

# History of Physics Newsletter

Volume IV, Number 1

October 1989

## DIVISION NEWS

### APS MEETINGS

The Division of History of Physics will sponsor invited paper sessions at the following APS meetings in 1990.

#### **Atlanta, GA, "Philosophy in Physics."**

January 22-25, 1990. This is a joint meeting of the APS and the AAPT, and this session is cosponsored by the APS Division of History of Physics and the Committee on History and Philosophy of Physics of the AAPT. The session is being organized by James T. Cushing. The speakers include:

*Ernan McMullin*: "The Role of Philosophy in Newton's Science"

*Fritz Rohrlich*: "Conceptual Coherence Between Physical Theories"

*George Gale*: "Philosophical Mid-wifery and the Birth Pangs of Modern Cosmology"

*David Park*: "What Does Probability Mean in a Physical Theory"

#### **Washington, DC, "Aspects of Field Theory"**

April 16-19, 1990.

This session is being organized by Laurie Brown.

#### **Washington, DC, "Special Commemorative Session on Maxwell"**

(The plans for this session are tentative.) The session will be organized by Daniel M. Siegel.

### NOMINATIONS FOR OFFICERS

The Nominating Committee for the 1990 Divisional election consists of C. Stewart Gillmor (chair), Stephen Brush, Kenneth W. Ford, Stanley Goldberg, and Roger Stuewer. The Nominating Committee would appreciate receiving suggestions for nominees who are willing to be Vice-Chairperson (to become Chairperson in 1991) and/or members of the Executive Committee who serve for three years. Please send suggestions as soon as possible to Professor C. Stewart Gillmor, Department of History, Wesleyan University, Middletown, CT 06457. Members of the History of Physics Division are eligible for nomination.

### ELECTION RESULTS

Allan Franklin was elected vice-chairperson of the Division of History of Physics for 1989 and

will serve as chairperson in 1990. He is a Professor of Physics at the University of Colorado. He received his AB from Columbia University and his Ph.D. from Cornell. He began his career as a high energy experimentalist, and since 1975 he has worked on the philosophy and history of physics concentrating on the role of experiments. His historical studies have included the discovery of parity nonconservation, the discovery of CP violation, the Millikan oil-drop experiment, and the history of weak interactions from Fermi to V-A. He has also worked on the history of medieval science. His most recent book is "The Neglect of Experiment."

The membership of the Division elected Laurie M. Brown and Kenneth W. Ford to serve three-year terms on the Executive Committee.

### EMILIO G. SEGRÈ

Emilio Segrè died unexpectedly on April 22nd of this year; he was a member of the Executive Committee of this Division. Segrè was born in Tivoli, Italy in 1905; he received his Ph.D. degree from Rome in 1928. He was a close friend and co-worker of Enrico Fermi, and he was deeply involved in the famous experiments which discovered and used slow neutrons at the University of Rome. In 1938, he moved to the University of California where he remained, except for the war years at Los Alamos. He was Emeritus Professor of Physics at the University of California and Professor of Nuclear Physics at the University of Rome at the time of his death. His death occurred three days prior to the National Academy of Science Commemorative Session on the 50th Anniversary of the Discovery of Fission which he had helped organize as co-chairperson with Glenn Seaborg. Segrè was the co-discoverer of the elements technetium, astatine, and plutonium. In 1959, he shared the Nobel Prize with Owen Chamberlain.

Segrè's contributions to the history of science included: co-editor of "The Collected Papers of Enrico Fermi," author of the biography "Enrico Fermi: Physicist," and author of the books: "From X-Rays to Quarks - Modern Physicists and their Discoveries" and "From Falling Bodies to Radiowaves - Classical Physicists and their Discoveries."

Segrè's insights that stemmed from his being a very active participant in both European and American physics for more than half a century will be missed.

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 who wish to receive it should make a donation to the Division of the History of Physics of \$10 per volume (\$5 additional for airmail). Each volume consists of 5 issues. Editor: *Albert Wattenberg*, Department of Physics, University of Illinois, Urbana, IL 61801. Associate Editors: *Stephen G. Brush*, Dept. of History and Institute for Physical Science and Technology, University of Maryland, College Park, MD 20742, and *R.D. Sard*, Department of Physics, University of Illinois, Urbana, IL 61801.

(election results continued)

**Laurie M. Brown** is a Professor of Physics and Astronomy at Northwestern University where he has been a faculty member since 1950. He received both his A.B. and his Ph.D. from Cornell. He was a member of the Institute for Advanced Study (1952-1953), a Fulbright Fellow in Rome (1958-1960), and a Visiting Professor at: Rome, Seattle, Sao Paulo, and Keio University in Yokohama. He was one of the founders of this Division, and he served as its Chairperson for 1983-84. During the last decade his historical articles have been on the history of theoretical physics in the twentieth century. He was one of the organizers of two international history symposia and is the co-editor of the proceedings of the symposia.

**Kenneth W. Ford** is Executive Director of the American Institute of Physics. He received his bachelor's degree from Harvard and his Ph.D. in theoretical physics from Princeton. His research was in nuclear structure and field theory. He has been on the faculty of Brandeis, U. of Massachusetts at Boston, and the U. of California at Irvine. He has been President of New Mexico Institute of Technology, and Executive Vice-President of the U. of Maryland. He is author of a number of texts as well as a book for the general reader. He has served as President of the AAPT and Chair of the APS Forum on Physics and Society.

**Stanley Goldberg** was chosen by the Executive Committee to complete the term of Emilio Segrè who died unexpectedly. (See front page.) He is consultant to the National Museum of American History and has developed elements of the exhibit: "A Material World." He is consultant to the National Air and Space Museum where he has been serving as director of the Sloan New Liberal Arts Workshop. He has been Professor of History of Science at Hampshire College. He is the author of "Understanding Relativity: Origins and Impact of a Scientific Revolution."

## EXECUTIVE COMMITTEE

The Executive Committee held its annual meeting on May 1st, 1989, in Baltimore, Maryland. Highlights of the reports and discussions are given below:

1. The Chairperson, Lawrence Badash, reported that the members in the Division of History of Physics will not be assessed an additional \$5.00 as will members of other divisions of the APS. Badash and Stephen Brush

both had advised the APS council that such an assessment for non-technical subunits would have had a very deleterious effect. The APS action on the question of assessments took place at the January 1989 meeting of the APS Council. Badash requested that the DHP Secretary/Treasurer keep a permanent file of the titles and talks given at Division invited sessions at APS meetings. He also noted that H. Medicus' session on solid state physics had an attendance of 700 persons, that A. Needell's session on Cosmic Ray physics drew 150 persons; that Gillmor's session on Theoretical Physics drew about 110 persons; that Badash's radio activity session in San Francisco drew about 200 people.

2. Stephen G. Brush, Divisional Councillor, reported on Council actions and considerations that impact on the Division. The possibility of a change in governance of the APS is covered in the APS News section of this Newsletter.

The question of using acid-free paper for publishing journals of the APS was discussed at the April 30th Council meeting. Brush spoke of the serious problem of fragile decaying paper in journals. Needell spoke in favor of acid-free paper in journals for libraries but questioned its use for copies for individuals. The following motion was passed.

"The DHP supports the APS proposal to publish all APS journals on acid-free paper, unless it is cost effective to print a separate run on acid-free paper for libraries and depositories."

**Notice to membership concerning the use of acid-free paper for APS journals:** Interested persons are asked to request that the APS use acid-free paper by writing to B. Craseman, APS Publications Committee Chairperson, c/o American Physical Society, 335 East 45th Street, New York, NY 10017.

Brush introduced the topic of APS Memorial Sessions, and the inclusion or non-inclusion of the DHP. The APS council has made financial support and sponsorship of some Commemorative Conferences contingent upon approval or co-sponsorship by the DHP. An example is the Gibbs Memorial session at Yale in May 1989. Another case is the "Maxwell Foundation" proposal to sponsor a celebration of a Maxwell Centennial 1890-1990. (The date of publication of his "Scientific Papers." Daniel Siegel expressed an interest in helping with a Maxwell session.

3. Secretary-Treasurer's report: Stewart Gillmor reported that a financial accounting would be submitted at the end of the fiscal year. One confusion that was being cleared up was an APS billing for almost \$2,000. He requested, that as per APS by-laws, all session chairs present requests for meeting registration fee waivers for non-APS speakers through the Secretary-Treasurer (Gillmor) for submission to the office of the Executive Secretary of the APS.

4. As chairperson of the program committee, L. Badash reported on the 1989 DHP sessions. The sessions planned for 1990 are listed at the beginning of this section, Division News. Discussion arose about the possibility of having the joint sessions with the AAPT

in April instead in January. There is probably a difficulty for high-school teachers to go to meetings during the school term.

5. Fellowship Committee - Report by S. Brush, chairperson of committee: The following were recommended by the Division and were approved by the APS Council to be **FELLOWS of the AMERICAN PHYSICAL SOCIETY**:

**Paul Forman**, National Museum of American History  
*Citation*: "For his research on the history and cultural background of modern physics, and for his development of museum exhibits presenting physics to the public."

