Sessler Chosen as APS Vice-President in 1995 Election

Members of the American Physical Society have elected Andrew M. Sessler a senior scientist at Lawrence Berkeley Laboratory, to be the Society’s next Vice-president. Sessler’s term begins January, when he will succeed D. Allan Bromley (Yale University), who will become President-Elect. Sessler will become APS President in 1998. The 1996 President is J. Robert Schrieffer of Florida State University (see interview, page 2).

In other election results, Gerard M. Crawley of Michigan State University was elected as chair-elect of the Nominating Committee, which will be chaired by Martin Blume of Brookhaven National Laboratory in 1996. The Nominating Committee selects the slate of candidates for vice-president, general councillors, and its own chair-elect. Its choices are then voted on by the APS membership. Susan J. Seidman (Los Alamos National Laboratory), Donald Hamann (AT&T Bell Laboratories), Daniel Auenbach (IBM Almaden Research Center), and Ronald Wolfer (Smithsonian Astrophysical Observatory) were elected general councillors.

Vice-President

After earning a bachelor’s degree in mathematics from Harvard University, Andrew Sessler received his Ph.D. in physics from Cornell University. He spent a year with Hans Bethe doing elementary particle physics research before joining the faculty of Ohio State University. In 1962 he moved to Lawrence Berkeley Laboratory, where he has remained ever since, with the exception of brief tenures at the Niels Bohr Institute, CERN, and Japan’s KEK facility. He served as LBL’s director from 1973 to 1980.

Sessler has also been active in arms control and human rights issues, chairing the Federation of American Scientists from 1987 to 1991, and co-founding Scientists for Saharan, Oxford and Shamsky. He received the first APS Nicholson Medal for Humanitarian Service for the latter accomplishment. Sessler’s extensive service with the APS includes stints as chair of the Panel on Public Affairs, the Committee on the International Freedom of Scientists, the Committee on Applications of Physics, and the Division of Physics of Beams. Describing himself as “an optimist and an activist,” Sessler focused in his candidate’s statement on ways the APS can take action on so far-reaching challenges as continued support of physics research by the federal government, the continued health of the profession in industry and academia, and the shrinking job market for Ph.D. physicists. The APS should also be concerned with the impact of electronic publishing on its journals, as well as continuing its efforts on behalf of physics education, women and minorities in physics, human rights, and stimulating physics in other countries.

Specifically, Sessler supports increased APS involvement in “selling” physics to the government, the universities and the industrial sector, which he believes is remarkably capable of performing in ways which constantly surprise non-physicists,” he said of future employment opportunities. “We are admirably suited for ‘nontraditional’ jobs.”

To this end, Sessler particularly advocates stressing ways physics can contribute to such pressing national issues as energy conservation, and reiterated the importance of U.S. involvement in ITER, as well as the need for a fusion facility in this country. He also supports a proposed APS-sponsored study on the status and technological potential of electricity generation from renewable energy sources. “Such unbiased studies can be of great importance to the government and the citizenry, and it puts the APS, in good light, into the public eye,” he said, citing past work on safe reactors, high efficiency vehicles, and directed energy weapons as examples.

The Society’s efforts against pork-barrel additions to the federal budget, as well as Congress’ cancellation of the Superconducting Super Collider and the Advanced Neutron Source, are good examples of the APS assuming a vocal role in shaping national science policy, according to Sessler. He also believes the APS should continue to be a strong advocate for small science, which he deems essential to the continued health and vitality of the field. However, “At the same time, we clearly need in many subfields of physics a healthy national program built upon major facilities in the U.S., as well as numerous international programs based upon jointly constructed major facilities,” he said.

Chair-Elect, Nominating Committee

Gerard Crawley received BSc and MSc degrees from the University of Melbourne in Australia in 1959 and 1961, respectively, and a Ph.D. in physics from Princeton University in 1965. Following a postdoctoral appointment at Michigan State University, he was a Queen Elizabeth II Fellow at the Australian National University from 1966 to 1968. He returned to Michigan State University as an Assistant Professor in 1968 and has held a faculty appointment there ever since. He served as associate director of the National Superconducting Cyclotron Laboratory and chaired MSU’s Department of Physics and Astronomy from 1988 to January 1994, when he assumed his current post as Dean of the Graduate School.

Crawley’s research interests are in experimental nuclear physics, particularly in the simple modes of nuclear excitation. His APS service includes a stint as chair of the Division of Nuclear Physics from 1991 to 1992. He also co-chaired the division’s Resource Committee. In this latter role, he was responsible for the production and circulation of a brochure which attempted to explain to a lay audience what nuclear physicists do and what society gains from an investment in nuclear physics. He chaired the Selection Committee for the APS Visiting Minority Lectureship in 1994 and is currently a member of the APS Committee on the Status of Women in Physics.

Crawley identified three major challenges facing the physics community in his candidate’s statement: the continued tight job market for Ph.D. physicists, and the perpetuation of the myth that choosing a career other than faculty at research universities constitutes failure as a physicist; better representation of women and minorities in the physics profession; and the need for better communication with non-physicists, both in local and federal government, and the general public. “We must help them to...”

Inside the Beltway

Freshman House Republicans Muscle Legislation to a Crawl by Michael S. Lubell

When Congress returned from its summer recess shortly after Labor Day, the Republican leaders knew that they had a full plate before them. What they didn’t know was how indescribable its contents would turn out to be. Working against the October 1 deadline for the new fiscal year, they could barely achieve enough consensus to send two of the thirteen appropriations bills to President Clinton’s desk for his consideration. He signed the one for energy and defense into law, but vetoed the other for legislative branch spending.

To avoid shutting down the federal government, all parties in the budget debate were forced to agree to a Continuing Resolution. For six weeks, it allowed all agencies to spend money at a level that was 5 percent below the lowest figure contained in either the House or Senate appropriations bill or the actual spending for FY 1995. But in some instances the Senate or House appropriations bills had zeroed out activities of the federal agencies. The Superconducting Super Collider and the Advanced Technology Program administered by NIST. To deal with these, the Continuing Resolution provided for spending at a level 10 percent below the FY 1995 figure.

It took all of Speaker Newt Gingrich’s considerable leadership skills to sell his House Republican freshmen on the temporary spending plan. But their public objections to the deal worked out with the White House made it abundantly clear to even the most casual of observers that these missionaries were not about to forego their November 1994 calling in the ensuing budget debate.

