

History of Physics Newsletter

Volume III, Number 2

October, 1987

WARNING

Division Memberships May be Terminated

A new procedure proposed by the APS would discontinue the previous practice of continuing memberships in Divisions by default. Under the proposed plan if you wish to continue your membership in the History of Physics Division in future years, you must explicitly designate on your APS dues bills that you wish to be a member of the Division. See (in this issue of HPN page 18) item 2a in the Report to the Executive Committee of Stephen Brush, the Divisional Councillor.

DIVISION NEWS

APS MEETINGS

The Division of History of Physics will sponsor four sessions at the following APS meetings in 1988:

Crystal City, VA Tentative title "Teacher - Apprentice" January 25-28, 1988, This is a joint session with the AAPT; it is being organized by John Rigden.

H. B. G. Casimir, Netherlands: "Ehrenfest and Pauli"
M. L. Goldberger, Inst. Adv. Study, Princeton: "Fermi"
R. R. Wilson, Cornell: "E. O. Lawrence"

New Orleans, LA "History of Semiconductor Physics." March 21-25, 1988. The session is being organized by Heinrich Medicus.

Georg Busch, ETH Zurich: "Early History of Semi-Conductor Physics up to 1940."

Hsu Yun San, Purdue University: (tentative title) "Semi-Conductor Developments - Purdue, Lark-Horowitz, and Others."

J. Bardeen, University of Illinois: (tentative title) "Research that Led to the Invention of the Transistor"

O. Madelung, Marburg: "III - IV Compounds"

Stephan V. Molnár, IBM Yorktown Heights: "Historical Developments Leading to the Ongoing Research in Magnetic Semi-Conductors."

Baltimore, MD April 18-21, 1988

A session on "History of Symmetries in Physics" is being organized by Arthur Miller. A session on "History of Cosmology" is being organized by Peter Galison.

NOMINATIONS FOR OFFICERS

The Nominating Committee for the 1988 election consists of Allan Needell (Chair), Stephen Brush, and Peter Galison. The Nominating Committee would appreciate receiving suggestions for nominees who are willing to serve on the Executive Committee. Names and vitae of possible candidates for Vice-Chairperson (to become Chairperson in 1989), for Secretary-Treasurer to serve for three years, and for two persons to serve 3 year terms on the Executive committee should be sent by November 20th to Allan Needell, National Air and Space Museum, Room 3561, Smithsonian Institution, Washington, DC 20560. Division members eligible for nomination are listed in the most recent APS membership directory.

ELECTION RESULTS

Lawrence Badash was elected Vice-Chairperson of the Division of History of Physics for 1987. He will serve as Chairperson in 1988. He is Professor of History of Science at the University of California at Santa Barbara. He is head of UCSB's Program in History of Science and Technology. Except for a research year in Cambridge and sabbaticals in England, France and New Zealand, he has been at Santa Barbara since 1966. He is a co-founder of the West Coast History of Science Society (1971), Council Member of the History of Science Society (1975-78), co-founder of the Santa Barbara Arms Control Study Group (1980), and director of the Univ. of California's Summer Seminar on Global Security and Arms Control (1983 and 1986). His teaching and research interests have focused on 20th-century physics especially radioactivity, Rutherford, Los Alamos, and the history of the nuclear arms race.

The Division elected **Emilio Segrè** and **Daniel Siegel** to serve three year terms on the Executive Committee.

Emilio Segrè is Emeritus Professor of Physics at the University of California at Berkeley and Professor of Nuclear Physics at the University of Rome. He is a member of the National Academy of Sciences and a Nobel Laureate. His research interests have included: experiments with slow neutrons, studies of the elements technetium, astatine, and plutonium, and production of the anti-proton. His contributions to history include a biography entitled "Enrico Fermi: Physicist," chairman of the editors of the "Collected Works of Enrico Fermi," and two volumes: "From X-rays to Quarks - Modern Physicists and their Discoveries" and "From Falling Bodies to Radio Waves - Classical Physicists and their Discoveries."

The History of Physics Newsletter (HPN) is published by the Division of the History of Physics of the American Physical Society. It is distributed free to all members of the Division. Others may subscribe at \$10 per volume (\$5 additional for airmail). Each volume consists of 5 issues; we expect to publish two issues per year. Editor: *Albert Wattenberg*, Department of Physics, University of Illinois, Urbana, IL 61801. Associate Editors: *Stephen G. Brush*, Dept. of History and Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742, and *Robert D. Sard*, University of Illinois, Urbana, IL 61801.

(election results continued)

Daniel Siegel is Associate Professor of the History of Science at the University of Wisconsin in Madison. His experimental work was on the measurements of particles containing "strange" quarks. His publications in history include: "Balfour Stewart and Gustav Robert Kirchoff: Two Independent Approaches to 'Kirchoff's Radiation Law'"; "Classical-Electromagnetic and Relativistic Approaches to the Problem of Non-Integral Atomic Masses"; "Thomson, Maxwell, and the Universal Ether in Victorean Physics"; and "The Origin of the Displacement Current."

Other members of the Executive Committee are: Chairperson, **Roger H. Stuewer**; Past-Chairperson, **Martin Harwit**; Secretary-Treasurer, **Albert Wattenberg**; Division Councillor, **Stephen G. Brush**; Members with terms expiring in May 1988, **Gordon Baym** and **Allan A. Needell**; Members with terms expiring in May 1989, **Peter Galison** and **Sallie A. Watkins**; ex officio Director for Center of History of Physics, **Spencer Weart**.

The Amendment to the By-Laws, V7, which concerns the responsibilities of the Divisional Councillor, was approved in the recent mail balloting of the membership. It now needs to be approved by the Council of the APS.

EXECUTIVE COMMITTEE

The Executive Committee held its annual meeting on April 21, 1987 in Crystal City, VA. Highlights of the discussions are given below:

1. Chairperson Harwit reported that there were overflow audiences at the invited papers sessions of the History Division at the March meeting in New York and at the April meeting in Crystal City. Attempts to get funding for a History of Physics book prize will need to be continued.

2. Report of S. G. Brush, Division Councillor:

a) **Limit on Memberships in Divisions, etc.** The APS Council has been urged by W.W. Havens and H.

Lustig to allow only one free membership per APS member in a Division, Topical Group, or Section. One of the proposals discussed was a charge of \$5 for each additional subunit membership. A number of Councillors objected, and there have been objections in writing (and also at a subsequent meeting that Havens had with representatives of the subunits); the matter has been tabled. The concern is that if the APS limits the number of subunits to which a member may belong, most physicists will give a higher priority to membership in technical divisions. Therefore subunits such as topical groups, forums, sections, and the History Division could be seriously weakened. The current proposal of the APS Treasurer, H. Lustig, is to allow free membership in subunits through fiscal 1989, but to require all APS members to explicitly designate on their dues bill the subunits to which they want to belong, rather than to continue by default in those subunits which they joined in earlier years.

b) **Future Patterns of APS Meetings** W. W. Havens thinks the APS needs to change its pattern of meetings. (A brief review of the problem was given in the previous HPN vol.III #1 page 2.) In particular, it is hard to find suitable meeting places in the Washington, DC area in April. So we may have to give up our traditional time and place for the History Division's annual meeting. (The Council of the APS, at its meeting of 4/24/87, created a "Task Force" consisting of all Division and Forum Councillors to make recommendations on future patterns of APS meetings.) The views of the Executive Committee of the History Division were the following: 1) We should continue to try to sponsor joint sessions with the AAPT. 2) We should continue to have sessions at APS meetings and not have separate "Divisional Meetings" (eg. concurrent with History of Science Society meetings). 3) If a fixed pattern of APS meetings were to develop for other Divisions, the History Division should continue to try to schedule its invited sessions with all other Divisions from year to year. We feel that the History of Physics is of general interest to all fields of physics.

3. Report on results of elections: see above cover page.

4. R. Stuewer is planning on having four sessions of invited papers at general APS meetings in 1988. (See above APS MEETINGS.) If you have suggestions for topics for future sessions of the Division and/or you are willing to help in organizing sessions of invited papers write to the current vice-chairperson of the Division, Professor Lawrence Badash, History of Science, University of California at Santa Barbara, Santa Barbara, CA 93106

5. Report by Rita Lerner on AIP/Tomash publication series on the History of Physics: In addition to the previous five, three new publications will appear this year. Number VI in the series is "Basic Bethe: Seminal Articles on Nuclear Physics, 1936-1937," by Bethe, Bacher, and Livingston with a preface by Bethe and an Introduction

previous five, three new publications will appear this year. Number VI in the series is "Basic Bethe: Seminal Articles on Nuclear Physics, 1936-1937," by Bethe, Bacher, and Livingston with a preface by Bethe and an Introduction by R. Stuewer. Number VII in the AIP/Tomash series is "A History of the Theories of the Aether and Electricity," by Edmund T. Whittaker with an introduction by Arthur Miller. Volume I is "Classical Theories" and volume II is "Modern Theories 1900-1926." Number VIII in the Tomash series is "Radar in World War II" by Henry E. Guerlac, with a forward by Dale Corson and an introduction by John Rigden and I. I. Rabi.

