

New Federalism: Old Story for Basic Research

Ronald Reagan's "new federalism"—as evidenced by the fiscal year 1983 budget proposals sent to Congress this week—is but a variation on last year's theme of strong support for national defense and "letting the marketplace decide."

For instance, while claiming strong ideological support for the federal funding of basic research—investigations without any clearly defined payoffs—this year's budget-support documents reiterate last year's intent to finance primarily those research-and-development (R&D) ventures that "help meet national needs." Not surprisingly, research with a clear payoff—such as medicine, engineering, computer science, physics and defense-related inquiries—shows the most sizable budgetary gains in the new Reagan budget.

Reagan's philosophy is represented perhaps nowhere better than in the National Science Foundation's proposed budget. NSF primarily supports basic research. And while its proposed budget appropriations for research and related activities would increase 12.7 percent from last year—to \$94.2 million in FY '83—funding for research in the more technologically oriented disciplines of mathematics and physical sciences would in fact climb 15.1 percent, 23.5 percent for engineering studies and 28.6 percent for programs in its division of Scientific, Technological and International Affairs.

In contrast, NSF's support for physiology, cellular and molecular biology received a proposed increase of 7.3 percent—only 0.6 percent above the FY '82 computed inflation rate. And increases in behavioral and social-science programs were in no way sufficient to compensate for last year's 6.7 percent inflation figures. Science-education programs, gutted in a controversial series of budget-paring sessions last year (SN: 2/28/81, p. 131), would be totally eliminated in FY '83. Whether or not the government decides to invest in this area in the future, says NSF director John B. Slaughter, will not be determined until a federal study of precollege science education is completed in 18 months. The Minority Institutions Sciences Improvement Program would also be eliminated this year.

Across the entire federal government, proposed outlays for R&D are up 9.9 percent over estimated FY '82 spending levels, 20 percent over actual spending in FY '81. Of this \$41 billion figure, basic-research spending accounts for \$5.6 billion, or roughly 13.7 percent.

—J. Raloff

SPACE

NASA: Slowly through the solar system

The Reagan administration's budget plan for the National Aeronautics and Space Administration in FY '83 calls for a 10.6 percent increase over the previous year, but with the agency following a strongly restricted role. Its explorations of the solar system would be sharply curtailed, including analyses of data already in hand, with other activities farmed out to different agencies or to the private sector, and yet others recast to emphasize their "national security implications."

The space shuttle, though its costly basic development is behind it, dominates the proposed budget even more strongly than in recent years. Shuttle activities would consume more than 52 cents of every NASA dollar, or 64.2 percent of the agency's research and development funding (which includes everything but construction of facilities and the operations costs of the various NASA centers). The study of other worlds, however, is another story.

It could have been worse. The Voyager 2 spacecraft is to continue toward its en-

counters with Uranus and Neptune, rather than being shut off as was seriously discussed earlier by the administration. And still in the works is the Galileo orbiter and probe of Jupiter, though in a modified version that would take about 4½ years instead of 2½ to reach its goal and then make barely half as many close approaches to the planet's major moons.

Canceled completely is the long-sought Venus-Orbiting Imaging Radar mission, and seven other deep-space craft, already long on the job, would be virtually ignored: Pioneers 6 through 9 are measuring particles and fields in vast orbits around the sun; numbers 10 and 11 are headed out of the solar system, seeking the extent of the sun's influence; and the Pioneer Venus Orbiter still gathers data about earth's bizarre "twin." "The Pioneer spacecraft operations and data analysis," says the administration's hefty budget book, "will be terminated by the end of September 1982.... Only those operations necessary to the survival of the spacecraft will be performed." NASA estimates an annual saving of \$8 million or less for all 7 craft. (The Viking 1 lander on the surface of Mars is programmed to run unattended into 1994, so even its operations costs are minimal. "No matter what they

do to us," says an agency official, "we'll keep it going.") The NASA infrared observatory on Hawaii's Mauna Kea is missing from the budget completely—as well as from that of the National Science Foundation, which NASA has hoped will take over its funding.

A similar problem exists for the vast store of planetary data already on earth. The Lunar Curatorial Facility at Johnson Space Center in Houston, home and research coordinator for the Apollo moonrocks, "may have to be mothballed for a year," says Andrew Stofan, NASA's acting associate administrator for space science and applications. In addition, funds to support scientists studying results from planetary spacecraft and other sources have been slashed from \$50.7 million in FY '81 to \$35.5 million in the new proposal (the administration's belated FY '82 plan was in part determined by projections for 1983)—a reduction made all the sharper by two years of inflation.

