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New Results Supporting Standard Model Highlight 1996 DPF Meeting

New experimental results increase confidence in the Standard Model, including the latest mass measurements for the top quark, W and Z particles, as well as electroweak precision measurements, according to speakers at various invited and contributed sessions of the 1996 APS Division of Particles and Fields (DPF) Meeting, held 10-15 August in Minneapolis, Minnesota. This year's meeting also featured reports on the first observation of W^+W^- pairs and exciting new results in QCD theory.

New Precision Measurements

More precise measurements of the top quark have been achieved at Fermilab's Tevatron collider merely one year after its momentous experimental discovery was announced. According to Sally Dawson of Brookhaven National Laboratory, who closed the conference with a summary of the year's highlights in particle physics, the new results are viewed by many as a triumph of the Standard Model, although some key questions remain unresolved.

The new mass of the top quark is determined to be 175 ±6 GeV, an improvement in precision by a factor of two. The 100 candidate events used to calculate a new value for the top quark mass represent the combined inventories of both the CDF and D0 detector groups. The combined data also resulted in a more precise determination of the mass of the W boson, a carrier of the so-called weak force. The new mass, expressed as an average from Fermilab's CDF and D0 detectors and from CERN experiments, was determined to be 80.35 GeV, reducing the overall uncertainty from 160 to 130 MeV/c^2.

The mass of the Z boson has been determined as 91.1863 ±.0020 GeV/c^2, as a result of new extremely precise measurements that emerged from the ALEPH, DELPHI, L3 and OPAL experiments at CERN's LEP electron positron collider, as well as the SLD experiment at SLAC. In addition, new measurements from the CLEO experiment at Cornell University helped resolve two possible areas of deviation observed last year at LEP and SLAC in the rate of decay of the Z boson into charm and anti-charm quarks, and in the rate for Z decay into bottom and anti-bottom quarks.

In addition to providing further experimental confirmation for the Standard Model, these improved particle measurements are an important link to finding the as-yet-unobserved Higgs boson, which endows the W and Z bosons with large mass and is also believed to be responsible for breaking the symmetry between the weak and electromagnetic forces. In fact, if the Higgs mass lies within the lower part of the range suggested by the new measurements of the top quark and W particle, it could be observed at the upgraded LEP-II collider at CERN. If the mass is towards the higher range, scientists may have to wait for a future upgrade of the Tevatron or for CERN's Large Hadron Collider, scheduled to begin collecting data in 2006.

QCD Theory

Fermilab's Liz Buckley-Geer, who spoke on Thursday morning, reported that the CDF detector also produced measurements of quark or gluon jets at large angles with respect to the proton beams, and with energies approaching half the energy of incoming beam particles. While the data agreed qualitatively with QCD predictions in the production rate, data for the largest-energy jets exceeded predictions by nearly a factor of two. In contrast, the D0 experimental data, agreed more closely with QCD theory. Eventually it was determined that the data and theory could be brought into better agreement by modifying the fraction of the proton momentum carried by energetic gluons.

Last year, scientists at the HERA electron-proton collider in Germany reported that the density of low momentum gluons in the proton was much larger than expected. Using new special detectors, the H1 and ZEUS experiments found that this excess persists down to those gluons carrying as little as one-millionth of the proton's momentum, a striking effect that may provide evidence of a new regime in which perturbative treatment is supplanted with collective effects of multiple-gluon states. In addition, scientists with CERN's LEP collaborations have succeeded in isolating pure samples of quarks or gluons emerging from Z boson decay, which had previously been experimentally indistinguishable. This ability could become an important ex-

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The APS Committee on Committees

No kidding! Just as many of you suspected, the APS even has a committee to keep track of its many (about 20) committees. Pictured above are: Joseph Dehmer (standing at left), Martin Blume, Laura Greene, Amy Halsted (committee administrator), Ernie Henley, James Wynne, Zachary Levine (standing) and Anthony Johnson. Barbara Levi, COC chair, is not in the photo. This hard working group of member volunteers selects about 40 members out of 400 nominees to fill openings on 1997 APS committees. COC also conducts reviews of committee activities. Now, as to who keeps track of the Committee on Committees…

IN THIS ISSUE

INSIDE THE BELTWAY

Science in Crisis: Fact or Fiction

by Michael S. Lubell, APS Director of Public Affairs

Washington is a town that thrives on accusations, leaks and exaggeration. The goals of the propagandists are control, power and turf. And capturing the attention of the media is central to any success they might achieve.

In an age of electronic communication, channel surfing and limited attention spans, the 10-second sound bite has become crucial for anyone hoping to get a message across. For science, the message this fall has been reduced to a single word — *Crisis!*

A little more than a month ago, Presidential Science and Technology Advisor Jack Gibbons and other analysts punctuated this exclamation in commentaries at the George Washington University symposium *Science in Crisis at the Millennium*. A day later, similar notes reverberated in the marble rotunda of the Low Memorial Library at Columbia University, site of the conference *Science the Endless Frontier, 1945-1995*.

For scientists, policy makers and politicians, the central question is how much truth underlies the rhetoric? To find the answer, one need look no further than the new five-year projections for the federal science budget.

Democrats and Republicans, alike, have repeatedly proclaimed strong support for basic research. But whether the budget forecasts emanate from the Democratic White House or the Republican Congress, the out year spending plans for science are anything but encouraging.

The presidential budget, released in March and adjusted in July, forecasts a drop of 18.1 percent in constant dollars for the National Science Foundation's R&D account over the period 1995 to 2002. The Republican plan, contained in this year's congressional Budget Resolution, offers a slightly more positive projection, but still shows a cut of 6.8 percent.

For the Department of Energy, which accounts for about 50 percent of all federal funding in the physical sciences, the out year projections are even bleaker. During the last few years, the DOE has been an agency under siege. Attacks on it have come from antagonists at both ends of Pennsylvania Avenue. Not

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McIlrath to Become New APS Treasurer

On 11 November, Thomas J. McIlrath will become Treasurer of The American Physical Society. McIlrath, who holds a Ph.D. in physics from Princeton University, is a professor in the Institute for Physical Science and Technology at the University of Maryland at College Park and associate dean for research and graduate studies in the graduate school there. A laser and atomic physics experimenter, he is also a staff member at the National Institute of Standards and Technology in Gaithersburg, Maryland. McIlrath succeeds Harry Lustig, who has been APS Treasurer since 1985. A longer article about the new treasurer will appear in *APS News* soon.

Physicists To Be Honored at November Meetings

Five physicists will be honored for their work in fluid dynamics and plasma physics in November. The 1996 James Clerk Maxwell Prize, Excellence in Plasma Physics Award, and the Simon Ramo Award will be presented during the annual fall meeting of the Division of Plasma Physics in Denver, Colorado, November 11-14. The 1996 Fluid Dynamics Prize and Otto Laporte Award will be presented during the annual fall meeting of the Division of Fluid Dynamics (DFD) in Syracuse, NY, November 24-26.

PRIZES

1996 James Clerk Maxwell Prize

Established in 1975 by a donation from Maxwell Laboratories, Inc., the James Clerk Maxwell Prize is intended to recognize outstanding contributions to the field of plasma physics.

Thomas Michael O'Neil
University of California, San Diego

Citation: *"For seminal contributions to plasma theory including the effect of trapping on Landau damping, the plasma-wave echo, and the confinement, transport, and thermal equilibria of non-neutral plasmas, liquids and crystals."*

O'Neil received his Ph.D. from the University of California, San Diego, in 1965 and spent the next two years as a member of the research staff at General Atomic. In 1967 he joined the UCSD faculty, where he is currently a professor of physics. His early research focused on nonlinear effects in plasmas and included the extension of Landau damping to the nonlinear regime, as well as the theory of plasma wave echoes. More recently, he has studied the novel physics of magnetically trapped nonneutral plasmas, liquids and crystals. In 1991 he was co-recipient of the APS Excellence in Plasma Physics Award.

1996 Fluid Dynamics Prize

Established in 1979 the Fluid Dynamics Prize is intended to recognize and encourage outstanding achievements in fluid dynamics research. The prize is now supported by friends of the Division of Fluid Dynamics and the AIP Journal, *Physics of Fluids*.

