

The House measure would cancel several programs, including the Triana mission, which has attracted Republican opposition largely because it was championed by Vice President Gore. Space scientists have been reeling from the House committee's blow to their account by a \$163 million decline, or 7.7%, to \$2 billion, mainly because CONTOUR, a \$50 million comet mission, would be dropped altogether. "Not only are these cuts devastating to NASA's programs, they are a knife in the heart of employee morale," said Dan Goldin, NASA's administrator.

In the same bill, NSF emerged with what has been termed a "survival" budget, though some of its ambitious spending plans for next year would need to be scuttled. While most of the research directorates would hang on at this year's levels, the foundation's total budget would be cut 1.7% in the House plan, down \$64 million to \$3.6 billion. The full committee accepted the subcommittee's recommendation to reduce the president's request by \$274.6 million. The appropriators allowed only \$35 million of the \$146 million that had been sought for NSF's share of the administration's \$366 million multi-agency information technology initiative and nothing for a requested \$35 million terascale computer. They were put off by the cost of the IT² initiative and by the fear that NSF would favor one of its two existing supercomputer centers, at the University of California, San Diego, and the University of Illinois at Urbana-Champaign, in any competition for the new computer. Programs in the mathematics and physical sciences directorate would be funded at \$735 million, nearly \$20 million below the administration's request.

The House's allocations for NSF left the agency's director, Rita Colwell, in shock. "We're able and ready to do 21st century science and engineering, but we can't do it on a 20th century budget," she said in a statement. "While I ap-

preciate the very severe constraints the Congress has to work within, we need to redouble our efforts to show why investing in science, engineering, and technology should receive priority attention."

The proposed reductions in the budgets of NASA and NSF have called forth wistful memories of the Republican leadership when Newt Gingrich was House Speaker. A former history professor, Gingrich was a dynamic force behind the appropriations process for science, technology, and education, unlike his successor, Speaker Dennis Hastert of Illinois. Gingrich's concerns showed up as boosts for R&D budgets during his reign.

The House energy bill would provide \$15.6 billion for DOE, \$1.5 billion less than the Senate's version. The large difference between the two bills is certain to result in a troublesome conference. The House appropriation also withholds \$1 billion until Congress restructures the department's nuclear weapons programs or establishes a new semi-autonomous agency to manage those programs.

In the wake of growing congressional anger over charges of security breaches, health violations, and management failures at the weapons labs, House members of both parties have demanded that DOE needs to clean up its act. By a vote of 96-1, the Senate approved a semi-independent Agency for Nuclear Stewardship inside DOE, but the House report accompanying the appropriations bill goes further and advocates the creation of a new independent agency outside the department. Even if the restructuring occurs promptly, the bill would not allow the \$1 billion to be available until after next 30 June. Pete Domenici, the influential New Mexico Republican who heads the Senate Energy and Water Development Appropriations Subcommittee, argues that the resulting delay will disrupt DOE's stockpile stewardship program, which maintains the safety and

reliability of nuclear weapons without conducting underground tests.

In DOE's science account, the House would provide \$2.6 billion for R&D, a cut of 2.8% after adjusting for general reductions. Fusion research would receive \$245 million, an increase of 10.8% for fiscal 2000 after several years of flat or declining budgets. High energy physics would rise 1.3% to \$698 million and nuclear physics would ascend 5.3% to \$351 million. Within the basic energy sciences, however, the House bill would reduce funding for the Spallation Neutron Source, to be built at Oak Ridge National Laboratory, to \$68 million, down from the requested \$214 million. The bill calls for revised project estimates and management plans with clearer milestones before additional construction funds are provided.

Commerce Department funding for science and technology would be cut by \$420 million, or 15% below current levels, by House appropriators. The largest whacks at the department are at the National Institute of Standards and Technology's Advanced Technology Program, which would be eliminated and the National Oceanic and Atmospheric Administration, where most R&D programs would suffer, though the Senate has other ideas about funding both the ATP and NOAA.

