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Ehlers, Lane Receive 2001 Public Service Awards

On May 16th, Representative Vernon J. Ehlers (R-MI) and Neal Lane, former presidential science advisor under the Clinton Administration, were awarded the second annual Public Service Awards, following a reception in their honor in the historic Rayburn Building in Washington, DC. The awards are jointly sponsored by the APS, the American Astronomical Society (AAS), and the American Mathematical Society (AMS), which collectively represent more than 100,000 scientists and mathematicians.

The Public Service Award is intended to honor public figures who have made sustained and exceptional contributions to public policies that foster support for research, education, and industrial innovation in the physical sciences and mathematics. Both awardees have been instrumental in highlighting the importance of federal investment in science and technology research and development, and the need for a more balanced federal portfolio, as well as improvements in science education and public outreach.

AMS President Hyman Bass, University of Michigan, praised Ehlers for understanding the importance of investment in science: "He's one of us." Ehlers became the first PhD physicist elected to Congress in 1993 and is now in his fourth full term of office. He came to Capitol Hill following a distinguished tenure of service in teaching, scientific research and communication service. Ehlers received his PhD in nuclear physics from the University of California, Berkeley, in 1960, where he taught and did research for six years until joining the physics department of Calvin College, later chairing the physics department.

He currently sits on the House Science Committee, where he chairs the Subcommittee on Environment, Technology and Standards, and is also a member of the House Education and Workforce Committee. Ehlers was instrumental in rewriting the nation's

Photo by Rick Kozak

Recipients Neal Lane (left) and Vernon J. Ehlers (center) are congratulated by APS President-elect William F. Brinkman.

science policy, culminating in the report, "Unlocking the Future" in 1998, and is currently directing his efforts to ensure that science is an integral part of the education bill currently under consideration by Congress. And as a member of the House Administration Committee, he guided the program to revamp the House computer system, connect it to the Internet, and allow all US citizens access to House documents.

Ehlers expressed his appreciation for this public recognition of his efforts on behalf of science "There is precious little reward in Congress for pursuing science policy and the advancement of science," he said. "We don't get positive feedback from fellow Congressmen or constituents, or from the scientific community, since scientists tend to be apolitical." However, he noted that scientists are becoming more active on Capitol Hill which is "making my job much easier."

Lane received his PhD in physics

See AWARDS *on page 7*

INSIDE THE BELTWAY:
A Washington Analysis

The Science of Political Seismology

By Michael S. Lubell, APS Director of Public Affairs

In the post-Clinton era it takes more than a thong and a cigar to rattle the cages of Washington officialdom. But that's what happened when a normally taciturn New Englander, Senator James Jeffords of Vermont, announced that he was leaving the Republican fold.

For the first time in American history, a political party gained control of a house of Congress through an action not related to an electoral outcome. It took the Republican party more than half a century to take over simultaneously the White House, the Senate and the House of Representatives, and it lasted less than five months.

Whether the shift in control of the Senate will have any impact on science policy is problematic. We'll take a close look in a moment, but a *derigueur* report of political recriminations comes first.

As soon as Jeffords made his intentions known, both ends of Pennsylvania Avenue revved up their PR operations. Amidst charges of insensitivity, miscalculation and incompetence, a stunned President Bush vociferously denied that his Administration's conservative agenda had driven Jeffords away. And a suddenly diminished Senate Majority Leader Trent Lott (R-MS) lashed out at Democrats as he summarily rejected the premise that the GOP leadership had frozen out Jeffords' moderate views.

There was an element of truth to both disavowals. The fact is that Jeffords for years had cast his votes, as well as his lot, with Democrats on many key issues. He was the sole Republican voting nay on the Reagan tax cut two decades ago, and his positions

See BELTWAY *on page 7*

APS Selects Wiseman as 2001–2002 Congressional Fellow

The APS has selected Jennifer Wiseman, currently a Hubble Fellow at Johns Hopkins University in Baltimore, MD, to be its 2001-2002 Congressional Science Fellow. The APS Congressional Fellowship program is intended to provide a public service by making individuals with scientific knowledge and skills available to members of Congress, few of whom have a technical background.

Jordan Raddick/APS

Jennifer Wiseman

"This is important because public policy increasingly is determined by technical considerations, and science is a major component of many issues with which Congress must grapple," says Michael Lubell, APS Director of Public Affairs, citing global warming, energy policy, defense technologies, AIDS, pollution, and communications technologies as examples. In turn, the program enables scientists to broaden their experience through direct involvement with the legislative and political processes, which ideally will enhance not only their own careers, but the physics community's ability to communicate more effectively with its representatives in Congress.

Wiseman's interest in science dates back to her early childhood, and she chose physics as a career because "I feel that if you understand physics, you have a basis for understanding any other kind of science." Her childhood fascination with the night sky led her to choose astrophysics as a specialization in graduate school. "I grew

See CONGRESSIONAL FELLOW *on page 3*

APS Holds First Electronic Election

This year, the APS will conduct its first-ever, membership-wide electronic election. Electronic voting was made possible this year by a change in the Washington, DC statutes where the APS is incorporated.

"Members with valid e-mail addresses will receive election notices and a unique personal identification number via e-mail from the APS election service provider for login purposes," said Ken Cole, APS Administrator for Governing Committees. "Members without e-mail addresses, or invalid e-mail addresses will be sent a traditional paper ballot in the mail. Paper ballots will also be sent upon request."

Voting will take place on a website hosted by Survey and Ballot Systems, an independent, external organization who is conducting the APS election. "Everyone is encouraged to vote online, but safeguards are in place to insure each member votes only once," says Cole.

In the event a member attempts to vote electronically as well as by paper ballot, the electronic vote will take precedence. Cole hopes that the convenience of online voting increases participation, since it can be done at any time and there is no expense to return a paper ballot in the mail.

An election preview appears in this issue on page 6. Candidate information is also available on the APS website at: http://www.aps.org/exec/Election. The election website will be open and paper ballots accepted from June 1 until September 1. Questions can be directed to: Ken Cole, Administrator for Governing Committees, One Physics Ellipse, College Park, Maryland, 20740, Phone: (301) 209-3288, e-mail: cole@aps.org.

New APS Forum Will Address Grad Student Concerns

Citing the need to reach out more to its graduate student members, the APS Council approved the formation of a new Forum on Graduate Student Affairs (FGSA) at its April meeting in Washington, DC. The new forum is intended to enhance the Society's ability to meet the needs of physics graduate students, and to provide an opportunity for their increased involvement and discussion with the greater physics community.

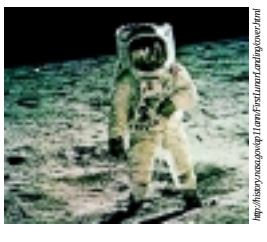
Providing initial leadership for the FGSA will be interim chair Susan Niebur of Washington University in St. Louis.

"We are the next generation of physicists, and hence we need to communicate and work together with older physicists," says Jennifer Rittenhouse West, a graduate student at the University of California, Santa Barbara and another organizer of the Forum. "Needs change over the years, and we need a society that is responsive to those changes. We also need a strong membership, which can best be accomplished by recruiting the youngest members of our profession and getting them involved early on in the Society's affairs."

The roots of the fledgling FGSA

See FORUM *on page 4*

HIGHLIGHTS



http://history.nasa.gov/ap11ann/FirstLunarLanding/cover.html

"Members in the Media"

"Think of going to work every day and being confronted with problems that have no solutions. Our life is essentially dealing with things we don't understand. That's really exciting. It's just such wonderful, magic super stuff to do."

— Christopher C. White, NIST, on what it's like to work at NIST, Washington Post, April 1, 2001

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"Just because Einstein's work has passed every test to date does not mean it's the final word."

–Clifford Will, Washington University, on a proposed new test of general relativity, Indianapolis Star, April 4, 2001

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"You're looking at the business end of the accelerator."

–Trevor Weekes, Harvard-Smithsonian Center, on the observation of "extreme" galaxies, NY Times, April 10, 2001

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"Those numbers are alarming, and apparently true."

–Michael Dine, UC Santa Cruz, on the mystery of dark energy in the universe, NY Times, April 10, 2001

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"Under large strains, they have the extraordinary property of being able to bend without breaking and then be bent back into their original shape."

–Michael R. Falvo, U. of North Carolina, on carbon nanotubes, Business Week Online, April 13, 2001

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"Some Senators are championing efforts to support the National Science Foundation and the Energy Department. But their time will be wasted if President Bush doesn't help. He should tell Congress that he is willing to accept increases to the key agencies that underpin the nation's economic growth and standard of living."

—Richard Smalley, Rice University, Dallas Morning News, April 24, 2001

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"We expected the particles to be released for a much longer time at these high energies. Instead, the time is so short that we can't measure it."

–John G. Cramer, U. of Washington, on results from experiments at RHIC, UPI, May 1, 2001

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"I don't think we've absolutely proven black holes spin, but the evidence is now very good."

–Todd Strohmayer, ABCnews.com, May 1, 2001

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"The 'crack' is the high-velocity interaction of the ball and the bat and the air between them as it's pushed out fast and hard in a high-frequency pulse."

