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HISTORY of Physics NEWSLETTER

From the Chair

Celebrating Our Heritage

By Michael Riordan, Forum Chair

In late January I received my copy of the winter Newsletter of History of Science Society and was very pleased to notice an announcement of the Abraham Pais Award among its listings of grants, fellowships and prizes. After two years of hard work by our dedicated Award Committee, word is finally going out to history and physics colleagues about this award "for outstanding scholarly achievements in the history of physics." And it is fittingly named in honor of Bram Pais, a great physicist and a noted historian of physics who truly embodies the international spirit of both fields; his spirit will endure in the annual granting of this Award. We now await with great anticipation the submission of nominations for this Award and the naming of its inaugural winner.

It gives me great satisfaction to have served on the Forum's Award Committee while the Pais Award was becoming a reality. I think we all looked forward to the regular conference calls, usually an hour but sometimes longer, during which we discussed and debated the next steps in establishing the Award, building its endowment, and finalizing the details of how winners are to be determined. This was committee work at its finest, with everyone making major contributions. It would take too many words to enumerate their contributions here, but let me repeat once more their names: Ben Bederson, our indefatigable Chair; Steven Brush; Gloria Lubkin; Harry Lustig; myself; Roger Stuewer; and Spencer Weart representing the American Institute of Physics, which cosponsors the Pais Award with the American Physical Society. We have also received excellent support throughout from the APS development team of Darlene Logan and Sarah Davis.

Abraham Pais and his wife Ida Nicolaisen taken Sept 7, 1996 by Norton M. Hintz, courtesy AIP Emilio Segre Visual Archives

Fundraising efforts are continuing under the leadership of Harry Lustig, who has assumed the Chair of the Award Committee from Ben, who now has his hands full editing the Forum's Newsletter. Our goal is eventually to increase the endowment to $200,000, so that the Pais Award can be elevated to the level of a full APS Prize. Thanks to a generous grant from the Richard Lounsbery Foundation, engineered with the aid of Fred Seitz, the endowment now stands at over $130,000, not including a matching Lounsbery grant of $13,000. We urge you to consider adding to this growing endowment in your donation plans.

During the past year, the Forum has inaugurated one more effort at recognizing important contributions to the history of physics by establishing the Historic Physics Sites Committee at the instigation of Alan Chodos and Judy Franz. As part of the APS activities that will occur during the World Year of Physics 2005, they hope to begin identifying and publicizing U.S. locations and institutions at which major advances occurred in the history of physics. The HPS Committee has been established to advise the APS staff regarding the standards, policies and procedures to be followed in determin-

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ing and recognizing the most important sites. In naming members of this Committee, I aimed for both geographical and disciplinary diversity. A very distinguished panel has agreed to serve and been confirmed by the Forum Executive Committee: Gordon Baym of the University of Illinois, Sidney Drell of SLAC, Mildred Dresselhaus of MIT, Gerald Holton of Harvard University, and John Rigden of Washington University. They should begin their meetings and deliberations soon.

In both these efforts to celebrate our physics heritage, we must strive to do more than just congratulate our colleagues and institutions for their outstanding achievements. I have always thought that the history of physics is a powerful teaching tool — and at many levels of the educational process. The stories of physics achievements and how they came about serve not only to help communicate the content of our field to those outside it; they also help illustrate how physics is such an integral part of the wider cultural milieu of modernity. Nothing has underscored this connection better than Neal Lane's article, "Ben Franklin, Civic Scientist," in the October 2003 issue of *Physics Today*. It was Franklin's experiments on electricity and his international scientific recognition that gained him instant acceptance into French society and its ruling circles — access that proved crucial in gaining France's financial and military support during the American Revolution.

As I step down from the Chair of this Forum, therefore, I urge my successors, my fellow Executive Committee members and the entire Forum membership to keep this educational purpose in mind as the Pais Award (or, hopefully, Prize) and Historic Physics Sites initiative become realities. There is a danger that these worthy efforts may become yet another case of what newspaper reporters call "inside baseball," serving only to congratulate our colleagues for jobs well done while the educational possibilities are largely ignored. As the ultimate "meaning" of these important initiatives will be established during their first few years of existence, we cannot relax just yet.

HISTORY of Physics NEWSLETTER

The *History of Physics Newsletter* is published twice yearly by the Forum on History of Physics of the American Physical Society. It is distributed free to all members of the Forum. The Forum also has reciprocal arrangements with History of Science Society, Philosphy of Science Association, and the International Society for the History of Philosophy of Science. Nonmembers who wish to receive the Newsletter should make a donation to the Forum of $5 per year (+$3 additional for airmail. Each 3-year volume consists of six issues.

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Editor's Note

Abraham Pais Award

Michael Riordan, in his lead piece in this issue, discusses the circumstances surrounding our success in creating the new History of Physics Award, named after Abraham Pais. I would like to add only one item to this discussion. The funds we raised for the Award were almost completely contributed by physicists, and not by others with deep pockets.(There is a notable exception, Mr. Sam Ballen, who contributed generously as a person dedicated to the history of science, and several Foundations also contributed substantially). The initial major impetus for achieving our goal was a double contribution by John and Elizabeth Armstrong, who gave us both an outright grant and an equal matching amount, which stimulated further giving. Virginia Trimble aided significantly in meeting the matching requirement. There were other important amounts contributed by many of our colleagues, too numerous to mention here. I would however like to point out that as of this writing we have received gifts from no fewer than 70 people, almost everyone of them members of our forum. The complete list of donors at the time of this writing is presented in a separate section of this Newsletter.

Changing of the Guard

As is inevitable from time to time, two stalwarts of our Forum are ending their respective tenures of FHP service. I am taking over as Editor of our Newsletter with this issue from Bill Evenson, with Michael Riordan serving in a newly created position as Associate Editor, and Ken Ford is ending his service as Secretary-Treasurer of the Forum.

Bill Evenson (PhD Iowa State University) began his scientific career as a research associate at the University of Pennsylvania in 1968. Since that time he has held many academic positions, mainly at Brigham Young University, ranging from Assistant Professor in 1970 up to Dean of the College of Physical and Mathematical Sciences in 1991. He is currently retiring from his position at BYU as Professor of Physics, to become Professor of Physics and Associate Dean of Science and Health at Utah Valley State College. He was Fulbright Senior Scholar at the University of Constanz in 1991. His activities in our Forum include Program Committee member and Chair 1995-97, Nominating Committee 1998-2001, Secretary-Treasurer 1998-2001, as well as Editor of the FHP Newsletter from Vol. VII No.1, Fall 1997 through Vol. IX No.1, Fall 2003. I am sure you can all recognize his splendid performance in this position simply by perusing the various issues of the Newsletter which have appeared under his editorship.

Kenneth W. Ford (Ph D Princeton U) began his scientific career at Los Alamos in 1950, as a Research Assistant. He then held academic positions at Princeton, Brandeis, University of California Irvine and Boston University, then serving as President, New Mexico Institute of Mining and Technology, followed by a stint as Executive Vice President of the University of Maryland System , followed by several other positions in industry and at the American Physical Society, culminating finally as Executive Director and CEO of the American Institute of Physics from 1987-93. Upon his retirement from AIP, he served in several educational positions and finally served as FHP Secretary-Treasurer, from 2002-2004. In between he held numerous other part time and volun-

tary positions. He is a Fellow of APS. While he claims that his role as Secretary Treasurer was mainly a routine one, I can personally vouch for the fact that his service went well beyond this, and that he has been a solid, invaluable flywheel, keeping FHP running smoothly despite some tendency for it to lurch, from time to time. He leaves FHP in sound fiscal and operational positions

Both Bill Evenson and Ken Ford merit our heartfelt and enthusiastic thanks for their exemplary service on behalf of our Forum.

Invitation to our Members

This Newsletter is meant to be an outlet for the distribution of information to Forum members on all aspects of the history of physics. Our membership, about 3,000 strong, is an invaluable resource for the field. We are happy to offer this venue as a platform for any member whose personal memories and observations are of possible interest to our readers, and I would like you to therefore consider this as an invitation to send in whatever items you think might be worth presenting. In addition the Editor would greatly appreciate being alerted to articles and books in the history of physics, personal and institutional histories, memoirs, and any other works in physics history that would be worth calling to our readers' attention.

Forum News

Web version vs. paper version of FHP Newsletter:

We have received about half a dozen responses to our inquiry in the Fall 2003 FHP Newsletter inviting your opinions concerning whether to offer our Newsletter exclusively electronically or whether to continue mailing a paper version to all members in addition to the electronic version. No member expressed the latter opinion. This question will be considered at the meeting of the FHP Executive Committee during the April APS meeting; its decision will be relayed to our membership expeditiously. Considerable financial saving will result if a paper version is mailed only to those members who request it. Please write the Editor if you still wish to voice your opinion on this issue.

Forum Business and Executive Committee Meetings

The annual Forum Business Meeting will be held at the "April" APS meeting in Denver, CO (actually May 1-4, 2004). The time and place will be posted on the FHP web site. The Forum Executive Committee will also meet at the "April" APS meeting. This meeting is for members of the Executive Committee and guests.