Still on track are two earth-orbiting tools for astronomy—the Space Telescope and a Gamma Ray Observatory. Some funds were added for the International Solar Polar Mission, but only for some science instruments and support for a spacecraft being built by the European Space Agency, rather than to resume work on a U.S. entry. As expected, a U.S. mission to comet Halley goes unmentioned.

Military concerns are emphasized. In aeronautics, for example, says the budget book, "major systems technology work will continue only in low speed and high speed systems technology in support of the nation's military aircraft; but systems technology projects having relatively near-term commercial applications would be curtailed." Of nine budgetary "line items" in that category in FY '81, two remain. Satellites and other space technology intended to accelerate the adoption of such tools by other agencies or the private sector would also be cut back.

—J. Eberhart

BIOMEDICINE

Funds slated for modest increase

Compared to some areas of science, biomedical research is not faring all that badly in the administration's proposed FY '83 budget. The budgets for the National Institutes of Health, the Food and Drug Administration and the Centers for Disease Control would all be increased.

The proposed NIH budget is \$3.75 billion, or \$109 million over the congressionally appropriated FY '82 budget. Of that

That DOES it for two agencies

\$109 million increase, \$37 million would go toward supporting 15,000 research grants (the major source of basic biomedical research money in the United States), and \$65 million would go toward turning basic findings into vaccines, drugs and other treatments or preventives.

The FDA is slated to get \$356 million, an increase of \$27 million over the FY '82 budget. The increase would go toward salaries and expenses for the FDA staff, which would be focusing on three priority concerns — bringing safe and effective new drugs to market more rapidly (this past year the FDA approved 27 new drugs, more than in any single year since 1962), encouraging voluntary compliance among food and drug manufacturers instead of imposing regulations on them and keeping the scientific capabilities of the FDA up to date.

The CDC has been authorized to get \$217 million, an increase of \$4 million over 1982. The CDC programs that would profit from the increase include venereal disease control, epidemic services, technology development and application, risk reduction/health education and childhood immunization. Even though the last would get \$1 million more, some pediatricians testified before a congressional subcommittee last week that they do not think it is enough to keep childhood disease epidemics totally in check, especially since the program was reduced \$2 million between fiscal 1981 and fiscal 1982 (from \$30 million to \$28 million). As might be expected, the administration does not share this concern. As Mitchell Goldstein of HHS told SCIENCE NEWS, "We don't think such childhood epidemics will happen with the grant dollars that the states are getting.... The main goal now is to maintain the current high rates of immunization."

What is certain, though, is that the budgets for some biomedical programs would be lower under the proposed 1983 budget than they are under the appropriated 1982 one. For instance, NIH funds for training young scientists would drop \$4 million (from \$156 million to \$152 million). And one program is being phased out by the administration as of next September — FDA batch-by-batch certification of antibiotics. "Eliminating this outdated regulatory requirement," according to the administration, will result in an annual savings of 190 federal staff years of effort, as well as saving antibiotics producers \$6 million. But the elimination also means letting 100 to 150 FDA employees go, or at least finding them other positions, Joseph Graham, acting deputy director for the FDA's National Center for Antibiotics Analysis, told SCIENCE NEWS. And as John Weber, a research chemist with the FDA's Division of Drug Chemistry, points out, "If you cut out the certification lab, you leave the Food and Drug with no qualified people to do antibiotic analyses."

—J.A. Treichel

The Reagan administration is still attempting to abolish the cabinet-level Departments of Energy and Education, though the timetable and manner for these proposed terminations have changed since the President's initial September proclamation (SN: 10/3/81, p. 212). If President Reagan has his way, the Energy Department will be cannibalized by other cabinet-level agencies, while the Education Department would merely be downgraded to a smaller Foundation for Education Assistance — with significantly reduced responsibilities. An outline for these agency terminations was unveiled in budget proposals that the administration sent to Congress this week. Details on these termination proposals, however, won't appear until the administration sends its legislation for "reorganizing" the agencies to Capitol Hill — perhaps as early as by the end of the month.

According to Energy Department Undersecretary Guy Fiske, the President wants to shift most existing federal energy programs into a yet-to-be-established Commerce Department agency — the Energy Research and Technology Administration. ERTA would manage energy research and development, uranium enrichment, basic energy science (primarily in high-energy and nuclear physics), and DOE's current defense activities. (Those defense activities, by the way, account for 47 percent of DOE's FY '83 budget request.)

The Interior Department would pick up most of the Energy Department's remaining programs: federal energy-resource programs such as the Strategic Petroleum Reserve (accounting for 20 percent of DOE's entire FY '83 budget request), the Naval petroleum and oil-shale reserves and five power-marketing administrations.