COMMITTEE APPOINTMENTS

The appointed Committees of the Divisions for 1987-1988 are:

- Nominating Committee - see coverage 17.
- Fellowship Committee: S. Brush (Chair), G. Baym, L. Brown, W. Fowler, and M. Klein.
- Program Committee: R. Stuewer (Chair), P. Galison, H. Medicus, A. Miller, and J. Rigden.

APS and AIP NEWS

APS Council Actions - Resolutions passed by the APS Council which may be of interest to Division members are: a) That Council form a Task Force consisting of all Division and Forum Councillors to evaluate the present yearly pattern of all APS technical meetings, and to recommend to Council by its meeting on January 24, 1988 a pattern for the future, and a plan for continued coordination of meetings among all the technical subunits of the Society. b) That Council authorize the Executive Secretary to negotiate for hotel space in the Washington area in April through 1991. c) That for fiscal year 1988 the "Dues Equivalent" transfer to Divisions, Sections and Topical Groups be \$2.50 for each member at June 30, 1987. d) Council approved increases in non-member domestic journal subscription rates for calendar year 1988 and an increase in dues allocations to Divisions, Sections and Topical Groups proportionate to the increase in membership dues for fiscal year 1988.

Boost of Pi-NET Services - Pi-NET (described in HPN Vol.II, 5 pg 68) has undergone a variety of design changes and system improvements during the past year in anticipation of the expanded capability that the recently delivered new computer will provide. "In the works" is an expanded Job Opportunities database that includes additional job notices which are updated on a monthly bases, and procedures are implemented to promptly remove notices once positions are filled. There are now twenty additional journals in the "Journal Article Titles" database.

Reprints from most of these journals can be ordered online. A redesigned, more comprehensive Announcements section includes greater coverage of "Physics Today", a new Education and Employment Data (EED) section, and three months of the American Physical Society's weekly Washington newsletter "What's New".

A Pi-NET User's Guide is available. Send a check for \$3.00 (for postage and handling) payable to AIP, to Publications Sales, American Institute of Physics, 335 E. 45th St. New York, NY 10017.

AIP-CHP Grants-In-Aid - The Center for History of Physics of the AIP has a program of small GRANTS-IN-AID for research in the history of 19th and 20th century physics and allied sciences (such as astronomy, geophysics, and optics) and their social interactions. Grants will be for a maximum of \$2000 each - double the amount formerly offered. They can be used only to reimburse direct expenses connected with work in these fields. Preference will be given to those who need funds to use the Center's Niels Bohr Library in New York City, or to microfilm papers or to tape oral interviews with a copy to be deposited in the Library. Applicants should be working towards a degree in the history of science, or have a record of publication in the field. Deadlines for receipt of applications are June 30th and December 31st. For more information write to Spencer Weart, Center for History of Physics, American Institute of Physics, 335 East 45th Street, New York, NY 10017.

Rigden Named Director of Physics Programs of AIP - Dr. John S. Rigden has been appointed Director of Physics Programs of AIP. Dr. Rigden will succeed Dr. Lewis Slack who retired July 2, 1987 after having served in the position twenty years. Previously, Dr. Rigden was a Professor of Physics at the University of Missouri, St. Louis since 1973. As Director of Physics Programs, Dr. Rigden will be responsible for overseeing the activities of the Career Placement Division, the Education and Employment Statistics Division, the Physics History Division, the Public Information Division, the Education Division, and PHYSICS TODAY Magazine. Since 1978, Dr. Rigden has served as editor of the American Journal of Physics, a publication of the American Association of Physics Teachers (AAPT). He is an active author, having written numerous scientific and popular articles plus two books including Rabi: Scientist and Citizen published by Basic Books in 1987.

Peierls' Historical Photographs - Sir Rudolph Peierls recently gave the Niels Bohr Library a large selection of fine historical photographs. The Center for History of Physics Newsletter of May - 1987 contains a sample from the collection. They date from 1929 to very recent, and the faces of the famous physicists are very clear.

ANNOUNCEMENTS & REPORTS

Dudley Observatory Awards

The Board of Trustees of Dudley Observatory has given its 1987-1988 Herbert C. Pollock Award (Supporting Research in the History of Astronomy and Astrophysics), in the amount of \$10,000, to Professor **Stephen G. Brush** of the University of Maryland, for his project "Theories of the Origin of the Solar System Since 1950" The Board also voted a Dudley Award of \$5,000 to Professor **Robert S. Westman**, University of California at Los Angeles, for his project "The Copernicans: Universities, Courts, and Interdisciplinary Conflict, 1540-1700."

The **Herbert C. Pollock Award** is for support of an innovative research project in the history of astronomy or astrophysics by a faculty member, research associate, or postdoctoral student with an institutional association. Special consideration is given to proposals that involve the Dudley Collections. (See HPN vol.II,5,pg52.) There are also smaller Dudley Awards as well as the Pollock Award. Interested applicants should let the Committee know whether they are otherwise supported; they should obtain more information from the Pollock Awards Committee, Dudley Observatory, 69 Union Ave., Schenectady, NY 12308. (The deadline for applications this year is December 15, 1987.)

Guggenheim Fellowship

Richard S. Westfall, Professor of History and Philosophy of Science at Indiana University, has been awarded a Fellowship by the John Simon Guggenheim Foundation, to conduct his research on patronage and 17th-century science. Professor Westfall is the author of a biography of Isaac Newton, "Never at Rest," and many other publications on Newton and 17th-century physics.

ACLS Fellowships and Awards

The American Council of Learned Societies administers fellowships and awards made possible by support from a number of organizations which include: Andrew W. Mellon Foundation, Ford Foundation, Pew Charitable Trusts, National Endowment for the Humanities, the Carnegie Corporation of New York, and the John D. and Catherine T. MacArthur Foundation. This year, the recipients of Postdoctoral Fellowships for Senior Scholars include **John L. Greenberg**, independent scholar in history. His project is "The Origins and Genesis of the 18th Century French Mathematical Physics Community."

The Templeton Prize

The Reverend **Stanley L. Jaki** of Seton Hall University and of the Institute for Advanced Studies at Princeton has won the \$330,000 Templeton Prize for progress in religion. He is a scholar in theology and physics, and he

has written a dozen books on physics, the mind and computers, creation, astronomy, science and its evidences of God. His book "Relevance of Physics" is considered the outstanding work in the field. The award cited him for illuminating ways in which science, culture, and religion are linked. The prize was presented by Prince Philip at Windsor Castle in England in May.

Bancroft Library in Berkeley

Beginning in the 1930's and for over three decades, the Berkeley campus and National Laboratories of the University of California were major centers of physics research especially in nuclear and elementary particle physics. Six Berkeley physicists have received the Nobel Prize. The Bancroft Library is the central repository for special collections in the History of Physics at Berkeley and of the Berkeley physicists.

One of the collections concerns the start and growth of the Radiation Laboratory which is now the "Lawrence Berkeley Laboratory" (LBL). Fifty cartons of the correspondence and papers of E.O. Lawrence, director of the Laboratory during his lifetime, are the nucleus of a wide-ranging set of manuscript collections at the Bancroft. Nobel prizewinners Luis Alvarez and Edwin McMillan have both begun to give papers to the Bancroft, which also holds some papers of Nobel laureate Emilio Segrè.

There are many oral history collections also available. One series deals with Los Alamos National Laboratory; another series is from interviews with personnel of the Radiation Laboratory; another series focuses on research in Medical Physics and the establishment of the Society of Nuclear Medicine. For further information call or write to the History of Science and Technology Program, The Bancroft Library, University of California, Berkeley, CA 94720 (415)-642-0959.

History of Science in France: Guide

A "Guide de l'Histoire des Sciences et des Techniques en France," by C. Blondel and V. Gourlet, has been published by Editions Belin. The "Guide," which supersedes J. Rosmorduc's "Annuaire de l'Histoire des Sciences et des Techniques en France" (1980), consists of 480 entries on individual scholars (each with a select bibliography) and 157 entries on institutions and research groups. It is fully indexed by period, region, and area of interest. The information in the "Guide" is drawn from an extensive computerized data base that will allow the entries to be revised at regular intervals. The publication itself and the preparation and updating of the database have been made possible by the support of the Centre National de la Recherche Scientifique. Orders for the "Guide," which appears in the series of "Cahiers d'Histoire et de Philosophie des Sciences" of the Societe Francaise d'Histoire des Sciences et des Techniques, should be sent directly to the Publishers: Editions Belin, 8 rue Ferou, 75278 Paris, Cedex 06, France.