–Robert K. Adair, Yale University, on the science behind the crack of the bat, ABCnews.com, May 4, 2001

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"Cheating is on a gray scale. Things come rolling into your computer, and you feel ownership of them even if you don't own them. You slide down the slope into full-fledged intellectual theft."

—Louis A. Bloomfield, U. of Virginia, on apparent massive cheating detected by comparing answers with a computer program, Washington Post, May 9, 2001

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"This can show power engineers how a superconducting transmission line could operate. It shows a practical application."

—John Clem, Iowa State, on the first commercial test of cable made from high-T_c superconductors, Washington Post, May 20, 2001

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"Nowhere is the inherent unity of science better illustrated than in the interplay between cosmology, the study of the largest things in the universe, and particle physics, the study of the smallest things."

—Rocky Kolb, Fermilab, Dallas Morning News, May 21, 2001

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"University research programs provide students with mandatory hands-on technical skills. Therefore, a cut in federal research support means fewer local students will be able to fill our high-tech jobs. "

—P Craig Taylor, University of Utah, op-ed piece in the Salt Lake City Tribune, May 27, 2001

This Month in Physics History

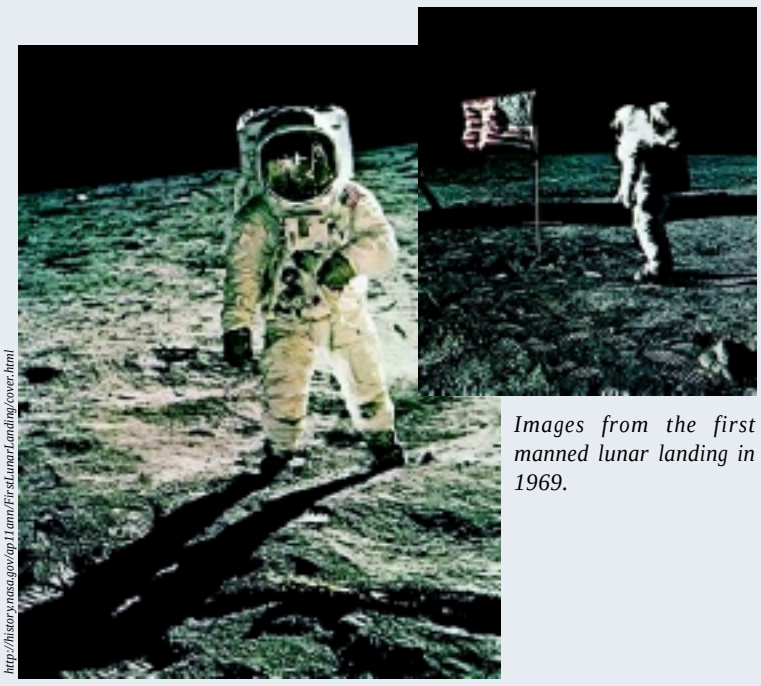
July 20, 1969: First Manned Lunar Landing

America has long had a love affair with space, dating back to the Sputnik Era in the 1950s. In May 1961, President John F. Kennedy issued a challenge and made a public commitment to land a man on the Moon by the end of the decade, a notion that captured the nation's collective imagination and fueled support for Apollo, an ambitious lunar landing program that culminated in 1969 with the fulfillment of Kennedy's vision: the first manned lunar landing.

The beginnings of the Apollo program were marked by tragedy on January 27, 1967, when three astronauts were killed in the Apollo 1 fire. However, the program quickly rebounded from the loss, and a year and a half later the first manned mission, Apollo 7, was launched: an Earth-orbiting mission that did not travel to the moon. The Apollo 8 and Apollo 10 manned missions did travel to the moon, but did not land on the lunar surface.

Amid much excitement and unprecedented worldwide media coverage — with one million people and half of the members of Congress tuned in to the event at the Kennedy Space Center in Florida — Apollo 11 was launched on July 16, 1969, with three astronauts on board what was then the most powerful rocket ever built. Commander Neil A. Armstrong, Command Module Pilot Michael Collins, and Lunar Module Pilot Edwin "Buzz" Armstrong spent the next three days en route to the moon on a lunar trajectory, traveling 24,200 miles per hour. Every morning Mission Control would wake the crew and give them a news report. Color TV telecasts were made daily to a worldwide audience as the astronauts conducted their routine chores around the spacecraft.

The spacecraft reached the moon on July 19th, and the following day Aldrin and Armstrong entered the lunar module — dubbed Eagle — and separated from the command module, leaving Collins to orbit the moon until their return. The site of the first lunar land was called *Mare Tranquilitatis*, chosen for its smooth and level area, despite its high density of craters. In fact, the module had to be manually piloted by Armstrong at one point to avoid a sharp-rimmed ray crater measuring 180 meters across and 30 meters deep. He landed the module about 6 kilometers from the planned landing site, and reported, "Houston, the Eagle has landed."



http://history.nasa.gov/ap11ann/FirstLunarLanding/cover.html

Images from the first manned lunar landing in 1969.

Finally, at 10:39 PM EST, Armstrong opened the outside hatch of the lunar module and squeezed through the opening, proceeding slowly down the 10-foot, 9-step ladder. His progress was hampered by the extensive life support and communications equipment he carried on his back. But at 10:56 PM, in an historic moment televised live around the world, Armstrong took his left foot off the module footpad and placed it on the moon's surface, and the entire world heard his famous words: "That's one small step for man; one giant leap for mankind." It was the first time in history that man had set foot upon anything not originating from the Earth.

After surveying his surroundings and testing his movements in the lunar gravity, Armstrong took samples of lunar soil and rocks. Aldrin soon joined him on the lunar surface, and the two astronauts planted the US flag in the surface. They also conducted planned scientific experiments, including setting up a telescoped pole with foil hanging from it to collect particles from the solar wind in the foil and return them to Earth. A seismic detector was also set up to measure "moonquakes" and meteorite impacts, along with a laser reflector, intended to bounce laser beams off the moon and enable scientists to more accurately measure the distance between the Earth and the moon.

After about 24 hours on the moon's surface, Armstrong and Aldrin returned to the lunar module, blasted off the lunar surface, and redocked with Columbia, still being manned by Collins. The return trip to Earth lasted about 60 hours, and at 12:40 PM on July 24, Apollo 11 splashed down in the Pacific Ocean, just south of Hawaii.

Apollo 11 was followed by five more lunar landings until the entire Apollo program was canceled in 1972, but none proved as successful, or as popular with the public, as that historic mission. Apollo 11 not only marked the first men on the moon, but also the first return of samples from another planetary body (basalts estimated to be 3.7 billion years old). They left behind the American flag, a TV camera, two still cameras, experimental devices, and the descent stage of the lunar landing module with a plaque affixed its leg, bearing a map of the Earth and this inscription:

Here men from the planet Earth
First set foot upon the moon
July 1969 A.D.
We came in peace for all mankind

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Snowmass Meeting Charts Course for High-Energy Physics

By Richard M. Todaro and Jordan Raddick

The Snowmass Village ski resort in the Colorado Rockies just outside Aspen is the setting for a major get-together of the particle physics community that runs for three weeks from June 30 – July 21 this summer.

The Snowmass 2001 conference, formally dubbed the Summer Study on the Future of Particle Physics, is designed to be a comprehensive assessment of the current state of particle physics, as well as a detailed discussion of where the field should go over the next 20 years. It is being organized by the APS Division of Particles and Fields (DPF) and the Division of Physics of Beams (DPB).

"The goal is to assess where particle physics is now and where it wants to go," said Chris Quigg, one of two co-chairs of the organizing committee and a physicist at Fermi National Accelerator Laboratory.

Watching the proceedings closely will be the US Government — whose money supports most high-energy physics research — through the High Energy Physics Advisory Panel.

Known by its acronym HEPAP, the 15-to-20 person committee has served as the main advisory panel to the government for over 30 years on all matters relating to high-energy physics. HEPAP, in turn, will keep tabs on the conference through a 24-member Sub-panel on Long Range Planning for US High Energy Physics.

"Our charge is to make a plan for the US high-energy physics program over the next 20 years," said Jonathan Bagger of Johns Hopkins University. Bagger is co-chairing the sub-panel with Barry Barish of Caltech.

At Snowmass, the long-range sub-panel members will join scientists from universities and the ten largest high-energy physics laboratories as part of the comprehensive assessment of where the field of particle physics is and where it ought to go.

Quigg, who is also the DPF chair, said an important aim of the conference is to bring the theoretical side of the field together with the experimental side so that, for example, string theorists can bring their "vision" to the experimentalists.

"There is a real effort to draw those people into Snowmass for the benefits to both sides," Quigg said. "They (string theorists) have the longest vision of what particle physics might become, what the ultimate narrative might be."

"It is important for all of us and especially the people planning experiments to have these visions in mind. And in the other direction, it won't be harmful for young string theorists to rub shoulders with experimenters and other theorists who work more closely with experiment," Quigg said.

The original estimate of 500 attendees had grown to over 600 just before Memorial Day, and Quigg estimated Snowmass Village could probably accommodate up to 800 people.

Ronald Davidson, the other organizing committee co-chair and chair of the DPB, said the conference will recognize various communities, within particle physics and beam physics.

"It's a rather large amalgamation of folks from the two divisions of APS," said Davidson, who was director of Princeton University's Plasma Physics Laboratory from 1991-1996.

