

History of Physics Newsletter

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HISTORY OF PHYSICS DIVISION MEETINGS

The Division is sponsoring sessions of invited papers at four APS meetings during the academic year 1983-84: San Francisco (20-23 November), San Antonio (30 January-2 February), Detroit (26-30 March) and Washington (23-26 April). We will also co-sponsor the annual meeting of the Joint Atlantic Seminar in the History of the Physical Sciences to be held at Cornell, 27-28 April. See below for details.

Interaction of Theory and Experiment in Physics

A session on the interaction of theory and experimental physics will be held at the APS meeting in San Francisco, 20-23 November 1983. Check the APS Bulletin for exact time and place. The following papers will be presented:

"The Renaissance of the Lightquantum" - Bruce Wheaton, University of California, Berkeley

"The Interaction of Theory and Experiment in Particle Physics: Reminiscences and Insights" - Melvin Schwartz, Digital Pathways, Inc.

"The Discovery and Acceptance of CP Violation" - Allan Franklin, University of Colorado

"Experience, Experiment, and Certitude in Late Medieval Optics" - Katherine Tachau, Pomona College

The session will be chaired by E. J. Lofgren, Lawrence Berkeley Lab.

ELECTION RESULTS

Arthur I. Miller has been elected Vice-Chairperson of the Division of History of Physics for 1983. Miller is University Professor of Philosophy and History and Affiliate of the Physics Department, University of Lowell, and an Associate of the Physics Department, Harvard University. He is the author of Albert Einstein's Special Theory of Relativity: Emergence (1905) and Early Interpretation (1905-1911) and two forthcoming books, Creativity and Imagery in Scientific Thinking and Frontiers of Physics, 1890-1911. In 1984 Miller will succeed Laurie M. Brown of Northwestern University as Chairperson of the Division.

The Division also elected Allan Franklin and Gloria B. Lubkin to 3-year terms on its Executive Committee. Franklin is Professor of Physics at the University of Colorado; he has published a monograph on The Principle of Inertia in the Middle Ages and articles on 20th century particle physics. Lubkin is Senior Editor of Physics Today and has participated in oral history interviews with several physicists, as a consultant to the American Institute of Physics' Center for History of Physics.

Computers

A session on the history of computers in physics will be presented at the joint APS-AAPT meeting in San Antonio, Texas, 30 January-2 February 1984. Speakers will include Henry Tropp, Humboldt State University; David Roper, Virginia Tech; and Alfred Bork, University of California at Irvine; and a fourth speaker to be announced. For details consult the APS Bulletin issue for this meeting.

The History of Physics Newsletter (HPN) is published by the Division of 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 issues, total of about 100 pages); there is an additional cost of \$5 for foreign subscribers if they want copies sent by air mail. We expect to publish two issues per year. A few free sample copies of issue no. 1 are still available on request to the Editor.

HPN will publish news of the Division, including announcements of sessions of papers at APS meetings; notices of positions which might be filled by historians of physics, and of grants and fellowships for which they may apply; notes and queries on various topics; information about meetings, journals, societies and projects related to history of physics; and summaries of publications and work in progress. We do not publish substantive research articles or book reviews. The Editor welcomes letters, suggestions, summaries and news items.

Editor: **Stephen G. Brush**, Department of History and Institute for Physical Science & Technology, University of Maryland, College Park, MD 20742 (301/454-2724). Associate Editors: **Gloria B. Lubkin**, Physics Today, American Institute of Physics, 335 East 45 Street, New York, NY 10017, and **Kathryn Olesko**, Department of History, Georgetown University, Washington, DC 20057.

Annual Business Meeting

The annual Business Meeting of the Division, and the annual meeting of the Executive Committee, will be held at the APS meeting in Washington, DC, 23-26 April 1984. A session of papers will also be presented at that meeting. Details will be announced in the next issue of HPN.

1984 Joint Atlantic Seminar

The 11th annual meeting of the Joint Atlantic Seminar in the History of the Physical Sciences will be held at Cornell University, April 27-28, 1984. Since its inauguration in 1973 at the Universite de Montreal, the JAS has functioned as an informal gathering of established scholars, recent Ph.D.s and doctoral candidates who are interested in recent developments and current research in the history of the physical sciences. The purpose of the JAS has always been to encourage dialogue not only among historians of the physical sciences, but among historians and scholars of other disciplines as well. Traditionally, the Friday evening session of the JAS is devoted to the discussion of a special theme, whereas the longer Saturday session provides a refreshing glimpse into the results of recent research undertaken by younger members of the field.

The theme for the 1984 Friday evening session will be announced at a later date. Graduate students and recent Ph.D.s who would like to present papers at the Saturday session should forward an abstract of the paper and a curriculum vitae to Prof. L. Pearce Williams, Department of History, Cornell University, Ithaca, NY 14853.

Registration forms for the Seminar will appear in the next issue of HPN.

Condensed Matter

A session on the History of Condensed Matter Physics will be held at the APS March meeting. Speakers will include **Cyril Stanley Smith**, MIT, on the prehistory of solid state physics; **Krzysztof Szymborski**, University of Illinois, on color center research; and **Spencer Weart**, AIP Center for History of Physics, on the solid community 1930-1960. Details will be announced in the next issue of HPN.

DIVISION COMMITTEES

Executive Committee

The Executive Committee held its annual meeting on 21 April 1983 at Baltimore, MD. The Secretary-Treasurer announced that the official membership of the Division as of the end of March 1983 was 1485. In addition there are about 60 non-member subscribers to the Newsletter.

It is planned to publish two issues of the Newsletter each year, one in February and one in August or September. Because of the low turnout for the election, it was suggested that the ballot not be included as part of the Newsletter next time but mailed separately to members.

It was agreed that the Division will co-sponsor the next meeting of the Joint Atlantic Seminar on the History of Physical Sciences, to be held at Cornell in spring 1984. [See above]

It was agreed that a committee should be appointed to consider the establishment of a book prize. That committee has now been appointed and consists of **Stephen Brush** (chair), **Gerald Holton**, and **Robert Schofield**. Suggestions about the prize may be sent to any member of this committee.

Gloria Lubkin agreed to serve as Associate Editor of the Newsletter, replacing **George Snow**; **Kathryn Olesko** will continue as the other Associate Editor.

Nominating Committee

The Nominating Committee for next year's election consists of **Allan Franklin** (chair), **Gordon Baym**, **Paul Hanle**, and **Linda Wessels**. Nominations for Vice-Chairperson (to become Chairperson in the following year) and for two 3-year terms on the Executive Committee should be sent by October 31 to Prof. Allan Franklin, Physics Dept., Campus Box 390, University of Colorado, Boulder, CO 80309. A list of Division members, eligible for nomination, is at the end of the APS Directory.

The current membership of the Executive Committee is as follows. Terms expire in April of the year indicated. Addresses may be found in the APS Directory.

Laurie M. Brown, Chairperson (1984)
Arthur L. Miller, Vice-Chairperson (1984, to become Chairperson in 1984)
Stephen G. Brush, Secretary-Treasurer (1985)
Martin J. Klein, Past Chairperson (1984)
Max Dresden, Divisional Councillor
William A. Fowler (1984)
Gertrude Scharff-Goldhaber (1984)
Roger H. Stuewer (1985)
Robert R. Wilson (1985)
Allan Franklin (1986)
Gloria B. Lubkin (1986)

Publication Committee

The American Institute of Physics is planning to expand its publishing program into the area of scientific books, including reprints and translations. The aim of such a program would be to fill some of the gaps created by cutbacks of commercial publishers on specialized short print-run books and monographs that have resulted from recent changes in the tax law (see editorial in Physics Today, May 1982). Each Division of the American Physical Society has been asked to designate a review committee to recommend books for reprinting and other appropriate publications. Accordingly, the chairperson of the Division of History of Physics has appointed a Publication Committee: **Roger Stuewer** (chair), **Laurie Brown**, and **Stephen Brush**. Members of the Division who wish to submit suggestions of books to be reprinted are encouraged to contact any member of this Committee.

Program Committee

The program committee has been appointed for the next year and consists of **Laurie Brown** (chair), **Lillian Hoddeson**, **Arthur Miller**, **John Rigden**, and **Albert Wattenberg**. Suggestions for papers and sessions should be sent to any member of this committee.

ANNOUNCEMENTS

NEH Grant to HSS

On March 9, 1983, the National Endowment for the Humanities awarded the History of Science Society a Challenge Grant of \$80,000. The Grant was contingent on raising an additional \$240,000 from non-Federal sources. Almost all of the matching funds had been pledged within a month of the NEH announcement. The Society is seeking a long-term fund of a total of \$1,700,000, to be used to expand its publications (including revival of Osiris), sponsor symposia on frontier topics, aid the career development of younger scholars, support the ongoing operations of HSS, and support prizes. For further details see the History of Science Society Newsletter, July 1983, pp. 1-3, and Science, 25 March 1983, p. 1409.

Archives Centre at Oxford

The Contemporary Scientific Archives Centre, under the guidance of the British National Committee for the History of Science, Medicine and Technology, celebrated its 10th anniversary in April 1983. Its latest progress report takes the number of completed collections to 92, including a substantial proportion of the British Nobel Prizewinners during the relevant period covered by its terms of reference. Publications in 1982 included collections of Leslie Fleetwood Bates (magnetism), Otto Robert Frisch (nuclear physics), and Gordon Brims Sutherland (infrared spectroscopy). For further information write to the Executive Director, Mrs. Jeannine Alton, Contemporary Scientific Archives Center, 16 Wellington Square, Oxford OX1 2HY, England, UK.

Henry's Laboratory Notebooks

Albert Gluckman has prepared a typescript of selected portions of Joseph Henry's laboratory notes of his experiments on magnetic induction (circa 1836-1842). They should be of interest to physicists and scholars and students concerned with the history of science because these notes illuminate the process of Henry's discoveries, as well as bring into sharp focus the main trends of his electrical research; and in addition, they point to the importance of Felix Savary's own 1826-7 earlier researches on the periodicity of magnetic polarity under the discharge of the Leyden jar. This phenomenon was interpreted by Henry as evidence for the existence of oscillation of current from a Leyden jar discharge. It anticipated by 5 years Helmholtz's deduction of the oscillation of discharge-current; a deduction he arrived at by application of the principle of the conservation of energy.

The publication of a soft-cover electro-printed edition is being considered, and could be accomplished inexpensively if a sufficient volume of sales could be expected. Readers who might purchase such an edition and/or use it in their classes are asked to contact Mr. Gluckman at 11235 Oakleaf Drive 1619, Silver Spring, MD 20901.

History in Eos

Stewart Gillmor has been named Editor of Eos for History. Eos is the Transactions of the American Geophysical Union, which goes to over 14,000 AGU members. Articles on the history of geosciences may be submitted to Gillmor at the Department of History, Wesleyan University, Middletown, CT 06547.

BOOK SERIES**History of Science Reprints**

Editions Culture et Civilisation, Brussels, announces a new series of photographic reprints of classic scientific works, including L'Hypothese de l'atome primitif, essai de cosmogonie by Georges Lemaitre (1946). Other books available include Traité de Dynamique (1743) and other books by J. le R. d'Alembert; Experimental Researches in Electricity by Michael Faraday (1839); Discorsi e dimostrazioni matematiche, intorno a due nuove scienze by Galileo Galilei (1638); De Magnete by William Gilbert (1600); Ueber die Erhaltung der Kraft by Hermann von Helmholtz; Traité de la lumière by Christiaan Huygens (1690); Philosophiae naturalis principia mathematica (1687) and Opticks (1704) by Isaac Newton; and Die galvanische Kette by G. S. Ohm (1827). For a catalog write to Editions Culture et Civilisation, Avenue Gabriel Lebon 115, 1160 Brussels, Belgium.

British Title Catalogue

The Nineteenth Century Short Title Catalogue (NSTC) Project has been established under the chairmanship of John Jolliffe, Bodley's Librarian (Oxford). The Project aims to produce a series of bibliographies which will catalogue the great majority of British books for the period 1801-1914. In addition to an author catalogue there will be detailed listings by subject and place of imprint. British books will be defined, in this context, as all works published in the British Isles, the colonies and dependencies both past and present, including the U.S.A.; and all translations of such books, wherever printed.

A newsletter, which will be free on request, will describe the project in more detail and furnish news of its progress along with relevant notes and queries. Write to the Project's Executive Office, 20, Great North Road, Newcastle upon Tyne, NE2 4PS, England, UK.

Berkeley Papers in History of Science

A description of this series appeared in HPN no. 1, p. 5. Forthcoming publications include Werner Heisenberg. A Bibliography of His Writings, compiled by Martha Baker-Cassidy and David C. Cassidy.

AUDIOVISUAL MATERIALS**Nuclear Physics**

A 56-minute videotape, "The Age of Innocence: Nuclear Physics in the 1930s," suitable for classroom use, is available for purchase. Based upon a Symposium on the History of Nuclear Physics held at the University of Minnesota in May 1977, the script was written by Janet Krober and incorporates excerpts and discussions by Hans A. Bethe, Otto R. Frisch, Maurice Goldhaber, Sir Rudolf Peierls, Emilio G. Segre, John A. Wheeler, Eugene P. Wigner, Laura Fermi, and others. The videotape was produced by Roger Stuewer and directed by Gary Greenberg. It may be purchased for \$70 in 1/2" VHS or 1/2" Beta-Max formats, or for \$82 as a 3/4" Videotape cassette. Contact: Lyn J. Weiler, Television Traffic Manager, Rarig Center, 330 21st Ave. South, University of Minnesota, Minneapolis, MN 55455 (612/373-3867).

Anaximander to Einstein

The Soul of Science, an audiovisual history of science from Anaximander to Einstein, has been prepared by Hawhill Associates in consultation with the History of Science Department at the University of Wisconsin, Madison. It is available in 3 different formats: slide/tape, sound-filmstrip, or video-cassette. For information write to Hawhill Associates, Inc., 125 E. Gilman St., Madison, WI 53703 (608/251-3934).

CONFERENCES AND COLLOQUIA

History of Science Society

The Annual Meeting of the History of Science Society will be held in Norwalk, CT, 27-30 October 1983. There will be several sessions on the history of physics, scheduled for Friday morning and afternoon, Saturday morning, and Sunday morning:

The 1930's - Roger Stuewer, "Rutherford's Satellite Model of the Nucleus"; Arthur I. Miller, "On the Roots and Ramifications of Heisenberg's Early Work on Nuclear Physics"; John S. Rigden, "From Nuclear Moments to Radiofrequency Spectroscopy"; Martin J. Klein, "Some Quantum Mechanical Questions of the Early 1930s."