Smithsonian Studies in History and Technology

The Smithsonian Institution has just published "A Brief History of Geomagnetism and A Catalog of the Collections of the National Museum of Natural History" (87pp. and 75 photographs and illustrations). It was co-authored by Robert P. Multhauf and Gregory Good. It is No. 48 in the Smithsonian Studies in History and Technology and concentrates on instruments used in America. It is available free of charge to researchers and scholars; if possible, write on official letterhead to Deborah J. Warner, National Museum of American History Rm. 5122, Smithsonian Institution, Washington, DC 20560.

National Coordinating Committee for the Promotion of History

The NCC issues reports containing news from Washington that is of interest to historians. They are called "Director's Reports" and are prepared by Dr. Page Putnam Miller. The NCC has been active in trying to facilitate the appointment of U.S. Archivist; last December they appointed a distinguished committee to compile a list of individuals who could serve ably as the U.S. Archivist, and the list was sent to the White House. The NCC has also briefed Senators on the concerns of historians and archivists. Frank Burke has served as Acting U.S. Archivist for over two years and at first he adopted a "caretaker" role. Subsequently he has taken leadership in promoting the need for an additional archival building. Two decades ago the National Archives building on Pennsylvania Ave. reached its records storage capacity. This has forced the Archives to use unsuitable storage and research facilities (including boxes in the aisles), and it has impeded the work of researchers. It is hoped that as part of the '88 appropriation, planning money for a new facility will be included. The administrative offices of the NCC are: 400 A Street SE, Washington, DC 20003.

MEETINGS

University of Bologna - To celebrate the Ninth Centenary of the University of Bologna, the Group for the History of Physics of the Italian Research Council (CNR) is organizing a Conference on the History of modern cosmology, in association with the third ESO-CERN Symposium. It will take place May 20th to 23rd, 1988 in Bologna. Some of the people who actually made Modern Cosmology are still active scientists and can tell the story from their own unique point of view. Historians, cosmologists, physicists in general will be able to assess the discipline in the broader framework of the History of Science. The local Organizing Committee is chaired by Professor Silvio Bergia, c/o CONFERENCE SERVICE srl, Via Tagliapietre, 18/b - 40123 Bologna, Italy.

Case Western Reserve Michelson-Morley Centennial - The symposium will take place on October 28-29, 1987 at Case Western Reserve University. A wide range of modern physics topics will be addressed by distinguished historians and physicists; the keynote address will be given by Daniel Kevles. Write to the Michelson-Morley Symposium, Physics Department, Case Western Reserve University, Cleveland, OH 44106.

The Chinese Society of History of Sciences and Technologies is joining with the Chinese Physical Society to sponsor a Symposium on the History of Experimental Physics, which will take place in Hunan Province during April 1988. Some of the sessions listed are: "Celebrations of Centennials of the Michelson-Morley Experiment, Hertz' Discovery of Electromagnetic Waves, Raman's Birthday, and the Fiftieth Anniversary of the Discovery of Nuclear Fission;" "The History of the Determination of Universal Constants;" "The History of Experimental Physics in Ancient China."

The symposium welcomes papers from foreign scholars. Please contact: Prof. Kuo I-Ling, Department of Physics, Tsinghua University, Beijing, People's Republic of China.

History of Science Society - The 1987 annual meeting will take place at the Radisson Plaza Hotel in Raleigh, NC from October 29th to November 1st, 1987. It is a joint meeting with SHOT. Sessions which will be of interest to historians of physics include: two Friday morning sessions, one organized by Kathryn Olesko entitled "Works in Progress: Mathematics and the Physical Sciences in the Modern Era" and the other session organized by Seymour H. Mauskopf entitled "Workshop: Grant Seeking in the History of Science and Technology"; a Friday afternoon session organized by Darwin H. Stapleton entitled "Workshop: Archives of Twentieth-Century Technology and Science, New Acquisitions, 1982-1987"; a Saturday morning talk by Spencer Weart on "The Organization of the Solid State Physics Community"; and a Saturday afternoon session organized by David K. Hill entitled "Historical, Technical, and Empirical Aspects of Galileo's Early Physics." The local arrangements co-chair is Prof. Edith Sylla, School of Humanities and Social Sciences, North Carolina State University, Box 8101, Raleigh, NC 27695-8101.

There will be a joint meeting of HSS and the British Society for the History of Science in Manchester, England July 11-15, 1988. For more information about the meeting contact Ronald L. Numbers, Department of History of Medicine, University of Wisconsin, 1300 Wisconsin Ave., Madison, WI 53706.

Humboldt University of Berlin - The Summer Institute of 1988 in the History and Philosophy of Science at Humboldt University will take place from June 17th to July 5th, 1988. It will concentrate on Highlights in the theoretical development of Science (especially physics, psy-

chology, and biology) in the 19th and 20th centuries. Leading historians of the GDR will report. Visits to important cultural and historical sites are also planned. More information may be obtained from Professor W. Woodward, Department of Psychology, Conant Hall, University of New Hampshire, Durham, NH 03824.

International Union of the History and Philosophy of Science - The XVIIIth International Congress of the History of Science will take place on August 1st to 9th, 1989 starting in Hamburg and then moving to Munich. The general theme will be Science and Political Order. As a new departure it is proposed to introduce Poster Sessions. Chairpersons of the various Commissions and committees of the Division of the History of Science of the IUHPS who are interested in organizing special symposia are invited to contact Professor Fritz Krafft, Fachbereich Mathematik, Staudinger Weg 9, D-6500 Mainz, FRG.

The Second Latin American Congress of the History of Science and Technology - will take place in São Paulo, Brazil, from June 30th to July 4th, 1988. For more information write to the Comissão Organizadora, 2.0 CLAHCT Caixa Postal 6063, 13.081 Campina, SP, Brazil.

University of Maryland - Symposium on Spacetime Symmetries - May 24th to 28th, 1988 the University of Maryland at College Park will host the International Symposium on Spacetime Symmetries, in commemoration of the 50th Anniversary of Eugene P. Wigner's fundamental paper on the Inhomogeneous Lorentz Group. The symposium is being organized by Y. S. Kim (Univ. of Maryland) and W. W. Zachary (Naval Research Lab.). The prospective participants include eight Nobel prize laureates and an impressive group of theoretical physicists. For further information contact W. W. Zachary, Naval Research Laboratory, Washington, DC 20375-5000.

Tulane University - Principia Tricentennial Symposium, Newton's Legacy will be held in New Orleans November 12th to 14th, 1987. The symposium will examine both the impact on science and the intellectual, political, and social history during the 300 years following the publication of the Principia. The program will be divided into five half-day sessions organized around the centennial years 1687, 1787, 1887, and 1987 and will include contributed papers. For more information contact Frank E. Durham or Robert D. Purrington, Department of Physics, Tulane University, New Orleans, LA 70118.

BOOK PUBLISHERS

In this category we are trying to limit announcements to books that are recently published or about to be published, and whose contents directly relate to the History

of: Physics, Physicists, Laboratories, and Associated Institutions.

AAPT Publications

Melba Phillips editor - **Physics History from AAPT Journals** This collection of 27 reprinted articles is in three sections: The 'Classical' Period, Some 'Modern' Physics and its Creators, and Historical Aspects of Physics Education. The reprinted authors include: Chandrasekhar, Compton, Heisenberg, and Brattain.

O. W. Greenberg editor - **Quarks** It includes Greenberg's Resource Letter plus 22 articles published between 1964 and 1983 relating to the development of quark model ideas.

F. B. Dunning editor - **Atoms in High Rydberg States** This collection includes Dunning's Resource Letter and thirteen articles relating to the states' behavior in electric and magnetic fields, interaction with radiation, and collisions with neutral particles. For more information write to AAPT Publications, AAPT Business Office, 5110 Roanoke Place, Suite 101, College Park, MD 20740

Adam Hilger

G. E. Bacon editor - **Fifty Years of Neutron Diffraction** Pioneers from fifteen countries trace the history from 1936 to the present. The reminiscences capture the opportunities for neutron scattering and show the changes in the neutron experimenters' way of life over the past fifty years. Write to Taylor and Francis, 242 Cherry Street, Philadelphia, PA 19106.

AIP/Amer. Assoc. of Physicists in Medicine

Juan A. del Regato, M.D. - **Radiological Physicists** This is a collection of biographies which gives interesting insights into the lives, scientific contributions, and personalities of ten important physicists including: Röntgen, Marie Curie, Rutherford, Bragg, Duane, Joliot, and Compton. Dr. del Regato has made outstanding contributions to therapeutic radiology. His previous historical publications have been mainly biographical monographs and articles in radiological journals. Write to American Institute of Physics Marketing Service 335 East 45th St. New York, NY 10017

Lillian Barber Press Inc.

Sadi Carnot - Reflexions on the Motive Power of Fire: A Critical Edition with Surviving Manuscripts - Translated and Edited by *Robert Fox* It is a new translation of the 1824 text and it is the first translation of Carnot's scientific manuscripts. Write to Lillian Barber Press Inc. P.O. Box 232 New York, NY 10163

Basic Books Inc.

