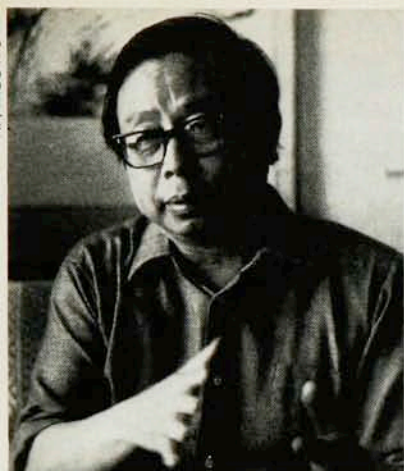




Fang Lizhi: 'Conscience of China'

Most of the graduate students and postdocs asked to remain unidentified because they feared harassment or retaliation. They know that back home more than 1000 students, teachers, scientists, intellectuals and workers have already been rounded up, often in the dark of night, paraded before television cameras and labeled "counterrevolutionaries," "thugs" and "dregs," then trundled off to an uncertain fate or to swift execution. Chinese students in the US suspect that their words and deeds are monitored and entered into dossiers for later use—a "Big Brother" tactic right out of George Orwell's novel *Nineteen Eighty-Four*.

A graduate student in physics, who asked not to be named, told of being called by a PRC consulate official in New York and asked about organizers of rallies in Washington and Boston. "They wanted to know who participated," he said, "and my answer was: 'We all took part. It was unanimous.' Their intentions are obvious: They want to build a case so when we go back they can get even."

Chinese students reacted swiftly to the PRC version of Orwell's Ministry of Truth. When Beijing began rewriting the events of 3-4 June, the stu-

dents in the US set up information networks to communicate the truth of the horrors, the show trials and the executions by electronic mail over personal computers and fax machines. Chinese student associations and other groups ran ads in newspapers telling of their anger over the "slaughter of innocents" and their shame over the "cover-up of the bloody events."

They gathered by the hundreds at rallies, meetings and night vigils from Columbia University in New York City to Stanford and the University of California at Berkeley to protest the actions of their own government. At Fermilab, research assistants asked that the PRC flag in the line of foreign flags be flown at half staff to commemorate the deaths in Tiananmen Square. Fermilab Director Leon Lederman ordered the flag to be taken down entirely. "I am ashamed for my nation," a female postdoc at a Midwest university said. Albert Wu, a physics professor at the University of Michigan, called the dialogue among Chinese students "an unforgettably moving experience."

About 400 students, about half of them Chinese, attended a panel discussion at the University of Illinois's YMCA on the evening of 14 June. The principal panelist was Guan Wei Yan, who had been removed as president of the University of Science and Technology at Hefei in January 1987 along with Fang Lizhi, then the university's vice president. A solid-state physicist, Guan, who has been at Illinois since 1 June, working in high- T_c superconductivity, is a spiritual and intellectual leader of Chinese students. In the US since 1 March, he has been a visiting professor at Notre Dame University and will be at the University of Maryland and University of Houston this summer before he returns to China in October.

At the Illinois meeting Guan emphasized the great uncertainties ahead for students and their country.

But whatever the future holds for China should be determined within China, he said, not by foreign governments.

While the widespread demand for political reform and anger about official corruption that led to the protests in Beijing and a half-dozen other cities has subsided, at least for now, Chinese students in the US continue to call for democratic change. They consider the US China's best hope. It is hardly surprising under the circumstances that Fang, a prominent astrophysicist and China's best-known dissident, sought sanctuary in the US embassy with his wife, Li Shuxian, a physics professor at Beijing University, and their youngest son. Fang has particular reason to fear for his safety. His scathing remarks on the irrelevance of Marxism have earned him the personal enmity of China's elderly leaders. His refuge in the US embassy provoked an immediate warrant for his arrest as both an "enemy of the people" and a counterrevolutionary. It also led PRC leaders to denounce the US for interfering in China's internal affairs.

Meanwhile, Fang's oldest son, Fang Ke, a research assistant in the physics department at Wayne State University in Detroit, appeared on NBC-TV's "Today" show to praise his parents as "the conscience of China."