**Allan David Franklin**, Colorado

*Citation*: "For his research in the history of theories and experiments in medieval and modern physics."

**Arthur I. Miller**, Lowell and Harvard

*Citation*: "For his research in the history of modern physics, especially the genesis of relativity and quantum theory, and for popular lectures and articles on history of physics."

**Robert E. Schofield**, Iowa State

*Citation*: "For his research in the history of physical science, especially the works of Joseph Priestley and 18th century natural philosophy."

6. Publications Report: It was suggested by Al Wattenberg that the Division publish only one issue of the Newsletter each year, and that the election ballots be sent separately using first class mail. A brief discussion followed and the suggestion was tabled. The present Chairperson Max Dresden is interested in suggestions for an Associate Editor for the Newsletter.

7. Rita Lerner reported on the Tomash - AIP History Series volumes published in 1988-89. They include K. Sopka's "Quantum Physics in America" and M. Planck's "Theory of Heat Radiation" re-issued with an introduction by A. Needell.

8. According to the Constitution and By-Laws of the APS, the Executive Committee of each Division acts as a nominating committee for Divisional Councilors. The two nominees chosen were Roger Stuewer and Al Wattenberg. The election will take place in the spring of 1990 at the same time as the election of the officers of the Division

## COMMITTEE APPOINTMENTS

The appointed Committees of the Division for 1989-1990 are:

Nominating Committee - see cover page 1.  
"Nominations for Officers."

Program Committee: M. Dresden (Chair), L. Brown, J.T. Cushing, and D. Siegel.

Fellowship Committee: L. Badash, L. Brown, and M. Phillips.

## APS & AIP NEWS

**Changes in the Governance of the APS** - The Constitution and By-Laws of the APS are being revised to take into account the growth and importance of the many subunits of the APS. As well as Divisions, the Forum, and Geographical Sections, the APS now has growing and active Topical Groups. At the present time the Councilors of the APS are elected by the Divisions, the Forum and the Membership (through Councilors at Large). Some Divisions have ten times the membership of others and are represented by only one Councilor. The revisions of the Constitution and By-Laws being considered are trying to correct some of these inequities without turning the Council into a general assembly that cannot function because of its size. Even a council of 50 to 70 members would require that more authority be given to the Executive Committee or a Board that can meet more often and conduct the affairs of the APS. You are urged to pay attention to these considerations of the Council by reading the "Highlights of the meetings of the Executive Committee and Council" in the Bulletin of the APS or probably in the new monthly newsletter of the APS, *News of the American Physical Society*. See next item.

**News of the American Physical Society** is a new monthly newsletter that the American Physical Society is planning to publish in 1990 with three test issues planned for September, October, and November of this year. Bob Strauss is the editor; he has contacted the Divisions to try to make the newsletter as broadly representative as possible and to get a good balance in coverage of APS activities. It will be mailed out with the Bulletin of the American Physical Society till the end of 1990. In January 1991, there will be separate mailings of the Newsletter and the Meeting Program; the delay is to accommodate to postal requirements. The proposal is to have full distribution of the Newsletter and limited distribution of Meetings Programs.

**AIP Center for the History of Physics Recipient of Mellon Foundation Grants** - The Center was awarded grants from the Mellon Foundation to support work outside the United States on two major projects: the study of scientific collaborations in high-energy physics and the Center's International Catalog project; the study of collaborations was described in the October 1988 issue of HPN. This grant will allow the study to gather information on collaborations with significant foreign membership as well as at the CERN laboratory in Switzerland.

For the International Catalog of Sources for History of Physics, the Mellon grant will support special efforts needed for the international component. The grant may make possible new cooperative ties to individuals and institutions, and it will provide sup-

port for travel and related activities that will strengthen existing links. The present plan is to work as far as possible with one or two key centers or repositories in a given country.

Both these studies include **funds for freelance work** by foreign historians, archivists, and graduate students. For the study of high-energy physics collaborations, the Center will need free-lancers to carry out some of the necessary interviews and reviews of records and to prepare translations or summaries of scientific articles. The International Catalog project has funds to support free-lancers on any continent to do field work in foreign repositories on its behalf, locating and preparing brief descriptions of selected collections of interest as well as preparing translations into English for the Center's catalog. If you are interested in **applying for these positions for yourself or your students**, please contact Joan Warnow, AIP Center for the History of Physics, 335 East 45th St., New York, NY 10017.

**The Center for History of Physics Newsletter** is published biannually. It reports activities of the Center and its Niels Bohr Library and other information of value to those interested in the history of physics and allied sciences. As an example, articles in the May 1989 issue included: A History of Physics at the AT&T Archives, The Harvard University Archives and the History of Physics, Resources for History of Physics at the Hoover Institute. In the latter article one finds out that the Sir Karl Popper papers (the collection is almost 180 linear feet) is at the Hoover Institute and contains the voluminous correspondence of Popper with Einstein, Bohr, Heisenberg, and Schrödinger. A regular feature in the CHP Newsletter is a report from the International Catalog of Sources that is an updating of preserved documentation at various university archives, government and industrial laboratory archives, and other repositories. The most frequent additions are the papers of living or recently deceased scientists at those institutions. The CHP Newsletter is available on request without charge; the Center welcomes donations (tax deductible) to the Friends of the Center for History of Physics. AIP, 335 East 45th Street, New York, NY 10017.

## MEETINGS

**AAAS Annual Meeting** will take place in New Orleans on February 15-20, 1990. A symposium "Young Einstein" is being organized by *Caroline L. Herzenberg*. The speakers are: *John Stachel, Lewis Pyenson, Robert S. Cohen, Evan Harris Walker, and Senta Troemel-Ploetz*.

**The British Society for the History of Science** - The BSHS has announced several conferences for 1990. The theme of one of the meetings is **The History of Energy**. It has been tentatively scheduled for January or April; for further information write to John V. Pickstone, Centre for the History of Science, Technology, and Medicine, Mathematics Tower, Manchester University, Manchester M13 9PL, England. Another interna-

tional conference, **The Scientific Revolution: Science, Technology, and Medicine in the Early Modern Period**, will be held at Keble College, Oxford during July 17-20, 1990. Speakers have been invited on a broad range of topics, but others may submit papers to John Hendry, 58 Canfield Gardens, London NW6 3EB, England. Other inquiries should be sent to the Executive Secretary, British Society for the History of Science, 31 High Street, Stanford in the Vale, Faringdon, Oxon SN7 8LH, England.

**The European Physical Society** has formed an Interdivisional Group on History of Physics. One of its first activities will be the organization of a conference on **Science Education and History of Physics** during August 28-30, 1990 at Cambridge UK. For more information write to Andrew Warwick, St. John's College, Cambridge, England.

### IAGA Call for Papers

The International Association for Geomagnetism and Aeronomy is sponsoring two sets of sessions in Vienna, Austria during August 1991. The sessions on **Pioneers in Geophysical Research** will include the role of leading scientific ideas in the development of geophysical sciences, and papers of pioneers in Geophysics and related disciplines. Also included are papers on the function and role of scientific societies. The sessions will include posters. The other meeting is **Historical Data: Long-Short Variability of Solar and Geomagnetic Activity**. - Long- and short-term observations and data in solar-geomagnetic activity will be discussed. A main topic is the so-called "Maunder-Minimum" in the 17th century and other minima in solar activities during the last centuries. The use of historical sources for on-going research will be discussed. The sessions will include posters. All inquiries about both sessions should be sent to Dr. Wilfried Schröder, Hechelstrasse 8, D-2820 Bremen Rönnebeck, Federal Republic of Germany.

**History and Philosophy of Science in School Science Teaching** - An international conference on the subject will be held at Florida State University in Tallahassee, November 6-10, 1989. It is designed to promote an interchange between teachers, scientists, historians, philosophers, and administrators. For more information contact Kenneth G. Tobin, Science Education, Carothers Hall, Florida State University, Tallahassee, FL 32306-3032; (904) 644-2764

**History of Science Society** - The 1990 Annual Meeting will be held during October 25-28, 1990 in Seattle, Washington, at the Holiday Inn Crowne Plaza. Peter Galison and Timothy Lenoir (Program in the History of Science, Stanford University, Stanford, CA 94305-2024; (415) 725-7014) will serve as Program Co-chairs. Information on travel grants which may be available is in the section on Grants and Fellowships of this Newsletter.

### HSS Call for Papers

Members of the History of Science Society are invited to submit proposal for sessions for next year's

annual meeting which will be held in Seattle on 25-28, October 1990. Send proposals by 1 February 1990 to Peter Galison and Timothy Lenoir, Program Chairmen, Program in the History of Science, Bldg. 200-33, Stanford University, Stanford, CA 94305-2024; telephone (415) 725-0714. Email: hf.bsk@STANFORD.

They are soliciting papers from graduate students for works in progress sessions for next year's History of Science Society's annual meeting which will be held in Seattle on 25-28 October 1990. In addition to work in progress sessions, they would like to encourage graduate students to propose sessions in which recent work related to controversial issues in the history of science will be discussed. Send proposals by 1 February 1990 to Peter Galison and Timothy Lenoir, Program Chairmen, Program in the History of Science, Bldg. 200-33, Stanford University, Stanford, CA 94305-2024; telephone (415) 725-0714. Email: hf.bsk@STANFORD.

