HAPPER WALKS INTO THE CALDRON OF DOE's TOP RESEARCH POSITION

Atop Will Happer's desk at his bare-walled office in the Forrestal Building in Washington sits a miniature hand-carved wooden figure of Ganesh, the Hindu god of wisdom and prudence. In Hindu mythology, Ganesh bears the head of an elephant, placed there by his god-father, Siva. By custom, Ganesh is invoked at the start of an important undertaking. Happer is likely to need the virtues of Ganesh as he begins his new job—that of director of the Department of Energy's research office, which will spend about $3 billion this year for DOE scientific facilities and programs. In this post he is responsible for directing the operation of DOE's non-weapons laboratories and for supervising the programs in basic energy sciences, high-energy and nuclear physics, fusion energy research, biological and environmental research, and the department's own scientific computing operations and science education projects. And if that isn't enough, Energy Secretary James D. Watkins has charged Happer with making sure that the national labs are transferring their best technologies to US industrial companies and with serving as his personal adviser on R&D policies and projects throughout the department, even on defense matters.

Happer takes all this in stride. Urbane and unflappable, he approaches the DOE job with impressive credentials. Arriving at Columbia University in 1964 with a PhD in atomic and nuclear physics from Princeton University, he was spotted by I. I. Rabi as an "up-and-comer" and promoted quickly to assistant professor, then professor, codirector (with Sven Hartmann) of the Columbia Radiation Laboratory in 1971 and eventually lab director in 1976. He inherited Polykarp Kusch's contract from the Air Force Office of Scientific Research to work in optical pumping of spin-polarized nuclei and in laser spectroscopy—fields in which Happer quickly became a leading authority.

"He was quietly impressive," recalls Marvin L. Goldberger, who was one of Happer's teachers at Princeton. According to Goldberger, who later became president of Caltech and director of the Institute for Advanced Study in Princeton, New Jersey. "Will Happer was distinguished by a tidiness of mind, a steady clear-headedness that led him right to the heart of the matter."

Happer: 'Mr. Integrity' at DOE research.

In 1980 Happer returned to Princeton as a professor of physics, and he has been there since. For nearly two decades he also served on Jason, a self-selected, prestigious group of scientists and engineers who exert a powerful influence on US defense, energy and environmental policies. Happer was chairman of Jason from 1987 to 1990, a period when it studied such issues as submarine security and global climate change. A veteran Jasonite, Richard Garwin of IBM, characterizes Happer as "a person of total integrity, enormous energy and wide interests." Happer, as Garwin puts it, is "a mine of aphorisms, poetry and witticisms—from the Bible, from literature, from everywhere. He has a quote for every occasion."

Besides his accomplishments in basic research, Happer has made some clever contributions to technology. In the early 1980s, for instance, he invented the concept of projecting an artificial guide star 100 km or so into the sky by a ground-based atomic sodium laser to compensate for atmospheric turbulence—an "adaptive optics" technique developed by Lincoln Laboratory for the Strategic Defense Initiative and later declassified for use in astronomy.

Sidney D. Drell of SLAC, another member of Jason, refers to Happer as "an absolutely first-class physicist with a deep sense of duty and with uncompromising standards and principles. I think he'll need those traits as he steps into the caldron at DOE."

DOE's Office of Energy Research has been in hot water for years. Federal budget constraints for R&D haven't stopped the department from starting an array of costly new projects, such as the Superconducting Super Collider, the Continuous Electron Beam Accelerator Facility, the Relativistic Heavy Ion Collider and several large synchrotron light sources. The financial burdens of these machines on existing programs, as well as the changes made in the magnetic and inertial fusion programs, angered many prominent scientists and riled some influential members of Congress. The DOE research office became the center of a conflict of interests between those demanding big machines and those arguing for individual researchers.

The post of director has been vacant since the last occupant, Robert O. Hunter Jr, left in October 1989 under powerful pressures from scientists and politicians. (James F. Decker has been acting director in the interim.) After Hunter departed, more than two dozen scientists were considered for the job, and some were even interviewed by Watkins. Then, last December, Edward A. Frieman, director of the Scripps Institution of Oceanography and himself DOE's research director in the Carter Administration, submitted Happer's name to Watkins. As a member of the Secretary of Energy Advisory Board, Frieman was able to make the case for Happer directly to Watkins. Within days, Happer was offered the job by one of Watkins's aides. Happer accepted, he once said, "out of a conviction to serve my country." Happer's remark sounds corny, observes Robert Novick, who has remained a close

friend since Happer was his postdoc at Columbia, "but with Will it's an obsession to serve the public good."

Happer's commitment to civic duty was inherited. He was born in 1939 in Vellore, India, the son of William Happer, a Scottish physician serving as a lieutenant colonel in the British army, and Gladys Morgan Happer, a medical missionary from North Carolina. After his father went off with the Indian army to Iraq early in World War II, his mother sailed back to the US with little Will. When the Oak Ridge National Laboratory opened to produce enriched uranium for the first atomic bomb, Will's mother became the first physician at the site. Upon India's independence, the family relocated in Edinburgh. In 1962, while Happer was a graduate student at Princeton, he obtained a certificate of US citizenship, on the basis of his mother's birthplace—though he had to wage a fierce battle against the bureaucracy to get it.