Luis W. Alvarez - **Alvarez**

Barrow and Silk - **The Left Hand of Creation**

John Rigden - **Rabi**

For more information write to Basic Books, Inc. 10 East 53rd St. New York, NY 10022

Birkhauser Press

Editor *G. Feinberg* - **T. D. Lee Selected Papers Vol. I: Weak Interactions and Early Papers, Vol. II: Field Theory and Symmetry Principles, Vol. III: Random Lattices to Gravity** Write to Birkhauser, 380 Green St. Cambridge, MA 02139

Cambridge University Press

Arthur S. Eddington - **Space, Time, and Gravitation** This is a reissue in paperback of Eddington's introduction to the General Relativity Theory. Write to Cambridge University Press, 32 East 57th Street, New York, NY 10022.

Ostwalds Klassiker der Exacten Wissenschaften

Manfred von Ardenne - **Arbeiten zur Elektronik**

Heinrich Hertz - **Die Prinzipien der Mechanik**

Gerhad Harig - **Physik und Renaissance**

The above are part of a series of reprints of established classical works being published in German. For more information write to Akademische Verlagsgesellschaft Geest & Portig K.-G., DDR-7010, Leipzig, Sternwartenstrasse 8, Postschleissfach 930.

Harvard University Press

A.P. French and *P.J. Kennedy* editors - **Niels Bohr, A Centenary Volume** This is now available in paperback at \$14.95

National Academy of Sciences Press

The **Biographical Memoirs** were briefly described in the September 1986 issue (HPN II,5 pg72). Biographies and selected bibliographies of physicists contained in Vol.56 (Washington, DC 1987) include:

James B. Fisk by *William H. Doherty* pp. 91-116.

John H. Van Vleck by *P. W. Anderson* pp. 501-540.

North-Holland Physics Publishing

Armin Herman, John Krige, Ulrike Mersits, Dominique Pestre and with a contribution by *Lanfranco Belloni* - **History of CERN Volume I** This book is the first of two volumes on the history of CERN from its conception in the late 40's up to the mid-60's. It covers the scientific aims of CERN, its prehistory, the provisional Council of Representatives of European States, and the national situations and decision making processes. Write to Elsevier Science Publishing Co. Inc. PO Box 1663, Grand Central Station, New York, NY 10163.

Oxford University Press

Anatole Abragam - **Reflections of a Physicist**

Abragam is most famous for his pioneering work in nuclear magnetic resonance. It includes a non-technical summary

of his discoveries as well as his insights into the process of scientific investigation.

N. F. Mott and *H. S. W. Massey* - **The Theory of Atomic Collisions** This outstanding work is a classic which every physicist trained in the 1930s to 1960s owned. It has finally been reprinted in paperback.

Abraham Pais - **Inward Bound: Of Matter and Forces in the Physical World** In alternating technical and non-technical sections, he covers the discoveries of the constituents of matter from x-rays to the present day with perspective on the discoverers and the theorists. Pais continues the same high standards of historical analysis and beautiful style that won him an American Book Award for his previous book on Einstein, "Subtle is the Lord." For more information write to Oxford University Press, 200 Madison Ave., Dept. NWS, New York, NY 10016

Princeton University Press

John Stachel - **Collected Papers of Albert Einstein Vol. I The Early Years (1879-1902)** This is the first of forty projected volumes which will contain over 14,000 documents drawn from the Einstein Archive, as well as newly discovered material. The Einstein Project is sponsored by the Hebrew University of Jerusalem and Princeton University Press; the project is located at Boston University. The collected papers are being edited by a staff of five, headed by John Stachel, Professor of Physics at Boston University. English translations of the documents will be made available to subscribers to the series in a microform edition. Included in this volume are newly discovered letters to his future wife and fellow physics student containing discussions of the then current physics topics as well as theoretical ideas that he later developed. For more information on the planned publications see Stachel's article in the *British Journal for the History of Science* 20, 57-66, (1987) entitled "'A Man of my Type'-Editing the Einstein Papers." Subscriptions to the collected papers can be obtained from Princeton University Press, 3175 Princeton Pike, Lawrenceville, NJ 08648

Simon and Schuster

Richard Rhodes - **The Making of the Atomic Bomb** This is a well documented human, political, and scientific history of the scientists and events which preceded and resulted in the atomic bomb. There are very interesting insights into Bohr, Rutherford, the Hungarian physicists, etc., and it reads like a novel. It is a comprehensive history. Available at booksellers and public libraries.

Springer-Verlag

Max Dresden - **H.A.Kramers: Between Tradition and Revolution** This is a personal and scientific biography of a leading figure in the inception of quantum theory.

Jagdish Mehra and *Helmut Rechenberg* - **Erwin Schroedinger and the Rise of Wave Mechanics; Part 1:**

Schroedinger in Vienna and Zurich 1887-1925; Part 2: The Creation of Wave Mechanics; Early Response and Applications 1925-1926 These two books are Volume 5 of Mehra and Rechenberg's *The Historical Development of Quantum Theory*. The first four volumes were published in 1982. The present books are based on the published and unpublished papers, notebooks, memoranda, scientific correspondence, etc. Part 2 not only gives the early reactions of outstanding physicists but deals with the applications and with Schroedinger's attempts to obtain an interpretation. More information can be obtained from Springer-Verlag New York, Inc., 175 Fifth Avenue, New York, NY 10010

GRANTS & FELLOWSHIPS

American Council of Learned Societies

Grants-in-Aid are designed to assist scholars with the expenses of specific programs of research in progress. These expenses may include personal travel and maintenance away from home necessary to gain access to materials, research or clerical assistance, and reproduction of materials. Awards for living expenses at home to relieve the applicant of the necessity of teaching beyond the conventional academic year will be made only in exceptional cases. Grants are not ordinarily made for the purchase of personal computers, books, or other non-expendable materials. Deadline: December 15, 1987, Amount: \$3,000 maximum, Tenure: between April 15, 1988 and April 15, 1989.

Grants for Travel to Meetings - The ACLS, in cooperation with its constituent societies, administers a program of travel grants, awarded on a competitive basis, to enable scholars in the humanities and humanities-related disciplines to participate in international scholarly meetings outside North America. Travel grant Stipends are expendable for travel only and cannot be applied to per diem expenses. Persons having a major, official role in a meeting are eligible to apply, but preference is given to those who are to present scholarly papers. Prospective Travel Grant applicants should address inquiries and requests for forms to the Travel Grant Office of the ACLS, American Council of Learned Societies, 228 East 45th Street, New York, NY, 10017-3398.

National Endowment for the Humanities

NEH "Overview" of Endowment Programs - Copies of the new "Overview" became available July 1987. The application deadline dates through 1988 are listed. For a free copy write or call: July 1987 Overview, Room 409; National Endowment for the Humanities. If you mention that you saw the "Overview" announced in the History of Physics Newsletter, they will send you a compli-

mentary copy of "Humanities", NEH's bi-monthly magazine. NEH, 1100 Pennsylvania Ave. NW, Washington, DC 20506. Telephone 202-786-0438.

Fellowships for College Teachers and Independent Scholars Grants provide support for teachers in two-year, four-year, and five-year colleges and universities that do not grant the Ph.D., and also for independent scholars and writers, to undertake fulltime independent study and research in the humanities. Individual applicants are eligible. Application deadline is June 1, 1988. Room 316, 202-786-0466.

Travel to Collection Grants - These enable individual scholars to travel to use the research collections of libraries, archives museums, or other repositories. Individual applicants are eligible. The deadline for receipt of applications is January 15, 1988 for projects beginning after June 1, 1988. Write or call: Travel to Collections, room 316, telephone 202-786-0463.

Summer Seminars for College Teachers - Participants' Grants provide support for faculty members engaged primarily in undergraduate teaching to participate in eight-week summer seminars directed by distinguished scholars at institutions with libraries suitable for advanced study. Individual applicants are eligible. Applications should be submitted to the seminar director before March 1, 1988 for the 1988 summer seminars. One of the 1988 Summer Seminars will be directed by Prof. Stephen Brush of the University of Maryland (Institute for Physical Science and Technology, College Park, MD 20742). The topic is "Development of the Modern Scientific Worldview."

Directors' Grants provide support for scholars at institutions with libraries suitable for advanced study to design and direct summer seminars. Institutions are eligible applicants. The application deadline is March 1, 1988 for summer 1989 seminars. For information and application forms for both participants' and directors' grants, write or call: Ms. Anne Wallace, Summer Seminars for College Teachers, Room 316, Division of Fellowships and Summer Seminars, National Endowment for the Humanities, 1100 Pennsylvania Ave., Washington, DC 20506; telephone 202-786-0463.

