Briefing:

Science and Engineering Academies Elect New Officers

Spring has brought several new officers to the National Academies of Science (NAS) and Engineering (NAE). Stephen Bechtel, Jr., will leave the engineers' governing council on 30 June, having served as the first outside chairman of the revamped, independent council established in 1982. Bechtel heads the engineering firm bearing his name (founded by his father), the former employer of George Shultz and Caspar Weinberger. As a fund-raiser, Bechtel was exceptional, helping to raise more than $15 million to support NAE operations. This sum is considered the first installment of a $30-million plan to study U.S. industrial needs over the next decade, known as the "Technological Leadership Program."

Bechtel will be succeeded by John Welch, Jr., the 51-year-old chairman and chief executive officer of General Electric. By academy standards, he is "pleasingly young and fresh," one observer says. Welch is a chemical engineer, credited with original work in industrial plastics. He encouraged the development of computer-aided tomography (the CAT scanner) at GE and pushed the company into medical technologies. He is described as energetic and forceful, having shown some daring recently by his decision to merge GE with RCA. U.S. antitrust authorities had no objection. Welch's experience, combining the electronics and service industries, will fit in well with NAE's agenda, staffers say.

Meanwhile, the NAE council has gained three new members. They are Edward Kane, former president and now director of E. I. du Pont de Nemours & Co., to be NAE's treasurer; Ralph Gomory, director of research at IBM's Thomas J. Watson laboratory; and Herbert Richardson, dean of engineering at Texas A&M University.

The National Academy of Sciences announced some changes recently as well. Its new foreign secretary will be William Gordon, professor emeritus of space physics at Rice University. He succeeds Walter Rosenblith of Massachusetts Institute of Technology (MIT). The NAS council acquired four new members: Francisco Ayala of the University of California at Davis, Harry Gray of the California Institute of Technology, Arthur Kelman of the University of Wisconsin at Madison, and Francis Low of MIT.

In another area, NAS has combined its management of research involving the environment and toxicology under a single new Board on Environmental Studies and Toxicology within the National Research Council. The board will be chaired by Donald Hornig, Alfred North Whitehead Professor of Chemistry at Harvard. ■

ELIOT MARSHALL

Congressmen Urge Support for Supercollider

A group of 91 congressmen has sent a letter to President Reagan urging his support for the proposed superconducting supercollider. Dated 11 April, the letter calls the machine "an investment in the future competitiveness of our country, both by the training of our next generation of high-energy physicists and by the technology transfer of the discoveries to our private sector." However, the letter does not call Reagan's attention to the cost of the project, estimated at $3 billion to $6 billion.

The 91 signatories to the letter were organized by Representatives Vic Fazio (D–CA) and Ron Packard (R–CA) largely out of a concern that R&D money for the supercollider might be cut from the Energy Department's budget for fiscal year 1987. "We need approval for next year, so that the supercollider can qualify for construction funding in FY 1988," says Fazio. "Without funding this year, the project may die." Fazio sits on the House appropriations energy and water development subcommittee, and Packard is the ranking Republican on the science and technology investigations and oversights subcommittee.

Despite the current concern over federal deficits, support for the supercollider is widespread in Congress because the project promises to create some 8000 permanent jobs wherever it is built, to say nothing of an influx of construction money into the region. Indeed, interstate competition for the supercollider is already keen. But for now, says a staffer involved in organizing the group of 91, the members are willing to work together to get the supercollider itself approved. The staffer also says that the initiative for the letter to Reagan came from Capitol Hill, not from the physicists involved in planning the machine.

Meanwhile, the supercollider's Central Design Group, headquartered at the Lawrence Berkeley Laboratory, has submitted its 712-page conceptual design report to the Energy Department, together with several thousand pages of appendices. The department is planning to subject this report to an in-depth review at a meeting in Berkeley on 28 April through 3 May, with special attention being paid to the technical specifications, cost estimates, and schedule.

The results of that review will then form the basis for the department's own deliberations on the supercollider. The project is currently being considered for a new start on construction in FY 1988. If it goes forward then, however, budgetary pressures will likely force a slow rate of construction. Alternatively, energy officials may decide to delay the project a year and ask for a new start in FY 1989. Or, they may decide to ask for more R&D. In any case, they will have to reach some kind of decision during the summer, since their budget proposals for FY 1988 are due to go to the White House in September. ■

M. MITCHELL WALDROP

Congress Urged to Change Patterns of Research Support

Growth in economic productivity in the United States will continue to lag unless trends in federal support for science change. This warning was delivered on 15 April to the House Science and Technology Committee's Science Policy Task Force by witnesses assembled to give advice on the optimum funding level for national research. The hearings were part of a yearlong assessment of research priorities for the next decade.

Harvey Brooks, a professor of technology and public policy at Harvard University, argued that "We must not expect to realize the benefits of our own basic science unless we are agressive in seeking out and using the results." Not only must the nation's applied scientists be quicker to tap breakthroughs in basic knowledge, he says, but they must "become more aware of what is going on elsewhere in the world."

Both Brooks and Martin Baily, a senior fellow at the Brookings Institution, drew attention to declining federal support for civilian applied research. "This is a move in the wrong direction," said Baily. And although applied research in the defense sector has risen dramatically in recent years, Brooks noted that the resulting innovation is less and less applicable to the civilian economy.

Even with additional federal support, though, Brooks and Baily say the United States needs to pay more attention to research in other countries. To keep abreast of world competitors, Baily advocates that information centers be set up in critical scien-

tific and technology areas. The facilities might be funded by user fees and would track, catalog, and digest foreign scientific developments for the American research community.

