. Cronin, Enrico Fermi Institute, The University of Chicago, 5640 South Ellis Avenue, Chicago, IL 60637. Telephone (312) 702-7581 (Hildebrand) or (312) 702-7102 (Cronin).

Division of Nuclear Physics History Session

Subsequent to the scheduling of the APS General Meeting in Washington in April 1992, Hugh Richards of the University of Wisconsin organized a historical session on fast neutron experiments in the early 1940s. At the suggestion of Gerald Holton, chairperson of the Division of History of Physics, the session was scheduled at the Division of Nuclear Physics meeting in Santa Fe, NM 15-17 October 1992. The session is entitled "The Birth of the Nuclear Age, Fifty Years Ago, Part II: Some Preludes to Los Alamos." Robert W. Seidel is chairperson. The speakers are: *H.T. Richards* "Some 1942 Fast Neutron Measurements at Rice and Minnesota." *J.L. McKibben* "Accelerator Developments and Fast Neutron Scattering Studies at Wisconsin;" *A.O. Hanson* "Instrumental Developments and Fast Neutron Fission Studies at Wisconsin;" *L.D.P. King* "Early Measurements at Purdue of some Fusion Reaction Cross-sections;" and *R. Serber* "Theoretical Studies (1942) at Berkeley."

NOMINATIONS FOR OFFICERS

The Chairperson of the Nominating Committee for the 1993 Forum Election is Professor David C. Cassidy. The other members of the Nominating Committee are: L. Badash till May 1993, and S. Brush and P. A. Kidwell till May 1994. The Nominating Committee would appreciate receiving suggestions for nominees who are willing to serve. Because of changes in the APS bylaws, there is a new position, Chair-elect. The Vice-chair succeeds the Chair-elect, and the Chair-elect succeeds the Chair. Next year Sylvan S. Schweber will become Chair of the Forum. Therefore this year we need to elect both a Chair-elect and a Vice-chair and we need nominees for both of these officers. We also need to elect two new members of the Executive Committee who will serve for three years. Please send suggestions as soon as possible to Professor Cassidy, 146 Connecticut Ave., Freeport, NY 11520.

ELECTION RESULTS

Sylvan S. Schweber was elected vice-chairperson of the Division of History of Physics, and he will serve as chairperson of the Forum in 1993. He is Professor of Physics and Koret Professor of the History of Ideas at Brandeis University where he has been since 1954. He received his Ph.D. in theoretical physics at Princeton in 1952. He has written extensively on 19th and 20th century physics; he has a major interest in how to build bridges between physical scientists and historians.

David C. Cassidy was elected to serve a three year term on the Executive Committee. In 1976, he received his Ph.D. from Purdue in conjunction with the Department of History of Science of the University of Wisconsin at Madison. He is currently Associate Professor in the Natural Science Department at Hofstra University and an Adjunct Assoc. Prof. in the History Department of SUNY at Stony Brook. He was Associate Editor of the Albert Einstein Papers.

Gloria B. Lubkin was elected to serve a three year term on the Executive Committee. She

joined **Physics Today** as an associate Editor in 1963 and she has been Editor since 1985. She did her graduate work in physics at Boston University, and she was a Nieman Fellow at Harvard in 1974-75. Her interests include oral interviews with early leaders in nuclear physics, and she regularly publishes history articles.

EXECUTIVE COMMITTEE

The Executive Committee of the Division of History of Physics met in Washington, DC on 23 April 1992. The meeting was conducted by Martin Klein; the incoming chairperson Gerald Holton was unable to attend because he was recovering from an illness.

The Councilor's report by Wattenberg described the actions of the APS Council that concerned the Division. On 3 November 1991, the Council approved in principle the proposed new bylaws of the Division/Forum subject to the approval of the membership in a mail ballot. (Addendum to report: Stewart Gillmor, announced that the vote was 616 YES, 11 NO, with 2 Abstentions.) The Council approved the Fellowship Committee's recommendation of Roger H. Stuewer to be named a Fellow of the APS. The Council adopted a proposed "Guideline for Professional Conduct."

The Secretary-Treasurer, Stewart Gillmor, gave a preliminary financial report because the APS fiscal year reports are not issued until after July 1st. A request had been made that the Division provide funds to waive registration costs for some attendees at the Third International Symposium on the History of Particle Physics. A motion to support the conference up to a maximum of \$2,000 at the discretion of the Chairperson and the Secretary-Treasurer was adopted.

Max Dresden had requested funds for speakers and for publicity for the Commemorative Symposia that the Division was cosponsoring with the University of Chicago. It was suggested that an announcement of the Symposia be sent out with other mailings that the division was planning. It was moved to provide financial support for speakers at the conference up to a maximum of \$2000 subject to the approval of Martin Klein and the Secretary-Treasurer. The motion was adopted.

Gillmor mentioned that Past Chairperson, Allan Franklin, and several others recommended that there should be some special award of thanks to Heinrich Medicus of R.P.I. for his years of service to the Division of History of Physics in organizing sessions. Gillmor moved to award such a certificate to Medicus, to invite him and his wife to the April 1993 meeting for the presentation at a lunch or reception during the meeting. The motion was approved.

The **Annual Business Meeting** of the Division was held on 23 April with Klein presiding. Secretary Gillmor summarized the Executive Committee meeting held earlier in the day. Klein called for discussion of the proposed bylaw changes that had been mailed to the membership in March. The counting of the votes on the bylaws had been scheduled for 10 May 1992.

Members asked for a bigger and better book exhibit at the APS meeting. They also requested that the Division/Forum ensure that the APS/AAPT joint meeting continues.

APS & AIP NEWS

Forum on the History of Physics Needs Funds for an Award. At the April 1991 meeting of the APS Council, the guidelines of the Task Force on Prizes and Awards were approved. There is renewed interest among the Executive Committee members of the Division/Forum in the possibility of setting up an Award in the area of History of Physics. The APS guidelines stipulate that in order to sponsor an award the APS has to be assured that there are sufficient funds to pay for the stipend and expenses for at least five Awards. Anyone with suggestions as to possible donors or sources of funds for an Award related to research or publication in the area of History of Physics should contact Professor Gerald Holton, Jefferson Laboratory, Harvard University Cambridge, MA 02138.

Forum/Division Fellowship Committee: The APS committee on Constitution and Bylaws proposes that the Fellowship Committee of the Divisions or Forums shall consist of the Vice-chair and four members appointed by the Chair to staggered two year terms. The Vice-

chair shall chair the Fellowship Committee. The Fellowship Committee shall promote the nomination of candidates for Fellowship, shall review the qualifications of candidates for Fellowship and shall report its recommendations to the Executive Committee of the Division and to the Executive Secretary of the Society.

The Joint Meeting of the APS & AAPT will be the April General Meeting of the APS which will probably be in the Washington, DC area for the next few years.

The May 1992 issue of the **History Newsletter of the AIP Center for History of Physics** has a short article on a report on the Simpson Papers prepared by Allan Needell and Martin Collins of the Department of Space History of the National Air and Space Museum. The article includes some of the problems and lessons learned in organizing the complex papers of multifaceted scientists such as James A. Van Allen of Iowa and John A. Simpson of Chicago. They found it a great help to have the active participation of the originator of the papers. Simpson provided essential information on the nature and organization of the materials. No less essential was the the background of advice which has accumulated in the archival community. (MIT's *Appraising the Records of Modern Science and Technology* is available from the Society of American Archivists.) The expertise of places such as the AIP Center for History of Physics and the National Air and Space Museum are available to those trying to organize modern scientific papers.

The AIP Study of Multi-Institutional Collaborations in Space Science and Geophysics has been funded and work has commenced. Twelve collaborations have been selected for case studies. The working groups have decided that there are dramatic differences from the collaborations in high-energy physics which require revision of the previous question sets. Meanwhile final reports are in preparation on the archival, historical, and sociological findings of the study of high-energy physics collaborations.