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aphsnews@aps.org
Schrieffer Focuses on Improving Communication, Science Education

The impact of electronic publishing on APS journals, science education reform, and improving communication between the society's community and the general public is of particular concern for the APS in the eyes of J. Robert Schrieffer, who begins his tenure as APS president this month. A professor of physics at the University of Florida, Schrieffer succeeds C. Kamar N. Patel of the University of California, Los Angeles.

Schrieffer's interest in science developed early, with childhood interests in chemistry and mathematics. However, he didn't attend the standard physics class at his small high school in Illinois. The physics teacher there had minimal background in the subject, and, amid a textbook used in MIT's introductory physics courses, he and Schrieffer pursued an independent course of study together: Ironically, Schrieffer initially intended to study electrical engineering in college, but switched his major to physics two years later.

He received his Ph.D. in physics from the University of Illinois in 1957, specializing in the theory of superconductivity. After holding faculty appointments at the University of Illinois, the University of Chicago, and the University of Pennsylvania, he became Chancellor's Professor at the University of California, Santa Barbara, where he also served as director of the Institute for Theoretical Physics. In 1992 he was appointed University Professor at Florida State University, where he is also chief scientist of the National High Magnetic Field Laboratory.

A past recipient of the APS Oliver Buckley Prize, Schrieffer shared the 1972 Nobel Prize in Physics with John Bardeen and Leon Cooper for the microscopic theory of superconductivity. His current research centers on strongly correlated fermion systems and magnetic effects in solids. He has served on numerous committees of federal agencies, and was recently appointed chairman of the Scientific Council of the International Centre for Theoretical Physics in Trieste, Italy, a facility which fosters research in developing countries.

Q: One of your concerns is the need to improve communication between subfields of physics to unify the community, particularly in its approach to funding agencies. What suggestions do you have for the APS to help to accomplish this?

A: One way is by organizing cross-disciplinary symposia at APS meetings to give more visibility to people who work in one field, but who have expanded their interests into other fields and thus could address the exciting big questions that lie ahead. It's something that we really haven't moved very far on, but it is very important.

The APS Executive Board and Council typically deal with matters too large and too short term for the annual Executive Board retreat in June. Perhaps we can come up with some more specific things that would be helpful in this area.

Q: What can individual physicists do in this regard?

A: It is very important to ensure that the physicists who are the best communicators become more active in spreading the word through general lectures. There were some outstanding candidates for the Lilienfeld Prize this year, for example, each of whom were wonderful communicators about their own research. It would be nice if we could expand this beyond one individual per year and have a group of APS-sponsored lecturers to give colloquia.

Q: A number of scientists have expressed concern that the implications of their research to the point where most of the essence is lost, in their opinion. Many distrust the media's focus on flashy aspects and think less attention is paid to actual physics. So there's an inherent chasm between the two in terms of communication. How can we bridge that gap?

A: You have to get people who are not only very talented at this, but also enjoy doing it. Fortunately the field does have a number of people who have these talents. Historically, there have been a lot of scientists who've been wonderful communicators in physics and we should use these people more and help them realize that they have a very special talent. Unfortunately, many such communicators are viewed as less than outstanding scientists because they're simplifying things, and also inverting their own personality into it. So being standouts communicators in some sense degrades their scientific image.

Q: You're also concerned with improving inter-collegiate education. Must agree that it is vital to instil students' curiosity so that they seek out more information on their own. Can this be done in a traditional school structure, or are some drastic changes needed in our educational process?

A: We must at least have the intention of making big changes in order to achieve small changes. A very large force is necessary to move something of enormous inertia, and our present educational system is a great inertia. Sometimes the enthusiasm and excitement of new discoveries in physics never reach the high school classroom. This partly because individual states include only basic facts in their physics requirements, such as the formula for water. Not a single concept, axiom, experimental technique, or even a sense of the intellectual structure of the field is included. Students are never asked how to reason or conceptualize anything.

We must bring education into the 21st century, perhaps by using camcorder or videotaped lectures by outstanding communicators which are still flexible enough for teachers to insert them into standard curricula. It could lead to a knowledge-based versus a wisdom-based approach to education. Physics is probably one of the worst in this regard. We teach students all the techniques and expect them to acquire the complementary wisdom by osmosis.

Q: There is still a serious funding crisis for physics research, and an ongoing budget battle in Congress. How might physics have to change in order to survive in this changing economic climate? Will it have to adapt?

A: When physics enjoyed only a small fraction of its present funding level, outstanding research was done. The field has advanced some distance since then, but still the major breakthroughs are made by relatively few individuals. In all fairness, one can absorb any amount of funds. It all depends on how one distributes scarce resources. One can overload a field. The peer review system is very good for maintaining quality, but it also tends to focus sources on areas that have already been fertilized. I think the physicists community needs to vigorously look for new areas of opportunity where investment could pay off. We could get some of the more senior people to sanction these exciting new areas to attract not only funding, but scientists interested in doing research at the vanguard.

Q: International cooperation, particularly on large mega-science projects. There's discussion on whether the U.S. will participate in projects like the Large Hadron Collider, whether the U.S. is willing to become a copartner as opposed to a leader and a star. How can the APS help in this debate?