Once Happer accepted the idea of joining DOE, he was subjected to a series of FBI checks over the next six months and White House reviews for possible financial and ethical conflicts. In early May, Watkins phoned Happer at Princeton and said that President Bush was prepared to nominate him for the DOE position, but it would be absolutely necessary for him to resign his Princeton professorship. The White House ethics office and several senators had demanded that Happer sever all ties with Princeton to avoid any conflicts of interest, particularly over the Princeton Plasma Physics Lab, which the DOE research chief oversees.

To Happer, resignation from Princeton was a financial and emotional wrench. It meant he had to give up his tenure, among other things. He also agreed to resign as a trustee of MITRE, a systems engineering firm that hosts Jason. Once he had made these commitments, the President on 17 May sent Happer's nomination to the Senate. Happer's confirmation hearing before the Senate Energy and Water Development Committee on 18 July took a scant 17 minutes. Only two senators attended: Bill Bradley of New Jersey, himself a prominent Princeton alumnus, representing the Democrat majority, and Frank Murkowski of Alaska, for the Republican wing. Bradley, serving as chairman on this occasion, noted that Happer would be leaving the university if confirmed. "Princeton's loss will be our collective gain," said Bradley. "His is an extraordinary talent that the department is lucky to have."

For his part, Happer testified as to his plans at DOE: "One of my goals would be to strengthen the interactions between the laboratories, industry and the universities, and to make the most effective use of their complementary capabilities. I would work toward strengthening ties to the private sector to ensure effective technology transfer. I am convinced that some of the programs supported today by the Department of Energy will help to provide abundant and environmentally safe energy in the future . . . I would plan to strengthen the department's educational role, since scientific and technological capabilities are of increasing national importance." When Bradley asked what he expected would be the most challenging aspect of the job, Happer said making sure DOE's research program went forward steadily in this era of increasingly tight budgets.

Happer's nomination was quickly confirmed on 2 August, just as Congress left for its summer recess. He was sworn in on 6 August by Deputy Energy Secretary Henson Moore. "Will faces some hard problems," says Hunter, who certainly ought to know. "The real issue for him is: What can he do to improve the state of science and what are the science communities willing to do to help him?"

—IRWIN GOODWIN

NSF BREATHES LONGER LIFE INTO MIT's MAGNET LAB—TO 1995

What a difference a year makes. When the National Science Board endorsed the National Science Foundation's decision last fall to pull the plug on MIT's Francis Bitter National Magnet Laboratory and to fund a new national magnet lab at Florida State University, there was fear and trembling among the staff and users of the MIT facility. They all knew that NSF still was obligated to provide the Bitter Lab with $6 million for 1991, the final year of its three-year contract, but the foundation had made no commitment beyond the last day of the fiscal year, 30 September. With the day of reckoning rapidly approaching for the MIT lab, the Science Board came to the rescue on 9 August by agreeing to provide a total of $18 million to keep the lab operating for another four years, to the end of fiscal 1995.

Of added importance, the board endorsed NSF's plan to put up another $5 million for Bitter Lab physicists and engineers to undertake the design and construction of a hybrid dc magnet generating a field strength of 45 tesla. This magnet will be developed in collaboration with the new National High Magnetic Field Laboratory, a partnership of FSU, the University of Florida and Los Alamos. Because the magnet will be the centerpiece of the Florida lab, which is scheduled for completion in late 1994, FSU will put up $4 million of the magnet's expected total cost of $9 million from its NSF funding.

The Science Board's verdict gives the Bitter Lab a new lease on life. "It means we are not going to a premature death this fall," says a pleased J. David Litster, the Bitter Lab's director, who also serves as MIT's vice president for research and associate provost. To some 370 researchers in condensed matter physics, materials science and engineering, chemistry and biological sciences who conduct research at the Bitter Lab, news of its continued operation is welcome indeed. Last summer, after the board had approved NSF's decision to reject the MIT proposal to keep the lab running, many of the users besieged board members with angry protests. They complained that the foundation and the board had utterly ignored the findings of three of NSF's own advisory groups—all recommending continued funding for the Bitter Lab. The High Magnetic Field Users' Committee, representing all of those who make use of the MIT lab from about 80 research groups, argued that the choice of Florida State over the Bitter Lab "will have a severe negative impact ('catastrophic' might be the proper word) on users for many years—perhaps indefinitely." While the Florida lab is under construction, the committee wrote in its petition to NSF, users would be expected to conduct their research at magnet facilities in either France or Japan, since the MIT lab is the only national user facility in the US providing high magnetic fields for research. Such a situation was impractical, users pointed out. As it happens, the magnet facility at the Institut Laue–Langevin in Grenoble, France, has