

# HISTORY OF PHYSICS NEWSLETTER

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## FROM THE EDITOR

Forum members who have perused the Forum's home page on the World Wide Web will have discovered that the entire text of the October 1995 History of Physics Newsletter is available there, in addition to brief notices of the sessions that the Forum is organizing for the 1996 APS spring meetings in St. Louis and Indianapolis. An additional, useful feature is the access provided to other history of physics home pages.

Members are invited to comment on the Forum's home page and to suggest additional categories of information that would be useful and, in particular, to forward the addresses of appropriate history of physics home pages not yet listed. Please contact either David Cassidy, the Forum's Secretary-Treasurer (email: [chmdcc@vaxc.hofstra.edu](mailto:chmdcc@vaxc.hofstra.edu)) or the editor ([wblanpie@nsf.gov](mailto:wblanpie@nsf.gov)) with suggestions. [NB: information on access to the APS and AIP home pages, as well as home pages of U.S. government agencies, appears in the October issue of the Newsletter]

Expanded access to the World Wide Web provides a means to address two perennial concerns about the Newsletter: first, containing costs for printing and mailing, which now absorb well over half the Forum's annual budget; second, the desirability of providing members with more timely announcements of meetings, possible fellowships, and the like. Although it is probable that the Newsletter will continue to be published and distributed in hard copy in October and February, the Forum's Executive Committee is also weighing the desirability of reducing the size of the October issue and/or restricting distribution of hard copy to those members who specifically request it. Complete texts of everything appearing in hard copy will in any case be available on the World Wide Web, along with additional announcements updated more frequently than twice annually.

In order to assist the Executive Committee in determining policy regarding the Newsletter, Forum members are asked to respond to questions concerning their access to (and use of) e-mail and the World Wide Web which appear along with the election ballot on the inside back cover and [online](#).

William A. Blanpied

## FORUM NEWS

### APS 1996 Meetings

The Forum is involved in three sessions of historical interest at APS meetings this spring. The first, on Topics in the History of Radioactivity, will be held at the March meeting in St. Louis, scheduled for Tuesday the 19th at 2:30 pm and will commemorate the centenary of the discovery of radioactivity. Speakers will include: Sally Quinn, "The Curies and the New Theory of Matter," Erwin Hiebert, "Radioactivity and the Philosophy of Chance," and Helena M. Pycior, "Marie and Pierre Curie: Complementary Partners in the Study of Radioactivity."

The Forum is co-organizing two sessions at the joint APS-AAPT in Indianapolis, May 2-5. The first, organized jointly with the APS Committee on the Status of Women in Physics, is scheduled on May 4 at 11:00 am. Speakers will include Ruth Howes, "Contributions of Women to the Manhattan Project," Ruth Sime, "Lise Meitner and the Discovery of Fission," and Caroline Herzenberg, "Contributions of Women to Physics 1898-1998: an Historical Archive."

The second May session, entitled Historical Perspectives on Computing and Physics, is being organized jointly with the APS Division of Computational Physics and is scheduled on May 3 at 11:00 am. Session speakers will include: Jack Worlton, "The Roots of Computational Physics: Some Perspectives from Los Alamos," Arthur J. Freeman, The History of Physics Newsletter is published by the Forum on the History of Physics of the American Physical Society. It is distributed free to all members of the Forum. Others who wish to receive it should make a donation to the Forum on the History of Physics of \$10 per volume (\$5 additional for airmail) Each volume consists of five issues. Editor: William Blanpie, Division of International Programs, National Science Foundation, 4201 Wilson Blvd., Arlington, VA 22230, (Internet: [wblanpie@nsf.gov](mailto:wblanpie@nsf.gov)). Associate Editor: Stephen G. Brush, Department of History and Institute for Physical Sciences and Technology, University of Maryland, College Park, MD 20742 (Internet [brush@ipst.umd.edu](mailto:brush@ipst.umd.edu)), "Computational Condensed Matter Physics: From its Early Beginnings to the Present Golden Age," and Charles J. Murray, "How Physicists Drove the Development of Supercomputers.." Abstracts of presentations for this session appear below in the section on Meetings.