(continued on page 8)
John Bardeen won the Nobel Prize, said “He arranged to have the President of the APS’ send Schawlow a congratulatory letter. of the APS’ send Schawlow a congratulatory letter. Schawlow, then APS Executive Secretary, said “He arranged to have the ‘President announce in October, and the APS President. The latter was Arthur H. Havens, then APS Executive Secretary, as having won the prize before serving, seven during, and after their tenure. Thirteen winners of the Nobel Prize in Physics. received the prize before serving, seven during, and after their tenure. Thirteen winners of the Nobel Prize in Physics. nuclear physics, however, fared less well. It received an 8 percent reduction to $304.5 million. And magnetic fusion, which unfortunately had its future spending tied to two new projects, ITER and Tore Supra, was left to fend for itself. Budget cutters excised 30 percent of its FY 1995 base, despite last minute efforts by the Clinton Administration to establish a coherent set of priorities. With the freshmen Republicans demanding, “He arranged to have to their face and social agenda in dealing with their more moderate Senate Republican counterparts, it’s far from clear which appropriations bills will ultimately make their way onto the President’s desk. And once they get there, it is far from clear which bills the President will find acceptable. A series of Continuing Resolutions may avert the federal train wreck that some pundits inside the Beltway have forecast. But for many science activities that will be small, sacrosanct, since the House Republican freshman class have vowed to make the stop-gap spending measures reflect deep cuts across the board. According to various sources on the Hill, those cuts could reach 20 or even 40 percent as the fiscal year progresses. Bitter disputes over legislation to raise the debt limit and vitriolic debates over those cuts could reach 20 or even 40 percent as the fiscal year progresses. A complete list is also available on the Fellowship section under the Prizes, Awards & Fellowship button of the APS Home Page (http://aps.org). • The APS Council approved two minor changes to the APS Bylaws regarding those currently required to serve on POPA in the first year following their fellowship. Comments should be sent to the Executive Office of the APS, One Physics Ellipse, College Park, MD 20740-3344; or by e-mail to <halsted@aps.org>. • Six APS representatives traveled to Tokyo in September to attend the Second International Conference on Research and Communications in Physics. They were joined by representatives from physics organizations around the world, including UNESCO, the International Union of Pure and Applied Physics, the Balkan Physical Union, the European Physical Society, the Evdovs Physical Society, and the physical societies of Russia, Poland, Uzbekistan, China, Sweden, Asia Pacific, Germany, Korea, Latvia, Malaysia, and Mexico. A final decision is still pending regarding the conference, re-asserting the participants’ commitment to basic and applied science as a global endeavor. • U.S. Representative and physicist Vernon J. Ehlers (R-MI) was elected to APS fellowship. His citation reads, “For contributions to atomic physics research, physics education, and dynamic leadership in the pursuit of better understanding the welfare of science in the United States.” Ehlers received his Ph.D. in nuclear physics from the University of California at Berkeley in 1960 and then spent two years as a postdoctoral fellow, one at Berkeley and one at the University of Heidelberg in Germany. Following his tenure as a research associate at Lawrence Berkeley Laboratory, he joined the faculty of Calvin College in 1966, leaving in 1983 to pursue his political career. A long-standing APS member, Ehlers was involved with the fledgling Forum on Physics and Society in the early 1970s and also served on the Panel on Public Affairs. He first entered public politics in 1975, when he was elected as a county commissioner, and was sworn into the 103rd U.S. Congress in January 1994. The APS Council elected a total of 180 APS representatives to membership in November, 1995. Their names were published in the March issue of APSNEWS. A complete list is also available on the Fellowship section under the Prizes, Awards & Fellowship button of the APS Home Page (http://aps.org). The APS Division of Biological Physics is sponsoring a workshop on physical techniques in biological sciences on Sunday, March 17, just prior to the 1996 APS March Meeting in St. Louis, Missouri. The workshop will focus on researches who are unfamiliar with the types of information about biological systems that can be obtained using modern physical techniques, and are interested in a series of overview lectures on the subject. “Significant advances in the understanding of biological systems can be made by applying a variety of physical techniques to their study,” said Denis Rouseau of AT&T Bell Laboratories, who organized the workshop. “Some are particularly powerful for the study of the active site of enzymes, whereas others yield information of a more global nature.” The four techniques covered in the course are electron paramagnetic resonance, raman scattering, atomic force microscopy, scanning tunneling microscopy, and x-ray absorption fine structure. A new study, “1994 Salaries: Society Membership Survey,” released by the American Institute of Physics shows that the median annual salary for a full-time physics professor is $67,600.00. The median is 67.6/59.4 in government; 67.9/61.5 for full professors (9-10 month salary). The selected job areas are as follows: 78.1/68.4 for those working in industry; 67.6/59.4 in government; 67.9/61.5 for full professors (9-10 month salaries). 48.5/46.2 for associate professor, and 42.6/42.0 for assistant professors. [Item courtesy of Philip F. Schewe of the American Institute of Physics.]
New insights into nuclear structure, superheavy elements, and future accelerators.

The study of nuclear structure and reaction dynamics has led to a fundamental understanding of the subatomic world. For instance, the discovery of new superheavy elements and the study of nuclear reactions at high energies have contributed to our knowledge of the nuclear force and the stability of atomic nuclei. These investigations have not only expanded our understanding of nuclear physics but have also stimulated the development of new technologies and applications. The insights gained from these studies have been crucial in advancing the field of nuclear physics and have paved the way for further explorations into the complex interplay between nuclear structure and reaction dynamics.

**New Aspects of Nuclear Structure**

Neutron-rich nuclei are of particular interest to scientists since they might provide unique insights into nuclear structure associated with an excess of neutrons, such as a new region of deformation, shell effects, and modes of excitation. According to K.E. Rehm of Argonne National Laboratory, deep-inelastic reactions have been shown to produce neutron-rich nuclei with a high multiplicity of gamma-ray emission. However, the lack of sensitivity of available gamma-detector arrays has made it difficult to study these reactions. Lee and his colleagues carried out gamma-spectroscopy studies of coincidence reactions to detect the projectile-like fragments, and coincident gamma rays were detected in the gampgammasphere. The group also studied neutron transmission as a function of spin, and the variation of the interaction strength of the first backscattering.

**Superheavy Elements**

New results of research on the synthesis and investigation of properties of heavy nuclei at Russia’s Flerov Laboratory of Nuclear Reactions have led to the observation of a new region of nuclear stability near the closed-deformed shells of 108Z and 162Sn, which are of particular interest to scientists since they might reveal new aspects of nuclear structure and reaction dynamics. The experiments were conducted with beams from the facility’s heavy-ion accelerator using a gas-filled separator of recoils. The discovery of this new region allows scientists to make much more accurate assessments regarding the properties of heavy nuclei.

According to K.E. Behn of Argonne National Laboratory, the discovery of heavy-ion induced fusion reactions at sub-Coulomb barrier energies reveals a rich and interesting interplay between reaction dynamics and nuclear structure. The enableable progress has been made in recent years advancing present understanding of the sub-barrier fusion enhancement by the Coulomb interaction at sub-Coulomb barriers, such as static deformation, vibrational motion, and neutron transfer reactions. New measurements at ANL involving beams from the facility with a particularly strong enhancement effects began reported, and these processes are expected to enhance the fusion of highly heavy ions usable with radioactive beams.

The insights gathered from these advanced research efforts have significantly advanced our understanding of nuclear structure and reaction dynamics, enabling new applications in areas such as materials modification, energy production, and medical applications. The ongoing exploration of these fundamental aspects of nuclear physics promises to unlock even more remarkable discoveries in the future.
Challenge to Scholarly Surveys Again Rejected

Judge Leonardi B. Sand, of the United States District Court for the Southern District of New York, issued a decision on November 2, 1995, reaffirming the First Amendment right to publish surveys analyzing the prices of scientific journals. The decision represents a significant confirmation of the legal principle that scholarly surveys of pricing are of public importance to the scholarly community.

