

WASHINGTON REPORTS

Sciences Fare Better Than Expected in 1997 Budget as Congress Rushes for the Door and the Election

With less than six hours before the start of fiscal 1997, on 1 October the Senate cleared legislation for nine Cabinet departments and dozens of agencies, avoiding a partial government shutdown. Just after 10 pm the same night, President Clinton signed the omnibus appropriations bill, which bundled six separate spending measures into more than 2000 pages, and thereby enacted the last of the 13 appropriations statutes for the fiscal year. So ended the fractious 104th Congress, best remembered for its fiscal battles with the White House and their shutdown of the Federal government for 21 days last winter. In its rush to the doors of the Capitol building, the Republican members, who two years earlier had taken control of the House for the first time in 40 years, breathing fire and brimstone and threatening to pull out by their roots the Departments of Commerce, Education and Energy, left grudgingly but quietly to run for reelection.

The endgame was a stark contrast from the heady days at the beginning of the 104th Congress in January 1995. Then, Republican leaders spoke of little else but their "Contract with America," and many of the 74 members of the Republican freshman class issued intimidating statements about killing or maiming nondefense discretionary programs on their way to a balanced budget by 2002. But in the 104th's final days, they departed Washington for their home districts not only without fulfilling their earlier campaign promises but having made concessions on several programs and on a handful of issues that left many wondering what all the fuss over the Contract and the fiscal 1997 budget resolution had been about. For in the end, Congress agreed to a better budget deal than was imagined even as late as last August, when lawmakers went on their traditional summer recess. Not only was President Clinton able to protect his pet projects, such as his Goals 2000 education initiative, student aid and his national service program, Americorps, but he found it relatively easy to squeeze in \$6.5 billion more for bilingual and immigrant education, education technology, job training, environmental activities and other priorities,

including science and technology.

To the surprise of many pessimists in the science community, Congress agreed to R&D appropriations amounting to a 4.1% increase in fiscal 1997 over last year. The total for all Federal agencies, including the Defense Department, comes to \$74 billion, an increase of \$2.9 billion over fiscal 1996. Even so, the overall increase in 1997 is not enough to overcome three years of nearly level funding at \$71 billion, resulting in a net loss in 1997 due to inflation of 1.9% since the start of fiscal 1994, according to the American Association for the Advancement of Science.

Only the National Science Foundation and the National Institutes of Health were able to keep their R&D budgets ahead of inflation during the past three years. NIH's allocation for 1997 shows an increase of \$785 million, or 6.9%, over the previous year and is \$371 million more than the Administration asked for. Though NSF got \$50 million more, which is about a 2% increase, the foundation's research programs got a larger boost of \$118 million, for a 5.1% bump up. "The foundation's increase is in keeping with the pledge by Republican leaders to back basic research wherever it is found," says