Besides being hampered by lagging federal and private support, Brooks argues that scientific creativity is being stifled by an increasingly elaborate grants competition process. When used too exclusively, he says, it can be "wasteful of the time and energy of talented people." He advocated directly funding the work of some scientists with proven track records.

With respect to the funding of science in tight budgetary times, Brooks asserts that large weapons development programs, the space station, or the shuttle should not be viewed as science, and consequently should not compete with the science budget. Projects such as the Superconducting Super Collider, unmanned planetary probes, or large telescopes do fall within the scientific arena, he argues, and they should compete for funds along with other research projects. ■ MARK CRAWFORD

Copyrights Obsolete in An Electronic Age, OTA Finds

The patent and copyright laws must be overhauled to take account of complex new electronics and communications gadgetry, according to a recent report by the Office of Technology Assessment.

The study, "Intellectual Property Rights in an Age of Electronics and Information," made no splash at its release on Capitol Hill on 16 April. The problem, not a new one for OTA, is that its recommendations are vague, as a congressional staffer complained. However, the report does suggest that Congress might want to create an entirely new regulatory agency—something akin to the patent office and patent court combined—to handle intellectual property disputes. On the other hand, Congress may not want to touch the idea.

The study was commissioned by the subcommittees in charge of patent and trademark laws, headed by Senator Charles Mathias (R–MD) and Representative Robert Kastenmeier (D–WI). They hoped to get a forecast of the kind of changes that might be needed to keep the laws up to date with the revolution in electronics.

Without question, the information business is booming. As the report says,"Individuals are consuming, on the average, 1.2% more words each year." According to the OTA, the data-shuffling sector of the economy accounts for 41% of the U.S. labor force and 34% of the gross national product. The numbers are growing. The increased traffic in information means that "it will be treated more and more like a commodity, to be bought and sold in the marketplace." This will lead to new and complex battles over access to data, claims of authorship, and the integrity of products such as computer-spawned films and music.

As these economic stresses mount, OTA says, the courts may be overwhelmed. Rooted in the traditions of the printing press, the old patent and copyright system may not be versatile enough to deal with the dilemmas posed by electronic machinery. Some of the problems OTA foresees are:

■ It may be hard to establish who an author is, or what percentage of the product he or she may rightly claim, when many people contribute simultaneously to a database or other computerized product. Many things, from newspaper articles to airplane designs, are created by joint efforts focused in a single computer's brain.

■ Existing laws may not be useful in sorting out conflicts that arise between man and machine. For example, if a computer music-writing program is modified by a musician and produces a popular song, is the computer (or its programmer) entitled to royalties? Present law is unclear on how to treat "interactive" programs, in which the computer and its user together create an original work.

■ The ease and speed with which digital information can be copied poses new problems. It will be possible with laser disks and new optical technology to obtain the equivalent of 100 novels almost instantaneously from a site 100 miles away. The 100 novels may then be copied and stored in a matter of seconds. The temptation for piracy will be great. The impulse to limit access will also be great. OTA suggests that existing laws are not sophisticated in this area. They may not be adequate to balance the need for public access to information against an expected clamor for new author's rights.

■ Despite the passage of a new software copyright law in 1980, the courts have given widely varying interpretations of what is and is not protected. The reason, OTA says, is that "copyright law cannot be successfully applied to computer programs." In general, the courts have tended to err on the side of the authors, according to the OTA, giving more protection to software than may be desirable. This could discourage legitimate forms of reverse engineering. It could lead also to the duplication of effort and the enforced use of inefficient programs.

■ Digitized pictures and sound tracks will create special problems. For example, movie producers may be able to stock useful old scenes, perhaps even images of actors, for use in synthetic filmmaking. Lucasfilm of San Rafael, California, now sells an optical disk device called EditDroid that automates virtually the entire process of film editing. With computers, it will be possible to resurrect dead movie stars and cast them in new roles. (California has already passed a law requiring that the heirs' permission be obtained.) Sorting out royalty claims in the future may be very difficult.

In many if not all of these cases, the marketplace will develop a way around the dilemma. However, there is some risk, OTA warns, that private solutions may neglect the constitutional goal of providing as much public access to information as can be fairly given. For example, some companies have devised interlocking systems that require the use of specific hardware to play their tapes or to run their computer programs. Such built-in controls will not be popular and will never be effective, OTA says, unless they are made mandatory by law. Yet it will not serve the public well to have such a law.

The report concludes by offering several policy alternatives. One would be to create a new federal agency to handle intellectual property claims. Another is to do nothing, meaning, OTA says, to rely on the courts to sort out most of the problems. But OTA observes that the courts are not well equipped to deal with the complexities of the fast-moving electronics business. Congress may simply wish to strengthen the existing enforcement system and encourage software writers to join royalty-collecting societies, as singers and actors have done in the past.

The OTA's analysis aims to provide a comprehensive solution to some problems that are still rather ill defined. But, according to Stanford University law professor Paul Goldstein, chairman of OTA's advisory panel for this report, it may be more sensible to move slowly. The best approach may be to cope with each technological case as it comes along, adhering to past principles. In his view, Congress should try to fit each new technology into the existing legal framework, but, where this would create a clear distortion, it should simply enact a new law. This is what Congress did in 1984 with the creation of the novel Semiconductor Chip Protection Act, which protects the "architecture" of electronic circuits. This approach has proved more effective, in Goldstein's view, than the decision in 1980 to amend old copyright laws to accommodate the needs of software writers. ■

ELIOT MARSHALL