Tape Recordings of Historical Sessions are available in many cases from the AIP Center for History of Physics. There is a desire

to keep the voices of the scientists commenting on their own experiences. This spring the Center recorded several sessions at APS meetings: "The John Bardeen Memorial Symposium" with talks by *Conyers Herring, J.R. Schreiffer, Nick Holonyak, George Pake, and David Pines*; "Early Days of the Modern Theory of Solids: A tribute to Fred Seitz" including talks by Rudolph Peierls, Phil Anderson, and Fred Seitz himself, and "The Birth of the Nuclear Age-50 Years Ago" with talks by *Ed Creutz, Volney C. Wilson, Al Wattenberg, and John A. Wheeler*.

The AIP Center would appreciate being informed of historical sessions at which scientists are giving talks that ought to be tape recorded.

ANNOUNCEMENTS AND REPORTS

Chemical Heritage Foundation

The National Foundation for the History of Chemistry, which was founded in 1987 by the American Chemical Society and the American Institute of Chemical Engineers, has changed its name to the Chemical Heritage Foundation, CHF. There has been an increase in the number of organizations affiliated with the Foundation. The Arnold and Mabel Beckman Center for the History of Chemistry and the Othmer Library of Chemical History continue as operating units of the Chemical Heritage Foundation. Reports on the activities of the Center and other news of the history of chemistry, chemical engineering, and chemical industries appear in the Beckman Center News. For more information, write to the Editor of the Beckman Center News, 3401 Walnut Street, Philadelphia, PA 19104-6228.

Einstein Publications

Original Einstein papers are available which were published in the series "Sitzungsberichte Preussische Akademie Wissenschaften" from 1922 to 1931. For the list of publications and their prices, write to W. Schröder - Science Editor, Hechelstrasse 8, D-2820 Bremen-Roenebeck, Germany.

Guide to Historical Resources in the Atmospheric Sciences

Some copies of the Guide are still available free of charge from its author, James R. Fleming, Science-Technology Studies Program, Colby College, Waterville, ME 04901.

History of the Geosciences

Work has begun on an encyclopedia to be edited by *Gregory A. Good* and published by Garland Publishing. Scheduled to appear in 1994 the book will include entries on a wide range of subjects in the history of the geosciences including but not restricted to, geophysics, geology, oceanography, meteorology, and the near-space sciences. It will encompass a broad cultural and chronological range. It is intended to provide an overview of current scholarship and new directions in this fast-changing field. For more information write: Prof. Gregory A. Good, History Department, West Virginia University, Morgantown WV, 26506.

The Carnegie Institution and the History Committee of the American Geophysical Union sponsored a symposium entitled "The Earth, the Heavens and the Carnegie Institution of Washington: Historical Perspectives after 90 Years." The symposium, from June 14 through June 17, 1992 was held at the Carnegie Institution building, 1530 P Street, Washington DC. Twenty-five papers and commentaries covered the history of the Institution's Geophysical Laboratory, Department of Terrestrial Magnetism, Mt. Wilson Observatory and the Institution's support of earth and space science through fellowship programs. For more information write: Prof. Gregory A. Good, History Department, West Virginia University, Morgantown WV, 26506.

Historical Documents Study

This spring, the National Historical Publications and Records Commission published the results of an 18 month study. The report entitled "Using the Nation's Documentary Heritage" draws on statistical data from 1394 responses from historians and genealogists dealing with problems that researchers encounter in historical studies. The report is interesting in providing information and insights into how

people gain access to and use sources. Copies of this report may be obtained by writing to: Historical Documents Study Report, NHPRC (NP), National Archives Building, Washington, DC 20408.

Memoirs and Proceedings of the Manchester Literary and Philosophical Society

The publication has been announced of an *Index to the Memoirs and Proceedings from 1781 to 1989*. This is the first alphabetical author and subject index to the Memoirs and Proceedings of the Manchester Society covering the 154 volumes published between 1785 and 1990. It is a primary source for the study of the development of science and technology over the past 200 years. The names include outstanding British, American, and other scientists, and it includes both contributions from these scientist and articles about them. (The clothbound edition costs £55.) For more information write to Manchester Literary and Philosophical Publications Limited, 14 Kennedy Street, Manchester M2 4BY, England.

Research in NASA History: A Guide to the NASA History Program

A new pamphlet replacing the 1986 pamphlet on history at NASA has been prepared. The new pamphlet offers a guide to the historical documentary resources available at NASA Headquarters in Washington, DC, at NASA facilities located around the country, and through the federal records system. Anyone wishing a free copy of this publication can obtain it from the NASA History Division, Roger D. Launius, Chief Historian, NASA Headquarters, Washington, DC 20546.

Oxford Dictionary of Scientific Quotations

The editors would appreciate receiving quotations which should be in a dictionary of scientific quotations. Quotations may be from scientists both living and dead and from other writers upon science. They may also be "attrib.," or part of the "folklore" of science. The editors hope that they will find all the more obviously prominent quotations and would be specifically grateful for slightly more out-of-the-way instances, perhaps quotations not yet famous but which de-

serve to become so. Further information can be obtained from, and quotations should be sent to the Editors, W.F. Bynum and Roy Porter, ODSQ, Wellcome Institute for the History of Medicine, 183 Euston Road, London NW1 2BN, England.

Perspectives on Science - *Historical, Philosophical, Social*

The University of Chicago Press is announcing a new publication to appear in the Spring of 1993. The Journal is devoted to studies of the sciences that integrate historical, philosophical, and sociological perspectives. The journal will foster historiographical works combining social and institutional analyses of science, as well as analyses of experiments, practices, concepts and theories. They are interested in the submission of articles and developing a reviewing staff. All articles will be peer reviewed. If you have any questions about the journal, contact the Editor Joseph C. Pitt, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

Smithsonian Videohistory Program

The Smithsonian Institution has a collection of videotapes dealing with the history of science and technology. The video tapes are part of twenty-two different projects in American Science and Technology.

Stanley Goldberg, consulting historian for the National Museum of American History, recorded 18 sessions with 55 participants in the physics and technology of the Manhattan Project. The interviews were supplemented with visual documentation of laboratories and production plants. Locations included Hanford, Boston-Cambridge, Oak Ridge, Knoxville, and Los Alamos.

Another set of tapes deal with aspects of the history of computing, including tapes on the ENIAC, Mini- and Micro-Computers, the RAND Corporation, and Robotics.

Tapes, transcripts, and finding aids are available for researchers, and copies are available for a fee. For information contact The Video History Archives, 2135 Arts and Industry Building, Smithsonian Institution, Washington, DC 20560. (202)-357-1420.

Uppsala Newsletter in the History of Science

The Spring 1992 issue of the Uppsala Newsletter has an amusing and interesting article on "Industrial Heritage Studies" which is being fostered by "The International Committee for the Conservation of the Industrial Heritage." The field is being studied and taught in more than forty countries. Britain took the lead in the 1950s and 1960s. Although the original efforts were preservation of industrial monuments, the emphasis has shifted to being an academic subject with strong linkages to the conservation of cultural history. The Uppsala Newsletter *History of Science* will be sent without cost to anyone interested. Inquiries and information should be sent to the Editor: Tore Frängsmyr, Office for History of Science, Uppsala University, box 256, S-751 05 Uppsala, Sweden.

MEETINGS

The American Association for the Advancement of Science will meet in Boston 11-16 February 1993. Questions about the **AAAS Section on History and Philosophy of Science** and its program should be addressed to its Secretary, Edward Manier, Department of Philosophy, University of Notre Dame, Notre Dame, IN 46556; (219)239-6471.

The American and European Nuclear Societies - "Fifty Years of Controlled Nuclear Chain Reaction." The purpose of the meeting is to commemorate the fiftieth anniversary of the first controlled nuclear chain reaction. The meeting will be at McCormack Place in Chicago, Illinois on 15-20 November 1992. The meeting will also cover the past experiences and future prospects for non-power applications of nuclear radiation in medicine, industry, and agriculture. It is intended that an exhibit of historical items associated with the development of nuclear energy will be on display at the meeting. Sessions on the 16th of November, Monday afternoon and evening will include some of the participants of the events of fifty years ago; Walter Zinn is the honorary chairman of the meeting. Please direct inquiries to Robert Avery, General Chair-

man (ANS), Argonne National Laboratory, Bldg.208, 9700 South Cass Avenue, Argonne, IL. Phone: (708)-972-4572.