Parviz Moin
Fermi National Laboratory

Citation: *"For his pioneering work of direct numerical simulation and large-eddy simulation of turbulent flows in the study of turbulence physics, modeling and control; for developing novel approaches in turbulence research using a computer-generated database as the primary resource; and for his leadership in the international turbulence research community as the founding director of the Center for Turbulence Research."*

Moin received his Ph.D. degree in mathematics and mechanical engineering from Stanford University in 1978. He was a fellow of the National Research Council and a staff scientist at the NASA Ames Research Center before joining the Stanford faculty in 1986. He is the founding director of the Center for Turbulence Research at Stanford and NASA/Ames. Established in 1987 as a research consortium, the center is devoted to fundamental studies of turbulent flows and is widely recognized as an international focal point for turbulence research, attracting diverse groups of researchers from engineering, mathematics and physics.

Moin pioneered the use of direct and large eddy simulation techniques for the study of turbulence physics, control and modeling concepts, and has written widely on the structure of turbulent shear flows. His current interests include interaction of turbulent flows and shock waves, aerodynamic noise and hydroacoustics, turbulence control, large eddy simulation and parallel computing.

AWARDS

1996 Excellence in Plasma Physics Research Award

Established in 1981, this award is intended to recognize a particular recent outstanding achievement in plasma physics research.

Christopher E. Clayton

Chandrashekhar Joshi
University of California, Los Angeles

Citation: *"For their pioneering experiments in plasma-based accelerator concepts; particularly for their unambiguous experimental demonstration that electrons can be accelerated to relativistic energies by the beating of two laser beams in a plasma with their frequency difference equal to the plasma frequency."*

Clayton received his Ph.D. in engineering from UCLA in 1984 and is currently the project manager for UCLA's Neptune Laboratory. He has contributed to the understanding of stimulated Brillouin scattering, collinear optical mixing, and most recently, to the wave breaking of relativistic plasma waves

(Continued on page 6)

Aylesworth Observes Politics in Action on the Hill

Outgoing APS Congressional Fellow Kevin Aylesworth received a crash course in politics and the inner workings of the federal government during his year on Capitol Hill, tackling opposing viewpoints from other Congressional offices, special interest groups, lobbyists and the national media, while keeping abreast of a maelstrom of technology-related policy issues.

Following an intensive, 10-day orientation period and interview process a year ago, Aylesworth chose to spend his fellowship year as a legislative assistant for Senator Tom Harkin (D-IA), responsible for issues of defense, disarmament, energy and veterans' affairs. "Politically I tended to agree more with the stance of Harkin's office, so I felt it was a pretty good match," he said.

Specific highlights of his year included Aylesworth's work, along with others in Harkin's office, on an amendment to the defense authorization bill, which President Clinton signed into law in September. He also drafted numerous statements on Harkin's behalf, and found himself dealing with the media on the high-profile issue of reimbursement of restructuring costs for defense contractors that sell to or merge with other corporations. "I learned very quickly to keep my mouth shut, although perhaps not as quickly as my office mates would have liked," he said.

In addition to honing his skills in teamwork and media relations, the experience of dealing with people from all walks of life helped Aylesworth hone his communication skills, especially in communicating technical issues to the public. "I think I'd make a much better teacher now, because I've learned how to boil things down to their essentials," he said, admitting that like many physicists, he usually tried to give too much detail when dealing with the public. "Now I realize that the important thing is to give people a feeling and appreciation for the issue without bogging them down with details, because most people don't have time for the details."

Still, Aylesworth was no stranger to politics and science-related social issues prior to his fellowship year. His concern over the tight job market for young scientists led him to found an electronic bulletin board in May 1990 called the Young Scientists Network (YSN). It now has a readership of over 2,000 from many branches of science. Aylesworth received the 1996 APS Forum on Physics & Society Award in recognition of these accomplishments. He has testified before Congress and also met with representatives of the NSF and the Office of Science and Technology Policy, as well as participating in numerous panel discussions on employment-related issues.

His experiences on the Hill have helped offset his earlier image as a "hot-headed" young troublemaker. "I was a bit brash in my early years, but I think I had to be to get any notice," he said. "I contend that my brash tactics paid off, although I paid a personal price for it. Some people still think I'm 90 percent bomb thrower and 10 percent reasonable, when in fact I'm the other way around." He admits, however, that the image comes in handy during tricky negotiation processes.

Although he has gained the most recognition for his work on funding and employment issues, Aylesworth has strong interests in science and law and hydrogen energy policy, and as he looks for employment at the end of his fellowship year, he is extending his job search to encompass as broad a range of options as possible.

He is investigating opportunities in computer consulating, as well as other positions on the Hill, although for the latter he will not begin searching in earnest until after the Presidential election in November.

Aylesworth received his Ph.D. in physics from the University of Nebraska in 1989, specializing in the magnetic and structural properties of magnetic thin films and multilayers. He spent two years as a postdoctoral associate at the Naval Research Laboratory and then worked as a technical assistant/paralegal for an attorney in Cambridge, Massachusetts, before founding YSN and becoming a Congressional Fellow. He was elected to the APS Council in 1993 after a successful write-in campaign placed him on the ballot, along with fellow YSN member Zachary Levine.

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1997 March Meeting: Large & Small, Old & New

The 1997 APS March Meeting will be held March 17-21 1997, in Kansas City, Missouri. This year will see the addition of two new topical groups to what is presumably the world's largest physics meeting. The Topical Group on Magnetism and its Applications and the Topical Group on Statistical and Nonlinear Physics were established at the May 1996 meeting of the APS Council, and will join the usual suspects in arranging symposia and contributed paper sessions.

In contrast to the small and newly formed units, the Division of Condensed Matter Physics, which represents the largest portion of the meeting's presentations, will be 50 years old in 1997. Originally established as the Division of Solid State Physics in 1947 (its name was changed in 1978), it has the largest membership of any unit of the APS.

The addition of the two new topical groups to the lineup at the March Meeting augments the steady growth of the meeting since the "Woodstock of Physics" in New York 10 years ago, which featured the presentation of spectacular new results in the area of high-temperature superconductivity. This can also be seen, for example, in the fact that the Forum on Industrial and Applied Physics (also very well-represented at the March Meeting) is the second largest APS unit, even though it was founded only two years ago. Furthermore, growth in the membership of the Materials Physics Topical Group, established in 1984, led to its becoming a become a Division in 1990.

These contrasts of newly emerging areas of study with more established areas of research, of large groups and small groups of colleagues, of industry and academia, of students and researchers, combine to make the gargantuan March Meeting a major attraction to physicists and one of the most exciting events of the APS year.

A tentative list of invited speakers is available on the APS home page (http://www.aps.org) in the March Meeting announcement. This year there will be almost 100 invited symposia and over 550 invited speakers. Last year, contributed submissions totaled 4,350 papers and the Society anticipates an even higher number this year.

Once again, in an effort to cut down on the number of parallel session created by the meeting's increasing popularity, DCMP poster sessions will be highlighted on Monday and Tuesday evening. Submitting for poster presentation guarantees a speaker's presentation will be on one of the first two days of the meeting. Please see the announcement in *APS Meeting News* for further information.

Due to the success of the electronic abstract submission process, the complete program will be available to the membership much earlier than it was in the paper universe. Look for the 1997 March Meeting program to be posted on the APS home page by 15 January 1997, fully two months before the meeting. This will enable attendees to create their own schedule in advance and take advantage of reduced airfare by booking their flights earlier.

Tutorials will be given on Sunday, prior to the first day of the meeting, at the Kansas City Convention Center. These half-day short courses are designed to give the attendees practical applications of a diverse set of tools, technology and theory. The cost is $75 per course, and $25 for students. (See article in November 1996 *APS Meeting News*.)