Forum Election

Forum elections information is contained in this *Newsletter.* A complete list of candidates along with their biographies and candidate statements is included. ***Voting*** however is performed either on the web or by separate mail. By now those with email addresses will have received the ballot, along with the same biographic and candidate statements appearing in this Newsletter. Those without email addresses or incorrect ones should have received mail ballots. ***Deadline for receipt of ballots is March 26.***

List of Donors to the Abraham Pais Award in the History of Physics

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Forum Program for March and April Meetings

March Meeting March 22-26, 2004 Montreal Canada

INVITED SESSION Monday afternoon, March 22 524AB, Parlays des Congres

Session D5 - The History of Physics in Canada: Some Highlights.
Chair: Robert Romer

[D5.001] Harriet Brooks: Canada's First Woman Physicist
Geoffrey Rayner-Canham (Sir Wilfred Grenfell College, Memorial University) *(in* cooperation with Marelene Rayner-Canham)

During those early halcyon days of the study of radioactivity, one young Canadian woman, Harriet Brooks, joined Ernest Rutherford's group as his first research student. Later, she joined J.J. Thomson's group in Cambridge and, finally, Marie Curie's group in Paris. During her short research career, she made several important contributions to science. She investigated the nature of 'emanation' from radium; discovered that radioactive substances could undergo successive decay; and first reported the recoil of the radioactive atom. Much of this research was published under her name alone though Rutherford made extensive reference to her discoveries in his Bakerian lecture of 1904.

Brooks life is of interest not only in what she accomplished, but also in the challenges she faced as a pioneering woman scientist in the early part of the twentieth century. In the presentation we will blend the account of her life and work with the societal context. This work was accomplished jointly with Marelene F. Rayner-Canham.

[D5.002] McLennan, Allen and Misener: Low temperature physics at Toronto in 1920-1936 and the discovery of superfluidity.
Allan Griffin (Department of Physics, University of Toronto)

John C. McLennan was the dominating force in the Department of Physics at the University of Toronto from 1900-1932. During this period, with great energy and enthusiasm, he built up the Department into a major research laboratory and stimulated many Canadians to do graduate work in physics . With a graduate student Gordon Shrum, McLennan was successful in producing liquid Helium in 1923, the second place outside of Leiden. During the next decade, fundamental work on superconductors and liquid Helium was carried out at Toronto. Besides celebrating the career of McLennan, I will discuss the work of Jack Allen and Don Misener, two of the most famous graduates of this lab in the early 1930s. Misener's rotating cylinder experiment in 1935 measuring the abrupt decrease in the viscosity below the transition gave the first evidence that He II did not behave like a classical fluid. Misener went on to Cambridge University in 1936 for his Ph.D. and joined up with Allen, who had gone there in 1935 as a research fellow. Working together, they observed superfluid flow in thin capillaries in late 1937. New information will be presented on the detailed chronology of events which led to this seminal discovery, and its relation to the independent work of Peter Kapitza in Moscow. I will also speculate on why Allen did not share the Physics Nobel Prize awarded to Kapitza 40 years later.

[D5.003] Gerhard Herzberg and 'The Temple of Science'
Boris P. Stoicheff (Department of Physics, University of Toronto)

By age thirty, Herzberg had attained international status as one of the pioneers of molecular spectroscopy, but he was not wanted in his homeland Germany. In 1935 he found a safe haven at the University of Saskatchewan in the Canadian prairies. With his decade of research there and publication of two of his classic volumes on Molecular Spectra and Molecular Structure, spectroscopy blossomed in Canada. After an interlude of three years at Yerkes Observatory he accepted the challenge offered by the National Research Council of Canada (NRCC) to establish a major laboratory in Ottawa, which in time became one of his and Canada's crowning achievements. In 1971 Herzberg became one of the few physicists (following Rutherford and Debye) to be awarded the Nobel Prize in Chemistry. Along with his preeminent research on the spectra of free radicals, his Spectroscopy Laboratory was highly acclaimed in the Nobel Citation: "the only institutions which have previously played such a role were the Cavendish Laboratory in Cambridge and Bohr's Institute in Copenhagen". A review of Herzberg's many accomplishments in physics, chemistry, and astrophysics will include seminal contributions of Canadians in spectroscopy, as well as a brief history of the NRCC in its golden age.

[D5.004] Brockhouse and others: Neutron Scattering and Condensed Matter Physics at Chalk River Labs
Eric Svensson (National Research Council Canada, Steacie Institute Neutron Program, Chalk River Laboratories, Stn. 18. Chalk River, ON, K0J 1J0 Canada)

Bertram Brockhouse, in brilliant, pioneering work carried out during the period 1950-1962 at Chalk River Laboratories, laid the foundation for the field of inelastic neutron scattering. Bert invented/developed an abundance of new instrumentation (most notably the Triple Axis Crystal Spectrometer) and techniques (most notably the Constant-Q Method) and he and his collaborators carried out a truly impressive number of ground breaking measurements. These included the first determination of phonon dispersion curves (in aluminum in 1955, with Alec Stewart), the first determination of a magnon dispersion curve (in magnetite in 1958), the first measurements of phonons in semiconductors, alkali halides and several other metals, the first measurements of magnons in a metal (cobalt), and the first observation of a Kohn anomaly. Bert Brockhouse was a great scientist with an amazing intuition, but, as he regularly emphasized, the terrific atmosphere for scientific research at Chalk River Labs as well as the outstanding technical support staff and facilities were essential ingredients of his success. He also had unlimited access to, in succession, the NRX and NRU reactors which were, when they were commissioned (in 1947 and 1957) and for several years thereafter, the best research reactors in the world. Bert's accomplish-

ments were ultimately recognized by the 1994 Nobel Prize in Physics, which he shared with Clifford Shull of the United States, Cliff having laid the foundation for the field of elastic neutron scattering. My presentation will focus strongly on the work of Brockhouse, but I will also cover several highlights from the Chalk River program of neutron scattering studies on liquid helium, started in 1952 by Dave Henshaw and Don Hurst. (Don Hurst was the person who hired Bert Brockhouse and charged him with "finding something interesting to do with neutrons".) The helium program, now running almost continuously for half a century, has been a major focus of my own research. One of its most notable achievements was the first convincing experimental demonstration (in 1982) that there was a substantial Bose-Einstein Condensate in superfluid helium, with the condensate fraction estimated to be approximately 13% at a temperature of 1 K.

INVITED SESSION
Tuesday morning, March 23
516AB, Palais des Congres

Session H6 - The History of Physics in Industrial Laboratories.
Chair: Chetan Nayak

[H6.001] From X-Rays to MRI: Physics in GE
Roland W. Schmitt (Rensselaer Polytechnic Institute)

The GE Research Laboratory, founded in 1900, became the first laboratory of scientific research in U.S. industry. William Coolidge, a physicist, joined the laboratory in 1905 and produced two advances of immense importance. The first, ductile tungsten, is still the heart of every incandescent light bulb. The second, the "Coolidge" X-Ray tube, remains an essential tool of modern medicine. In the process, Coolidge explored two main approaches of physics in industry. One addresses a commercial problem or opportunity (better light bulbs) and finds interesting physics. The other explores interesting physics (X-rays) and creates a commercial opportunity. This paper addresses the mix of these approaches during GE's years as an "electric" (and therefore physics-based) company. Episodes include the following: the work of Irving Langmuir (1932 Nobel laureate in chemistry, but as much physicist as chemist); the post-World War II "golden age of industrial physics" when the endless frontier offered opportunities from nuclear power to diamond making to superconductivity; the Nobel-prize winning work of Ivar Giaever; and interdisciplinary efforts that enabled GE to become a world business leader in two medical diagnostic technologies it did not invent: computed tomography and magnetic resonance imaging. I will speculate on whether this mix of problem-driven and opportunity-driven effort is as relevant to the 21st century as it was to the 20th.

[H6.002] The Rise of Basic Research at the Bell Labs: Young Turks and Younger Turks
Philip Anderson (Princeton University)

ABSTRACT

Even before World War II, a certain amount of fundamental physics research came out of the Bell Labs. Already in the 20's, before the Labs were five years old, the discoveries of electron diffraction by Davisson and Germer, and of thermal noise by Johnson and Nyquist, had come as byproducts of wide-ranging technological studies. By the late '30's, there was a small group of broadly-trained scientists who formed a nucleus around which the "young Turks" in management —J B Fisk, M J Kelly, W Shockley, perhaps others—formed the postwar physical research department, comprising at first perhaps 50 people with a mandate to do exploratory but "relevant" research. This talk will discuss how some of the generation of postwar hires, with the cooperation of enlightened managers like W O Baker and A H White, further tested and enlarged their freedom to do basic, curiosity-driven research in an academic atmosphere. I call this group, consisting of individuals like B T Matthias, G H Wannier, R G Shulman, P A Wolff, myself , and a number of others, the "younger Turks".

[H6.003] The History of Physics at IBM T.J. Watson Laboratories
Allen Fowler (IBM)

INVITED SESSION
Wednesday morning, March 24
516C, Palais des Congres

Session N7 - Monolayers and Multilayers: Agnes Pockels and Katharine Blodgett.
Chair: Ya Yee C. Lee

[N7.001] Agnes Pockels: Life, Letters and Papers
Christiane A. Helm (Institut fur Physik, Ernst-Moritz-Arndt Universitat, 17489 Greifswald, Germany)

Agnes Pockels (1862 – 1935) was a German woman, whose studies pioneered surface science. She was born in malaria infected North Italy while her father served in the Austrian army. Because he suffered adverse health effects, the family moved in1871 to Braunschweig (North Germany). There, Pockels went to high school. She was interested in science, but formal training was not available for girls. She took on the role of household manager and nurse as her parents' health deteriorated further. Her diary illustrates the difficulties she faced in trying to maintain her own health, the health of her parents and her scientific research at the same time. When Pockels was 18 or 19, she designed a ring tensiometer. Additionally, she found a new method to introduce water-insoluble compounds to the water surface by dissolving them in an organic solvent, and applying drops of the solution. Her surface film balance technique from 1882 is the basis for the method later developed by Langmuir. Since her experimental work was highly original and in a new field, she failed to get it recognized in her own country. When she was 28, she wrote to Lord Rayleigh, since she had read about his recent experiments in surface physics. Rayleigh was so impressed with her experimental methods and results that he had her letter translated from German and published it in Nature (1891). She continued her research on surface films, interactions of solutions and contact angles (more papers, 3 in Nature). Still, she did all experiments at home. With the death of her brother in 1913 and the onset of the war, she retired into private life. Thus she was surprised when she was awarded in her late 60ies with a honorary doctorate by the TU Braunschweig (1932) and the annual prize of the German Colloid Society (1931).

