

OMB Finds 'Fat' in Research

Portents of what's in store for federal research under President Ronald Reagan emerged last week in a listing of budget cuts being proposed by the Office of Management and Budget. This unofficial preview of OMB proposals appeared to be an administration move aimed at softening the impact of its budget paring—expected to involve proposed cuts in excess of \$45 billion—by spacing out controversial details over a matter of weeks. And the numbers indicated there had been notably little attempt to excise only politically benign programs.

Repeatedly the Reagan administration has stated that it is not out to cut "meat and marrow" from the budget, just fat. In light of that, the proposed cuts offered early glimpses at how science policy is shaping up in the White House. Suggested cuts for three agencies—the National Science Foundation, National Aeronautics and Space Administration and Department of Energy—highlighted attitudes displayed more subtly elsewhere by OMB. ● **NSF** Earlier this year, NSF noted that "many strong and active university research groups are currently hobbled by obsolete or worn-out equipment and facilities." Upgrading these facilities, the agency said, would permit researchers "to be more productive and efficient and to undertake more advanced work, thus multiplying the return on investment of federal research project support funds." But OMB proposed cutting all "new starts" at NSF for fiscal year 1982. So the \$75 million program to upgrade and modernize university research instruments and equipment found itself heading OMB's hit list.

Another potential casualty on the list was the 25-meter millimeter-wave telescope. Designed to study electromagnetic frequencies that fall between the domains of traditional optical and radio telescopes, the facility could become "an essential tool for studying interstellar molecular clouds and star-forming regions at the heart of the galaxy," said NSF.

OMB budget cutters found a \$5 million program designed to provide greater research-initiation grants to women scientists and engineers inessential. A \$3 million Minorities in Science program was also slated for major cuts. (It provides support for minority scientists and engineers beginning their research careers and offers special opportunities for improving the research environment at predominantly minority institutions.) Similarly, funds would be slashed for the \$14.5 million small-business innovation program. Designed to ensure that research by small and technology-oriented businesses is used effectively, it provides incentives for transferring research developed by

those firms into practical and innovative commercial applications.

● **NASA** Even without OMB's proposed "retrenchment" of the space agency's budget, planetary scientists had long been concerned about the flagging state of the spacecraft programs that provide most of their data. Only one—the Galileo orbiter and probe of Jupiter—had even been in the works; President Jimmy Carter's support for the long-sought Venus Orbiting Imaging Radar emerged only in his final, lame-duck budget, and a U.S. mission to comet Halley has seemed mired in the lobbying stage. "At least," said one researcher after the presidential election but before OMB's pronouncements, "we have nowhere to go but up. Or do we?" His question was well-founded.

The initial OMB plan proposed to reduce the Carter version of NASA's FY 1982 budget by about 9.4 percent, with more than a third of the shrinkage coming from space science. This would amount to a 28.8 percent cut in science programs, compared with 5.3 percent for the space shuttle and related activities (which account for nearly half of NASA's dollars) and 10.2 percent for aeronautics research. The

Galileo Jupiter mission—on which about \$275 million had already been programmed through FY 1981—would be canceled; the Venus radar project would be deferred, and no Halley's comet mission was mentioned at all except perhaps by the implication of an OMB statement that "the proposed reductions ... consist primarily of deferral or deletion of new starts...." Also deferred would be the earth-orbiting Gamma Ray Observatory, which was the only "new start" in the science section of Carter's NASA budget for the previous year. (Primary changes in the space-shuttle program would consist of a six-month delay in production of the fourth shuttle orbiter vehicle and deletion of funds for purchase of long-leadtime items for a fifth orbiter.)

Rarely revealed in advance of an administration's budget, the OMB proposals—promptly dubbed a "hit list" and referred to by one scientist as "slamming the door on the whole solar system"—produced a tempest of reactions, from midnight phone calls among scientists-turned-activists to a fullscale rumor mill about what programs would and would not survive. One high-level NASA official commented on the unusual lack of information communicated by still-higher officials who were dealing directly with OMB as the Reagan budget was being hammered out. A NASA approach reportedly being tried prior to the budget's unveiling was to seek

Potential recisions for National Science Foundation
(budget authority in \$ millions)

	FY 1981			FY 1982		
	Carter Proposal	Reagan Proposal	% Change	Carter Proposal	Reagan Proposal	% Change
Science Education	81	65	-20	112	65	-42
Fellowships/Traineeships	15	15	0	22	18	-18
Other programs (curriculum development, institutional support, etc.)	66	50	-24	90	47	-48
Behavioral, Social and Economic Sciences	73	58	-21	84	40	-52
Behavioral and neural	39	34	-13	44	30	-32
Social and economic	34	24	-29	40	10	-75
Scientific, Technical and International activities	56	35	-32	80	38	-53
Industry/University cooperative research	14	9	-36	27	12	-56
Small business innovation	8	6	-25	15	5	-67
Intergovernmental and public service science	13	4	-69	9	2	-78
International activities	14	9	-36	17	7	-59
Other programs	7	7	0	12	12	0
Cross Directorate Programs (instrumentation upgrading, women-in-science and minority programs, etc.)	27	17	-37	98	0	-100
Astronomy Facility (25-meter telescope)	0	0	0	10	0	-100
Other NSF programs	848	848	0	974	974	0
Total	1083	1021	-6	1358	1117	-18

Based on OMB figures

control over the actual cuts once OMB had established an amount. A rumored example of NASA's exercising of such an option was suggested to be that Jet Propulsion Laboratory (the agency's main planetary-research center, which would be radically affected by a cutoff of planetary missions) might be "given \$50 million and told to get something to Halley."