In 1986 and 1988 The American Physical Society (APS) and the American Institute of Physics (AIP) published surveys prepared by Professor Henry Branchan of Duke University and Professor Louis Murzin/Madison analyzing the comparative prices of physics journals. A suit challenging the surveys was brought by Gordon & Breach Science Publishers (G&B). As noted by Judge Sand, "A suit has happened, journals published by AIP and APS scored near the top of the articles' rankings and several of G&B's journals were ranked at or near the bottom." G&B filed suit in New York, and the case was later transferred to Europe, claiming that the articles constituted false or misleading advertising.

The recent decision arises from G&B's request that the court modify its prior restraining order. A portion of the articles was speech entitled to constitutional protection. Judge Sand stated that "it is plainly incontestable with justice and reason" noting that G&B "seeks [its] back-door entry to revisit the issue, after undertaking the exact discovery that the Court cautioned against in the first instance." G&B also challenged various "secondary uses" of the surveys, including advertising, letters, and presentations by APS and AIP officials. Judge Sand ruled for AIP and APS on several of these claims, but found there were factual issues as to others that had to be resolved at trial.

For the remaining secondary uses, G&B will now have to show that the surveys were false or misleading -- a standard different from that applied in Switzerland and Germany after thorough review.

Dr. C. Kumar N. Patel, President of The APS and Dr. Roland W. Schmitt, Chair of the Governing Board of the AIP stated that "we are extremely gratified by Judge Sand's decision. His action provides important protection for studies of an issue of significant importance to libraries and the scientific community as a whole -- the escalating price of journals in a period of declining library budgets."

They said, however, "we are dis- tressed that, in having to litigate the remaining secondary uses, AIP and APS will have to defend again in the U.S. what has previously been found in Germany and Switzerland that the surveys are not false or misleading. Although we are confident that we will prevail on the remaining is- sues, the scholarly community is not served by the diversion of scarce re- sources into the defense of G&B's lawsuits."

For further information or a copy of the decision, contact Joan Whither (301) 209-3003, fax: (301) 209-0846, or email: (jwcharter@acp.org).

Southeastern Research Opportunities Featured at SES Fall Meeting

Emerging new research opportunities in the Southeast, in such areas as magnetic fields research, free electron lasers, and the quark structure of matter, were among the highlights of the 62nd meeting of the APS Southeastern Section held in Tallahassee, Florida, in November. Hosted by the National High Magnetic Field Laboratory (NHMFL), which houses some of the world's most powerful research magnets ever developed, the conference also featured invited sessions on nuclear waste management, astrophysics, and computer applications in physics teaching.

A number of new opportunities in the Southeast are opening up many diverse research opportunities in the region. For example, Florida State University's Radioactive Ion Beam Facility at Oak Ridge National Laboratory has been completed. The scientific program, affording new research opportunities in nuclear structure and nuclear astrophysics, will begin operation in the spring of 1996.

Louisiana State University opened its Center for Advanced Microstructures and Devices two years ago, containing the world's largest mass-produced ion beam cir- cuit in the U.S. with a maximum energy of 1.5 GeV. Applications include basic research, chemical and structural analysis, process development, and production of microdevices. Duke University's Free Electron Laser Labora- tory is making advances in applications of these accelerator-based light sources to such diverse fields as nuclear spectroscopy, surgery, mul- timedia applications, and analytical microscopy. Finally, the completion of the Continuous Electron Beam Facility is expected to produce several new insights into the quark structure of matter.

Opportunities for scientists also exist in magnetic field research. Magneto- photoluminescence (MPL) spectroscopy has proven to be a powerful technique for studying the interband optical transitions in quantum well-type semi- conductor heterojunctions, and the NHMFL has established a facility to optically study the properties of two- dimensional electron systems at high magnetic fields in the quantum limit using MPL. Other promising areas of research include the continued improvement of high-resolution nuclear magnetic resonance, which is expected to reach 1 GHz in the near future, and strongly correlated electron systems at extreme limits.

Southeastern colleges are discovering innovative applications of computers to education. For example, L.C. Dennis of Florida A&M University has developed a project known as the Cyberspace Middle School (http://www.scri.fsu.edu/~dennis/CM.html), a World Wide Web site for math and science education which emphasizes hands-on activities. Access to the school's home page currently ex- ceeds 750 visitors and electronic requests for science information or project ideas are received weekly.

Other efforts include computer systems developed for introductory physics interfaces at the University of Tennessee and the University of Florida, which feature user-friendly software programs for creating experiment-specific, acquisition programs, and spreadsheet programs to aid student data analysis. Kinesthetic apparatus in the Physics Workshop Program at Dickinson College help students relate natural phenomena to the laws of me- chanics, while North Carolina State University uses instructional computer animations in its physics courses.

Over the next several years, approxi- mately 100 tons of excess weapons plutonium in the U.S. and former Soviet Union will be produced from the nuclear stockpile. Other potential areas of research include the continued improvement of high-resolution nuclear magnetic resonance, which is expected to reach 1 GHz in the near future, and strongly correlated electron systems at extreme limits.

Southeastern researchers. Topics in- cluded new supercomputer simulations of core collapse supernovae, nuclear probes of stellar evolution, recent ob- servations of gamma ray bursts at the Compton Gamma Ray Observatory, and the assembly of a large database of old star clusters in the Milky Way using re- cently acquired technology at the Space Telescope Science Insti- tute in Baltimore, Maryland.

Friday evening's banquet featured the presentation of the George B. Pegram Award to Joseph Ferguson of Mississippi State University, and the Jesse W. Beans Award to George Samuel Hunt of the University of Tennessee. Awarded annu- ally by the section for more than 20 years, the awards consist of a gold medal and certificate citing the recipient's accomplishments for which he or she is being honored. The Beans Award is intended to recognize a physi- cist in the Southeastern region who has conducted significant research in physics, while the Pegram Award honors an individual who has demonstrated ex- cellence in the teaching of physics.
The U.S. physics community faces some alarming questions with disquieting international overtones: What will be the consequences for high-energy physics if the U.S. refuses to support the Large Hadron Collider (LHC) at CERN? What will happen to fusion research if ITER self-destructs? What will physicists do if there is no domestic or international development of next-generation intense synchrotron and neutron sources? What can we do to promote dialog among nations concerning the implementation and management of major new collaborative programs? And finally, what role will physicists play in the Megascience Forum of the Organization for Economic Cooperation and Development (OECD)?