[N7.002] 100 Years of Monolayers at the Air/Water Interface: Agnes Pockel's Scientific Legacy
Charles Knobler (Department of Chemistry and Biochemistry, University of California, Los Angeles, CA 90095-1569)

The experimental methods for the prepa-

ration and study of monolayers at the air/water interface devised by Agnes Pockels just over 100 years ago remain fundamental tools for monolayer research. From the standpoint of physics, they have provided an entry to a unique world of two dimensions that continues to attract interest; they and have led to applications in materials and biology. I will draw from recent experiments that show the continuing impact of Pockel's work in what continues to be a lively area of science.

[N7.003] Katharine B. Blodgett: Aunt, Friend and Physicist

Katharine Gebbie (National Institute of Standards and Technology)

Katharine Blodgett was the Blodgett of Langmuir-Blodgett films. She was the first woman scientist to join the General Electric Company research staff, the first woman to obtain a doctorate from the Cavendish Laboratory in Cambridge, and the first industrial scientist to win the Garvan Medal. She was also my aunt. This talk about her life will include many personal anecdotes and a clip from a 1939 film on Surface Science, the first in the Nobel Science Series made by the American Institute of Motion Pictures. The clip begins with Irving Langmuir demonstrating the behavior of his amphiphilic monolayers at the air-water interface, and then goes on to introduce Katharine Blodgett, who shows the transfer of films from the air-water interface to a solid substrate.

[N7.004] 70 Years of Built-Up Films: Katharine Blodgett's Scientific Legacy

Daniel Schwartz (Department of Chemical and Biological Engineering, University of Colorado at Boulder)

While working at the General Electric Research Laboratories in 1934, Katharine Blodgett published a brief account (in JACS) of her success at transferring layers of fatty acids from the water surface to a glass plate layer-by-layer; creating what was arguably the first rationally-designed nanostructured material. These structures would come bear her name along with that of her mentor, Irving Langmuir. Although various commercial applications have been proposed, ranging from anti-reflection coatings to soft X-ray monochromators, Langmuir-Blodgett (LB) films have never truly found their way into the marketplace in a significant way. Nevertheless, the scientific interest in LB films remains strong after 70 years because the technique offers a controlled method for building supermolecular assemblies with well-defined molecular arrangement and orientation. LB films have proven extremely useful as a research tool in order to explore fundamental interactions of amphiphilic molecules, chemical reactions in confined geometries, and to create model systems to calibrate and challenge new experimental techniques. From a statistical physics standpoint, LB films offer the possibility of studying the evolution of structure and phase transitions as a molecular system evolves from two to three dimensions. LB methods are also frequently used to create model biological membranes of known composition as well as molecular (or nanoparticle) layers for studies of potential nanoscale optoelectronic devices.

April Meeting
May 1-4 2004
Denver Colorado

FOCUS SESSION
Tuesday morning, May 04
Governor's Square 17
Adam's Mark Hotel

Session V8 - Science Advising.

Chair: Joel Primack

[V8.001 Science and Technology Advice to the President

D. Allan Bromley (Yale University)

Now that a decade has passed it is possible to review more objectively my term as The Assistant to President George H. W. Bush for Science and Technology. This talk will focus on some of the accomplishments and failures that characterized this 1989-1993 period. Prominent among the accomplishments was an unprecedented level of communication and cooperation achieved among some twenty agencies supporting Samp;T, the formal statement of US technology policy and extensive expansion of international cooperation; among the failures was our underutilization of the unique resource offered by PCAST. Let me note, however, that it was both a privilege and pleasure to be a member of George H.W. Bush's senior staff; he understood the importance of science and technology and provided strong support for it.

[V8.002] Presidential Science Advising from the Atomic Bomb to SDI

Gregg Herken (University of California)

The relationship between American presidents and science has always been surprisingly idiosyncratic. Chief executives from Franklin Roosevelt to Ronald Reagan have adopted very different approaches to dealing with the scientific community. The early history of presidential science advising is the story of a few energetic individuals who sought to influence government policy when there was no established method for scientists to approach the White House. President Eisenhower created such a channel in 1957 with the President's Science Advisory Committee [PSAC]. Under Ike, advising the president became for the first time a systematic and formal enterprise for scientists. But the decades after Sputnik witnesses a steady waning of the importance of the president's scientists. This decline was accelerated by the Vietnam war and controversies over antiballistic missile defense and the supersonic transport, culminating in the abolition of PSAC by the Nixon administration in 1973. To some observers, science advising reached its nadir a decade later, with President Reagan's announcement of the Strategic Defense Initiative (SDI). The advent of "Star Wars" demonstrated the influence of a small, select group of politically-active scientists: a consultative process reminiscent of the ad hoc situation pre-PSAC.

[V8.004] On Advising Congress and the President

Jack H. Gibbons

I devoted two decades trying to enable improved access to science and technology issues for elected policymakers, and to bringing trained scientists and engineers into government. After 13 years as Director of OTA and more than five years serving the President as Science and Technology Advisor I can confirm Victor Hugo's observation that "Science says the first word on everything and the last word on nothing." There are strong similarities, but also major differences in the functions of advisor to the Congress vs. advisor to the President. These differences will be discussed by examples; lessons learned will be drawn. The potential contribution from Samp;T analysis/advice to all branches of government is much greater than currently exists. Our community can be more helpful by heeding lessons learned, participating in and reinforcing first-rate analyses, and countering the efforts of those

who attempt to make political gains out of purposeful distortions of scientific consensus. Mark Twain once observed that "a lie can travel halfway around the world before truth can put on its shoes." In matters of Samp;T policy our community needs to learn how to put on our shoes more promptly.

[V8.005] The Congressional Science Fellow Program and Other Efforts to Help Congress and the Public Make Wiser Decisions on Technology

Joel Primack (University of California, Santa Cruz)

For thirty years the AAAS Congressional Science and Technology Fellow Program, with which the APS program is affiliated, has been bringing scientists and engineers to work on the staffs of Congress. During the same period, many independent technology policy groups at universities, professional societies including the APS, and non-profit organizations have prepared excellent reports. But despite these efforts, U.S. science and technology policy is often terrible! For example, the current Administration contends that there is not enough scientific evidence of global warming to actually begin to do something to slow the growth in fossil fuel use, but there is plenty of evidence to support deploying a missile defense system now, and we need to be ready to test new generations of nuclear weapons. We scientists must develop a bigger public constituency for good decisions. We need to present, not only sound recommendations backed up by convincing studies, but also wise moral leadership.

INVITED session Tuesday morning, May 04 Governor's Square 15 Adam's Mark Hotel

Mossbauer Spectroscopy: Various Historical Perspectives

Chair: Catherine Westfall

[W5.001] Early Days and the Beginnings of the Iron Age

John P. Schiffer (Physics Division, Argonne National Laboratory, Argonne, IL 60439)

Work related to the Mössbauer effect will be covered in the period from 1959-60 when the effect was first reported and the original experiments were confirmed. These were followed by the discovery, toward the end of 1959, of a very large effect in 57Fe. The following months saw a period of intense activity as the implications of the discovery were followed up. As many as 5 Letters were published in a single issue of Physical Review Letters, with a turn around time of 2-3 weeks between submission and publication. In the first few months of 1960 a large variety of new physics topics were explored, from hyperfine fields and chemical shifts to relativistic and gravitational effects. [EOB]

[W5.002] The First International; Mossbauer Conference.

Hans Frauenfelder (Center for Nonlinear Studies, Los Alamos National Laboratory)

Rudolf Mössbauer's pioneering paper was published in the Zeitschrift fur Physik in 1958. He once said that he chose this journal because he hoped that nobody would read it so he could pursue his work without competition. He was wrong. It was read mainly in the US and competition rapidly increased. The field developed so fast that the first international conference took place already in June 1960 at the University of Illinois. Less than six weeks passed between the invitations by phone and the conference, every one came, and the proceedings were published equally fast. The sessions went from 0830 to past midnight. This conference has been followed by many others, but the excitement of the first conference has not been forgotten.

