It Could Have Been Worse for R&D in Carter's "Austerity" Budget

Basic research gets special treatment and a cost-of-living-plus increase

In a year when the first sentence of the President's budget message contains the words "lean" and "austere," science has escaped with an increase in current if not in constant dollars in the Carter budget. Federal obligations for R & D would increase $1.2 billion in fiscal year 1980 to a total $30.6 billion if Congress follows the President's lead. This is a growth of 4.2 percent over the current year, well under the estimated rate of inflation which agencies are figuring variously at 7 or 8 percent. Basic research funding, however, is again accorded special treatment, with obligations scheduled to reach $4.6 billion in FY 1980, up $379 million or 9 percent over this year.

(Unless otherwise stated, the numbers in the stories below refer to budget obligations, the money the government authorizes to be spent during a given fiscal year.)

In fact, R & D was included in one of four categories of programs which Carter exempted from the major reductions he is asking elsewhere.

A discernible pattern in the R & D budget across the board is for basic research to be emphasized and development to be soft-pedaled. Since basic research tends to be relatively less expensive than development work, especially costly demonstration and pilot projects, the budget-makers must find the basic research particularly attractive this year.

One exception to the mild boom in basic research is the Department of Health, Education, and Welfare, a very conspicuous one since basic research at HEW totals about $3 billion. The Carter budget calls for a mere 1.3 percent increase this year overall, with a tiny decline for the National Institutes of Health, unprecedented in the modern history of that agency's buoyant budget. Administration officials are quick to point out that HEW, NIH included, received a bumper budget increase last year and the average annual increase for the two Carter budgets has been about 11.5 percent.

Federal funds earmarked for R & D in universities and colleges rise a modest $172 million to $3.9 billion in the Carter budget. Since HEW-NIH funding amounts to about half the total of federal R & D funding for universities and colleges, the token increase given health R & D strongly influences the total.

In a briefing on the budget, the President's science adviser Frank Press emphasized the trends over the 2 years since Carter has taken office, noting that the average annual percentage increase for basic research in that period was 12.4 percent. This is the fourth year that basic research has fared better than the rest of the R & D budget.

Again this year Press and Office of Management and Budget director James T. McIntyre, Jr., appear to have done some effective missionary work in behalf of R & D among the mission agencies. At his briefing Press observed that "in tight budget years research is the first thing to be squeezed out." Press and McIntyre wrote to agency heads asking them to pay particular attention to research. It is perhaps not entirely due to the conversion of agency heads to R & D that basic research came through the budget process pretty well, since Press says that President Carter "made the final decisions himself."

The basic research dividends, of course, were not distributed evenly among agencies or within agencies. If last year was supposed to be the year of the zero base budget, this could be the year of the zero increase budget or worse.—JOHN WALSH

Health

Although basic research in general seems to have fared rather well in President Carter's proposed budget for FY 1980, fundamental research in the biomedical sciences is a conspicuous exception. The President has called for what amounts to a standstill budget of $3.2 billion for the National Institutes of Health (NIH); two major cuts in revenue could have important consequences.

First, funds to support new research proposals would be cut nearly in half. Whereas the FY 1979 budget contains an estimated $494 million for new, investigator-initiated grants, the budget for FY 1980 includes only $279 million for such research, a decrease of $215 million.

Second, substantial cuts in money to support the education of physicians and other health professionals are proposed. Specifically, the Administration would like to decrease support by $174 million, taking most of the money from capitation grants to medical schools. Health, Education, and Welfare (HEW) Secretary Joseph A. Califano, Jr., says there is no reason to continue to support medical education through capitation grants which were originally invented as a device for getting medical schools to increase the size of their classes. With payment on a "per head" basis, the more students a school enrolled, the more money it collected from the government. Now, the conventional wisdom is that the doctor shortage of the 1960's will turn into a doctor surplus in the 1980's. Therefore, Califano says, capitation grants are no longer necessary.