### **Business Meeting**

The annual business meeting of the Forum will be held on May 4, immediately following the session on Women in Physics and in the same room. All members are welcome to attend and participate.

## **MEETINGS**

### **APS/AAPT Session in Indianapolis**

Abstracts of papers to be presented at the May 3 APS/AAPT Session on Historical Perspectives on Computing and Physics follow:

- Jack Worlton, "The Roots of Computational Physics: Some Perspectives from Los Alamos"  
The year 1996 marks the 50th anniversary of the dedication of the ENIAC, the first computer to demonstrate the power and potential of electronic computation for the physics community. Several national laboratories, including Los Alamos Scientific Laboratory, used the ENIAC for weapons calculations, and this led to the development of several one-of-a-kind machines at these laboratories, including the MANIAC at Los Alamos. The use of these early electronic computers for the solution of complex problems in physics contributed to the development of computational methods, such as the Monte Carlo method, and to the development of the discipline of computational physics.

Because of the complexity and time criticality of weapons calculations, Los Alamos and other weapons laboratories (Lawrence Livermore National Laboratory and Sandia National Laboratories) collaborated with commercial computer vendors to develop ever more powerful computers to meet these needs. These laboratories became early customers for these new machines, thereby encouraging their development and contributing to the rapid growth of the computing industry in the United States.

These laboratories continue to work at the forefront of science and engineering. For example, the Department of Energy has chartered the Accelerated Strategic Computing Initiative (ASCI) for the development of computers that will exceed current capabilities by several orders of magnitude, again leading the way to new frontiers in computational physics.

- Arthur J. Freeman, "Computational Condensed Matter Physics: From Its Early Beginnings To The Present Golden Age"  
Computational physics, in general, and computational condensed matter physics (CCMP), in particular, is now seen to be in a golden age. In all fields of CCMP research, there has now been achieved a high level of reliability concerning predictions of physical and chemical properties and phenomena - thanks in large part to the continued rapid development and availability of high-performance computers and their easy accessibility (via networks and workstations) and the new computational methods/algorithms

which this permitted to be generated. A prime area continues to be electronic structure theory where new theoretical/computational methods - based on the density functional theory of Hohenberg, Kohn and Sham - have been developed (by us and others) that permit highly precise solutions of complex many-body systems at the level of the local density approximation. Looking back over 40 years, the present state has been slow in coming. The way was marked by pitfalls and frustrations in (a) attempting to satisfy the ever increasing demands of experimentalists seeking to understand results obtained with ever more sophisticated equipment and (b) the struggle with performing increasingly complex calculations without having adequate computing power. As will be described, these decades were also marked by triumphs and the growing acceptance of the value and importance of these complex numerical investigations.

- Charles J. Murray, "How Physicists Drove the Development of Supercomputers"  
Makers of the world's fastest computers now claim they can operate their machines at one trillion operations per second. That's about 10,000 times faster than today's Pentium chips. To reach such speeds, however, users must often pay more than \$30 million per machine. Who needs such speed? And who can afford it? Up to now, physicists at the country's national defense labs have been the primary users of such machines. With these so-called "supercomputers," they have simulated the detonation of countless weapons, thereby reducing or eliminating the need for actual nuclear testing. They have also dramatically improved the country's weather forecasting abilities, enabling forecasters to predict hurricanes and floods days in advance. By creating a market for these machines, the physics community has also made the United States a world leader in computing. Technologies developed in the supercomputing arena have trickled down to other mainframes and desktops. This presentation will explore the unusual world of supercomputing: the needs of the physics community, the unique atmosphere within which the machines are designed, and the industry's future.

## **1996 History of Science Society Meeting**

The 1996 meeting of the History of Science Society will be held in Atlanta, Georgia, November 7-10. Proposals for sessions as well as individual papers are due April 1, 1996. Nominations for recipients of the society's prizes are also due at that time.

For further information contact the History of Science Society Executive Office, Box 351330, University of Washington, Seattle, WA 98195. FAX: (206) 685-9544; Internet: [hsexec@u.washington.edu](mailto:hsexec@u.washington.edu).