**International Conference on the History of Science in China** - For information about the sixth conference, to be held at Robinson College, Cambridge, England, August 2-9, 1990, write to the Needham Research Institute, 8 Sylvester Road, Cambridge CB3 9AF England.

## ANNOUNCEMENTS & REPORTS

### Acoustical Society of America's Committee on Archives and History

The Acoustical Society has established the Committee to assist in the collection, documentation, and maintenance of materials of lasting interest in the history of acoustics. The new Committee will compile an inventory of the location and types of materials relating to the broad field of acoustics and associated disciplines. They will develop strategies for preserving these materials and will have the benefit of the assistance of the AIP Center for History of Physics, in cooperation with repositories around the nation. For more information, or if you have suggestions, write to the Committee on Archives and History at the Acoustical Society of America, 500 Sunnyside Blvd., Woodbury, NY 11797, attention Elaine Moran, or call William J. Cavanaugh (chair of the committee) at (508) 443-7871.

### Aspray to Direct IEEE History Center

This past spring, Dr. William Aspray accepted the position of Director of the Center for The History of Electrical Engineering of the Institute of Electrical and Electronics Engineers, IEEE. The Center is located at IEEE headquarters in New York City; it promotes the study and understanding of the history of electrical science and technology among engineers, historians, and the general public. The programs of the Center include archival and bibliographic services, oral history and documentation projects, exhibits, research,

and publications. Aspray leaves the Charles Babbage Institute, Center for the History of Information Processing, which he first came to as a Fellow in 1978-1980. He returned to CBI as Associate Director in August 1983. In January 1989 he became the Acting Director of CBI. He has written on many aspects of the history of computing, computers, and information for the general public and for technical readers including a monograph on Von Neuman.

### Dudley Observatory: Herbert C. Pollock Awards

The Board of Trustees of the Dudley Observatory announces that the sixth annual competition for the Herbert C. Pollock Award in the History of Astronomy and Astrophysics has been won by Prof. Robert W. Smith, of John Hopkins University for his project "A Biography of V.M. Slipher." The Pollock Award is \$10,000.

Secondary Pollock/Dudley Awards, in the amount of \$5,000 each, were made to Woodruff T. Sullivan, III, University of Washington for "A History of Radio Astronomy," and to Dr. Nathaniel M. White, Lowell Observatory, for "A History of Lunar Occultation Techniques from 1600 to the Present."

### Garland Publishing

Garland Publishing, Inc. is expanding its program in the history of science and welcomes proposals for encyclopedias, monographs, bibliographies, and other research tools. (Also see below the announcement of The Institute for the History of Astronomy.) All inquiries and proposals should be addressed to Kennie Lyman, Editor, Garland Publishing, Inc., 136 Madison Ave., New York, NY 10016.

### Gerald Holton Receives Gemant Award

Gerald Holton, Professor of History of Science at Harvard University, has been selected by the Governing Board of the American Institute of Physics to receive the 1989 Andrew Gemant Award for his contributions to the history of physics and to the wider interpretation of physics. The Andrew Gemant Award is given to physicists who make an outstanding contribution to culture; the amount of the award is \$8,000.

### HSS-SHOT Joint Study

Plans exist for a collaborative study by the History of Science Society and the Society for the History of Technology of the critical problems and research frontiers in the history of science and technology. The culmination of the study is to occur in the fall of 1991 at the next joint meeting of the two societies in Madison, Wisconsin. The NSF has committed \$11,000 in support of the study. As the project progresses, suggestions will be welcome. For further information contact Professor Holmes at the Section of the History of Medicine, Yale University, 333 Cedar Street, New Haven, CT 06520.

### John Heilbron Receives the HSS Watson Davis Prize

The History of Science Society awarded its prizes for 1988 at its banquet in December 1988. The Watson Davis Prize was awarded to **Professor John L. Heilbron**, of the University of California at Berkeley, for "Dilemmas of an Upright Man: Max Planck as Spokesman for German Science."

### Institute for the History of Astronomy

The Institute has announced two collaborative publication projects. It will publish a series of volumes on the history of astronomy with the Kluwer Academic Publishers. With the Garland Publishing, (See above announcement of Garland Publishing.) it will prepare a one-volume encyclopedia of cosmology. This volume will focus on historical, philosophical, and scientific foundations of modern cosmology. It will cover cosmologies and cosmologists, and it will emphasize historical and contemporary problems and how science has reached its current understanding. Historians of science and astronomy willing to write articles for the encyclopedia, or with manuscripts for the series or suggestions for the encyclopedia should contact Norris S. Hetherington, Institute for the History of Astronomy, 1742 Spruce Street, Suite 201, Berkeley, CA 94709.

### MIT Institute Archives and Special Collections

The MIT Libraries has published a "Selective Guide to the Collections." The Collections emphasize the history of contemporary science and technology and their impact on society; they illustrate the growing influence at MIT of government and industrial resources on research as well as the role of the MIT academic staff in the formation of science policy. Copies may be ordered for \$7.50 from: The Institute Archives and Special Collections, Room 14N-118, Massachusetts Institute of Technology, Cambridge, MA 02139.

### National Coordinating Committee for the Promotion of History - Director's Report

Two items of interest in the August 1989 report are: 1) The National Endowment for the Humanities has budget bills in the House and Senate which are an increase over the current level. The report accompanying the House bill specifies that \$6.4 million of the increase "is provided for matching support for museums, universities, and other institutions to assist them in stabilizing collections of material culture ...," and \$1 million is recommended for the State grant program. 2) Authorization for the building of Archives II was included in the FY'89 budget (\$205 million) and the ground breaking will take place this fall in College Park, Maryland. Meetings with users have taken place and have been most concerned with the implications of the architectural design on the research process, specifically the areas of interchange between archivists and researchers. In regard to which records will remain at the Pennsylvania Avenue site and which will be at Archives II, the present plan seems to indicate that the

records of interest to physics historians will be at Archives II. Although the basic plan is in place, further refinements of the transfer plan are expected. For information concerning the National Coordinating Committee for the Promotion of History, write to the Director, Page Putnam Miller, NCC, 400 A Street SE, Washington, DC 20003.

### The National Registry for the Bibliography of History

The registry is sponsored by the Association for the Bibliography of History. They solicit listings of bibliographical projects in progress in any field of history by historians and bibliographers in the United States and Canada. The registry is designed to reduce possible duplication of projects and to provide information for work now in progress. The listing is published each year in *American History: A Bibliographic Review* (Meckler & Co) and is also regularly circulated to interested publishers. For information write to Thomas T. Helde, Director, National Registry for the Bibliography of History, Georgetown University, Washington, DC 20057.

### Commission on Bibliography of the International Union of the History and Philosophy of Science

The Commission has published its report on Britain. The report covers research projects concerned with preparing critical editions, translations, correspondence, bibliographies and catalogues, of manuscripts or of scientific literature of the past. It was edited by Renato G. Mazzolini of the University of Trento and has been published as Fascicule 1 (1988) of the *Journal Nuncius* by Leo Olschki Editore, Florence. Useful details are given of about 40 projects underway in 1987, and there is an index of addresses of project leaders.

### Physis, Rivista Internazionale di Storia della Scienza

Physis is resuming publication with a new series in 1990. The new series will be published under the auspices of the Domus Galilaeana (Italy's only post-graduate research and teaching institute in the history of science) by the publisher Olschki. For some decades, Physis had a rich tradition of publishing over a wide diversity of fields and periods, from authors both established and promising. The administration will try to publish substantive original research from a broad spectrum of scholars. They invite authors to consider contributing to Physis. In addition to well documented articles that represent the results of original research of up to c. 30 typed pages, Physis will also publish short notes, reports on major meetings and research projects, and essays and short reviews. Please write to the coordinating editor, Prof. Guido Cimino, Istituto della Enciclopedia Italiana, Piazza Paganica 4, 00186 Rome.

### Royal Greenwich Observatory Archives

The Royal Greenwich Observatory is moving from Herstmonceux and the observatory will not be able to house its historical records. The records will be

moved to the Cambridge University Library in several phases beginning in January 1990. The aim is to keep much of the collection open and available to researchers. For information concerning the various types of documents, their location, and availability, please write to Adam Perkins, Archivist, Royal Greenwich Observatory, Herstmonceux Castle, Hailsham, East Sussex, BN27 1RP, England.

### Royal Swedish Academy

A new center for History of Science has been established at the Royal Swedish Academie des Sciences in Stockholm. The purpose of the Center is to stimulate research in the history of science, especially thru the use of the rich archives of the Center. The Director of the Center is Professor Tore Frängsmyr. The Center will include the archives and manuscripts of the Academy, the large instrument collection, The Berzelius Museum, and the Nobel Archives.