IN BRIEF

- The APS New England Section held its annual fall meeting October 18-19 at the University of Vermont in Burlington. Two plenary sessions on biophysics featured lectures on optical tweezers and molecular motors in muscle, detecting the motion of living cells, and the separation of white from red blood cells in a microfabricated lattice. The session on nanostructures included talks on quantum-dot molecules and semiconductor nanocrystallites, while single-electron devices and a proposed Mott transition field effect transistor were the topics at the quantum devices plenary session. Friday evening's banquet featured a keynote address by Robert K. Adair of Yale University on the limits of the biological effects of electromagnetic fields.

- The APS New York State Section held its annual fall meeting October 11-12 at Cornell University, featuring its 75th Topical Symposium on the subject of space science. These symposia are aimed at a general interest level and intended to be tutorial in nature for non-specialists. Thirteen lectures were given by leading researchers in space science, on such topics as: solar neutrinos, the existence of habitable extrasolar planets, results from NASA's Galileo mission to Jupiter, comets and asteroids, the complexities of massive star formation, an update on the LIGO experiment, the cosmic microwave background, and halo microlensing in galaxies. Friday evening's banquet featured a keynote address by renowned astronomer Carl Sagan, who gave his reflections on the field of astrophysics and space science in general.

- The APS Division of Atomic, Molecular and Optical Physics unveiled its AMO Physics Handbook at its meeting in Ann Arbor, Michigan in May. Published by the American Institute of Physics (AIP) and nearly four years in the making, the project was intended to provide the key ideas, techniques and results of AMO physics in a concise and authoritative manner, and in a style that is accessible to people new to the field and to workers in related fields such as engineering, chemistry and materials science, according to editor Gordon F. Drake, University of Windsor, Canada. The nearly 1,100 pages are organized into 88 chapters covering mathematical methods, atoms, molecules, scattering theory, scattering experiment, quantum optics, and applications, together with extensive references as a guide to the literature. There is also a CD-ROM version with full search capabilities. Copies may be ordered directly from the AIP Order Department, P.O. Box 20, Williston, VT 05495-0020, or by calling 1-800-809-2247; Fax: 1-800-864-7626. The cost is approximately $104.

- Many physics postdocs do not consider themselves "underemployed," unless their appointments extend beyond three years, according to a new report from the American Institute of Physics Education and Employment Statistics Division. Within six months of graduation, 63 percent of all U.S. physics Ph.Ds in 1994 held postdoctoral appointments. Approximately 30 percent of fourth-year postdocs classified themselves as "underemployed"; the figure is less than 5 percent for first-year postdocs. (The 213 postdocs who responded to the AIP survey were left to define the term "underemployment" for themselves). But postdocs at all stages responded that their physics education is being put to good use: over 95 percent of first year postdocs and 80 percent of the fourth-year postdocs responded that they consider their current jobs "professionally challenging." For more information, and a free copy of the report, contact Raymond Chu of AIP, rchu@aip.acp.org, (301) 209-3069.

AIP Offers New Web Site for History of Physics and Astronomy

A site featuring the history of physics and allied sciences is now available on the Internet's World Wide Web, mounted by the AIP Center for History of Physics. The address (URL) is http://www.aip.org/history.

Use of the Web was originated by physicists but is spreading explosively among the general population. The most eager users are young people with an interest in technology and the future — exactly the sort of people who should be exposed to the real story of science as a human enterprise, according to Spencer Weart, the Center's director. "The Web is an outstanding new way to advance public understanding of the physical sciences and their relationship to society, and the AIP Center has moved aggressively to take advantage of the opportunity," he said.

Users entering the site will find a number of options:

- Pages about the Center for History of Physics with information on the programs and services, for example grants-in-aid and advice on oral history interviewing.
- Information on the Niels Bohr Library, including general descriptions of the holdings, a sample of finding aids to archival materials and abstracts of oral history interviews in the Library's collections, and information on how to get access to the materials (in person, mail or email).
- An introduction to the Emilio Segre Visual Archives, including a sample of photographs—some of them enlivened with quotes or vignettes—and forms that can be submitted to request copies of pictures.
- A variety of Web links to other sites useful to anyone interested in the history of physics and allied sciences such as astronomy, geophysics and optics. There are sites for societies, organizations, exhibits, institutional histories, and so forth.
- Pages for the Friends of the Center for History of Physics, including "plaques" honoring past donors, and information on programs such as the donation of bookplates to honor or memorialize colleagues.
- The AIP History of Physics Newsletter with information on current work, bibliography of books and articles, reports of new archival deposits in the field, photographs, etc.
- A featured Web exhibit: "Einstein: Image and Impact," using photographs, quotes, and text to present highlights of Albert Einstein's life. By the end of the year this will be expanded to a major site including over 80 photographs and 70,000 words of text.

Besides expanding the Einstein exhibit, during the coming year Center staff will mount a number of additional finding aids to collections and hundreds of additional photographs from the Visual Archives. Under development is a major search engine to support on-line access to abstracts of all the Library's archival holdings (published in the 1994 Guide to the Archival Collections in the Niels Bohr Library, but including more recent accessions), the Library's catalog of books, and—not least—the entire International Catalog of Sources for History of Physics and Allied Sciences.

Highlight 1996 DPF Meeting *(Continued from page 1)*

perimental tool for disentangling the decays of particles which decay predominantly into quarks from the large QCD backgrounds.

The LEP electron-positron collider also significantly increased the energy at which it operates in 1996, from about 135 GeV at the beginning of the year to 162 GeV mid-year. This increase resulted in the first experimental observation of pairs of W bosons, as well as permitting the extension of searches for new particles. A sixfold increase in data samples produced by the Tevatron experiments this year has also substantially increased the range of new particle searches, although none have yet been found.

Sunday evening featured a special plenary session celebrating 100 years of particle physics. SLAC's Martin Perl reflected on the discovery and subsequent impact of the tau lepton on the field, and Robert Wilson of Cornell University compared the dreams of Fermilab with the present-day reality. Robert Sachs of the University of Chicago closed the session with a review of the conception and birth of the DPF itself.

OPINION

APS VIEWS

The APS: A Bird's Eye View

by Amy Halsted

When I started working for the APS nine years ago, I had no idea of the opportunities that I would encounter. At the time I needed a job, and the position at APS met my criteria. I came to the interview with some trepidation, and was quizzed by four physicists simultaneously. After surviving that trial, my writing was tested. They gave me material describing the research of an APS prizewinner, from which I drafted a brief speech that the President might deliver when he presented the prize. The prizewinner's work involved something called "ballooning formalism." I wondered what I was getting into. Fortunately I possessed the right combination of skills and experiences, and the APS hired me.

Not long after, I found myself sitting in committee meetings, trying to take minutes while 10 or so of you discussed unfamiliar people, facilities, situations, and fields of endeavor. The acronyms nearly drove me mad: ICTP, CSWP, *PRD*, ORNL, *BAPS*, DCMP, CIFS, NIST, POPA, *RMP*, DAMOP, OSTP, IAEA, *APL*, LANL, NSF, but soon I was the one spelling them out to others. It took longer to discern the difference between APS and AIP, but finally I began to grasp that as well.

At one early meeting, my attention strayed and I looked down the table at one of the members. His concentration had also lapsed, and I watched him holding a clear plastic cup half-full of water, tipping and rotating it slowly before his eyes and watching the surface remain level as the water assumed the changing shape of its container. At that moment I began to understand the nature of physicists. I got accustomed to people cracking physics jokes that I didn't always get. I wasn't surprised anymore to see a committee member absently covering a page with odd looking figures and calculations. I learned that physicists weren't like most people I knew.

And I learned more than that. I quickly realized that I was receiving an education on the job. My work with the Committee on the International Freedom of Scientists introduced me to the compelling, frustrating, confusing, and occasionally thrilling field of human rights. I attended a reception for Andrei Sakharov when he came to New York, and I was fortunate enough to work with both Yuri Orlov and Fang Lizhi. Staffing the Committee on Membership (then the Committee on Opportunities) taught me about the physics community, and how statistics are gathered and interpreted. That committee met once at Fermilab, and we were given an unforgettable VIP tour. Working with the Committee on Applications in Physics increased my understanding of the concerns and culture of American industry. The Committee on International Scientific Affairs introduced me to global issues. Its deliberations were among the hardest for me to follow, and also among the most rewarding as I slowly acquired a rudimentary knowledge of international interactions in physics.