Secretary of State James A. Baker III has proposed providing safe conduct for Fang and his family to a third country, but short of PRC troops storming the American embassy it appears that the Fang affair may settle into an awful stalemate like the one that resulted in Cardinal Mindszenty's holing up in the US legation for 15 years after the Hungarian uprising in 1956.

President Bush has expressed his sympathy with the student protests, stating that the prodemocracy movement in China is "inexorable" and that "the genie will not be put back in the bottle." —IRWIN GOODWIN

WASHINGTON INS & OUTS

GRAHAM DEPARTS, MURRIN TO COMMERCE, TOP CHANGES AT NASA AND PENTAGON

On 5 June, the same day that President Bush formally asked the Senate to approve his nomination of D. Allan Bromley of Yale University as director of the Office of Science and Technology Policy, **William R. Graham**, director of OSTP since 1 October 1986, left the White House to become

senior vice president for corporate development at Jaycor, a midsized high-technology company with headquarters in San Diego and total sales of \$66 million last year. Jaycor designs and develops laser beam and pulse power weapons for the Defense Department's Strategic Defense Ini-

tiative. It also provides technical and systems management services to a wide spectrum of government and corporate clients, including Oak Ridge National Laboratory and Martin Marietta. One of Jaycor's intense interests right now is to take over Maxwell Labs, a company with simi-

lar products and roughly equal revenues. On 9 June, Maxwell rejected Jaycor's unsolicited buyout bid of \$44 million.

At Graham's farewell reception in the ornate Indian Treaty Room of the Old Executive Office Building, a message from the President was read aloud: "To your lasting credit," Bush wrote, "you championed the wise principle that sound, objective science must drive policy, not the other way around. . . . In the councils of government and as adviser to two Presidents you could always be counted on to give your candid and informed views . . . whether the subject was threats to our national security, challenges to our economic competitiveness or the advancement of science for its own sake."

Graham earned a BS in physics from Caltech and MS and PhD degrees in electrical engineering from Stanford, then worked on nuclear weapons technology and effects at Hughes Aircraft and at the Air Force Weapons Lab in the 1960s. In 1971 he was one of 25 Rand Corp staff members, mainly physicists, who left to set up R&D Associates, a high-technology research organization and science think tank in Marina del Rey, California. In the 1970s Graham served on several defense task groups for Ronald Reagan, who was then seeking the Republican nomination for President.

Once in the White House, Reagan appointed Graham chairman of the General Advisory Committee on Arms Control and Disarmament. He served in that post from 1982 until 1985. Reagan then named him deputy to NASA Administrator James M. Beggs. Ten days after Graham's Senate confirmation, Beggs resigned under a cloud of improprieties surrounding the now-canceled Sergeant York battlefield anti-aircraft weapon developed by General Dynamics, where Beggs had been executive vice president at the time of the contract. Beggs later was cleared of all charges. Meanwhile, Graham was catapulted into the post of acting administrator, and ten weeks later the Challenger space shuttle exploded, killing its entire crew of seven. Suddenly, Graham became a familiar figure at Congressional hearings and on television talk shows.

Taciturn and guarded by nature, Graham was ill suited in the aftermath of the Challenger tragedy to restore public confidence and agency morale during the reconstruction of NASA. So when Reagan selected James C. Fletcher to steer NASA back into space, Graham was given a conso-

lation prize—the dual positions of Presidential science adviser and OSTP director, both vacant since George A. Keyworth II left early in 1986. Perhaps Graham's most important legacy to NASA was his elevation of Admiral Richard H. Truly, who had piloted two shuttle missions in the early 1980s, from the Navy's Space Command to associate administrator for spaceflight, with prime responsibility for overhauling the shuttle.

At OSTP, Graham's first major public appearance came in late July 1987 when he shared the stage with Reagan and the Secretaries of State, Defense and Energy at a government-sponsored conference on commercial applications of high- T_c superconductors. But Graham got himself in hot water before the conference by denying all foreign scientists, businessmen and embassy officials permission to attend. Graham was accused of xenophobia and of seeking to impose secrecy on scientific work carried out in laboratories throughout the world. Graham, for his part, said the event was meant to "reach out" to US industries and stimulate them to develop products from the new materials.