## BOOK PUBLISHERS

### AIP Conference Proceedings

Edited by *Stanley Goldberg* and *Roger H. Stuewer* - **The Michelson Era in American Science: 1870 - 1930.** This collection of historical papers is from a two day symposium held at the Case Western Reserve University in October 1987. The Conference of historians and scientists was organized into four sections entitled: "The Crafting of Great Experiments," "The Interpretation of Great Experiments," "Michelson and His Scientific Legacy," and "American Science in the Age of Michelson and Beyond." This is AIP Conference Proceedings No. 179 and can be obtained from the American Institute of Physics Marketing Service, 355 East 45th Street, New York, NY 10017-3483. (\$43.20 for members of APS)

### Birkhäuser Boston

*Michael Monastyrsky* - **Riemann, Topology, and Physics.** The book presents Riemann in an historical context and allows one to see the influence of his mathematical contributions to more recent physics problems.

*Isaak Moiseevich Yaglom* - **Felix Klein and Sophus Lie: Evolution of the Idea of Symmetry in the Nineteenth Century.** The book covers the lives of these great mathematicians and the ideas and motivations for symmetry groups which are an essential part of contemporary theoretical physics. For more information write to: Birkhäuser Boston, Inc. c/o Springer-Verlag Distribution Center, P.O. Box 2485, Secaucus, NJ 07094.

### Cambridge University Press

Editors: *Laurie M. Brown*, *Max Dresden*, and *Lillian Hoddeson* - **Pions to Quarks - Particle Physics in the 1950's.** This is a collection of essays, discussions, and personal reminiscences which are based on the

1985 International Symposium on Particle Physics in the 1950's which was held at the Fermi National Accelerator Laboratory. Several of the speakers were Nobel laureates who received their prizes for their contributions during those years. Speakers also included historians of science, accelerator builders, and designers of experiments. There are interesting insights into the lives of physicists as well as the history of physics and some political aspects of research funding.

Edited by *Necia G. Cooper* -- **From Cardinals to Chaos: Reflections on the Life and Legacy of Stanislaw Ulam.** Ulam was a fascinating character whose initial reputation was as a precocious mathematician. He is best known to physicists for his pioneering use of high speed computers to solve physics problems. One of his collaborations with von Neuman developed the Monte Carlo method. A collaboration with Fermi and Pasta was the forerunner of applications to the field of non-linear lattice dynamics. His later work included attempts to use lattice gas automata to calculate flow patterns. The book is a collection of articles by people who worked with him for many years mainly at Los Alamos. For a review of the book see *Physics Today*, June 1989, pp.69-72.

Editors: *René Taton* and *Curtis Wilson* - **Planetary Astronomy from the Renaissance to the Rise of Astrophysics - Part A: Tycho Brahe to Newton.** Volume 2a of the **General History of Astronomy** deals with the transformation of astronomy that took place between the late sixteenth century and the early eighteenth century. The style is that of a readable narrative.

*C.W. Smith* and *M.N. Wise* - **Energy and Empire: A Biographical Study of Lord Kelvin.** This biography is based on a wealth of manuscripts and correspondence. It shows the influence on Kelvin of engineers as well as the famous physicists of his period.

*R.W. Smith* with contributions by *Paul A. Hanle*, *Robert H. Kargon* and *Joseph N. Tatarewicz* - **The Space Telescope: A Study of NASA, Science, Technology, and Politics.** The book describes the history of the twenty-five year effort and planning of The Space Telescope, the most expensive scientific facility ever constructed. It is a joint enterprise between NASA and the European Space Agency and promises to be the most productive optical telescope ever built.

*Walter J. Moore* - **Schrödinger: Life and Thought.** This comprehensive biography draws upon recollections of friends, family, and colleagues, letters and diaries. It covers his work, his ideas, and his personal life.

Two books now available in paperback are: *Allan Franklin* - **The Neglect of Experiment**, and *A.J. Friedman* and *C. Donley* - **Einstein as Myth and Muse.** For more information on Cambridge University Press books, write to Cambridge University Press, 32 East 57th Street, New York, NY 10022

**Dover - New Paperbacks**

*René Dugas - A History of Mechanics.*

Edited by *Moris H. Shamos - Great Experiments in Physics: First Hand Accounts from Galileo to Einstein.*

*George Gamow - One Two Three ... Infinity: Facts and Speculations of Science.* Write to Dover Publications, Inc. 11 East 2nd Street, Mineola, NY 11501.

**W.H. Freeman and Co.**

*Victor F. Weisskopf - The Privilege of Being a Physicist.* This is a collection of 16 essays. It includes the building of the atomic bomb and his memoirs as a Hitler refugee and as a leader in theoretical physics with reminiscences of Bohr, Pauli, and Heisenberg. Write to W.H. Freeman, 41 Madison Ave., New York, NY 10010.

**Harwood Academic Publishers**

Editors: *Herman Feshbach, Tetsuo Matsui, and Alexandra Oleson - Niels Bohr - Physics and the World.* Proceedings of the Niels Bohr Centennial Symposium held by the American Academy of Arts and Sciences in Cambridge Massachusetts. More than half the articles have an historical perspective. Write to Harwood Academic Publishers, P.O. Box 786, Cooper Station, New York, NY 10276.

**IEEE**

*Paul J. Nahin - Oliver Heaviside, Sage in Solitude: The Life, Work, and Times of an Electrical Genius of the Victorian Age.* Nahin is an historically minded engineer who does an excellent job of illuminating the science and technology interaction that characterized the electrical physics of the latter half of the nineteenth century. For more information write to The Institute of Electrical and Electronics Engineers, 445 Hoes Lane, Piscataway, New Jersey 08855.

**Norton**

*Richard P. Feynman - What Do You Care What Other People Think? Further Adventures of a Curious Character.* This second volume includes his role as a member of the investigation of the *Challenger* disaster. Available at bookstores.

**Princeton University Press**

*E. J. Dijksterhuis Trans. Dikshoorn - Archimedes.* This is both a book about Archimedes and a translation of his works. Write to Princeton University Press, Princeton, NJ 08540.

**Royal Society of London**

Editors *D.G. King-Hele; A.R. Hall - Newton's Principia and Its Legacy.* These are the Proceedings of a

Royal Society discussion meeting held in London on June 30th, 1987. This collection of papers ranges from the reception of the Principia by Newton's outstanding Continental contemporaries to the continuing impact of Newtonian principles in the present century. This is volume 42, No. 1 of Notes and Records of the Royal Society. It is also available as a separate book.

**Scottish Academic Press**

*Stanley L. Jaki - The Physicist as Artist: The Landscapes of Pierre Duhem.* The French physicist and historian of science, Pierre Duhem, painted well over 400 landscapes. Professor Jaki draws a detailed parallel between Duhem's ideas on physics and his landscapes. For more information write to the Gower Publishing Company, Old Post Road, Brookfield, VT 05036

**Springer-Verlag**

*David H. DeVorkin - Race to the Stratosphere: Manned Scientific Ballooning in America.* The flights in the 1930s and 1940s combined scientific aims with feats of daring and significant technological advances. This scientific history should be of interest to anyone who wishes to know how and why scientists who studied cosmic rays, meteorology, and solar physics participated in the dawn of the space age foreshadowing the Apollo program.

*Gerrett L. Verschuur - Interstellar Matters.* Radio astronomer tells the story of the discovery and tortuous road to acceptance of interstellar matter. The book is described as a scientific detective story of a century of shared effort by the world astronomical community. Write to Springer-Verlag NY, P.O. Box 2485, Secaucus, NJ 07096-2491.

**Stanford University Press**

*J.W. Lewis and X. Li Tai - China Builds the Bomb. ISIS Studies in International Policy.* This is an historical study with a foreword by S. Drell. Write to Stanford University Press, Stanford, CA 94305.

**Ticknor and Fields**

*Jeremy Bernstein - The Life it Brings: One Physicist's Beginnings.* Jeremy Bernstein is an outstanding writer whose articles in the New Yorker magazine on physics and physicists such as I.I. Rabi have attracted a very broad audience. In the 1960's, his theoretical contributions included collaborations with T.D. Lee. The book develops the person rather than his physics. Write to Ticknor and Fields, 52 Vanderbilt Ave. New York, NY 10017.

**RECENT & FUTURE ARTICLES****American Journal of Physics**

March 1989

"How Rutherford Missed Discovering the Quantum Mechanical Identity" by *G.M. Temmer.*



April 1989

"Molecular Beam Experiments, the Lamb Shift, and the Relation between Experiments and Theory" by *S.S. Schweber*. 57, 397

May 1989

"Actually Eotvos Did Publish his Results in 1910, it's just that no one knows about it ..." by *Michael M. Nieto, Richard J. Hughes, and T. Goldman*.

#### American Scientist

May-June 1988

"Starting the Exploratorium" by *Sheila Grinell* (The "Exploratorium" is the hands-on, perceptual, trend setting science museum developed by Frank Oppenheimer in San Francisco's Palace of Fine Arts.)

#### European Journal of Physics

Vol. 9, #4 1988:

"Grand Schools of Physics: Physics at the University of Oxford" by *B. Bleaney*.

#### HSPS - Historical Studies in the Physical and Biological Sciences

Volume 19, Part 2 includes: "Cosmic Ray Romancing: The Discovery of the Latitude Effect and the Compton-Millikan Controversy" by *E.D. Maria A. Russo*. "In any Light: Scientists and the Decision to Build the Superbomb, 1952-1954" by *Peter Galison and Barton Bernstein*.