Guided Studies of Great Texts in Science - The Humanities, Science and Technology program at NEH announces support for the preparation of "Guided Studies of Great Texts in Science". The intention of the Endowment is to make available to a wider audience a series of historically significant scientific texts from antiquity to the twentieth century. The primary audience for these volumes will be both general readers and undergraduate students. Inquiries should be addressed to: Daniel P. Jones, Program Officer, Humanities, Science and Technology, Division of

Research Programs, Rm 316, National Endowment for the Humanities, 1100 Pennsylvania Ave., N.W., Washington, DC 20506, telephone 202-786-0210.

AWIS

The Association for Women in Science (AWIS) announces a new publication entitled "Grants-at-a-Glance", which provides information on more than 350 grants, fellowships, scholarships, awards, and prizes in the life, physical, and social sciences and engineering. To order a copy send \$8.00 (check payable to AWIS) to AWIS Publications, 2401 Virginia Avenue, N.W., Suite 303, Washington, DC 20037.

Fulbright Grants

The Council for International Exchange of Scholars has announced the opening of competition for the 1988-1989 Fulbright Grants in research and university lecturing abroad. More than 300 grants in research and 700 grants in university lecturing are available. Application deadlines are; November 1, 1987, for institutional proposals for the scholar in-residence program; January 1, 1988, for Administrators' awards in Germany, Japan, and the United Kingdom; February 1, 1988, for travel only awards to France, Italy, and Germany. Fulbright Awards are granted in virtually all disciplines, and scholars in all academic ranks are eligible to apply. For more information and applications call or write Council for International Exchange of Scholars, 11 Dupont Circle, N.W., Washington, DC 20036-1257; telephone 202-939-5401.

HSS Associated Scholars

The History of Science Society Associated Scholars Program has funds to aid scholars trained in the history of science but currently unemployed, unaffiliated with any institution making use of their training as historians of science, or with affiliations that are either part-time or short-term without prospects of continuation or renewal. Awards in amounts up to \$1,000 will be made to facilitate research or travel to perspective job interviews. Applicants must have received a Ph.D in the history of science, technology, medicine, or a related field closely affiliated with the history of science. Applications may be submitted at any time to the Coordinator of Programs of the History of Science Society. Applications should be directed to Joseph W. Dauben, HSS Coordinator of Programs, Department of History, Herbert H. Lehman College, CUNY, Bedford Park Boulevard West, Bronx, NY 10468.

Andrew W. Mellon Foundation Fellowship

The American Philosophical Society Library announces the Andrew W. Mellon Foundation Fellowship in Bibliography for 1988-89. The Fellow's primary responsibility will be to conduct a bibliographic study, to be

published by the Library, of some important part of the Library's collection. Candidates are encouraged to consider topics relating to polar exploration, modern physics, or the Society's extensive fine arts collection, though proposals in other areas also will be welcomed. One third of the Fellow's time will be free for research and study of the Fellow's choice. Candidates must have a Ph.D. or an equivalent record of professional experience and scholarly publications. The Fellowship is for eleven months and carries a salary of up to \$25,000, commensurate with the Fellow's level of scholarly achievement. Benefits and travel funds are also provided. Candidates must apply by April 1, 1988, and an appointment will be made by June 1. For further information, write to Dr. Edward C. Carter II, Librarian, American Philosophical Society Library, 105 South Fifth Street, Philadelphia, Pennsylvania 19106.

Harvard University announces the availability of Andrew W. Mellon Faculty Fellowships in the Humanities for nontenured, experienced junior scholars who have completed, at the time of appointment, at least two years of postdoctoral teaching as college or university faculty members in the humanities, usually as assistant professors. The appointment will last from July 1988 to July 1989, with a salary of \$27,000, and will offer limited teaching duties, departmental affiliation, and opportunity to develop scholarly research. Applications are due November 2, 1987. For particulars and application procedures write Richard M. Hunt, Program Director, Harvard University Mellon Faculty Fellowships, Lamont Library 202, Cambridge, MA 02138.

Stanford University announces the availability of Andrew W. Mellon Postdoctoral Fellowships in the Humanities at Stanford. To be awarded to highly promising scholar-teachers in the humanities, these nonfaculty one-year positions will carry departmental affiliation and limited teaching duties and the opportunity for scholarly work and intellectual growth. The award carries an annual stipend of \$22,000 plus benefits. The fellowship is renewable for a second year. All materials, including three letters of reference, are due no later than November 15, 1987. For more information write Mellon Postdoctoral Fellowships, Dean's Office, Humanities and Sciences, Building One, Stanford University, Stanford, CA 94305.

NASA History Office

NASA is offering four opportunities for funded research in the coming year. The first, an annual aerospace history fellowship, is administered by the American Historical Association in cooperation with the History of Science Society, the Society for the History of Technology, and the Economic History Society. Although the deadline for the 1987-1988 fellowship has passed, begin thinking about 1988-89. For details, contact the American Historical Association at 400 A Street, SE, Washington, DC 20003 (tel: 202-544-2422).

National Science Foundation

Postdoctoral and Senior Postdoctoral Research Fellowships in History and Philosophy of Science - Objectives and Scope: The History and Philosophy of Science Program is pleased to announce the establishment of a special program of postdoctoral research fellowships. Fellowships will be awarded to scholars who wish to improve and expand their skills in the history and philosophy of science and technology. The purpose of the program is to promote opportunities for Fellows to undertake original, independent research in a new setting while working with a senior sponsoring scholar in the field. This is to be accomplished by providing opportunities for: (1) - recent Ph.D.'s in the history and philosophy of science and technology to undertake full-time research at a time in their careers when opportunities for sustained research may be limited, and (2) - experienced scientists and engineers to enhance their knowledge and methodological skills in the history and philosophy of science and technology to enable them to contribute their technical knowledge of science to these fields. The research proposed for the Fellowship may be in any field germane to History and Philosophy of Science areas of support. Projects in twentieth century science and technology are especially encouraged.

An applicant must be a citizen of the United States. In addition, an applicant must either 1 - have been awarded the doctoral degree in the history and/or philosophy of science after December 1, 1982, or have earned this degree by no later than January 1, 1988; or 2 - have advanced teaching and research experience in some field of science or engineering. Fellows must be affiliated during the tenure of the award with an established and fiscally responsible nonprofit host institution. The applicant must move to a new institution and research environment with which he/she has not had prior affiliation at the graduate or post-graduate level, or with which he/she will have been affiliated for no more than three months prior to the start of fellowship tenure. The Fellowship is awarded for one year. Each provides a stipend of \$18,000. The deadline is December 1, 1987.

All inquiries are to be sent to NSF Postdoctoral Research Fellowships in History and Philosophy of Science, 1800 G Street, N.W., Room 336, National Science Foundation, Washington, D.C. 20550.

The Directorate for Science and Engineering Education, NSF, is a potential source of financial support for projects designed to use the history of science, mathematics, and technology to improve the understanding of the content of science, its intellectual development, its methodology, and its applications and implications. The Directorate funds projects at all instructional levels, with emphasis upon elementary, middle, and secondary schools. "Revitalizing Mathematics Teaching with History," directed

by Professors Robert L. Hall and Helena M. Pycior of the University of Wisconsin-Milwaukee, is an example of such a project with an historical orientation. Another is the summer workshop at the Bakken museum and library in Minneapolis, where high school physics teachers repeat historically significant experiments. The Teacher Preparation Program supports creative materials for teacher education, and research on factors affecting the recruitment and preparation of teachers. The incorporation of the history of science into the teacher education curriculum would, for example, be a suitable strategy to propose to this program.

The Instructional Materials Development Program provides funds for the preparation of new or improved materials and strategies aimed at students in grades K through 12. Detailed information about these programs and procedures for proposal submission appears in the Program Announcements for the Division of Teacher Preparation and Enhancement (NSF 87-10) and the Division of Material Development, Research and Informal Science Education (NSF 87-12). Copies may be requested from the National Science Foundation, Washington, D.C. 20550. Target dates for the receipt of proposals for the Teacher Enhancement Program are February 1 and August 1, for Teacher Preparation April 15 and October 15, for Instructional Materials Development February 1, June 1 and October 1, and for Informal Science Education April 1, August 1 and December 1.

Brief preliminary proposals are required for Instructional Materials Development and Informal Science Education and encouraged for the other two programs. They should be submitted to the appropriate program or, if in doubt, to Dr. Florence Fasanelli, Division of Teacher Preparation and Enhancement, National Science Foundation, Washington, D.C., 20550, 202-357-7074. Dr. Fasanelli will also be available to respond to general questions about these programs and their relationship to the history of science, mathematics, and technology. Requests for information concerning college-level programs should be directed to the Office of Undergraduate Science, Engineering and Mathematics Education, 202-357-9644. The National Science Foundation also supports research in the History and Philosophy of Science, through its Directorate for Biological, Behavioral and Social Sciences. Dr. Ronald Overmann, 202-357-9677, is the Program Director.