Recent Physics - Andrew Pickering, "Producing a World: Transformations of Experimental Practice in the History of High-Energy Physics"; S. S. Schweber, "History of Quantum Electrodynamics"; Peter Galison, "Image and Logic: Two Traditions of Experimentation in High-Energy Physics"; Steven Weinberg, "History of the Problem of Infinities."

Science, Method, and Metaphysics: The Broader British Physics of the 19th Century - Gregory A. Good, "Were John Herschel's Optical Researches Guided by his Ideas on Method?"; David B. Wilson, "Alternative to Materialism: The Religious Thought of George Gabriel Stokes"; Paul Theerman, "Maxwell and Method: Cultural Resonances in the Philosophy of Physics."

Works in Progress - Issues in the History of Physics - James R. Hoffmann, "Descartes, Physical Models, and the Theory of Color"; Naum Kipnis, "The Reception of Fresnel's Principle of Interference by the Paris Academy of Sciences, 1816-1824"; Thomas Archibald, "H. A. Lorentz and Action-at-a-Distance Electrodynamics"; Maila Walter, "P. W. Bridgman and the Privacy of Scientific Knowledge."

The following papers relating to history of physics will be presented in other sessions: Spencer R. Weart, "Obstacles to a History of Modern Industrial Physics"; David Cahan, "The Rise of Physics Research Institutes"; Karl Hufbauer, "The Jeans-Eddington Dispute (1915-1932)"; John Greenberg and Judith E. Goodstein, "Origins of Nuclear Astrophysics at Caltech, 1938-1957"; Joan Warnow, "The Splendid New Physics - When the Historians Come, Will the Documentation be There?"; Erwin W. Hiebert, "Ernst Mach, Historian of Science"; I. Bernard Cohen, "The Interactions between the Natural Sciences and the Social Sciences in Historical Perspective"; Morton M. Wise, "Physics and the Social Sciences"; Michael Mahoney, "Changing Canons or Mathematical and Physical Intelligibility in the later 17th Century"; Dennis L. Sepper, "Goethe against Newton, On Saving the Phenomenon of Color"; George Grinnel, "Newton's 'Principia' as Whig Propaganda, Revisited."

There will also be a luncheon meeting on 20th century physics, arranged by Peter Galison.

British Society for the History of Science

The schedule of BSBS meetings for 1983-84 includes the following:

"The Discovery of the Earth," Anglo-French Meeting, Paris, 22-24 September; details from Dr. Robert Fox, Dept. of History, U. of Lancaster, Lancaster LA1 4YG, England

"Joint Meeting with British Society for the History of Mathematics," Open University, 26-30 September; details from Dr. Cynthia Hay, History of Mathematics, The Open University, Walton Hall, Milton Keynes MK7 6AA, England

"Cambridge Mathematical Physics in the 19th Century," Lancaster, 23-26 March; details from Dr. Peter Harman, Dept. of History, University of Lancaster, Lancaster LA1 4YG, England.

"New Perspectives in 19th Century Science," Canterbury, 12-14 April; details from Dr. C. W. Smith, Unit for History of Science, Physics Bldg, University of Kent, Canterbury, Kent CT2 7NR, England

"Science, Technical Change and Work," Manchester, 12 May.

For information contact The Administrator, British Society for the History of Science, Halfpenny Furze, Mill Lane, Chalfont St. Giles, Buckinghamshire HP8 4NR, England, UK.

Energy

The International Committee for the History of Technology is planning a meeting on "Energy in History: The Topicality of the History of Technology," at Lerbach, West Germany, 2-7 September 1984. Contact Dr. R. A. Buchanan, The Newcomen Society, c/o The Science Museum, Exhibition Road, London SW7 2DD.

GUEST EDITORIAL

The following appeared as an Editorial by George Siscoe, Department of Atmospheric Sciences, University of California at Los Angeles, in the April 1983 issue of the Newsletter of the AGU Committee on the History of Geophysics. It is reprinted by permission of Dr. Siscoe and the Committee.

The Normalization of Science History

It might not be the tide which leads on to fortune, but there is a new and strong current flowing out of the past and into the professional lives of scientists and their institutions. Evidence of it is everywhere. The last three years have seen the creation of the Center for the History of Electrical Engineers, the Babbage Institute for History of Information Processing, the Center for the History of Chemistry, the History of Earth Sciences Society, the Historical Astronomy Division of the American Astronomical Society, the Division of History of Physics of the American Physical Society, the History Committee of the Astronomical Society of the Pacific, the Historical Commission of the International Association of Geomagnetism and Aeronomy, in addition to our own Committee on the History of Geophysics of the American Geophysical Union. This is only a partial list since it is not based on a systematic search.

With few exceptions these institutional units were created as permanent organizations either partly supported by societies of professional scientists or as permanent divisions within such societies. They join a lesser number (as judged by the same unsystematic sample that provided the above list) of older, well-established institutional units concerned with science history that exist within scientific societies, such as the Center for History of Physics of the American Institute of Physics, the Committee on the History of Atmospheric Sciences of the American Meteorological Society, and the Commission on History of Astronomy of the International Astronomical Division.

General interest in discipline-specific science history is evidenced by the large attendance at sessions organized by history sections of scientific societies. One of the most well-attended sessions of the Fall AGU meeting was the one commemorating the IGY.

The history sessions of the American Astronomical Society are acknowledged to be the most popular events of the AAS meetings. The Division of the History of Physics organizes sessions of broad interest for the national meetings of the APS. History sessions are now a regular part of IAGA assemblies through the effort of its History Commission. A history session was featured at the 1980 NATO Advanced Study Institute on the Exploration of the Polar Upper Atmosphere, though there was no history unit involved in organizing it. History sessions have already become a part of the AGU Chapman conferences, such as the Solar Wind Conference in Vermont and the Magnetospheric Currents Conference in Virginia. These too were very popular and provoked the greatest audience participation.

The new interest in discipline-specific science history naturally creates pressure for suitable publication outlets. The response to this pressure also naturally takes longer to formulate than does the pressure for history sessions. Astronomy already has a publication outlet in the Journal for the History of Astronomy. The newly founded History of Earth Sciences Society has its own journal. The AIP publishes occasional history articles in Physics Today and (on behalf of AAPT) the American Journal of Physics. Similarly occasional history articles appear in EOS of the AGU. Also, research articles which utilize historical data have appeared in JGR, CRL, and RGSP within the last three years. Yet there resides within the membership of scientific societies an enormous reservoir of discipline-specific historical information that could be material for valuable articles. To release the potential in this reservoir, two things are needed. One is the interest of the members. The other is a suitable vehicle for publication of such articles. The explicit establishment of a publication outlet for discipline-specific science history articles, either as a separate journal or as a special issue of an existing journal or some other means, also automatically confers institutional sanction on such articles and thereby fosters science history activity within the society.

That there is a lively interest in discipline-specific science history by society members has already been demonstrated.

It might be that commercial publishers are reacting more quickly to this interest than are scientific societies. Five of the 1983 Annual Review series begin with a pure science history article, namely the Annual Reviews of: Earth and Planetary Sciences, Astronomy and Astrophysics, Materials Science, Fluid Mechanics and Physical Chemistry. It should be mentioned however that Volume 29 (1978) of the Antarctic Research Series of the AGU carries an excellent historical article.

One notes also in connection with the recent growth of interest in science history an increase in the resources being made available to historians of science through their History of Science Society (HSS). The HSS, which now has over 3000 members, was created in 1924 by George Sarton, the founding father of the discipline of History of Science. The journal of the Society is Isis, the major publication outlet for professional historians of science. This year the HSS was awarded a challenge grant from the National Endowment for the Humanities (NEH). Through the NEH grant the HSS intends to raise \$320,000, which will be used to bolster Isis and to revive another publication, Osiris, which acts as a supplement to Isis.

But the phenomenon which is the focus of our attention here is the sudden, nearly simultaneous and seemingly independent emergence of science history units attached to or embodied within the institutions of the practitioners of science, as distinct from the historians of science. It is this phenomenon which is referred to in the title of this editorial as the normalization of science history. It is normal that science history be a subject within the discipline of history, which mainly it has been, and that it be an integral part of the training, thinking and activity of working scientists, which mainly it has not been until recently.

The process of normalization was begun at the grass roots level by working scientists. It had little if any impetus from historians of science, who look at the phenomenon with concern about what it might do to the standards of historical research. Also it was not imposed on the societies from above by their governing bodies. The cause of the phenomenon is not obvious. Why should the creation of history units or scientific societies have been so sudden and so ubiquitous? One can point to the possible influence of the seminal work by Thomas Kuhn, who showed scientists the his-

torical process operating within contemporary science. He allowed working scientists to recognize that what seemed to be failures in the scientific method were instead instances of the dynamical mode by which science evolves. Another work of general influence was the paper by John Eddy on the Maunder Minimum. This paper subsequently involved a large number of disciplines in a subject that had as its origin the investigation of historical data.

Whatever the initial stimulus was, once the historical units were formed, they found that their reasons for being were numerous and important. Aside from the dissemination of historical information through the meeting sessions and publications of societies, they assumed responsibility for gathering and preserving discipline-specific journals, historical records and instruments. They also attempt to document contemporary science history related to the disciplines through the accumulation of biographical material and the publication of obituaries. The functions of history units are well-documented and do not need to be reviewed here. The main point is to recognize the existence of the phenomenon itself.

Unlike all of the other newly created history units mentioned in the first paragraph, the Committee on the History of Geophysics of the AGU was established on a temporary two year trial basis. In its 1 1/2 years of existence, it has demonstrated that AGU members are as interested in discipline-specific science history as are the members of its sister societies. The time has now come for the CHG and the AGU governing board to decide what kind of permanent history unit to establish within AGU and how best to foster good, productive activity on discipline-specific history by Union members.

GRANTS AND FELLOWSHIPS

Note: Several programs of grants and fellowships will have deadlines for applications for 1984 awards during the next few months. Consult previous issues of HPN, pp. 7-8, 29 for information. We will publish announcements of new programs, and substantial modifications in continuing programs.

A comprehensive "Guide to Fellowships and Awards for the Study of Science, Technology, and Society" was published in Science, Technology & Human Values, Spring 1983, vol. 8, issue 2 (no. 43), pp. 41-55. It includes current information on awards offered by AAAS, Brookings Institution, MIT, NASA History Office, NEH, Smithsonian, and other organizations.

Ethics

The Ethics and Values in Science and Technology Program of NSF, in cooperation with the Humanities, Science, and Technology Program of NEH, offers Interdisciplinary Incentive Awards to enable individuals with training in either science or the humanities to address contemporary ethical issues in science, technology or clinical research. Qualifications include a Ph.D. or M.D. in a scientific or humanistic discipline, five years of postdoctoral professional experience, and a strong publication record. The stipend is up to \$20,000 per annum. Deadline: 1 February. For further information contact: Interdisciplinary Incentive Awards, Ethics and Values in Science and Technology, National Science Foundation, Washington, DC 20550. Request publication SE 81-62A.

EVIST also supports various kinds of research projects in this area. Closing dates for preliminary proposals are November 1 and May 1, and for formal proposals, February 1 and August 1. For information write to Ethics and Values in Science and Technology, NSF, Washington, DC 20550.

Center for History of Physics

The American Institute of Physics' Center for History of Physics announces a program of small Grants-in-Aid for research in the history of 19th and 20th century physics and astronomy and their social interactions. Grants will be for a maximum of \$1000 each and can be used only to reimburse direct expenses connected with research. Preference will be given to those who need part of the funds for travel to use the resources of the Center's Niels Bohr Library in New York City, or to microfilm papers or conduct tape-recorded oral history interviews with a copy deposited in the Library; other projects will also be considered. Applicants should either be working toward a graduate degree in the history of science, or show a record of publication in the field.

To apply, send a vitae and a letter of about two pages describing your research project and the expenses for which support is requested. (They may then ask for further information and references). Send to Spencer Weart, Center for History of Physics, American Institute of Physics, 335 East 45 Street, New York, NY 10017.

Institute for Advanced Study

The Institute for Advanced Study, Princeton, offers postdoctoral awards for visiting members in the fields of historical study and social science for 1984-85.

The School of Historical Studies is concerned with all learning for which the use of the historical method is a principal instrument. Interests of the faculty include the history of mathematics and sciences. The School of Social Science encourages research with a historical and humanistic bent.

Application must be made by October 15, 1983, to the School of Historical Studies and by December 1, 1983, to the School of Social Science. For further information, write the appropriate school, Institute for Advanced Study, Olden Lane, Princeton, NJ 08540.

National Endowment for the Humanities

NEH has announced a special fall deadline in its Basic Research Program (formerly General Research Program) for proposals eligible in the Project Research Category. This category supports collaborative or coordinated research projects involving two or more scholars or individual researchers working with consultants, research assistants, clerical or technical support personnel. Applications must be postmarked no later than October 21, 1983; funded project may begin on or after July 1, 1984. Applications for studies in the history and philosophy of science and technology are encouraged. For information contact Basic Research Program, Division of Research Programs, NEH, 1100 Pennsylvania Avenue, NW, Room 319-Gs, Washington, DC 20506 (phone 202/786-0207).

NEH has established a new "Travel to Collections" Program to enable American scholars to travel to research collections of libraries, archives, museums, and other repositories in North America and Western Europe. The program provides grants of \$500 for consultation of materials essential to a scholar's research but not readily available near the scholar's home or regular place of work. The research cannot be for work leading to an academic degree, and the grants cannot support travel to professional meetings or conferences.

Proposals must be received by January 15, 1984, for travel to begin after June 15, 1984. For information contact Program Officer, Travel to Collections, Division of Research Programs, Room 319-GT, NEH (as above).

For information about other NEH programs relating to science and technology, contact Humanities, Science and Technology Program, NEH, Washington, DC 20506 (202/724-0276).

MIT

The MIT Program in Science, Technology, and Society, with the support of the Exxon Education Foundation, invites applications for several one-year research fellowships on the relationship of science, technology & society. Topics for research may include social and historical studies of science & technology. Partial or full stipend is available; amount normally does not exceed \$25,000. Senior candidates are encouraged to supplement stipends with other funds. Fellows are expected to reside in the Boston area; appointments begin in September. Deadline: 15 January. For further information contact Dr. Shawn Finnegan, Secretary, Exxon Fellowship Committee, STS Program, E51-210, MIT, Cambridge, MA 02139.