The British Society for the History of Science will hold a joint meeting with the Physics History Group of the University of Essex on 9-11 July 1993 entitled William Gilbert and the Elizabethan World. For further information and offers of papers, contact Prof. L.J. Jordanova, Department of History, University of Essex, Wivenhoe Park, Colchester, CO4 3AQ, England.

The British Society for the History of Science Conference on Technological Change will be held in collaboration with the University of Oxford on 8-11 September 1993. It is an opportunity for an examination of the state of the discipline of the history of technology. Some of the themes for planned sessions include: technology and the ancient world; medieval technology and social change; technologies in early modern Europe; technology, science, and industry; technology transfer internationally; historiographical perspectives. For further details and offers of papers, write to Prof. Robert Fox, Modern History Faculty, University of Oxford, Broad Street, Oxford, OX1 3BD England.

University of Chicago Symposia on December 1st & 2nd, 1992 commemorate the Centennial of the University's Physics Department and the 50th Anniversary of Enrico Fermi's Experiment of December 2nd, 1942. (See the cover page of this Newsletter.)

Der Deutsche Physikalische Gesellschafft, Fachverband Geschichte der Physik - The German equivalent of the APS has an active History of Physics Division. It has announced a Physics History Conference on the theme "Physik und Weltanschauung" to take place in Mainz the 22-26 of March 1993. For more information and to receive circulars about the conference, write to Dr. Dieter Hoffmann, PTB-IB.TS, Abbestrasse 2. D(W)-1000 Berlin12, Germany.

The seventh International Conference on East Asian Science will take place at Kyoto International Hall and Kansai University Memorial Hall in Osaka, Japan on 2-7 August 1993.

For copies of the circulars contact Hashimoto Keizo of Kansai University, 39-2 Tange, Momoyama-cho, Fushimi-ku, Kyoto 612, Japan.

International Congress on the History of Oceanography - This meeting will mark the 90th anniversary of what is now called the Scripps Institute of Oceanography and will reflect the research interests of that institution. This fifth congress will take place at La Jolla on 7-14 July 1993. For further details, write to ICHO V, University of California, San Diego, Office of Conference Manager, Mail Code 0513, 9500 Gilman Drive, La Jolla, CA 92093-0513.

1992 Annual Meeting of the History of Science Society will take place 27-30 December 1992 at the Capitol Hilton in Washington, DC. The American Historical Association is meeting at the same time in Washington at the Shoreham and Sheraton Hotels which can be reached by Metro from the Capitol Hilton. Sessions which contain talks that may be of interest to physicists are:

Monday 28 Dec. 9:00-11:30 "The Practice of Early Astrophysics: New Perspectives",

Tuesday 29 Dec. 9:00-11:40 "Works in Progress: Twentieth Century Physics and Astronomy,"

Tuesday 29 Dec. 9:00-12:00 "Works in Progress: Medieval and Early Modern Science,"

Tuesday 29 Dec. 12:00-1:45 "Workshop on the Relation of Oral and Archival Sources in Writing History and Biography,"

Tuesday 29 Dec. 2:00-4:30 "Large Scale Collaborative Research: The Case of High-Energy Physics."

The program and registration forms etc. are in the July 1992 Newsletter of the History of Science Society which can be purchased from the Office of the Executive Secretary, History of Science Society, 35 Dean Street, Worcester, MA 01609.

1993 Annual Meeting of the History of Science Society will be held in Santa Fe, New Mexico on 11-14 November 1993. The Program Co-Chair has issued a call for papers; the deadline for proposals for sessions is 1 April 1993. Proposal for sessions and for individual papers should be sent to Paul L. Farber, Department of History, Oregon State University, Corvallis, OR

97331-5104. (E-mail: farberp@ccmail.orst.edu; FAX: 503-737-2434.)

History of Space Research in Europe - An International Symposium on Science Beyond the Atmosphere is organized by the History of Science Department of the University of Palermo in collaboration with eight other groups and institutions. The aim of the symposium is to discuss the development of space research in Europe from the early 1960s onward. It will include contributions from some of the main protagonists and of the historians working in the field. It will take place in Palermo, Italy on 5-7 November 1992. The address for information and registration is: Prof. Arturo Russo, Istituto di Fisica, via Archirafi 36, I-90123 Palermo, Italy. Phone: (int)-39-91-6166590; fax (int)-39-91-6165413.

GRANTS & FELLOWSHIPS

ACLS

The American Council of Learned Societies offers Fellowships and Grants-in-Aid to support postdoctoral research in all disciplines of the humanities including history. Many of these awards have deadlines in 1992 that will have passed by the time you receive this issue of the Newsletter. We suggest that you request their announcement for Fellowships and Grants Competitions to be held in 1993-94. American Council of Learned Societies, 228 East 45th Street, New York, NY 10017-3398.

A program of possible interest is the **College Faculty Fellowships in Humanities Curriculum Development** Deadline January 15, 1993; Amount: \$45,000 maximum; Tenure: one academic year, 1993-1994. Two fellowships at each of four selected cities will be available to college faculty in the humanities with a particular commitment to teaching. Those interested should obtain more information about the program by writing to the ACLS.

AIP Center for History of Physics

The 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 \$2000 each. They can be used only to reimburse direct expenses connected with the work. Preference will be given to those who need part of the funds for travel and subsistence to use the Niels Bohr Library in New York City or to microfilm papers or to tape-record oral history interviews with a copy deposited in the Library. 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 advisor), or show a record of publication in the field. For more information, write to Spencer Weart, Center for History of Physics, American Institute of Physics, 335 East 45th Street, New York, NY 10017. Deadlines for receipt of applications are June 30 and December 31 of each year.

Alexander von Humboldt Foundation - North American Office

The Alexander von Humboldt-Stiftung of Bonn, Germany opened a North American Office in Washington, DC on January 1st, 1992. The objective of the Foundation is to "... grant research fellowships ... to highly qualified persons of foreign nationality ... to enable them to carry out research projects in the Federal Republic of Germany." It is funded by the German Federal Government. Since 1953, the foundation has spent over \$560 million enabling over 14,000 foreign scientists world-wide to pursue scientific research in Germany. Over the years, more than 2,800 American Scientists have been invited to Germany. The **Research Fellowship Program** (600 per year, world-wide) offers stays of up to 24 months for highly qualified researchers (minimum requirement: Ph.D.) under 40 years of age from any academic field. Application to all programs is open and encouraged. For more information about the Alexander von Humboldt-Stiftung and its various programs, please contact Dr. Jan Keppler, Alexander von Humboldt Foundation, Suite 903, 1350 Connecticut Ave., NW, Washington, DC 20036; phone: (202) 296-2990.

The Fulbright Scholar Program - The Council for the International Exchange of Scholars' brochure "The Fulbright Scholar Program: Grants for Faculty and Professionals, 1993-94" can be obtained from the Council, 3007 Tilden Street, NW, Suite 5M, Washington, DC 20008-3009.

HSS Travel Grants - With support from the Richard Lounsberry Foundation and other funds, the History of Science Society has been able to award travel grants to their annual meeting. The awardees are independent scholars, advanced graduate students, and individuals (including those with temporary and part time appointments) teaching at smaller colleges and universities without travel budgets. It is best to apply for these grants early in the spring by writing to the HSS Executive Secretary, Michael Sokal, History of Science Society, 35 Dean Street, Worcester, MA 01609.

Institute for Advanced Study at Princeton - The School of Historical Studies of the Institute for Advanced Study offers research fellowships and visiting memberships for periods ranging from two months to two years. The program is mainly for promising young assistant professors at institutions which grant a leave of absence. In the past, the deadline has been in the fall. One should obtain detailed information and application forms well in advance of the deadline by writing to the Administrative Officer, School of Historical Studies, Institute for Advanced Study, Princeton, NJ 08540.

National Endowment for the Humanities

I again urge you to get a free copy of the NEH "Overview" of Endowment Programs; the most recent edition is dated July 1992. The "Overview" describes more than 30 funding opportunities. Also in the "Overview":

- How to get application forms
- When to apply (all the way thru 1993)
- Who to contact for help
- What project ideas are eligible for

NEH funding and what ones are not.

Also you will receive a copy of their new telephone directory. Write or call NEH "Overview", Room 406, 1100 Pennsylvania Ave., N.W. Washington, DC 20506. Telephone: (202) 606-0438.