## **OPINION**

### **"Thin Ice Over Deep Water"**

Future historians who seek to assess and interpret the U.S. government's quest, during the 1990s, for a new science policy model to replace the long-standing, but now defunct Cold War model may view the budget battles which began in the fall of 1995 as either a turning point, or a curious anomaly. Be that as it may, two successive and unprecedented government shut-downs have had at least short term negative consequences for science funding agencies - and their constituents. In an address entitled, "Thin Ice Over Deep Water: Science and Technology in a Seven Year Downsizing" delivered to the American Astronomical Society on January 15, 1996, 10 days after the end of the second shut-down, National Science Foundation Director Neal Lane described the immediate situation at NSF, and speculated on possible long-term consequences for the agency and the U.S. scientific community. Some excerpts:

"So, what about the budget situation and prospects for the future? Right now, Washington is frenetic and confusing--on good days. I will not share my adjectives for the other days. We are caught up in a political debate of differing ideologies and different plans for reaching apparently similar goals. The budget sits at the center of this debate. The American writer Ambrose Bierce said in his Devil's Dictionary, "A conservative is a statesman who is enamored of existing evils, as distinguished from the liberal, who wishes to replace them with

others." There are days when everything seems reduced to such absurdity. And the frequency of such days has been increasing of late.

"At NSF, we returned from the shutdown to the sight of over 20 large mailroom carts crammed one against the other, brimming over with four weeks of proposals and correspondence. The last report I had showed over 2000 proposals in the queue (on the average, we receive and log in about 240 proposals per day). On a single day last week, I know we received over 900 proposals. NSF program officers will soon be faced with the enormous task of sorting through everything and deciding what to do first. During the shutdown, many of our facilities, including astronomical facilities, began to run out of money. We considered truncating this season's Antarctic program.

"The situation is something like returning to storm or flood damaged property. In the beginning, you are consumed with pulling out wet carpeting, rescuing family heirlooms or momentos, sweeping out the mud and sludge. When that is done, you begin to recognize the real damage, the deep and dangerous structural damage. Have the wind and water destabilized the outside walls and the roof? Is the electrical wiring safe and properly functional? Do the pipes and plumbing work? Likely the more pervasive and more costly problems are the ones that emerge secondarily. I cannot tell you today what those will be for NSF, for astronomy, for science in America. But, they do not portend positive outcomes. "The entire sordid episode has, I believe, irreversibly changed the image of public service, and I'm very worried about the implications for NSF as well as other agencies. But, the shutdown reflects a much larger set of conflicts and challenges. "My message to you today is that if you don't take it as one of your professional responsibilities to inform your fellow citizens about the importance of the science and technology enterprise, then that public support, critical to sustaining it, isn't going to be there. "One thing that has been striking during this year of budget battles and, most recently, the shutdown, is the perceived stony silence of the science and technology community--the universities, where most of the fundamental research is done, and with a few exceptions, business and industry, which depend on the knowledge and technologies research provides. And I can assure you that this perceived lack of concern has not gone unnoticed in Washington. "Returning to the title of my talk, I believe we are skating on thin ice. But, the good news is that we have an unprecedented opportunity--handed to us by the threats to the enterprise--to work together to prevent the ice from wearing thinner, by upholding the science and technology, research and education, necessary to keep this nation safely and prosperously above the deep."

The full text of Dr. Lane's remarks is accessible via the NSF home page: <http://www.nsf.gov>.

## **FORUM ELECTION**

Please vote for: a Vice-Chair and two new members of the Executive Committee.

### **Nominees For Vice-Chair**

#### **William A. Blanpied**

I am a particle physicist (PhD Princeton, 1959), turned civil servant (at the National Science Foundation since 1976, and currently Senior International Analyst in the Division of International Programs.) As a college sophomore, I seriously considered majoring in history rather than physics. Had I done so, I probably would have become a professional historian of science. Instead, I have remained an amateur, and trust that I remain faithful to the root meaning of that word.