Graham led interagency task forces charged with coming to grips with new developments in R&D and intellectual property rights. He says he sees R&D, and basic science in particular, emerging as a key factor in all international relations. To implement that vision, he sought support at the ministerial meeting of the Organization for Economic Cooperation in Paris in May 1988 for a "framework of principles" guaranteeing access for scientists and technologists to basic research activities, regardless of the institutional structure in which they function, and for a common view on intellectual property rights so that this issue does not become a barrier to the free exchange of research. He won support on both counts. The OECD framework on intellectual property rights was an important part of the US-Japan science and technology agreement signed in Toronto by President Reagan and Prime Minister Takeshita in June 1988. It was also integral to recent scientific exchange agreements concluded with Brazil and India, both of which were negotiated by Bromley, Graham's designated successor.

President Bush announced his intention on 22 May to nominate **Thomas J. Murrin** as Deputy Secretary of Commerce. Murrin was graduated from Fordham University in 1951

with a BS in physics and joined Westinghouse Electric the following year. He moved up the Westinghouse ladder to become executive vice president of the Defense and Public Systems Group in 1971 and finally president of the Westinghouse Energy and Advanced Technology Group in 1983. He held that post until 1987. He then joined Carnegie Mellon University as Distinguished Service Professor in Technology and Management.

A 35-year veteran of Westinghouse turf wars, Murrin, known by colleagues as assertive and combative, is regarded in the business community as an outstanding manager. He was an outspoken member of President Reagan's Commission on Industrial Competitiveness, which concluded in its 1985 report, "Global Competition: The New Reality," that the government should develop a strong trade policy that would include reducing the cost of capital to stimulate industry's investment in R&D. It also called for improving the nation's education system to ensure "a more skilled, flexible and motivated work force"—recommendations that the Reagan Administration failed to carry out. Murrin is likely to be the Bush Administration's point man for many of the nation's high-risk technologies, such as high-definition television and high- T_c superconductivity.

Even before he has Senate approval for the space agency's top job, acting NASA Administrator Richard Truly has been filling some key vacancies. On 16 May he appointed **Samuel W. Keller** as associate deputy administrator, the agency's third-ranking position, which had been occupied by Noel W. Hinners, who resigned two days before. Truly made the announcement in his first televised talk to all NASA employees, only one day after he became acting administrator.

In Keller's old post of deputy associate administrator for space science and applications, which he had held since December 1977, he was known as a "real pro." In the Gorbachev era, Keller has been NASA's chief negotiator with Soviet space ministers and scientists. Before coming to NASA headquarters in 1975, Keller was director of administration and management at Goddard Space Flight Center, and prior to that he was at The Johns Hopkins University Applied Physics Laboratory and at the Naval Research Lab. He received a BS in engineering from the University of Maryland and a law degree from George Washington University.

Keller's old job of deputy associate

administrator for space science and applications went to **Alphonse V. Diaz**, effective 2 July. Diaz had been division vice president for space and aeronautics services at General Electric Government Services in Cherry Hill, New Jersey. In this capacity he was responsible for managing NASA-related activities provided by GE. He had been at GE only one year, having previously worked at NASA since 1964, when he joined the Langley Research Center in Hampton, Virginia, as a cooperative education student. Later at Langley he took part in developing the organic biochemical experiment placed on board the Viking lander that went to Mars. He also worked in NASA's Solar System Exploration Division and the Space Science Office.

Diaz received an MS in physics from Old Dominion University in 1970 and a master's degree in management from MIT in 1986.

At the Defense Department, several key changes were made in the past few months: **George P. Millburn**, executive director of the Defense Science Board, became deputy director for defense research and engineering (research and advanced technology), effective 4 September. In this position he is responsible for guidance and oversight of the Pentagon's science and technology program, which covers all research, exploratory development and advanced technology demonstrations. It is the government's largest multidisciplinary program, totaling about \$5 billion annually.

Before Millburn joined the Defense Science Board in 1986, he was technical assistant to the Deputy Under Secretary of Defense for Research and Advanced Technology as well as acting Deputy Under Secretary for 16 months in the early 1980s. He also was director of the SHAPE Technical Centre in the Hague, providing scientific and technical advice to the Supreme Allied Commander, Europe (SACEUR).