NEH Divisions seem to be autonomous bodies, and one needs to contact the correct Division or program office in order to obtain information. The Divisions are: Education Programs (room 302), Fellowships and Seminars (316), Preservation and Access (802), Public Programs

(420), Research Programs (318), State Programs (411). There is also the Office of Challenge Grants (429).

The NEH Division of Fellowships and Seminars is concerned that scholars at museums, historical societies, and research libraries may not be aware of their eligibility for the various programs of independent study and research offered by the Division. The deadline for fellowships is May 1, 1993. Write to room 316 or call (202)-606-8466.

NEH College Teachers Summer Seminars Although the NEH sends us information on these programs early in January, due to the time consumed in preparing, printing, and mail distribution, the information would get to you after March 1st which is the deadline for receipt of applications. If you wish to know about these seminars or the possibility of directing such a seminar, we recommend that you write to NEH College Teacher Seminars Room 316 or phone (202) 606-8463, and request that you receive future schedules and lists of seminars.

NEH Division of Research Programs - A new Guide to the Division and its programs was issued March 1, 1992. The Division provides support: for the preparation for publication of editions and translations of important works in the humanities; for the preparation of reference materials; for large interpretive studies; for research conferences; and for the development of research opportunities through programs conducted by scholarly organizations and independent research centers. Projects designed to further research in the humanities and submitted by or thru nonprofit institutions or organizations in the United States are eligible for support. In some Programs of the Division of Research individuals are eligible. The Division does not provide support for: research undertaken for an academic degree; projects that focus on pedagogical theory, tests and measurements; computer hardware or other permanent equipment costs. Collaborative research projects are supported and encouraged including history and interdisciplinary areas. The Endowment encourages studies that promote the collaboration of humanities scholars with scientists.

Support is available for research in many areas of inquiry that include, but are not limited to, the form, content, and purpose of scientific knowledge; the processes through which scientific knowledge is developed; the invention, innovation, and transfer of technology; the interaction among sciences, technology, medicine, and other elements of culture. Awards usually range from \$10,000 to \$200,000 and the use of federal matching funds is encouraged. For institutional applicants, the Endowment's contribution to a project normally will not exceed 80 percent of the total project costs. I suggest that you get more information by obtaining a copy of the "Guide to the Division" by writing to the Division of Research Programs, (Room 318; phone: (202) 606-8210). The address of the National Endowment for the Humanities is 1100 Pennsylvania Avenue, N.W. Washington, DC 20506.

National Science Foundation Programs

The previous issue of this newsletter devoted a good deal of space (see pages 7-8) to the possibility of obtaining support from the NSF. There are: NSF Scholars Awards, Grants for Larger Research, Infrastructure or Education Projects and Professional Development Fellowships. For further information contact: Ronald Overmann or Rachele Hollander, SSTS, Room 312, NSF, Washington. **Warning** One should not assume that present or previously existing programs of the NSF will be supported at the same level in future years. Consideration is being given to major changes in emphasis of parts of the NSF research programs.

Rockefeller Archive Center Grants for Travel and Research

The Archive Center, a division of Rockefeller University, invites applications for its program of Grants for travel and Research at the Rockefeller Archive for 1993. The competitive program makes grants of up to \$1,500 to researchers in any discipline, usually graduate students or post-doctoral scholars who are engaged in research that requires the use of the records at the Center. The deadline for applications is 31 December 1992. Inquiries about the program and requests for applications should be addressed to Darwin H. Stapleton, Director, Rockefeller Archive Center, 15 Dayton Avenue, North Tarrytown, NY 10591-1598.

BOOK PUBLISHERS

American Institute of Physics

Robert L. Weber **Pioneers of Science: Nobel Prize Winners in Physics**, second edition

E. G. Bowen **Radar Days**

Melba Phillips **The Life and Times of Modern Physics**. Collection of recent articles from **Physics Today** on aspects of the development of modern physics For more information write: American Institute of Physics, c/o AIDC, 64 Depot Road, Colchester, VT 05446.

Birkhäuser Verlag Boston

Nahum Kipnis **The History of the Principle of the Interference of Light**

For more information write: Birkhäuser Boston Inc., P. O. Box 2485, Secaucus, NJ 07096-2491

Cambridge University Press

Elisabeth Crawford **Nationalism and Internationalism in Science, 1880-1939**

Mikulaus Teich and Roy Porter eds. **Fin de Siecle and its Legacy**. Of interest is an article by Erwin Hiebert on the transformation of physics at the turn of the century.

Larry Stewart **The Rise of Public Science: Rhetoric, Technology and Natural Philosophy in Newtonian Britain**.

For more information write: Cambridge University Press, 32 East 57th Street, New York, NY 10022.

Chadwyck and Healey

Peter Jones ed. **Sir Isaac Newton A Catalogue of Manuscripts and Papers Collected and Published on Microfilm by Chadwyck and Healey**. The volume is free to purchasers of the microfilm collection. For more information write: Chadwyck and Healey, 1101 King Street, Alexandria, VA 22314.

Columbia University Press

William H. Durham and Robert D. Purrington eds. **Some Truer Method: Reflections on the Heritage of Newton**. For more informa-

tion write: Columbia University Press, 40 West 20th St., New York, NY 10025.

Cornell University Press

Samuel T. Edgerton Jr. **The Heritage of Giotto's Geometry: Art and Science on the Eve of the Scientific Revolution.**

Bruce J. Hunt **The Maxwellians.** An account of how the ideas of Maxwell's Treatise on Electricity and Magnetism were finally picked up, interpreted and remolded in the late nineteenth century. The "Maxwellians" of the title include Oliver Heaviside, G. F. FitzGerald and Oliver Lodge among others. For more information write: Cornell University Press, P. O. Box 250, Ithaca, NY 14850.

Dover Publications

William Gilbert **De Magnete.**

Vasco Ronchi **Optics, the Science of Vision.**

James Clerk Maxwell **Matter and Motion.** A further reprint of Maxwell's elegant outline of mechanics, together with the chapter "On the Equations of Motion of Connected Systems" from his Treatise and notes and appendices on relative motion and the principle of Least Action by Joseph Larmor. For more information write: Dover Publications Inc., 11 East 2nd Street, Mineola, NY 11501.

Editions Frontieres

Andrei Sakharov **Facets of a Life.** For more information write: Editions Frontieres, B.P. 33, 91192 Gif-sur Yvette, Cedex France

Garland Publishing

Carlton V. Maley Jr. **The Theory of Beats and Combination Tones, 1700-1863.** For more information write: Garland Publishing, 136 Madison Avenue, New York, NY 10016.

Kluwer Academic Publications

Jan Faye **Niels Bohr: His Heritage and Legacy.**

P. Nicolacopoulos ed. **Greek Studies in the Philosophy and History of Science.** Of in-

terest is a paper by Yourgas Goudaroulis on the controversy between Heisenberg and Fritz London on superconductivity, 279-291.

Sabetai Unguru ed. **Physics, Cosmology and Astronomy, 1300-1700: Tension and Accommodation.** Boston Studies in the Philosophy of Science, vol. 126.

Zev Buchler **Newton's Physics and the Conceptual Structure of the Scientific Revolution.** Boston Studies in the Philosophy of Science, vol. 127. For more information write: Kluwer Academic Publishers, P. O. Box 358, Accordia Station, Hingham, MA 02108-0358.

Krieger Publishing Co.

Ron Miller **The Dream Machines: A Pictorial History of the Spaceship in Art, Science and Literature.** For more information write: Krieger Publishing Co., P. O. Box 9542, Melbourne FL 32902-9542

Lehigh University Press

Clark A. Elliott and *Margaret W. Rossiter* eds. **Science at Harvard University: Historical perspectives.** This collection contains articles on astronomy at Harvard, the relationship between Harvard and IBM and the impact of World War II on astronomers at Harvard. Included is a bibliography of science at Harvard and a chronological overview, 1636-1945. For more information write: 302 Linderman Library, Bethlehem, PA 18015-3067.

MIT Press

Gary Hatfield **The Natural and the Normative: Theories of Perception from Kant to Helmholtz.**

William Aspray **John von Neuman and the Origins of Modern Computing.** For more information write: MIT Press, 55 Hayward Street, Cambridge, MA 02142.