But even more dramatic than the proposed Energy Department reorganization is the shift in emphasis indicated by budget figures themselves. For example, citing a need to further refine the federal government's focus on only basic and long-term R&D technologies, outlays for fossil, solar, geothermal and other non-nuclear programs would be reduced \$1 billion — to \$700 million in FY '83. Roughly 50 percent of the \$90.8 million slated for coal programs would go toward advanced technology concepts and coal liquefaction. "In some cases," the budget documents say, "e.g. coal gasification, the introduction of commercial processes is not technologically constrained but is rather dependent on favorable economic conditions, so it makes little sense to continue government R&D on further technology development." While investigation of novel electrochemical processes would continue, battery development would cease, as would all work on electric-energy systems and electric-storage technologies; they are be-

lieved to be too applied in nature.

In contrast, the FY '83 budget emphasizes nuclear programs — particularly development of magnetic fusion and breeder reactors. Hoping to get the Clinch River Breeder Reactor into operation before 1990, the administration would double the funding for CRBR in FY '83.

One new FY '83 initiative involves collection of a commercial nuclear-waste-disposal fee. Expected to yield \$330 million next year from charges assessed utilities operating nuclear-power plants, it would more than offset the \$50 million that this administration is proposing to spend for "generic" research on nuclear-waste disposal schemes.

Federal Budget Authority for Energy R&D

	Proposed FY 83 (million \$)	% change from FY 82	% change from FY 81
Fossil	107	-74.3	-89.2
Solar	72	-65.4	-86.3
Geothermal	10	-84.1	-93.6
Conservation	18	-77.8	-94.0
Environment	169	-24.2	-26.0
Magnetic fusion	444	-2.2	+12.7
Breeder reactors	577	-16.0	-13.0
CRBR	254	+108.2	+108.2
Nuclear fuel cycle/spent fuel	59	+742.9	+181.0
Commercial nuclear wastes	315	+19.8	+28.0

OMB

The FY '83 budget request for education, when inflation is considered, would result in a 50 percent cut in federal aid to education from FY '81 levels. According to Education Secretary Terrel Bell, the new Foundation would reduce staff by 1,400, repeal 11 "unnecessary" commissions, transfer 28 programs and terminate 23 others in order to "return decisions about how and what to teach back to where they belong — to teachers, parents, state and local officials, and educational institutions."

But for the research community, the major fear over the Education Department's reorganization stems from an accompanying proposal to eliminate graduate students from the Guaranteed Student Loan (GSL) program (offering the lowest-rate education loans). This proposal "could prove a disaster for campus-based scientific and technical research," says Bob Aaron of the Action Committee for Higher Education, because half of all U.S. graduate students now rely on it. At a time when the administration is pushing to make the U.S. economy more productive, it would be "foolish" to "threaten our technical prowess by cutting back on loans to graduate students," Aaron told SCIENCE NEWS. His organization represents 12 university and college groups.

—J. Raloff, L. Tanglely

Reagan proposal: Let's get physical

Behavioral and social scientists, still reeling from the draconian budget slashing proposed by the Reagan administration last year, are mixed in their initial reaction to the no-growth budget recommended for social sciences in FY '83. While last week's spending proposal may be viewed as a philosophical victory, critics say, it does more to underscore the administration's original position that much social research does not merit public support.

At NSF, the behavioral and social sciences would not share in the real growth proposed by President Reagan for science spending generally. The Biological, Behavioral and Social Sciences Directorate would receive a \$10.7 million increase to \$186.7 million if Congress were to agree, but the lion's share of that is marked for the Foundation's biological priorities. Funding for behavioral, neural and social sciences would be held steady, though at a level far below that voted by Congress in FY '81.

The administration last year called for a 50 percent cut in the social science budget at NSF, and only through the active lobbying of the Consortium of Social Science Foundations (COSSA)—formed last May to represent the interests of 11 scientific disciplines—was the administration convinced to restore half of the proposed cut. The current and proposed budgets mark \$17.6 million for sociology and economics and \$14.7 million for cognitive and behavioral science and anthropology. According to NSF director John B. Slaughter, the Foundation has always viewed the social sciences as "an integral part" of the agency's work, and social scientists have convinced the White House of their value, according to Dennis Prager of the Office of Science and Technology Policy. "The budget reflects the view that the initial cuts were much too deep," Prager says. "We were on the verge of destroying some very important programs." But COSSA director Roberta Balstad Miller notes that, while she is pleased that the administration reconsidered its original position, she views the proposed budget as inequitable because it bolsters the natural sciences at the expense of social sciences.