Austria

The Austrian Ministry for Science and Research has started a program of scholarships to US graduate students for research and study in Austrian history. An "excellent command of German" is required. Applicants must be between 20 and 35. Deadline will probably be in November. For further information contact Prof. George Barany, Department of History, University of Denver, Denver, CO 80208 or the Austrian Institute in New York City.

Electricity

The University of Minnesota and the Bakken Library of Electricity in Life are sponsoring a joint program of graduate student fellowships aimed at increasing the scholarly utilization of the library and its scientific instrument collections, which are strong in the history of electricity. Deadline: 15 February. Contact Prof. Roger Stuewer, School of Physics & Astronomy, University of Minnesota, Minneapolis, MN 55455.

Computer History

The Charles Babbage Institute offers an annual fellowship for graduate students planning to write a dissertation on some aspect of the history of computers and information processing. Residence can be at the student's home institution, an archival research facility, or at the Babbage Institute. The stipend for 1983-84 was \$5000 plus up to \$2500 for tuition and other expenses. Deadline: 15 January. For further information contact: Charles Babbage Institute, University of Minnesota, 104 Walter Library, 117 Pleasant St. SE, Minneapolis, MN 55455.

Sigma Xi

Grants-in-Aid of Research are supported by voluntary contributions from the membership of Sigma Xi. Awards are normally made in amounts up to a maximum of \$1,000. They may be made to support scientific investigation in any field, including history of science. There are restrictions on use of the grants. Deadlines are February 1, May 1 and November 1 each year. Contact Dr. M. Patricia Morse, Chairperson, Committee on Grants-in-Aid of Research, Sigma Xi Headquarters, 345 Whitney Avenue, New Haven, CT 06511 (203/624-9883).

MacArthur

Mott Greene, a historian of geological science at Skidmore College, received a MacArthur grant of \$192,000 to allow him to spend the next 5 years on full-time research. After completing a biography of Alfred Wegener, he plans to write a book on "formalisms" in modern physical science.

ACLS

Fellowships awarded by the American Council of Learned Societies include:

Stuewer, Roger H. (Minnesota) "The Evolution of Nuclear Models, 1919-39"
Westman, Robert S. (UCLA) "The Copernicans - Universities, Courts, and interdisciplinary conflict, 1543-1700"

NSF-HPS FY 82 Grants

Grants awarded for studies in history and philosophy of science by the NSF for FY 1982 included:

Brown, Laurie M. (Northwestern) "The Meson Paradox and the Nature of Scientific Discovery"
 Brush, Stephen G. (Maryland, College Park) "History of Planetary Physics"
 Devons, Samuel (Barnard) "Some Historical Aspect of Experimental Physics"
 Frankel, Henry (Missouri, Kansas City) "The Rise of Paleomagnetic Directional Studies and their Importance in the Recent Revolution in the Earth Sciences"
 Franklin, Allan D. (Colorado) "The Role of Experiment in Physics"
 Goldberg, Stanley (Hampshire College) "The Assimilation of Scientific Revolutions: The Case of Special Relativity in America"
 Kargon, Robert H. (Hopkins) "Karl T. Compton and the Development of American Science"
 Lankford, John (Missouri, Columbia) "Growth and Development of a Scientific Specialty: Astrophysics and the Transformation of the American Astronomical Community, 1859-1936"
 Paul, E. Robert (Dickinson College) "Research Programs in Transition: Hugo Seeberger and Cosmology"
 Sklar, Lawrence (Michigan, An Arbor) "Research in the Philosophical Foundations of Statistical Mechanics"
 Sullivan, Woodruff T. (U. of Washington) "A History of Radio Astronomy"
 Teller, Paul R. (Illinois, Chicago Circle) "The Projection Postulate of Quantum Mechanics: A New Perspective"
 Unguru, Sabetai "Optics and the Development of Physical Science"

Proposal Shortage

"The number of research proposals in the social and behavioral sciences submitted to federal agencies declined sharply during the first two years of the Reagan administration, the Consortium of Social Science Associations has found...The only agency in which the consortium found an increase was the NSF's division of social and economic science, which had 8% more proposals... The group warned that the research programs might lose support in Congress if there is a continued drop in the number of proposals since agencies use that number to help justify their annual budget requests." (Chronicle of Higher Education, 18 May 1983, p. 20)

OBITUARY

Price

Derek J. de Solla Price, Avalon Professor of the History of Science at Yale University, died in London on September 3, 1983, at age 61. Price was well known to historians, sociologists and practitioners of science for his books Little Science, Big Science (1963), Science since Babylon (1975) and many other publications, his research on scientific instruments such as the Antikythera mechanism, and his introduction of statistical techniques in the analysis of the scientific literature. An interview with Price appeared in Omni, December 1982.

QUERIES

Emil Wiechert

Emil Wiechert (1861-1928) was one of the founders of geophysics and international seismological research, and a leading physicist. He corresponded with some leading scientists of his time (e.g. L. A. Bauer, Lord Kelvin, A. Einstein, W. Voigt, G. Gerland, A. Schuster, F. Exner, etc.). Information is sought on the location of his library, letters, scientific manuscripts and personalia.

-- Dr. Wilfried Schroeder, Hechelstrasse 8, D-2820 Bremen-Roenebeck, Germany.

Origins of Abbreviations

Do you know of any paper which gives the origins of standard abbreviations, e.g. I for electric current comes from Intensity (Ampere's term) but why c for velocity of light (celeritas?), p for momentum, etc.? Surely there must be a dictionary of abbreviations and their origins somewhere.

-- Leonard X. Finegold, Department of Physics and Atmospheric Science, Drexel University, Philadelphia, PA 19104.

Classical Orbits in QM

I am interested in obtaining information or references pertinent to the construction of classical orbits within the context of quantum mechanics. In particular, the use of wave packets for the hydrogen atom system to represent an orbit in the sense of celestial mechanics (semi-major axis, eccentricity, inclination, etc.) is of especial concern to me.

-- Laurence G. Taff, Lincoln Laboratory, Massachusetts Institute of Technology, Lexington, MA 02173.

Tchebychev translations

I am seeking English translations of two papers by P. Tchebychev: "Theorie des mecanismes connus sous le nom de parallelogrammes," Mem. Savans Etrang. St. Petersb., 1854, 7: 537-68, and "Sur les questions de minima qui se rattachent a la representation approximative des fonctions," Bull. St. Petersb. Acad. Sci., 1858, 16: col. 145-49; Mem. St. Petersb. Acad. Sci., 1859, 9: 201-91. If no such translations exist, I would like to encourage some scholar to generate and publish them.

-- W. A. Edson, Radio Physics Laboratory, SRI International, 33 Ravenswood Ave., Menlo Park, CA 94025.

Places of Historical Interest

I have the opportunity to go to Europe for 3 months this summer and would like to visit places of historical interest to physical science in England and on the Continent as background for teaching science to non-science majors. Are there any publications that provide this kind of information?

--Rev. Robert E. Wood, C. M., St. Mary's Seminary, Perryville, MO 6375

(Editor's note: one such publication is an article by J. C. Albergott, "West European Scientific Museums: A Survey," Amer. J. Phys., 1971, 39: 243-53. There must be others.)

REPORTS

1983 Joint Atlantic Seminar

The 10th anniversary meeting of the Joint Atlantic Seminar in the History of the Physical Sciences was held on April 8 and 9 in Washington, DC, where it was jointly sponsored by the Smithsonian Institution and Georgetown University. About 50 historians, physicists, chemists and astronomers attended the 1983 meeting.

In recognition of the success that the history of the physical sciences has had outside a college or university framework, the Friday evening session of the seminar was devoted to a discussion of the topic, "The History of the Physical Sciences Outside the Academy." Four invited speakers --

David Allison (Historian at the Naval Research Laboratory), **Joan Bromberg** (Head of the Laser History Project), **David DeVorkin** (Curator at the National Air and Space Museum), and **Stanley Goldberg** (most recently at Hampshire College, but spending the year as an independent scholar) -- addressed the intellectual, personal and professional concerns and problems that characterized their work as historians in contexts where like-minded colleagues or support facilities were few and far between. A lively discussion on this topic continued through the reception that followed this session, held at the National Museum of American History.

Doctoral candidates and recent PhDs spoke on their research at the Saturday session of the seminar which was held at Georgetown University. The entire morning session was devoted to electrodynamics and relativity theory from Ampère to Einstein. **James R. Hofmann** (University of Pittsburgh) spoke on "Ampere's hesitant transitions from Synthesis to Analysis: Methodological Strategy in Electrodynamics." In his presentation, Hofmann argued that the null experiment technique, recognized by Ampère in 1822, was not employed with seriousness until 1825 when Ampère found himself in competition with Jean-Baptiste Biot and Claude Pouillet, both of whom used hypothetico-deductive reasoning or synthesis in their work. Methodological differences in the construction of physical knowledge also dominated a discussion by **Tom Archibald** (University of Toronto) on "Carl Neumann and Rudolf Clausius on the Propagation of Electrodynamical Potentials." Focussing on aspects of Neumann's mathematical reasoning, particularly on his use of optical analogies and of Hamilton's principle, Archibald stressed

the debate between Neumann and Clausius on the relative importance of formal and physical structures in the mathematical formulation of physical laws. The role of G. F. FitzGerald in the origin of the FitzGerald contraction was described by **Bruce J. Hunt** (Johns Hopkins University). Hunt argued that FitzGerald may have generated the notion of "change in size," but that he left it to others to work out the fine details of the theory. Finally, working from the 1912-13 Einstein notebooks, **John Norton** (Einstein Project, Princeton University Press) showed that Einstein did indeed know how to apply coordinate conditions to generally covariant field equations and that he even knew of the two different coordinate conditions which could be used to reduce the Ricci tensor to a Newtonian form. Norton reveals that Einstein and Grossman's rejection of general covariance and the three year struggle with field equations stemmed more from the tenacity with which Einstein held onto the idea of causality than from mathematical ignorance.

Papers during the afternoon session covered a wide variety of topics. Among the speakers were: **Richard Kremer** (Harvard University) on "Physics, Physiology and Energy Conservation in the 1860's: Heidenhain vs. Fick"; **Paul Theerman** (Joseph Henry Papers, Smithsonian) on "James Renwick's Biographies and the Social Image of Science in Nineteenth-Century America"; **Karen Parshall** (Sweet Briar College) on "Joseph H. M. Wedderburn and the Finite Division Algebra Theorem"; **Jeffrey Crelinsten** (University of Toronto) on "Disciplinary Struggles and the Rise of Astrophysics at Cambridge: A. S. Eddington and the Plumian Professorship of Astronomy and Experimental Philosophy"; and **Joseph N. Tatarewicz** (National Air & Space Museum) on "Where are the people who know what they are doing? Space Technology and the Renaissance of Planetary Astronomy, 1958-1975." The seminar ended with a reception in the Faculty Lounge of the Intercultural Center at Georgetown University.

Support for the 1983 JAS was generously provided by the National Air & Space Museum, the National Museum of American History, the Joseph Henry Papers, and Georgetown University.

Summaries and authors' addresses for some of the papers mentioned above will be printed in this issue of HPN.

The 1984 JAS will be held at Cornell University in May 1984 (see above for details).

HISTORY & PHILOSOPHY OF SCIENCE

by Ann LeBerge

The 4th International Conference on History and Philosophy of Science took place in Blacksburg, Virginia, November 1-6, 1982. Sponsored by the International Union of History and Philosophy of Science (IUHPS) and Virginia Polytechnic Institute and State University, the conference brought together 26 historians and philosophers of science from 12 countries. In addition, about 20 other individuals attended the conference and participated in the discussions.

In the opening session four philosophers of science presented papers dealing with models of scientific change. Ilkka Niiniluoto (Helsinki) provided a fitting introduction by reviewing what Sarton, Popper, Feyerabend, Kuhn, Lakatos and Laudan have said about scientific progress. After comparing the theories of the realists and instrumentalists on scientific progress, Niiniluoto then presented his own realistic approach to scientific progress based on what he called truthlikeness.

John Worrall (London School of Economics) attacked what he called the "received view" of science (logical positivism) and offered a post-positivistic view of science. Worrall suggested that scientists employ "tacking" to resolve the difficulties posed by theory confirmation. "Tacking" simply means the adjustment of known results to fit the theory.

In the next paper Diderik Batens (Ghent) talked about dialectical logics and their relevance to an understanding or problem-solving and question-answering in science. He showed the relevance of such logics to several issues concerning the nature of scientific change.

In a paper on scientific change and value change Larry Laudan (Virginia Tech) challenged Kuhn and others who have put forward the "big package" to explain theory change in science. Laudan contended that paradigms are not the packages Kuhn thinks they are, in that ontologies, methodologies, and values almost never change concurrently. Laudan suggested that scientific change is substantially more piecemeal than the "big package" proponents would claim. Changes at one level are not necessarily accompanied by changes at other levels. The majority of theory transitions do not represent shifts at all levels.

In the session devoted to 18th century natural philosophy Gereon Wolters (Konstanz) examined the relationship between science and philosophy in the work of Karl Lambert, an 18th century astronomer, physicist, and philosopher. For Lambert, the purpose of science was pragmatic, not theoretical, for he saw science as providing the tools needed for social existence.

Roderick Home (Melbourne) traced the origins of experimental physics back to early 18th century France and singled out the Abbe Nollet and Pierre Poliniere as the two individuals who did the most to establish the tradition of experimental physics in France. Home credited Poliniere with introducing the experimental method into French universities. Nollet and others embraced Poliniere's idea that the principles of physics are directly discoverable by experiment.

Kathleen Okrulich (London, Ontario) opened the session on the Mechanical Philosophy under Strain with a talk on "ghosts" in the world machine. Okrulich suggested that for the 17th century mechanical philosophers there were 7 "ghosts" or possible explanations to account for motion in the world machine, such as God, the animus mundi, pluralistic corpuscular "ghosts," monadic or nominal "ghosts," and Leibnizian natural inertia.

In a paper devoted to the mechanical philosophy and its problems Alan Gabbey (Belfast) suggested that the three principal problems confronting the mechanical philosophers were to explain the mind/body interaction, the impenetrability or hardness problem and the problem of perpetual motion.