Bagger said his group's aims dovetail with those of the conference. "Our report is supposed to be science-driven, so we have a wonderfully broad charge," he said. "And we start by asking 'What is particle physics? What will it be in 20 years? What tools do we need to access the science? What R&D do we need to prepare the tools?' These are the same questions that Snowmass is looking at."

He said he hopes the particle physics community and his sub-panel "converge on a similar set of recommendations," adding that his group is "working in the context of the larger community."

The sub-panel's recommendations to HEPAP are due in October, with a final report due in January 2002. HEPAP, in turn, will make recommendations to the Department of Energy and the National Science Foundation.

Peter Rosen, head of the Department of Energy's Office of High Energy and Nuclear Physics, said the sub-panel's report will provide a "road-map" of the decisions regarding the direction the particle physics field decides at the conference.

"The sub-panel will be at the conference," said Rosen. "The recommendations are due by the end of October. They will send their report to HEPAP, which will consider the report and will either endorse it, or if they have some questions, send it back to the sub-panel with some further questions."

Rosen said HEPAP's final recommendations will then be used by his agency to determine what sort of research to fund and what kind of machines, if any, should be built once the Large Hadron Collider (LHC), at the CERN laboratory in Switzerland, becomes operational.

"Right now the energy frontier in high energy physics is the Tevatron, located at Fermilab in Illinois. That is the highest energy machine in the world. But when the LHC comes on, that will be seven times the energy…and the question in front of the high energy physics community over here is where do they see the field going after LHC?"

The Office of High Energy and Nuclear Physics, which is within the Department of Energy's Office of Science, this year alone will provide about $700 million to fund high-energy physics research as well as $350 million for nuclear physics research.

"Our office supports about 90 percent of the government-funded high-energy physics research in the US," Rosen said.

The National Science Foundation provides between $50 million to $80 million annually in funding to high-energy physics research.

As for the conference, Quigg said it is designed to be a "three week scientific workshop" that will include 27 working groups. Among these are five physics groups, seven experiment groups, nine technology groups, and six machine/accelerator groups.

The groups will "meet in two pairs, two sessions at a time," Quigg said, with physics and technology groups meeting for half days and machines and experiment groups meeting for the other part of the half days.

Also included is a "Science Weekend" on July 7-8 that is billed as an "extravaganza of activities for people of all ages who are curious about the world they live in," according to the Snowmass conference web site (http://snowmass2001.org).

Quigg said the weekend event is designed to be "a huge exercise in public outreach of various sorts" by the particle physics community that will feature "a cast of many hundreds, perhaps thousands."

Congressional Fellow, *from page 1*

up in an area where you could see the beauty of the night sky very clearly and I was drawn to the idea of being able to apply what I was learning in physics to the study of the heavens," she says.

Wiseman received her BS in physics from the Massachusetts Institute of Technology in 1987 and had the distinction of co-discovering a comet while still an undergraduate. She participated in a short-term field research trip to Lowell Observatory in Arizona, where, under the mentorship of Drs. Edward Bowell at Lowell and Jim Elliot of MIT, she discovered an unexpected object — later deemed Comet Wiseman-Skiff — on a photographic plate taken by astronomer Brian Skiff. Wiseman concedes this was a rare occurrence for the average undergraduate: "I'm thankful to my mentor at Lowell Observatory for enabling me to make that discovery." After that initial early success, Wiseman went on to graduate school, earning her PhD in astronomy from Harvard University in 1995, with a thesis entitled "Large Scale Structure, Kinematics and Heating of the Orion Ridge," under the direction of Dr. Paul T. P. Ho. She then served three years as a Jansky Fellow at the National Radio Astronomy Observatory before taking on her fellowship at Johns Hopkins University. At Johns Hopkins, Wiseman studies regions of star formation, specifically the conditions in interstellar gas clouds that lead to the birth of new stars.

Despite satisfaction with her research career, Wiseman decided to apply for the APS Congressional Fellowship to foster a parallel interest in integrating science into the broader context of public service. She has long been active in public outreach, giving astronomy lectures to elementary, middle and high school students and to general adult audiences since 1993. "I'm interested in many different kinds of broader issues, and this fellowship gives me a chance to use my scientific training in many areas," she says. Issues of particular concern include science education, adequate funding for responsible science, alleviating world poverty and injustice, and environmental protection.

Congressional Fellows with broad interests usually work on the staff of a Congress Member, with the particular member to be chosen in the Fall. Fellows also have the option of working on specific topical committees, such as the 2000-2001 APS Congressional Science Fellow, Sherri Stephan, who serves as a legislative fellow on the Subcommittee on International Security, Proliferation, and Federal Services.

Regardless of where she ends up serving on Capitol Hill, Wiseman is looking forward to learning about Washington and perhaps imparting some of her knowledge in turn. "I think it is important for the public and for legislators to understand the significance and excitement of the scientific discoveries they fund and to feel a part of the team," she says. "On the other hand, scientists need to understand and articulate their role as being one of public service, whether through practical solutions to problems, such as new drugs, or simply enlightening people to the wonders of the universe. I think if we can get that sort of better communication in both directions, including open dialogue that heeds public concerns of how and why scientific research is done, we can bridge the gap in perceptions that sometimes exists between scientists and the general public."

How's the Air Up There?

With nothing less than "the future of particle physics" on the agenda at this summer's big particle physics pow-wow at the Snowmass Village ski resort in the Colorado Rocky Mountains, an important question arises: Is it a good idea to hold such a rarified conference fully a mile and half above sea level, where the air itself is so rarified? Though the surrounding snow-capped mountains dwarf the town, it is still 8,104 feet above sea level, and the average air pressure is about 25% lower than at sea level. Might the lack of oxygen impact the discussions between conference attendees?

No, says a medical doctor who has studied the impact of low oxygen on the human body. Now a faculty member at the University of Washington's Department of Medicine, in 1981 Robert Schoene set up a laboratory at 21,000 feet on Mount Everest. That study and others led to nearly 40 scientific papers on the effects of high altitudes on physiology, respiration, nutrition, sleep and blood adaptation. "Humans are tropical beasts and there are limitations both to performance and just tolerating that environment," says Schoene. In fact, humans don't live much above 15,000 feet.

But what about moderate altitudes such as Snowmass Village? Schoene — an avid mountain climber who has scaled Denali in Alaska, peaks in the Andes, and Mount Rainier as well as Everest — also spent a year on sabbatical at a medical clinic near the Keystone ski resort in Breckenridge, Colorado. He found that about 25% of the "lowlanders" suffered from acute mountain sickness within the first 12-36 hours. Caused by leakage of bloodstream fluids into the brain, which can occur at high elevations, symptoms of acute mountain sickness include headache, loss of appetite, sleeplessness, and lethargy. "These symptoms are often mistaken for a hangover by people at resorts," he says.

Yet Schoene insists that cognitive skills are unlikely to be adversely affected at the elevation of Snowmass. "People might feel a bit fatigued and headachy on the first day, but I think within a day or two everyone should be doing just fine after acclimatizing," he says.

—Richard M. Todaro

LETTERS

Meeting Proposal Raises Real Concerns

In the May 2001 issue of *APS News*, James Langer advocates reforming APS meetings. While I share his concern regarding declining APS membership and the importance of maintaining unity within the discipline of physics, I did think that his comments regarding a possible combination of the present April General Meeting with the Fall the Division of Plasma Physics meeting a bit misleading. The issue is hardly "small, independent unit meetings" — the DPP annual meeting is already substantially larger than the April general meeting. Like Langer's description of the March general meeting, the DPP meeting features many parallel sessions spread out over five days. This is hardly the sort of "small focused event" which could be held at the Institute for Theoretical Physics in Santa Barbara or at the Aspen Center.

The 1998 proposal to combine the DPP meeting with the present April General Meeting provoked much spirited debate within our community. Concerns raised by members of the DPP at that time included a reduction in the number of cities with appropriate facilities; the possibility of increased room rates at larger hotels near convention centers (cost becomes a paramount concern when your budget is under stress); the inevitable scheduling problems in large meetings with parallel sessions (which often result in those presentations which you particularly wish to attend being scheduled simultaneously with each other or with your own presentation); and the general fatigue which results from trying to absorb too much information in too little time.

A combination the DPP meeting with the April general meeting remains a live issue. However, if my colleagues and I are to be persuaded to take this step it is important to address the very real concerns raised by our members.

W.M. Nevins
Lawrence Livermore National Laboratory

Editor's Note: The author wishes to clarify that the above letter represents his personal opinions, not those of the DPP Executive Committee, on which he serves.

Letter Supports Langer

I wholeheartedly support President Langer's argument on the back page of *APS News*. I have attended the APS March Meeting essentially every year since my second year in graduate school in 1991. People often complain that it is too big, and it is certainly useful to also attend smaller more focused meetings. However, the March Meeting is very important both scientifically and, more abstractly, for building a sense of community. Especially as a young student I loved the excitement and the sense that so many fields were open for me to enter.

Rachel Wortis
Sherbrooke, Québec

Physics Needs a Technological Revolution

I checked out the website featuring slides and audio from the MgB_2 Session (May 2001, *APS News*) and was impressed. However, something jumped out at me, which leads to a lot of questions about the physics culture. Why did these speakers, whose presentations were important enough to have over a thousand people in attendance, use transparencies and not a laptop and projector like every non-physics conference I've been to?