Some questions, like the first three, wrench our vitals. The last seems benign, almost petty. But rephrasing the question makes the issue more immediate. How will physicists affect the debate among the industrialized nations about where, when and who will benefit from the next big science project? The implication is that we may find ourselves excluded from the decision-making process which will mold the complex and fate of physics for a generation or more.

However, despite all the lip-service to the contrary, there is little evidence that the international community is moving toward ever-increasing cooperation in big science research. The credibility of the U.S. as a partner in international ventures is open to question as Congress and the Administration inflate and collapse the bubble of support for collaborative programs.

The instruments at our disposal for international participation are few. In the post-war period, foreign regional projects like CERN were viewed as peripheral chips in our national mosaic dominated by Fermilab and SLAC. United Nations programs such as the International Atomic Energy Agency were engineered by the member states as mere extensions of their foreign policies. The International Union of Pure and Applied Physics moved along at its leisure pace, badly underfunded and only occasionally seeking larger relevance through the organization of international committees on specific subjects.

By far the largest programs for support of U.S. scientists in international collaborations came from the Department of Energy, the Department of Defense and other government funding agencies. But many of these programs are imploding and the very survival of some agencies is at risk.

With this in mind, it's important to focus on the last two questions above in the context of current problems. We are familiar with the recommendation of the Drell Panel which requested funds for U.S. participation in the LHC. What will happen if funding is not provided? Is it all certain that the long-standing policy of open access to the best qualified U.S. physicists will not be abrogated?

Not necessarily. At a meeting of the UNESCO Physics Action Council at CERN this past June, Director-General Chris Llewellyn-Smith asserted that the CERN council would not impose sanctions on non-member participation in the absence of contributions to operations.

Is this ingratitude for the open policy that hosted thousands of European scholars at U.S. institutions over the past two generations? More likely, this reflects the hard realities of an organization seeking to implement a difficult program while laboring under declining financial resources. It also illustrates the fear of some CERN members that U.S. participation, now fourth behind England, Germany and France in the existing experimental program, will shouldered out the smaller dues-paying members. This is not an idle fear. More than 500 U.S. physicists are now involved in the preparation of LHC experiments, whereas there are fewer than 270 physicists for Italy, Germany, France and the U.K., respectively.

What about the OECD Megascience Forum — the one-time vision of APS Vice-President D. Allen Bromley during his tenure as President Bush's science advisor? Both the U.S. Liaison Committee to IUPAP and the UNESCO Physics Action Council have expressed their apprehension that the physics community will be excluded from the process or relegated to a secondary role as expert “advisors.” And there are reasons for the scientific community who have yet to face the reality that large science programs must reflect the individual interests of nations and the collective interests of regions. Scientists cannot decide where a facility is best sited, the criteria of a location, the economic prospects of ours, or somehow suggest that a new Ph.D position is available. If he does not work out, he can be terminated just like any other employee. If the field cannot support a scientist, better he should know after he completes his Ph.D before he begins to pursue the country for ten years, completing five post docs.

I strongly believe that the post doc position is simple exploitation. It should be eliminated.

Wallace M. Manheimer
Naval Research Laboratory

For example, that granting agencies require applicants to list, along with papers and previous grants, names and addresses of all previous Ph.D and MS advisors, and solicit from each of these a confidential letter assessing the value of their graduate training to their present employment. This would have more effect than all the “alumni cooperation workshops” that have ever been held.

Pieter B. Visscher
University of Alabama

Barrett Ripin's editorial ("Why Belong?", APS News, November 1995) raised many very relevant points. However, I was disappointed that on the most important question of the PhD glut, he chose to concentrate entirely on the demand side (to which the efforts of APS and its members represent a small perturbation at best) and to ignore the supply side, where they could (given the will to do so) solve the problem in a short time. Suppose, for example, that granting agencies required applicants to list, along with paper and previous grants, names and addresses of all previous Ph.D. and MS advisors, and solicited from each of these a confidential letter assessing the value of their graduate training to their present employment. This would have more effect than all the “alumni cooperation workshops” that have ever been held.

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How I Went From Comedy Writer to Science Teacher in 65 Easy Lessons

by Casey Keller

Well it’s finally happened: responsibility for the education of America’s youth has been passed on to a couple of guys who used to write for “The Loveboat” and “Who’s the Boss?”. What’s wrong with you people? What can you be thinking?

My partner, Richard Albrecht, and I had spent 15 years writing situation comedies when we interviewed for a job as head writers on a new show called “Beakman’s World.” We watched a ten-minute presentation tape. On it, we saw a bizarre man with hairy hair in a bizarre laboratory talking about the most excruciatingly boring subject we had ever considered — and making it fascinating and fun. Best of all, it made us laugh.

We had reservations about taking the job. We’re not scientists, we’re comedy writers. Mark Waxman, the show’s executive producer, assured us that our lack of scientific knowledge would not be a problem. The research people would write the lessons. All we had to do was add jokes.

Mark Waxman isn’t a liar, but he was badly mistaken. “Beakman’s World” is teaching science in new and exciting ways. Those new and exciting ways are the jokes. Our research staff did an honest job, but they could not deliver on Mark’s promise. That was really up to us.

It turned out to be great fun. We immersed Beakman in a tank of water to explain displacement. We had Josie and Lester sing “Bee-Barf-A-Loo-La” to remind our viewers that honey is regurgitated from the stomachs of bees. Beakman, Lester and Liza got their hands dirty fixing a clogged drain pipe to explain how doctors treat heart attacks. We call these gags that make you laugh “bite-sized pieces that little minds can digest.” It’s that moment where the light bulb goes off over the heads of our audience.

I had to turn from comedy writer to science teacher overnight. And the way they said it, it was as if all the stuff I thought I hadn’t learned back in Mr. Green’s ninth grade science class jumped up out of my unconscious memory and into my conscious memory. Wunderful still, it started making sense. Suddenly, Archimedes’ Law became as clear as a bell and I finally understood the difference between potential energy and kinetic energy. (Don’t laugh. I told you I’m not a scientist.)

Sixty-five episodes later, “Beakman’s World” has won three Emmys, the Cable Ace Award for Best children’s show, and the Ollie Award for Excellence in Children’s Programming. More importantly, my children love the show and it has taught me a lot about audience. One summer vacation, Zoe, my five-year-old, took the pilot of our plane aside to tell him that the four forces of flight are thrust, drag, lift and weight.