Furthermore, the Administration is taking the position that it should not spend a lot to educate men and women for a high-paying profession such as medicine without getting something back—namely, medical service in underserved areas such as small towns and inner cities. (The Republicans thought so too.) Likening the National Health Service Corps to the Peace Corps in its potential for doing good, Califano suggested that he sees the doctor corps as the wave of the future.

None of the individual institutes of the NIH received much in the way of increases, and four of them actually face cuts. (Last year, Congress increased the NIH budget by $340 million above the President's request and may see fit to outspend him again.) The National Cancer Institute, with a whopping budget of $936 million, found itself only $281,000 richer than last year. In terms of increases, the National Institute of Child Health

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and Human Development led all the rest, with a requested raise of $3.5 million, which doesn't keep up with inflation.

Two areas of the health research budget presently slated for more substantial increases are (i) mental health and alcoholism and (ii) preventive health. By and large, the focus is on broad social problems, and expanded funds will go as much for service as for research. For example, the Alcohol, Drug Abuse and Mental Health Administration (ADAMHA) will provide "new alcoholism service programs on high-risk, poverty and minority populations, especially women and youth." In addition, there will be new money to "increase research on the causes and treatment of mental illness, alcoholism and drug abuse" and to continue programs to "facilitate deinstitutionalization of the chronically mentally ill." Altogether, ADAMHA will get an increase of $91 million.

Increased spending in prevention, to the tune of $137 million, is slated for programs to get people to stop smoking (although no one knows how to do it), to teach children and pregnant women to eat right, do something about teenage pregnancy, and to expand health screening programs. In addition, the Center for Disease Control will get an extra $43 million (a 16 percent increase over its FY 1979 budget of $313 million) to immunize children against childhood diseases and older persons against the flu, and to expand its efforts to get communities to fluoridate their water.

All in all, those who deliver care in one form or another are gaining ground.

—BARBARA J. CULLITON

Science

Under the Carter budget, the National Science Foundation breaks the billion dollar barrier. But just barely. The $77.6 million increase called for in the budget would give NSF $1.006 billion for the year, allowing the agency to inch into the bureaucratic big time. This would compare with $928.4 billion this year and amounts to an 8.4 percent rise.

The government-wide dispensation on basic research is evident in the NSF budget, with basic research rising by $87.3 million to $824.3 million or 11.8 percent. Applied research is scheduled to rise $2.8 million to $72.8 million or just 4 percent. The basic research fillip has a particularly strong effect in the NSF budget, since 91 percent of NSF support of R & D will go into basic research.

For NSF, FY 1980 will not be a year of daring departures. It looks, rather, as if most new funds will be added incrementally to existing programs. A good example is the foundation's continued effort in behalf of instrumentation. Two years ago the agency began to bolster the program to provide instrumentation needed by individual grantees. Research is growing increasingly "instrument intensive," and the lag in instrument funding was having a negative impact on research. Major Western European countries in the last decade outspent the United States 3 to 1 on instruments. The new budget calls for total funds for facilities, major equipment, and instrumentation of $101 million compared to $88 million last year. Significantly, the amount allocated to major equipment was reduced, and funds for instrumentation increased. In the current year, $54.4 million is earmarked for instrumentation; for next year the figure is $81.6 million.

Applied research is scheduled for a slight reduction. The Applied Science and Research Applications (ASRA) directorate, successor to RANN (Research Applied to National Needs), is to be cut from $62.8 million this year to $62.4 million next. Much more than the $400,000 net decline in the ASRA budget is accounted for by the $3.6 million decrease in funding that will come with termination of NSF's Chemical Threats to Man and the Environment program and the $700,000 cut that will be realized in the Community Water Management Program scheduled to be ended at the close of the current fiscal year. Major increases in funding will go to NSF's earthquake hazards program, programs for science and technology to aid the physically handicapped, and to research on human nutrition.