John Dorling (Amsterdam) opened the session on Intertory Relations with a paper in which he argued that we can obtain special relativity theory from Euclidean geometry by modifying one of the congruence axioms.

Marcello Pera (Pisa) defended the notion of cumulative progress in science, noting that the main objection to the notion is the existence of major discrepancies in the history of science. Recognizing that a model of cumulative progress is at variance with the history of science, Pera admitted that not every scientific change is an example of cumulative progress. Pera questioned the relevance of the history of science to the philosopher of science, claiming that

history provides a vast reservoir of data which philosophers of science simply use to justify their claims.

Other sessions were devoted to the social sciences and genetic epistemology.

In addition to the formal sessions, which met Tuesday through Saturday, participants had the opportunity to go hiking in the nearby mountains on Thursday afternoon. In spite of the rainy, cold weather which signalled the end of Indian summer, a number of individuals took to the trails. Two receptions, one hosted by D. Reidel, publishers, and another by the Center for the Study of Science in Society at Virginia Tech, were held during the week. On Friday evening Joseph Pitt, chairman of the Joint Commission of the IUHPS and of the local organizing committee, hosted a lovely party for conference participants at his home in Gavagi Hollow, near Newport, Virginia.

In-depth discussions, an atmosphere of informality and collegiality characterized the conference. By the end of the week a certain *esprit de corps* was clearly evident among conference participants. Certainly the feeling was that the goals of the IUHPS in setting up the biannual smaller conferences had been met at the Blacksburg meeting.

A volume of edited papers resulting from the conference is being prepared by Joseph C. Pitt and will be available in December 1983. It will be published by D. Reidel in the Western Ontario Series in the Philosophy of Science. The tentative title is Change in Modern Science and Technology.

North Carolina: Polanyi Lecture

Beginning this fall, the University of North Carolina at Chapel Hill will hold a biannual public lecture, known as the Michael Polanyi Lecture, on the history and philosophy of science. The invited lecturer will spend a week visiting the campus as a guest of one of the departments in the University's Division of Natural Sciences. The first Polanyi Lecturer will be Freeman J. Dyson, whose talk will be on September 21, 1983. His host department will be the Department of Physics and Astronomy.

Symmetries

The First International Meeting on the History of Scientific Ideas sponsored by the Universitat Autònoma de Barcelona, devoted to the topic "Symmetries in Physics (1600-1800)" was held at Sant Feliu de Guixois, Catalonia, Spain, 20-26 September 1983. Papers will be presented on symmetry and simplicity in the physics of Galileo and Newton, Euler's invariance, unity of forces, Pierre Curie's principle, Goettingen school and conservation laws, Bose and Fermi statistics, discrete symmetries and their violation, internal symmetries, gauge theories and their unification.

For further information contact M. G. Doncel, Dept. Física Teòrica, U. A. B., Bellaterra (Barcelona), Spain.

Theory Acceptance & Rejection

A meeting on "The Acceptance and Rejection of Scientific Theories," sponsored by the British Society for the History of Science and the British Society for the Philosophy of Science, was held at Leicester, 28-30 March 1983. Papers presented included: Trevor Pinch, "The Social Construction of Experimental Knowledge in Physics"; Jon Dorling, "A Rational Reconstruction of Einstein's Methodology of Discovery"; Neil Martin, "Saving Duhem and Galileo."

Information about BSHS meetings may be obtained from its Hon. Programme Secretary, Dr. B. Norton, Department of Philosophy, University of Leicester, Leicester LE1 7RH, England, UK.

Scottish Science

The 1983 Summer Meeting of the British Society for the History of Science was held 4-6 July at Dalrymple Hall, Glasgow, on the theme "Scottish Science." Papers presented included: Mike Barfoot, "Newton neutered: Lord Monboddo's Verdict on the Active Powers"; David Wilson, "The Aerial Ether: Kelvin and Stokes on Ether, Matter and Method"; Crosbie Smith, "The Irreversible Cosmos: William Thomson and the Universal Dissipation of Energy"

Particle Physics

by Jeanne Laberrigue

An International Colloquium on the History of Particle Physics was held at Paris, 21-23 July 1982, under the auspices of Centre National de la Recherche Scientifique and Societe Francaise de Physique. The meeting was devoted to the period 1930-1960 when particle physics emerged as an autonomous field from nuclear physics and cosmic ray physics, and its foundations were established. The development of this new field was so rapid and so impressive and the advance in our knowledge was so important that it was necessary to limit the subjects, trying to put emphasis on topics that have not been treated or much stressed before.

So the Colloquium was devoted to some of the main discoveries: the origin and evolution of some of the concepts (isospin, strangeness...), fields (neutrino physics...), theories (Q. E. D., weak interactions) and technical methods that appeared at that time as well as the role played by the institutions. Moreover, the Second World War being the most important fact in the history of this period, the position of elementary particle physicists in relation to the new weapons was also treated.

One of the aims was to collect direct testimonies of eminent physicists, whose contributions during the period concerned were of the most importance. Another was to have participation of young physicists and historians of science.

It is a fact that many elementary particle physicists, feeling that the scale of experiments performed today is reaching a limit, are looking at the recent past and are interested to know their roots.

Numerous eminent physicists participated with enthusiasm at the Colloquium. Reports were given on: Cosmic Ray Physics (B. Rossi, P. Peyrou),

Early History of Physics with Accelerators (H. Anderson), Weak Interactions (E. Amaldi), Neutrino Physics (F. Reines), Isotopic Spin (N. Kemmer), Strangeness (M. Gell-Mann), Q. E. D. (J. Schwinger). A report of B. Pontecorvo on the Infancy and Youth of Neutrino Physics was distributed. Spencer R. Weart reported on "The Road to Los Alamos." Round tables on elementary particles in Cosmic Ray Physics, role of institutions and evolution of concepts were led by W. Fretter, V. F. Weisskopf and L. Michel with the participation of R. Armenteros, C. Butler, R. Dalitz, L. Leprince-Ringuet, C. O. Ceallaigh, O. Piccioni, G. Rochester, E. Amaldi, P. Auger, E. Goldwasser, A. Messiah, Y. Yamaguchi, K. Nishijima, F. Perrin, J. Steinberger, E. Wigner, and C. N. Yang.

In the auditorium and during the breaks, the discussions and conversations were very vivid and the atmosphere was imprinted with great cordiality. Physicists of different generations and historians had the opportunity to exchange their points of view.

The proceedings have been published (see summaries section, below). They constitute an important contribution to the history of physics.

During the Colloquium a little exhibition with original material was presented. Afterwards it was loaned to the 21st Conference on High Energy Physics and CERN.

Instruments

The Scientific Instrument Society was launched at an inaugural meeting at the Science Museum, London, 20 April 1983. Open to all interested in scientific instruments, the Society aims to contribute to historical knowledge and understanding through the collection, conservation and study of scientific artifacts. Contact Carole Stott, Scientific Instrument Society, c/o Astronomy and Navigation Dept., National Maritime Museum, Greenwich, London SE10 9NF, England, UK.

Artificial disintegration of Nuclei

"50 Years of Artificial Disintegration of Atomic Nuclei and Modern Nuclear Physics" was the subject of an international conference at Kharkov, 4-6 October 1982, sponsored by the Kharkov Physico-Technical Institute of the Ukrainian Academy of Sciences. A book of papers presented at the conference was published in advance under the title Essays on the History of Nuclear Physics Development in the USSR, edited by E. Inopin. Speakers included D. Ivanenko on "Nuclear Physics in the 30s," A. Grinberg on "I. V. Kurchatov and the first accelerators in the Leningrad Physico-Technical Institute," and E. Inopin on "Atomic nuclei models." I. Selinov read a paper on the history of nuclear isomerism, nuclear shell model, and magic numbers. Many scientists from Moscow, Leningrad, Dubna, Kharkov, and other parts of the Soviet Union and from abroad took part in the conference. (Information from V. J. Frenkel, Leningrad)

Storia della Fisica

The III Congresso Nazionale di Storia della Fisica was held at Palermo, Italy, 11-16 October 1982. Sessions were held on the following topics: "Storia della fisica e didattica"; "Comunicazione Scientifiche"; "Storia della fisica e ricerca contemporanea"; "La tradizione scientifica in Sicilia e nel Mezzogiorno d'Italia." The proceedings will be published together with those of the II Congresso held in Pavia in October 1981. For information contact Prof. Arturo Russo, Istituto di Fisica, Via Archirafi, 36 - 90123 Palermo, Italy.

Historiadores de las Ciencias

The Sociedad Latinoamericana de Historia de las Ciencias y la Tecnología sponsored the "Primera Reunion Latinoamericana de Historiadores de las Ciencias" in Puebla, Mexico, 23-26 August 1982. Papers included: Lewis Pyenson (Canada), "In partibus Infidelium: Rivalidades imperialistas y Ciencias Exactas a principios del Siglo XX en Argentina"; Eduardo L. Ortiz (England), "La visita de Albert Einstein a la Argentina en 1925"; Tomas Gonzalez de Luna (Mexico), "Análisis crítico de la obra de Lakatos, Pruebas y Refutaciones"; Giuliana Vicarioli (Costa Rica), "De un espacio egocentrico a un espacio objetivo"; Tomas Brody (Mexico), "La historia de la Física en la enseñanza de la Física"; Juan Jose Saldana G., "La primera teoría corpuscular de la doble refracción. Un caso de 'lucha' por el poder teórico"; Ma. Grazia Ianniello (Italy), "Historia de la Física y la Enseñanza de la Física."

For further information contact Dr. Carlos Viesca, Secretario, Sociedad Latinoamericana de Historia de las Ciencias y la Tecnología, Apartado Postal: 21-783, 04000, Mexico, D.F.

Brown Archive

Sanborn C. Brown, plasma physicist, profes emeritus of physics at M.I.T., and biographer of Count Rumford, gave his professional papers and two extensive collections of books and other historical materials to Dartmouth College prior to his death in 1981. One collection concerns the history of plasma physics; the other consists of letters, documents, books and other memorabilia relating to Count Rumford and his contemporaries in scientific and political history. Available by arrangement. Write to Kenneth Cramer, Archivist, Special Collections, Dartmouth College Library, Hanover, N.H. 03755. [Information from Lois W. Brown, Hemlock Corner RFD 1, Henniker NH 03242)

EINSTEINIANA

1916 Letter

FBI Investigation

The cover story of The Nation, Sept. 3-10, 1983, is on "The F.B.I. and Dr. Einstein." The author, Richard Alan Schwartz, obtained copies of about 1,500 pages of the file accumulated by the Federal Bureau of Investigation on Albert Einstein, between 1932 and 1955, through the Freedom of Information Act. Unsubstantiated material in the file accused Einstein "of running an espionage ring, of being the 'brain' behind the alleged Communist push to take over Hollywood, of inventing a miracle ray, of being behind the Lindbergh kidnapping and of devising a robot able to read human minds and exercise thought control."

More significant is Einstein's own reaction to a 1940 letter suggesting that Peter Debye, then at Cornell, was a German spy. When F.B.I. agents questioned Einstein, "he was careful not to make any statements he could not substantiate and to point out possible benign interpretations of the charge against Debye," but he "expressed strong doubts about Debye's character and loyalty."

Schwartz notes that the file underscores the U.S. government's suspicion of Einstein's "efforts to have the fruits of his research applied in a responsible and moral fashion. It also reveals something of Einstein the public figure, who inspired a mixture of awe and fear among ordinary people... What is so disturbing about the file is that it shows that, in spite of the apparent professionalism with which most of the investigations were conducted, there seems to have been a willingness, almost a desire, to presume that Einstein was guilty or something." Since most of the file material concerns Einstein's public expression of opinion, the effort to collect it represents an "appalling.. waste of public funds."

A four-page letter from Einstein to Helene Savic, dated 8 September 1916, was recently purchased for \$5,500 by Todd Alexrod of Las Vegas. The letter mentions his separation from his first wife, Mileva Maritsch, and their two sons. It concludes, "In spite of my exterior problems my life flows along in perfect harmony. I dedicate all my thoughts to reflection." - New York Times, 30 May 1983, p. 23.

Publication of Papers

The first volume of Einstein's Collected Papers and Correspondence, covering his student years, 1879-1900, will be published early in 1984 by Princeton University Press. The question of English translations of the papers is not yet settled. (Physics Today, June 1983, p. 62)

One reader eagerly awaiting the publication of Einstein's papers is E. J. Post, who mentions the 1911 discussion of the two vacuum speeds of light in Physics Today, Oct. 1982, p. 116, 118. Post calls for prompt reprinting of all previously-published Einstein papers, so far delayed by lawyers.

SUMMARIES

Authors of books and articles on the history of physics are invited to send summaries for publication in this section. Maximum lengths: 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 or publisher, and give the price in U. S. dollars, including cost of mailing (if applicable). We can also publish summaries of papers presented at meetings if the author is willing to distribute preprints; otherwise, if copies are not available but the author is willing to correspond with others about the research, a summary may be submitted for the "Work in Progress" section. Publication will be expedited if each summary is typed, on a separate sheet, in the format or the examples below.

Medieval Motion

MAIER, ANNELIESE. On the Threshold of Exact Science: Selected Writings of Anneliese Maier on Late Medieval Natural Philosophy. Edited and translated with an introduction by Steven D. Sargent. Philadelphia: University of Pennsylvania Press, 1982. xiv + 173 pp., \$21.50. Reviewed by Edward Grant in *ISIS*, 1983, 74: 130-131.

"The first five essays are...concerned with various aspects of the scholastic theory of motion...The sixth selection is devoted to matter theory...the final chapter is given over to Maier's evaluation of medieval accomplishments." (Grant).

Polar History

HAKFOORT, C. Wetenschapshistorische etiketten en de gevaren van polaire analyses. Tijdschrift voor de geschiedenis der geneeskunde, natuurwetenschappen en techniek. (1982), 5: 1-5.

"Labels in the history of science and the dangers of polar analyses." Introduction to a special issue, "Kanttekeningen bij erkende etiketten. Natuurwetenschap en geneeskunde in de 17e en 18e eeuw" (Comments on accredited labels. Science and medicine in the 17th and 18th century), which deals with the problem of using labels in the history of science and medicine. In particular, the contributions relate to labels concerning scientific schools and traditions, and to the dangers of 'polar analysis'.