W. W. Norton

Judith Goodstein **Millikan's School: A History of Cal. Tech.** For more information write: W. W. Norton Co. Inc., 500 Fifth Ave., New York, NY 10110.

Leo S. Olschki

Silvio A. Bedini **The Pulse of Time: Galileo Galilei, The Determination of Longitude, and the Pendulum Clock.** For more information write: Leo S. Olschki, Florence, Italy.

Oxford University Press

J. B. Bullen **The Sun as God: Painting Literature and Mythology in the Nineteenth Century.** Of interest is Gillian Beer, "The Death of the Sun: Victorian Solar Physics and Solar Myth." For more information write: Oxford University Press, 200 Madison Avenue, New York, NY 10016.

University of Pennsylvania

Philip L. Cantelon, Robert G. Hewlett and Robert C. Williams eds. **The American Atom: A Documentary History of Nuclear Policies.** Second edition. For more information write: University of Pennsylvania Press, Blockley Hall, 418 Service Drive, Philadelphia, PA 19104.

Routledge

James Robert Brown **The Laboratory of the Mind: Thought Experiments in the Natural Sciences.** For more information write: Routledge, 29, West 30th Street, New York, NY 10001-2291.

Rutgers University Press

Nathan Reingold **Science American Style.** Collection of essays in the history of American science including papers on Joseph Henry. For more information write: Rutgers University Press, 109 Church Street, New Brunswick, NJ 08901.

Michael Segré **In the Wake of Galileo.** The myths that have grown up around Galileo. Galileo's place in the scientific culture and political communities of Post-Renaissance Italy. The role of experiment in his science and the questions Galileo left unresolved. How did his political-religious confrontation affect the course of science?

Science Museum

Graeme Fyffe and Robert Anderson **Joseph Black: A Bibliography.** For more information write: Science Museum Books, Science Museum, Exhibition Road, London SW7 2DD, United Kingdom.

Simon and Schuster

William J. Broad **Teller's War.** For more information write: Simon and Schuster, Prentice Hall Building, Sylvan Ave., Englewood Cliffs, NJ 07632.

Smithsonian Institution Press

M. Susan Barger and William B. White **The Daguerrotype: Nineteenth-Century Technology and Modern Science.** For more information write: Smithsonian Institution Press, Dept. 900, Blue Ridge Summit, PA 17294.

Springer-Verlag

A. O. Barut, H. Odabasi and A. van der Merwe eds. **E. U. Condon: Selected Scientific Papers and Selected Popular Writings.**

V. M. Cherausenko **Chernobyl: Insight from the Inside.**

P. Damerow, G. Freudenthal and P. McLaughlin **Exploring the Limits of Preclassical Mechanics.** This treatise explores the transition from early ideas on falling bodies to classical mechanics. The change is seen not as evolution or revolution but as a result of the limits of preexisting systems of thought.

D. H. DeVorkin **Science with a Vengeance: The Military Origins of the Space Sciences in the American V-2 Era.**

J. Eisenstaedt and A. J. Kox **Studies in the History of General Relativity.**

Wolfgang Pauli **Die Allgemeinen Prinzipien der Wellenmechanik.**

Frederick Seitz **The Science Matrix: The Journey, Travails, Triumphs.** For more information write: Springer-Verlag, 175 Fifth Avenue, New York, NY 10010, or, P. O. Box 2485, Secaucus, NJ 07096-2491.

St Martins Press

G. G. Gheverghese **The Crest of the Peacock: The Non-European Roots of Mathematics.**

For more information write: St. Martins Press, Scholarly and Reference Division, 175 Fifth Ave., New York, NY, 10010.

Temple University

Michael B. Stoff, Jonathan F. Fanton and R. Hals Williams eds. **The Manhattan Project: A Documentary Introduction.**

For more information write: Temple University Press, Room 305, University Services Building, Broad and Oxford Street, Philadelphia, PA, 19122.

John Wiley and Sons Inc.

Donald K. Yeomans **Comets: A Chronological History of Observation, Science, Myth and Folklore.**

For more information write: John Wiley and Sons, New York, NY.

RECENT ARTICLES**American Journal of Physics**

1990, vol. 58

"The Bohr-Einstein 'weight of energy' debate and the Principle of Equivalence," *Richard J. Hughes*, 826-828.

1991, vol. 59

"A Note on the Blackburn Pendulum," *R. J. Whitaker*, 330-333. The device that illustrates harmonic motions was invented by Hugh Blackburn (1823-1909).

American Scholar

1991, vol. 60

"The Bulldog: A Profile of Ludwig Boltzmann," *George Greenstein*, 97-105.

American Scientist

1991, vol. 79

"Thought Experiments," *Ray Sorensen*, 250-263.

Annals of Science

1991, vol. 48

"Scientific Instruments in Russia from the Middle Ages to Peter the Great," *W. F. Ryan*, 367-384.

"Public Claims, Private Worries: Newton's *Principia* and Leibniz's Theory of Planetary Motion," *D. B. Meli*, 415-450.

"Planck's Principle and Jeans's Conversion," *G. Gorham*, 471-498.

Archive for History of the Exact Sciences

1990, vol. 42

"Boltzmann's Probability Distribution of 1877," *Alexander Bach*, 1-40. The account traces the problem to the introduction of Bose-Einstein statistics.

"A Heated Controversy over Cold Light," *Marjorie Malley*, 173-183.

1991, vol. 43

"On the Process of Hertz's Conversion to Hertzian Waves," *Manuel G. Doncel*, 1-27.

"The Rejection of the Ricci Tensor in Einstein's first tensorial Theory of Gravitation," *Giulio Maltese*, 363-381.

Archives internationales d'histoire des sciences

1989, vol. 39

"The Affirmation of the Concept of Isotropy & the Birth of Mass Spectroscopy," *G. Bruzzanti* and *N. Robotti*, 309-334.

1990, vol. 40

"Quantum Numbers and Electron Spin: the History of a Discovery," *Nadia Robotti*, 305-331.

Contemporary Physics

1990, vol. 31

"Ferromagnetic Resonance at the Clarendon Laboratory, Oxford," *D. M. Bagguley* and *P. Bleaney*

Cultura e Scuola

1990 vol. 29

"Matematica ed elettrodinamica nell'opera di Ampère," *Salvo D'Agostino*, 261-271.

Eos

1990, vol. 71

"Prediction and Theory Evaluation: Alfvén on Space Plasma Phenomena," *Stephen G. Brush*, 19-33.

European Journal of Physics

1990, vol. 11

"Tübingen: Another Scene of Quantum Theory," *J. Brandmüller*, 313-322. Friedrich Paschen and quantum theory.

French Historical Studies

1991, vol. 17

"Old Wine—New Bottles: Atomic Energy and the Ideology of Science in Post-War France," *David Pace*, 38-61.

Historia Mathematica

1990, vol. 17

"Varieties of Mechanics by 1800," *Ivor Grattan-Guinness*, 313-338.

Historia Scientiarum

1990, vol. 40

"A Reexamination into Newton's Definition of Mass and Mach's Criticisms," *Yan Kangian*, 29-40.

1990, vol. 41

"An Oriental in Europe: Nagoaka, Righi and the State of Physics, 1910," *Bruno Carazza and Helge Kragh*, 37-44.

History of Science

1991, vol. 29

"Boltzmann and Hertz on the *Bild*-Conception of Physical Theory," *Salvo D'Agostino*, 380-398.

"Ideas above his Station: A Social Study of Hooke's Curatorship of Experiments," *Stephen Pumfrey*.

History Today

1991, vol. 41

"Time, tide and Michael Faraday," *Frank A. J. L. James*, 28-34.

Invention and Technology

1992, vol. 7, No. 3

"The Work of the World," *Curt Wohleber*, 44-54. Nikolai Tesla, as engineer and model for Hollywood's image of the scientist. 1992, vol. 7 No. 4

"Amazing Light," *Joan Lisa Bromberg*, 18-26. The history of the laser. "Secretly going Nuclear," *James R. Hansen*, 60-63. Attempts at the Langley Memorial Aeronautical laboratory to make use of fusion reactions during the 1930s.