From my experience both in and out of the physics community, the problem seems not to be a willful rejection of technology, but rather ignorance of tools that both the business world and other academic disciplines (e.g. engineering) take for granted. Physics students are shortchanged by the isolation of their departments from the real world. Maybe it is time to encourage physics students to work summer internships in industry so they can bring back this knowledge to the physics community?

John Neumann
Carnegie Mellon University

Galileo and Neptune

I was greatly interested by the article in the May issue of *APS News* on Galileo and the telescope. But I was disappointed that you did not mention that one of the "background stars" he described in his very carefully recorded notes has recently been identified as the planet Neptune, which was very close to Jupiter at the time he was observing that planet's inner moons. [See C.T. Kowal and S. Drake, "Galileo's Observations of Neptune," Nature, **287**, 311-313 (1980)]

Specifically, Galileo recorded on January 28, 1613 that the distance between two "background stars" seemed to have changed from the previous night. A tribute to his powers of observation and careful recording of results indeed!

Oliver Wells
Yorktown Heights, New York

Science Leads to Changing Knowledge

It is strange to me to think that there are many people defending the ideas of evolution as if it were the ultimate theory which explains the origin of the universe and biological life on earth. Even if the unfounded links between species (which are very different from the found changes in same species) are to be found, evolution couldn't yet be thought of as a universal and unquestionable truth.

For example, Newton's concept of absolute time was the truth in his day. Today it is well known and proven that time is relative. New theories are constantly being developed, and new experimental facts discovered. On the other hand, some interpretations of creation as found in the Bible can and do need to change. These historical facts tell us that there is a point on which creationists and evolutionsts cannot disagree: science reveals how transitory is human knowledge. It is my opinion that, as time goes by, science will help Christians understand Genesis better.

Heron C.G. Caldas
Minas Gerais, Brazil

Panelists Debate Pros and Cons of Proposed NMD System

A distinguished panel of experts in national defense policy and technology squared off to discuss their views on the proposed national missile defense (NMD) system during a special session at the APS April Meeting in Washington, DC. While the panelists offered differing opinions as to the feasibility and wisdom of deploying such a system, all agreed that they have the same goal: developing the best national defense for the country.

National defense policy has been dominated for the last 30 years by the ABM Treaty signed in 1972. However, Henry Cooper, former chief negotiator at the Defense and Space talks in Geneva and the third director of the Strategic Defense Initiative Organization under President Bush the elder, believes that the ABM treaty is no longer adequate to address emerging threats in the post-Cold War era, and that its constraints on developing new technology has led to the "dumbing down" of national defense programs. "We have invested most of our resources over the last eight years in the most complex, expensive, and least effective options," he said, expressing his hope that the Bush Administration will seek to reverse that trend by abandoning the treaty in favor of a new strategic approach to national security and defense.

The current rationale for developing a national missile defense system, according to Richard Garwin of the Council on Foreign Relations, is the emergence of such rogue states as North Korea, Iran and Iraq, all of which pose potential ICBM threats, armed with biological warfare agents such as anthrax, or nuclear warheads. "The NMD systems as proposed would be ineffective against the threat of feasible countermeasures," argued Garwin, who believes that boost-phase interceptors are the nation's best short-term solutions against these rogue-state ICBM threats to national security, because they strike before the ICBM reaches a speed that would carry it to its target, and because the rocket is more visible and more fragile than the warhead.

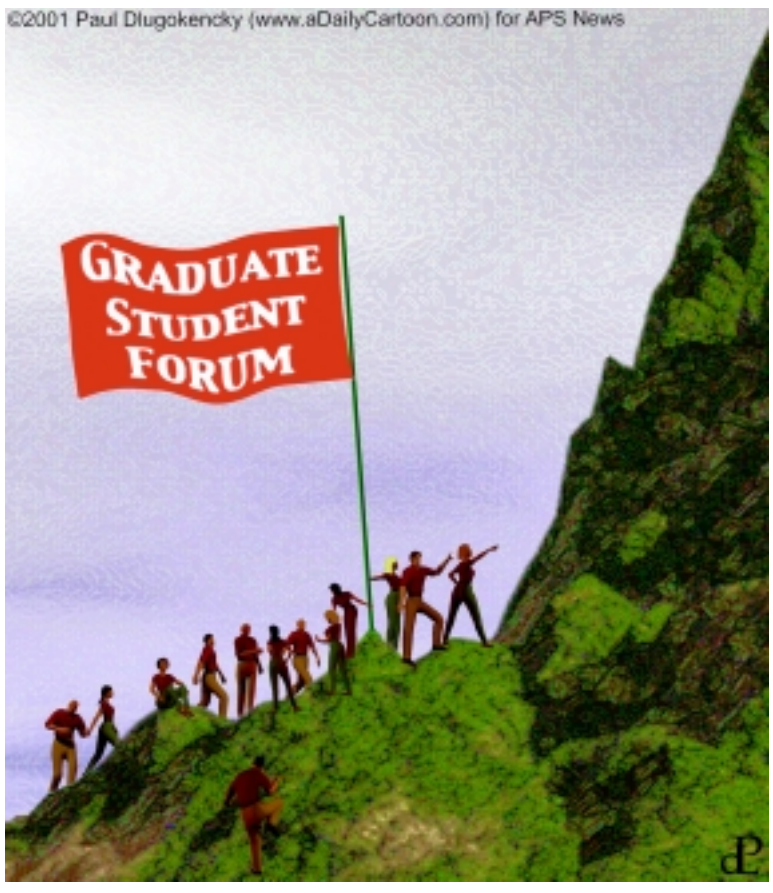
Foremost among Garwin's recommendations is a negotiation with Russia, Ukraine, Belarus, and Kazakhstan to permit deployment of boost-phase interceptors near North Korea and Iraq, which is not allowed under the 1972 ABM Treaty. He would also request an interpretation that would permit deployment of about 20 mid-course interceptors at Grand Forks, ND, which is an ABM site, but which is not permitted to defend "the national territory". While these deployments would not address biological weapons or short-range missiles, the ABM Treaty does not impede development of technologies to counter these threats. Garwin and Cooper both called for continued development of the Brilliant Pebbles interceptors initiated under the first Bush Administration, believing that the technology would prove generally useful. Cooper favors deployment of these interceptors in orbit, while Garwin does not—arguing that they would be destroyed soon after they were orbited. Garwin also recommended development of pre-boost-phase intercept, and suggested the US cooperate with Russia to safeguard against accidental launches.

The possibility of complex countermeasures to an NMD system is a major source of concern for many opponents to the program, according to Lisbeth Gronlund, Senior Staff Scientist at the Union of Concerned Scientists and a Research Fellow in MIT's Security Studies Program, and co-recipient of this year's APS Burton Forum Award. The proposed NMD system under the Clinton Administration called for ground-based "hit-to-kill" interceptors to intercept launched missiles outside the atmosphere with satellite-based infrared sensors to aid in tracking and guidance. Unfortunately, such a system is vulnerable to such countermeasures as anti-stimulation decoy balloons and "cooled shrouds" for nuclear warheads, which could outwit the infrared sensors used in an NMD system to detect missiles. The system also does not address the possibility that a rogue state could divide a biological warfare agent into 100 or more small "bomblets" for more effective distribution, making it much more difficult to intercept all of them.

Gronlund believes the technology proposed under Clinton will still be the core of the Bush Administration's approach, since it is the furthest along in development, but will most likely be augmented by such technologies as boost-phase interceptors and space-based defense systems. While its proponents argue that the feared countermeasures are beyond the technical capabilities of emerging missile states, and that the NMD system will evolve further to take these into account, "No one has argued that the NMD system as currently planned would defeat these sorts of countermeasures," she said.

See PANELISTS *on page 5*

Forum, *from page 1*



date back to the formation of a task force on graduate student affairs appointed by APS Executive Officer Judy Franz, whose members were culled from a list of volunteers. All of the discussion occurred via e-mail, and ultimately it was decided that a new forum was needed. Task force members identified three primary objectives: (1) enhance the Society's ability to meet the needs of physics graduate students; (2) offer them support services; and (3) provide them with an opportunity for increased inclusion and participation in the activities and decision-making of the physics community.

According to West, when the existing APS forums were notified of the petition to establish the FGSA, the response was mostly favorable. However, concern was expressed about possible overlap in objectives, particularly with the Forum on Education (FED) and with the APS Committee on Careers and Professional Development (CCPD). There was also some concern that the new forum might discourage active participation of students in other units.

West points out that past FED meetings and news letters have not focused much on graduate education, and the CCPD doesn't deal with education issues. Furthermore, "The forum is a wonderful avenue for improving communication between senior and junior members of the APS, and makes the dispersion of information so much easier," she says.

She adds that the forum desires to work closely with all the existing APS units, not take over any one's area of interest. As for drawing students away from other forums, most graduate students aren't even aware that such units exist. West herself just joined the FPS, which she heard about through her work on the task force, "so I don't think [other units] need to worry about their membership going down."