In any event, my serious amateur status has allowed me - perhaps compelled me, - to focus attention on themes decidedly out of the mainstream which also bear some relationship with my professional pursuits. My research on the introduction and evolution of European science in India, for example, has provided a means for exploring tacit assumptions underlying both the conceptual and organizational aspects of science. Likewise, my two

decade-long interest in the evolution of U.S. science policy from the New Deal to the present has provided a superlative if not always encouraging context for my day to day work with the U.S. government.

Both the practice of physics and the social and political contexts of the discipline are undergoing profound transformations whose future impacts, of course, remain unknowable. Historians of physics, however, possess unique tools for understanding the broader implications of those transformations. The approaching centenary of the American Physical Society provides the Forum on History of Physics, working in concert with its sister fora, with unique opportunities to inform the ongoing debate among U.S. physicists on the future of their discipline. Let us take advantage of those opportunities.

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### C. Stewart Gillmor

C. Stewart Gillmor is Professor of History and Science and former Chairman of the History Department at Wesleyan University. He received his B.S.E.E. from Stanford and Ph.D. from Princeton. He was U.S. exchange physicist with the 6th Soviet Antarctic Expedition, a Fulbright Research Fellow at the Cavendish Laboratory (Cambridge), the first NASA History Scholar at NASA, Research Fellow at the Center for Research in Terrestrial and Planetary Physics in Paris. He has authored or edited four volumes on the history of physics and of geophysics and has served on several history committees for the American Geophysical Union, the AIP., and APS. He is currently editing a volume on the discovery of the magnetosphere and the early history of magnetospheric physics. He served the APS Forum for History of Physics as Secretary-Treasurer from 1988-94.

*Statement: I view the Forum for the History of Physics primarily as a way for historians of science and for physicists to meet, to learn, and to exchange views. While we certainly have links with education, and with current societal issues, these areas have their own Forums within APS. I believe APS members share a deeper interest in and support for the history of science than I have experienced in other areas of science. A challenge to our Forum is to bring sessions of historical interest to APS members in other Divisions, and to balance the sessions which highlight events within the past 50 or 100 years, with sessions speaking to physics across the centuries. I heartily agree that science is a complex enterprise, compact of elements both intellectual and social. Yet here I reveal my bias about current social science/cultural historical critics, some who write about physics while holding only the barest notion of any technical physics. If elected, I would be most pleased to again serve the Forum to the best of my ability.*

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### Nominees For Executive Committee

#### Allan Franklin

*Statement: I am currently Professor of Physics at the University of Colorado. I began my career as an experimental high-energy physicist. For the past twenty years I have worked in the history and philosophy of science, particularly on the roles of experiment in physics. The historical episodes I have discussed include the discovery of parity nonconservation, Millikan's oil-drop experiment, the history of weak interactions from Fermi's theory in 1934 to V-A theory in 1957, the Fifth Force, and the history of the 17-keV neutrino. On the philosophical side I have discussed theory choice, Bayesian confirmation theory, and the epistemology of experiment. My publications include: *The Neglect of Experiment* (Cambridge University Press, 1986), *Experiment, Right or Wrong* (Cambridge University Press, 1990), *The Rise and Fall of the Fifth Force* (American Institute of Physics, 1993), "The Appearance and Disappearance of the 17-keV Neutrino," *Reviews of Modern Physics* (1995), and "The Resolution of Discordant Results," I served as Chair of the Forum when it was still the Division of the History of Physics, and am a Fellow of the American Physical Society.*

*A major issue facing both the Forum and the physics community as a whole is the rather negative view of science that is prevalent in both science studies and in the general humanities community. Whether it is attributed to inherent gender bias, Eurocentrism, or the interests of physicists, physics is regarded as fatally*

*flawed and incapable of providing knowledge of the world. I believe this view is incorrect. Science is a reasonable enterprise based on valid experimental evidence and on reasoned and critical discussion. As such it can, and does, produce knowledge. Although members of the Forum confront the critic's view of science by presenting accurate histories of physics, more needs to be done. We need to know the criticisms and to provide answers to them. I suggest that some future invited Forum sessions include both the views of the critics of science as well as informed members of our own community. This is important for the future of our discipline. These negative views are those that are being presented to our students, both future physicists and citizens. These views also inform the public view of science. I believe such sessions will both inform us about the issues and also encourage members of our community to combat them.*