[W5.003] One Part Nuclear, One Part Solid State: Fifty Years of Mössbauer Spectroscopy

Catherine Westfall (Argonne National Laboratory)

Starting in 1955 Rudolf Mössbauer conducted experiments that would demonstrate in the next three years that an atomic nucleus in a crystal does not recoil when it emits a gamma ray and provides the entire emitted energy to the gamma ray. The resonance spectroscopy made possible by this discovery led to fifty years of scientific explorations in a wide variety of fields including nuclear and solid state physics, chemistry, and geology. At the current time, Mössbauer spectroscopy is a vital part of science programs, both in many laboratories and at world-class light sources, such as Argonnes Advanced Photon Source. This paper will focus on the history of multidisciplinary Mössbauer research at Argonne National Laboratory and particularly on the interaction between nuclear and condensed matter physicists. This was necessary because of the ultra-high energy resolution of the Mössbauer resonance with its ability to resolve hyperfine interactions between the nuclear moments (nuclear charge distribution, the nuclear magnetic moment, and nuclear quadrupole moment) and corresponding solid state properties (electron charge distribution at the nucleus, magnetic field at the nucleus, and electric field gradient at the nucleus.) Understanding and exploiting Mössbauer spectroscopy therefore required work at the intersection of nuclear and solid state physics and the skills and knowledge of both specialties. The paper will start with the discovery and confirmation of the Mössbauer effect. Then it will outline early important experiments, such as the use of Mössbauer spectroscopy to confirm Einstein's general theory of relativity, and give an overview of the rapid expansion of this research tool, first with the use of Fe57 and later with the use of other isotopes. In particular the paper will focus on Argonnes cutting-edge Mössbauer work on transuranics. This work built on the resources and expertise first developed at the laboratory during WWII and brought together not only nuclear and condensed matter physicists, but also chemists, material scientists, and others.

[W5.004] Mössbauer Relaxation Phenomena: Spin Fluctuations in the Later Iron Age

Hollis Wickman (National Science Foundation)

The Mössbauer isomer shift, quadrupole interaction, and magnetic hyperfine interaction may each be subject to fluctuations due to various origins: electronic relaxation, atom diffusion, valence fluctuations, etc. In 1963-64, Afanas'ev and Kagan noted that magnetic hyperfine structure might be expected due to slow electronic relaxation in paramagnetic materials. A formal expression for the line shape was derived, but no spectra were computed to illustrate expected effects. Also at this time, a part of my thesis at Berkeley involved Mössbauer and magnetic resonance studies of the small iron storage protein ferrichrome A, which crystallizes with iron in natural magnetic dilution, reducing electronic relaxation rates, leading to line broadening and, ultimately at low temperatures, to spectral features reminiscent of those seen previously in magnetically ordered materials. Using a rate equation ap-

proach from the motional narrowing problem in NMR, I was able to simulate the Mössbauer 'relaxation spectra' of ferrichrome A and related materials. Thereafter, many theoretical analyses and spectral simulations followed, dealing with essentially all cases of fluctuating nuclear environments. Of particular interest were papers of Blume and collaborators, 1965-68. The current presentation reprises some modest 'first' observations and analyses of relaxation effects, by the author and collaborators, at Berkeley and Bell Labs, during the "Later Iron Age", ca. 1963 to 1968. They include the first "molecular ferromagnet", and crystal field level crossing and anti crossing spectral effects. Some of these phenomena relate to current areas such as single molecule magnets.

ORAL SESSION
Monday afternoon May 03
Plaza Court 3, Adam's Mark Hotel

Session S14 - History of Physics.
Chair: Nina Byers

[S14.001] Germany's Failure to Achieve an Atomic Bomb in World War II: Bad Science, Good Intentions or Neither?

Harry Lustig (City College of New York, emeritus)

This is a progress report on a project to find a definitive answer to the disputed question why the Germans did not succeed in building an atomic bomb. The most extreme answers among those that have been put forward are, on the one hand, that Werner Heisenberg did not understand the difference between a nuclear reactor and a bomb and, on the other, that German scientists dragged their feet because they wanted to deny this weapon of mass destruction to Hitler. From an examination of a number of the German scientific reports on their Uranium Project and of other sources, it seems evident that any early idea of a bomb being a run-away reactor was soon replaced by the realization that a bomb required fast neutrons and close to pure uranium 235. As for the hypothesis that the scruples of German scientists played a significant role in preventing a German atomic bomb, the available records appear to negate that explanation as well. Rather, the minuscule resources devoted to the project, the lack of German industrial capacity, the poorly organized and decentralized organization of the research, and the modus operandi of researchers, including Heisenberg, of simultaneously pursuing other interests, doomed the prospect of getting a bomb.

[S14.002] Bonebrake Theological Seminary - Most Secret A-Bomb Project Site

Katherine R. Sopka, Elisabeth M. Sopka (FOCAS - Four Corners Analytic Sciences)

In late 1943, a small number of nuclear scientists was urgently assembled in Dayton, Ohio by the U.S. Army Manhattan District Engineers and Monsanto Chemical Company Research Division to set up a top secret research project essential to counteract the German atomic bomb threat. The site chosen was an old stone building built in 1879 by the United Brethren Church in a residential area known locally as the Bonebrake Seminary. Centered on a sizeable open plot, the austere three story building was surrounded by a tall cyclone fence with a narrow gate and a minimal guard post - nothing revealed the site's intense research activity then or even in the post-WWII Cold War period. Bonebrake scientists would produce the highly radioactive polonium sources for the plutonium (Pu-239) bomb igniter used in August over Nagasaki just before the end of WWII against Japan. The existence of Bonebrake and its research/production work remained classified top secret throughout the Cold War. Only in recent times can any reference be found even to the existence of this project (unlike , for example, Los Alamos or Oak Ridge) and few, if any details, have ever been published. The primary source of information for this paper is Dr. John J. Sopka who was recruited from Princeton University by the Manhattan District in 1943 as physicist for this project.

[S14.003] Early electron-atom scattering and its influence in the development of quantum mechanics

Benjamin Bederson (New York University)

I discuss the role played by atomic collision physics in the early development of quantum mechanics. The most obvious, and dramatic, case was of course the Franck-Hertz experiment, which was what could be categorized as the first energy-loss experiment. This dramatically connected the previously known spectroscopic data, which revealed stationary eigenstates, to the dynamic interactions between particles that nevertheless referred to those same energy states. Not quite as well known, however, was the very early elastic electron-atom collision experiments, eventually leading to the Townsend-Ramsauer effect, that was in effect the first electron interference experiments, directly, or perhaps indirectly, confirming the wave-like properties of electrons. I will review the long, but direct line that led from early classical wave scattering theory, as exemplified in the late 1800's by Rayleigh's analysis of the scattering of plane sound waves by spheres, through the Faxen-Holtsmark and Morse-Allis use of essentially the same formalism, but adapted to non-relativistic wave mechanics. Other examples of early collision experiments will also be discussed.

[S14.004] Newton's diffraction measurements

Michael Nauenberg (University of California Santa Cruz)

This year marks the tercentenary of the publication of Newton's Opticks which contains his celebrated theory and experiments of light and colors as it evolved from the first published version in 1672. It is still fairly unknown, however, that in this book Newton also reported his experiments on diffraction fringes obtained from various "slender" objects placed in a beam of sunlight. These experiments posed an insurmountable difficulty to Newton's corpuscular theory of light, which failed to account for his observations. This failure explains the long delay in the publication of this book. In my talk I will compare Newton's experimental results on diffraction with the predictions of Fresnel's wave theory to demonstrate that his measurements were remarkable accurate. Eventually these measurements paved the way for Young's correct explanation of the diffraction fringes as a wave interference phenomenon.

[S14.005] THE QUEST FOR OTHER WORLDS

Virginia Trimble (Univ. of Maryland, College Park, MD and Univ. of California, Irvine, CA)

In the 4^th century BCE, Epicurus taught that there are an infinite number of worlds like (and unlike) ours, and Aristotle taught that there is only one. Neither hypothesis can currently be falsified. Over the ensuing millennia, the concept of aperoi kosmoi (plurality of worlds, or plenitude) has had four

rather different meanings, each with a modern descendent, and all conceivably true. Some interpretations permit direct observation and knowledge of other worlds; some do not. The talk will explore these, ending with a précis of recent searches for planets orbiting other stars.

[S14.006] Karl Popper's Quantum Ghost

William Shields (Virginia Tech)

Karl Popper, though not trained as a physicist and embarrassed early in his career by a physics error pointed out by Einstein and Bohr, ultimately made substantial contributions to the interpretation of quantum mechanics. As was often the case, Popper initially formulated his position by criticizing the views of others—in this case Niels Bohr and Werner Heisenberg. Underlying Popper's criticism was his belief that, first, the "standard interpretation" of quantum mechanics, sometimes called the Copenhagen interpretation, abandoned scientific realism and second, the assertion that quantum theory was "complete" (an assertion rejected by Einstein among others) amounted to an unfalsifiable claim. Popper insisted that the most basic predictions of quantum mechanics should continue to be tested, with an eye towards falsification rather than mere adding of decimal places to confirmatory experiments. His persistent attacks on the Copenhagen interpretation were aimed not at the uncertainty principle itself and the formalism from which it was derived, but at the acceptance by physicists of an unclear epistemology and ontology that left critical questions unanswered. In 1999, physicists at the University of Maryland conducted a version of Popper's Experiment, re-igniting the debate over quantum predictions and the role of locality in physics.

Fellow Nominations

Members are urged to nominate suitable candidates for Fellow of the APS, through our Forum. Nominations for APS Fellow based on achievements in the history of physics should be sent to the APS office in College Park by May 15 of each year, following the instructions given at http://www.aps.org/fellowship/fellinfo.html. Such nominations will be sent to the FHP Fellowship Committee for review. This committee will make its recommendation to APS.