Prior to joining DOD, Millburn was with The Aerospace Corp in El Segundo and San Bernardino, California, where he was largely responsible for the Minuteman MIRV. He served as cochairman of the operations panel in President Nixon's space task group that advocated and defined NASA's space shuttle. He also worked at Ford Motor's Aeronutronics Division in Newport Beach, California, where ICBM decoys were designed and tested, and at the Lawrence Radiation Laboratory in Livermore, where he helped develop new concepts for nuclear warheads on strategic missiles.

Millburn got a PhD in nuclear physics from the University of California at Berkeley in 1956.

Thomas J. Welch, formerly deputy assistant to the Secretary of Defense for atomic energy matters, succeeded Millburn on 16 April as executive director of the Defense Science

Board. Welch received a PhD in physics from Auburn University in 1974. He worked as a physicist at the Army Land Warfare Laboratory and later at the Army Ordnance Center, where he specialized in chemical and biological warfare.

—IRWIN GOODWIN

RESEARCH COUNCIL CITES FLAWS IN NSF EMPLOYMENT STATISTICS

How seriously should we take government reports warning of the coming shortage of scientists and engineers in the US? Demographic analyses indicate that the college-age population peaked at about 30 million in 1982, and by 1995 there is likely to be a 12–16% decrease in enrollments at colleges and graduate schools. Women along with men from some minority groups, already underrepresented in most sciences, seem to be losing interest in the so-called hard sciences—a situation that contributes to the declining percentage of students majoring in those fields. Retirements by faculty in the physical sciences are certain to increase in the 1990s, possibly resulting in a teaching shortage. Foreign students are flocking to the nation's graduate schools, particularly in the physical sciences and engineering, but just how many will remain in the US to work is murky.

Indeed, a study released on 6 April by the National Research Council, entitled "Surveying the Nation's Scientists and Engineers," suggests that the US does not know as much about its current and future scientific and technical work force as it should. Data collected by the National Science Foundation, the primary source of information on the demographics, training and size of the nation's scientific and engineering work force, are "ambiguous, subject to misinterpretation by users, and very difficult to relate to estimates produced by other data systems," the report states.

In addition to NSF, information on scientific and engineering personnel is gathered by the Census Bureau and the Bureau of Labor Statistics, and the National Center for Education Statistics conducts surveys of the career paths of high school and college graduates. However, deciding exactly who is a scientist or engineer often results in confusing and seemingly contradictory data. Thus, NSF estimates there are 4.6 million employed scientists and engineers in the US—50% more than the total calculated by the Census Bureau and

the Bureau of Labor Statistics in their Current Population Survey.

The Research Council recommends that NSF identify scientists and engineers both by training and by employment, then integrate its statistical data with those collected by other Federal agencies. The importance of such data "crosswalks" was also raised last spring at an NSF-sponsored workshop run by the Commission on Professionals in Science and Technology. The report of that workshop, "Measuring National Needs for Scientists to the Year 2000," will be released soon. The commission's executive director, Betty M. Vetter, worries that "we are making all sorts of expensive decisions based on poor data."

While the US leads all other nations in monitoring the population of scientists and engineers, according to the Research Council's report, a need exists for an expanded "national data system" that would provide greater detail on science and engineering career paths, worker productivity and changes in the workplace. Such information is urgently needed, says the report, because of "the unusual importance of scientists and engineers to the nation's continued productivity and economic growth."

The Research Council's report was warmly received by William L. Stewart, director of NSF's Division of Science Resource Studies, who states that it fairly expresses concerns brewing within NSF. The report repeatedly cites the need for substantial, but unspecified, increases in staff and funding to make full use of the potential in NSF's employment statistics. NSF is currently estimating the costs of the Research Council's proposed changes. But there is already some good news for the foundations's Division of Science Resource Studies: After three years of declining budgets, the division received modest boosts in 1988 and 1989, and NSF has requested \$6 million in fiscal 1990—a 39% increase over 1989.

—COREY S. POWELL ■