In a strictly polar analysis it is assumed, (1) that two and no more than two schools or traditions do matter, (2) that the parties are involved in debates and conflicts, or, at least, have opposite opinions, and (3) that every scientist in the period concerned belongs to one of the two groups. Though a polar analysis can appropriately describe an actual historical debate, it can easily cross its original boundaries. This 'polar imperialism' is operative in different dimensions, e.g. time, space, content and context. This issue presents case-studies illustrating the use and misuse of polar analyses.

For reprints write to C. Hakfoort, Instituut voor geschiedenis der natuurwetenschappen, Rijksuniversiteit Utrecht, Janskerkhof 30, 3512 BN Utrecht, The Netherlands.

Pre-Galileo

WALLACE, WILLIAM A. Prelude to Galileo: Essays on Medieval and Sixteenth-Century Sources of Galileo's Thought. xvi + 369 pp. Dordrecht-Boston: Reidel, 1981. Cloth \$49.95; paper \$23.50.

This is a collection of sixteen essays, all but one previously published, now revised and unified to document the transition from late medieval to early modern science as portrayed in Galileo's writings and the sources on which he drew. The first two parts of the book describe the medieval and sixteenth-century foundations for the study of motion found in Galileo's early *De motu* and writings on mechanics. The last two parts, making up two-thirds of the book, contain detailed studies of Galileo's Latin notebooks written around 1590, while he was beginning his teaching career at the University of Pisa. These essays reveal the strong affinities between Galileo's seminal ideas and those of contemporary Jesuits at the Collegio Romano. The book's thesis is strongly revisionist: it challenges the generally accepted view of Galileo as a Melchisedech-like figure without forebears who created modern science single-handed, adducing previously unknown manuscript evidence to argue the contrary.

Torricelli

UNIVERSITÉ DE NICE. Cahiers du Séminaire d'Épistémologie et d'Histoire des Sciences. "Journées Torricelli, Nice 29-30 Juin 1981, Actes I." Cahier N° 15/16, Janvier 1983., 24 + 57 pp.

Contents: Cahier N° 15, Torricelli et son Époque. Lanfranco Belloni, "Le Triumvirat des Éléves de Castelli: Magiotti, Nardi et Torricelli," pp. 1-24. Cahier N° 16, A. Beauvieu, "Torricelli et la France, ou plutôt Torricelli et les Français" (Resume), pp. 1-3; F. De Gandt, "L'analyse de la percussion chez Galilée et chez Torricelli," pp. 5-50. Sommaires de périodiques sur l'Histoire des Sciences. Journées Oresme [Université de Nice, 11-12 Juin 1983].

For information about this publication contact Pierre Souffrin, Observatoire de Nice, B. P. 252, 06007 Nice Cedex, France.

Light Scattering

HEY, J. D. From Leonardo to the Graser: Light scattering in historical perspective. Part I. South African Journal of Science. (1983) 79: 11-27.

Summary: "The main stages in the conceptual development of the related subjects of light scattering and fluorescence are traced from the time of Leonardo da Vinci to the experiments of Tyndall and Andrews in the 19th century."

Address: Dept. of Physics, U. of Cape Town, Rondebosch 7700, South Africa.

Cosmos

TAUBER, GERALD. Man and the Cosmos. New York: Greenwich House, 1982. \$9.95.

This is a reprint edition of an earlier work under the name "Man's View of the Universe." (New York: Crown Publishers, 1979).

In nine chapters the various stages are portrayed in which man has developed his understanding of the Cosmos. Complementing the narrative are descriptions of the specific scientific discoveries that have influenced that development. Written in non-technical language they are accompanied by numerous diagrams. The book is richly illustrated by old prints, drawings, rare photographs and recent views transmitted by space explorations and telescopes.

Hypotheses

LAUDAN, LARRY. Science and Hypothesis. Historical Essays on Scientific Methodology. x + 258 pp. Boston: D. Reidel Pub. Co., 1981. \$37.50.

Includes: "A revisionist Note on the Methodological Significance of Galilean Mechanics"; "The Clock Metaphor and Hypotheses: The Impact of Descartes on English Methodological Thought, 1650-1750"; "The Epistemology of Light: Some Methodological Issues in the Subtle Fluids Debate"; "Ernst Mach's Opposition to Atomism" and other papers (some based on previously-published articles).

Kepler to Newton

CUSHING, JAMES T. Kepler's Laws and Universal Gravitation in Newton's *Principia*. *American Journal of Physics*, 1982, 50(7): 617-628.

An outline is presented of the line of reasoning which Newton used in his *Principia* to obtain Kepler's three laws of planetary motion from his own laws of motion and of universal gravitation. His combination of deductive and retroductive reasoning is related to his general philosophical outlook on the nature of science. The discussion, while written for the modern reader, preserves the essentially geometric character of Newton's constructions in the *Principia*.

For reprints write to Prof. J. T. Cushing, Dept. of Physics, University of Notre Dame, Notre Dame, IN 46556.

Cartesian/Newtonian

VANPAEMEL, G. Cartesiaanse en newtoniaanse natuurwetenschap aan de Leuvense Artesafakulteit. *Tijdschrift voor de geschiedenis der geneeskunde, natuurwetenschappen, wiskunde en techniek*, (1982), 5: 39-49.

The dissemination of Cartesian and Newtonian science in the Leuven Faculty of Arts shows that in both cases the direct influence of Descartes and Newton was replaced by an indirect influence through the Cartesian and Newtonian textbooks. At the same time the sharp controversy between both systems did not occur at the level of science education. To define the 'Cartesian' and 'Newtonian' points of view in the curriculum, we cannot use the criteria of conceptual resemblance (e.g. between Descartes and Cartesianism) or controversial antithesis (between Cartesianism and Newtonianism). We have to look more closely at the role of the textbooks, the position of their authors, their styles, and the people who did not read them. Whatever may come out as 'Cartesian' or 'Newtonian' should in the first place be the description of a historical process, rather than based on rigorous methodological or epistemological issues.

For reprints write to G. Vanpaemel, Katholieke Universiteit Leuven, Departement Wiskunde, Celestijnenlaan 200B, B-3030 Leuven, Belgium.

Metascience

RĂDULET, REMUS. Metascientific Research in the Evolution of Physics. *Science of Science*, 1981, 1(5), vol. 2: 45-54. (Published by Ossolineum, Wrocław, Poland; U.S. distributor, D. Reidel Pub. Co., Boston)

The author considers that the meta-theoretical approach to particular problems constitutes a stimulus to their development. Examples: univocal operative definitions of concepts, breakdown of theorems into several propositions in order to recognise laws in each of them, suppression of incoherences in propositions, fusion of sciences with equal structures, and realisation of deductive and logical completeness.

The author is at the Rumanian Academy of Sciences.

Newton's Career

WESTFALL, RICHARD S. The Career of Isaac Newton. A Scientific Life in the Seventeenth Century. *The American Scholar*, 1981, 50: 341-353.

The article identifies three important aspects of Newton's career, physical isolation, philosophic breadth, and theological depth, and argues that every scientific career in the 17th century shared these characteristics to a considerable extent. Since they would not characterize a typical career in science in the 20th century, they provide a measure of the extent to which the scientific enterprise has changed during the past three hundred years.

Author's address: Dept. of History & Philosophy of Science, Indiana University, Bloomington, IN 47401.

Newton on Matter

DOBBS, B. J. T. Newton's Alchemy and His Theory of Matter. *Isis*, 1982, 73: 511-28.

Using previously unpublished material from Newton's alchemical papers, this article argues that Newton used alchemy as a critical counterweight against the inadequacies of ancient and contemporary atomism, inadequacies regarding cohesion and activity, life and vegetation, and the dominion and providence of God. His final formulations on the nature of matter and the powers associated with it grew naturally out of alchemical, theological, metaphysical, and observational concerns.

Author's address: B.J.T. Dobbs, Department of History, Harris Hall, Northwestern University, Evanston, Ill. 60201

Wolff

HAKFOORT, C. Christian Wolff tussen cartesianen en newtonianen. *Tijdschrift voor de geschiedenis der geneeskunde, natuurwetenschappen, wiskunde en techniek*, (1982), 5: 27-38.

In the traditional view on the period 1700-1750 a sharp distinction is drawn between two antagonistic scientific schools, Cartesianism and Newtonianism. The scientific work of Christian Wolff (1679-1754), which was recently called Cartesian, serves as an example to show limitations and false suggestions of such a polar view. Wolff's attitude in the discussions on Descartes' vortices and Newton's gravitation, as well as on Newton's new theory of light and colours, is analysed. In addition, his ideas on the method and structure of science are discussed. Wolff's scientific position turns out to be neither Cartesian, nor Newtonian. The introduction of an additional 'ism' (neo-Cartesianism or Leibnizianism) is found to be premature.

For reprints write to C. Hakfoort, Instituut voor geschiedenis der natuurwetenschappen, Rijksuniversiteit Utrecht, Janskerkhof 30, 3512 BN Utrecht, The Netherlands.

Geophysical Newtonians

FORCE, JAMES E. Some Eminent Newtonians and Providential Geophysics at the Turn of the Seventeenth Century. *Earth Sciences History*, 1983, 2(1): 4-10.

At the end of the Seventeenth Century, geophysical speculations among such eminent Newtonian natural philosophers as William Whiston, Edmond Halley, and John Keill concerning the moral fabric of the post-Fall geophysical system, the earth's place in the Newtonian framework of the heavens, and what counts as evidence in geophysical theorizing reflect a definite rejection of the dominant Seventeenth Century Earth Theorist, Thomas Burnet. All three Newtonians are confident that the earth's fabric is not morally corrupt, that, like Newton's heaven, the earth is providentially designed, and that knowledge of its structure ought to be firmly rooted in empirical observation. Nevertheless, there is a major disagreement between Whiston and Keill about how to interpret the Bible. Whiston accepts revealed scripture, properly interpreted by the Newtonian exegete, as compatible with Newtonian science. Keill alone among the Newtonians is convinced that there are some aspects of the Bible which no amount of "scientific" interpreting will square with science. In such cases, for Keill, the Biblical view must always prevail. In the views of neither man, however, is there room for any sort of warfare between the new science and old religion. Either revelation is completely accepted when an apparent dispute arises as with Keill or a complete correlation is simply assumed as with Whiston.

Leibnizian Space/Time

WINTERBOURNE, A. T. On the Metaphysics of Leibnizian Space and Time. *Studies in History and Philosophy of Science*, 1982, 13(3): 201-214.

This paper argues that for Leibniz the space and time of physics are not phenomena, but are in the nature of 'fictions' while spatiality and temporality are phenomena *bene fun-data*. Leibniz's views on continuity confirm this interpretation. Leibniz's distinction of 'real' and 'ideal' separates perceptual time and space from the time and space of physics. Geometrical continuity belongs only to the abstractions of mathematics and, particularly, to determine space and time.

Photocopies only, available free from Dr. A. T. Winterbourne, Birmingham Polytechnic, Margaret Street, Birmingham, B3 3EX, United Kingdom.

Why Earthquakes?

CAROZZI, MARGUERITE. Reaction of British Colonies in America to the 1755 Lisbon Earthquake - A Comparison to the European Response. Earth Sciences History, 1983, 2(1): 17-27.

The Lisbon earthquake produced split reactions among some European naturalist-theologians such as Elie Bertrand and William Stukeley. As preachers, they referred to the wrath of God, as naturalists, they discussed natural causes of earthquakes. Bertrand gave a summary of current theories on earthquakes but remained skeptical and preferred to record related events in Switzerland. Stukeley proposed a theory according to which earthquakes were caused by electricity. John Michell, Woodwardian Professor at the University of Cambridge, referred only to natural causes, relying on the notion of subterranean fires. He explained that, according to his observation of anticlines, combustible matter lied deeply buried and pent up in flat countries, whereas in mountains strata containing such material occurred close to the surface so that vapors could easily escape through the vents of volcanoes. The reaction to the Lisbon earthquake in newspaper articles, earthquake-sermons and pamphlets printed in the New World appears unanimous: earthquakes are caused by God, although he may act through natural causes. Dr. John Perkins, physicians in Boston, proposed that earthquakes may be caused by settling of land in mountains. He argued that the upper parts of lands consist of harder and less pliable material than the lower parts which are yielding and water-soaked. Underground waters carry away parts of this lower substance and the resulting caverns collapse when the overlying heavier material sinks into the lower one.

Avogadro's Hypothesis

BROOKE, JOHN HEDLEY. Avogadro's hypothesis and its fate: a case study in the failure of case-studies. History of Science, 1981, 19: 235-273.

The paper examines various explanations for the delay of 50 years before Avogadro's hypothesis was widely accepted and applied. Several of these explanations rely heavily, and narrowly, on theses drawn from the philosophy of science. This case-study approach is challenged on both historical and philosophical grounds. A detailed analysis suggests that far from the eventual acceptance of Avogadro's hypothesis having led to a revolution in chemistry, it was a prior revolution in chemistry that made possible the rehabilitation of Avogadro's hypothesis.

Author's address: Department of History, Furness College, University of Lancaster, Lancaster, England. Very limited number of preprints available.

Substance

HARMAN, P. M. Metaphysics and Natural Philosophy. The Problem of Substance in Classical Physics. Brighton, Eng.: The Harvester Press, and Totowa, NJ: Barnes & Noble, 1982. \$26.50.

This book emphasizes the conceptual diversity of the systems of physical theory comprising classical physics, and highlights the role of metaphysical arguments in the justification of the ontological assumptions of these physical theories. By focusing on some of the major concepts in the historical development of classical physics, concepts of force, inertia, energy and matter, this book seeks to provide an analysis of the problem of substance and the associated concepts of force, energy, and the activity and passivity of matter in the physical theories of the 18th and 19th centuries. By an analysis of the work of Newton, Leibniz, Kant, Faraday, Helmholtz, Maxwell and others this book emphasizes the role of metaphysical argument in establishing the intelligibility and conceptual rational of physical theories. The book analyses the attempts by 18th-century natural philosophers to clarify the conceptual structure of physical theory, and the reference to ontological foundations and metaphysical argument by 19th-century physicists in formulating energy and field theories and in justifying their appeal to mechanical principles.

Instruments

WYNTER, HARRIET. Catalogue. Scientific Instruments and Curiosities. 26 pp. London: Harriet Wynter Ltd., June 1983.

Photographs and descriptions of 65 items (barometers, quadrants, microscopes, telescopes, astrolabes, etc...), mostly 18th or 19th century. "This catalogue is sent to you free-of-charge but ... If you want to stay on our mailing list, send us £ 6.50 (U.S. \$10) or become a customer."