The off-line time with committee members was equally enlightening. I got bolder about asking for explanations of confusing issues that had been discussed during the meetings, and always found the members willing to clarify. I heard rich anecdotes about famous and revered scientists, and sometimes those august individuals were there at the dinner table, charming or bedeviling their colleagues and me.

Around this time, I began to develop my own theories about physicists and what makes them the way they are. I thought about why so many outspoken dissidents in other countries are physicists and how dearly some of them have paid for speaking out. It seemed to me that physics is about a love of truth, rigorously proven and scrupulously reported, no matter what the consequences. I also observed an unusual happiness and contentment in the physics community, and found that most physicists are pretty good company. I concluded that there is no reason on earth to become a physicist except for the love of physics, and people who love what they are doing tend to be happy. Count me in that group.

Taking advantage of the tuition reimbursement that APS offers, I started work on a masters in public administration in 1991. Many of the assignments required me to study my employer, and my appreciation of APS grew again. In particular, I started to understand the complexity and enormity of the work of the Treasurer's department, and what Harry Lustig has accomplished for the APS.

Prior to my employment at APS, I had suffered the vagaries of several small businesses in New York. Relieved by the apparent stability of the APS, I remember telling my father confidently, "The APS isn't going to go anywhere!" Six years later the Society was moving to Maryland. In spring of 1993 I wrote my M.A. thesis about the relocation and how the decision was reached. During that period I was also obliged to make my own choice about whether or not to relocate. I was less critical of the Society's decision-making process, which seemed unusually disorganized and almost impulsive at the end, when I realized how much it resembled my own lengthy and agonizing deliberations.

My position in Maryland as administrator to Council and the Executive Board affords me a bird's eye view of the organization. My job is to help record and chart the progress of the APS as it grows and makes changes, studies the results, falters, heals itself, learns new tricks, and moves forward. Many staff members and even more volunteers find the APS as compelling as I do, and share my faith in it. The Society captured me early on, and I'm still buying what it's selling.

Amy Halsted is Administrator of Operating Committees at the College Park, Maryland, APS Headquarters.

LETTERS

We Shouldn't Have to Choose Between Effectiveness & Honesty

I was sadly amused by a curious juxtaposition in the August/September 1996 issue of *APS News*. On page 4, we find the full test of the APS Council's 1991 "Guidelines for Professional Conduct," whereas on page 5 we are confronted with Stephen Schneider's self-righteous reaffirmation of what he calls a "double ethical bind."

Schneider correctly protests that Julian Simon has misquoted him by mistakenly ascribing to him the statement that "scientists should consider stretching the truth." However, when Schneider repeats the correct version of his 1989 Discover magazine interview, one sees that, apart from a crude overstatement, the misquotation factually covered Schneider's thoughts. For indeed, in that interview he says that in order to achieve broad media coverage, "we have to offer up scary scenarios… and make little mention of any doubts we might have." Are these ethics compatible with what we read on page 4?

The sentence following Schneider's idea of a double ethical bind states, "Each of us has to decide what the right balance is between being effective and being honest." We scientists should all be obliged to Schneider for allowing us, poor things, to choose between the two — but there are not alternatives to being honest, either as scientists or respectable human beings.

One final remark: Schneider let it be understood that his ethical standards are governed by his concern about the future of humanity and his desire "to see the world a better place." Many of us who have lived in at least part of the period from 1930 to 1990 in Europe (or certain other parts of the world, for that matter) are fed up with self-appointed saviors of man's future and their concomitant relative ethics.

Paul Roman

Ludenhausen, Germany

Two-Year College Faculty Members Are Forgotten by APS

There are 604 public four-year institutions of higher education in this country that enroll nearly 6 million students (including graduate students). However, 1,021 public two-year colleges (TYCs) enroll more than 5 million students, or about 48 percent of all public college students, according to 1995 data collected by the *Chronicle of Higher Education*.

The percentage of students enrolled in public TYCs is increasing steadily, for obvious reasons. Average tuition and fees are only about $1,114 per year, compared with $2,543 per year for public four-year institutions. Furthermore, an engineering undergraduate makes a choice between taking a physics course at a university, where a professor would lecture in front of a crowd of some 200 students, or taking the same course at a TYC where the class size is typically about 20 students.

I was therefore surprised to discover that in 1994, only 0.8 percent of APS members identified themselves as two-year college employees. Of these, most were teaching faculty. According to a 1995 survey published in *The Physics Teacher* (vol. 33, 1995, pages 85-90), the average size of full-time physics faculty at TYCs was 1.6; about 96 percent of physics faculty have at least a master's degree, and about 8 percent have completed their Ph.Ds.

These data raise several questions. The job market for physics Ph.Ds is shrinking, yet there exists an apparently untapped reservoir of jobs at TYCs. A conservative estimate shows that one should expect more than 100 openings annually due to the attrition of existing faculty only. One should expect that APS would make the physics community aware of these jobs and would encourage recent Ph.Ds and postdocs to apply for these positions. Such a policy would certainly be compatible with the mission of the APS to advance and diffuse the knowledge of physics. Why, then, are there only about 240 APS members among the more than 2,400 physics faculty at TYCs?

My suspicion is that many physicists who had taken these teaching positions simply did not renew their APS memberships after awhile. I can only guess what precipitated such a decision, but what first comes to mind is a feeling of utter isolation at a TYC, combined with often experienced put-downs, derogatory remarks, or outright contempt demonstrated by other segments of the APS membership. *The Physics Teacher* study found that 74 percent of TYC physics faculty experienced direct negative comments from colleagues at four-year colleges and universities, and 92 percent experienced indirect negative comments. In addition, 20 percent said that they felt anger caused by this lack of respect.

I think this reflects very badly on the mindset of the APS membership. It is not only evidence of a self-serving attitude, but an unwise one as well. After all, the APS is trying very hard to raise the general public awareness of the relevance of science, and to promote the standing of physics and physicists in society. And yet the APS alienates and frustrates its own members, who are at the front line of that struggle for the hearts and minds of future decision makers, to the point that such members allow their APS memberships to lapse.

The times for research funding are tough, and one would expect a stronger emphasis to be placed on educational issues. Yet it seems that the physics community is not interested in the diffusion of the knowledge of physics. Graduate students who have "unhealthy" interests in quality education rather than research are promptly sent away to a college of education and never heard from again. Physics departments are generally not interested in how future physics educators are being prepared both on undergraduate and graduate levels. They have no say and no desire to have any say in shaping the physics curricula in colleges of education, and in fact have abdicated any responsibility for education of future physics teachers. As a result, few physicists are applying for positions at

OPINION

Science for All Students

by Laurie Fathe

This summer, two major reports were released which address the current state of undergraduate science and math education, and the need for changes in the current approach. These reports, *From Analysis to Action* from the National Research Council, and *Shaping the Future* from the National Science Foundation, provide a contextual perspective for this dialog on science and math education, and present concrete recommendations for addressing the problems they document. The reports have somewhat different perspectives and tones, with the NRC report being more succinct and providing a "how-to" manual, while the NSF report includes more detailed and harsher discussion of the existing situation. But overall they share many common themes and recommendations.

There is little in the content of these reports to surprise the informed and aware educator. The reports praise the success of education for future scientists, and point to the strong motivation found in students working closely with faculty on research. The reports similarly decry the state of science and math education for everyone else, from other science students to pre-service teachers to humanities students. The NRC report opens with a list of problems: undergraduates do not receive enough instruction in science and math; many classes stress "coverage" without engaging the students in the process of science; drop-out rates from science majors are alarmingly high; students rarely get to share in the excitement of investigation that engages the faculty; future teachers are not encouraged in science and math programs; science graduates are not appropriately prepared to succeed in the workplace.