#### ISIS

June 1989

"Vivani's Life of Galileo" by *Michel Segrè*. Vivani assisted Galileo in his old age and called himself "Galileo's Last Disciple." "Einstein and the War Department" by *Richard Alan Schwartz*. This is an account of the material the author obtained under the Freedom of Information Act.

#### Physics Today

February 1989 - Special Issue: Richard Feynman

"The Young Feynman" by *John Archibald Wheeler*.

"Feynman at Cornell" by *Freeman J. Dyson*.

"A Path to Quantum Electrodynamics" by *Julian Schwinger*.

"Dick Feynman - The Guy in the Office Down the Hall" by *Murray Gell-Mann*.

"Feynman and Partons" by *James D. Bjorken*.

"Richard Feynman and Condensed Matter Physics" by *David Pines*.

"Richard P. Feynman, Teacher" by *David L. Goodstein*.

"Richard Feynman and the Connection Machine" by *W. Daniel Hillis*.

"A Lowbrow's View of Feynman" by *Valentine L. Telegdi*.

These are an exceptional series of articles for the historical insights into the physics of the last half century to which Feynman contributed so much.

March 1989

"Heinrich Hertz and the Development of Physics" by *Joseph F. Mulligan*. This article describes Hertz's con-

firmation of Maxwell's electromagnetic theory as well as many other important discoveries that Hertz made along the way.

May 1989

"Reminiscences of Landau" by *I.M. Khalatnikov*.

"Landau's Attitude Toward Physics and Physicists" by *Vitaly L. Ginzburg*. Landau was a unique physicist and teacher of physicists who had a great influence on modern Soviet theoretical physics. His texts with Lifschitz are world famous. His major theoretical contributions were in condensed matter physics.

July 1989

"50th Anniversary of Nuclear Fission" by *Emilio Segrè*. Emilio Segrè recalls the work that led to Hahn's discovery of fission and the work in other laboratories throughout the world, especially the Rome Laboratory where Segrè worked with Fermi. Had they been better chemists, the Rome group might have realized already in 1935 that uranium fission was happening under their noses.

August 1989

"The First Symposium on Relativistic Astrophysics" by *Engelbert L. Schucking*. The anecdotal style of this article provides insights into a number of outstanding relativistic astrophysicists.

#### Reviews of Modern Physics

July 1989

The 1988 Nobel Prize in Physics was shared by Leon Lederman, Mel Schwartz, and Jack Steinberger. Their papers in this issue are the texts of their addresses on the occasion of the award.

"The First High-Energy Neutrino Experiment" by *Mel Schwartz*. The article describes the state of knowledge in 1960 and the experiment that showed that the muon neutrino is different from the electron neutrino.

"Experiments with High Energy Neutrino Beams" by *J. Steinberger*. This article covers details of subsequent experiments using neutrinos at Brookhaven National Laboratory and at CERN while he was at those laboratories.

"Observations in Particle Physics from two Neutrinos to the Standard Model" by *Leon Lederman*. This article is an historical review, somewhat personal, of the experiments, and ideas that led to the present "Standard Model."

#### J. Royal Astronomical Society of Canada

Vol.82, No. 3, 1988

"Historical Remarks on the Discovery of Interstellar Molecules" by *Gerhard Herzberg*. 1987 was the 50th anniversary of the discovery of the first interstellar molecule, CH, by Swings and Rosenfeld. The article covers the confirmation and subsequent discovery of other molecules by optical spectra and by radio astronomical methods.

## GRANTS & FELLOWSHIPS

### AIP Center for History of Physics

**AIP Center for History of Physics** has a program of Grants-in-Aid for research in the history of modern physics and allied sciences (such as astronomy, geophysics, and optics) and their social interactions. Grants can be up to \$2,000 each. They can be used only to reimburse direct expenses connected with the work. Preference will be given to those who need part of the funds for travel and subsistence to use the resources of the Center's Niels Bohr Library in New York City, or to microfilm papers or to tape-record oral history interviews with a copy deposited in the Library. Applicants should be working toward a graduate degree in the history of science or show a record of publication in the field. To apply, send a *curriculum vitae* plus a letter of no more than two pages describing your project and a brief budget to Spencer Weart, Center for History of Physics, 335 East 45th Street, New York, NY 10017. Deadlines for receipt of applications are June 30 and December 31 of each year.

### American Council of Learned Societies

**Grants-in-Aid** are designed to assist scholars with the expenses of specific programs of research in progress. These expenses may include personal travel and maintenance away from home necessary to gain access to materials, research or clerical assistance, and reproduction of materials. Awards for living expenses at home to relieve the applicant of the necessity of teaching beyond the conventional academic year will be made only in exceptional cases. Deadline: December 15, 1989. Amount: \$3,000 maximum, Tenure: between May 1, 1990 and May 1, 1991. American Council of Learned Societies, 228 East 45th Street, New York, NY.

**Grants for Travel to International Meetings** - The ACLS, in cooperation with its constituent societies, administers a program of travel grants, awarded on a competitive basis, to enable scholars in the humanities and humanities-related disciplines to participate in international scholarly meetings outside North America and the Caribbean Islands. Travel grant stipends are expendable for travel only and cannot be applied to per diem expenses. Persons having a major official role in a meeting are eligible to apply, but preference is given to those who are to present scholarly papers. The amount of the awards is \$500-\$1,000. The deadline is March 1, 1990 for meetings from July to December 1990. As there are restrictions on these grants, applicants should obtain more complete information and the appropriate forms from the Travel Grant Office of the American Council of Learned Societies, 228 East 45th Street, New York, NY.

### HSS Scholars Programs

**The History of Science Society's Independent Scholars Program** awards Grants-in-Aid of up to

\$2,000 for research travel and other research expenses to individuals trained or doing research in the history of science. It is for persons who are unemployed, unaffiliated with any institution making use of their training and experience, or employed either part-time or without prospects of continuation or renewal. Proposals for such grants should consist of: a brief (three pages or less) statement of the proposed research project, a *curriculum vitae*, a proposed budget, and one letter of recommendation. Submit eight copies of such proposals to the HSS Executive Secretary, 35 Dean Street, Worcester, MA 01609; (508)831-5712 by April 30th (for projects beginning after July 1st) or by October 30th (for projects beginning after January 1st).

### National Endowment for the Humanities

The NEH "Overview of Endowment Programs" mid-year edition is new and revised. Over 32 pages describe 30 funding opportunities; it is free to those interested in the possibility of applying for NEH grants. Also in the "Overview":

- How to get application forms
- When to apply (all the way thru 1990)
- Whom to contact for help
- What project ideas are eligible for NEH funding and what are not.

Write or call NEH "Overview," Room 406, 1100 Pennsylvania Ave., N.W. Washington, DC 20506. Telephone: (202) 786-0438. If you mention that you saw this announcement in the History of Physics Newsletter, they will send you a complimentary copy of their magazine, "Humanities."

**NEH Divisions** seem to be autonomous bodies, and one needs to contact the correct Division or program office in order to obtain information. The Divisions are: Education Programs (room 302), Fellowships and Seminars (316), General Programs (426), Research Programs (318), State Programs (411). There are also the Office of Challenge Grants (429) and the Office of Preservation (429). It is very important that you know the name of the appropriate program if you try to contact the Office of Publications and Public Affairs - telephone (202) 786-0438. I urge you to get a copy of the NEH "Overview" described in the previous paragraph. The address of the National Endowment for the Humanities is 1100 Pennsylvania Avenue, N.W. Washington, DC 20506

**Travel to Collection Grants** (Division of Fellowships & Seminars) - These enable individual scholars to travel to use the research collections of humanities materials in libraries, archives, museums, or other repositories. Individual applicants are eligible. The deadline for receipt of applications is January 15, 1990. Write or call: Travel to Collections, room 316. Tel: 202-786-0463.

**NEH Summer Seminars for College Teachers** (Div. of Fellowships & Seminars)

**Participants' Grants** provide support for teachers in two-year four-year, and five-year colleges and universities and for others who are qualified to do the work of the seminar and make a contribution to it. Participants attend six- or eight-week summer seminars directed by distinguished scholars at institutions with libraries suitable for advanced study. Individual applicants are eligible. Applications should be submitted to the seminar director before March 1, 1990 for the 1990 seminars. A list of seminar offerings may be obtained from the program. Write or call room 316. Tel: 202-786-0463.

**Directors' Grants** provide support for scholars of the humanities to direct summer seminars at institutions with libraries suitable for advanced study. Potential directors should apply through their institutions. The application deadline is April 1, 1990 for summer 1991 seminars. For information and application forms for both participants' and directors' grants, write or call: Summer Seminars for College Teachers, Room 316, (same as previous item).

**NEH Division of General Programs** - This division fosters public understanding and appreciation of the humanities by supporting projects that bring significant insights of scholarly disciplines to general audiences through interpretive exhibitions, radio and television programs, symposia, printed materials and reading and discussion groups.