At the meeting with science society representatives and others on 10 August, Lane said he was "confident" that the awful budget situation can be turned around "if America's research community makes its strong voice heard in the days ahead. Otherwise, if the cuts are allowed to stand, we will all be leading lesser lives in a lesser land." He then quoted President Clinton as having once said: "Cutting back on research at the dawn of a new century where research is more important than it has been for even the last 50 years would be like cutting back our defense budget at the height of the cold war."

IRWIN GOODWIN

Science Loses an Urbane Champion in Congress With Death of George Brown After 18 Terms

With the death on 15 July of George E. Brown Jr, who served in Congress for 36 years, science in the US has lost its most venerable political champion. At the age of 79, he was the oldest current member of the House of Representatives and the senior Democrat on the Science Committee. Brown served as the committee's chairman for four years (1991-95), until the Republicans returned to power in the House for the first time in 40 years. His death

was attributed to a rampant infection following surgery for a heart valve replacement.

Brown was known on Capitol Hill and in Washington scientific society circles as "Mr. Science." Upon his death, President Clinton issued a statement noting that Brown's "support for science was drawn from his deep belief that science and technology could help achieve a peaceful world and a just society." At a meeting of the National

Science Board on 29 July, a resolution was passed recognizing Brown as "more than a friend of science. . . . [He] was a fount of wisdom about how science and technology transform our lives and our understanding of it. As an advocate for space exploration and environmental protection, he challenged scientists and policymakers alike to consider the unanticipated consequences that future generations would face. As a champion of basic

research and science education, Mr. Brown reminded us that all citizens of all ages expect, and deserve, a return on government investments. . . . In a lecture last year [to a science group], he said, 'Given that we can completely transform the world with our knowledge, we are morally compelled to answer the question, What is the end that we seek?'

A memorial service held on 28 July in the Los Angeles suburb of Monterey Park, where Brown was mayor in 1955–58, was attended by some 1100 mourners, including congressional leaders of both parties, NASA Administrator Dan Goldin, and President Clinton's science adviser, Neal Lane. In his remarks, Lane characterized Brown's quintessential quality: "his ability to thrive in two separate worlds at the same time—a rough-and-tumble world of politics and two-year election cycles and a more quiet and contemplative world devoted to thoughtful analysis of the long-term progress of science and society." Lane concluded by quoting from a recent interview in which Brown stated his philosophy: "From my earliest days, I was fascinated by a utopian vision of what the world could be like. I've thought that science could be the basis for a better world, and that's what I've been trying to do all these years."

A second memorial for Brown was conducted two days later in the rococo rotunda of the US Capitol. On this occasion, with some 500 guests attending, an Army string quartet performed the third of Bach's *Brandenburg Concertos* and Aaron Copland's *Variations on a Shaker Melody*, and House Speaker Dennis Hastert of Illinois, Minority Leader Richard Gephardt of Missouri, friends, and family members reminisced about Brown's life and accomplishments. One of the speakers was Brown's widow, Marta, who has entered a special Democratic primary to be held this month for his seat in California's 42nd Congressional District. She said, "George believed that public service was a noble calling, that an individual could make a difference, and that through persuasion and reason we could build a better society. Media advisers, sound-bites, and political polling were never used to set his positions. George consulted his knowledge of history, the details of the issue, and his conscience in setting his own course. His approach to campaigning was to be as candid as possible and rely on

the good judgment of the people. This style served him well through every election since 1962, despite repeated forecasts of his impending political demise."

Despite Brown's political longevity, both parties thought he was vulnerable. He was reelected in 1992, 1994, and 1996 with slim majorities. In 1992, he received an unprecedented endorsement from a bipartisan group of the nation's top academics and industrial scientists, including seven Nobel laureates, the former science advisers to Presidents Reagan and Ford, and technology executives at Ford Motor Co, Hewlett-Packard, and AlliedSignal. He



BROWN: Portrait of a physicist turned politician.

won that election with 51% of the total vote. By far his toughest victory was that of 1996, when his opponent was a Superior Court judge and the wife of a police officer. He won by 996 votes.