Here are the specifics on the nomination process, taken from the APS website:

To Submit Nominations:

- Insure nominee is a member of the Society in good standing.
- Obtain signatures of two sponsors who are members of the Society in good standing.
- Submit a complete original nomination packet (signed Nomination Form and Supporting Letters) and one photocopy packet prior to unit deadline to:

Executive Officer
ATTN: Fellowship Program
The American Physical Society
One Physics Ellipse
College Park, MD 20740-3844

Supporting letters should be included with nomination form to insure attachment to the correct nomination package. Individuals providing letters of support do not have to be members of the APS.

Note

Nomination forms may be obtained by:

- writing the above address,
- sending an email message to: fellowship@aps.org,
- telephoning: (301) 209-3268 or faxing: (301) 209-0865,
- downloading electronic version of the nomination form from this website.

Nomination Process:

1. Submit nomination to the APS prior to unit deadline.
2. Nominations reviewed at the Unit level by the Unit Fellowship Committee. (By July 1)
3. Recommendations reviewed by the APS Fellowship Committee. (By September 1)
4. Final approval given by full APS Council. (By November 30)
5. Notification of newly elected fellows as well as sponsors of nominees deferred or dropped.
6. General announcement of new fellows in March issue of the *APS News*.

Nomination Categories

- **New:** Nominations that have been submitted for the first time and have not been reviewed at any level.
- **Deferred:** Nominations that have been reviewed once and are held over for automatic consideration by the next year's unit fellowship committee. Update information from sponsors is recommended.
- **Dropped:** Nominations that have been reviewed by two consecutive unit fellowship committees and have not been selected for fellowship. For further consideration, a completely new fellowship nomination packet must be submitted. There is no waiting period before a new nomination can be submitted.

Further Nomination Information

For further information regarding Fellowship Nominations, please email: fellowship@aps.org or telephone: (301) 209-3268.

The present members of the FHP Fellowship Committee are:

Robert Romer, Chair, rhromer@amherst.edu
Nina Byers
Elizabeth Paris
Dan Siegel

Candidates' Statements

Ian Durham

Institution: Simmons College

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Resume: Ian Durham is a mathematical physicist and historian of science who specializes in the foundations of modern physics, astronomy, and mathematics. His work has focused in recent years on an in-depth study of Sir Arthur Eddington's monumental tome *Fundamental Theory,* with an emphasis on Eddington's interpretations of Heisenberg's Uncertainty Principle and Pauli's Exclusion Principle. He was recently invited to deliver a paper and presentation at an interdisciplinary conference being held at Cambridge University in honor of the 60th anniversary of Eddington's death.

Durham's other research focuses primarily on historical and philosophical interpretations of quantum mechanics, analyses of alternative cosmological theories including varying speed of light (VSL) theories, and studies of the nature of mathematics. Durham contributed more than fifteen biographies to the forthcoming *Biographical Encyclopedia of Astronomers* edited by Thomas Hockey, and his work on Eddington has been highlighted in several periodicals in recent years including Ivars Peterson's MathTrek in *Science News Online* and the APS Virtual Pressroom.

In spring 2004 Durham will complete his Ph.D. in Mathematics at the University of St. Andrews in Scotland. He also holds an MS (2001) from Johns Hopkins University and a BS (1997) from SUNY Buffalo. He has been a Visiting Assistant Professor of Physics at Simmons College in Boston for the past three years where he helped develop a new major in physics. He has held adjunct lecturer positions at the United States Naval Academy and at the University of Maine at Machias where he regularly teaches an online History of Mathematics course.

He is a member of the American Physical Society, the Edinburgh Mathematical Society, the Canadian Society for the History and Philosophy of Science, and the Canadian Society for the History and Philosophy of Mathematics. He has a pending application for a Fellowship with the Royal Astronomical Society.

Statement: The history of physics is vital to our understanding of the relationship physics has with society in general. As technology, driven largely by discoveries in physics, becomes a greater part of our lives, we need to promote an understanding of the relationship we have to that technology. History is the natural source of guidance in such a situation. How have we reacted in the past to powerful scientific discoveries like the bomb, electricity, the heliocentric universe? As a member of the Executive Committee I would work to promote the study of the history of physics as a tool for better understanding our relationship to the physical world around us. Specifically, I will work to develop sessions at national meetings that deal with topics that may be relevant to some current event, recent discovery, or important anniversary. I would also like to see the Forum sponsor independent meetings focused solely on the history of physics as a way of highlighting the Forum's work. And finally I would work to recruit more young scientists and historians such as myself to become more involved in the Forum.

Gordon Kane

Institution:U of Michigan, Ann Arbor

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Resume: Gordon Kane is a theoretical particle physicist and particle cosmologist. He has published over 160 research papers, written or edited eight books, and given over 170 talks at national or international meetings plus many seminars, colloquia, and public talks. Two of the books are for general readers. He has been a J. S. Guggenheim Fellow, and is a Fellow of the American Physical Society, a Fellow of the American Association for the Advancement of Science, a Fellow of the Institute of Physics of England, and a Fellow of the Johns Hopkins Society of Scholars. He is the Victor Weisskopf Collegiate Professor of Physics at the University of Michigan.

Statement: Four centuries ago there was no understanding of how the natural world works, or why it is as it is. Today a great deal is understood. How we got from there to here is fascinating and should be better known to scientists and to everyone. History adds meaning to science. I am convinced that understanding how scientific progress occurs improves our ability to make progress, and should be more widely available to scientists. I have occasionally taught a general undergraduate course that covers scientific developments in their historical context, "From the Greeks to quarks and dark matter". Understanding the history, and why science flourishes better in some cultures than others, has long been important to me, and I would be happy to contribute to broadening the appeal and availability of the history of science via the Forum on the History of Physics.

John S. Rigden

Institution: Washington University (AIP retired)

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Resume: John S. Rigden is currently Adjunct Professor of Physics at Washington University in St. Louis. He received his B. S. from Eastern Nazarene College and his Ph.D. from Johns Hopkins University. Upon completion of his graduate work, he was a postdoctoral fellow at Harvard University. He has served on the faculties of Eastern Nazarene College, Middlebury College, and the University of Missouri-St. Louis. In 1987 he joined the American Institute of Physics where he served as Director of Physics Programs. Rigden's scholarly work has been in the areas of molecular physics and the history of science.Rigden was editor of the *American Journal of Physics* from 1978 to 1988. In 1992 he was the Director of Development of the National Science Standards Project at the National Academy of Sciences. In 1995 he was elected Chair of the APS Forum on History of Physics. He has served on numerous committees of the American Association of Physics Teachers, the American Physical Society, the American Association for the Advancement of Science, and the National Academy of Sciences.

Rigden is the author of *Physics and the Sound of Music* (John Wiley), *Rabi: Scientist and Citizen* (Basic Books), *Hydrogen: The Essential Element* (Harvard), and *Einstein: the Standard of Greatness* (in press, Harvard). He co-edited *Most of the Good Stuff, Memories of Richard Feynman*

and served as Editor-in-Chief for the four-volume *Macmillan Encyclopedia of Physics* and *Building Blocks of Matter: A Supplement to the Macmillan Encyclopedia of Physics*. Currently he is co-editor (with Roger Stuewer) of the scholarly journal, *Physics in Perspective*, published by Birkhauser. Rigden is a Fellow of the American Association for the Advancement of Science and the American Physical Society. He holds an honorary Doctor of Science degree from Denison University.

Statement: The Forum on the History of Physics (FHP) is important for two reasons: the American Physical Society is the voice of American physics; and the history of physics provides a powerful avenue for bringing physics to the larger public. The first reason strengthens the second. There are many ways FHP can serve the vital interests of physics. Already, FHP organizes sessions at APS meetings; these are always well attended. The Forum could work closely with the APS Forum on Education to serve the needs and interests of both students and faculty. Historical connections can not only enliven physics courses, they can also undercut the student perception that physics is just "one damn thing after another." The Forum could also work closely with the Forum on Physics and Society to enhance the appreciation and understanding of physics within the larger community. The need to find effective ways to communicate physics with the public has never been greater.

Noemi Benczer-Koller

Institution: Rutgers University

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Resume: Noemie Koller is an experimental nuclear physics Professor at Rutgers University. She is mainly interested in magnetic moments of nuclear excited states as measured by techniques encompassing both nuclear and condensed matter methods. She served as Associate Dean for the Natural Sciences of the Faculty of Arts and Sciences. She is a Fellow of the APS and the AAAS. She has served on the Editorial Board of the American Journal of Physics, the AAPT Resource Letters Board, Hyperfine Interactions and Physical Review C. She has chaired a University Gender Equity Committee and served on the APS Committee on the Status of Women. She chaired the APS Division of Nuclear Physics and its original Ad-hoc Committee on Education. More recently, she chaired the APS Committee on the International Freedom of Scientists.

Statement: The public's appreciation of science and physics has grown lately thanks to the increase in media coverage, interest in the proliferation of technology of mechanical devices, highly sophisticated medical diagnostic and treatment facilities, as well as the access to the dream world of space travel which is no longer in the realm of science fiction. The gathering and study of available documents tying the threads of the intellectual growth of the field with those of societal fabric in its historical context is yet another avenue to pursue to increase communication and broaden the vision of both the scientific community and the humanistic, political, economic and artistic society surrounding us.

Having lived through many of the developments of the latter half of the 20th century as an active, socially conscious-physicist, I am very interested in understanding and sharing the knowledge of how scientific progress occurs, how it is nurtured by the environmental conditions, and how to exploit the wealth of scientific ideas for the enrichment of all.