**Humanities Projects in Media** - Grants support the planning, writing, or production of television and radio programs in the humanities intended for general audiences. The collaboration of scholars in the humanities with experienced producers, writers, and directors is required. The Endowment is particularly interested in applications for television and radio projects on the lives of historically significant Americans. Eligible applicants are: nonprofit institutions, organizations, and groups including public television and radio stations. The deadline is March 16, 1990. Write or phone room 420. Tel: 202-786-0284.

**Division of Research Programs** are the most likely ones to be of interest to physics historians. The programs include: **Texts, Editions, Translations, Publication Subvention, Reference Materials, Interpretive Research, and Projects.** Most of these programs have deadlines that occur in the spring or early fall. For more information write to room 318. (Telephone numbers depend on the specific program.) A booklet on the Division of Research Programs can be obtained by writing to the Director of the Division of Research, Room 318, National Endowment for the Humanities, 1100 Pennsylvania Ave., N.W. Washington, DC 20506.

#### Northwestern University

Northwestern University offers both graduate and postdoctoral fellowships in the history of sci-

ence. Graduate students should apply directly to the Graduate School, Northwestern University, Evanston, IL 60208, indicating that they are applying to the History Department in the history of science. Application deadline is January 15, 1990. Postdoctoral candidates (stipend \$22,000) should contact David Joravsky, History Department, Northwestern University, Evanston, IL 60208. A Ph.D. degree within the past five years is required. The deadline for the 1990-91 academic year is December 1, 1989.

#### Stanford University

**Stanford University Andrew W. Mellon Postdoctoral Fellowships** for 1990-91 will be awarded to highly promising scholar-teachers in the humanities. These one year non-faculty positions carry annual stipends of \$26,000 (plus benefits), departmental affiliation, limited teaching duties and the opportunity for scholarly work; they are renewable for a second year, The Ph.D. must have been received after June 1983 and before September 1990. For further information and application forms contact the Dean's Office, Humanities and Sciences, Building One, Stanford University, Stanford, CA 94305.

## JOBS

The **AIP Center for History of Physics** has funds from the Mellon Foundation for two major projects which are described on page 4 of this issue. Both of these projects include funds for free-lance work by foreign historians, archivists, and graduate students. For the study of high-energy physics collaborations, they will need free-lancers to carry out some of the necessary interviews and reviews of records and to prepare translations of scientific articles. The International Catalog project has funds to support free-lancers on any continent to do field work in foreign repositories on behalf of the Center for History of Physics. It would include locating and preparing brief descriptions of selected collections of interest as well as preparing translations of existing descriptions to English for the Center's catalog. If you are interested in applying for these positions for yourself or your students, please contact Joan Warnow, AIP Center for History of Physics, 335 East 45th Street, New York, NY 10017-3483. Telephone: (212)661-9404.

The **University of New Hampshire** seeks a tenure-track assistant professor in history of science, with additional regular teaching responsibilities in an interdisciplinary humanities program, beginning September 1990. Specialization outside U.S. history, expertise in philosophy of science and publications and teaching experience are preferred. Send letter of application, curriculum vitae, and letters of recommendation by December 1, 1989, to Robert Mennel, Department of History, Horton Social Science Center, University of New Hampshire, Durham, NH 03824.

## SUMMARIES

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

Summaries should be sent to Albert Wattenberg, Department of Physics, University of Illinois, 1110 W. Green Street, Urbana, IL 61801.

### J.J. THOMSON'S DISCOVERY

**Falconer, Isobel.** *Corpuscles, Electrons and Cathode Rays: J.J. Thomson and the 'Discovery of the Electron'*, British Journal for the History of Science, 1987, 20: 241-276.

This fresh look at J. J. Thomson's "discovery of the electron" casts doubt on the commonly held belief that it was the outcome of an interest in cathode rays extending over 16 years. It provides a new account of the cathode ray controversy, examines what Thomson meant by a "corpuscle" and the origins of this concept in his earlier work. Finally it describes the acceptance of the "corpuscle" and how it became identified with the "electron." Author's address: Flat 3, Woodlands, Bridge Rd, Leigh Woods, Bristol BS8 3PB England.

### THOMSON AND POSITIVE RAYS

**Falconer, Isobel.** *J.J. Thomson's Work on Positive Rays, 1906-1914*, Historical Studies in the Physical and Biological Sciences, 1988, 18: 265-310.

J. J. Thomson's interest in positive rays in 1905 was an attempt to resolve a crisis in his views of electricity and matter. This paper examines the interplay between experiment and theory in his subsequent work. The experiments were directed by pre-1905 matter theories, which inadequacies in experimental technique allowed Thomson to maintain. In 1910 F. W. Aston began work as Thomson's assistant. His influence in refining Thomson's techniques, and the consequent impact on Thomson's theories is analyzed. Author's address: Flat 3, Woodlands, Bridge Rd, Leigh Woods, Bristol BS8 3PB, England.

### CAVENDISH ON HEAT

**McCormach, Russell.** *Henry Cavendish on the Theory of Heat*, Isis, 1988, 79: 37-67.

This paper centers on a recently unearthed manuscript by Henry Cavendish, dating from the 1780s, entitled "Heat." In it Cavendish identifies heat with the vis viva (kinetic energy) of the vibratory particles of which bod-

ies are composed. "Heat" is a systematic presentation of Newton's theory of heat together with comprehensive supporting evidence drawn from diverse fields. With this, his last, fundamental theory, Cavendish brought the mechanical understanding of heat to a level that would not be surpassed for over half a century.

### CARNOT CYCLE

**Tansjö, Levi.** *Comments on the Closure of the Carnot Cycle*, Journal of Chemical Education, 1985, 62: 585-591.

Sadi Carnot's own procedure for establishing the famous, reversible cycle that bears his name was simple and incontrovertible. Nevertheless, it was rejected by his first interpreters and fell into oblivion for a long time. The following questions are discussed in the paper: Why did Carnot set up the cycle as he did? Why did not his first commentators adopt his procedure? For reprints: L. Tansjö, Chemical Center, University of Lund, P.O. Box 124, S-221 00 Lund, Sweden.

### KEPLER ON VISION

**Field, J.V.** *Two Mathematical Inventions in Kepler's "Ad Vitellionem Paralipomena"*, Studies in History and Philosophy of Science, 1986, 4: 449-468.

The two inventions in question are the point at infinity and the (inverted) retinal image. The two processes of invention are both closely bound up with Kepler's conception of the role of mathematical reasoning in natural philosophy. The paper is largely concerned with Kepler's proof that vision is by intromitted light, rather than by extramitted eye-beams.

### SCHRÖDINGER AND COSMOLOGY

**Ruger, Alexander.** *Atomism From Cosmology: Erwin Schrödinger's Work on Wave Mechanics and Spacetime Structure*, Historical Studies in the Physical and Biological Sciences, 1988, 18: 377-401.

This paper describes a neglected part of the story of Schrödinger's repeated attempts to derive the discontinuous elements in atomic physics from

continuous foundations. In 1922 for the first time, and then throughout the 1930s, inspired by speculations of Edington's, Schrödinger sought to obtain the quantum discontinuities from spacetime geometry or cosmological "boundary conditions." This led him to the discovery of particle creation in expanding universes.

### JESUITS ON NEWTON

**Fischer, K.A.F.** *Newton's Ideas at the Jesuit Universities of Slovakia*, Centaurus, 1988, 31: 164-167.

In the Hapsburg-monarchy the introduction of Newton's doctrine proceeded in hand with the expansion of the heliocentric doctrine as a result of the decree of Maria-Theresa and the decrees of Pope Benedict XIV. The heliocentric oriented Jesuit physicists and astronomers presented themselves as Newtonians since the name of Newton was not included in the "index librorum prohibitorum." The change from Cartesian ideas, which were tolerated by Aristotelian scientists to the Newtonian doctrine did not proceed "overnight." The transitional stages can be presented through the analysis of many documents on this theme that exist in Slovakian Universities which are referenced. "Breviarium" of the Newtonian astronomy was the first publication of this kind in the Hapsburg-monarchy. (Tyrnaw, 1760). Reprints available from K.A.F. Fischer, P.O. Box 002, F-67.160 Wissenbourg, Ville, France.

### NOT DISCOVERING THE NEUTRON

**Six, Jules.** *Pourquoi ni Bothe ni les Joliot-Curie n'ont decouvert le neutron?*, Revue d'Histoire des Sciences, 1988, 41: 3-24.

From a rigorous historical analysis, the author brings a new explanation of the missed neutron discovery by the Joliot-Curies in 1932. In the same time, the exact role of Bothe is described, redressing some tendentious commentaries found in some physics books containing historical retrospectives. This article has been included in a more general book dedicated to the neutron discovery by J. Six "La decouverte du neutron (1920-1936)," Ed. du CNRS, Paris 1987.

## THE FIRST SEMI-CONDUCTOR LASERS

Holonyak, N. Jr. *Semiconductor Alloy Lasers-1962*, IEEE Journal of Quantum Electronics, 1987, 23: 684-690.