Address: Harriet Wynter Ltd., Arts and Sciences, 50 Redcliffe Road, London SW 10 9NJ, England, U.K.

Animal Energy

KREMER, RICHARD L. Physics, physiology and energy conservation in the 1860s: Heidenhain vs. Fick. Presented at the Joint Atlantic Seminar in the History of the Physical Sciences, Washington, D.C., 8-9 April 1983.

After Helmholtz's 1847 formulation of the principle of energy conservation, most physiologists did not doubt that the principle applied to organic processes. Yet whole animal calorimetry studies seemed to indicate the contrary. Heidenhain and Fick developed another model for applying the energy principle to life by measuring heat and work produced by isolated, contracting muscles. These reductionist physiologists quarreled over physical definitions and ultimately failed to prove that energy is conserved because of disagreeing over when chemical processes occur during muscle action. Their debate reveals some of the pitfalls in 19th-century "organic physics."

For preprint write to R. L. Kremer, Dept. of History of Science, Harvard University, Cambridge, MA 02138.

Ether

SIEGEL, DANIEL M. Thomson, Maxwell, and the Universal Ether in Victorian Physics. Pp. 239-268 in G. N. Cantor, M. J. S. Hodge (eds.) Conceptions of Ether. New York: Cambridge Univ. Press, 1981.

In the decades after 1850 the luminiferous ether was assigned additional functions: James Clerk Maxwell showed how the optical ether could be fruitfully regarded as the seat of electrical and magnetic effects as well; and William Thomson (Lord Kelvin) argued that atoms of ordinary matter could be viewed as nothing but patterns of vortex motion in an ubiquitous, space-filling medium. These ideas of Maxwell and Thomson, as interpreted and elaborated in the closing decades of the nineteenth century by George Fitzgerald, Oliver Lodge, Joseph Larmor, and others, gave rise to the notion of a truly universal ether.

Author's address: Department of the History of Science, University of Wisconsin, Madison, WI 43706.

Statistical Atoms

BRUSH, STEPHEN G. Statistical Physics and the Atomic Theory of Matter, from Boyle and Newton to Landau and Onsager. x + 356 pp. Princeton, NJ: Princeton University Press, 1983. Cloth \$45.00, Paper \$15.00

The book begins with a survey of theories of gases from the 17th through 19th centuries. Following chapters discuss irreversibility and indeterminism in heat theory (Fourier, Maxwell, Boltzmann), leading to Brownian movement and Heisenberg's principle. A brief outline of the development of quantum mechanics and its philosophy is followed by a chapter on quantum mechanical properties of matter, which has a long section on the superfluidity of liquid helium. Other 20th-century topics covered are interatomic forces, the chemical bond, phase transitions and critical point phenomena. The use of cases from the history of statistical physics in the philosophy of science is discussed, especially in regard to "reduction." A final chapter reviews some outstanding contemporary problems on the basis of a mail survey of scientists active in statistical physics research.

Carnot

WILSON, S.S. Sadi Carnot. Scientific American, August 1981, 245(2): 134-145.

"He is known for his analysis of an ideal heat engine, but his chief interest was the practical application of steam power. Furthermore, the cycle he described is not an ideal one for most modern engines."

Virial & 2nd Law

BIERHALTER, GÜNTER. Das Virialtheorem in seiner Beziehung zu den mechanischen Grundlegungen des zweiten Hauptsatzes der Wärmelehre. Archive for History of Exact Sciences, 1982, 27(3): 199-211.

The virial theorem discovered in the previous century has been interpreted sometimes as the mechanical counterpart of the second law of thermodynamics. However, it is not clearly explained in the subject papers how the analytical equation $dQ/T = dS$ should result from the virial theorem.

The present article covers this gap. It is explained how by means of variational procedures used by L. Boltzmann and R. Clausius as well as of the hypothesis of a periodical motion of the molecules, the existence of the entropy function can be concluded from the virial theorem.

Offprints may be obtained while supply lasts from G. Bierhalter, Rudolf-Pöhlner-Allee 8, D-7530 Pforzheim, Fed. Rep. of Germany.

Truth

LEPLIN, J. Truth and Scientific Progress. Studies in History and Philosophy of Science, 1981, 12: 269-291.

This paper attempts an explanationist defense of scientific realism which survives the historical objection that inference to empirically successful theories has proven precipitous. By analyzing increases of predictive, explanatory, and observational power with theory change as distinct explanations for realism, the charge that an explanationist argument must violate the methodological requirement of independent testability is answered. The problem of defending the explanatory status of approximate truth is circumvented by analyzing progress as increase of truthlikeness. The precession of Mercury's perihelium is discussed as an example.

A limited number of reprints is available from J. Leplin, Department of Philosophy, University of North Carolina, Greensboro, North Carolina 27412.

Relativity in Annalen

PYENSON, LEWIS. M. Planck--Redaktor "Annalen der Physik": Bor'ba za ytvershdenie teorii otnositel'nosti. Voprosy Istorii Estestvoznaniya i Tekhniki, 1982, 1: 61-71.

Based on the correspondence between the two editors of the Annalen der Physik, M. Planck and W. Wien, the editorial policy towards articles on the theory of relativity is considered. It was Planck who took an active part in popularizing the theory and tried to achieve its general recognition, paying in this case special attention to the physical meaning of the theory.

Author's address: Institute d'histoire et de Sociopolitique des Sciences, Case postale 6128, Succursale "A", Montreal, P.Q., H3C 3J7, Canada.

Michelson Experiment

HAUBOLD, H. J.; R.W. JOHN, Albert A. Michelsons Ätherdrift-Experiment 1880/1881 in Berlin und Potsdam. NTM-Schriftenreihe für Geschichte der Naturwissenschaften, Technik und Medizin (Leipzig), 1982, 19: 31-45.

In 1881, Michelson performed for the first time in Potsdam his interferometer experiment to determine the velocity of the earth relative to the hypothetical luminiferous aether. After a short review of Michelson's experiments with light before 1880 his scientific stay at the Friedrich Wilhelms University of Berlin and the Astrophysical Observatory of Potsdam is reconstructed by means of documents from the archive of the University. Helmholtz' influence on Michelson carrying out his experiment is analyzed and the importance of the Michelson interferometer for nowadays physics is outlined.

For reprint (and additional papers) write to H. J. Haubold, Zentralinstitut für Astrophysik, DDR-1500 Potsdam, Telegrafenberg, German Democratic Republic.

Relativity in America

GOLDBERG, STANLEY. The Assimilation of Relativity in America. Presented at the History and Philosophy of Science Colloquium, University of Maryland, College Park, Maryland, April 18, 1983.

This paper examines the manner in which Einstein's theory of relativity was first received and then assimilated in the American scientific community. The role of various social institutions in effecting that assimilation will be discussed; and the question will be raised of the possibility of defining an American scientific style as a manifestation of American culture. Particular attention will be paid to the manner in which physicists and philosophers of science have addressed the epistemological issues raised by the theory of relativity.

Author's address: 504 Third Street, S.E., Washington, D.C. 20003

Einstein's Epistemology

DEBNATH, LOKENATH. Albert Einstein - Scientific Epistemology. Pp. 315-327 in Th.M. Rassias, G.M. Rassias, (eds.) Selected Studies: Physics-Astrophysics, Mathematics, History of Science. Amsterdam/New York/Oxford: North-Holland Publishing Company, 1982.

This centennial tribute commemorates Albert Einstein and his scientific epistemology. A brief account of his great contributions to physical science as well as scientific epistemology is presented in recognition of the unique scientist-philosopher duality of Einstein. Attention is given to Einstein's conception of scientific theory and method in order to understand his scientific epistemology.

Author's address: Department of Mathematics and Physics, East Carolina University, Greenville, NC 27834, USA

Birkhoff on Gravity

BIRKHOFF, GARRETT. George D. Birkhoff's Theory of Gravitation. Pp. 57-77 in Th.M. Rassias, G.M. Rassias, (eds.) Selected Studies: Physics-Astrophysics, Mathematics, History of Science. Amsterdam/New York/Oxford: North-Holland Publishing Company, 1982.

In 1943, George D. Birkhoff formulated a theory of gravitation in flat spacetime. This theory was intended to be a simple mathematical model, providing a consistent basis for rederiving classical celestial mechanics with appropriate relativistic corrections. An analysis is made of the scientific and philosophical background of this theory, and of its relation to Poincaré's 'new physics' of 1904 and Birkhoff's two earlier books on Einstein's theories.

Author's address: Dept. of Mathematics, Harvard University, Cambridge, MA 02138, USA

Einstein on Light

GRABINSKA, T. Einstein's light postulate. Physics Today, (May 1983) 36 #5: 106,108.

Summary of E. Zahar's paper "Why did Einstein's Programme supersede Lorentz's?" and comments on the translation of Einstein's 1922 speech in Japan, published last August in Physics Today. Followed by a brief note by Yoshimasa A. Ono, the translator.

Transmutation

TRENN, T.J. Transmutation: Natural and Artificial. xv + 128 pp. Wiley/London: Heyden, 1981. \$19.95. Foreword by Glenn T. Seaborg.

The newer alchemy is partly rooted in the old, but the new "gold" is energy. It can be released through nuclear processes either in the reactor mode or in the "bomb" mode; but these two are paced each with its own characteristic chain reaction of essentially different rates - and never the twain shall meet.

Webster

KIRKPATRICK, PAUL. David Locke Webster II. November 6, 1888 - December 17, 1976 Biographical Memoirs, National Academy of Science, 1982, 53: 367-400.

This is a written text of 7500-8000 words, followed by a bibliographical listing of the subject's published works, about a hundred in number. The treatment is chronological, from birth in Boston to death in California. It is personal and sometimes anecdotal, containing little detail of his scientific work and no equations. His most notable scientific achievement, and one of his first, was his prior discovery of the quantum relationship which became known throughout the world as the Law of Duane and Hunt. This is alluded to in the memoir but its curious story not unfolded. [See Am. J. Phys., 48 (1980): 803-6] The author was an academic associate of Webster for about three decades.

No reprints available.
Author's address: Paul Kirkpatrick
273 Santa Teresa, Stanford CA
94305

Particles

Comptes Rendus du Colloque International sur l'Histoire de la Physique des Particules: Quelques découvertes, concepts, institutions des années 30 aux années 50. Proceedings of the International Colloquium, 21-23 July 1982 in Paris. Published by Les Editions de Physique, Avenue du Hoggar, Zone Industrielle de Courtaboeuf, B.P. 112, 91944 Les Ulis Cedex, France. (Also: Journal de Physique, Tome 43, supplément au n° 12, December 1982) Published 1982. xx + 496 pp.

Summaries of several papers from this book are presented separately; papers without summaries are listed below: L. Leprince-Rinquet, "Les Rayons Cosmiques et la Physique des Particules à l'École Polytechnique"; C. O'Ceallaigh, "A Contribution to the History of C. F. Powell's Group in the University of Bristol 1945-49"; W. B. Fretter, "Cosmic Rays and Particle Physics at Berkeley"; R. H. Dalitz, "Strange Particle Theory in the Cosmic Ray Period"; O. Piccioni, "Ideas and Non Ideas and the Discovery of the Leptonic Property in Rome"; J. Rösch, "La Venue au Pic-du-midi du Groupe Blackett et du Groupe Leprince-Rinquet"; V. F. Weisskopf, "The Places Where Quantum Mechanics Was Born"; Amaldi, "Italy between the Two World Wars"; P. Auger, "Les Organismes Internationaux"; Y. Yamaguchi, "Role of Institutions in Research of High Energy Physics in Japan for the Period 1930-1960"; A. Messiah, "La Physique des Particules en France après la Seconde Guerre Mondiale (1945-1960)"; E. L. Goldwasser, "How Little Science Became Big Science in the U.S.A."; L. Michel, "Introduction à la Table Ronde"; F. Perrin, "La Découverte de la Radioactivité Bêta Positive"; E. Wigner, "On Science and its Evolution"; C. N. Yang, "The Discrete Symmetries P, T and C"; K. Nishijima, "Some Selection Rules Based on Isospin and Charge Conjugation"; M. Crozon, "An Exhibition on the History of Particle Physics".

Beta Decay

AMALDI, E. Beta Decay Opens the Way to Weak Interactions. Pp. C8-261 - C8-300 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

After a short introduction with some personal recollection, the author summarizes, in Sect 2, the main points of Fermi's theory of beta decay and of the neutrino hypothesis first proposed by Pauli. The successive Sections refer to: a few extensions and modifications of this theory (Sect 3), various experimental investigations carried out in the 30s for testing Pauli's hypothesis and Fermi's approach (Sect 4), further attempts, refinements and proposals (Sect 5) and a few fundamental step forward such as the discovery of the universality of weak interactions, of parity violation by weak interactions, the 2-component theory of the neutrino and the (V-A) theory of weak interactions (Sect 6). Finally Section 7 refers to a few contributions given in the period 1930-1960 to the problem of double beta decay.

Author's address: Istituto de Fisica "Guglielmo Marconi", Piazzale Aldo Moro, 2, 00185 Roma, Italy.

Auxiliary Hypotheses

LEPLIN, J. The Assessment of Auxiliary Hypotheses. British Journal for the Philosophy of Science, 1982, 33: 235-249.

Empiricism traditionally analyzes the legitimacy of recourse to auxiliaries for disconfirmed theories in terms of testability conditions. This approach is incapable of yielding a viable account of the objectivity of theory choice, and it misleadingly collapses a number of importantly different dimensions of appraisal for auxiliaries under the rubric of "ad hocness". An original analysis of ad hocness is defended and contrasted with other requirements on the basis of an historical study of suspect auxiliaries. Examples include Lorentz's contraction hypothesis, Pauli's neutrino hypothesis, and the postulation of trans-Uranian and intra-mercurial planets.

A limited number of reprints is available from J. Leplin, Dept. of Philosophy, University of North Carolina, Greensboro, North Carolina 27412.