But where the NRC report talks in broad terms, the NSF report documents the current situation in startlingly frank terms. The exclusionary and elitist atmosphere of science classes, particularly physical science classes, is described in grisly detail, as is the arrogant and disrespectful approach of some faculty. And if anecdotal evidence is not sufficient to convince faculty and institutions that changes are needed, the NSF report cites Elaine Seymore and Nancy Hewitt's three-year study "Talking about Leaving" which found that 90 percent of students transferring out of math and science majors and 75 percent who persisted in those majors described the quality of the teaching they experienced as poor. Undergraduates seeking a positive experience in science based on discovery in a supportive environment are likely to be disappointed by the current educational system and its faculty.

But faculty cannot be held solely responsible for the climate of science classrooms, or the low priority placed on teaching and educational scholarship. While national leaders encourage faculty to focus more on education, to provide a high quality discovery-based classroom experience for all their students, to develop innovative and relevant curricula, and to incorporate more student-centered learning techniques into their instruction, faculty respond with the realities of their situation. And the reality is that at most colleges and universities, educational innovation and scholarship are ignored or only minimally acknowledged, and successful teaching is sometimes seen as a negative rather than a positive in a faculty record; research and research publication are the accepted measures of success. Bruce Alberts, President of the National Academy of Sciences, is quoted on the irony of having the most prestigious positions at many institution of higher education be those with no teaching responsibilities.

The NRC report, in addressing this sad state of affairs, charitably states "Considerable uncertainty surrounds the vital matter of what institutional value is attached to the different kinds of professional work. Faced with this uncertainty, faculty members are apt to stress the one activity for which relatively clear objectives and rewards exist: research that results in peer-reviewed publications. Yet the distortions that result from a single-minded attention to research divorced from teaching are evident: buy out of teaching time in favor of research; a haunting sensation that time spent preparing a lecture is time taken away from research; admonitions of elders to forget about teaching until one has tenure; funds available for travel to research meetings but not to develop teaching skills, and a virtual absence in many institutions of informed discussion about what makes for good teaching." Any faculty member who has ever felt the pressure to put students second will echo these sentiments. The recommendation that follows stresses that "Universities need to be more inclusive in their definition of what constitutes scholarship and teaching... 'scholarship' can and should encompass a much broader range of activities than those now defined as essential for academic success."

It will not be trivial to implement even the major recommendations of these reports: "All students should have access to supportive, excellent programs in science, mathematics, engineering, and technology, and all students should acquire literacy in these subjects by direct experience with the methods and process of inquiry"; "Departments and programs should define their missions and establish explicit goals ... and be evaluated against those goals by fair assessments that are as rigorous as those applied for research"; and "Institutions must promote a new balance and a new linkage between teaching and research, so that teaching is enlivened by investigation and research is defined more broadly, and so that faculty may be rewarded for educational scholarship as well as for other kinds of scholarship."

Bringing about the level of cultural change suggested here will take a coordinated effort between all segments of the scientific and educational community; funding agencies, professional societies, and the government have a major role in this process. These players can provide strong and visible leadership in the area of undergraduate science and math education and insure that they implement appropriate rewards for this critical work. The reports insist that educational activities must be funded at levels commensurate with research, and that other forms of recognition also parallel those in research. Professional societies are urged to "act as powerful forces for change within the academic community" since faculty often feel stronger ties to their discipline than to their local institutions. The reports fall short of challenging the National Academy to select new fellows based on educational achievement, or suggesting that there be Presidential Young Educator awards for promising new teaching faculty, or proposing grants to allow faculty to buy out of research so that they may concentrate on their teaching, but these changes would be within the scope and the spirit of the recommendations.

The overriding question is whether or not there is sufficient will to accomplish the monumental task set forth by these reports. One can argue that because colleges and universities rely on the influx of research dollars, this is what they reward, and if funding for educational activities were equivalent to that for research then there would be a change in what these institutions reward. The money is indeed a necessary condition for change, but not sufficient. There must be a true cultural shift in higher education, and in the culture as a whole, to valuing teaching. Only then can we hope to achieve the goals so clearly set before us.

Laurie Fathe is project manager for the, Los Angeles Collaborative for Teacher Excellence and on the physics faculty of Occidental College in Los Angeles, California and is a former APS Congressional Fellow.

Letters *(continued)*

TYCs; these jobs go by default to other candidates. Yet it is in a TYC setting where a majority of state legislators are exposed to science for the first and often last time, and where the battle for the public image of physics is fought.

The graveness of the situation in physics education is further compounded by regulations in several states, enacted in the interest of educational lobbies. For example, a person with a Ph.D. or M.S. in physics may not be legally qualified to teach physics in a TYC or public high school, but a person with a degree in physics education from a college of education is deemed to be qualified. This is a lunacy that should be very strongly addressed and rectified by the APS.

I would suggest the following remedial steps that I hope will be considered by the APS to improve the standing of its members in two-year institutions:

(1) Create and support a topical group for physicists in two-year colleges, or more generally, physicists in education.

(2) Generally, the APS should strengthen the emphasis placed on physics education; presently these issues are recognized as the domain of the American Association of Physics Teachers.

(3) APS should work to remove bureaucratic barriers that currently prevent easy access for physicists with M.S. or Ph.D. degrees to jobs in education at the TYC and high school levels. Current legislation favors individuals with degrees in physics education who may actually be deficient in knowledge of physics, despite possessing teacher's certificates.

(4) The distribution of funds for research vs. physics education should be reconsidered. For instance, if the recently proposed "Drell bump" for high energy physics in the amount of $350 million was instead applied to revamp physics programs specifically in two-year public institutions, that would translate into an average of $350,000 per physics program. I am willing to risk a prediction that suddenly physicists would become interested in these jobs, thus alleviating the crisis in the job market and simultaneously boosting the quality of physics programs and physics faculty at these institutions.

(5) Finally, the APS should work to remove bureaucratic barriers that currently prevent faculty at a TYC from applying for research grants from DOE, NSF, the Research Corporation, etc. After all, why should a physicist with a long research record and many publications become automatically ineligible for these grants at the moment he or she accepts a faculty position at a two-year institution? Research proposals are supposed to be evaluated on merit, and any form of "preventive censorship" should be abolished.

Mikolaj Sawicki
John A. Logan College
Carterville, Illinois

Szilard, Schawlow Inducted into Inventor's Hall of Fame

Two renowned physicists and long-standing APS members were inducted into the National Inventors Hall of Fame in Akron, Ohio in September. The late Leo Szilard was honored for the invention of the nuclear reactor. His co-inventor, Enrico Fermi, had already been inducted. Nobel laureate Arthur L. Schawlow was honored for his invention of the laser, together with Charles Townes, who is also already a Hall of Fame member.

The APS has established awards in honor of each of these physicists. The Leo Szilard Award for Physics in the Public Interest was established in 1974 by the APS Forum on Physics and Society, to recognize outstanding accomplishments by physicists in promoting the use of physics for the benefit of society in such areas as the environment, arms control and science policy. The Arthur L. Schawlow Prize in Laser Science was established in 1991 by the NEC Corporation. It is intended to recognize outstanding contributions to basic research that uses lasers to advance our knowledge of the fundamental physical properties of materials and their interaction with light.

Schrieffer and Garmire Named to Committee on National Medal of Science

In September, President Clinton announced his intent to appoint Dr. Robert Schrieffer, APS president, and Dr. Elsa Garmire, APS Council and Executive Board member, to the President's Committee on the National Medal of Science. A highly prestigious award, the National Medal of Science was created to recognize individuals who have made outstanding contributions to science and engineering. The President's Committee on the National Medal of Science reviews nominations and assists in deciding recipients of the National Medal of Science.

Schrieffer holds the Eminent Scholar chair with the State of Florida University System. He is a professor of physics at Florida State University and the University of Florida, and also serves as the chief scientist for the National High Magnetic Field Laboratory. Schrieffer won the Nobel Prize in physics in 1972 with two other scientists for their study for the microscopic theory of superconductivity. He was awarded the National Medal of Science in 1984. He holds a B.S. from Massachusetts Institute of Technology and a Ph.D. from the University of Illinois.

Garmire received her Ph.D. in physics from the Massachusetts Institute of Technology and was recently named dean of the Thayer School of Engineering at Dartmouth College. She is also a past president of the Optical Society of America. Other nominees to the President's Committee are Joan Argetsinger Steitz, a professor of biophysics and biochemistry at Yale University who received the National Medal of Science in 1986; and Kenneth Arrow, a professor emeritus of economics at Stanford University who received the Nobel Memorial Prize in economic science in 1972.

