

Physically better but biologically slow

President Reagan is advocating "a comprehensive freeze on total federal spending" in the fiscal year 1984 budget proposal that he sent to Congress Monday. Seen from this perspective, funding for science and engineering survived the budget's carving fairly well: Reagan's latest blueprint for federal spending proposes a 17 percent increase for research and development programs, to \$47 billion—well in excess of the year's projected 5.5 percent inflation rate. And though basic research fared less well—these programs would increase only 10 percent over last year, to \$6.6 billion—the aggregate hides some notable exceptions.

"In a climate of intense fiscal scrutiny, it's no longer possible to spread increases uniformly throughout science," explained George A. Keyworth II, the President's science adviser. So the administration will focus spending on "areas that promise the greatest return to our foremost national priorities—industrial advances to fuel our economy and defense," Keyworth said. After 15 years of "rather healthy funding," he observed, the life sciences are in no real jeopardy, whereas fields such as fundamental mathematics have been "virtually devastated." As a result, basic research in life sciences would grow only 3 percent in Reagan's 1984 budget, while basic research in physics, engineering and math would climb 15 percent. At the National Science Foundation, basic research in fundamental mathematics, engineering sciences, astronomy and plant sciences have all been slated to receive robust increases of 25 percent. And at the Defense Department, R&D spending would climb 29 percent, basic research 36 percent over 1983 levels.

In a switch in policy from his last two budgets, the President is also authorizing some major new initiatives—again, primarily benefiting the physical and engineering sciences. For example, NSF would start a very-long baseline radio-telescope array to view distant high-energy phenomena with unprecedented resolution. The National Aeronautics and Space Administration would begin developing a numerical aerodynamic simulator at its Ames laboratory to support computational chemistry, aeronautical research and climate modeling. And the Energy Department would begin building an advanced-materials research center at Lawrence Berkeley Laboratory. Keyworth noted that "I attach about as much priority to [the new LBL center] as to any other single initiative" in the 1984 R&D budget. —*J. Raloff*

National Science Foundation

Bolstering a frayed foundation

Nowhere is the administration's attitude toward science capsulized so well as in the \$1.3 billion budget proposed for the National Science Foundation, the agency charged with the support of all branches of basic science and engineering. The 18 percent boost in funding is aimed at shoring up the nation's basic research enterprise by shoring up the educational system, by investing directly in research manpower, and—especially—by buying the instruments needed for technological research. The administration's new support would not benefit all disciplines evenly, however; generous increases in spending are marked for mathematics, physical sciences and astronomy, while funding for some of the behavioral and social sciences would actually be eroded by inflation.

The agency's highest priority is upgrading the equipment for university-based research, especially in engineering and astronomy; the agency has requested \$180 million, a 60 percent increase over this year and a 100 percent increase over FY 82, for new tools.

Somewhat of a surprise is the administration's proposal to reinvest in science education, an enterprise it had abandoned two years ago. Recognizing that the continuing supply of talented scientists is affected by the quality of early education, NSF has requested increased funding for programs to encourage good math and

science teaching in the schools. The agency is also planning to boost its support for graduate students in all scientific disciplines and, through a new awards program, to encourage young researchers in academic careers.

None of the foundation's major new investments would be spread evenly across disciplines. Substantial increases (on the order of 22 percent) are marked for research in mathematics and the physical sciences, engineering and astronomy, much of it to improve instrumentation that has been degraded by years of inflation. The agency has also requested hefty increases for research in the life sciences, especially plant sciences and neuroscience.

After proposing two years ago to slash funding for social science data bases, the administration has reversed itself and asked for an additional \$3.5 million for such research. Despite this change, however, the new budget proposal signals no heightened interest in non-medical studies of human behavior; fields such as psychology, sociology and anthropology are slated for negligible new funding.

The agency's priorities—especially astronomy and botany—reflect to some degree the personal priorities of physicist Edward A. Knapp, who was recently named director of the foundation.

—*W. Herbert*

Space

NASA: Signs of change?