Neutrino born

PONTECORVO, B. The Infancy and Youth of Neutrino Physics: Some Recollections. Pp. C8-221 - C8-236 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

The talk is quite subjective in character, and is in no way complete. It is not a chapter of history of particle physics. It is a collection of a few short stories related to neutrino physics. Two of these, about Pauli and Fermi, touch on subjects already covered by a number of physicists, including the author, in connection with the recent neutrino's fiftieth birthday. A story about Majorana's work on Majorana's fermions, which is following, has been covered much less extensively, at least in English. There follow a few recollections, very personal indeed, related to the experimental and theoretical work of the author in proposing and developing the C1-A method of neutrino detection, in establishing the notion of weak processes and in proposing a new type of weak interaction investigations - high energy neutrino experiments.

Author's address: JINR, Dubna, USSR.

Early Accelerators

ANDERSON, H. L. Early History of Physics with Accelerators. Pp. C8-101 - C8-162 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

The early history of physics at accelerators is reviewed, with emphasis on three experiments which have had a profound influence on our view of the structure of matter: The Franck and Hertz experiment demonstrating the mechanism of atomic spectra, the Cockcroft and Walton experiment opening practical ways of studying nuclear disintegration, and the discovery of the Δ^{++} isobar of the proton by Fermi and collaborators, revealing structure in the nucleon. Fermi's work is illustrated by pages from his notebooks.

Author's address: Los Alamos National Laboratory, Los Alamos, NM 87545.

Lawrence

HEILBRON, J.L., ROBERT W. SEIDEL, and BRUCE R. WHEATON. Lawrence and his laboratory. Nuclear science at Berkeley, 1931-1961. 106 pp. University of California, Berkeley: Office for History of Science and Technology, 1981. \$4.50 prepaid including postage.

A large-format (8 1/2 x 11"), well-illustrated outline of the Laboratory's history during the period of its undisputed leadership in accelerator design and particle physics. In order to provide depth as well as breadth of coverage, we have written on two levels. One is a general narrative of the main events and forces in the several periods into which we have divided the Laboratory's first thirty years. The other is an episode from each period that we take to typify it: deuterium disintegration in the 1930s, calutron design during the second world war, meson manufacture in the late 1940s, neutron production for military purposes in the early 1950s, the anti-proton experiments of the mid 1950s, and the building and deployment of the bubble chamber in the late 1950s.

Neutrino detected

REINES, F. Neutrinos to 1960 - Personal Recollections. Pp. C8-237 - C8-260 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

An account is given of the events which led to the detection of the free neutrino starting from the tentative idea to use a nuclear explosion as the neutrino source to the detailed realization of the experiment at a nuclear reactor. The logical requirement for detection of the neutrino at a point remote from its origin is discussed as are some subsequent developments in experimental neutrino physics.

Author's address: Department of Physics, University of California, Irvine, CA 92717.

Berkeley in '30s

VARNEY, ROBERT N. Some physics not in The Physical Review. Physics Today, Oct. 1982, no. 10: 24-29.

"Reminiscences from Berkeley in the 1930s, a period in which a small group of very young scientists stumbled into greatness, revolutionizing the way physics is done."

The author is retired from a position as senior scientist at the Lockheed Palo Alto Research Laboratory.

Nuclear Age

WALSH, John Recollections of the Nuclear Dawn. Science, 1982, 218: 980-81.

Report on symposium of American Nuclear Society on "Historical Perspectives, the Dawn of the Nuclear Age" at which various anecdotes were recounted by I.I. Rabi, H.D. Smyth, and others.

American Bomb

WEART, S. R. The Road to Los Alamos. Pp. C8-301 - C8-321 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

A field of science involves not only pure knowledge, but also images in the public mind. By affecting funding and recruitment into the field, these images help to determine its destination in the world of action. The history of nuclear physics offers an example. By 1938 the field was linked with images of "transmutation", involving not only scientific methods but images of great improvements for health and wealth, and weapons that would bring world peace or doom. The scientists who went to Los Alamos to build atomic bombs did so chiefly because they wanted to defend themselves against the Nazis, just as others were doing with radar and incendiary bombs. Yet they were also responding to fantastic, but accurate, images that were already deeply established in the public mind; without those images there would have been no atomic bombs.

Author's address: Center for History of Physics, American Institute of Physics, 335 East 45 Street, New York, NY 10017.

German Non-Bomb

GOUDSMIT, SAMUEL A. Alsos. Reprint of the 1947 edition with a new introduction by R. V. Jones. (Volume I in the series, "The History of Modern Physics, 1800-1950") Hard bound, 6" x 9", 304 pp., illus., 10 figs., index. ISBN 0-938228-09-9. Los Angeles: Tomash Publishers, 1983. \$28.00 plus \$1.50 shipping; California residents add 6.5% (\$1.82) sales tax.

During World War II, while American scientists were working to devise an atomic bomb at the Manhattan District Project, an intelligence operation was launched to determine what progress toward a similar goal German scientists might have made. This highly secret undertaking was given the code name "ALSOS," the Greek word for "groves" (Major General Leslie Groves was the military commander of the Manhattan District Project).

Samuel A. Goudsmit, a Dutch-born American physicist, completely unconnected with the Manhattan District Project, was chosen to head the mission. In this book, first published in 1947, Goudsmit gives his personal, humorous, and highly readable account of the activities and findings of the ALSOS mission. At the same time, Goudsmit analyzes the characteristics of science in Germany under the Nazis.

In this new edition of Goudsmit's long-out-of-print volume, the publishers have included additional pictorial material and a new foreword by Professor R. V. Jones, whose long association with British intelligence activities included the responsibility for scientific liaison with interned German nuclear physicists.

Particles in Cosmic Rays

PEYROU, CH. The role of Cosmic Rays in the Development of Particle Physics. Pp. C8-7 - C8-67 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

The discoveries of elementary particles in cosmic rays are reviewed. The paper starts with the discovery of the positron in 1932, follows with the discoveries of the light mesons and make an extensive description of the finding of strange particles in cosmic rays.

Author's address: Division EP, CERN, 1211 Genève 23, Switzerland.

Cosmic Ray Techniques

ROSSI, B. Development of the Cosmic Ray Techniques. Pp. C8-69 - C8-88 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

A close relationship exists between the advances of cosmic-ray physics and technical developments. Thus the development of highly sensitive ionization chambers, eventually to become self-recording instruments, was an essential prerequisite of the observations which first suggested, then proved the extraterrestrial origin of the radiation. The invention of the Geiger-Müller counter and of the associated coincidence devices opened the door to the investigation of the physical properties of the local radiation. Also "c.r. telescopes," made of G.M. counters, discovered the E-W effect, showing that primary c.r. are positively charged particles. The development of cloud-chambers suitable for c.r. observations, and the development of nuclear emulsions were responsible for the discovery of "new" elementary particles in the local radiation (the positive electron, the μ -meson, the π -meson, the "strange" particles). New techniques involving the use of very large detector arrays produced important advances in the study of air showers showing that the primary spectrum extends beyond 10^{20} e.v. Finally, the availability of space vehicles, coupled with the development of new suitable detectors made it possible to determine the chemical and isotopic composition of the incident radiation.

Author's address: Department of Physics and Center for Space Research, MIT, Cambridge, MA 02139.

Strange Particles

ROCHESTER, G. D. Observations on the Discovery of the Strange Particles. Pp. C8-169 - C8-175 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

Observations on the early history of the discovery of the strange particles, starting in 1940 with the work of L. Jánosy and his collaborators on showers of penetrating particles and ending with the confirmation of the Manchester discoveries by C. D. Anderson and his group in Pasadena in 1950. The rôle of P. M. S. Blackett is emphasized.

Author's address: Department of Physics, Durham University, South Road, Durham, DH1 3LE, United Kingdom.

Cloud Chamber

BUTLER, C. C. Early Cloud Chamber Experiments at the Pic-du-Midi. Pp. C8-177 - C8-184 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

The early history of cloud chamber work on strange particles is described. Particular attention is given to the pioneering work of the Manchester group at the Pic-du-Midi in France. The paper concludes with some preliminary remarks on the value of historical studies of the development of main areas of physics.

Author's address: Loughborough University of Technology, Loughborough, Leicestershire, LE11 3TY, United Kingdom.

Strangeness

GELL-MANN, M. Strangeness. Pp. C8-395 - C8-408 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

This paper is not a history of the discovery of the strangeness, but rather a contribution to such a history, consisting of personal reminiscences. The atmosphere and ideas of the period 1951-1953 are described. The author explains the reasons that led him to introduce the concept of the strangeness and how he had to convince people and to overcome oppositions.

Author's address: Lauritsen Laboratory of Physics, California Institute of Technology, Pasadena, CA 91125.

Particle Chronology

SIX, J. and ARTRU, X. An Essay of Chronology of Particle Physics until 1965. Pp. C8-465 - C8-493 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

The main developments in elementary particle physics, from the origins to 1965, are presented in a chronological list with three columns: theories, experimental discoveries and technical means. Our work mainly focuses on the period 1930-1965, for which we give the references of the original papers.

Authors' address: J. Six, Laboratoire de l'Accélérateur Linéaire, Bât. 200, Université Paris-Sud, 91405 Orsay, France; X. Artru, Laboratoire de Physique Théorique et Hautes Energies, Bât. 211, Université Paris-Sud, 91405 Orsay, France.

Nuclear Chemistry

SEABORG, GLENN T.; WALTER, LOVELAND, eds. Nuclear Chemistry. xvi + 488 pp. Stroudeberg: Dowden, Hutchinson, Ross, 1982. \$75.00.

An annotated collection of reprints tracing the history of nuclear chemistry (and nuclear science) from 1896 to the present. The "bench mark" papers discussing radioactive decay, nuclear structure, nuclear reactions, cosmochemistry, the applications of nuclear chemistry and nuclear energy are reprinted. English translations of several papers are presented for the first time.

High Energy Theory

CUSHING, JAMES T. Models, High-Energy Theoretical Physics and Realism. Paper delivered at a symposium on high-energy physics at the 1982 Philosophy of Science Association Meeting in Philadelphia.

Developments in the history of theoretical high-energy physics are used to examine three issues. First is the use of highly abstract, formal models in the generation and evolution of theories. Second, a representation of the scientific enterprise is argued for in which the stability of successful theories is a reflection of the difficulty of constructing them, rather than of their objective truth. Third, the reality of theoretical entities is related to these two issues.

For reprints write to Prof. J. T. Cushing, Dept. of Physics, University of Notre Dame, Notre Dame, IN 46556.

Thermonuclear Reactions

HAUBOLD, H. J., R.W. JOHN. Present Status of the Theory and Analytic Evaluation of Non-Resonant Thermonuclear Reaction Rates. Astronomische Nachrichten, 1982, 303: 161-187.

The paper deals with the theory of rates for thermonuclear reactions first computed by Atkinson and Houtermans (1929) from the physical point of view and by Faxen (1921) from the mathematical point of view. Results recently obtained by the authors are also reviewed in connection with the earlier work on the evaluation of thermonuclear reaction rates. In this sense the paper is only partly about history of physics.

For reprint (and additional papers) write to H. J. Haubold, Zentralinstitut für Astrophysik, DDR-1500 Potsdam, Telegrafenberg, German Democratic Republic.

Fusion

BROMBERG, Joan Lisa. Fusion: Science, Politics, and the Invention of a New Energy Source. xxvi + 344 pp. Cambridge, Mass., MIT Press, 1982. \$30.00.

Fusion is a history of the scientific strategy of the program to invent a magnetic energy fusion reactor, as that strategy evolved under the joint impact of technical developments and national and internal politics. The fusion program started in 1951, within the context of hydrogen bomb research; the book carries the story from then to a point midway through the Carter presidency. Preponderant attention is paid to the programs at the four Atomic Energy Commission laboratories -- Oak Ridge, Livermore, Los Alamos and Princeton Plasma Physics Laboratory -- on which the bulk of federal money was spent. The steady movement of the locus of strategic decision-making, from the laboratories towards more central management levels, is also traced.

Semiconductors

SCHOPMAN, J. Wetenschap in bedrijf: ontwikkeling en organisatie van organisatie van het halfgeleideronderzoek binnen de N.V. Philips Gloeilampenfabrieken (1930-1955). Tijdschrift voor de geschiedenis der geneeskunde, natuurwetenschappen, wiskunde en techniek, (1982), 5: 158-185.

A study has been made of semiconductor research in the Netherlands during the period 1930-1955. Research was only performed by the N.V. Philips Gloeilampenfabrieken at Eindhoven, especially within its Natuurkundig Laboratorium (Physical Laboratory). From 1914 Philips spent much attention to scientific research. This is due to its type of products. In the case of semiconductors the laboratory first studied barrier layer semiconductors, in particular selenium. During the second world war new types of resistors were developed as a result of the work on spinels and controlled valency. After the war the germanium technology appeared to have been developed so far that germanium formed the ideal semiconductor material; later it was superseded by silicon.

For reprints write to J. Schopman, Centrale Interfaculteit, Rijksuniversiteit Utrecht, Transitorium 2, Heidelberglaan 2, Utrecht, The Netherlands.

Casimir

CASIMIR, HENDRIK B. G. Haphazard Reality. Half a Century of Science, xii + 356 pp. New York, 1983. \$20.00.

Recollections of theoretical physics in the 1920's and 1930's, and of later activities at the Philips Research Laboratory, with general considerations on industry and science after WW2.

Einstein vs. Bell?

FINE, ARTHUR. What is Einstein's Statistical Interpretation, or, Is It Einstein for Whom Bell's Theorem Tolls? To be published in Topoi, Fall 1984.

In principle, the standard account of Einstein's statistical interpretation of the state functions of quantum theory is inconsistent with the quantum theory for coupled systems (Bell's Theorem). I show that the standard account is also inconsistent with the text provided by Einstein that describes his interpretation. I offer a different account of Einstein's interpretation, one that avoids Bell's Theorem, is consistent with quantum theory, and that seems to fit Einstein's text exactly. I relate these issues to the program of hidden variables, where I try to explain Einstein's conception of that program, and his ideas on the right way to "complete" the quantum theory. There is an appendix on locality, showing how Einstein's conception of locality differs fundamentally from those commonly used in the Bell literature.

Author's address: Department of Philosophy, Northwestern University, Evanston, IL 60201

Schwinger on QED

SCHWINGER, J. Quantum Electrodynamics - An Individual View. Pp. C8-409 - C8-423 in Colloque International sur l'Histoire de la Physique des Particules. Paris: Editions de Physique, 1982.

The aim of this report is to describe the development of the quantum electrodynamics in the years from the 1930's to the 1950's. It is based on the way the author saw and participate to this development. Four phases are discussed: preparation (1934-1946); non-covariant relativistic theory (1947); first covariant relativistic theory (1947-1948); second covariant relativistic theory (1949-1950). A detailed technical description is presented. The author shows the influence of quantum electrodynamics in other areas of physics.