Following the report of high efficiency generation and transmission of recombination radiation from Zn-diffused GaAs p-n junctions at the 1962 IRE Solid State Device Research Conference (July, Durham, NH), a many-laboratory race began to construct a semiconductor laser. Although it is widely believed that only GaAs was involved in the research that led to a semiconductor laser, the visible-spectrum alloy  $\text{GaAs}_{1-x}\text{P}_x$  was in the middle of this activity and was (fall of 1962), with GaAs, a first semiconductor alloy or crystal that could be "tuned" in energy gap (and wavelength) from direct-gap to indirect-gap. The ternary  $\text{GaAs}_{1-x}\text{P}_x$  was the forerunner of all present-day III-V alloys used in heterojunction devices. The sequence of events leading to the  $\text{GaAs}_{1-x}\text{P}_x$  laser, as well as its introduction in modified form as the first practical LED, are described.

## INTERSTELLAR MOLECULES

Herzberg, G. *Historical Remarks on the Discovery of Interstellar Molecules*, Journal of the Royal Astronomical Society of Canada, 1988, 82: 115-127.

The discovery in 1937 of the first interstellar molecule was made by Swings and Rosenfeld on the basis of optical spectra obtained by Dunham & Adams at Mt. Wilson Observatory. Three years later additional lines of CH and three lines of CN were identified by McKellar and in the following year three lines of CH<sup>+</sup> by Douglas & Herzberg. It was more than 20 years later that OH was identified by radio astronomical methods followed five years later by the first polyatomic molecule NH<sub>3</sub> by Townes and his associates. Now more than 60 interstellar molecules are known.

## PTOLEMY'S "ALMAGEST"

Evans, James. *On the Origin of the Ptolemaic Star Catalogue*, Journal for the History of Astronomy, 1987, 18: 155-172 and 233-278.

The origin of the star catalogue in Ptolemy's *Almagest* has long vexed historians of astronomy. Ptolemy says that he observed the stars himself. However, it has sometimes been main-

tained that the catalogue is really due to Hipparchos and that Ptolemy simply updated it for precession. This article includes a detailed review of the controversy and presents new evidence as well. The conclusion: there is no sound reason to doubt that Ptolemy did what he says he did. For reprints: James Evans, Department of Physics, University of Puget Sound, Tacoma, WA 98416.

## ATOM SCIENTISTS

Boorse, Henry; Motz, Lloyd; and Weaver, Jefferson Hane. *The Atom Scientists*, x + 435 pp., New York: John Wiley & Sons, 1989.

This is a history of atomic theory as revealed through the lives of the physicists and chemists who contributed to this history. Starting with the writing of Lucretius, who popularized the primitive atomic theory of Democritus, the authors present the continuous human endeavor to understand the structure of the atom and its constituents, whose story cannot be separated from the personalities of innovators any more than it can from the social and intellectual conditions out of which it arose. The life stories presented here show that these great figures were not a breed of supermen, but, like all of us who come from diverse social and cultural backgrounds, products of their societies, and had a wide range of human traits and behavior. However, they departed in a notable way from the usual human pattern in their irrepressible desire to reduce the apparently infinite complexity of the observable world to an intellectually comprehensible and esthetically satisfying order.

## TIME REVERSAL

Bergmann, Otto. *A Quantum Mechanical Version of the Paper by E. Schrödinger Über die Umkehrung der Naturgesetze*, Foundations of Physics, 1988, 18: 373-378.

Schrödinger's paper, written in 1931, is reproduced in his *Collected Works*. He considers a problem in classical diffusion theory: a particle starts from  $x_0$  at time  $t_0$  and reaches  $x_1$  at  $t_1$ , find the probability distribution for any intermediate time. He generalizes this problem and concludes with applications to wave mechanics. The paper by the present author reformulates Schrödinger's problem as follows: a density operator is given which reduces to the pure states  $|i\rangle$  at  $t_0$  and  $|f\rangle$  at  $t_1$ . For reprints write to the author at Department of Physics, George Washington University, Washington, D.C. 20052

## ERTEL'S DYNAMICAL METEOROLOGY

Schröder, W. *Fifty Years of Hans Ertel's Book: "Methods and Problems of Dynamical Meteorology,"* Wetter and Leben, 1988, 40: 136-144.

This paper summarizes the development and importance of Hans Ertel's book "Methods and Problems of Dynamical Meteorology," during the last fifty years. It can be shown that the book stimulated teaching and research worldwide. Furthermore, Ertel's book is an excellent example for the mathematical and physical foundation of modern theoretical meteorology all over the world. For reprints, write to Dr. W. Schröder, Hechelstrasse 8, D-2820 Bremen-Rönnebeck, Federal Republic of Germany.

## PREDECESSORS OF COPERNICUS

Saliba, G. *Arabic Astronomy and Copernicus*, Zeitschrift für Geschichte der Arabisch-Islamischen Wissenschaften, 1984, 1: 73-87.

This article assumes that there is a relationship between the Copernican astronomical models and those developed by the Damascene astronomer Ibn al Shatir (d. A.D. 1375). The article is then devoted to the investigation of the history of these models as they were developed by other Arab astronomers in the three centuries prior to Ibn al-Shatir.

## AUSTRALIAN RADIO ASTRONOMY

Sullivan, Woodruff T. III. *The Early Years of Australian Radio Astronomy*, Australian Science in the Making, ed. R. W. Home Cambridge: Cambridge Univ. Press, 1989, 308-344.

The development of radio astronomy at the CSIR Division of Radiophysics, Sydney, over the period 1945-52 is traced in detail. It is shown how the study of "solar and cosmic noise" grew out of ionospheric physics and wartime radar development under the leadership of Joseph Pawsey and E. G. "Taffy" Bowen. The major early discoveries are described in detail; by 1952 these put the Australian group at or near the top in almost every subfield of radio astronomy. The contrasting institutional situations in Australia, England, and the United States in the postwar period are also discussed, in particular in terms of why radio astronomy in the US was so much weaker during this period. (No reprints are available.)

## RADIO "STARS"

**Sullivan, Woodruff T. III.** *The Entry of Radio Astronomy into Cosmology: Martin Ryle's 2C survey of Radio Stars*, ed. B. Bertotti, to appear in *Modern Cosmology in Retrospect*, (Cambridge University Press, forthcoming).

The development of ideas on the discrete sources of radio emission ("radio stars") over the period 1946-53 is covered as prelude for a study of how it was that Martin Ryle, working in the Cavendish Laboratory of Cambridge University, came to undertake the 2C survey of radio stars. Based on his archives, the evidence is presented as to how he came to radically alter his interpretation of the nature of the radio stars, from being an unknown type of nearby, dark star to being a (equally unexplained) type of galaxy at such large distances that one could use them as cosmological probes. The paper closes with a look at the reception accorded to Ryle's 1955 announcement that the statistics of the 2000 sources in his survey clearly ruled out the steady-state theory of the universe. For preprints: Woodruff T. Sullivan, III, Department of Astronomy FM-20, University of Washington, Seattle, WA 98195.

## RAMAN EFFECT

**Brand, J.C.D.** *Discovery of the Raman Effect*, Notes and Records, 1989, 43: 00. 1-23.

The discovery of vibrationally shifted scattering brought immediate fame to C. V. Raman, its principal author, and launched his associate, K. S. Krishnan, on a memorable career. Although Raman laid the experimental foundations with style and assurance, his grasp of the theoretical background was never wholly secure; thus, he did not share fully in the surge of interest surrounding questions of spectral activity and selection rules, and the implementation of the discovery passed largely into other hands. For reprints: J. C. D. Brand, Chemistry Department, University of Western Ontario, London ON N6A 3K7, Canada.

## C. P. SNOW

**Brand, J.C.D.** *The Scientific Papers of C. P. Snow*, History of Science, 1988, 26: 111-127.

C. P. Snow, essayist and novelist, began his career as an academic researcher in the field now known as chemical physics, and continued as a professional scientist for about seven years. While his first papers were well received, his drive for success led Snow

into errors of judgment and some of his later work was seriously flawed. These setbacks undoubtedly influenced his decision to leave science, though his writing drew extensively from his earlier experience. For reprints: J. C. D. Brand, Chemistry Department, University of Western Ontario, London ON N6A 3K7, Canada.

## ABRAHAM'S ELECTRON

**Guidone, Mario.** *L'elettrone rotante di Max Abraham*, Atti del IX Congresso Nazionale di Storia della Fisica, Urbino, 1988 to be published.

Electron spin is generally considered a merely formal property; yet this piece of reality was built up mainly with classical materials and tools.

Ehrenfest's recovery of the old-fashioned Abraham electron model prompted a dialogue between classical and quantum frameworks, pursued by Bohr, in spite of Pauli's iconoclastic phenomenonism.

This example confirms that the classical roots of quantum mechanics were defensively removed from early foundational discussions, and that differences were overvalued and dramatized, as in quantum paradoxes. Author's address: Mario Guidone, via Langlois 49, 63023 Fermo (AP), Italy. For reprints: Fabio Bevilacqua, Dipartimento di Fisica "A. Volta," via A. Bassi 6, 27100 Pavia, Italy.