The favoring of basic research in the Carter budget is intended primarily to redress the relative neglect of such research during the past decade. But it should not be read as an endorsement of science for science's sake.—JOHN WALSH

Energy

No spectacular budget changes are planned for the Department of Energy (DOE), just more of the familiar policy that Carter and DOE Secretary James Schlesinger have promoted in the past 15 months. In brief, this means there will be a little more money to spread around for solar power and environmental impact research projects. There will be more for basic research in general. There will be a lot more for nuclear waste management and weapons building, and a lot less for demonstration projects.

Overall departmental spending (outlays) will remain constant, at about $10 billion. The Administration will request a smaller budget authority for DOE in fiscal 1980—down from $11.3 billion to $8.4 billion—because the department does not believe it needs additional funding at this time for the strategic petroleum reserve. This item amounted to $3 billion on last year's budget, enough to carry the project tidily through this year, officials believe.

Excluding figures for the reserve, the energy budget request increased by about 8 percent, just enough to keep pace with inflation. Budget authority for research and development will go up only one-half of 1 percent (to $4.6 million), although outlays will increase by 3 percent. The request for basic research will increase much more, by about 17 percent. Outlays to universities will increase about 5 percent.

Schlesinger told reporters that while last year's budget was essentially a "stapling together of the requests of predecessor agencies," the 1980 request is the first "comprehensive document" he has put together expressing his plans for DOE. A substantial decrease in the estimated demand for nuclear reactor fuel, he said, made it possible to pry loose $600 million, which would have paid for uranium enrichment and will now be used on solar power and conservation projects. Schlesinger said that his staff is trying to restrain spending and tighten control over 225 large-scale energy projects, to decentralize DOE authority, and to focus more attention on the long-term risks and benefits of ideas before giving them developmental support.

Only two new legislative proposals are in sight: one to authorize DOE to borrow $300 million to start work on a self-financing nuclear waste storage facility, and another to rewrite a program giving aid to the states for developing local energy plans. The site for the waste dump will not be chosen until Congress authorizes funding for it.

In addition to this legislation, DOE will seek $85 million in supplemental funding to carry out the National Energy Act passed last year, and $32 million to cover unanticipated costs in defense programs. Not included in the budget are tax credits costing the Treasury about $848 million (down from $1 billion in fiscal 1979) to encourage fuel conservation by industry, home insulation, and the purchase of solar equipment.

Among the major categories of DOE spending, defense work received by far the largest increase, amounting to $337 million or 12 percent. The largest chunk

of the increase ($191 million) will be used to finance weapons research, development, production, and surveillance. The next chunk ($115 million) will pay for an accelerated program of military nuclear waste disposal and for the acquisition of land in southeastern New Mexico for a waste isolation pilot plant.

There will be a slight decline ($42 million) in the funds requested for research and development of new technologies, with a moderate amount of reallocation of funds from one area to another. The losers are nuclear fission (down $167 million), geothermal (down $19 million), and hydroelectric (down $11 million). The gainers are solar power (up $69 million), environmental research on such things as the effect of low-level radiation and coal burning (up $33 million), magnetic fusion (up $8 million), and fossil fuels (up $5 million). The new budget contains $590 million for research on nuclear breeder technologies (down from $742 million last year, the second annual decrease), but nothing for breeder development. The decision on development will be made in 1981.

Support for basic energy research will increase from $220 million to $276 million, with most of the new emphasis on the chemistry of nuclear waste, solar energy processes, and coal liquefaction, gasification, and combustion. The request for basic science funding also increases, from $431 million to $474 million, with particular emphasis on high-energy physics. Conservation research funding shows no increase, and grants to states for conservation decline—according to DOE—because there was a lag in implementation caused by the late passage of the National Energy Act.

The net effect is to give a comfortable boost to solar power and fundamental energy research, improve the nuclear waste handling system, build some more weapons, and let everything else drift.