Smithsonian - Guggenheim Fellowship

The National Air and Space Museum, through the support of a fund established by the Daniel and Florence Guggenheim Foundation, has announced a one year resident fellowship for pre- or postdoctoral research. Young scholars interested in historical and scientific research related to aviation and space are encouraged to apply. Minimum academic requirement for the predoctoral position is a bachelor's degree and current enrollment in a graduate

program in an accredited college or university. Postdoctoral program applicants preferably should have received their Ph.D. within the past seven years.

The deadline for submitting the application is January 15th. Requests for the application package should be sent to: Guggenheim Fellowship, Office of the Deputy Director, National Air and Space Museum, Smithsonian Institution, Washington, DC 20560.

JOBS

University of California, Davis

The Committee on History and Philosophy of Science at the University of California, Davis seeks a philosopher or historian of science, at the associate or full professor level (tenured), with a national reputation, to develop and head a new unit in the College of Letters and Science. The successful candidate will be expected to continue his or her research program, complement existing faculty in teaching duties, and be willing to serve in leadership and administrative roles, including development of the program and planning for additional recruitment. Those desiring further information about Davis or the Interdepartmental Program in History and Philosophy of Science should write or call James R. Griesemer, Chair, Committee on History and Philosophy of Science, Department of Philosophy, University of California Davis, CA 95616; telephone 916-752-1068 or 752-0607. Complete dossiers should be sent, including a vita, list of three references, and offprints of a recent work. Applications will be considered until the position is filled, but not later than December 1, 1987.

DOE

The Department of Energy announces a vacancy open until filled for a historian to write and publish broad historical studies of regional American energy development. Qualifications include excellent writing skills and knowledge of twentieth-century American history or history of science and technology. For more information, write (including a vita) or telephone Terrence R. Fehner, Chair, Search Committee, History Division, MA-295, U.S. Department of Energy, Washington, DC 20545.

RECENT & FUTURE ARTICLES

American Journal of Physics August 1987 contains: "Resource letter HP-1: History of Physics" by *Stephen G. Brush*,

"The Influence of Herman von Helmholtz on Heinrich Hertz's Contributions to Physics" by *Joseph F. Mulligan*.

Annual Review of Fluid Mechanics 1987

"Ludwig Prandtl and His Kaiser-Wilhelm-Institute" by *K. Oswatitsch* and *K. Wieghardt*.

European Journal of Physics Volume 7, 3 contains:

"The Light in Maxwell's Wave Equation" by *H.P. Krumm* and *M.W.J. Scourfield*,

"Electromagnetic or Electromagnetic Induction?" by *W. Gough* and *J.P.G. Richards*.

HSPS - Historical Studies in the Physical and Biological Sciences Physics articles in the issue Volume 17, Part 2 include:

"Propaganda in Science: Sommerfeld and the Spread of the Electron Theory of Metals" by *Michael Eckert*,

"Early Theory of the Electron Gas" by *Walter Kaiser*,

"Whole Earth History" by *Stephen G. Brush*,

"Toward the History of X-ray Astronomy" by *Norriss S. Hetherington*,

"Failure or Success? Interpretations of 20th Century French Physics" by *Terry Shinn*,

"What did 19th Century British Physics Owe to Cambridge?" by *Norton Wise*

ISIS Articles of interest to physicists in Volume 77, 289 include:

"Laboratory Design and the Aim of Science: Andreas Labavius vs Tycho Brahe" by *Owen Hannaway*,

"Mathematics and the Physical Sciences in America" by *John Servos*

In Volume 78, 291 includes: "Bruno and Copernicus" by *Ernan McMullin*

Physics Today The May 1987 issue has a special section commemorating the Centennial of the Michelson-Morley Experiment; the historical articles are:

"Michelson and Measurement" by *Lloyd S. Swenson Jr.*,

"The Impact of Special Relativity on Theoretical Physics" by *J. David Jackson*,

"Einstein and Ether Drift Experiments" by *John Stachel*,

"Michelson in 1887" by *Albert E. Moyer*.

Historical articles in other issues include:

"Reminiscences of the Early Days of Fission" by *Henry H. Barschall* (June 1987),

"Arthur Gordon Webster, Founder of the APS" by *Melba Phillips* (June 1987),

"Leo Szilard" by *Barry J. Bernstein* (Sept. 1987),

"Merle A. Tuve" by *Thomas D. Cornell* (January 1988).

Science in Context

This is a new journal devoted to new approaches in the history, philosophy, and sociology of the sciences. It will be published twice a year with the March issue devoted to a range of topics and the September issue devoted to a single topic. Autumn 1987 was announced to be "Medieval and Renaissance Cosmology." The editors are: *Robert Cohen* Boston University, *Yehuda Elkana* Tel-Aviv University, and *Simon Schaffer* Cambridge University. For more information write to Cambridge University Press, 32 East 57th Street, New York, NY 10022.

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 Albert Wattenberg, Department of Physics, University of Illinois, 1110 W. Green Street, Urbana, IL 61801.

MEDIEVAL COSMOLOGY

Duhem, Pierre. *Medieval Cosmology: Theories of Infinity, Place, Time, Void, and the Plurality of Worlds*, edited and translated by Roger Ariew, with an introduction by Stanley Jaki and a preface by Roger Ariew. xxxii + 632 pp. Chicago: The University of Chicago Press, 1985. \$35.00.

A selection and translation from the ten-volume *Système du Monde*, the greatest work of Pierre Duhem (1861-1916), a physicist whose interests turned to the history and philosophy of science in his later years. The selection is limited to the *Système's* discussion of cosmology, the theory and structure of the universe. It includes Duhem's excerpts from the largely unexamined thirteenth- to fifteenth-century manuscripts and books from the Bibliothèque Nationale with which Duhem demonstrated the sophistication of medieval physics. In recent years Duhem's views on the construction and comparison of theories and on the links between the history and philosophy of science have sparked renewed scholarly interest. Duhem was one of the first thinkers to maintain the importance of historical insight in scientific work. The *Système* reveals a powerful mind using historical data to support a particular philosophical view of physical theory.

Editors address: Dept. of Philosophy, Virginia Polytech. Inst. & State Univ., Blacksburg, VA 24061.

THE ROLE OF EXPERIMENTS

Franklin, Allan. *The Neglect of Experiment*. xiii + 290 pp., 10 plates, 15 tables, 34 line drawings. Cambridge: Cambridge University Press, 1986.

What role have experiments played, and should they play, in physics? How does one come to believe rationally in experimental results? This book attempts

to provide answers to both of these questions. The approach combines the detailed study of four episodes in the history of twentieth century physics with an examination of some of the philosophical issues involved. The episodes are the discovery of parity nonconservation in the 1950s; the nondiscovery of parity nonconservation in the 1930s, when the results of experiments indicated, at least in retrospect, the symmetry violation, but the significance of those results was not realized; the discovery and acceptance of CP violation; and Millikan's oil-drop experiment.

MAXWELL
ON MOLECULES

Garber, E., Brush, S. G., and Everitt, C.W.F. (eds.). *Maxwell on Molecules and Gases*. xxvii + 550 pp. index. Cambridge, Mass.: M.I.T. Press, 1986.

This is the second in a projected three-volume series on James Clark Maxwell's papers on Saturn's Rings, Theories of Matter, Kinetic Theory, Thermodynamics and Statistical Mechanics.

The volume contains Maxwell's notes, drafts and correspondence on molecules and kinetic theory together with his published papers to emphasize the development of his thought and his response to critics (Clausius), referees (William Thomson), and correspondents (Tait, Stokes, Herbert Spencer and others). A critical commentary places Maxwell's work in the context of gas and molecular theory in the 19th century.

With Maxwell's kinetic theory of gases molecular theories were placed on a firm theoretical-experimental footing. His gas theory stressed the transport properties of gases as a means of measuring molecular dimensions, mean free paths, and numbers in unit volume. Maxwell's experiments on viscosity established kinetic theory and set several physicists to

examine diffusion and thermal conductivity. Maxwell then examined available molecular theories (partly inspired by the kinetic theory of gases) in light of these experiments. In particular he discussed the implications of the equipartition theorem on mechanical molecular models.

ANALYSIS OF
MODERN SCIENCE

Holton, Gerald. *The Advancement of Science, and its Burdens: The Jefferson Lecture, and Other Essays*. xi + 350 pp. New York: Cambridge University Press, 1986. Paper, \$12.95.

Continuation of the author's analysis of how modern science works and what its influences are on our world, with particular emphasis on the role of the thematic elements - those often unconscious presuppositions that guide scientific work to success or failure. Many of the conclusions emerge from the continuing study of Einstein's contributions, as well as of other scientists' contrasting styles of research.

Some of the specific questions addressed include: What was Einstein's overall scientific program? How did his work shape the imaginations of twentieth-century artists and writers? Are there national differences between styles of scientific research? By what mechanisms is progress in science achieved despite the enormous diversity of individual, often conflicting efforts? What is the belief system of contemporary scientists, and do they still need a guiding philosophy of science? What are the uses and dangers of metaphor in frontier research? Is there a sequence of steps by which high-level theories are constructed? What limits may society validly place on the scope of research programs? And finally, in his Jefferson Lecture, the author examines the new relationship developed between "pure" research and technologically directed development.