Roger Stuewer

Institution:U of Minnesota

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Resume: Roger H. Stuewer received his Ph.D. degree with a double doctoral major in the history of science and physics from the University of Wisconsin in 1968. He is currently Professor Emeritus of the History of Science and Technology at the University of Minnesota with faculty appointments in the School of Physics and Astronomy and Minnesota Center for Philosophy of Science. He has taught courses on the history of 19th and 20th-century physics and has supervised the Ph.D. dissertations of nine graduate students in the history of physics at Minnesota. He has held visiting professorships in the history of physics at the Universities of Munich, Vienna, Graz, and Amsterdam and has given over 100 invited lectures in many countries of the world. He has published numerous articles on the history of quantum and nuclear physics and has written, edited, or co-edited eight books, including *The Compton Effect* and *Nuclear Physics in Retrospect*.

He has served as Secretary of the History of Science Society, Chair of the AIP Advisory Committee on History of Physics, Co-Chair of the International Union's Commission on History of Modern Physics, Chair of the APS History Division and later of its History Forum on History of Physics, Chair of the AAAS Section on History and Philosophy of Science, and President of the Minnesota Chapter of Sigma Xi. He is currently Chair of the Advisory Board of the Seven Pines Symposium and Chair of the APS/AIP Selection Committee for the Abraham Pais Award for the History of Physics. He is Co-Editor of the journal *Physics in Perspective*, Editor of the Resource Letters of the *American Journal of Physics*, and serves on the Editorial Board of other journals. He has been a Sigma Xi Distinguished Lecturer and an APS Centennial Speaker. He has received a Distinguished Service Citation from the AAPT and the George Taylor Distinguished Service Award from Minnesota's Institute of Technology. He is a Fellow of the AAAS and of the APS.

Statement: The Forum on History of Physics has been and is a major vehicle for bringing physicists and historians of physics together to pursue common intellectual, educational, and professional goals. I have devoted much of my academic and professional life to these activities and look forward to continuing them. I note that in the World Year of Physics 2005 the Forum (formerly Division) on History of Physics will mark the 25th anniversary of its establishment, which will provide a significant opportunity to celebrate, assess, and extend its activities. I would look forward to playing a role in these and related ventures, both before and after 2005, as a Member at Large of the Forum's Executive Committee.

Harry Lustig

Institution:APS and CCNY (retired)

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Resume: Harry Lustig is an emeritus professor of physics and Provost Emeritus at the City College of the City University of New York. He received his Ph.D. degree in physics from the University of Illinois at Urbana-Champaign in 1953. During his 33 year career at CCNY he held visiting appointments

at Stanford University and the Universities of Colorado, Illinois, and Washington. In 1964-65 he was a Fulbright Professor at University College, Dublin and from 1970 to 1972 he served as Senior Officer in the Department of Science and Technological Education at UNESCO, Paris.His earlier research and publications were in the areas of theoretical nuclear physics and the Moessbauer effect. He has also contributed to the field of energy studies, to science education, to international cooperation in science, and to the economics of scientific publishing.

During the past decade, Lustig's interests have increasingly focused on the history of physics. Among his publications in that field are, with E. M. Henley, a 1998 biographical memoir of Robert E. Marshak for the National Academy of Sciences, and "To Advance and Diffuse the Knowledge of Physics — an Account of the One-Hundred Year History of the American Physical Society", *Am. J. Phys.* , 68, 595-636 (2000). He is now trying to find a definitive answer to the question why the Germans did not achieve an atomic bomb during World War II.Lustig served as Treasurer of the American Physical Society from 1985 through 1996 and, in 1993-94, simultaneously as the Society's Acting Executive Secretary. He has, since its inception, been a member of the FHP Committee which is raising the endowment for the Abraham Pais Award in the History of Physics, and now serves as its chair.

Statement: Physicist-historians seem to follow two career paths, that — to conjure up unlikely role models — of Herodotus, by making significant contributions as professional historians from the beginning of their professional lives, and of Tacitus, by becoming admired historians later in life, after having made their mark in other fields.

It is the singular achievement of the APS Forum on the History of Physics to unite these two archetypes in the pursuit of two most worthwhile endeavors — to advance and diffuse the knowledge of the history of physics and to promote an interest in this history among our colleagues in the APS. FHP's increasingly effective invited and contributed paper sessions at Society meetings are making an invaluable contribution, as will the recently established Pais Award in the History of Physics. The collaboration in the design and management of the Award between FHP and the American Institute of Physics Center for History of Physics should animate further collaboration between the two organizations.

I believe that, if elected, I will be an effective Secretary-Treasurer of FHP, if for no other reason than my accumulated experience and record in previous executive positions. Most relevant among these is my eleven year service as Treasurer and operating officer of the APS. During my tenure the Society's net worth grew from $7 million to $30 million. I take satisfaction in having initiated, as APS Treasurer, the system of "capitation" under which the APS now provides much of the income of the Forums. Needless to say, I look forward also to contributing my share to the general policy deliberations and initiatives of the Executive Committee and to the activities of the Forum. Ken Ford will be the proverbial hard act to follow, but I will try as hard to be a worthy successor.

Myron Campbell

Institution:U of Michigan, Ann Arbor

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Resume: Myron Campbell is a Professor of Physics at the University of Michigan. He received his Ph.D. from Yale University in 1982 under the guidance of Robert K Adair. His thesis work was searching for CP violation in K-mu-3 decays by looking at the polarization of the muon perpendicular to the decay plane. His research is in high energy physics and he has been a member of the CDF Collaboration since 1982. He has supervised four graduate students who completed work on electroweak and top quark measurements. He is a Fellow of the American Physical Society, and will be the Physics Department Chairman effective September, 2004.

Campbell has created and taught several courses on the history of physics, including two seminars and Physics 204 — *Great Books in Physics*. These courses teach both physics and history through the use of primary texts. The books used in the courses includes *Opticks,* and Faraday's Diaries. More recent work is studied through the use of original papers. In these courses he gives a biographical sketch of each scientist, describes the conventional wisdom before the discovery, and describes the impact of each discovery. To the extent possible, the students reproduce the key experiments, using the tools and techniques available at the time of the discovery.

Statement: The vast majority of students who have taken introductory physics courses will come away with an understanding that physics, and even all of science, is just a body of facts. The courses generally give no insight into science as a process, or to the human struggle involved in this process. Students taught in the standard way can deftly manipulate equations, but often are unable to state the basic concepts. In my class on *Great Books in Physics* I build models of Galileo's inclined planes and ask the students to repeat his discovery. Students who have had a physics course have always had the most difficulty with this experiment. They invariably want to measure the times needed for the rolling ball to pass through equally spaced intervals. The students who are most successful in this experiment are musicians. They can accurately judge equal time intervals and by listening to the ball rolling down the plane and hitting small wires laid across the channel they can measure the distances traveled in equal time intervals. From this experiment they are then able to clearly grasp the concept that uniformly accelerated motion means that the distances traveled in each successive time interval will increase by the same fixed amount.

Constraints on introductory courses have led to uniformity in the textbooks, methods, and syllabi of these courses, so a radical transformation of how the introductory courses are taught is probably not possible. Can the history of physics be used to guide an improvement in the teaching of introductory physics, as well as outreach to the public? I believe that the members of the FHP are in a unique position to bring such improvements. Deep understandings of the process in physics including knowledge of wrong turns and missteps is required to bring the idea that science is a process performed by scientists to our teaching of introductory physics.

William Evenson

Institution: Utah Valley State College (BYU retired)

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Resume: Bill Evenson is Associate Dean of Science & Health at Utah Valley State College. He was Professor of Physics at Brigham Young University for 33.5 years and served as Associate Academic Vice President, Dean of the College of Physical and Mathematical

Sciences, and Dean of General Education. He received his Ph.D. in theoretical condensed matter physics from Iowa State University in 1968. He was an NSF postdoctoral fellow at the University of Pennsylvania with J. R. Schrieffer. His physics research now deals mainly with studies of surfaces, defects in materials, and inverse problems in statistical physics. He was a Fulbright Senior Scholar (research) at University of Konstanz, Germany, for 1998-99.

Evenson has a long-standing interest in the history of physics and served as FHP program chair in 1995-96 and on the committee to commemorate the centennial of the discovery of the electron in 1997. He was FHP Secretary-Treasurer from 1998-2001 and editor of *History of Physics Newsletter* for 6.5 years from 1997 to 2003. He is a current member of the Editorial Board of the journal *Physics in Perspective*. He was founding chair of the APS Four Corners Section, where he instituted and promoted what has become a successful program of public outreach lectures connected to the annual section meeting. He is currently Secretary-Treasurer of the Four Corners Section. He served on the APS Panel on Public Affairs (POPA) from 2001 through 2003.

Statement: Each year the Forum has an excellent set of sponsored sessions on the history of physics at annual APS meetings, including a successful annual contributed session. In addition, we provide reports of these sessions to our membership through the *Newsletter*. These efforts have provided an important and valuable service to APS members interested in history of physics. The Forum has now successfully organized and raised money for the Abraham Pais Award for the History of Physics, providing not only recognition but strong encouragement for scholarly work in the history of physics. I have supported these efforts over many years of FHP activity, and I would like to help the Forum to strengthen its efforts further in these areas and in two other important areas: the use of history to bring a fuller understanding of physics to the general public and increased, more effective use of history in physics and science education.

I have urged in the *History of Physics Newsletter* that we should use history of physics more often as a guide in the teaching of physics, in explaining science to the public and to policy makers, and in our research in physics. For maximum effect in this effort, we need to convey fully the realities of doing physics. FHP needs to be at the forefront of dissemination of the perspective on physics that is possible through history. As part of this effort to bring the history of physics into more common currency in our educational and public outreach efforts, I would seek to strengthen our ties to related organizations in both physics and physics history. If elected Vice Chair of the Forum, I will devote myself to increasing the effectiveness of FHP in bringing history of physics into our educational and public outreach endeavors, while strengthening the already outstanding programs of sessions and *Newsletter*.