Inside the Beltway *(Continued from page 1)*

surprisingly, its projected budget through 2002 reflects the political hammering it has been taking. But its budget also reflects the low visibility the agency has as a prime sponsor of scientific research.

Where the DOE stands in the scientific pecking order became clear last spring, when the Clinton Administration released its budget priorities. To meet its stated commitment to basic research, the White House identified agencies that it said should receive favored treatment in the federal budget. The National Science Foundation and the National Institutes of Health made the cut, but the Department of Energy didn't. As a result, in the Administration's plans for the out years, the DOE General Science budget, covering high-energy and nuclear physics, is projected to slip 20.7 percent, and the Energy Supply R&D budget, covering Basic Energy Sciences and Fusion Energy Science, suffers a 27.8 percent plunge. The Republican plan shows about the same size cut for the total of the two activities, but it allocates it differently: 12.6 percent for General Science and a whopping 38.0 percent for Energy Supply R&D.

The die has not yet been firmly cast, but the projections for science reflect several political realities. They can be understood with little sophistication.

Usually, out year budgets attract as much attention in Washington as reports of a new pothole on Pennsylvania Avenue. After all, federal budgets are annual agreements, with no individual Congress considering itself bound by the fiscal plans laid out by any of its predecessors.

Budgets are also political documents that reflect the current mood of the country. When the mood changes, as it often does from one year to the next, budget priorities are quickly readjusted to meet voters' altered views and expectations.

But the severely constrained out year budgets released this year are likely to stick, at least for a while and at least in the aggregate, if not in detail. Balancing the budget by 2002 has become the mantra of both political parties. And with public trust in government still falling, woe unto any politician who even hints at breaking this fiscal covenant, at least anytime soon.

With Republicans pressing for higher defense spending and Democrats holding firm on entitlements, the civilian discretionary budget — less than 17 percent of all federal spending — is caught in an extraordinary vise. Barring any other action, it must trimmed by almost one third, if a balanced budget is to be reached.

While these political realities pose serious challenges, the threat to the scientific enterprise has not yet reached crisis proportions. Recent surveys show that science enjoys extremely high support among the public. And on Capitol Hill there is continuing good will for basic research among members of both political parties.

But what lawmakers lack is a clear understanding of how the impending budgetary decisions will affect the nation's technological future. Economists and policy planners can provide some of the answers. But in the end, it is the scientific community that will have to deliver the message. If it fails to do so, the die will be cast, and the threatened crisis will become reality.

Is this a call to arms? You bet it is!

Physicists To Be Honored *(Continued from page 2)*

excited by forward Raman scattering.

Joshi received his Ph.D. in applied physics from England's Hull University in 1978 and held a postdoctoral position at the National Research Council in Ottawa, Canada. He is currently a full professor in the E.E. department at UCLA. Joshi has made fundamental contributions to the understanding of extremely nonlinear optical effects in plasmas including; parametric instabilities, resonant self-focusing, frequency upshifting by ionization fronts, and nonlinear coupling between electron-plasma waves.

1996 Simon Ramo Award

Sponsored by TRW, Inc., and the Division of Plasma Physics, the Ramo Award was established in 1985. It is intended to provide recognition to exceptional young scientists who have performed original doctoral thesis work of outstanding scientific quality and achievement in the area of plasma physics.

Michael Alan Beer
Princeton University

Citation: *"For fundamental contributions to the development of simulations of gyrofluid equations for studying tokamak plasma turbulence, including a novel fluid model of trapped electrons that led to realistic comparisons with experiments."*

Beer received his Ph.D. in 1994 from Princeton University and is currently working at the Princeton Plasma Physics Laboratory. His present research focuses on the development of fluid models for plasma turbulence and simulations of turbulent transport in tokamaks and magnetic confinement fusion experiments.

1996 Otto Laporte Award

The Otto LaPorte Award was established in 1985 to honor important advances in fluid dynamics.

Donald Coles
California Institute of Technology

Citation: *"For his contributions to fluid dynamics through exquisite experiments on turbulent boundary layers, Taylor-Couette flow, vortex rings, and turbulent wakes, and his insightful analysis of turbulence data. His research and teaching have inspired several generations of students and researchers throughout the world."*

Coles received his undergraduate education at the Universities of Michigan and Minnesota. He obtained his M.S. and Ph.D. from the California Institute of Technology in 1948 and 1953, respectively. His main research interests and research publications include work on the dynamics of rotating fluids and on the properties of turbulent flow, and he has made notable contributions to the development of advanced experimental techniques and instrumentation. In 1985 he received the Dryden Medal from the Institute of Aeronautical Sciences.

APS/AIP CONGRESSIONAL SCIENCE FELLOWSHIPS: 1997-1998

The American Physical Society and The American Institute of Physics are currently accepting applications for their 1997-1998 Congressional Science Fellowship Programs. Fellows serve one year on the staff of a senator, representative, or congressional committee. They are afforded an opportunity to learn the legislative process and explore science policy issues from the lawmakers' perspective. In turn, Fellows may lend scientific and technical expertise to public policy issues.

QUALIFICATIONS include a Ph.D. in physics or a closely related field, a strong interest in science and technology policy and, ideally, some experience in applying scientific knowledge toward the solution of societal problems. Fellows are required to be U.S. citizens and be members of APS or, for the AIP Fellowship, any of the AIP Member Societies. In exceptional cases, the Ph.D. requirement may be waived for applicants with compensating experience.

TERM OF APPOINTMENT for both fellowships is one year, beginning September 1, 1997, with participation in a two-week orientation in Washington, organized by the American Association for the Advancement of Science. Choice of congressional assignment is reserved to Fellows.

A STIPEND of up to $45,000 is offered, in addition to allowances for relocation, in-service travel, and health insurance premiums.

APPLICATIONS should consist of a letter of intent, a 2-page resume, and three letters of reference, accompanied by a cover sheet indicating: name, address, phone, email, references, U.S. citizenship, Ph.D. status, society membership, and where you learned about the programs. All submissions should be on standard 8.5" x 11" paper, single-sided and unstapled, and should be sent directly to the address below. Candidates should state in the letter why they are applying and briefly describe their public service experience. Letters of reference should discuss not just the candidate's competence as a physicist, but also the education, experience, and attributes which would particularly qualify the candidate to serve as a Fellow. Unless otherwise specified in the letter, the applicant will be considered for both APS and AIP fellowships.

ALL APPLICATION MATERIALS MUST BE POSTMARKED BY JANUARY 15, 1997.

APS/AIP Congressional Science Fellowship Programs
529 14th Street, NW, Suite 1050
Washington, DC 20045
(202) 662-8700 • email: opa@aps.org
APS and AIP home pages: www.aps.org and www.aip.org

Please note that other physics-related Congressional Science fellowship programs are run by The American Geophysical Union (contact Pat Azriel/202-462-6900) and The Optical Society of America/The Materials Research Society (OSA contact: Susan Reiss/202-223-8130; MRS contact: Gail Oare/412-367-3004). Please contact these societies directly for information on their Fellowships.

ANNOUNCEMENTS

NOMINATIONS FOR PRIZES AND AWARDS

The following prizes and awards will be bestowed at meetings of the Society in the coming year. Members are invited to nominate candidates to the respective committees charged with the privilege of recommending the recipient. A brief description of each prize and award is given below, along with the addresses of the selection committee chairs to whom nominations should be sent. Please refer to the APS Membership Directory, pages xxiii- xxxix, or the APS home page [http://www.aps.org] under the Prize, Award and Fellowship button, for complete information regarding rules and eligibility requirements for individual prizes and awards.

James Clerk Maxwell Prize

Sponsored by Maxwell Laboratories, Inc.

Purpose: To recognize outstanding contributions to the field of plasma physics.

Nature: The prize consists of $5000, an allowance for travel to the Division of Plasma Physics Annual Meeting where the prize will be awarded, and a certificate citing the contribution made by the recipient.