PHYSICS IN 1904

Sopka, Katherine R. (Compiler). *Physics for a New Century: Papers Presented at the 1904 St. Louis Congress*. xx + 300 pp. New York: Tomash Publishers/American Institute of Physics, 1986, \$30.00.

This publication, the fifth in the series "The History of Modern Physics, 1800-1950" with Gerald Holton and Katherine Sopka as co-advisory editors, makes available for the first time in a single volume the texts of the talks related to physics given during the week-long Congress of Arts and Sciences that was part of the Universal Exposition commemorating the centenary of the Louisiana Purchase. Thirteen addresses are reprinted, given by an international group of speakers which included L. Boltzmann, C. Barus, P. Langevin, S. Newcomb, W. Ostwald, H. Poincaré, and E. Rutherford. Their aim was to present a view of recent progress in physics and of remaining contemporary problems. Also included are a Foreword to the papers by Albert E. Moyer and a Preface by Sopka describing the Congress. Editor's address: FOCAS, 1611 Forest Avenue, Durango, CO 81301.

OPPENHEIMER

Kant, Horst. *J.R. Oppenheimer*. Leipzig: 176 pp. BSB B. G. Teubner, Verlagsgesellschaft, 1985. (In the series "Biographien hervorragender Naturwissenschaftler, Techniker und Mediziner, Band 83).

J. Robert Oppenheimer (1904-1967) wurde als "Vater der amerikanischen Atom-bombe" bezeichnet. Er leitete in Los Alamos unmittelbar die Konstruktion der vor 40 Jahren auf Hiroshima und Nagasaki abgeworfenen Uran-bzw. Plutonium-Bomben, unter seiner wissenschaftlichen Leitung fand kurz zuvor in der Wüste von Nevada der Trinity-Test, die erste Atom-bombenexplosion überhaupt statt. Der anerkannte theoretische Physiker Oppenheimer hatte diese militärtechnische Aufgabe übernommen, weil er wie fast alle am sogenannten Manhattan-Project beteiligten und in dessen Zielstellung eingeweihten Wissenschaftler überzeugt war, dass man den Faschisten in der Entwicklung dieser Waffe zuvorkommen müsse. Wegen ihres militärisch sinnlosen Einsatzes und ihres Missbrauchs für die Welt-herrschaftspläne der U.S.A. kamen ihm Skrupel, die er auch äusserte, ohne sich der Regierungspolitik direkt entgegenzustellen. Es genügte aber, dass er in einem demütigenden Prozess zum "Sicherheitsrisiko" erklärt und seiner staatlichen Funktionen enthoben würde. Dieses Dilemma

eines genialen, humanistisch denkenden bürgerlichen Wissenschaftlers in einer imperialistischen Welt wird hier sachlich mit vielen Dokumenten dargelegt.

GUSTAV HERTZ

Kuczera, Josef. *Gustav Hertz*. Leipzig: 84 pp. BSB B. G. Teubner, Verlagsgesellschaft, 1985. (In the series "Biographien hervorragender Naturwissenschaftler, Techniker und Mediziner.") Band 80.

Gustav Hertz (1887-1975) gehörte zu den profiliertesten Physikern der DDR. Nach dem Studium in Göttingen, München und Berlin und der Promotion arbeitete er als Hilfsassistent mit James Franck zusammen an den berühmten Elektronenstossversuchen, für deren Ergebnisse beide den Nobelpreis für Physik 1925 erhielten. Im ersten Weltkrieg schwer verwundet, konnte er sich 1917 habilitieren. 1920-1925 im Philips-Laboratorium Eindhoven beschäftigt, erarbeitete er u. a. die Grundlagen des Diffusionstrennverfahrens für Gase, aus dem er dann als Direktor des Physikalischen Instituts der TH Berlin-Charlottenburg das Isotopentrennverfahren entwickelte, das später bei der Erschliessung der Kernenergie weltweite Anwendung fand. 1935 musste er unter faschistischem Druck das Lehramt niederlegen und arbeitete bei den Siemenswerken. 1945-1954 war Hertz in der Sowjetunion tätig, anschliessend bis zur Emeritierung Direktor des Physikalischen Instituts in Leipzig. Auf die Entwicklung der Physik und besonders der Kernphysik in der DDR hatte er massgeblichen Einfluss. Sein Leben und sein ergebnisreiches Schaffen werden in diesem Band für einen grösseren Leserkreis dargestellt.

ESSAYS 1900-1911

Miller, Arthur I. *Frontiers of Physics, 1900-1911: Selected Essays with an Original Prologue and Postscript*. xxv + 293 pp., tables and figures. Boston: Birkhäuser, 1986, \$34.95.

Physicists in 1905 were after bigger game than a theory of space and time rooted in kinematics. Much as today, they sought a unified description of the then-known forces: electromagnetism and gravitation. Today, however, the elegance and depth of their work is overshadowed by an unexpected development in 1905 - namely, what its originator, Albert Einstein, referred to as the "so-called relativity theory."

The essays brought together in this book explore the rich tradition in electrodynamics, electrical engineering, mathematics, and philosophy from which emerged the special theory of relativity. These prerelativistic developments are traced from their beginnings to the present from both the scientific and philosophic sides.

FRENCH SCIENCE

1860-1939

Paul, Harry W. *From Knowledge to Power: The Rise of the Science Empire in France, 1860-1939*. ix + 415 pp., index. Cambridge: Cambridge Univ. Press, 1985.

This book is the first full-scale treatment of the dramatic expansion of French science between 1860 and 1939. After the 1880s, reinvigorated university faculties played a key role in this growth, with many scientists enjoying close relations with industry, agriculture, the military, and politics. Many of these topics have not been seriously studied before. In the Third Republic the idea of governmental responsibility to support research became a dogma whose truth and social value few were able to doubt, even less to reject, because of the economic role science was perceived to play in the French economy. By 1939 a working mechanism of state funding for science, buttressed by a scientific ideology, had come into existence. The foundations for the post-World War II take-off had been laid. This new role of scientists was based on their research triumphs of utility and profit in biology as well as in chemistry and physics.

CARNOT

Cimbliris, Borisas. *Sadi Carnot: Una Nova Abordagem Biográfica*. Boletim da Sociedade Brasileira de História da Ciência, 1985, 3:14-15.

An attempt is made to explain Sadi Carnot's unusual failure to reach the scientific eminence to which he might have risen in his time. This externalistic approach groups the exogenous factors on one hand: his father's ostracism, political hostility to his family, a heterodox scientific style; on the other hand the endogenous or personality traits: a self-effacing and diffident character, wrong decisions on style, approach and timing, aloofness toward the members of the Academy, seclusion - and a final malady badly managed. As in the case of several other scientists,

here the external and internal factors determine a *pessimizer's* profile. This approach may help in explaining a few extant enigmas.

Although the original is in Portuguese, the author shall be glad to translate this and send copies on request.

Author's address: Dept. of Thermal Engineering, School of Engineering, Federal University of Minas Gerais, Rua Espirito Santo 35, 30000 Belo Horizonte, MG, Brazil.

CLASSICAL PHYSICS BIBLIOGRAPHY

Home, R. W. with the assistance of Mark J. Gittins. *The History of Classical Physics: A Selected, Annotated Bibliography*. xix + 324 pp. New York: Garland Publishing, Inc., 1984. \$53.00.

This is a selective bibliography of writings on the history of physics in the period between the 17th-century Scientific Revolution and the onset of modern physics in the years around 1900. The 1,300 entries survey books, articles and dissertations in all major European languages, with English translations taking precedence. Items are classified chronologically and by subject matter. There is an index of names.

CLERK MAXWELL

Tolstoy, I. *James Clerk Maxwell, A Biography*. viii + 184 pp. The University of Chicago Press, 1983. \$17 (cloth), \$6.95 (pb).

This biography gives a coherent account of Maxwell's life and thought emphasizing the manner in which the two are interwoven. Precocious interests and great talent, an affluent and caring family inevitably led Maxwell into physics – via Edinburgh University and Cambridge. Maxwell made deep contributions to colour theory, to thermodynamics and to statistical mechanics (the kinetic theory of gases). The latter, in particular, gives an enduring monument to his mature insight and abilities as a theoretical physicist.

INVENTORY OF PUBLISHED LETTERS

Wheaton, B. R., and Heilbron, J. L. *An Inventory of Published Letters To and From Physicists, 1900-1950*. 971 pp. on microfiche, 102 pp. accompanying index.

Berkeley Papers in History of Science, Volume 6. Office for History of Science and Technology, University of California at Berkeley. 1982. \$20. (Also available as a set, including the bibliography noted below, for \$35.)