As I said, I’m not a scientist, I’m a comedy writer. But I have learned a few things during my time at “Beakman’s World.”

Children don’t hate learning — they just hate school. And why shouldn’t they? As important as it is, school is the process by which we harness our children’s talents so that they can be put to work for our society. We impose structure on their unbridled free spirits. For a few hours each day we take away their spontaneity and make them focus their energies on things that often don’t interest them. School is where many children get their first tastes of failure when kids are watching. Those powerful little brains are sponges, soaking up everything they see and hear on that television screen. But the little minds don’t have the tools to discriminate between things worth learning and things not worth learning. If you doubt me, ask my son, Max, to recite TV commercials for our local Ford dealer.

All television is educational television when kids are watching. Those powerful little brains are sponges, soaking up everything they see and hear on that television screen. But the little minds don’t have the tools to discriminate between things worth learning and things not worth learning. If you doubt me, ask my son, Max, to recite TV commercials for our local Ford dealer.

Since all television is educational television whether we intend it to be or not, it’s our job as parents to help our children choose the shows that interest them. And it’s our job as parents to teach our kids from “Sesame Street” are extremely valuable, empowering and life affirming. The things they learn from their local news show may not be. More importantly, it’s our job as parents to provide shows for children that are worth watching and lessons that are worth learning.

I’ve picked up a bit of scientific knowledge over 65 Beakman episodes. I’ve learned that the main purpose of every life form on earth is to pass on its genetic information. But we humans are probably the only species that has something else to pass on besides our genes. We have to pass on our culture and our civilization. Not just because it’s a nice thing to do, but because it’s essential to our survival.

We must equip our kids with the knowledge they need and the skills to acquire that knowledge if we’re going to keep our economy competitive with Japan and half billion people on this planet when I was born. Today, there are close to 5 billion. Who in the physics community believes that everybody will be by the time my kids are young adults. We’ve got to equip these people with the knowledge they need to survive. We’ve got to empower them with the learning skills and thinking skills they’ll need to keep civilization civilized — or as close to civilized as it gets.

And it’s not just my kids, Max and Zoe, who need this empowerment. The quality of their lives and their survival depend on everybody’s kids learning, and more important, learning to learn.

Casey Keller is a television writer-producer with a long list of credits in situation comedy. “Beakman’s World” can be seen on CBS affiliates and on cable’s The Learning Channel. With his partner, Richard Albrecht, he recently created another educational show, “A.J.’s Timer Travelers,” which premiered in syndication this fall.

This article originally appeared in the newsletter of the APS Forum on Education, Summer 1995.

Communicating Physics to the Public is a Valuable Skill

by Ruth Howes

Panel after distinguished panel recommends improving the communications skills of physics students. We in the physics community heartily endorse their recommendations. Fortunately, neither the physics community nor the assembled experts describe exactly what “communications skills” we need to improve. Research results are judged by publication and presentation to critical peers. Current teaching techniques include having students write up their research for Physical Review Letters, or using class for 10-minute physics papers, or even requiring proposals for senior projects. But today the physics of physics research depends on consistencies outside physics and science itself.

For years, industrial physicists have pointed out that they interact regularly with engineers, mathematicians, chemists, and even biologists. Today’s corporations are moving away from central labs dedicated to basic research towards research tied closely to specific product development. Certainly small start-up companies tie research activities to production. In these arenas, physicists must work closely with business types trained in marketing and management.

Recent budget debates demonstrate that the general public (including policymakers) does not understand science in general and physics in particular. The images of physics and physicists on popular television programs are problematic to say the least. Consider the recent commercials for tires, soft drinks and tennis shoes that claim to violate the laws of physics, use physics jargon to repel potential customers and which, if analyzed as principles of physics to win games. Dare to ask a casual passerby what physics is or what physicists do. The results can be startling.

We physicists can no longer afford the luxury of talking mainly to ourselves. We must learn to appreciate the skills of the journalist, and yes, the public relations guru. Physics must reach the media and the public they serve with physics and its exciting results.

Our students should practice writing press releases on their research projects, as well as Physical Review Letters. Physics students should explain their work not only to classmatess, but also to groups from other disciplines and members of the public, such as school students and parents. We must recognize that communication includes receiving as well as broadcasting. Attending seminars in other disciplines, students should analyze them as physicists. Real-world problems present themselves in ordinary language. Therefore students must learn to recast their results in physics terms — and, of course, explain their physics results in ordinary language.

Finally, we must recognize that those who communicate physics to the public and to students possess a unique talent and a practiced skill. Not all of us can be the envelope designers, but we can help students who wish to become real-life scientists. Nevertheless, all physicists should have a solid understanding of the major ideas of physics and the fundamentals of physics research. Not all of us can explain frontier research results to the person on the street. But all physicists must learn to do this effectively, and do it as a matter of course, of our students’ rights, because we exceed our own, and value those among us who can communicate.

Ruth Howes is a professor of physics at Ball State University. She is also the Ball State chapter chair of the APS Forum on Education.
become aware of the value and excitement of our discoveries, which enrich society both materially and intellectually," he said.

General Councillors
Daniel Auerbach received B.S., M.S., and Ph.D. degrees in physics from the University of Chicago. He held research positions at the FD M Institute for Atomic and Molecular Physics, Amsterdam, and the University of Chicago and served on the faculty of the Johns Hopkins University before joining IBM in 1978. His research interests center around the dynamics of gas-surface interactions, including the determination of potential energy surfaces, the study of energy transport, and the theoretical description of the detailed mechanisms of chemical processes on surfaces.

Auerbach has a broad range of professional activities. He served as an associate editor of Chemical Physics Letters and is currently on the editorial board of Surface Science Reports and Applied Physics. He served in various capacities in the American Chemical Society, including being Chairman of the Division of Physical Chemistry. He is a member of the American Vacuum Society, the American Chemical Society, and is a fellow of The American Physical Society.

In his candidate's statement, Auerbach identified his chief goal as strengthening and initiating new activities for the APS aimed at defining, expanding and maintaining the APS aimed at defining, expanding and maintaining the APS aimed at defining, expanding and maintaining the APS vision of Physical Chemistry. He is a Fellow of The American Physical Society.

Q: The APS recently formed the FRONTIERS Committee. What should the Society be doing to address this issue?
A: Most of the Society's income derives from its journals, while one of the Society's goals is to be developing electronic versions of its journals, the prevailing concern is how to maintain subscriptions and avoid having someone post Physical Review Letters on the World Wide Web, for example, providing universal access free of charge.

