

In the telephone discussion with the group Domenici sounded particularly excited by the suggestion from Minas Ensanian of Electropograph Corporation (Eldred, Pennsylvania) that the government produce a booklet summarizing those aspects of patent law and protection of intellectual property that are involved in technology transfer agreements between government laboratories and industry. In a remark addressed specifically to the academics present, Domenici challenged universities to contribute to the drive for industrial competitiveness: Professors, he felt, should convince their students that manufacturing is at least as important as research.

The third group of talks at the Corporate Associates meeting highlighted several frontiers in physics. Edward Stone of Caltech, formerly the scientific director of the Voyager II mission, who has just been named director of the Jet Propulsion Laboratory, brought to the meeting many beautiful photographs taken on the mission and summarized both the knowledge and new questions that it produced. David Campbell of Los Alamos National Laboratory presented a clear exposition of the study of nonlinear processes. John Hopfield of Caltech spoke about work on neural networks and "biological" computation. Virgil Dugan, acting vice president of energy programs at Sandia, wrapped up the session with his view of the future of the energy industry.

Sandia facilities

Those attending the Corporate Associates meeting were given tours of the various Sandia facilities. Several of the facilities visited were created to simulate the effects of nuclear bombs: Hermes III, a linear induction accelerator producing 20-MeV gamma rays; Proto II, a radially converging accelerator generating soft x rays; and two pulsed nuclear reactors, one of which (SPR III) can deliver about 150 000 MW peak power. The other reactor (ACRR) was pulsed during the visit, so that the visitors could observe the emission of blue Čerenkov radiation from the water around the core.

Another facility, called STAR, is used to test the effect of shock waves on systems and components. The tour also included the Particle Beam Fusion Accelerator II. It delivers a 5 million-volt pulse in about a millionth of a second to impel an ion beam (usually lithium) toward a fusion target.

In the desert beyond Sandia's main buildings is the national solar ther-

mal test facility, with a field of 220 glass heliostats that can generate up to 5 MW of thermal power. Research there is now directed toward the design of larger, lighter-weight and more economical heliostats.

On one of the tours, the Corporate Associates representatives were introduced to Sandia's efforts in semiconductors. The research and development there includes work on silicon integrated circuits, compound semiconductor devices and materials, and semiconductor structures such as sensors and micro-machined devices. One requirement of VLSIs developed at the lab is resistance to high levels of radiation. At the Center for Compound Semiconductor Technology, formed in 1988, visitors saw the clean room and the facilities for molecular-beam epitaxy, metal-organic chemical vapor deposition, ion implantation

and photolithography. They also visited a lab for the development of optoelectronics.

The tour also featured a robotics lab. Sandia is DOE's leading lab for the application of robotics to hazardous environments and to small-batch manufacturing that requires frequent reconfiguration.

At the meeting's banquet AIP presented its science writing award to Bruce Murray of Caltech for his book *Journey into Space* (see story below). Then Albert Narath, director of Sandia Labs, spoke on the theme of technology transfer. He echoed the sentiment of the other participants in the conference that despite the many practical difficulties of sharing technologies across industries and national labs, the benefits of cooperation at the precompetitive stage promise to be high.

—BARBARA GOSS LEVI

MURRAY OF CALTECH WINS AIP SCIENCE WRITING PRIZE

At the AIP Corporate Associates meeting held at Sandia National Laboratories in Albuquerque, New Mexico, in October, Bruce C. Murray, a professor of planetary science at Caltech, was presented with this year's AIP science writing award to a scientist. The award consists of \$3000 and a certificate. Murray was chosen for his book *Journey Into Space: The First Thirty Years of Space Exploration* (Norton, New York, 1989), a personal account of his involvement in planetary missions—and the politics sur-

rounding those missions—over the past three decades. (For a review of the book, see PHYSICS TODAY, October, page 95.)

As director of the Jet Propulsion Lab from 1976 to 1982 and as an active researcher in planetary science, Murray has been a central figure in the debate over US policy on exploration of the solar system and has frequently criticized NASA's preoccupation with the shuttle program, which he and others claim has siphoned off research dollars from other, smaller projects in planetary science and astrophysics.

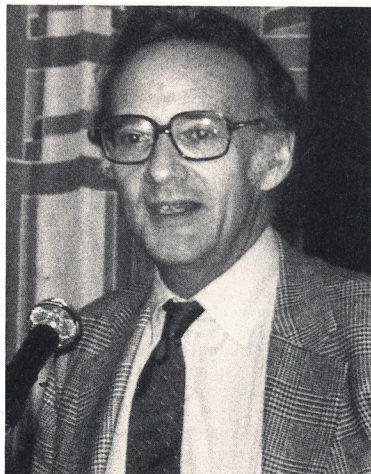
Murray received a PhD in geology from MIT in 1955 and joined the faculty at Caltech in 1960. He has been involved in numerous exploration projects, including Mariner missions to Mars, the Mariner mission to Mercury and Venus, and the Voyager mission to the outer planets. Murray is currently analyzing data from the Soviet Union's Phobos 2 spacecraft and is collaborating with French and Soviet scientists on a balloon probe for the 1994 Soviet Mars mission. With Carl Sagan and Louis Friedman, he founded the Planetary Society in 1980.



Bruce Murray receives his award for science writing from AIP. Murray was honored for his book *Journey into Space*.