New California Section Holds Inaugural Meeting

The fledgling APS California Section held its first regional meeting March 30-31 at the University of California, Irvine. Turnout was strong, according to Alexei Maradudin, a professor of physics at UC-Irvine who served as one of the conference organizers. "We were pleased with the number of people who participated in this event, and in the quality of the talks," he said. There were 80 registered participants and 42 contributed talks, as well as five invited plenary talks and a special after-dinner lecture by Virginia Trimble, a professor at UC-Irvine's Department of Physics and Astronomy.

Trimble's talk focused on the challenges facing astrophysics in the new millennium. In the same way that modern astronomy began with the overthrow of the medieval synthesis of Aristotelian philosophy and church doctrine by new technologies and new ways of thinking, she believes that "many current questions in astrophysics can be directly tied to developments of these same concepts." Some of the questions astronomers are asking include whether stars have sport; why quasar jets appear to be moving faster than the speed of light, and the implications for science; and how our star, our galaxy and our planet formed, and what its long-term fate might be.

Virginia Trimble was the keynote speaker at the first meeting of the APS California Section.

Among the plenary speakers was Thomas Katsouleas of the University of Southern California, who reviewed the status of advanced accelerator research worldwide and the potential of using laser-drivers and plasma wakefields. He also described a recent SLAC experiment that set a record for energy gain in a plasma wakefield device and explored numerous rich new beam physics phenomena.

Stuart Parkin (IBM Almaden Research Center) discussed recent developments in magnetic tunneling that suggest that the unique properties of magnetic tunnel junctions (MTJs) could make them the best candidates for magnetic memory storage cells. This would enable an advanced non-volatile magnetic random access memory with even greater speed and density capabilities. Other plenary topics presented at the meeting included microscopic modeling of liquids in a biological environment; quantum information processing by electron spin resonance; and spatio-temporal chaos.

Following "Boot Camp", Final Five Selected from 2001 US Physics Team

By Richard M. Todaro

The five high school students who will represent the United States at the 32nd annual International Physics Olympiad in Turkey this summer have been selected from among the two dozen students who completed a grueling one-week "physics boot camp" at the University of Maryland in College Park, MD.

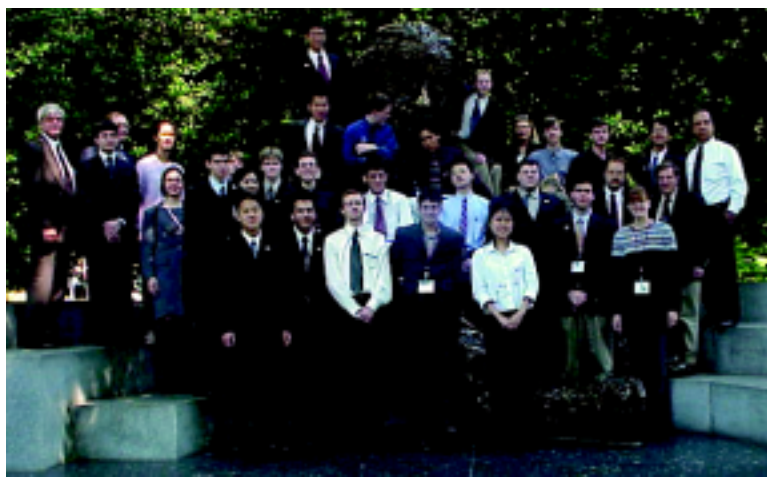
These five students and one alternate were chosen from a group of 24 that "includes some of the brightest and most talented physics and mathematics students in the country," according to Dr. Bernard Khoury, the executive director of the American Association of Physics Teachers, (AAPT) the organization that oversees selection of the boot camp participants and the final five team members. The program also benefits from fundraising and promotional activities of the American Institute of Physics (AIP), and receives financial support from APS.

The five students are Brian Beck of Beachwood, Ohio, Andrew M. Lutomirski of Los Angeles, California, Vladimir S. Novakovski of Springfield, Virginia, Daniel J. Peng of Colts Neck, New Jersey, and Willie W. Wong of Short Hills, New Jersey. The alternate is Ryan J. Hendrickson of Davidsonville, Maryland.

The selection over the Memorial Day weekend marked the end of the intense one-week program of exams, lectures and group laboratory work with the final team of travelers to the international event chosen by Khoury and seven coaches led by Dr. Mary Mogge.

The 20 male and 4 female students who participated in the annual boot camp this past May represented the highest scoring students on a battery of tests and were winnowed down from a nationwide field of nearly 1,100.

The students were required to spend "five to eight hours a day doing nothing but" physics problem solving, Khoury said. After hours, the students got to tour the NASA Goddard Space Flight Center in Greenbelt, Maryland and met with various members of Congress on a field trip to nearby Washington, D.C.



The 2001 US Physics Team annd their coaches gather in front of the National Academy in the friendly shadow of Albert Einstein.

Mogge, the US Physics Team academic director since 1999 and one of the seven coaches since 1995, said the final decision is based partly exam results and partly on lab skills. She said this reflects the "theoretical" and the "practical" components of the international competition, where team members vie for gold, silver and bronze medals.

"In the international competition, 40 percent of the score for a medal is determined by labs or the practical part and 60 percent by the theoretical part," said Mogge, who is also a professor of physics at California State Polytechnic University in Pomona.

The chosen five students will travel to Antalya, Turkey where they will represent the United States at the competition, which runs from June 28 to July 6, 2001. About 60 nations participate in the event pitting the best and the brightest physics students from around the world against each other.

Although the competition has been held every year since 1967, originally it included only Soviet-bloc nations and the US did not participate until 1986. Since that time, the AAPT has organized the US team through a selection process that starts in early January when high school teachers from around the country nominate their highest-achieving students to take a national exam.

The only requirement for participation in any given year is that students be in high school and that they have not reached their 19th birthday by June 1. Students may participate in more than one year and some students have won medals in multiple years.

The high school requirement is necessary because "some of these students are so bright that they could be in college by age 17," according to Maria Elena Khoury, the director of AAPT's programs and conferences.

She said that as many as 8,000 tests are mailed out nationwide to all 50 states and the District of Columbia to high school physics teachers in early January seeking nominations for students to take the test. She said there are usually about 1,100 responses and from these the top 200 scorers are selected in the first round and the final 24 who attend the physics boot camp are selected in the second round.

This year's 24 students are from 16 states, including three each from Illinois, California, and New Jersey and two from Virginia. Most of the two dozen boot camp attendees have attended schools with Advanced Placement physics and mathematics programs.

Mogge said the boot camp program gives the students "a chance to meet people who feel the same way about physics as they do." She also said that many of the students end up at Harvard, MIT, and Caltech and that "almost all go to prestigious schools," whether liberal arts colleges or state universities.

zero gravity

The Division Song

(After Gilbert & Sullivan)

We are the very model of a physical society.
We represent our members with impeccable propriety.
We have fourteen divisions of unparalleled variety,
And I'll recite them for you in their most complete entirety.

There's DAMOP that is optical, molecular, atomical,
And then there's Astrophysics which is not quite astronomical.
There's DCOMP where the emphasis is on things computational,
And Fluids where the ideal flow is strictly irrotational.

There's DPF and DNP who study tiny particles
And then report their findings in impenetrable articles.
And DPB is whom you see if beams you must accelerate,
While DCP is chemistry that physics can elucidate.

DCMP and DMP investigate material
And DPP is plasma, which is somewhat more ethereal.
Laser light's coherent and the path it takes is linear
And Polymers are molecules that couldn't be much skinnier.

Our next division, DBP, exists because in college we
Were told that physics even can be useful to biology.
If you've been counting carefully then you will not be forced to guess
That we are done, we've listed all divisions of the APS.

—Alan Chodos

In the Corridors of Power

In March, APS President George Trilling (third from left) testified before the Subcommittee on VA, HUD and Independent Agencies of the House Appropriations Committee, in favor of increased funding for NSF. Testifying with him were (l to r) American Chemical Society President-elect Eli M. Pearce, Mary J.C. Hendrix, President of the Federation of American Societies for Experimental Biology, and American Mathematical Society President Hyman Bass.

Panelists, *from page 4*

Baker Spring, F. M. Kirby Research Fellow in National Security Policy at the Heritage Foundation, summarized the primary criticisms frequently leveled at the proposed NMD system. First, many critics believe that the threat of ballistic missiles is insufficient to justify the expense of deploying a global defense system, and maintain that while there is proliferation of short-range missiles as evidenced in the Gulf War, long-range missile defense is not a high national security priority. Second, existing counter measures are likely to defeat a mounted defense. Finally, many critics believe that a national missile defense would pose an "intolerable risk" to the stability of US national security, as well as endangering the existing ABM treating and reigniting a nuclear arms race.

While acknowledging that many of these criticisms have merit, Spring believes they can be adequately resolved, insisting, "If we don't plan ahead, our response time will be insufficient for missile defense." While 10 years ago only the US, Russia, China and Japan had long-range missile capabilities, that scenario is changing rapidly, and hence "A stand-alone NMD system would not be a prudent way to proceed," said Spring. "We want to see an NMD system that is global in scale."

Like Cooper and Garwin, Spring also believes the ABM treaty is outdated and ineffective. "The treaty is still too self-limiting and won't allow us to address threats likely to occur," he said. The ABM treaty contains serious limitations on testing and development including stringent limits to sea- and space-based systems, which he believes could be effective counters to the threat of counter-measures.