Isis

1991, vol. 82

"A Word and the World: The Significance of Naming the Calorimeter," *Lissa Roberts*, 199-222.

"Noblesse Oblige: Biographical Writings by Nobelists," *Prina Abir-Am*, 326-343. This is an essay review of recent work.

"Archimedes among the Humanists," *W. R. Laird*, 628-638. Renaissance Humanists reactions to the recovery of Archimede's work.

Journal of Chemical Education

1990, vol. 67

"Piezoelectric Polymers: Direct converters to Electricity,"

Raymond B. Seymour and George B. Kaufmann, 763-765. The work of Pierre and Jacques Curie in 1880 and the discovery of the piezoelectric effect.

"Lessons learned from Lord Rayleigh on the Importance of Data Analysis," *Russell D. Larson*, 925-928.

Journal for the History of Astronomy

1991, vol. 22

"The Carnegie Institution of Washington and Radio Astronomy: Prelude to an American National Observatory," *Alan Needell*, 55-67. Merle Tuve and Lloyd Berkner.

"The United States Naval Expedition of 1849-1852 for Solar Parallax," *Wendell W. Huffman*, 208-220.

Physics Education

1991, vol. 28

The September issue, 284-312, is devoted to a study of Michael Faraday. The papers include Geoffrey Cantor on Faraday's search for the connection between gravity and electricity (see Summaries section), Frank James on Faraday's work on optical glass, Ryan Tweng on Faraday's notebooks and David Gooding on Faraday as a hands-on scientist.

Physics Today

1992, January

"Journey of a German Professor to El Dorado,"
Ludwig Boltzmann trans. *Bertram Schwarzschild*.

1992, April

"John Bardeen, the Man and his Science." This special issue includes: "John Bardeen's Role in International Science," *David Pines*, 64-70; "Public Policy and Industrial Activities," *George Pake*, 56-62; "Superconductivity and the BCS Theory," *J. Robert Schrieffer*, 46-53; "Princeton, Bell Labs and the Discovery of the Transistor," *Conyers Herring*, 26-33 and "John Bardeen and the Point Contact Transistor," *Nick Holonyak*, 36-43.

1992, May

"The Nobel Prizes at Ninety," *Gloria Lubkin*

1992, June

"Nuclear Magnetic Resonance Imaging: History, State of the Art and Future Potential," *Felix W. Wehril*, 34-42.

1992, July

"The Eventful Life of of Fritz Houtermans," *I. B. Khriplovich*, 29-37.

Physics World

1991, September

This issue has a section on Michael Faraday, 33-43 in celebration of the bicentennial of his birth. Also included is an article by David Gooding on Faraday's contributions to field theory, Brian Pippard on Faraday and electricity and Frank James on Faraday studies," *The Faraday Industry*."

Physis

1991, vol. 28

"Lines of Mathematical Thought in the Electrodynamics of Ampère," *Ivor Grattan-Guinness*, 115-129.

Proceedings of the Royal Institution

1990, vol. 62

"How Lawrence Bragg invented X-Ray Analysis,"
M. F. Perutz, 183-198.

Social Studies of Science

1991, vol. 21

"The Origins of the second Golden Age of Dutch Science after 1860," *Bastiaan Willink*, 503-516.

Scientific American

1991, vol. 264 #6 June

"Arthur Stanley Eddington," *William McCrea*, 92-97.

1992, vol. 267 #2 August

"How Cosmology Became a Science," *Stephen J. Brush*, 62-70.

Soviet Phys. Usp.

1990, vol. 33

"Rydberg and the Development of Atomic Spectroscopy," *M. A. El'yashevich*, *N. G. Kembrovskaya* and *L. M. Tomil'chik*, 1047-1060.

Studies in the History and Philosophy of Science

1990, vol. 21

"Born's Probability Interpretation: A Case Study of 'Concepts in Flux'," *Mara Beller*, 563-588.

"The Cosmological Constant: Einstein's Greatest Mistake?" *Christopher Ray*, 589-604.

Technology and Culture

1989, vol. 30

"Technology and the Process of Scientific Discovery: The Case of Cosmic Rays," *C. A. Ziegler*, 939-963.

SUMMARIES

Authors of books and articles on the history of physics are invited to send summaries for publication in this section. Maximum length: 75 words for articles, 150 words for books. In addition, for articles, please give author's mailing address and indicate whether reprints are available; for books published outside the U.S., indicate the U.S. distributor (if any) or complete mailing address of the publisher. Publication will be expedited if each summary is typed, on a separate sheet, in the format of the summaries below.

Summaries should be sent to Elizabeth Garber, History Dept., SUNY at Stony Brook, Stony Brook, NY 11794.

EDINBURGH OBSERVATORY

D. J. Bryden *The Edinburgh Observatory 1736-1811: A Story of Failure*, *Annals of Science*, 1990, 47: 445-474.

In 1736 Colin MacLaurin, Professor of Mathematics in the University of Edinburgh petitioned the Town Council for permission to erect an astronomical observatory in the College to broaden the research and teaching base of the University. After MacLaurin's death, the Council and the University Senate more concerned with the promotion of the Infirmary and associated medical teaching took no further action. The funds raised by MacLaurin were lent to his successor and largely dissipated. In 1776 the balance was transferred to the proposed Calton Hill Observatory. This private scheme was to be financially self-sufficient, generating income from visitors and student fees. It too failed. Funds were wasted on architectural elaboration, the Town Council failed to meet their financial obligations, the University acquiesced in the total inactivity of the Regius Professor of Astronomy, whilst the commercial-management base of the Observatory vitiated any serious scientific activity.

U.S. NAVAL OBSERVATORY

Steven J. Dick *John Quincy Adams, the Smithsonian Bequest and the Founding of the U. S. Naval Observatory*, *Journal for the History of Astronomy*, 1991, 22: 31-44.

The historian of American science A. Hunter Dupree has called the Naval Observatory the classic example of the "surreptitious creation" of a government scientific institution. This paper examines the origins of the Naval Observatory in the Depot of Charts and Instruments (1830), details the Congressional action that brought about a permanent Depot and a *de facto* Naval Observatory (1842), and describes how this Naval Observatory became the first National Observatory of the United States.

Author's address for reprints: U. S. Naval Observatory, 34th and Massachusetts Ave. NW, Washington D.C., 20392.

ASTRONOMICAL LINE SPECTRA

John B. Hearnshaw *The Analysis of Starlight: One Hundred and Fifty Years of Astronomical Spectroscopy* xv + 531 pp., Cambridge University Press (paper), 1990

This book traces the story of the analysis of starlight by astronomical spectroscopy from the time of Joseph Fraunhofer, who in 1814 used a telescope-mounted prism to observe the spectral light emitted by the sun and several bright stars. Fraunhofer discovered that light was missing at certain wavelengths in these spectra, and these so-called spectral lines were subsequently shown to hold many clues to the nature of the stars themselves. The book explains how the classification of stars using their line spectra developed into a major branch of astronomy in the 1890s at Harvard, whilst new methods in astrophysics made possible the approximate quantitative analysis of spectral lines in the 1920s and 1930s. After the second World War these techniques were improved when computers were programmed to model the structure of the outer layers of stars. A chapter of the spectroscopy of peculiar stars is included. The book is intended as an interpretive guide to the literature up to about 1965, and includes about 1600 references to original source material.

BRUCE MEDALISTS

Joseph S. Tenn *Bruce Medalist Profiles*, *Mercury*, 1990, 19: and 20.

This ongoing series of articles presents summaries of the lives and achievements of the astronomers awarded the Astronomical Society of the Pacific's highest honor, the Catherine Wolfe Bruce gold medal. The series starts with the first medalist Simon Newcomb (1898) and continues in order of

receipt of the medal, which was not awarded every year. Medalists have included G. V. Schiaparelli, William Huggins, Edward C. Pickering, Henri Poincaré and others. The articles appear throughout the year in the journal. There is also a brief discussion of Karl Schwarzschild vol. 20, p. 179, who was nominated but did not receive the 1914 medal.

SCIENTIFIC INSTRUMENTS:

Historians are increasingly turning to a serious study of experiment and method in physics in an effort to understand the place of physics in the development of western society. This necessarily includes the long-neglected makers of scientific instruments, whether technicians in the laboratory or workshop, or those in the trade of selling such instruments. Both have been vital to the health of physics since the seventeenth century.