Author's address: Physics Department, UCLA, Los Angeles, CA 90024.

Murphy

FORWARD, ROBERT L. Murphy Lives! Science 83, Jan./Feb., p. 78.

On the history of what is sometimes called the 4th Law of Thermodynamics, or "Murphy's Law," with a photo of Edward A. Murphy Jr.

Holton

BRINCKERHOFF, RICHARD F. Talks with great teachers: Gerald Holton. The Physics Teacher, 1982, 20: 602-5, 611.

Interview with Holton, Professor of Physics and History of Science at Harvard, about his career and contributions to physics education.

Author's address: R. F. Brinckerhoff, Science Department, Phillips Exeter Academy, Exeter, NH 03833.

Letters

WHEATON, BRUCE R. and J. L. HELLBRON. An Inventory of Published Letters to and from Physicists, 1900-1950. Berkeley Papers in History of Science, volume 6. 977 microfiche pages + 102 index pages. Office for History of Science and Technology, University of California at Berkeley, 1982. \$21.50. With BPHS, vol. 5 (see below) \$36.75 total. Calif. residents add sales tax.

The microfiche included with this publication list (on almost 1,000 pages of computer output) 40,000 references to individual letters written by or to any of 776 physicists active in the first half of the century. References are arranged by physicist's name and all physicist-physicist letters are given under both names. For each physicist, quoted letters are listed by correspondent's name, and the user is told the date of the letter, the language and length of the quotation, whether a facsimile copy is published, and the page and source of the published copy. Virtually all 7,000 entries in the same authors' 439-page bibliography Literature on the History of Physics in the 20th Century (BPHS vol. 5) were examined for quotations.

The accompanying printed index gives the full list of physicists for whom letters were found, a complete list of non-physicist correspondents' names scattered on the fiche, and a complete list by author and year of the published sources in which the quotations can be found. Because the fiche identify the published sources according to the subject codes used in the separate bibliography, access to the latter is necessary for full use of the Inventory.

Scientific Disciplines

WEISZ, DIANE B.; CARLOS E. KRUYTBOSCH. Studies of Scientific Disciplines: An Annotated Bibliography. iii + 185 pp. Washington, D.C.: National Science Foundation, 1983. Copies available from the National Technical Information Service, Document Sales, Springfield, VA 22161 (Cite publication no. PB83-159954), \$17.50; microfiche copies available from the National Science Foundation (accession number NSF/PRM 82006), \$4.50.

"The primary objective of this bibliography is to make accessible to the managers and practitioners of science and engineering the findings from the social studies of science in a form that will be useful to them." It contains 285 annotated entries, arranged in 13 disciplinary areas with additional cross-references; there are 92 entries for Physics. "On the whole, we believe that insufficient justice was done to well researched pieces from the history of science literature which deal with important social aspects of disciplines." Additional items are being collected for the next edition.

Authors' address: Ms. Diane Weisz & Dr. Carlos Kruytbosch, Division of Planning and Policy Analysis, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550 (a few individual copies are available for free distribution to scholars working in this field).

Geosciences

SCHRÖDER, WILFRIED. Aspects in the history of geosciences. Sudhoffs Archiv, 1982, 66: 339-349.

Research activities focusing on the history and philosophy of various sciences are rather heterogeneous. Some disciplines, such as medicine, mathematics, and astronomy, have numerous noteworthy compendia and even specialized journals where papers on their respective history and philosophy can be published. The situation in geophysics, meteorology, and other subdivisions of the geosciences is less favorable. In this essay it is shown that research in the history and philosophy of these sciences requires profound knowledge of many disciplines, including the geosciences. The author intends not only to acquaint a larger circle of geophysicists, with the necessity of studying historical aspects in geophysics, but also to stimulate colleagues in the history and philosophy of sciences to contribute to the history of geosciences through their own writings.

For reprint write to W. Schröder, Hechelstrasse 8, D-2820 Bremen-Ronnebeck, Fed. Rep. of Germany.

Wiechert

SCHRÖDER, WILFRIED. Emil Wiechert and the development of geophysics as an exact science. Archive for History of Exact Sciences, 1982, 27: 369-389.

Geophysical Aspects of the 19th century - geophysical problems at Neumann's school of theoretical physics - biography of Wiechert - development of geophysics at Göttingen (University, Academy of sciences) - international cooperation in geophysical research - Physics and geophysics in Wiechert's scientific work.

For reprint write to W. Schröder, Hechelstrasse 8, D-2820 Bremen-Ronnebeck, Fed. Rep. of Germany.

Altar & Appleton

GILLMOR, C. STEWART. Wilhelm Altar, Edward Appleton, and the Magneto-ionic Theory. Proceedings of the American Philosophical Society, 1982, 126(5): 395-440.

Wilhelm Altar, a young Viennese theoretical physicist, collaborated with Edward Appleton in 1925-26 on the magneto-ionic theory. Altar produced a manuscript "Wellenausbreitung in ionisierten Gasen unter dem Einfluss eines Magnetfelds." In this manuscript appears for the first time the plasma dispersion relation, or the equation of the wave-normal surface, in the cold-plasma model in plasma physics theory. This work also contributed to Appleton's later publication of the magneto-ionic theory, although Altar's work has not generally been known previously. Gillmor's article contains also an English translation of the Altar manuscript, and reference to letters and work of H. A. Lorentz, J. Larmor, G. Breit, C. G. Darwin, D. R. Hartree and others.

Author's address: C. S. Gillmor, Dept. of History, Wesleyan University, Middletown, CT 06457 (no reprints available).

Science/Pseudoscience

LAUDAN, RACHEL (ed.) The Demarcation between Science and Pseudo-Science. Blacksburg, VA: Center for the Study of Science in Society at Virginia Tech, 1983, 200 pp.

This is Volume 2 in the Center's series of Working Papers and contains papers presented by: Larry Laudan, "The Demise of the Demarcation Problem," pp. 7-35; Andrew Lugg, "Pseudoscientific Practices--Some Similarities and Differences," pp. 37-57; Thomas F. Gieryn, "Making the Demarcation of Science a Sociological Problem: Boundary-Work by John Tyndall, Victorian Scientist," pp. 59-86; Henry H. Bauer, "Velikovsky and the Loch Ness Monster: Attempts at Demarcation in Two Controversies," pp. 87-106; I. J. Good, "Scientific Speculations on the Paranormal: Introductory Comments," pp. 107-12; Seymour H. Mauskopf, "Believers and Skeptics: Attitudes Towards Evidence Within Parapsychology," pp. 113-47; Ron Westrum, "Cryptoscience and Social Intelligence about Anomalous Events," pp. 149-74; Rachal Laudan, "Scientific Insanity: Drifting Continents and Other Theories of the Crust of the Earth," pp. 175-200.

To order, send check for \$4.00 payable to the Center for the Study of Science in Society, Price House, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.

Algebra

PARSHALL, KAREN V. H. Joseph H. M. Wedderburn and the Finite Division Algebra Theorem. Presented at the Joint Atlantic Seminar for the History of the Physical Sciences, Georgetown University, Washington, D.C., April 15-16, 1983.

In the spring of 1905, the Scotsman, Joseph H. M. Wedderburn, succeeded in proving the finite division algebra theorem while he was a Carnegie fellow at the University of Chicago. Apparently Wedderburn and Leonard E. Dickson were both working on the conjecture that every finite division algebra was a field. Dickson seemingly sought a counterexample but Wedderburn found three distinct proofs. In the course of Dickson's research, however, he happened upon a class of algebras which Wedderburn and Oswald Veblen subsequently used to construct the first examples of finite non-Desarguanian and non-Pascalian geometries.

For preprints write to Karen V. H. Parshall, Dept. of Mathematical Sciences, Sweet Briar College, Sweet Briar, VA 24595

Universe Debate

SMITH, ROBERT W. The Expanding Universe. Astronomy's "Great Debate" 1900-1931. 229 pp. New York: Cambridge Univ. Press, 1982. \$29.50.

Between 1900 and 1931 astronomers significantly revised their conception of the universe based on three revolutionary discoveries; our galaxy was roughly ten times bigger than previously thought; there are galaxies beyond our own; these galaxies reveal the expansion of the universe.

This book describes and explains in detail these three discoveries, and in addition to presenting much new evidence, it provides major new interpretations of several of the processes and events associated with these discoveries. It exploits, for example, previously unused archival material in its discussion of the "Great Debate" between Shapley and Curtis in 1920.

Cosmology

MORANDO, BRUNO; JACQUES MERLEAU-PONTY. The Rebirth of Cosmology. Translated from French by Helen Weaver. 328 pp. Athens, OH: Ohio University Press, 1982. Paperback, \$9.95. (The first American hardcover edition was published by Alfred A. Knopf in 1976)

Pulsars

McMORRIS, MICHAEL N. Pulsar Research as Normal Science. *Physica*, 1982, 24: 265-279.

Pulsar research is characterized through a broadly sketched paradigm, a cumulative advance and puzzle-solving activity. It is argued that this characterization established pulsar research as normal science according to Kuhn.

Author's address: M. N. McMorris, Department of Physics, University of the West Indies, Mona, Kingston 7, Jamaica.

HERMANN, D. B. Kosmische Weiten. Geschichte der Entfernungsmessung im Weltall. Second edition. 96pp. Leipzig: J. A. Barth, 1981. Price 14,-M

Das Buch vermittelt einen Überblick über die Geschichte der Messung der Fixsternentfernungen. Damit wird zugleich gezeigt, wie eng der Zusammenhang zwischen den Entfernungsbestimmungen mit prinzipiellen Fragen des astronomischen Weltbildes ist, wie stark die Lösung des Problems vom Stand der Technik bestimmt wird und wie unternbar das scheinbar so einfache Problem der Sternentfernungsmessung mit zahlreichen anderen Kenntnissen der Astronomie zusammenhängt, auch mit solchen, die mit der "klassischen Astronomie" nichts gemein haben. Zum Abschluss soll auf die vielseitige Bedeutung verwiesen werden, die der Kenntnis von Entfernungen im Weltall überhaupt zukommt.

Nuclear Astrophysics

BARNES, C. A.; D. D. CLAYTON; D. N. SCHRAMM (eds.) Essays in Nuclear Astrophysics, Presented to William A. Fowler on the occasion of his seventieth birthday. xiv + 562 pp. New York: Cambridge University Press, 1982. Cloth, \$75; paper, \$29.95.

Includes the following historical papers: Fred Hoyle, "Two Decades of collaboration with Willy Fowler," pp. 1-9; E. M. Burbidge & G. R. Burbidge, "Nucleosynthesis in galaxies," pp. 11-21; G. J. Wasserburg & D. A. Papanastassiou, "Some short-lived nuclides in the early solar system -- A connection with the placental ISM," pp. 77-140; John N. Bahcall & Raymond Davis, Jr., "An account of the development of the solar neutrino problem," pp. 243-85; "Publications and Research Papers of William A. Fowler," pp. 533-44.

Valence

STRANGES, ANTHONY. Electrons and Valence: Development of the Theory, 1900-1925. 296 pp. College Station, Texas: Texas A & M University Press, 1982. \$28.50.

Along with the doctrine of atomism, the electron theory of valence ranks as one of the most fundamental developments in the history of modern chemistry. Its development began shortly after J.J. Thomson at Cambridge University discovered the electron in 1897. His valence theory and that of the German chemist, Richard Abegg, were among the earliest. Abegg and Thomson proposed that the bond holding atoms together in a molecule was always electrostatic or polar. But only in 1916 did G. N. Lewis succeed in putting forward the accepted electronic mechanism for the nonpolar bond--the shared electron pair. The polar bond remained in use for those structures known to consist of ions, while for essentially nonpolar compounds the Lewis shared electron pair quickly became the dominant mechanism of bond formation. J. J. Thomson, the Berkeley chemists, and Irving Langmuir made important contributions to the development of the electron valence theory, but G. N. Lewis was clearly the central figure. His far reaching idea of the shared electron pair bond, though later given a quantitative interpretation by quantum mechanics in the mid-twenties, remains to this day the foundation of modern valence theory.

Brillouin

YOUNG, ANDREW T. Wrong Brillouin. *Physics Today*, May 1982, 35, no. 5; 130-31.

Alfred Kastler noted that Young's article on Rayleigh scattering (Jan., p. 42) incorrectly attributes the Brillouin effect to Marcel Louis Brillouin instead of Leon. Kastler's letter is quoted.

Work in Progress
X-rays

NAGEL, D. J. History of X-Ray Work.

X-rays have had and still have immense impact on science and technology. 1995 will include the centennial of the discovery of x-rays. I am in the early stages of planning and information gathering for a book documenting the first century of x-ray work. Breadth of coverage will be emphasized; that is, all areas of x-ray research will be included. A major goal will be to give a balanced coverage of work in all nations. Correspondence relevant to this project will be welcome.

Write to: D. J. Nagel, Head, Condensed Matter Physics Branch, Naval Research Laboratory, Washington, DC 20375.

Turbulence

BATTIMELLI, GIOVANNI. Statistical theories of turbulence; G. Taylor's turning point in 1935. Presented at the National Air and Space Museum, Washington, D.C., 21 May 1981.

For further information write to Dr. G. Battimelli, Istituto di Fisica "G. Marconi", P.le A. Moro 2, ROMA (Italy).

Heisenberg

CASSIDY, DAVID C. Werner Heisenberg. A biography.

For further information write to Dr. D. C. Cassidy, Lehrstuhl für Wissenschaftsgeschichte, Universität Regensburg, D-8400 Regensburg, West Germany.

Space

WINTERBOURNE, A. T. Newton's Proof of Absolute Space: paper in preparation.

I am preparing a paper examining Newton's arguments for absolute space, given in the Scholium to Definition VIII of the *Principia*. The two thought-experiments have previously been misrepresented. The argument is more complex than the received interpretation suggests. The latter - concerning the move from forces to absolute space, changes the logic of Newton's argument. My reading of this may initiate discussion of Newton's idea of space as God's sensorium and Newton's implicit metaphysics.

Author's address: Birmingham Polytechnic, Margaret Street, Birmingham, United Kingdom.

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S. G. Brush/APS Div.Hist.Phys.
Inst. Phys. Sci. Tech.
University of Maryland
College Park, MD 20742

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