Research funding by the National Institute of Mental Health would increase by approximately \$10 million to just below \$150 million under the Reagan plan, still far short of the peak level of \$171 million in FY '81. In addition, staff scientists at NIMH would receive more than one-third of the total research budget, leaving less than \$100 million for university-based projects. The \$5 million boost for in-house research would include \$1.2 million for a new PETT brain scanner.

The request for a PETT scanner symbolizes the Institute's increasing interest in basic biological psychiatry and its di-

minished interest in social research. Of the total extramural research budget, more than one-quarter—or \$27.1 million—would be spent on basic brain studies. Other priorities include schizophrenia research and depression research, which are marked for \$17.4 million and \$14.7 million respectively. The young program for prevention of mental disorders would re-

DEFENSE

Shot in the arm for weapons research

For the second year in a row, Department of Defense spending for research, development, testing and evaluation will make up more than half of the federal government's research and development budget. The proposed 1983 defense budget calls for \$24.3 billion, an increase of \$4.3 billion over the previous year. This accounts for a little less than 10 percent of the total defense budget. Of the total for research and development, funding of basic research will increase from \$673 million to \$781 million in 1983.

The research budget reveals a new emphasis on the ability of military systems to survive a nuclear attack. A recent review pointed to "serious deficiencies in force survivability, endurance, and the capability to exercise command and control during nuclear war. Current communications and warning systems were found to be vulnerable to severe disruption from an attack of very modest scale." One of the problems is the susceptibility of electronic systems to electromagnetic-pulse fallout from a nuclear detonation (SN: 5/9/81, 300; 5/16/81, 314).

The budget proposes substantial, real growth in support of investigations of promising new technologies. These technologies include very high speed integrated circuits, systems for detecting the enemy at night or in poor weather, use of lightweight materials and development of electronics that are resistant to various types of radiation. At the same time, communications research continues on extremely-low-frequency systems for submarines, over-the-horizon radar and extremely-high-frequency satellites with an increased anti-jam capability.

Development is continuing on an advanced technology (Stealth) bomber and the new Trident II submarine-launched ballistic missile. The budget also provides for research on an antisatellite system and for continued support of NASA's space shuttle program. Significant budget increases are proposed for accelerated work on ballistic missile defense and the exploration of options for basing the MX missile. However, Congress is expected to look closely at the record defense budget, and changes are likely.

—I. Peterson

ceive \$4.1 million, and studies of stress and psychosomatic disorders would receive \$11.3 million. Like NIMH, the related drug and alcohol agencies would receive sizable boosts in research funding (to \$46 million and \$33 million) following severe cuts last year. According to Prager, the increases were requested because the institutes have demonstrated that they intend to be more discriminating in what they fund, weeding out much social research unrelated to their missions. —W. Herbert

EARTH SCIENCES

A landscape of peaks and valleys

The \$518 million budget proposed for the U.S. Geological Survey in FY '83 allows \$379 million for basic earth science investigations and topographic mapping and \$128.5 million for the supervision of mineral leases and collections of royalties for federal and Indian lands. The total budget is \$21.1 million more than in FY '82. Programs to study minerals deposits will benefit from increases, while the Earthquake Hazards Reduction Program and the Volcano Hazard Program each will be reduced by \$2.6 million. The level of monitoring at Mt. St. Helens will be reduced only slightly; the observatory at Mauna Loa, in Hawaii, will be funded at 1982 levels.

Officials of the National Aeronautics and Space Administration report that the proposed \$26.2 million for the geodynamics program requires that the program be revamped. The program to monitor regional crustal motions will conduct 25 percent fewer observations than last year, and the crustal dynamics project, based at Goddard Space Flight Center will be lengthened by two years, with completion now scheduled for 1988.

The FY '83 request of \$792.7 million for the National Oceanic and Atmospheric Administration reflects a \$71.8 million, or 8.3 percent, decrease from FY '82 levels. Services to provide remote sensing of weather phenomena and measurements of the earth's land surface would be increased by \$24.4 million, and mapping, charting and surveying services by \$25.4 million. One polar-orbiting meteorological satellite would be eliminated. The Sea Grant College Program would be terminated. Fisheries programs would be reduced by \$42.7 million.

The National Science Foundation's Ocean Drilling Program would receive \$14 million, down from \$20 million in FY '82. This figure is misleading, however, because the FY '82 sum provided for design work for the *Glomar Explorer*. Should NSF decide to proceed with the proposed Advanced Ocean Drilling Program, a new project that would replace the defunct Ocean Margin Drilling Program, officials report that "funds will be reprogrammed" for the *Explorer*.

—C. Simon