

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-