Bottom Lines: Physics-Related R&D Budgets for Fiscal 1997

	FY 96 actual	FY 97 request	FY 97 House	FY 97 Senate	FY 97 enacted
	(millions of dollars)				
National Science Foundation	3220	3325	3253	3275	3270
Research and related activities	2314	2472	2431	2432	2432
Academic research infrastructure	100	0	0	0	0
Major research equipment	70	95	80	80	80
Laser Interferometer Gravitational Wave Observatory	70	70	70	70	70
South Pole Station Safety project	0	15	10	10	10
Education and Human resources	599	619	612	624	619
Department of Energy	15 392.5	15 774.4	15 300.5	16 113.9	15 779.9
Basic energy sciences	641.2	653.7	643.0	649.7	649.7
Materials sciences, including solid-state physics	362.7	334.6	328.5	332.1	332.1
Chemical sciences, including atomic physics	195.6	173.4	170.0	171.9	171.9
Engineering and geosciences	39.6	41.3	40.5	41.3	41.3
Energy biosciences	28.7	28.2	27.7	28.2	28.2
Biological and environmental research	395.0	379.1	379.1	389.1	389.1
Fusion energy research	227.4	255.6	225.0	240.0	232.5
General science and research	965.8	1009.2	996.0	1000.6	996.0
High-energy physics	667.0	679.1	671.9	672.9	670.1
B-Factory, SLAC	52.0	45.0	45.0	45.0	45.0
Main injector, Fermilab	52.0	52.0	52.0	52.0	52.0
Nuclear physics	304.5	318.4	313.4	318.4	315.9
Relativistic Heavy Ion Collider, Brookhaven	65.0	65.0	65.0	65.0	65.0
Solar and renewable energy	275.2	363.2	272.3	269.7	270.0
University and science education	18.4	19.9	0.0	15.0	0.0
Environmental restoration and waste management, nondefense	618.1	651.4	622.1	595.9	591.9
Environmental restoration and waste management, defense	5544.8	5409.3	5543.8	5787.2	5619.3
Weapons activities	3454.8	3710.0	3684.4	3988.6	3911.2
Inertial fusion, including National Ignition Facility	241.2	366.5	366.5	366.5	366.5
National Aeronautics and Space Administration	13 903.7	14 704.2	13 604.2	13 704.2	13 704.2
Human space flight, including space station	5456.6	5362.9	5362.9	5362.9	5362.9
Science, aeronautics and technology	5928.9	5862.1	5662.1	5762.1	5762.1
Mission support and other expenditures	2518.2	2579.2	2579.2	2579.2	2579.2
National Institute of Standards and Technology	545.0	825.9	468.4	445.3	588.0
Scientific and technical research and services	258.7	270.7	268.0	270.4	268.0
Advanced Technology Program	220.9	345.0	110.5	60.0	225.0
Manufacturing Extension Partnership	80.0	105.0	89.9	99.9	95.0
Construction of research facilities	68.0	105.2	0.0	15.0	0.0
National Oceanographic and Atmospheric Administration	1792.7	1971.2	1735.2	1930.7	1851.1
Oceanic and atmospheric research	225.9	232.5	231.6	256.5	253.2
Climate and air quality, including global change	101.8	122.7	100.8	118.9	109.9
Atmospheric program, including solar research	43.4	43.8	43.2	43.5	43.5
Undersea research and ocean programs	80.7	65.1	73.2	94.2	87.2

Robert Walker, chairman of the House Committee on Science.

NSF's allocation for research and related activities includes \$50 million for operating research facilities at universities and \$1.4 million as a contingency fund to cover anticipated tariffs associated with locating one of the twin Gemini telescopes in Chile. The \$80 million awarded for construction of the Laser Interferometer Gravitational Wave Observatory and the South Pole Station safety project is considered adequate by the foundation to keep these programs on schedule. Neal Lane, NSF's director, expressed satisfaction that the agency's request of \$134 million for NSF staff salaries and expenses was agreed to by the House-Senate conference after the House had voted to make cuts that would have meant curtailing travel to scientific meetings and cutting peer review costs.

While Congress agreed to provide the education and human resources directorate the requested \$619 million for 1997, it decided to micromanage the way the funds would be spent: It called for \$10 million more for informal science education, to be used in conjunction with the K-12 systemic reform efforts in certain states and urban areas and \$2.5 million more for the Experimental Program to Stimulate Competitive Research in states where academic researchers find it hard to get grants through the peer review system, but \$2 million less for graduate fellowships, \$5 million less for undergraduate curriculum development, \$2.5 million less for precollege curriculum development and \$3 million less for research, evaluation and communications.

Nondefense R&D for 1997 totals \$33.5 billion, an increase of \$879 million, or 2.7% more than the previous fiscal year. Still, the largest portion of the R&D funding pie went to the Pentagon, which received \$1.7 billion more than its appropriation for 1996, for a boost of 4.9%. DOD's R, D, T&E allocation totals \$36.8 billion—largely the result of increased funding for new fighter planes and for the Ballistic Missile Defense Organization. BMDO, which started life in 1983 as President Reagan's Strategic Defense Initiative, and earned the caustic nickname of "Star Wars," received \$3.4 billion. Since 1983, the amount spent on SDI, BMDO and the Theater Missile Defense programs totals \$51 billion, including nearly \$3 billion for the x-ray laser and other nuclear directed-energy weapons and for space-based reactors and nuclear propulsion systems.

To be sure, all defense R&D, which includes weapons-related programs in the Department of Energy, received a whopping \$40.5 billion, an increase of

almost \$2 billion or 5.2% over last year. But funding for research programs in the Army, Navy, Air Force and the Advanced Research Projects Agency, in the budget categories known as 6.1 and 6.2, was cut by nearly \$100 million. Defense appropriations thus make up 55% of the total R&D budget for fiscal 1997—a slice of the R&D pie that has become larger in the past three years despite the end of the Cold War, the disintegration of the Soviet Union and the Administration's promise to allocate R&D spending equally between defense and nondefense programs.