William Schrieffer (continued from page 2)

Schrieffer, personally, I believe that science must be internationalized, not only on large scale projects, but on small-scale research as well. However, it is difficult for the APS to address this issue, because it relates to the future of a specific field, and not the needs of society as a whole. I believe that the APS should focus on its core responsibilities, namely, providing universal access to its publications. While the APS is committed to maintaining subscriptions and avoiding having someone post Physical Review Letters on the World Wide Web, for example, providing universal access free of charge.

Science, at least historically, has not been like the professions. We've traditionally been interested in the good of the field rather than the practitioners of the field, although we try to take care of our own generally, because doing science is how we make a living. John Bardeen was the first to be able to move between applied physics and fundamental physics with ease, and without any judgment as to which was the best. In fact, he felt both fields were important. The APS has been a major force in this transition. The APS has been a major force in this transition. The APS has been a major force in this transition. The APS has been a major force in this transition. The APS has been a major force in this transition. The APS has been a major force in this transition.

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Q: The emergence of electronic publication is raising a number of concerns, what is your view about the future of APS journals?
A: I believe that we need to adapt our publishing practices to the digital age. We must find new ways to serve the members who are over and above publications and meetings. We must think creatively about how the APS will be involved with 10 to 15 years from now, and how it will serve its members. If we don't address this issue, time will overtake us. Still, in general I feel very good about the future.
The American Physical Society

NOMINATION BALLOT

Council and Committee Positions
(To be Completed by Members of the Society Only)

(Please Attach Appropriate Supporting Biographical Documentation)

For Vice-President
Nominee: Affiliation:

______________________________________________ ______________________________________________
______________________________________________ ______________________________________________
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______________________________________________ ______________________________________________

For General Councillor
Nominee: Affiliation:

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For Chairperson-Elect, Nominating Committee
Nominee: Affiliation:

______________________________________________ ______________________________________________
______________________________________________ ______________________________________________
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For Membership on the Nominating Committee
Nominee: Affiliation:

______________________________________________ ____________________________________________________________________________________________ ______________________________________________
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(Continued on Reverse)
### Nomination for APS Fellowship

(continued)

Nominee's most significant contributions and principal publications (list four publications):

__________________________________________________________________________________________________

__________________________________________________________________________________________________

__________________________________________________________________________________________________

Suggested Citation to Appear on Fellowship Certificate if Nomination is Approved (30 words or less):

____________________________________________________________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________

__________________________________________________________________________________________________

Supporting Paragraph Enlarging on the Citation and Indicating the Originality and Significance of the Contributions Cited:

____________________________________________________________________________________________________________________________________________________________________________________________________

__________________________________________________________________________________________________

Sponsor's Data (Each nominee must have two sponsors who are members of the APS) (PLEASE PRINT):

1. Sponsor's Name: __________________________________________ Signature: __________________________________________
   Sponsor's Address: ______________________________________________________________________________________
   Sponsor's Recommendation: ______________________________________________________________________________

2. Sponsor's Name: __________________________________________ Signature: __________________________________________
   Sponsor's Address: ______________________________________________________________________________________
   Sponsor's Recommendation: ______________________________________________________________________________

3. Additional Information Required: (a) Curriculum Vitae or Biographical Information; (b) Supporting Letters

   PLEASE NOTE: To facilitate this nomination, be sure you have answered every question. Enclose original and duplicate of nomination form.

   For information on deadline dates for specific units consult the APS WWW Home Page (http://aps.org) under the Prize, Awards & Fellowship button, or call the APS Honors office at (301) 209-3268.
Now Appearing in RMP...

Reviews of Modern Physics is a quarterly journal featuring review articles and colloquia on a wide range of topics in physics, as well as a listing of review articles appearing in other journals and serial publications. Titles and brief descriptions of the articles in the January 1996 issue are provided below. Reprints of individual articles may be obtained by sending a written request to the American Institute of Physics, Attention: Circulation and Fulfillment Division, 500 Sunnyside Boulevard, Woodbury, NY 11797-2999.

Quantum Nondemolition Measurements: The Route from Toys to Tools. V.B. Braginsky and E.Ya. Khalili describe recent experiments that demonstrate the feasibility of quantum nondemolition (QND) measurements in quantum optics, and discuss some fundamental physics problems to which QND methods could be applied.

Strongly Correlated Fermions: The Local Impurity Self-Consistent Approximation. Antoine Georges, Gabriel Kotliar, Werner Krauth and Marcelo J. Rozenberg describe recent progress in the study of strongly correlated systems through the construction of a consistent dynamical mean-field theory, based on a mapping of lattice models onto quantum impurity models.

Sub-Poission Processes in Quantum Optics. Luiz Davidovich describes the basic concepts and main experimental achievements to date in the emerging field of nonclassical sources of light in quantum optics. He also presents recent derivations of the laser theory which allow him to analyze systematically four strategies for achieving quantum noise reductions in laser and masers.

Phase Diagram and Correlation Exponents for Interacting Fermions in One Dimension. Eugene B. Kolomeisky and Joseph P. Straley discuss aspects of one-dimensional, interacting Fermi gas that are of interest in higher-dimensional materials, especially the cuprate superconductors.

Nonlinear Dynamics of Radiative Condensations in Optically Thin Plasmas. Baruch Meerson describes recent progress in understanding the process of radiation condensation in plasmas, using reduced nonlinear models which illuminate a wide variety of condensation phenomena, including bubble formation, shock-wave propagation, and singularity development.

Decay Widths and Total Cross Sections in Perturbative Quantum Chromodynamics. Levam Skurkizade and Mark A. Samuel review the status of very-high-order perturbative calculations for several important quantum chromodynamic cross-sections and decay widths, as well as discussing ambiguities in the renormalization scheme and scale dependence of expansions in the strong coupling.

RMP Colloquia. This section contains short, broadly accessible articles describing recent research at the frontiers of physics, particularly those concepts that link many different subfields of physics.

CRDF Announces Cooperative Grants Program

On November 6, 1995, the U.S. Civilian Research and Development Foundation (CRDF) announced a call for proposals for its new Cooperative Grants Program. This program will allow teams of former Soviet and U.S. scientists and engineers to apply jointly for support of cooperative projects in any area of civilian research and development. Teams may apply for $10,000 to $80,000 of funds for a two-year period.