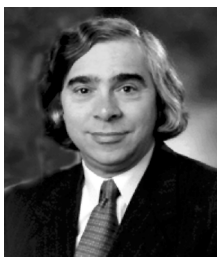
General Election Preview — Members to Elect New Officers, Councillors from 2001 Slate of Candidates

Election notices and invitations to vote electronically were sent to APS members with valid e-mail addresses in June. Members without e-mail or invalid e-mail addresses were sent paper ballots. Web votes and paper ballots must be received by Survey and Ballot Systems by noon CDT, September 1, 2001 to be counted.

Editors Note: Complete biographical information and candidate statements can be found at: http://www.aps.org/exec/Election

FOR VICE-PRESIDENT

ERNEST J. MONIZ
Massachusetts Institute of Technology



Moniz received his PhD in theoretical physics from Stanford University in 1971, with a thesis on the interaction of high energy particles with nuclei. After an NSF postdoctoral fellowship, he was appointed to the MIT physics faculty in 1973, where his research interests have focused on reaction theory, meson dynamics in nuclei, electronuclear response functions, and the quark structure of matter. At MIT, Moniz served from 1983 to 1991 as Director of the Bates Linear Accelerator Center, as well as chairing the Department of Physics from 1991 to 1995, and again in 1997. Moniz served as Associate Director for Science in the Office of Science and Technology Policy from 1995 to 1997, during which he was also a central contributor to the Clinton Administration's science policy statement, "Science in the National Interest." Following an unexpectedly brief return to MIT, Moniz rejoined the Administration as UnderSecretary in the Department of Energy, with principal programmatic oversight responsibility for the national laboratory system and for the R&D portfolio spanning science, energy, environmental and national security programs. In addition, the Secretary designated him as lead negotiator for Russian initiatives, a role that focused on control and elimination of weapons usable fissile materials. Moniz has previously served the APS as a member of the Study Group on Nuclear Fuel Cycles and Waste Management, of the Executive Committee of the Division of Nuclear Physics, and of the Physical Review Letters Review Panel.

FOR VICE-PRESIDENT

HELEN R. QUINN
Stanford Linear Accelerator Center

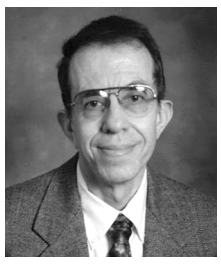
Quinn was born in Melbourne, Australia. She completed her PhD in physics in 1967 at Stanford and spent two years at Deutsches Elektronen Synchrotron (DESY) with her husband. In 1972 she became a postdoctoral fellow at Harvard, staying until 1976 when she was an Associate Professor and held a Sloan Fellowship. She held another postdoctoral position at the Stanford Linear Accelerator Center, where she has been a permanent staff member since 1979. Quinn has made significant contributions to particle physics theory for which she has received numerous honors. Two of her papers are particularly recognized. A paper with Howard Georgi and Steven Weinberg provided the first understanding of how the different coupling strengths of the strong, weak, and electromagnetic interaction can merge at very high energy into a single coupling in a grand unified theory. With Roberto Peccei she suggested a mechanism whereby the strong interactions can avoid being infected by the CP violation of the weak interactions. Quinn devotes significant professional time to education work. She was the founding President of the non-profit Contemporary Physics Education Project which produces wall-charts and other materials for high school and college physics teachers. She also manages SLAC's education and outreach programs. Within the APS she has held a number of positions: DPF Executive Committee; POPA; Committee on the Status of Women in Physics; Forum on Education Executive Committee; Committee on Education; Committee on Committees; and the APS Council and Executive Board.

FOR CHAIR-ELECT, NOMINATING COMMITTEE

SUSAN J. SEESTROM
Los Alamos National Laboratory

Seestrom was named Director of the Physics Division at Los Alamos National Laboratory in 2000. She joined the Los Alamos scientific staff in 1986. Seestrom's research has been in nuclear physics, studying nuclear structure with medium energy probes and symmetry violation using low energy neutrons. She has most recently been involved in development of novel sources of ultra-cold neutrons. Seestrom is a Fellow of the APS and has served on the Council and Executive Board of the APS and the Executive Committee of the Division of Nuclear Physics.

HARRY SWINNEY
University of Texas at Austin



Swinney was awarded a PhD in physics from Johns Hopkins University in 1968, and he served on the physics faculties of New York University and City College of New York before going to the University of Texas in 1978. Swinney conducts experimental studies of instabilities, pattern formation, chaos, and turbulence on systems far from equilibrium. He is a Fellow of the APS, and was awarded the APS Fluid Dynamics Prize in 1995. In the APS he has served as Councillor (1991-94), member of the Executive Board (1993-94), chair of the Membership Committee (1995), and member of the Executive Committee and other committees of the Division of Fluid Dynamics.

FOR INTERNATIONAL COUNCILLOR

CHRIS H. LLEWELLYN-SMITH
University College London, UK

Llewellyn-Smith is a theoretical particle physicist, who served as Director General of CERN (1994-98), and is currently President and Provost of one of the UK's leading research-intensive universities. He has worked on the quark model, deep inelastic lepton scattering, unified theories of the forces, quantum chromodynamics, and supersymmetry, with a particular emphasis on experimental tests of theories and models at existing or future accelerators. After completing his Doctorate at Oxford (England) in 1967, Llewellyn-Smith worked at the Lebedev Institute (Moscow), CERN and SLAC, before returning to Oxford in 1974. During his period as Director-General of CERN, the Large Hadron Collider (LHC) was approved, and LEP was upgraded and an extra year of operation was approved. Since 1999 Llewellyn-Smith has been President and Provost of UCL.

T. MAURICE RICE
Swiss Federal Institute of Technology (ETH), Switzerland

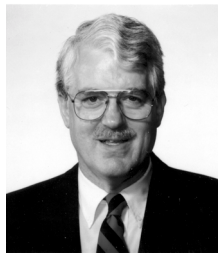
Rice is a native of Ireland. After undergraduate studies at University College Dublin, he obtained a PhD from the University of Cambridge in 1964. He spent one year at the University of Birmingham and two years as a postdoc at UCSD before joining the technical staff of Bell Labs in Murray Hill N.J. During his fifteen years at Bell Labs he served terms as head of the Theoretical Physics and Surface Physics Departments and also held visiting positions at Simon Fraser University in Canada and MPI Stuttgart in Germany. In 1981 he assumed his present position as professor of physics at the ETH Zurich. He is a Fellow of the American Physical Society, and in 2000 he received the John Bardeen Prize for contributions to the theory of superconductivity. Rice's research interests extend over many fields in theoretical condensed matter physics. In recent years he has concentrated mainly on the theory of strongly correlated electrons and its application to the microscopic theory of the high temperature superconductors.

FOR GENERAL COUNCILLOR

FRANCES A. HOULE
IBM Almaden Research Center

Houle received her PhD from the California Institute of Technology (1979) in Chemistry. In 1980, after an appointment as an IBM postdoctoral fellow at the University of California at Berkeley, she joined the IBM Research Laboratory, now the IBM Almaden Research Center. Her research is in the area of physics and chemistry of thermal and radiation-induction chemical modification of surfaces and thin films, and she is the co-author of the Chemical Kinetics Simulator Program, a widely used software package. She has a long history of service with the American Vacuum Society, including service on the AVS Thin Films Division Executive Committee and chairing the AVS Electronic Materials and Processing. Since 1997 she has served as co-chair of her children's elementary school science fair. She has received IBM Corporate Environmental Affairs and Outstanding Innovation Awards for her work on surface processing and simulation algorithms.

GERALD D. MAHAN
University of Tennessee; Oak Ridge National Laboratory

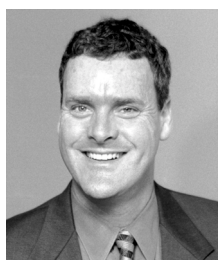


Mahan received his PhD in physics from University of California, Berkeley, in 1964. He was a research physicist at the Corporate Research Center of the General Electric Company from 1963 - 1967, and then joined the physics faculty at the University of Oregon until 1973. He was a professor of physics at Indiana University from 1973 to 1984, and currently he has a joint appointment as a professor in the Department of Physics and Astronomy at the University of Tennessee, and as a Distinguished Scientist in the Solid State Division of Oak Ridge National Laboratory. His research area is theoretical condensed matter physics. He predicted Fermi edge singularities in the x-ray spectra of metals and semiconductors, and the angular dependence of photo emission. Mahan is a Fellow of the American Physical Society and served on the Board of the APS Division of Condensed Matter Physics.

MIKLOS PORKOLAB
Massachusetts Institute of Technology

Porkolab was born in Budapest, Hungary in 1939. He received his PhD degree from Stanford University in 1967, and joined the research staff of the Princeton Plasma Physics Laboratory. In 1977, Porkolab joined the MIT Physics Department as a Professor. Since 1995, he has been serving as the Director of MIT's Plasma Science and Fusion Center. Porkolab's present research interests include experimental and theoretical studies of radio frequency wave interaction with fusion plasmas, as well as experimental studies of turbulence in magnetically confined high temperature plasmas. In 1984, Porkolab shared the APS Excellence in Plasma Research Award for the conclusive experimental demonstration of radio-frequency wave driven currents in tokamaks. Porkolab is a Fellow of APS, and since 1991, he has been an Editor of Physics Letters A for Fluid and Plasma Physics. In 1998-99, he served as Chair of the APS Division of Plasma Physics.