Christine Blondel, Françoise Parot, Anthony Turner and Mari Williams eds. *Studies in the History of Scientific Instruments*. Papers presented at the Seventh Scientific Instrument Symposium, Paris 1987, 350 pp. Roger Turner Books for the Centre de Recherche en Histoire des Sciences et des Techniques de la Cité des Sciences et de l'industrie, 1989.

This volume brings together twenty-five detailed studies of scientific instruments from the 16th to the 20th centuries. About half deal with French instrument-making and the remainder range widely across Europe. Subjects covered include; the structure of the instrument-making trade in Paris, 16th through 18th centuries, the development of astronomical instruments in the 19th and 20th centuries, the commercialization of instruments in the 19th century. The text is in both French and English.

Brian Gee *Joseph Henry's Trade with Instrument Makers in London and Paris*, *Bulletin of the Scientific Instrument Society* (England), 1990, No. 25: 19-24.

An opportunity to study the trade of instrument makers is provided by Joseph Henry's European tour of 1837. Archival evidence, from Henry's accounts at Princeton University, together with the published papers of Henry allow a number of points to be made about the state of the trade as well as highlighting the value of such trips to the Old World by the quickly advancing New World.

Brian Gee *On Attending to the Instrument Maker in Physics History in Physicists Look Back* ed. John Roche, 205-225. Adam Hilger (distributed in the U. S. by the American Institute of Physics), 1990.

A philosophical reflection on the emergence of the scientific instrument maker in England, discussing the issues of ability, status and role, as well as providing a model for the maker-user relationship. This paper is of particular interest to those studying science-technology models.

Davis Baird Baird *Associate's Commercial Three-Meter Grating Spectrograph and the Transformation of Analytical Chemistry*, Rittenhouse, 1991, 5: 65-80.

Analytical Chemistry was radically transformed during the period 1920 to 1950, as "wet" analyses were replaced with "dry" ones. The new physical methods had the advantage of speed, small samples and low limits of detection. But these methods required expensive instrumentation, which until the 1920s had not been commercially available. Baird's three-meter grating spectrograph was the first commercial spectrograph suitable for the qualitative and quantitative analysis of iron, steel and minerals; it demonstrated the advantages of a grating spectrograph over a prism spectrograph for chemical analysis. This paper traces the formation of Baird Associates and the development of the three-meter spectrograph from an idea to a commercially viable instrument. Author's address for reprints: D. Baird, Department of Philosophy, University of South Carolina, Columbia, SC 29208.

PATRICK BLACKETT

Gregory A. Good *Patrick Blackett in The Nobel Prize Winners in Physics*, Frank N. Magill ed., 551-559. Salem Press, 1989.

Patrick Blackett's improvements of the cloud chamber produced fundamental discoveries concerning cosmic rays and subatomic particles from the 1920s to the 1940s. He confirmed the existence of the positron, established the occurrence of pair creation and observed cosmic ray "showers." The article discusses these research programs, his political activity and his later critical work on the magnetism of rotating bodies and paleomagnetism. Blackett received the Nobel Prize in 1948 and later became President of the Royal Society. Authors address for reprints: History Department, West Virginia University, Morgantown, WV, 26506.

SEEBECK, GOETHE AND ROMANTIC SCIENCE

Keld Nielsen *Another Kind of Light: The Work of T. J. Seebeck and his Collaboration with Goethe. Part I*, Historical Studies in the Physical Sciences, 1989, 20: 107-178.

Seebeck, now known for his discovery of the thermoelectric effect, came into contact with Goethe while the latter was intensively occupied with his investigation of colors. A close friend of influential Romantics (Ritter, Hegel, Schelling, Weiss) Seebeck distinguished himself by collaborating closely with Goethe, mainly, it is argued, because Goethe's scientific methodology solved exigent problems for an experimental physicist of Romantic inclination. Those problems, Goethe's solution, Seebeck's early work and their frustration following the negative reception of Goethe's *Zur Farbenlehre* (1810) are described and related to contemporary trends in science and philosophy.

MICHAEL FARADAY:

1991 was the bicentennial of the birth of Michael Faraday. Such occasions generate renewed interest and renewed publishing. Some publications,

including a survey of the "Faraday Industry" are noted elsewhere in the Newsletter. The interest in Faraday includes a reappraisal of his work by trying to reconstruct his actual methods of working by David Gooding and appreciation of the role of religion in his science.

Geoffrey Cantor *Faraday's Search for the Gravelectric Effect*, Physics Education, 1991, 28: 289-293.

Faraday was convinced that, since the universe is a conserved system, gravity and electricity must be interrelated. Although he failed to detect this gravelectric effect by experiment, his search for it sheds considerable light on Faraday's science. Author's address for reprints: Department of Philosophy, University of Leeds, Leeds LS2 9JT, United Kingdom.

Geoffrey Cantor *Michael Faraday, Sandemanian and Scientist: A Study of Science and Religion in the Nineteenth Century* xii + 359 pp., New York, St. Martin's Press, 1991

"I am of a very small and despised sect of Christians, known, if known at all, as Sandemanians." Thus Michael Faraday introduced the subject of his religion to a correspondent. This book locates Faraday and his science in the context of the Sandemanians. After outlining the history of this now nearly extinct sect, Faraday's social and political views, including his attitude to the scientific community, are shown to derive from the Sandemanian social philosophy. Likewise, his profoundly religious understanding of nature is seen as permeating much of his science. This is a new interpretation of Faraday and a provocative insight into the historical relationship between science and religion.

Geoffrey Cantor, David Gooding and Frank A. J. L. James *Faraday* xiii + 109 pp., Basingstoke and London: Macmillan Educational, 1991.

Written for college students and the general reader this monograph introduces the life and work of Michael Faraday. The opening chapters deal with aspects of Faraday's life, his career, his religion, his character and his connec-

tion with the Royal Institution and other science-related organizations in London. The development of his science is traced through his training in chemistry and subsequent research in several problem areas in electricity, including electromagnetism and electrochemistry. His later work is portrayed as converging on broader concerns about matter, space and field theory. In a final chapter the authors examine Faraday's influence on science, engineering and his public image.

Brian Gee *Faraday's Plight and the Origins of the Magneto-electric Spark*, Nuncius, Annali di Storia della Scienza, 1990, 5: 43-69.

An examination of the complex set of issues which arose in the aftermath of Faraday's signal achievement of the discovery of electromagnetic induction. This study reexamines the polemic arising out of Leopoldo Nobili's interest in electromagnetism and supplements what is generally known with special regard for the impact in Britain of the news of Nobili's progress. It transpires that Faraday's plight had less to do with fears about Nobili stealing his glory and more to do with defending his position on home ground when others doubted his priority.

Brian Gee *Pre-technology and Development immediately following Faraday's Discovery of Electromagnetic Rotations*, History of Technology, 1991, 13: 41-72.

The origin of the electromotive engine depended upon far more than the discovery of electromagnetic rotations alone and therefore, strictly speaking, it is misleading to acclaim Faraday as its sole inventor. Tracing the movement of Faraday's new principle from 1821, nevertheless, provides an interesting exercise which reveals a disjunction between the rotary philosophical toys of the 1820s and the electromagnetic engines of the 1830s. The link between these two phases of development rests upon a number of individuals, philosopher mechanics, who saw in this rotary motion a new form of prime mover.

ELECTRODYNAMICS

Thomas Archibald *Energy and the Mathematization of Electrodynamics in Germany, 1845-1875* Archives internationales d'histoire des sciences, 1989, 39: 276-308.

This paper discusses the contrast between the theories of electrodynamics of Wilhelm Weber and Hermann von Helmholtz. Weber and his followers used velocity-dependent forces to describe the behavior of hypothetical electric particles, and saw potentials for these forces primarily as mathematical constructs which act as constraints on mathematical entities employed in the model. Helmholtz, on the other hand, rejected the possibility of velocity-dependent forces as leading to physically inadmissible states and insisted on energy not as a mere mathematical construct, but as an essential constraint on physical description. Author's address for offprints: Department of Mathematics, Acadia University, Wolfville, Nova Scotia BOP 1X0, Canada.