Virginia Trimble

Institution:UC Irvine

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Resume: Virginia Trimble is a native of Hollywood, California (Hollywood High School, W'61) and holds degrees from UCLA (BA physics & astronomy 1964), Caltech (MS astronomy & physics 1965, Ph.D. 1968), and Cambridge (MA 1969). For the past 30 years, she has oscillated at a frequency of 31.7 nHz between the University of California, Irvine, where she is tenured, and the University of Maryland, where her late husband, Joseph Weber, was tenured. Her current research interests are, roughly, the structure and evolution of stars, galaxies, and the universe, and of the communities of scientists who study them, with sponsored research much more narrowly circumscribed (e.g. NASA/Chandra, X-rays from single, cool, magnetic white dwarfs).

Trimble currently skippers the Commission on Astrophysics of the International Union of Pure and Applied Physics and the Division of Union-Wide Activities of the International Astronomical Union, and serves on committees for APS, AAPT, the American Astronomical Society, Sigma Xi, the Peter Gruber and Dan David Foundations, and other organizations. She has previously been a member of the Council and Executive Board of APS (1997-2000) and chair of its Division of Astrophysics (1999-2000), and a vice president of the AAS (1997-2000).

Long, long ago, she held fellowships from the Woodrow Wilson Foundation, NSF, NATO, and the Sloan Foundation, and she continues to collect and cherish occasional minor honors (NAS J Murray Luck Prize 1986, AAPT Klopsteg Lectureship 2001, J. Robert Oppenheimer Lectureship 2002, fellowships in APS, AAAS, and a foreign associateship in the Royal Astronomical Society). Publications? Well, she's had 500, but who's counting?

Statement:I began to take an interest in the history of science when I noticed that a good many things I remembered as "current events" were now regarded by younger generations as "history of physics." These include the discovery of quasars (when I was an undergraduate) and of the 3K microwave background radiation and pulsars (graduate school), and the recognition that there must be a black hole in the X-ray binary system Cyg X-1 (HD 226868), in which I took a minor part, by publishing the last fundamentally wrong paper on the subject in 1972.

My current attitude can perhaps best be described as "preserving the past for the future." Steven Weinberg (*Nature* 426, 389) has recently enunciated a somewhat similar thought, that it is essential for young scientists to learn something about the history of their subjects to remind themselves both of how science actually works and of how important it is in the long run.

Tasks for FHP? First, to keep reminding our colleagues of this importance and of how they can play a role in preserving the history of physics, through archiving their own papers, writing informative obituaries when asked, including relevant historical materials in their research and review articles and in their colloquia and public talks. Second, to keep history of physics a live presence in the APS — at its specialized as well as general meetings, in its journals, and in its governance and prize giving. Third, to interact with other groups having similar interests and responsibilities, like the Committee on History and Philosophy of Physics of AAPT, the History of Science Society, and, in my own little astrophysical corner, the IAU Commission on History of Astronomy and the AAS Division of Historical Astronomy. If you should be curious about this slightly odd Division name, it is because the group focuses on the use of very old astronomical observations (supernovae, comets, meteor showers, eclipses...) to address modern astrophysical questions as well as on the history of the subject itself. Old data are generally supposed to be more or less useless in physics. I wonder whether this is really true.

Future Meetings, Notes and Announcements

MEETINGS

The 22nd International Congress of History of Science will be held in Beijing from July 24 to 30, 2005. The Local Organizing Committee is sending you this invitation, sincerely welcoming you to Beijing to attend this quadrennial celebration of the international community of the history of science. China is a huge and developing country, with the most dynamic economy in the world today. The history of science also benefits from this prosperity, and is receiving more and more attention and support both from the state and society at large. Of course, not all things in this world are predictable, but as the organizers of the 2005 Congress we can promise you that we shall do our best to provide you with the finest possible service for this event. The Congress Website has now been restructured, and will be updated frequently in order to keep participants informed about important information concerning DHS activities and organization of the Congress. You are invited to visit it at: http://2005bj.ihns.ac.cn or http://2005bj.conference.ac.cn/. The First Circular has already been put on this website. Online Registration is also accepted. Welcome to Beijing! It would also be very much appreciated if you could spread this message to your colleagues and friends in our academic community. (This announcement is from Dun LIU President of the Local Organizing Committee).

HOPOS, Fifth Congress of HOPOS, the International Society for the History of Philosophy of Science, San Francisco, California, USA, June 24-27, 2004

HOPOS, The International Society for the History of Philosophy of Science, will hold its fifth international congress in the San Francisco, California, June 24-27, 2004. The congress is being held at the University of San Francisco, in cooperation with Stanford University and the University of California, Berkeley. The conference is open to scholarly work on the history of philosophy of science from any disciplinary perspective.

The deadline for submission of papers is passed.

HOPOS 2004 Program Committee: Roger Ariew, Co-Chair, Virginia Polytechnic Institute and State University; Menachem Fisch, Co-Chair, Tel Aviv University; Jonathan Hodge, University of Leeds; Manfred Kuehn, University of Marburg; James Lennox, University of Pittsburgh; Alfred Nordmann, Technical University Darmstadt, University of South Carolina; Laura Snyder, St. John's University

HOPOS is an international society of scholars who share an interest in promoting serious, scholarly research on the history of the philosophy of science. We construe this statement of shared interest broadly, to include all historical periods, studied through diverse methodologies, and to include topics in the history of related disciplines, such as the natural and social sciences, logic, philosophy, and mathematics. We aim to promote historical work in a variety of ways, but especially through encouraging the exchange of ideas among scholars through meetings, publications, and electronic media and through disseminating information about libraries, archives and collections, meetings, publications, and funding opportunities.

This note is from Menachem Fisch, Co-Chair of HOPOS 2004 Program Committee, The Cohn Institute for the History and Philosophy of Science and Ideas, Tel Aviv University, Ramat Aviv 61390,ISRAEL.

More information about and a membership form for HOPOS are available at http://www.umkc.edu/scistud/hopos/

***P*eter Salcher and Ernst Mach—A Successful Teamwork Symposium** to be held at Rijeka, Croatia, September 23rd-25th, 2004

You are cordially invited to attend. The topics for scientific papers will include:

- the cooperation of Salcher and Mach in the field of thermodynamics of shockwave phenomena
- Mach as a pioneer of education physics on the secondary level
- Salcher as a professor of physics and a photo-expert
- Salcher´s studies with compressed air in the Whitehead torpedo- factory
- Salcher and Mach as an example of successful research crossing borders
- the development of the theory of shockwave phenomena
- thermodynamics of shockwave phenomena
- state of art in the field of supersonic theory in modern earth and space technology

Symposium secretariat

FACULTY OF ENGINEERING, UNIVERSITY OF RIJEKA, Vukovarska 58, HR-51000 Rijeka, Croatia, Phone: ++385 51 67 58 01; 65 15 14; 65 15 18; Fax: ++385 51 67 58 01; E-mail: salcher@riteh.hr Web site: riteh.hr/salcher; Contact persons: Prof.D.Sc.Bernard Frankovic; D.Sc. Anica Trp; M.Sc. Kristian Lenic

Science and Music: Erwin Hiebert (Harvard, emeritus) gave a plenary lecture on "Science and Music in the Culture of Late 19th Century Physicists: The Role and the Limits of the Scientific Analysis of Music" at the XXIst International Congress of History of Science in Mexico City, July 2001. The proceedings of the Congress have now been published under the title "Science and Cultural Diversity" (www.smhct.org, 2003: isbn 970-32-0481-3 or 970-32-0477-5 for Volume 1 with plenary lectures)

5th GRADUATE CONFERENCE IN LOGIC, MATH, AND PHYSICS, 9th May, 2004, IN CONJUNCTION WITH THE 9th ANNUAL CONFERENCE ON CONTEMPORARY ISSUES IN PHILOSOPHY OF PHYSICS 8th May, 2004 And the Rotman Lecture May 7th, 2004

THE UNIVERSITY OF WESTERN ONTARIO, LONDON, ONTARIO, CANADA (the official deadline for this conference will have passed by the time you receive this announcement)

As of the end of January, confirmed speakers include Han Halvorson (Princeton) and others. This year the Rotman Lecture will be given by Jeremy Butterfield (Oxford).

Papers submitted will be considered for the Second Annual Clifton Memorial Book Prize, to be awarded to the best essay in the philosophy of physics among those submitted. The contest will be adjudicated by philosophy of science faculty at Western.