The CRDF intends to allocate over $6 million for Collaborative Grants Program awards. Proposals must be submitted to the CRDF’s office in Arlington, Virginia by March 1, 1996. Based on the results of a competitive peer review process, the CRDF Board of Directors will announce the first awards and award levels by July 1, 1996, and will announce all awards by September 1, 1996.

The CRDF is a private, non-profit foundation created in August 1995 as an American response to the ongoing crisis facing science and engineering in the former Soviet Union. The mission of the CRDF is to encourage productive civilian employment alternatives for former Soviet defense scientists while providing opportunities for FSU and U.S. scientists to pursue mutually beneficial entrepreneurial R&D activities expected to strengthen market economies and stable democratic regimes in the region.

The creation of the CRDF was originally authorized in 1992 Congressional legislation sponsored by Congressman George Brown of California, then-Senator Al Gore of Tennessee, and Senator Joseph Lieberman of Connecticut. Its imminent creation was announced by President Clinton at the May 1995 Summit Meeting in Moscow.

The CRDF’s initial funding derives from a $5 million allocation from the Department of Defense’s “Nunn-Lugar” program to promote demilitarization in the FSU and from a matching $5 million gift to the National Science Foundation (NSF) by philanthropist George Soros. The NSF, as directed by the 1992 legislation, used these combined funds to establish the CRDF, and also appointed its Board of Directors.

For more information on the CRDF Cooperative Grants Program, please contact the U.S. Civilian Research and Development Foundation, 1800 North Kent Street, Suite 1106, Arlington, Virginia, 22209; Phone: (703) 526-9720; Fax: (703) 526-9721; email: information@crdf.org; WWW: http://www.interex.com/crdf.
Looking Ahead: It’s Time To Defend All of Scientific Research

by Martha Krebs

As I write this, it is Thanksgiving eve here in Washington, DC. Most federal workers have just returned from a three-week vacation following the battle between the Republican Congress and the White House over a framework for balancing our nation’s budget by the year 2002. Although many of our colleagues in other science agencies were among those on furlough, the Department of Energy (DOE) operated on carry-over funds and the Energy and Water Development Appropriations bill signed by President Clinton on November 31, 1995.

Although the budget battles over the FY 1996 funds were not fought, it is a good time to reflect on them and to look forward to what the coming year may bring. The DOE quest for a framework of 1995 fighting for its existence and caught up in the f resh men Republican members’ zeal for reducing the number of cabinet agencies. In large measure, the energ y of Energy Secretary Hazel O’Leary and her immediate staff were absorbed in that contest, and it looks like we have survived to fight another year.

Below that grand scale, different DOE programs have been under different levels of support and attack. Our energy technology programs for efficiency and renewables have been caught up in the controversy that support for applied research is corporate welfare by another name, and look like they will be reduced by approximately 30 percent. Our atomic weapons programs with their focus on science-based stockpile stewardship and a recommitment to the three weapons laboratories have been well received and are increased above the President’s request. Our massive FY 1996 request went to Congress and our FY 1996 request that would have honored the HEPA recommendations. We will go forward with discussions for U.S. participation in the Large Hadron Collider, in collaboration with the National Science Foundation.

Nuclear physics was reduced $10 million below our request and continues to languish. The BHC project was cut $5 million for budget balancing purposes only. As a result, we expect the total project costs to increase about $20 million and stretch project completion by six months to one year. As NSAC is about to deliver its long-range plan to a $252 million budget projection, Congress is giving Energy Research a discouraging message that will likely bring some tough decisions in the next few years.

More positive was the message to the Basic Energy Sciences programs where increases for operation and instrumentation at the major synchrotron and neutron scattering facilities were strongly supported. New programs will also be started for basic research that supports the Partnership for a New Generation of Vehicles and environmentally sound material and chemical processes.

Our environmental programs faced some early challenges as “claptrap” science by some members of Congress, but our appropriators recognized the quality and independence of DOE’s investigators in our global climate and ozone research programs. By comparison to some of the other agencies who support work in these areas, Energy Research was well treated. The irrationality of these attacks in the face of peer-reviewed programs is frustrating to everyone involved, but especially the staff of the federal science agencies. They have worked hard through different administrations with changing political perspectives to establish programs and bring scientific results forward that illuminate policy decisions, but do not reflect the personal views of individual scientists.

The cheap shot attacks by politicians and scientists who have not been subject to peer review in these fields are deeply distasteful to me.

Another problematic action by Congress is the dramatic reduction of the fusion energy program. Reduced by one-third from $636 million to $234 million, the program must be fundamentally restructured away from a time-driven effort. What the character and scope of the new program should be is a tremendous challenge to the fusion and plasma scientists. Personally I think the Congressional action was unwise, foolish and tragic in the face of what we know will be the energy requirements of the U.S. and the world by the middle of the next century. It is also a tragedy for many individuals who have had a profound commitment to making fusion energy happen. A cut of this size, a shift in direction this sudden, will leave humankind and scientific wreckage; there is no avoiding it. In spite of this, Congress has made a clear statement and its FY 1996 funding level is based on the expectation that the restructured fusion science program will cost significantly less in the future. This is not the time for delay, recrimination. It is a time for imagination.

So what do we make of all this? What can we expect next year? What should we do? As a member of President Clinton’s administration, I believe that we have made a strong commitment to federal investments in science and technology that will drive the economy and protect the environment. These investments must also sustain our leadership in world-class science, math and engineering based on peer review. Haste in this, we face a period where the federal science investment is not likely to grow with inflation. This is in spite of good words from the Republican Congressional leadership. The budget agreement between Congress and the President will put more pressure on the discretionary parts of the Federal budget.

There is no way that the science budget will not be more deeply scrutinized than they already have been by both Congress and the Administration. The NSF and the National Institute of Health will undoubtedly receive favored treatment, but growth will be harder and harder to come by. The basic research programs in DOE, NASA, and the Department of Energy will continue to be squeezed, and defending the important benefits received from these investments must receive top priority. Attention of professional societies, not just divisions representing subfields. Funding that leaves programs like fusion will not go to other areas of science. Funding that leaves national laboratories will not go to other areas of science. Funding cut from applied research will not be added to basic science.

This is a time for defending all of science, not particular fields and institutions. This is a time for articulating the benefits our nation has received from its investments in science and scientists. It is a time for speaking to all of our public representatives, federal and local, and especially when they are not based in Washington, DC. This is a long-term job that will not take place in D.C., but will be finished once we know the final determination for the budget for FY 1997.

Martha Krebs is the Assistant Secretary of Energy Research, Office of Energy Research, at the U.S. Department of Energy.