Even with such "freedom," however, the mood of this week's budget countdown did not bode for smooth sailing at NASA over the next few months. Said one concerned planetary researcher, "I think it's going to be a battle that's going to be protracted into the summer and into the fall."

● DOE President Ronald Reagan's let-the-marketplace-decide philosophy was nowhere better evident than in OMB's proposed cuts for the Department of Energy. Government support of energy-technology development should continue only through the "proof of concept" stage, OMB said, with funding for further scale-up and development to be paid by industry as the technologies prove economic.

For instance, solar research, development and demonstration cuts of 22 percent for FY 1981 and 60 percent for FY 1982 "can be justified and sustained," OMB said, "by adopting a policy that federal support should be restricted to long-term R&D with the potential for high payoff." The budget agency also advised that until the Solar Energy Research Institute's mission is better defined, and an "appropriate" size staff agreed upon, construction of a permanent facility at SERI's Golden, Colo., site should be deferred.

The federal budget agency also proposed giving the ax to:

- all fossil-fuel demonstration and development programs,
- the entire magnetohydrodynamics program,
- conservation projects "where commercial viability can be tested by the private sector alone," including energy from urban wastes, advanced automobile engines, industrial processes and electric and hybrid vehicles,
- hydropower demonstrations programs,
- most geothermal loan guarantees and hydrothermal demonstration programs,
- plans for gasoline rationing (with termination to come as quickly as possible by providing only program-closing costs),
- research on near-term technologies for storing energy and
- pilot-demonstration plants for five synthetic-fuels technologies — SRC I and II, two high-Btu gasifiers and the Memphis medium-Btu gasifier. OMB recommends that the newly formed Synthetic Fuels Corp. pick up funding for these plants.

OMB's proposals were not expected to prove a precise blueprint for the President's formal budget proposal. But they did suggest that the new administration sees plenty of fat in the nation's research budget and will be making every effort over the coming year to render it. □

Rubens: The artist and arthritis

Although evidence for osteoarthritis and some other forms of arthritis is ancient, being found in the remains of dinosaurs and early humans, there has been little indication that the most excruciating form of arthritis, rheumatoid, predates the 19th century — until now. The origin of rheumatoid has been moved back at least 200 years by Belgian and U.S. investigators, and, as they report in the Feb. 6 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, their evidence derives from the paintings of 17th century Flemish artist Peter Paul Rubens. For instance, Rubens's final self-portrait reveals a swollen wrist and some finger deformities — signs of advanced rheumatoid.



Kunsthistorisches Museum, Vienna

They sell no whey before it's wine

Frank V. Kosikowski and his colleagues can wine and dine on whey — the watery part of milk that separates from the curds during cheesemaking. Kosikowski, of Cornell University in Ithaca, N.Y., in collaboration with scientists in Poland, has developed a technique for producing a dry, white wine and a highly nutritious protein concentrate from whey, a cheese-factory waste.

Wine from cheese has been a research target since 1948, but technical difficulties have precluded the commercial feasibility of proposed processes. Kosikowski says his process has more potential because it involves a whey powder rich in fermentable lactose, or milk sugar. In addition, use of the easy-to-transport powder obviates the need for a wine-making facility close to a cheese factory.

The cheese industry has about nine pounds of whey on its hands for every pound of cheese produced. The 4.5 billion pounds of cheese produced annually in the United States, therefore, result in more than 40 billion pounds of whey. While whey once was dumped into streams and other waterways, environmental laws now require the whey instead to sit in holding lagoons until it loses its pollution potential.

Maintaining these whey lagoons costs the cheese industry money and energy, Kosikowski says; turning the whey into

wine, on the other hand, recycles the waste and keeps a food substance in the food chain. Moreover, a bottle of whey wine costs less than half as much to produce as does a bottle of grape wine.

Conventional wine is produced when yeast ferments the grape juice, or converts the juice sugar to alcohol. Whey wine is produced by fermenting the portion of whey rich in lactose. The process begins by adding water to whey powder, a mixture containing about 13 percent protein, 71 percent lactose and a small percentage of other components. The protein portion is removed by an ultrafiltration technique, forming the nutritious secondary food product, and the minerals are removed by a process called electrodialysis — the use of a current to remove unwanted ions from a solution. The remaining lactose-rich whey component is fermented for about a week by special lactose-fermenting yeast. The resulting wine is clarified (the suspended material, such as yeast cells, is removed) and citric acid is added to maintain acidity. After the wine is aged, the finished product — a pale-yellow, tart, dry wine with a subdued aroma and bouquet — can be baked to a sherry-like liquid or distilled and aged to a brandy.

Such products could be practical, says Kosikowski, in regions and countries where wine grapes cannot be grown economically. □