Rules and Eligibility: The prize will be awarded to U.S. residents for work done primarily in the U.S. The prize shall be for outstanding contributions to the advancement and diffusion of the knowledge of properties of highly ionized gases of natural or laboratory origin. This prize shall ordinarily be awarded to one person, but a prize may be shared among recipients when all recipients have contributed to the same accomplishments.

Nominations of candidates shall remain active for three years. Send name of proposed candidate and supporting information by 1 March 1997 to: Prof. Allen H. Boozer, Columbia University, Dept of Applied Physics, 500 West 120th St, Rm 202, New York, NY 10027; Tel: (212) 854-4785; Fax: (212) 854-8257; email: ahb17@columbia.edu.

Excellence in Plasma Physics Research Award

Sponsored by Friends of the Division of Plasma Physics.

Purpose: To recognize a particular recent outstanding achievement in plasma physics research.

Nature: The award consists of $5000 to be divided equally in the case of multiple winners, and each recipient will receive a certificate to be presented at an award ceremony at the Division of Plasma Physics Annual Meeting Banquet.

Rules and Eligibility: Nominations are open to scientists of all nationalities, regardless of the geographical site at which the work was done. The award may be awarded to a set of individuals as well as to individual scientists, as appropriate, to honor those who make essential contributions to the cited research achievement. Nominations shall remain active for three years.

Send name of proposed candidate and supporting information by 1 March 1997 to: Prof Ian Hutchinson, MIT, NW 17-186, 175 Albany St, Cambridge, MA 02139; Tel: (617) 253-8760; Fax: (617) 253-0627; email: hutch@pfc.mit.edu.

Outstanding Doctoral Thesis in Plasma Physics Award

Sponsored by General Atomic, Inc., and the Division of Plasma Physics.

Purpose: To provide recognition to exceptional young scientists who have performed original doctoral thesis work of outstanding scientific quality and achievement in the area of plasma physics.

Nature: The award consists of $1500, a certificate, and an allowance for travel of up to $500 to attend the annual meeting of the Division of Plasma Physics at which the award will be bestowed.

Rules and Eligibility: Nominations will be accepted for any doctoral student (present or past) of a college or university in the U.S. or for U.S. students abroad. The work to be considered must have been performed as part of the requirement for a doctoral degree. Also, the nominee must not have passed his final doctoral examination or started regular employment more than one and half years before the nomination deadline for the selection cycle in which the nomination is to be considered. Each nominee will be considered in not more than two consecutive cycles.

Send name of proposed candidate and supporting information by 1 March 1997 to: Prof. Raymond Fonck, Dept of Nuclear Engineering, University of Wisconson, 1500 Engineering Drive, Madison, WI 53706; Tel: (608) 263-7799; Fax: (608) 265-2364; email: fonck@engr.wisc.edu.

Award for Outstanding Doctoral Thesis Research in Atomic, Molecular or Optical Physics

Sponsored by members and friends of the APS Division of Atomic, Molecular and Optical Physics.

Purpose: To recognize doctoral thesis research of outstanding quality and achievement in atomic, molecular or optical physics, and to encourage effective written and oral presentation of research results.

Nature: The award, which is given annually, consists of $1,000 and a certificate citing the contributions made by the recipient.

The 1997 award will be presented at the APS April Meeting in Washington, DC, in April 1997. Nominees must submit an abstract for presentation at the meeting. The selection committee will choose finalists who will be required to present their work orally in a special invited paper session devoted solely to such presentations. The selection committee will choose the winner from among the finalists based on both oral presentation and the written material described below. All finalists will receive a travel stipend of $250.

Rules and Eligibility: Doctoral students at any university in the U.S. or abroad who passed their thesis defense for the Ph.D. in the disciplines of atomic, molecular or optical physics after 19 November 1994 are eligible for the award, except for those whose thesis advisors serve on the current selection committee. Any APS member may submit a nomination for this award.

The complete nomination package must be submitted by 15 November 1996 to the chair of the selection committee: Dr. Kenneth C. Kulander, Lawrence Livermore National Lab, PO Box 5508, Livermore, CA 94551; Tel: (510) 422-5400; Fax: (510) 422-9180; email: kulander@llnl.gov.

Nicholson Medal for Humanitarian Service

Established in 1994 by the Division of Plasma Physics and the Forum on Physics and Society, and sponsored by friends of Dwight Nicholson.

Purpose: To recognize the humanitarian aspect of physics and physicists.

Nature: Recognition consists of the Nicholson Medal and a certificate which includes the citation for which the recipient has been recognized.

Rules and Eligibility: The medal is given to a physicist exhibiting extraordinary quality in one of the following areas: (1) a physicist who, through teaching, research, or science-related activities, has implemented a vision for improvement of the quality of life in our society; (2) a physicist who has demonstrated a particularly giving and caring relationship with students or colleagues, has produced works of educational significance, or has created special opportunities for students or junior colleagues; or (3) a physicist who has been a leader in the promotion of international human rights or peace, or in the promotion of international ties in science.

Send name of proposed candidate and supporting information by 1 March 1997 to: Dr. John M. Finn, Los Alamos National Lab, T15, MS K717, PO Box 1663, Los Alamos, NM 87545; Tel: (505) 667-8156; Fax: (505) 665-7150; email: finn@lanl.gov.

APS Mass Media Fellowship Program - Summer 1997

Deadline: 15 January 1997

▶ NEW IN 1997!

In affiliation with the popular AAAS program, APS will sponsor two ten-week fellowships for physics students to work full-time over the summer as reporters, researchers, and production assistants in mass media organizations nationwide.

▶ PURPOSE

The intent of the program is to improve public understanding and appreciation of science and technology and to sharpen the ability of the fellows to communicate complex technical issues to non-specialists.

▶ ELIGIBILITY

Priority will be given to graduate students in physics, or a closely related field, although applications also will be considered from outstanding undergraduate and postdoctoral researchers. Applicants should possess outstanding written and oral communication skills and a strong interest in learning about the media.

▶ STIPEND

Remuneration is $4,000, plus a travel allowance of approximately $1,000.

▶ TERM

Following an intensive three-day orientation in early June at the AAAS in Washington, winning candidates will work full-time through mid-August.

▶ SELECTION PROCESS

During February, a review committee will screen completed applications received by the January 15 deadline. Files of the four or five most qualified applicants will be submitted to host media organizations for final selection in April.

▶ TO APPLY

The following materials must be received at the address below by **JANUARY 15**:

- Completed application form (available from the program office, below)
- A copy of your résumé
- Brief sample(s) of your writing (3-5 pages on any subject, written in language understandable to the general public — no technical papers, please), on single-sided, 8 1/2" x 11" paper, unstapled
- Three letters of recommendation (to be mailed directly to the program). Two of these letters should be from faculty members; one should be a personal reference.
- Transcripts of your undergraduate and graduate work (to be mailed directly to the program)

▶ MAIL TO

APS Mass Media Fellowship Program
529 14th Street, NW, Suite 1050
Washington DC 20045
(202) 662-8700 • email: opa@aps.org
http://aps.org/public_affairs/Media.html (includes PDF application forms)

CAUGHT IN THE WEB

Notable additions to the APS Web Server. The APS Web Server can be found at http://www.aps.org

New/Updated Links:

APS News Online (latest edition)

Public Affairs

- New APS Mass Media Fellowship Program
- Updated Congressional Science Fellowship Information

Meetings

- DFD Meeting Program
- Southeastion Section Meeting Program

Careers/Employment

- Added AVS Employment Resources to the APS Jobs Listings

Education and Outreach

- 1997 Women Speakers List and Minority Speakers List
- APS Roster of Women & Minorities in Physics

THE BACK PAGE

An Alien Ate my Laundry: The Decline of Reason in the Age of Science

by James C. Garland

The woman in the photograph held out a tattered shirt. Behind her, the remains of her sheets and pillowcases hung in disarray on a clothesline. Her face was flushed with irritation. "AN ALIEN ATE MY LAUNDRY!" the headline declared in huge block letters. It was a simple statement of fact, but I wanted to see the evidence. I am, after all, a scientist.