AIP's GEMANT AWARD GOES TO BERNSTEIN FOR PHYSICS WRITING

Jeremy Bernstein, a professor of physics at Stevens Institute of Tech-



Jeremy Bernstein

nology and a veteran science writer, is the 1990 winner of the Andrew Gemant Award, sponsored by the American Institute of Physics. The Gemant award recognizes individuals who contribute to the understanding of the relationships between physics and society.

Bernstein, a theoretical physicist, is perhaps best known to the public through his writing in *The New Yorker* magazine, where he has been a staff writer since 1960. He has also written several books of popularized science, including a book about AT&T Bell Laboratories called *Three Degrees Above Zero*; his latest book, *Quantum Profiles* (Princeton U.P., 1990), discusses the development of the interpretation of the quantum theory. Bernstein's research has been in elementary particles, and he is currently involved in interpreting data from the Cosmic Background Explorer satellite.

Bernstein studied at Harvard University, where he received a BS (1951), MS (1953) and PhD in theoretical physics (1955). After holding research positions at Harvard, the Institute for Advanced Study and Brookhaven National Laboratory, he became an associate professor at New York University in 1962. Five years later he joined the physics faculty at Stevens.

The Gemant Award carries with it a \$5000 prize for the winner, along with a \$3000 grant to be given to an organization designated by the winner. Bernstein had planned to use his grant to sponsor a discussion on "Science: Sacred and Profane" at the New York Institute for the Humanities, but the event was canceled following the death on 29 September of its principle speaker, John S. Bell of CERN. Most of the grant was used to

organize and publicize the discussion, Bernstein told *PHYSICS TODAY*, and it has yet to be decided what will be done in place of the canceled event.

Bernstein will officially accept the award at the January 1991 meeting of the American Association of Physics Teachers and The American Physical Society. He will also present a talk on writing profiles of scientists.

PHYSICS JOB MARKET REMAINED STRONG IN 1988-89

There has been much concern of late that changes in the economy and in science funding are leading to a deterioration in the employment picture for young researchers. But the latest survey of physics and astronomy graduate students, conducted by the American Institute of Physics, indicates that at least through 1989 the employment prospects for physics graduates did not worsen—and in fact in many ways there was improvement.

In 1989 a higher proportion of physics PhD recipients than in 1988 said they had received more than one job offer: Almost half gave this response, compared to 40% the previous year. There was also greater demand for physics theorists than in years past: In 1988, only one in five theorists reported receiving more than one job offer, while in 1989 two in five theorists gave this response.

The average starting salary for 1989 PhDs who took postdoctoral positions was \$2310 per month, up from \$2150 in 1988. PhDs who accepted permanent jobs commanded monthly salaries of \$3540, compared with \$3400 the previous year.

The survey report's author, Susanne D. Ellis of AIP's education and employment statistics division, said she was surprised to find such a strong job market in 1989, having heard anecdotal evidence that indicated a gloomier situation. It may be that the predicted downturn will show up in later surveys, she added. The survey, conducted during the summer of 1989, polled all graduate students enrolled in US physics and astronomy departments as well as recent master's and PhD recipients.

Among 1989 physics master's degree recipients, 51% said they are making extensive use of their physics training in their first jobs, by comparison with 41% of their 1988 counterparts. A smaller proportion than in 1988—11%—said they had not yet found a job when the survey was conducted, compared with 15% the previous year.

Among foreign graduate students, the 1989 survey identified a shift over the past five years in the type of research favored. From 1985 to 1989 the proportion of foreign students doing theoretical research fell from 39% to 30%. During that same time the proportion of US grad students specializing in theory remained steady—about 25%.

In astronomy, 94 PhDs were granted in 1989, the same as the previous year. Two-thirds of the 1989 PhDs accepted postdocs and the remainder found permanent positions. As in earlier years, astronomy PhDs reported considerably lower starting salaries than physics PhDs. The average monthly salary for new astronomers was \$2500.

The 1988-89 graduate student survey is available from the Education and Employment Statistics Division, AIP, 335 East 45th Street, New York NY 10017.

—JEAN KUMAGAI

IN BRIEF

Eldon E. Ferguson has been named director of the newly founded Climate Monitoring and Diagnostics Laboratory in Boulder, Colorado, which is a unit of the National Oceanic and Atmospheric Administration's Environmental Research Laboratories. Ferguson previously served as director of research at the University of Paris—South in Orsay and as director of NOAA's Aeronomy Laboratory in Boulder.

Starting in January 1991 Britain's Institute of Physics will publish the newly founded *Journal of the Moscow Physical Society*. The editor in chief is L. V. Keldysh of the USSR Academy of Sciences. Queries and submissions may be addressed to B. L. Joffe at the Institute of Theoretical and Experimental Physics, K. A. Kikoin at the I. V. Kurchatov Institute of Atomic Energy or V. P. Silin at the P. N. Lebedev Physical Institute. The journal will be distributed in North America by the American Institute of Physics.

Professional scientists are invited to volunteer as "pen pals" in a program called Science by Mail. Each volunteer is asked to correspond with three to six small groups of children three times during the school year. Contact Science by Mail, Boston Museum of Science, Science Park, Boston MA 02114-1099; telephone (800) 729-3300.

Enzo Iarocci has succeeded Sergio Tazzari as director of the Italian National Laboratory at Frascati. ■