Brown studied physics and engineering at the University of California, Los Angeles, in the early 1940s. A Quaker, he had initially registered as a conscientious objector during World War II and worked in a Civilian Conservation Corps camp in Oregon. But in 1942, he decided to join the military and served as a second lieutenant in the Army for four years. After the war, he returned to UCLA, got his degree in industrial physics and began working in management in Los Angeles's city government, where he helped organize city workers. During this period, he also mobilized public opposition to the incarceration of Japanese Americans on the West Coast.

In 1954, Brown won his first elec-

tion as city councilman in Monterey Park and became its mayor in 1955. He was elected to the California State Assembly in 1958 and served there until 1962, when he ran for Congress and won, to his own surprise. Brown was reelected three times before he gave up a safe seat to run in the 1970 Democratic primary for the US Senate against Representative John V. Tunney, the son of onetime boxing champion Gene Tunney. Brown derided his opponent as "the lightweight son of the heavyweight champ," but he lost. Two years later, after the postcensus reapportionment created a new seat close to his childhood home in California's

Imperial Valley, Brown was returned to Congress.

In the House, Brown developed an amiable style of argument, tinged with wry self-deprecation. He bound his liberal values with a moderate's ability to find common ground and achieve consensus. F. James Sensenbrenner Jr, a feisty Wisconsin Republican who is chairman of the House Science Committee, found Brown to be "a forceful and tireless advocate for science. Whether it was protecting a science account from attack or pushing the newest area of research, George was a true friend to the science community." On Brown's death, Sensenbrenner said: "With George, a commitment to science always rose above party labels. His integrity and the strength of his word were never in doubt. George's bipartisan approach to science will be a legacy for the committee that I hope will not be lost in the years ahead."

Brown also strengthened science policies within the government. In the early 1970s and again in the 1980s, he led an effort to restructure the National Science Foundation (NSF), moving the agency into more active roles in engineering, education, and such advanced technologies as computers and biophysics. He spearheaded legislation shaping a permanent science advisory apparatus in the executive office of the president, which was established in 1976 as the Office of Science and Technology Policy. He was a force behind the creation of the Environmental Protection Agency in 1971 and the following year of Congress's Office of Technology Assessment, which the Republican leadership disbanded in 1995.

Brown was an active booster of space exploration, both with and without astronauts. He and Sensenbrenner worked together on an amendment to

a Science Committee bill that headed off the annual attempt by deficit hawks to ground NASA's participation in the international space station. More recently, they were allied in making sure the Russian government lived up to its agreement to provide components for the station. But Brown firmly opposed military uses of space. In the mid-1980s, he spoke out loudly and often against President Reagan's "Star Wars" concept of a space-based defense against ballistic missiles. Brown also had been an outspoken critic of US involvement in the Vietnam War and voted consistently against military spending bills in the last years of the war.

Rita Colwell, NSF's director, called Brown "the wise man of science in Congress." Throughout his long tenure on the Science Committee, she said, "he was the most articulate spokesperson for continuing investments in science and technology for the nation's long-term well-being."

IRWIN GOODWIN

NSF Funds Five New S&T Centers, the First New Ones in Eight Years

At its meeting on 29 July, the National Science Board, the governing body of the National Science Foundation, approved five new science and technology centers (STCs), committing almost \$94 million over five years to support their interdisciplinary research, educational outreach, and technology transfer. The five centers are the first new ones selected in the past eight years and bring to 28 the number of such centers operating under the agency's auspices.

NSF established its STC program in 1987 and modeled it on the uniqueness, flexibility, and diversity of the engineering research centers, the first of which had been selected three years earlier. At the time, academics accused NSF of usurping the role and funds of individual investigators by introducing

the STCs. Nevertheless, the formula was viewed as an instant success. A review by the National Research Council found the first batch of centers "sufficiently protean to respond to new ideas, techniques, and relationships, inside and outside the universities."