To space scientists, the National Aeronautics and Space Administration budget proposed a year ago by the Reagan administration for FY83 was a grim document. Plans for a long-sought mission to map Venus from orbit by radar (already postponed a year in FY82) were dropped completely. The operations and data-analysis of seven Pioneer deep-space craft, launched in past years but still on the job, would be terminated. Support for NASA's dedicated infrared observatory in Hawaii was omitted (in hopes that the National Science Foundation would take it over), and it was suggested that the Lunar Curatorial Facility in Houston, home of the Apollo moonrocks, "might have to be mothballed for a year."

Administration budgets do not necessarily match the versions that actually go into effect after months of horse-trading and legislative adjustments, but they can be signs of the times, or at least of administration attitudes. The operations costs for the Pioneers, for example, amount to only a few million dollars (NASA has so far managed to keep the craft going), so the idea of ignoring the already-paid-for probes was taken by many researchers as an administration rejection of planetary research in general. OMB director David Stockman was rumored to have said, "We'll have NASA out of planetary by 1984."

Reagan's proposed FY84 NASA budget, however, seems to suggest a different attitude. The Pioneers, the IR observatory and the moonrock facility are all there (though funds to analyze existing planetary data are still tight), and prominent is a \$29 million sum to begin a Venus Radar Mapper mission. The VRM is designed to cost only half as much as the version canceled last year (all the scientific instruments except the synthetic-aperture radar itself have been deleted), but it represents NASA's first planetary "new start" in seven years. It is strongly endorsed by NASA's cost-conscious Solar System Exploration Committee (SN: 10/30/82, p. 277), which has also advocated a "core program" of other low-cost missions in years to come. There is of course no administration commitment to any of those missions yet, notes agency administrator James M. Beggs, but "generally speaking," he says, "as far as planetary is concerned, it has a solid policy base now."

Also included are increased funds to develop several earth-orbiting scientific satellites under NASA's "Explorer" program (such as the Cosmic Background Explorer, first proposed a decade ago). Even the space shuttle, representing 61 percent of the agency's FY84 R&D budget, shows an increase in the money sought for operations, as opposed to "capability development." —*J. Eberhart*

NIH, NIMH: Holding the lid

The proposed FY84 budget for the National Institutes of Health — the funding source for 90 percent of all biomedical research in the United States—is \$4.1 billion. This is \$73 million over the administration's FY83 proposal (SN: 2/13/82, p. 100), but not quite enough to keep up with inflation.

Of the total, \$2 billion would go to support research project grants, the principal source of money for fundamental biomedical research conducted by university scientists. Of that \$2 billion, \$500 million would go toward paying for 3,676 competing grants, while the remaining \$1.5 billion would bankroll 11,560 noncompeting grants. (A scientist who competes for and wins an NIH grant is funded the first year with competing grant money and during the next two years with noncompeting grant dollars. After that time the scientist must compete again for a new grant.) The number of competing grants authorized for FY84 is down from the number proposed for FY83, which was 4,914. On the other hand, the number of noncompeting ones is up slightly from the FY83 number, which was 11,443.

Of the remaining \$2 billion earmarked for NIH, \$1.8 billion would go to NIH itself, either for in-house research in the various institutes or to be distributed to scientists outside NIH. As in recent years, the National Cancer Institute would command the lion's share of funds.

The National Institute of Mental Health has become a predominantly biomedical research agency under the Reagan administration, and the FY84 proposal would continue the trend away from research on social problems and toward basic biochemical and neuroanatomical studies. The Institute has requested \$119 million to spend on research grants, an increase of 19 percent over this year. The highest research priority would continue to be basic neuroscience, which would receive over \$30 million; universities have been acquiring the technology necessary for basic brain studies (including PET scanners), and the NIMH budget request reflects an interest in supporting this research trend. Other Institute priorities include research on the prevention of mental disorders (including the development of biological tests to identify propensity toward mental illness) and research on childhood mental disorders. The Institute would also boost funding for research on the serious mental disorders of adulthood, especially schizophrenia and depression, and studies of the special emotional problems associated with old age. The Institute also plans to maintain its research training program, which currently supports almost 900 young scientists at a cost of over \$15 million. —J.A. Treichel, W. Herbert

A slower flow of funds

Funding levels requested for earth sciences followed the general budget trends, with areas related to physical sciences and satellite systems slated for healthy increases. United States Geological Survey studies of strategic and critical minerals would receive \$3.4 million more than the FY83 \$5.7 million appropriation. Allocations for acid rain investigations are up half a million from FY83's \$2.5 million; studies of toxic waste and ground water contamination would increase by \$1 million, up from last year's \$6 million level. While the overall USGS budget is up by about \$14 million, basic geological studies would decrease from last year, to \$141.9 million. This includes a \$5 million cut in investigations of geological hazards such as earthquakes. Volcano studies, too, would drop about 30 percent to \$7.4 million this year. Studies of hazards related to siting of nuclear plants would be nearly halved, to \$1.7 million.