## Ruth Howes

Ruth Howes is the George and Frances Ball Distinguished Professor of Physics and Astronomy at Ball State University in Muncie, Indiana where she has been a member of the department of Physics and Astronomy since 1976. She obtained her Ph.D. (1971) in experimental nuclear physics from Columbia University and has since followed a checkered career path including service as a William C. Foster Fellow with the U.S. Arms Control and Disarmament Agency (1984-85), an American Association for the Advancement of Science Congressional Fellow (1993-94) and a program director in the Division of Undergraduate Education at NSF (1994-95). She has been active in the Forum on Physics and Society (chair 1991-92) and the Forum on Education (chair 1995-96) and has served on the Committee on Education, the CSWP and POPA. Her current research project is a study of women who did technical work on the Manhattan Project conducted in partnership with Caroline Herzenberg.

*Statement: I think instructive to recall that the current job crisis in physics is not the first to strike the community. In the past, physicists have responded with a variety of programs and tactics. The Forum should remind the membership of APS of those responses and their relative success in promoting the health of physics. In conjunction with the upcoming APS centennial celebration, the Forum will be asked to recall great discoveries and personalities in physics. We should also stress the role that the development of physics over the last century has played in spawning new fields in science and in developing technologies that have shaped modern life. Finally the Forum is uniquely qualified to guide physicists in responding to current trends in science so that the community accepts and profits from reasonable suggestions for changing the way we do business while strongly rejecting pseudoscience, poor quality science and irrational attacks on physics.*

## Jay Pasachoff

Jay Pasachoff received his Ph.D. in Astronomy from Harvard University in 1969, with a thesis on solar physics. He worked for a year at the Air Force Cambridge Research Laboratories, then as a postdoc at the Harvard College Observatory and later at Caltech. His interest in education and in explaining science to the public led to his appointment in 1972 as Director of the Hopkins Observatory at Williams College, where he is also Field Memorial Professor of Astronomy.

Pasachoff's historical interests have led him, most recently, to co-authorship of a book on historical studies and images of comets, about which he and his colleague have earlier written articles. He is author of textbooks in astronomy and co-author of texts in non-majors physics, calculus-based physics, calculus, and elementary and middle-school science. He is a fellow of the American Physical Society, Chair-elect of Division D (Astronomy) of the American Association for the Advancement of Science (AAA.S), has served on NASA's Astrophysics Council, and is a current Sigma Xi National Lecturer.

*Statement: I have long been interested in integrating the history of astronomy and physics with my teaching of and in "spreading the word" about the value of the history of science. I try, in my published texts, to properly fit developments in their historical context and to give students a feel for the development of individual fields. Recently, an art-historian colleague and I have spent a year writing a book about images of comets and meteors in 18th and 19th century British art and science, in the period from Newton's observations of the comet of 1680*

*to the apparition of Halley's Comet in 1910. This work has brought me to an enlarged study of the history of astronomical photography, and we have been tracking down the earliest comet photograph. My interest in such matters makes me particularly interested to be on the Executive Committee of the Forum for the History of Physics.*

### **Bertram Schwarzschild**

Bertram Schwarzschild was born in Vienna and grew up in New York City. He was an undergraduate at Cornell and received his PhD in high-energy physics at Berkeley in 1967. After post-doctoral positions at Imperial College (London), the University of Chicago, and the Max Planck Institute for Physics and Astrophysics (Munich) and the University of Toronto, he became an associate editor at Physics Today, where he has been for the last 17 years. There his primary activity has been discovering research news for the magazine's "Search and Discovery" section. But he has also served as editor for contributed articles of historical interest by authors such as Gerald Holton, Al Wattenberg, Emilio Segre, Alexander Akhiezer, and Ioseph Khriplovich. His translation of Boltzmann's humorous account of the summer (1905) he spent at Berkeley and Stanford appeared in the January 1992 issue of Physics Today.