PETER W. ROONEY
The Forum on Technology & Innovation



Rooney received his PhD in physics from the University of California at San Diego in 1995. He served as a program officer at the National Research Council from 1995 to 1997, where he directed a number of studies on science, technology, and public policy. From 1997 to 1998, he was the APS Congressional Fellow, serving as science advisor and special legislative assistant to Senator Joseph I. Lieberman (D-CT). On Senator Lieberman's behalf, he organized a bipartisan Senate effort to authorize a doubling of federally-sponsored civilian scientific research over ten years. In 1999, Rooney founded the Forum on Technology & Innovation, which delivers timely, authoritative, and balanced information to Congressional staff on technology and new economy issues.

ANNOUNCEMENTS

PROPOSED AMENDMENT TO THE APS BYLAWS

Regarding How Units Vote on Bylaw Amendments
First Vote Approved by Council
April 27, 2001

The APS Constitution and Bylaws Committee has reviewed the process of unit bylaws amendments. It has determined that several units allow voting on proposed bylaw amendments at their annual meeting. The committee feels that this practice is unfair for those members who cannot attend an annual meeting and recommends the following changes in the APS Bylaws on this matter. If you wish to comment on this, please contact Ken Cole by e-mail (cole@aps.org), or by mail (One Physics Ellipse; College Park, MD 20740).

BYLAWS CHANGE

ARTICLE VIII – DIVISION, TOPICAL GROUP, FORUM AND SECTION CONCERNS

3. *Revision of Division, Topical Group, Forum, or Section Bylaws.* A Division, Topical Group, Forum, or Section shall submit proposals for the revision of its Bylaws to the Council for its approval, subject to review by the Committee on Constitution and Bylaws. FOLLOWING COUNCIL APPROVAL, COPIES OF THE PROPOSED BYLAWS REVISIONS SHALL BE DISTRIBUTED TO ALL MEMBERS OF THE DIVISION, TOPICAL GROUP, FORUM OR SECTION WHO THEN SHALL VOTE ON THE PROPOSED REVISIONS BY PAPER AND/OR ELECTRONIC BALLOT, AS THE EXECUTIVE COMMITTEE SHALL DESIGNATE.

NOMINATIONS – 2002 BYLAW COMMITTEES

*To be submitted by members of the American Physical Society **only**.*

The Committee on Committees has the responsibility for nominating elected members of the Publications Oversight Committee and the Lilienfeld Prize Committee and for advising on suitable candidates to serve on the following Bylaw Committees appointed by the President:

Careers and Professional Development • Constitution and Bylaws • Education • Fellowship • International Freedom of Scientists • International Scientific Affairs • Investment • Meetings • Membership • Minorities • Status of Women in Physics • Physics Policy

The APS needs recommendations from the membership. Current personnel and last year's annual reports for many of the committees are on the APS website under the Governance button. Please provide the name and affiliation of nominees and include information on career highlights and suitability for the position. Self-nominations are encouraged. (Please verify that your nominees are APS members prior to submitting your form.)

The form is downloadable: http://www.aps.org/mem-cgi/coc

If you would like a copy of the form faxed to you, please e-mail Ken Cole at cole@aps.org and include your name and fax number.

Deadline for receipt of nominations is August 11, 2001.

Now Appearing in RMP...

The articles in the July 2001 issue of *Reviews of Modern Physics* are listed below. For brief descriptions of each article, consult the RMP website at http://www.phys.washington.edu/~rmp/current.html. *George Bertsch, Editor.*

Nobel Lecture: The double heterostructure concept and its applications in physics, electronics, and technology — *Zhores I. Alferov*

Nobel Lecture: Quasielectric fields and band offsets: teaching electrons new tricks — *Herbert Kroemer*

Nobel Lecture: Semiconducting and metallic polymers: The fourth generation of polymeric materials —*Alan J. Heeger*

Nobel Lecture: Synthetic metals: A novel role for organic polymers —*Alan G. MacDiarmid*

Nobel Lecture: The discovery of polyacetylene film - the dawning of an era of conducting polymers — *Hideki Shirakawa*

The theory of brown dwarfs and extrasolar giant planets — *Adam Burrows, W. B. Hubbard, J. I. Lunine, and James Liebert*

Historical roots of gauge invariance — *J. D. Jackson and Lev Okun*

Matter in strong magnetic fields — *Dong Lai*

The physics of manganites: structure and transport — *Myron B. Salamon and Marcelo Jaime*

Non-Fermi-liquid behavior in α- and f-electron metals — *G. R. Stewart*

Colloquium: Manipulating quantum entanglement with atoms and photons in a cavity— *J. M. Raimond, M. Brune, and S. Haroche*

Reviews of Modern Physics
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phone: (206) 685-2391

Volunteers Sought for Inter-American Cooperation

As one component of an overall Inter-American physics cooperation effort, the APS is currently seeking to identify volunteers who are interested in making contacts and establishing collaborations and working relationships with physicists in Latin America and the Caribbean. A list of such volunteers is now being compiled that will be available as a Directory both on the APS Web site and in a hard-copy form that will be directly distributed to physics departments in Latin America and the Caribbean. All APS members who are interested in being included in this directory of potential scientific collaborators with Latin American and Caribbean counterparts are encouraged to add their names to the directory by going to **http://www.aps.org/intaff/collab.html** and enrolling electronically. Further information can be obtained from **Dave Ernst** (david.j.ernst@vanderbilt.edu)

National Academy of Sciences

The National Academy of Sciences is accepting nominations for the **Arctowski Medal**, a prize of $20,000 and a $60,000 award to an institution of the recipient's choice to further research in solar physics and solar-terrestrial relationships. The award is presented every three years for outstanding contributions to the study of solar physics and solar-terrestrial relationships.

The National Academy of Sciences is accepting nominations for the **Arthur L. Day Prize and Lectureship**, a prize of $20,000 awarded every three years for new contributions to the physics of the earth. In addition, the recipient will deliver (a series of) lectures at an institution other than his or her own.

The National Academy of Sciences is accepting nominations for the **Robertson Memorial Lecture**, a $10,000 prize presented every three years; the 2002 field is low-temperature physics. In addition, the recipient is invited to lecture on his or her work and its possible international implications.

CALL FOR NOMINATIONS
All nominations will be accepted through August 31, 2001

For more information contact:
National Academy of Sciences
Awards Program; Room NAS 185
2101 Constitution Avenue, NW
Washington, DC 20418
Phone: (202) 334-1602
Fax: (202) 334-1682
e-mail: awards@nas.edu
http://national-academies.org/nas/awards

Awards, *from page 1*

from the University of Oklahoma and has had a long, distinguished career in both academia and government, in which he has been widely recognized as a scientist and educator. He served as Provost at Rice University from 1966 until 1984, when he spent two years as chancellor of the University of Colorado at Colorado Springs. He served as director of the National Science Foundation until his selection as chief science advisor to President Clinton. As director of the White House Office of Science and Technology Policy, Lane had responsibility for providing advice to the president in all areas of science and technology policy.

AAS President Anneila I. Sargent, Caltech, praised not only Lane's past accomplishments, but also his continued efforts as "a vocal and efficient advocate for science outside the Beltway." Lane returned to Rice University in January as University Professor in the Department of Physics and Astronomy, a special appointment entitling him to teach in any department in the university, and the first such appointment to be made by Rice. He is also a senior fellow at the Baker Institute, and plans to work with the Clinton library on the Administration's accomplishments in science and technology.

In receiving his award, Lane thanked all three societies for their efforts on behalf of science: the AAS and all astronomers "for keeping us excited about science with constant magnificent breakthroughs"; the APS and all physicists "for keeping astronomers' feet on the ground"; and the AMS and mathematicians: "We don't always know what you do, but we know we wouldn't have any science without you."

Beltway, *from page 1*

on abortion, missile defense and education were increasingly at odds with GOP policies.

In a 50-50 Senate, where a single Republican defection would produce a temblor, the temptation to part company with his party, whose philosophy had long been out of sync with his own, in the end simply proved too great. Jeffords bolted and Washington was jolted.

Without question, the political landscape will be altered for the balance of the 107th Congress. But those changes are unlikely to affect science in any major way. Here's why.

Control of the Senate hands over to the Democrats selection of committee chairmanships and management of the legislative agenda. But that's all. Since the membership of the Senate remains unchanged, and since it takes 60 votes to break a filibuster – a supermajority that neither party can muster on its own – legislation that passes ultimately will have to attract bipartisan support.

Senate Democrats undoubtedly will use their newly-gained power to feature their issues: education, a patient's bill of rights and increases in the minimum wage. And they will use their control of the Judiciary Committee to block the appointment of the most conservative presidential nominees for the federal bench.

But they will be circumspect when it comes to blocking the majority of the President's agenda. Politically, they cannot be perceived as being obstructionists, the way the Republicans were, when the House, under Newt Gingrich, incurred public opprobrium for "shutting the government down."

And they will have extraordinary difficulty advancing their own legislation, since Republicans still control the House of Representatives and the White House.