One doesn't expect reasoned discourse while splashing around in the shallow waters of supermarket tabloids. But even so, I was unprepared for the "scientific proof" of this amazing extraterrestrial encounter. What evidence was considered sufficiently plausible by the editors to warrant front-page coverage? Blurry snapshots of the outer space visitor taken by a next door neighbor? Scorch marks left on the lady's lawn by an interplanetary space drive?

Square holes. Our lady's laundry had been drying on the line, and when she came to collect it, she found her sheets and pillowcases riddled with bite-sized square holes. How did she know it was a space alien who had assaulted her clothesline? Well, obviously no earthly creature had a square mouth. But what about those tiny scraps of cloth scattered about the yard? Couldn't the kid across the street have done the deed with a pair of scissors? Not a chance. To her mind, the scraps of cloth merely signified that our outer-space visitor had not found his earthly snack to his liking and had upchucked it all over the back yard.

Looking at her picture, I couldn't escape the conclusion that this woman lived in a strange universe of UFOs, energy- focusing crystals and psychic mind readers. In her world, a laundry-eating extraterrestrial seemed as natural as a supermarket laser scanner. Why did she find it so difficult to differentiate between the real and the unreal?

In primitive cultures, human beings live and die at the mercy of familiar but unexplained forces — weather, disease, natural disasters — and in this context unexplained phenomena tend to be attributed to deities or spirits. The underlying concept behind magic is that supernatural powers can be invoked selectively by certain individuals to suspend the laws of nature.

One would think that the need for magic would be diminished in the scientific age. Today, we understand the forces that control the weather, how viruses are spread, and how crops grow. With such a secure base of knowledge, couldn't we reasonably assume that human beings might no longer turn to magic to explain the unknown?

I believe the opposite is true: that in response to science, our culture is turning to magic and superstition as a way of bringing order into a world that seems increasingly mysterious. I further believe that this embrace of the irrational is not a harmless indulgence of the imagination, but a growing deterioration in the ability of the general populace to think critically and to distinguish between fantasy and reality.

Science historian Gerald Holton (Harvard University) notes that more than half of the American population today believes astrology is grounded in scientific principles. More than half believes in the daily occurrence of miracles. Any New Age bookstore can provide abundant evidence of public interest in clairvoyants, faith healers, astrologers, and parascientific notions of energy halos, mystical pyramids, and extrasensory perception.

There is a vast perceptual gap between the illusions and the reality of science. To most persons living in our country, science and the technology it spawns have become virtually indistinguishable from magic. Science has come to be seen as so powerful that one need not even acknowledge the existence of laws of nature. If we are not yet able to travel into the future, or reverse the aging process, or make ourselves invisible, it is just a matter of extra research to make all these miracles come to pass. In effect, science has become intertwined with magic, and like the traditional magic of sorcerers and witch doctors, "science magic" undermines the ability of its believers to distinguish the real from the fantastic.

To some extent we have been victimized by our own successes. The pace of scientific and technological advance in this century has been so rapid that society seems almost to reel under a siege of new products and processes. Almost everyone has at times felt overwhelmed by novelty, by a sense that the texture of life has grown too complicated for our own good. This feeling is aggravated by a popular culture whose unapologetic enthusiasm for science magic reinforces the idea that the world is governed by mystical forces.

The entertainment industry spends hundreds of millions of dollars yearly promoting warp drives, matter transporters, parallel universes, robots made of liquid metal, and time travel. I worry about the cumulative impact of such entertainment on people too unsophisticated to understand they are not watching a plausible vision of futuristic technology, but merely a fanciful pastiche of misconceptions based on the present-day words of science.

There is no question that our schools fail to provide the needed counterbalance. The reasons are well-known: a methodology that emphasizes memorization of facts and labels, a fragmented science curriculum that skims over important concepts, overworked and under-educated science teachers, too-large classes, textbooks that emphasize flashy graphics over substance, and perhaps most importantly, an endemic failure to motivate students to stretch their brains and to take pleasure in the rewards of clear-headed thinking.

A major study, *Science for All Americans*, commissioned by the American Association for the Advancement of Science and published in 1992 by Oxford University Press, summarized the recommendations of distinguished panels of more than 400 individuals for improving national science literacy. These recommendations hold as their basic premise the idea that less is more: that American schools should narrow their scope, illuminating key principles and ideas and habits of mind, that the cultivation of the intellect requires more of laser beam's focus and less of a floodlight's sweep. It is a sensible agenda.

However, that the solutions are known does not make the problems less daunting. One does not easily kick-start into a motion a decentralized educational network of 80,000 schools and 50 million pupils. The problem will not be solved if it is only the educators and scientists who wave their arms in despair. The mandate to reform on such a grand scale requires broad national resolve. The greatest obstacle may be to persuade a society in which science illiteracy is endemic that something is actually wrong. How does one convince a person who has not learned to read of the value of books?

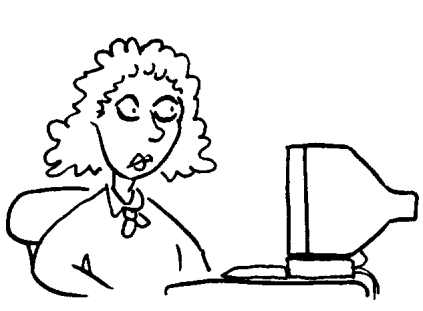
The case for science literacy is often framed in the context of workplace needs. The familiar argument is that success in a competitive international arena requires a steady supply of skilled scientists, engineers and technicians, and that our schools are not doing enough to meet this demand. I don't find this argument persuasive. Our scientists are acknowledged to be among the best in the world, and if our engineers and technical people are not quite so highly acclaimed, they are still the envy of most nations.

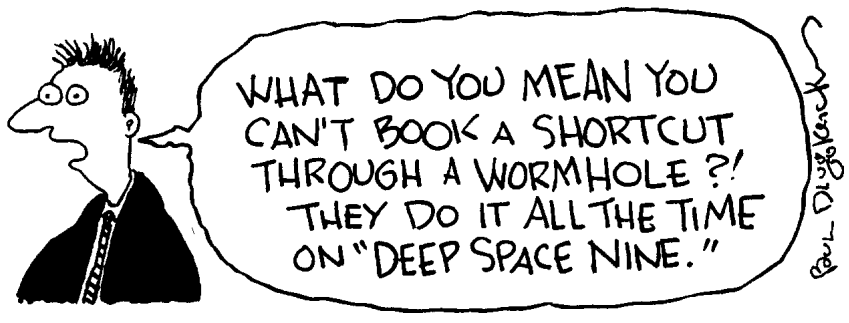
My concern lies not with the tip of the scientific iceberg, but with the submerged 90 percent. I fear we may have seriously underestimated the consequences for our culture of a scientifically illiterate population. Lacking an understanding of the physical world, we easily fall prey to hucksters, charlatans and those who promise easy solutions to complex problems. We abrogate our social responsibility to self-styled experts. We waste our dollars — and sometimes our lives — on useless medicines. We allow our political leaders to embark on costly, ill-fated schemes cooked up by special interest groups. We ignore real dangers to our planet because we cannot understand the warnings.

The power to understand is our most precious possession. The power resides partly in our genes, evolved over the millennia by the random forces of natural selection. But the power is also part of our intellectual heritage, a gift bestowed upon us by Aristotle, Galileo, Descartes, Einstein and thousands of other women and men throughout the centuries who have sought to elicit order from the confusion of their universe.

Today we reap the benefits of their labors. But as citizens of history's most privileged society, we ultimately hold this gift in trust, to be passed on to our children so that they will not only share in our prosperity, but will experience their full humanity. Our ancestors have made is possible for us to understand the complexities of our world, to appreciate the delicate beauty of the laws of nature and the elegant symmetries of the heavens. We owe it to them and to the generations who will follow us to preserve this fragile heritage.

James C. Garland is the president of Miami University in Oxford, Ohio. Note: Portions of text drawn from addresses given by the author to the Kit-Kat Club of Columbus, Ohio and the Faculty Assembly of Miami University.





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