The four microfiches give references by page to more than 25,000 quotations of letters published in books and articles listed in the same authors' 7000-entry bibliography *Literature on the History of Physics in the 20th Century* (Berkeley, 1981). Each quotation is identified by author and recipient of the letter, by date, and by length of the quotation. All known quotations of letters to or from physicists active in the period are included. The printed book index that accompanies the fiche gives a) a complete list of all physicists who have entries on the fiche, b) a complete list of all non-physicist correspondents with notation of which physicists' entries contain references to their letter, and c) a brief identification of all published sources from which quotations are drawn. Complete bibliographical data for these works is contained in the separate bibliography noted above.

EINSTEIN'S STATISTICS

Baracca, Angelo and Rechtman, Raúl S. *Einstein's Statistical Mechanics*. *Revista Mexicana de Física*, 31, No. 4:695-722 (1985).

The foundations of classical equilibrium statistical mechanics were laid down in 1902 independently by Gibbs and Einstein. The latter's contribution, developed in three papers published between 1902 and 1904, is usually forgotten and when not, rapidly dismissed as equivalent to Gibbs'. We review in detail Einstein's ideas on the foundations of statistical mechanics and show that they constitute the beginning of a research program that led Einstein to quantum theory. We also show how these ideas may be used as a starting point for an introductory course on the subject.

KEPLER, BRAHE, URSUS

Rosen, Edward. *Three Imperial Mathematicians: Kepler Trapped Between Tycho Brahe and Ursus*. 384 pp., 84 illustr., index, bibliography. New York: Abaris Books, Inc., 1986.

This book deals with the plagiarism of Ursus (Nicholas Reimers), his subsequent quarrel with Tycho Brahe, and the role played by Johannes Kepler before he succeeded Tycho, who succeeded Ursus,

as imperial mathematician.

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POSITRON'S DISCOVERY

de Maria, M. and Russo, Arturo. *The Discovery of the Positron*. *Rivista di Storia della Scienza*. 1985, 2:2 237-286.

In the paper world of theoretical physics the positron was "discovered" by P.A.M. Dirac in 1931, as a hole in the normally filled up sea of negative-energy states for ordinary electrons. This paper describes the complex process which led to the identification of the positively charged electron observed by C. D. Anderson in 1932 with Dirac's anti-electron. Anderson discovered the positron in the context of Millikan's research program on cosmic rays, with no awareness of Dirac theory. The latter, on the contrary, was known by P.M.S. Blackett and G. Occhialini who, a few weeks later, observed the positron as a component of the striking phenomenon of the showers they had successfully photographed by their counter-controlled cloud chamber. Putting together the data on the absorption of high energy gamma rays, F. Joliot and I. Curie's results on the interaction of neutrons with matter, as well as their positive appreciation of Dirac's theory, Blackett and Occhialini were able to suggest a theoretical framework in which the new particle could explain phenomena pertaining to cosmic-ray physics and to nuclear physics. Author's addresses: M. de Maria, Dip. di Fisica, Università di Roma, Pe Aldo Moro 5, 00185 Roma, Italy. A. Russo, Ist. di Fisica, Università di Palermo, Via Archirafi 36, 90123 Palermo, Italy.

HUBBLE: LEGAL EAGLE

Hetherington, Norriss S. *Edwin Hubble: Legal Eagle*. *Nature* 1986, 319:189-190.

There is more to the advance of science than new observations and new theories. Ultimately, people must be persuaded. Edwin Hubble, an attorney before becoming an astronomer, used trial tactics and techniques to help gain favorable verdicts from the court of science in three instances described in this article. Hubble made the observations and experiments necessary to win his cases,

and he skillfully argued some cases, orchestrating evidence to overcome prejudice against his ideas. A heroic image of pristine science may exclude orchestration, but advocacy is an integral part of science, not to be judged good or bad but to be recognized and studied.

Author's address: Office for History of Science and Technology, University of California, Berkeley, CA 94720. Xerox copies available.

CHEMICAL REVOLUTION

Melhado, Evan M. *Chemistry, Physics, and the Chemical Revolution*. Isis, 1985, 76:195-211.

To reduce the dissonance between the truism that a mature and independent discipline of chemistry emerged from the Chemical Revolution at the end of the eighteenth century and the theme of recent historiography that chemistry was heavily dependent upon physics, this paper exploits a disciplinary perspective.

Disciplinary history suggests that the Chemical Revolution was generated externally, by physics, which transformed an already largely independent discipline and then withdrew from it. By mid-century, chemistry in France had achieved a great measure of independence. It had coalesced around a small group of partisans of G. E. Stahl, the leading exponent of the phlogiston theory; and it had narrowed its focus onto mineralogy and wet-chemical analysis and onto the dry phenomena of combustion, calcination, and reduction. Physics informed the first of these preoccupations by ceding ideas about interparticulate attractions to the chemists, and it transformed the second by exploiting its heat theory to analyze the chemistry of gases.

Once the transformation was accomplished, physicists gradually withdrew from the field, taking interparticulate attractions and heat theory with them and leaving combustion theory again in the hands of the chemists. Free of influence from physics, chemists resumed their pre-revolutionary interests in description and analysis, which now flourished under the banner of stoichiometry.

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HEISENBERG

Miller, Arthur I. *Werner Heisenberg and the Beginning of Nuclear Physics*. Physics Today 1985, 38:60-68.

This paper explores how Heisenberg's 1932 groundbreaking work in nuclear physics was a continuation of his research in atomic physics, and why his nuclear physics research contained the seeds for the modern diagrammatic methods for elementary particle physics.

CORIOLIS FORCE EXPERIMENT

Röndigs, Gerd. *Benzenberg's Free Fall Experiment Using the Steeple of St. Michael's in Hamburg*. NTM - Schriftenreihe für Geschichte der Naturwissenschaften Technik und Medizin. Leipzig, 1986, 23:2 pp. 35-42.

In 1802 Johann Friedrich Benzenberg (1777-1846) carried out a series of experiments on falling bodies in the tower of St. Michael's Church in Hamburg. He studied the influence of the air resistance and the rotation of the earth. As firstly mentioned by Newton in 1679 the rotation of the earth causes a deviation toward the east. By means of the experimental devices available in the early nineteenth century it was difficult to demonstrate this effect, because even slight unintended influences might confuse the results completely. Based on numerous experiments Benzenberg found a displacement toward the east of about 9 mm and a displacement toward the south of about 3 mm at a height of fall of about 76 m. Whereas the displacement toward the east agrees with the theoretical value predicted by Gauss and Olbers, there is no explanation for a deviation in another direction. Subsequent investigations of Benzenberg (1804), Reich (1832) and Hagen (1912) indicate that this aberration was caused by unspecified conditions of the experiments.

CONCEPTS OF HEAT AND GASES

Schöpf, H.-G. *Frühe Ansichten und Einsichten über die Wärme und die Gase*. NTM - Schriftenreihe für Geschichte der Naturwissenschaften, Technik und Medizin. 1984, 21:35-47 (in German).

This paper tells the development of the early concepts of heat and the physical behavior of gases. Especially, the achievements of Lavoisier, Laplace, Rumford, Gay-Lussiac, Dalton, Avogadro are reviewed.

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PHYSICS AT GÖTTINGEN

Schröder, Wilfried. *Zur Rolle der Gesellschaft der Wissenschaften bei der Entwicklung der Physik in Göttingen (1880-1990)*. Nachr. Akad. Wiss. Göttingen, II. Math.-Phys. Klasse, No. 2/1985. Vandenhoeck & Ruprecht, D-Göttingen.

The paper discusses the role of the Göttingen Academy of Sciences in the development of physics in Göttingen. The relationship between the university and the Academy has been demonstrated. Table shows the financial support of the Academy to the physical work of Max Born, Peter Debye, James Franck, Eduard Riecke, Waldemar Voigt, Emil Wiechert et al. Some aspects of the meetings at Göttingen with other scientists (e.g. Max Planck, Hendrik Lorentz, Arnold Sommerfeld et al.) are described. A further chapter deals with physicists as members of the Academy (Debye, Lorentz, Bohr, Sommerfeld).

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DEUTERON

Stuewer, Roger H. *The Naming of the Deuteron*. Am. J Phys., 1986, 54(3) 206.

The naming of the deuteron involved a protracted debate between 1933 and 1935. The principal protagonists were Harold C. Urey, Gilbert N. Lewis, Ernest O. Lawrence, and Ernest Rutherford, but others on both sides of the Atlantic entered the fray as well. This paper examines the arguments and issues that emerged in the debate, and the process by which agreement was finally achieved on the name for this new particle.

HUGGINSES & DRAPERS

Tenn, Joseph S. *The Hugginses, the Drapers, and the Rise of Astrophysics*. Griffith Observer, October 1986, 50(10):2-15.

Biographies and description of pioneering spectroscopic work of William & Margaret Huggins in London and Henry and Anna Draper in New York. Includes account of their meeting and of Mrs. Draper's establishment of the HD catalog. Author's address: Department of Physics and Astronomy, Sonoma State University, Rohnert Park, CA 94928.

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