The NASA geodynamics program would receive nearly \$2 million more than last year's \$26.6 million, allowing that research to keep ahead of inflation. The request for the National Oceanic and Atmospheric Administration is 10 percent less than actual funding for 1983. Among major proposed increases are support for the Next Generation Radar System, storage and testing for the LANDSAT D' satellite (SN: 7/3/82, p. 4), and weather prediction. Atmospheric and hydrological research would suffer moderate cuts. □

Some deep plunges

If the President had his way, funding for the National Bureau of Standards would drop \$19.2 million, to \$98.7 million — accomplished largely by elimination of the Center for Building Technology, elimination of the Center for Fire Research, a 70 percent cutback in funding for its computer science and technology efforts (developing data-processing standards), and the resulting elimination of 512 of NBS's 2,700 staff members. The Interior Department would eliminate its \$2 million endangered-species grant program for states, and would cut law enforcement of small, pending endangered-species disputes. It would also kill recovery activities for the peregrine falcon, whooping crane and California condor, saving \$416,000. In all, Interior would cut \$4.6 million from wildlife-habitat management with the expectation that states and wildlife groups would pick up the activities. At the Environmental Protection Agency, funding would fall 11 percent for air-quality programs (to \$191 million), 43 percent for water-quality programs (to \$151 million), 35 percent for state grants (to \$173 million), and 11 percent for research and development (to \$206 million). □

High-tech energy funds increase

Increased funding for high-energy physics and basic energy sciences research figures prominently in Department of Energy budget requests for FY84. One major new project is the formation of an advanced materials research center at the Lawrence Berkeley Laboratory. The budget also includes funds to start construction of a linear colliding-beam accelerator at the Stanford Linear Accelerator Center. Also indicative of renewed support for the national laboratories is the proposed expansion of the National Synchrotron Light Source at the Brookhaven National Laboratory. Furthermore, DOE plans to institute a new, \$6 million program that will support the purchase of state-of-the-art scientific instruments for university research.

In order to implement the Nuclear Waste Policy Act, which was signed into law Jan. 7, DOE has asked for \$307 million for developing a high-level radioactive waste repository. The Nuclear Waste Fund, established by the act and financed by fees paid by nuclear utilities, is expected to provide an additional \$448 million.

Of the \$848 million for nuclear fission research, \$270 million is for the Clinch River Breeder Reactor, but DOE Secretary Donald P. Hodel called the figure "soft." Whether the project goes ahead in its present form will depend on DOE's success in finding financial support from non-governmental sources. Discussions between Congress and DOE in March will decide the fate of the project.

In its 1983 budget, DOE proposed drastic spending cuts for energy conservation, fossil energy and solar energy programs. However, Congress appropriated much larger sums than the department requested and saved many projects from extinction. For solar and renewable energy research, for example, DOE had asked for \$79 million and received \$253 million. The new budget request is \$102 million, reflecting a slowing in efforts to move more of this research to the private sector.

A year ago, abolishing DOE was a major issue, but legislation proposed to Congress to implement the reorganization of energy programs failed. The administration will try again in 1983, but Hodel could not state when such legislation would be introduced. —I. Peterson

Federal Budget Authority for Energy R&D

	FY 83 Estimate (million \$)	FY 84 Request (million \$)	% change from FY 83
Magnetic fusion	447	467	+ 4.5
Nuclear fission	816	848	+ 3.9
Environment	227	211	- 7.0
Fossil	311	138	-55.6
Conservation	410	101	-75.4
Solar & other renewables	253	102	-60.0
High-energy physics	422	490	+16.1
Nuclear physics	131	153	+16.8
Energy sciences	283	350	+23.7