## SCHRÖDINGER AND QUANTUM MECHANICS

**Rohrlich, F.** *Schrödinger and the Interpretation of Quantum Mechanics*, Foundations of Physics, 1987, 17: 1205-1220.

After a brief review of Schrödinger's life and philosophical views, this article focuses on his own attempts at interpreting quantum mechanics and on his later (1935) criticism of the Copenhagen interpretation. The issues he raised such as nonlocality, entanglement, and the conceptual incoherence between the quantum and classical description (Schrödinger's cat) are compared with present day views. Certain points of view which Schrödinger formed early in his career stayed with him throughout his life; they are still seen in his last published paper. Reprints available from the author, Syracuse University, Syracuse, NY 13244-1130.

## BIRTH OF PARTICLE PHYSICS

**Russo, Arturo.** *I Raggi Cosmici e la Nascita della Fisica delle Particelle Ele-*

*mentari*, Atti dell'VIII Congresso Nazionale di Storia della Fisica Gruppo Nazionale di Coordinamento per la Storia della Fisica del CNR, 1988, pp. 429-471.

By the end of the 1920s the introduction of the Geiger-Müller counters and cloud chambers into cosmic ray research marked a turning point in this field. The new instruments, in fact, made possible the direct investigation in the laboratory of phenomena related to high energy nuclear interactions and quantum electrodynamics. Bruno Rossi was the first scientist to gain a clear understanding of the new experimental territories and new theoretical perspectives opened by cosmic ray physics. After the discovery of the positron (1932) the main problem was to reconcile the new data on cosmic rays with the theoretical framework of quantum electrodynamics, a problem which was solved with the discovery of the mesotron (muon) in 1937. Reprints available from the author: Istituto di Fisica, Via Archirafi 36, 90123 Palermo, Italy.

## PERIODICALS DURING A WAR

**Richards, Pamela Spence.** *Great Britain and Allied Scientific Information: 1939-1945*, Minerva, 1988, 26: 177-198.

When the outbreak of World War II threatened to cut off English scientific libraries from their sources of valued German journals, the Scientific Advisory Committee of the War Cabinet encouraged the Association of Special Libraries and Information Bureaus (ASLIB) to microfilm single copies of clandestinely-acquired German periodicals and make them available to British scientists. After May 1942 the United States Office of Strategic Services (OSS) contributed to the ASLIB microfilm supply copies of journals collected by its agents on the periphery of the Reich. Reprinted from 1943-1945 in the United States, these microfilmed journals were later credited by American physicists as having been a factor in the timely completion of the Manhattan Project. Author's address: School of Communication, Information and Library Studies, Rutgers University, New Brunswick, NJ 08903.

## FERROELECTRICITY

**Kanzig, W.** *History of Ferroelectricity 1938-1955*, Ferroelectrics 1988, 74: 285-291.

A short historical overview is presented of the progress achieved in the world between 1938 and 1955 toward an understanding of the anomalous dielectric, piezoelectric, elastic and

thermal properties of Rochelle salt and  $\text{KH}_2\text{PO}_4$ -type ferroelectrics. The history of the discovery of the ferroelectric properties of  $\text{BaTiO}_3$ , and of the important steps leading to a phenomenological understanding and to molecular theories is given. The article is not complete. Two chapters are missing, namely: "Matthias and the Road to New Ferroelectrics" and "Antiferroelectrics." No reprints available.

## MAGNETISM IN CHINA

Guo-Dong, Li. *History of Magnetism in China*. Talk presented at International Symposium: Physics of Magnetic Materials Sendai, Japan, April 8-11, 1987.

The important discoveries and inventions of magnetism in ancient China are reviewed. First, the discoveries of lodestone, its attraction power of iron and the prototype south-pointing device (Shi-Nan) are introduced. Secondly, inventions of the south-pointing fish and south-point needle (magnetic compass), the applications of magnetic compass are described. Thirdly, the various medical uses of lodestone in a long historical period are also presented. Finally, a large number of records about geomagnetic (aurora) and heliomagnetic (sunspot) phenomena which have an important and valuable significance in science are mentioned. Author's address: Institute of Theoretical Physics, Academia Sinica, P.O. Box 2735, Beijing, China.

## FROM THE GREEKS TO EINSTEIN

Motz, Lloyd and Weaver, Jefferson Hane. *The Story of Physics*, 435 pp., Plenum Publishing Co., New York, 1989.

This story begins with the mathematical and astronomical speculations of the ancient Greeks and takes the reader through the pathways of Newtonian physics, showing why the Greeks did not develop an applicable physics, in spite of their remarkable speculations and their brilliant mathematics, whereas Galileo and Newton did. The step from Newtonian dynamics to the physics of Maxwell's electromagnetic theory of light and the electromagnetic field is carefully delineated. The origins of the Theory of Relativity and the Quantum Theory, the two great theories that guide us in our pursuit of a deeper understanding of the universe, are presented in such a way as to show why these theories had to replace the physics of Newton and Maxwell. In the final chapters the stories of quantum mechanics, nuclear physics, astrophysics, cosmology and modern particle

physics are told. Throughout the book brief biographical sketches of the great physicists whose bold thinking and researches revealed Nature's secrets are included.

## WILHELM AND OTTO STRUVE

Batten, Alan H. *Resolute and Undertaking Characters: The Lives of Wilhelm and Otto Struve*, xxv + 259 pp., D. Reidel, Dordrecht, Holland, 1988.

Wilhelm Struve (1793-1864), famous for his discoveries of double stars and for making one of the earliest measurements of stellar parallax, also founded a dynasty of astronomers that lasted through five generations and included a famous U.S. astronomer. This book is a biography of Wilhelm and his son and successor Otto (1819-1905). In it, Wilhelm's early career in Dorpat (modern Tartu) is described, with special reference to his double-star work and geodetic surveying. The story then moves to Pulkovo, outside St. Petersburg, where Wilhelm, with the backing of Tsar Nicholas I, founded the great Russian Central Observatory which this year celebrates its 150th anniversary. In 1862, Otto succeeded his father as Director of Pulkovo. The later chapters draw heavily on Otto's correspondence with Simon Newcomb and on the diaries of Cleveland Abbe, who spent two years working in Pulkovo.

## MICHELSON-MORLEY CENTENNIAL

Fickinger, William and Kowalski, Kenneth L., Editors, *Modern Physics in America*, Proceedings of a Michelson-Morley Centennial Symposium, AIP Conference Proceedings No 169. 258 pp. New York: American Institute of Physics, 1988.

This volume records the two day symposium held at Case Western Reserve University in celebration of the centennial of the Michelson-Morley experiment which was performed in 1887 at Case and Western Reserve. Two contributions of special interest to historians of science are the article by the late John Schoff Millis, former chancellor of Western Reserve and onetime student of Michelson, and the transcript of the talk given by Dorothy Michelson Livingston, Michelson's daughter. In addition, thirteen papers were presented by outstanding spokesmen for contemporary fields in physics, including astrophysics, biophysics, atomic physics, computational science, and culminating in four talks on supercolliders, supernovae, superconductors and superstrings by L. Lederman, R. Kirschner, P. C. W. Chu and M. Gell-Mann.

## COSMOLOGY OF LEMAITRE

Godart, O., and Heller, M. *Cosmology of Lemaitre*, History of Astronomy, 1985, 3: 203.

Lemaitre was the precursor of the Big Bang theory. He showed in 1925 that the Einstein static solution for an homogeneous Universe was unstable and that the De Sitter solution for an Universe empty of matter was in fact not static. He proposed in 1927 a Universe model starting logarithmically from the Einstein Universe and expanding indefinitely. Unsatisfied from the physical point of view, he examined the different solutions for an homogeneous Universe given by the General Relativity with the addition of a cosmological constant. Inspired by the radioactive processes and quantum theory, he gave up in 1931 the logarithmic infinity in the past for a singular beginning where the whole Universe is contracted in to an infinitesimal primeval Atom. Its subsequent splitting was accompanied with intense radiation. The relic of this primitive outburst was thought to be found in the cosmic radiation. In his model, a slowing down of the expansion favoured local contractions forming galaxies and quasi static regions limiting clusters of galaxies. Such are the main topics of Lemaitre's cosmology exposed in this book with its historical and philosophical backgrounds including some biographical notes concerning Lemaitre's career and character.

## GEOPHYSICS RESEARCH

Schröder, W. editor, *Past, Present and Future Trends in Geophysical Research*, 343 pp., Bremen-Rönnebeck, 1988, Price: 26, DM.

The book contains selected papers presented at the IAGA/TUGG Assembly, held in August 1987 in Vancouver. The papers cover a wide field in solar-terrestrial physics, including aurora research. One contribution gives a review of development of Geomagnetic secular variation and theories of Earth's interior, another is on the magnetic reconnection and viscous interaction. Several papers deal with longterm climatic variations, the problem of historical sources, and the problem of multi-variate analysis. Other contributions analyze the so-called bright nights and the role and foundation of a geophysical-meteorological observatory in Melbourne, Australia. Special attention is given to Kepler's atmospheric physics. Available from W. Schröder, Hechelstrasse 8, D-2820 Bremen-Rönnebeck, Federal Republic of Germany.

HISTORY OF PHYSICS NEWSLETTER  
Volume IV Number 1 -- October 1989

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