NSF went on to create biotechnology centers and supercomputing centers, and the Defense Department and NASA set up mission-related centers of their own. In 1997, the STC program was modified to emphasize the special contributions that collaborations among a critical mass of research scientists and graduate students bring to specific problems of science and technology. By providing long-term, stable funding to the centers, NSF has encouraged risk taking and ensured a solid foundation for attracting the cali-

WASHINGTON BRIEFINGS

In Desperate Need of a Jump START Just two months after Presidents Bill Clinton and Boris Yeltsin agreed to open negotiations on a START III treaty, and only two weeks after Vice President Al Gore and Prime Minister Sergei Stepashin announced that they would jump start the arms control process before the end of August, those objectives appeared to be in reverse gear again. On 9 August, Yeltsin unexpectedly fired Stepashin, the fourth prime minister he has dismissed in the past 17 months, and appointed in his place Vladimir Putin, another former KGB officer. Putin, the chief of Russia's Federal Security Bureau (FSB), the internal security and counterintelligence agency that succeeded the KGB after the Soviet Union was dismembered, has little experience in political and economic affairs, and none in diplomacy.

You might think that a treaty intended to reduce the levels of deployed strategic nuclear warheads by half would have a fairly good chance of being approved in the Kremlin, as it was on Capitol Hill. But you would be wrong. Since START II was signed by Clinton and Yeltsin in January 1993, further movement has been at a standstill.

For six years, Russia's lower house of parliament, the Duma, still dominated by Communists, has refused to ratify the treaty. All those years, the Clinton administration and the Senate have stood at the sidelines, watching the meltdown of Russia's economy and military. START II, which calls for limiting the number of deployed warheads to between 3000 and 3500, is considered by both sides to allow for too large a nuclear weapons arsenal today, let alone for the 21st century. Russia's defense minister, Igor Sergeyev, has stated publicly that his country is likely to have no more than 500 deployed strategic warheads by 2012 because it can't support a larger stockpile. In the past year, senior Russian military officials have acknowledged that 58% of the country's ballistic missiles are well past their operational life span and that 70% of its early warning satellites are either beyond their expected life or in serious disrepair. Yeltsin has suggested or actually stated on several occasions over the past four years that he is ready to negotiate START III, which would reduce warhead force levels to between 2000 and 2500. The Clinton administration and many members of the Senate have indicated their willingness to adopt the treaty quickly, perhaps designating even lower

stockpile levels. They admit, though, that this is impossible until START II is formally approved by the Duma.

That appeared promising late last year when Yevgeny Primakov, then Russia's prime minister, announced that the Duma was ready to ratify, despite concerns about the US's strenuous activities to enlist countries once in the Warsaw Pact into NATO. In fact, the Duma had set the vote for Christmas Day, but called the whole thing off when the US bombed Iraq. Nonetheless, Primakov convinced the Duma leadership to agree to another date. But on the scheduled day, 2 April, the US and NATO were engaged in bombing Yugoslavia, a World War II ally, and the Duma canceled the vote again.

By the time Yeltsin sacked Primakov in May and appointed Stepashin, another former director of Russia's FSB, the Clinton administration was depressed about the chances for START II, let alone for START III. However, at the Gore-Stepashin meeting in Washington on 28-29 July, they agreed to talk in August not only about START but about US intentions to deploy a limited antimissile defense system, which Russia has insisted would violate the AntiBallistic Missile Treaty. Under the 1972 ABM treaty, the US and Soviet Union pledged not to defend their homelands from long-range missile attack so as to accept the doctrine known as mutual assured destruction or MAD. "We both understand that there are ballistic missile threats we both face that do not come from each other but from other nations," Gore said at a news conference. "That is why it is important—in parallel with achieving arms control objectives—to discuss implications for the ABM treaty should the United States decide to deploy a national missile defense."

As this issue went to press, John D. Holum, the US State Department's under secretary for arms control and international security, planned to see Putin in Moscow to discuss the chances of START II in the Duma and the content of a START III agreement. "Government leaders change, yet governments continue to work with each other on issues of substance," said Holum. "As the famous dictum goes, 'Countries act in their national interest, not on the basis of one person or another.'"

The Power of One over CTBT In the Senate, one powerful committee chairman continues to forestall the entire body from voting on the Comprehensive Test Ban Treaty, which was