Nondefense R&D, for its part, received a total of \$33.5 billion, a boost of \$879 million, equal to 2.7% over fiscal 1996. But this sum was \$926 million, or 2.7% below President Clinton's budget request for civilian programs. Every major Federal agency engaged in funding R&D received increases, except the National Aeronautics and Space Administration, which lost 1.6% from its 1996 allocation, and the Department of the Interior, whose funding was down 7.9%

A basic research increase

When it came to basic research, Congress allocated \$14.8 billion for 1997, an increase of \$395 million or 2.7% above last year's amount and 0.9% more than the President's request. Even so, support for basic research is growing at a slower rate than R&D overall.

President Clinton defied House Republicans who sought to kill the Commerce Department's Advanced Technology Program, a grants program shared equally with industrial companies to develop "cutting-edge" technologies. The program, run by the National Institute of Standards and Technology, has been opposed as "corporate welfare." Taking the "slow death" approach, the House proposed cutting ATP's 1996 funds in half, to \$110 million, while the Senate offered \$60 million, just enough to wind up its contractual dealings in 1997. The Administration had asked for \$345 million in the new fiscal year, arguing that the program fosters outstanding technology that might be otherwise delayed or dumped and also creates jobs. When push came to shove, Republicans conceded defeat and allocated \$225 million. Meanwhile, NIST's core laboratory and research services fared better, receiving \$10 million more than the \$258 million appropriated last year. This was less than \$1.3 million below the President's request. Despite this, Arati Prabhaker, NIST's director, stated: "In a time of tight fiscal constraints, this is a very good budget." Congress, she said, provided ATP "with enough funding to meet all of our past

commitments and to make new awards."

Congress saw NASA's big budget as a target of opportunity. It appropriated a total of \$13.7 billion, or \$200 million less than in fiscal 1996. Congress proposed no specific cuts to Mission to Planet Earth, the climate forecasting program that the House wanted to slash by \$220 million. The Office of Space Science was funded at the requested level of \$1.9 billion—though Congress set out specific increases for such programs as cardiac imaging, Windsat, museum grants, education and the Thermosphere, Ionosphere, Mesosphere Energetics and Dynamics project, better known by its acronym, TIMED. The space station was fully funded at \$2.1 billion, despite a valiant effort in the Senate for the fifth year in a row to eliminate its appropriation. Congress also agreed to continue funding the Bion experiments involving monkeys launched into space in Russian satellites.

At the Department of Energy, the biggest worry all year was what Congress would appropriate for basic energy sciences. Not until late September did Congress decide to provide \$649.7 million, a 1.3% increase over last year. Although fears have been dispelled for 1997, the future for DOE funding is still uncertain. The Clinton Administration has proposed 8% annual reductions in DOE's overall research budget starting in fiscal 1998. This is bound to cut deeply into many programs in basic energy sciences, which provides about 17% of all Federal funding for the physical sciences, including the materials sciences and chemical sciences. Worse yet, downsizing DOE's research budget is likely to devastate programs and facilities in high-energy and nuclear physics, biological and environmental research and magnetic fusion.

The magnetic fusion account also worried researchers in the field. A House-Senate conference committee agreed to put up \$232.5 million for DOE's program in fusion energy sciences, notwithstanding a general reduction for the department that is likely to lower the actual amount to about \$230 million. Last spring the President had requested \$255.6 million for magnetic fusion, which was \$28 million more than Congress allocated in 1996 but \$93 million less than in 1995. While the conferees agreed that DOE should continue the engineering design phase of the International Thermonuclear Experimental Reactor, it also directed the department to complete the operations of the Tokamak Fusion Test Reactor at the Princeton Plasma Physics Laboratory and make sure the TFTR is shut down safely

some time in this fiscal year.

Martha Krebs, director of DOE's office of energy research, has testified before Congress that US hopes of contributing as a meaningful partner in CERN's Large Hadron Collider and in the multi-nation ITER project would go unrealized under the fiscal limits now proposed by leaders of both political parties. She also expressed concerns about the future of basic scientific research in the US if severe cuts are made in DOE's budgets.