This is how four key APS issues are likely to be affected. The science budget will continue to be squeezed, largely as a result of the $1.35 trillion tax cut, anticipated increases for defense spending and the four-percent cap on the growth of discretionary spending imposed by the White House. Although a four-percent increase covers inflation and population growth, increases in military spending will leave the rest of the discretionary budget substantially in the hole.

Recent analyses also predict that within two years, the federal government will once again face mounting deficits, if, as is widely expected, Congress extends the ceiling on the alternative minimum tax, which is scheduled to expire in 2004 under the quirkiness of the tax bill just passed.

On National Missile Defense, the White House will now have to answer to Carl Levin (D-MI) instead of John Warner (R-VA) as chairman of the Armed Services Committee and to Joseph Biden (D-DE) instead of Jesse Helms (R-NC) as chairman of the Foreign Relations Committee. That undoubtedly will delay deployment. But it won't kill it, since Levin and Biden both support substantial R&D spending for the program.

On energy R&D, there is already mounting bipartisan support for restoring much of the 30 to 50 percent cut to conservation and renewables contained in the presidential request. And on science education, there will be little fallout, since a strong bipartisan consensus already exists.

Jeffords' defection may be a seismic historical event, but for science it will be a minor tremor.

THE BACK PAGE

Energy, Economic Growth Can Be Compatible with Environmental Preservation

By Lawrence B. Lindsey

We all know that scientific research lies behind our nation's long-term economic success. Good science is also the key to both defining and addressing many of the great policy challenges facing our country, including energy and global climate change. Ultimately it will be the work of scientists — in laying the foundation for new technologies and increasing our understanding of the world around us — that will enable our nation to address these important policy challenges.

During his campaign, then-Governor Bush spoke of energy as a storm cloud forming over the economy. America's reliance on energy had continued to grow, but its supply had not kept pace. We now know the consequences. A few years ago, many people had never heard the term "rolling blackout," but now everybody in California knows the term all too well. Throughout the country, we've seen sharp increases in fuel prices, from home heating oil to gasoline hitting $2 a gallon in Chicago. In the Northeast, communities face the possibility of electricity shortages this summer. Energy costs as a share of household expenses have been rising, and families are feeling the pinch.

Similarly, we confront a potentially major challenge in human effects on the global climate. We also face the need to improve the quality of the air we breathe and the water we drink. The absence of a clear, coherent energy strategy means we will neither have energy nor a clean environment. One cannot stress enough the interdisciplinary nature of determining public policy on these issues. Economics and engineering are both involved in the process, but so too are physics, biology, chemistry, environmental science, law and political science.

To some, the task of providing energy and economic growth is incompatible with the preservation of a clean environment. But the data suggest that science, technology, and sound economic and public policy make both possible. Since 1973 the US economy has grown four times faster than our energy use. In recent years, very robust growth in the nation's GDP has been accompanied by a slowdown in the growth of greenhouse gas emissions. In both 1998 and 1999, US GDP grew by more than 4% each year while CO_2 emissions grew by less than 0.15% in 1998 and 1.3% in 1999. Our success in reducing other, more immediately health-threatening emissions has been even greater. Since 1970, for example, the economy has grown nearly 125%. But our emission of sulphur oxide is down 36%, and we have 98% less lead in our air. We have cut nitrous oxide emissions almost in half per unit of GDP.

"The treaty makes innovation largely irrelevant by imposing onerous restrictions before technological solutions can be developed."

These successes are due to major improvements in technology, which have already led to significant reductions in pollution from coal-fired plants. Coal currently provides half of all the fuel for electricity generation in this country and will, of necessity, play an important role for decades to come. But further progress is still possible. Two-thirds of the energy used in a conventional coal-fired power plant is wasted in the production of electricity. These losses can be minimized through numerous innovations, including the installation of high-efficiency steam turbines, reducing steam leaks, and using software to optimize combustion efficiency. New coal-burning power plants can achieve efficiencies of over 40% using existing technology and companies are investing in the search for even more efficient technologies. In addition, wasted energy can also be recycled for use in industrial processes or for heating buildings.

Technology also allows us to make efficient improvements in our use of energy on the demand side. For example, advanced sensors and controls enable buildings and factories to operate more efficiently, and allow equipment and lights to be turned off or dimmed when not in use. Furthermore, new technologies are allowing the market to work better. One example is time-of-day pricing, which provides consumers with an incentive to smooth out their electricity use, thereby minimizing the need for peak power production. The same type of improvements in energy efficiency can be obtained by a more interconnected electric grid.

It is an economic fact of life that science and technology, as well as the environment, prosper in a growing economy. Prosperity allows us to commit ever-increasing resources to cleaning up our environment, and to developing S&T which will lead to future economic growth and environmental improvements. This is not principally the case for larger commitments of public sector resources made possible by larger tax collections from a bigger economy. In fact, the great majority of scientific and technological advances and their applications take place in the private sector.

Currently, the average annual real rate of return on corporate investment in America is about 9%, including both plant and equipment investment, as well as research and development. A stream of research that yields 9% return over a century will lower the cost of doing something by a factor of 5000. For example, in 1900 a light bulb cost roughly $20 in today's currency; today it costs 40 cents, lasts at least 10 times longer, and uses a fraction of the electricity to generate the same amount of candlepower. When confronting long-range challenges like the environment, investments in the R&D of new technologies, with actual applications decades in the future, are far more cost-effective than trying to act with existing technologies.

"It is an economic fact of life that science and technology, as well as the environment, prosper in a growing economy."

It is precisely for this reason that the Bush Administration opposes the Kyoto Protocol. We believe it could damage our collective prosperity and, in so doing, put our long-term environmental health at risk. We believe the protocol both will fail to significantly reduce the long-term risks posed by climate change, and, in the short run, will seriously impede our ability to meet our energy needs and foster economic growth. Furthermore, by imposing high regulatory and economic costs, it may actually reduce our capacity both to find innovative ways out of the environmental consequences of global warming and to achieve the necessary increases in energy production.

Under the terms of the agreement, the estimated level of greenhouse gases expected in the year 2010 will instead be delayed by a little over a decade. Few of the developed nations who claim to support the treaty have, in fact, undertaken domestic policies to lend credibility to the idea that they will meet Kyoto's targets, with two exceptions: Britain and Germany.

In Britain, the abandonment of intensive use of coal and a switch to the use of new natural gas discoveries made the conversion fairly easy, while in Germany, the inclusion of the industrial base of the former DDR after reunification made attainment easy. It would have been cost-effective to shut down much of East Germany's highly polluting electricity generation even without Kyoto. However, looking at other nations, attainment of the treaty's goals is not realistic. A further 27% reduction by Japan and a 22% reduction by Canada are as unlikely as the 30% by the US from its projected 2010 levels.

The treaty does little to promote investment in new technologies, even though these advances offer the greatest long-term potential reward in terms of reducing the effects of global warming and improving quality of life on the planet. Technological solutions are most likely to succeed if investment and research are allowed to take place over a long period of time. Kyoto, by requiring dramatic upfront reductions in greenhouse gas emissions by those countries with the greatest ability to do such research, turns this on its head. The treaty makes innovation largely irrelevant by imposing onerous restrictions before technological solutions can be developed. Kyoto compounds this problem by making no requirements for much longer-term greenhouse gas emission reductions or for mitigation of the environmental effects of global warming.

A study done by the Clinton Administration estimated that the Kyoto Protocol would involve costs of between 0.6% and 4% of GDP. Electricity prices would run anywhere between 20% and 86% higher than current levels. There would also be an increase in gasoline prices of between 14 and 66 cents per gallon. In light of the very limited environmental benefits, a commitment as structured as this is not prudent. Worse, the treaty goes out of its way to raise these costs. This anti-economic reasoning involves treaty-imposed inflexibility in allowing the use of a number of creative options. Proponents of Kyoto have worked against such promising solutions as reforestation and more sensible agricultural land use that would likely provide enormous quality of life externalities for people on all parts of the planet, and these options should not be excluded from consideration.

Lawrence B. Lindsey

And of course, it is natural that the US government would object to a treaty that requires twice as much reduction in emissions from the US as from Europe and Japan combined. This is not a judgment of the Bush Administration, but reflects a long-standing view of the political process. In 1997, the Senate approved a resolution by a vote of 95-0 not to ratify the Kyoto agreement in its present form. In last year's presidential election, neither party platform supported ratification of the Kyoto treaty.

We oppose this failed attempt at negotiating a solution to excessive emissions of greenhouse gases. Sound public policy should encourage efficiency, not dictate austerity by telling families and businesspeople to choose how to ensure their health, safety and happiness by restricting the efficient use of energy. While our plan reduces wasteful energy, it does not seek to shrink our economy or lower living standards.

To speak exclusively of conservation, of environmental protection, or of increased energy production is really to duck responsibility for all the consequences of what one proposes. Sound, comprehensive energy, economic and climate change policies require that we focus on multiple objectives. Happily, if we make the right decisions today and establish an environment where innovation can flourish, these objectives are achievable. America's energy and environmental challenges are serious, but not unsurmountable, and it is impossible to overstate the role that science and technology will play in solving these problems.

Lawrence B. Lindsey is the Assistant to the President for Economic Affairs. This article was adapted from his keynote address at the AAAS Colloquium on Science and Technology Policy on May 3, 2001. The full text is available at http://www.aaas.org/spp/dspp/rd/colloqu.htm.