Please send questions and submissions to: Elana Geller (egeller@uwo.ca), Department of Philosophy, Talbot College, University of Western Ontario, London, Ontario CANADA N6A 3K7

For more information, go to: http://www.uwo.ca/philosophy/lmp.html

History of Technology Summer Event (Please send replies to ieemail@iee.org.uk

The History of Technology Summer Event to be held at University College, London from 2-3 July 2004, has been held by the Institution of Electrical Engineers for > 31 years and addresses the broad area of the History of Electrical Engineering. As 2004 is the centenary of the invention of the thermionic valve by John Ambrose Fleming of UCL and the 150th anniversary of the formation of the Atlantic Telegraph Company the main themes will be the historical aspects of electronics, submarine telegraphy and telephony equipment. However papers on all aspects of the history of > electrical engineering and related topics are welcome. For further information on how to submit a paper please visit: http://www.iee.org/events/history.cfm

The IEE, Event Services, Michael Faraday House, Six Hills Way, Stevenage, Herts, SG1 2AY, UK; Tel: +44 (0) 1438 765651 Fax: +44 (0) 1438; mailto:mswift@iee.org.uk

The European Scientist: Symposium on the era and work of Franz Xaver von Zach (1754-1832) Budapest 15-17 September 2004 First Announcement Purpose This symposium celebrates the era and work of Franz Xaver von Zach on the 250th anniversary of his birth. The meeting will bring together international experts in the history of science to present papers on the following topics. Biographical aspects Scientific periodicals Meetings of scientists Enlightenment, freemasonry and religious orders Interaction with politics The role of "managers of science" Gauss and the Hungarian science The evolution of star catalogues Minor planets and celestial mechanics Astrogeodetic instruments Local and global geodesy and navigation Civil and military cartography Geography and geophysics Dates: Sept. 15 to Sept. 17, 2004. The symposium precedes the autumn meeting of the Astronomische Gesellschaft, held in Prague at Sept. 20-25, 2004. The meeting will take place in the main building of the Hungarian Academy of Sciences in Budapest, Hungary. Accommodations: In medium category hotels, next to the building of the Hungarian Academy of Sciences, cost per night: 65 Euro in a single and 85 Euro in a double room (including breakfast). Participation is open for everybody who is interested in this subject. Interested participants are invited to register with the enclosed registration form. There is no registration fee. Accompanying persons are welcome. > Proceedings > > We intend to publish proceedings of the symposium. Scientific Organizing Committee: Peter Brosche (Daun/Bonn, chairman) Jim Caplan (Marseille) Anita McConnell (London) Gudrun Wolfschmidt (Hamburg) Local Organizing Committee (Budapest): Bela Balazs Lajos G. Balazs (chairman) Laszlo Parkos Magda Vargha Endre Zsoldos

REGISTRATION FORM: The era and work of Franz Xaver von Zach Budapest 15-17 September Family name: First name: Postal address: Fax: E-mail address: Number of accompanying persons: I would like to present a paper Title Authors Intended duration of talk: Abstract: Accommodation: please indicate your choice: I prefer single occupancy I wish to share a double room with: Return to: Prof. L. G. Balazs, Konkoly Observatory, P. O. Box 67, H-1525 Budapest, Hungary. Fax: (36)(1)275-4668; e-mail: balazs@konkoly.hu

The Intersection of Philosophy, Science and Theology in the Seventeenth Century, July 5-July 30, 2004

Steven Nadler, University of Wisconsin –Madison and Donald Rutherford, University of California, San Diego

Faculty: Roger Ariew, Martha Bolton, Vincent Carraud, Dennis Des Chene, Daniel Garber, Thomas M. Lennon, Christia Mercer, Tad Schmaltz, Robert C. Sleigh, Jr., Martin Stone, Catherine Wilson

Information: Steven Nadler
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The Atomic Bomb and American Society. July 15-17, 2005, Oak Ridge Tenn.

To mark the 60th anniversary of the detonation of the first atomic bomb, this conference will assess how nuclear weapons' development affected American society and culture. The conference organizers, Professor G. Kurt Piehler and Captain Rosemary Mariner (US Navy Ret.) invite proposals for papers that examine the political, economic, social, and cultural impact of nuclear weapons on American society. Organizers are especially interest in new scholarship examining the unique roles of Oak Ridge, Los Alamos, and Hanford in developing the atomic bomb and later generations of nuclear weapons., Interested individuals should submit a cover letter, 2-3 page proposal and c.v. by April 1 200r to: Prof. G. Kurt Piehler, Director, Center of the Study of War and Society, 220 Hoskins Library, University of Tennessee, Knoxville, Tennessee 37996-0128. Email: gpiehler @utk.edu

British Society for the History of Science will hold its annual meeting at Liverpool Hope University College in Liverpool, 25-27 June 2004. Papers are invited on all areas of the history of science, technology and medicine. For further details see http://bshs.org.uk/conf/2004annual/.

The International Committee for the History of Technology Will hold its 31st Symposium at Bochum, Germany 17-21 August, 2004 on (Re-)Designing Technological Landscapes. See http://www.icohtec.org

American Astronomy Division: Historical Astronomy Division of the American Astronomical Society presented its biennial Leroy Doggett Prize to Michael Hoskins of Cambridge University, who also, at the invitation of the AAS, delivered a plenary address on "The Real Carolyn Herschel", with extracts from her letters and diaries.

UPCOMING RELEASE:

Einstein's 1912 Manuscript on the Special Theory of Relativity by Albert Einstein

View this book at- http://www.georgebraziller.com/catalog/nonfiction/einsteins1912manuscript.html Three years ago, George Braziller, Inc. published a boxed facsimile limited edition of Einstein's 1912 Manuscript on the Special Theory of Relativity. The book was a huge success, and now, we are bringing out the paperback edition.

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Joseph F. Mulligan (retired from University of Maryland-Baltimore County) continues his writing in the history of physics, having recently published "*Physics and Fly-Fishing: The Remarkable Career of Baltimore's Alfred Marshall Mayer 1836-1897",* Maryland Historical Magazine **98** (2:Summer 2003): 173-185.

John S. Rigden's book, "*Hydrogen: The Essential Element" (Harvard University Press, 2002, paperback edition, 2003*) was named in 2003 as one of the twenty best science books of 2002 by *Discover* Magazine.

Book Review

John L. Casti. *The One True Platonic Heaven: A Scientific Fiction on the Limits of Knowledge*. (Joseph Henry Press, Washington, DC, 2003) xx + 160 pages, ISBN: 0309085470, $22.95, hard.

Reviewed by Bill Evenson, Brigham Young University, Utah Valley State College

This is John Casti's second "scientific fiction," following *The Cambridge Quintet*. He distinguishes "scientific fiction" from novel, as "more like a chronicle than a typical novel." (p. vii) He weaves history, philosophy, and fiction in an exploration of intellectual issues of science. In this case, he probes the nature of science as revealed in issues that arose in the early days of computing. The primary issue under consideration is the limits of science: "Are there questions about the world around us that are *logically* beyond the power of the scientific method to resolve?" (p. vii) And do computing machines and their limits shed light on this issue?

Casti plucks personalities and fragments from the history of science to create his fiction. But this is not a work in the history of science. He has transposed people and events to serve his story line, creating anachronisms and ahistorical juxtapositions. I am afraid that while the story is interesting, it is not very good fiction, certainly not in the sense of natural-sounding dialogue, nor in creation of character or place, nor in lyricism of language. But if not good fiction and not history, it is yet a very interesting philosophical exploration. The philosophical issues related to the limits of science and the insights brought by computing machines are explored in interesting and frequently insightful exposition.

The main characters are John von Neumann, Albert Einstein, Kurt Gödel, J. Robert Oppenheimer, and Lewis L. Strauss. Casti provides a "Dramatis Personae" at the beginning of the book in which he outlines in a page or two a brief (historically accurate) biographical sketch of each of these main players.

The Prologue sets the stage for the invention of computing: Hilbert in Bologna, September 1928; Gödel in Vienna and Königsberg, 1930; Turing in Cambridge, 1935; and von Neumann in Aberdeen, Maryland, 1944. Beyond the Prologue, the book is set in Princeton: a walk down Mercer Street, discussions, meetings, and a seminar at the Institute for Advanced Study (IAS), a party at the von Neumanns', Einstein musing at home, and a dinner party at the Oppenheimers' residence. The Epilogue sets some of the historical inaccuracies of the story straight and gives some references for further reading. The thread of the story relates to whether Gödel will be promoted to full professor and the intellectual issues as well as those of personality at play in this consideration.

Of course, IAS is the "one true platonic heaven" of the title. And the disparate views regarding Gödel's sought-for promotion focus the discussion on his essentially platonic view of mathematics and science in contrast to the more down-to-earth approach of those, like von Neumann, who were involved in building computing machines and investigating nature via computations.

At times the stilted dialogue makes it difficult to understand completely the point that a character is making. At other points, the limits of Casti's grasp of physics come into view. This is especially true in descriptions of special relativity: the relativity of simultaneity is "explained" by invoking the Twin Paradox; time dilation is explained with reference to a "*stationary* observer like the stay-at-home twin;" (p. 22, italics added) and Einstein himself is caricatured as a "naïve realist at heart." (p. 108)

On the other hand, the philosophical issues, which are after all the center of this book, are dealt with thoughtfully. The dialogue, stilted as it may be, brings these issues out in a way that caused this reader to rethink some important issues. Some encounters that stuck with me: Stan Ulam says, "*I* think the computer is very much like a telescope, not a calculating machine at all. A telescope enables us to see things the naked eye cannot. The computer will enable us to see things that are invisible – or rather, inaccessible – to the unaided brain." (p. 49) There is an interesting exchange between von Neumann and David Bohm about measurement in quantum mechanics and wave function collapse. (pp. 54-5) Ulam, Weyl, von Neumann, Bohm, Dyson, and Morgenstern explore what we mean by "knowledge" and, in particular, "scientific knowledge." (pp. 56-9)

If readers are able to put aside their sense of the actual history of the events alluded to in this book, and if they are able to overlook the scientific inaccuracies, the discussion of the limits of science is both interesting and important. Casti brings insights that I found rewarding in spite of my inability to overlook entirely the historical and scientific sticking points.