Her warnings about DOE's projected research budgets in fiscal 1998 and afterwards were reinforced in a letter to President Clinton from the heads of 12 research universities. In the letter, sent on 13 September, the university presidents, led by Gerhard Casper of Stanford University, expressed fears of the damaging effects on academic scientists and on the nation's research program if, as forecast, DOE's research programs were to de-

cline by 25% by fiscal 2000. The reduction would be 34% after inflation is taken into account, the presidents figured. Most of the 15 000 researchers who rely on the department's scientific facilities, such as synchrotron sources, accelerators and reactors, are at various universities, which would be unable to support them under the proposed fiscal scenario, the letter suggested. "If the facilities were maintained, there would be little opportunity for the university groups to use them," the presidents wrote. "If the facilities were cut back, there would be little opportunity for the university groups to carry out research. In either case, both science and the country's long-term research program would be damaged." They made a direct appeal to Clinton: "We very much hope that you can correct this situation as the fiscal 1998 budget is being formulated and fund [the energy research programs] at a level that sustains this

fundamental branch of scientific inquiry not just in the next fiscal year but for the future." Among the signers with Casper were Richard Atkinson of the University of California, William Brody of Johns Hopkins University, John Buechner of the University of Colorado, Richard McCormick of the University of Washington, Richard Peck of the University of New Mexico, Neil Rudenstine of Harvard University and George Rupp of Columbia University.

Anticipating these problems, the Council of the American Physical Society issued a statement on 6 May urging "sustained support for plasma and fusion science by the US government." The council noted the prospective one-third reduction in funding in fiscal 1996 and declared that additional cuts "would seriously damage" the field. "Once dismantled," the council stated, "these research programs may take decades to rebuild."

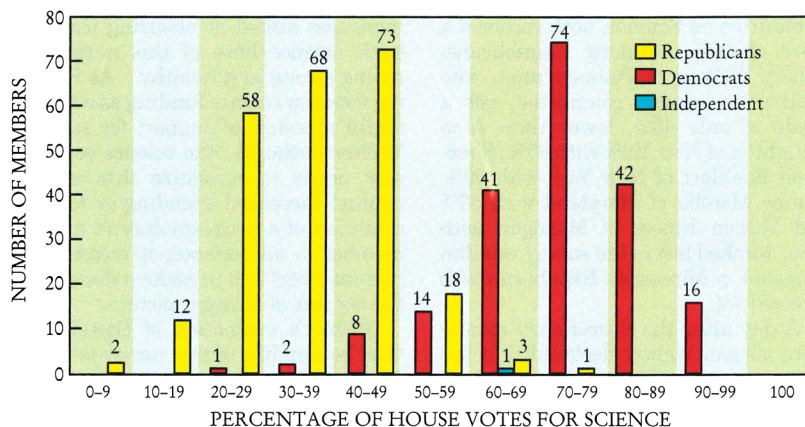
IRWIN GOODWIN

Watchdog Group Grades House on Science Issues, But Is Assailed for 'Politicizing' Science

For certain eminences in the science establishment, the idea seemed right. After all, data on the voting records of members of Congress have been collected for decades by special interest groups ranging from the American Association of Retired Persons, to the National Rifle Association, to Ralph Nader's Public Citizen, to various environmental organizations. But on 18 September, when ten distinguished scientists released a scorecard of voting by House legislators on science issues, the reaction was so scathing and skeptical that the organizers must have felt something like Wile E. Coyote, the determined pursuer in those "Road Runner" cartoons. Like Wile E., the scientists had prepared to trap their prey, only to find that the trap didn't have much effect and the prey escaped with little or no harm.

What angered many on Capitol Hill and in science-related organizations was that the outcome of the voting survey—that Democrats in the 104th Congress voted to back science and technology 72% of the time, against the Republican average of 35%—could do more harm than good in building political support for R&D funding.

The survey, called "Science ScoreBoard," was done by Science Watch Inc, a newly formed nonpartisan organization led by Roland Schmitt, a former vice president for research at General Electric and past chairman of the Na-



THE GAP IN GRADES between Democrats and Republicans in the House indicates voting records in defense of science.

tional Science Board. Science Watch's founder and chief operating official is Martin Apple, executive director of the Council of Scientific Society Presidents. He kept tabs on lawmakers through 30 roll-call votes out of nearly 1200 taken on the floor of the House of Representatives in the past two years—mostly on proposed cuts in science research and in technology programs. The House members were rated on their "pro-science" votes.

The results were a surprise to Apple, Schmitt and many others who follow science on the Hill. "It knocked my socks off for a whole day," Apple told reporters at a news conference.

We didn't expect the wide gap [in voting]. The degree of difference we found was extraordinary." Apple said all Science Watch members had seen the findings and agreed to their public release.

Only one Republican, Jimmy Hayes of Louisiana, who had run as a Democrat until he switched parties last year, was rated high, with a "pro-science" grade of 71%, while 132 Democrats scored above 70%. At the top end of the scorecard, 16 members, all Democrats, received a grade of 90% or higher, while 14 members, all Republicans, ranked below 20%. The top grades went mostly to House members repre-