HERTZ'S ELECTRIC WAVES

Manuel G. Doncel and Xavier Roqué eds. *Heinrich Hertz: los ondas electromagnéticas*, 248 pp., Barcelona: Publicaciones de la Universidad Autónoma de Barcelona y Ediciones del al Universidad Politècnica de Catalunya, 1989. Colección Clásicos de las Ciencias 2.

This is an anthology from Hertz's *Untersuchungen* (in English Electric Waves) with an introduction, many annotations and appendices of didactic, historical and textual character. It is accompanied by a facsimile of the German originals of Hertz's articles in the *Annalen der Physik* (Wiedemann's Annalen). An appendix on the conceptual conversion of Hertz to electromagnetic waves presents for the first time unpublished material from Hertz's Laboratory Notes. This is the second in an ongoing series of Spanish editions of scientific classics.

EARLY COMPUTERS

William Aspray ed. *Computing before Computers*, x + 266 pp., Ames IO: Iowa State University Press, 1990

This book presents a popular, illustrated account of computing technology prior to 1945 and the invention of the electronic, stored-program computer. The book covers all the major traditions of computing that eventually converged in the computer: desk calculators, difference and analytical engines, logic machines, punched-card tabulating systems, analog calculating devices and relay and electronic calculators. Although an edited volume, the five authors have striven for conformity in their chapters.

BOHR'S INFLUENCE

Abraham Pais *Niels Bohr's Times, in Physics, Philosophy and Policy*, Oxford: Clarendon Press, 1991.

This is an attempt to give a rounded picture of Bohr the man—with emphasis on his Danish background—the scientist, the philosopher, and of his involvement with political issues, notably the atomic bomb. Also treated are his roles as administrator, fund raiser, co-creator of international institutions (CERN, Nordita, Risø), and his influence on the development of biophysical methods (tracers). Particular attention is devoted to his contacts with other major figures: Rutherford and Einstein.

RUTHERFORD

Sam Devons *Rutherford and the Science of his Day*, Notes and Records of the Royal Society, 1991, 45: 221-242. The Rutherford Memorial Lecture, 1989.

Rutherford's life-work coincided almost exactly with the period c1895-1935 which is nowadays often dubbed the "Second Scientific Revolution," and conventionally characterized by the emergence of relativity and quantum mechanics. Rutherford's immense epoch-making work played a profound and leading role in this "revolution". Yet Rutherford's work displays a remarkable spirit of its own independence, even autonomy. As was said, he "rode the crest of a wave" which he made, in large part, himself. Appreciation of Rutherford's work provides an evergreen source of enlightenment and inspiration, to those who today engage in science, who teach science, and those who guide and foster its development, appreciation and comprehension.

J. C. SLATER

Paul H. Hoch *John Clarke Slater and the Science for the Transistor*, European Journal of Physics, 1990, 11: 283-291.

This article traces the socio-technical, economic and cultural influences on the development of American solid state physics and its relations to the national scientific "styles" of Britain, France and Germany. A key influence on the new science in America is Slater and MIT's close interactions with the American electronics and photographic laboratories. Also important in the inter-war period was the merging of "Anglo-American" (predominantly experimental) and "German" (predominantly theoretical) streams of physics as well as the post-war merging of civilian and military branches of American science. The article concludes with a discussion of the different national styles of solid state physics, and of the socio-economic determinants of Slater's most favored approach.

THE NAZIS & GEOPHYSICS RESEARCH

Gregory A. Good *The Rockefeller Foundation, the Leipzig Geophysical Institute and National Socialism in the 1930s* Historical Studies in the Physical Sciences, 1991, 21: 299-316.

This paper addresses how the rise to power of the Nazis affected the efforts of the Leipzig Geophysical Institute to attract funding from the Rockefeller Foundation. The article places the relations between these bodies in the institutional setting of geophysics between the two World Wars. The Leipzig affair helped to sour the Foundation on geophysics, and slowed the development of an important geophysical research center, contributing to a trend toward support of geophysics by mineral companies and the military.

GEN. GROVES & JUMBO

Stanley Goldberg *When Money is no Object: Jumbo!* Paper delivered at the Society for the History of Technology, Cleveland, Oct. 1990.

At the beginning of 1944, General Leslie R. Groves refused to permit a full scale test of the implosion bomb

because of the danger that a nuclear fizzle would result in the loss of the world's supply of plutonium. Los Alamos engineers undertook the design, and authorized the construction of a 214 ton steel bottle—Jumbo, the largest thing ever shipped on the railroads. While Jumbo was not used, the saga of its creation, shipment, and eventual disposition is an excellent example of General Groves's overpowering administrative style. Author's address: 508 Third Street SE, Washington, DC 20003.

GROVES & COMPARTMENTALIZATION

Stanley Goldberg *Groves and the Scientists: Compartmentalization and the Struggle to Build the Bomb*, Paper delivered at the History of Science Society Meeting, Oct., 1990.

When the project to build the atomic bomb was turned over to the Army Corps of Engineers, General Groves, head of the project inherited a compartmentalization system that had originally been devised by the physicist Gregory Breit. Groves extended and made the system even more rigid. His critics, then and later, claimed that this policy delayed the completion of the first bombs by over a year. There is no evidence that such charges have any basis in fact. While General Groves's policy was strict compartmentalization, when a strong case was made for the need for what became known as "Interchange," he always quietly gave way.

SYMMETRIES

Manuel G. Doncel, Armin Hermann, Louis Michel and Abraham Pais eds. *Symmetries in Physics, 1600-1980*, xvi + 678 pp. Bibliography, Name and Subject Indices. Barcelona: Publicaciones de la Universidad Autónoma de Barcelona, 1989. (International distribution through World Scientific)

These are the Proceedings of the First International Conference on the History of Scientific Ideas. Contributors to the proceedings include both physicists and historians of science. The history of the role of symmetry in physics is traced from Galileo and Newton through Euler and Romantic Physics to the systematic treatments of Noether, Klein and Lie and to the modern conceptions in relativity and symmetry

breaking. The development of symmetry in quantum physics begins with Bose and Fermi statistics, then with the ideas of de Broglie, Bohr, Einstein, Heisenberg and Pauli. Other papers present symmetry in energy conservation, cosmology, charge conjugation, time reversal, parity and especially the discovery of CP violation. In addition there are essays on the origin of unitary symmetries, complex quaternionic and octonionic structures in physics, and on the symmetry of quantum chronodynamics. Eugene Wigner closes the volume with an historical paper on laws and symmetries. Dialogs and roundtable discussions are included.

YUKAWA'S MESOTRON

Laurie M. Brown and Helmut Rechenberg *Yukawa's Heavy Quantum and the Mesotron, 1935-1937* Centaurus, 1990, 33: 214-252.

The unified "standard model" of strong and weak nuclear forces of the mid-1930s was based on the so-called Fermi field. However, theorists could never explain simultaneously the required nuclear properties, such as saturation, strength, range and charge independence of nuclear forces while also accounting for β -decay. Yukawa proposed to exchange, instead of the Fermi field, the massive charged quanta of a new field he invented, the U-field. In this paper we describe this central episode in the history of elementary particle physics.

LEV LANDAU

Laurie M. Brown and Helmut Rechenberg *Landau's Work on Quantum Field Theory and High Energy Physics (1930-1961)* in *Frontiers of Physics*, 53-81, (Proceedings of the Landau Memorial Conference, Tel Aviv, June 1988). Pergamon Press, 1990.

Lev Landau, one of the most versatile and fruitful theoretical physicists of the century, influenced fields as diverse as low-temperature and cosmic-ray physics. In this article we study those contributions that are related, in a broad sense, to elementary particle physics, including his penetrating and critical observations on quantum field theory and its limitations.

HISTORY OF PHYSICS NEWSLETTER
Volume V Number 2 -- October 1992

FORUM/DIVISION NEWS	21-23
AIP & APS NEWS	23-24
ANNOUNCEMENTS & REPORTS	24-26
MEETINGS	26-28
GRANTS & FELLOWSHIPS	28-30
BOOK PUBLISHERS	30-33
RECENT ARTICLES	33-35
SUMMARIES	36-39

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