—ELIOT MARSHALL

Agriculture

The request for the Department of Agriculture adheres to the general pattern, slightly reducing the sum for research and development (by about one-half of 1 percent), but increasing funds for basic research (by about 6 percent). Total R & D funding is expected to be $664 million. Special emphasis will be placed on biomass production of energy and production of methane from animal and other farm wastes. The Carter Administration, after a considerable struggle, managed to persuade Congress to spend $15 million last year for a program of competitive grants for agricultural research in American universities. This year the Administration hopes to increase funding for the project to $30 million. According to Carter's budget analysis, the emphasis will be on "basic knowledge needed over the long term to increase the efficiency of crop production," to reduce energy consumption on the farm, and to improve human nutrition. Unless Congress feels a need to protect the state agricultural colleges from further competition, this good idea will grow in influence.

—ELIOT MARSHALL

Space

When President Carter announced the civil space policy for his Administration last October 11, many observers were nonplussed. Though he claimed to have "set the direction of U.S. efforts in space over the next decade," the public document in which this was done was four pages long, only a summary of a much longer report that the National Security Council has steadfastly refused to release. The statement stressed the need for earth applications of space technology, but left most major policy issues up in the air.

Some of those issues have been clarified with the release of the National Aeronautics and Space Administration (NASA) budget for FY 1980. The agency's budget increase of $160 million or 3 percent will fall considerably short of inflation, and for only the second time in the last decade, the budget contains no money for new space projects. Although space science will receive a 19 percent funding boost, most of it will go to continuing and planned development of the space telescope, the Jupiter orbiter, the solar polar and solar maximum flights, the third high-energy astronomy observatory, and the space shuttle. A passel of projects desired by NASA were not funded, including a gamma ray observatory, a national oceanic satellite, a mission to map Venus by radar, advanced Spacelab astronomy experiments, extraterrestrials research, and a mission to rendezvous with Haley's comet, due in the vicinity of Earth in 1986. A host of projects desired by NASA contractors and a handful of congressmen were not even considered, including a solar power station and additional manned planet exploration. All in all, the budget gives a new meaning to Carter's words that "It is not a matter of playing down the importance of space. It is a matter of using what we have already learned more practically."

NASA officials, perhaps by now resigned to the continual slide in their budget, are making the best of it. Though the agency received $200 million less from OMB than it requested, NASA administrator Robert Frosch said at a press conference that "The budget can, in brief, be characterized as tight, but sufficient to continue our transition to the shuttle era in a time of fiscal stress." It also "leaves room in the years ahead for the selection of new projects from the many worthy candidates we are considering." Advocates in the scientific community of more planetary exploration are less sanguine. The Venus mission apparently cannot be launched until 1991 if it is not funded next year, for example.

All is not bleak in the NASA budget. In line with Carter's decision for NASA to re-enter the field of communications satellite research and development, 8 percent more will be spent on it. Also, aeronautics research will receive a funding boost of 14 percent, with a large part of it aimed at improving aircraft energy efficiency.—R. JEFFREY SMITH

Defense

If the Carter Administration gets its way with Congress this year, some 45 percent of all federal research and development funds will be spent by the Department of Defense (DOD). The Administration seeks total obligational authority for fiscal 1980 of $13.6 billion, or a 7 percent increase over fiscal 1979.

Basic research in defense will stay well ahead of inflation, reflecting the President's general exemption of basic research from the budgetary axe. Obligations for fiscal 1980 will rise by 17 percent to $436 million. The total obligational authority for basic defense research—that is, money to be obligated in this and coming years—will rise still more, to $477 million, or a 20 percent increase over fiscal 1979.

In other ways, the Administration seems interested in the long-term strengthening of basic research. Again this year, an increase of $30 million is sought in DOD research funds flowing to university campuses. This is part of a general post-Vietnam reconciliation between the DOD and the campuses, which are regarded as important sources of new ideas. The problem of outmoded facilities has also been a concern of Administration science officials; the defense budget proposes an increase of $96 million for R & D facilities.

Arms controllers and other students of military affairs will study this year's R & D presentations for signs of trends in both weaponry and Administration policy; the budget documents released by DOD offer many tempting nuggets. The most obvious signal is the hefty $536 million the Administration seeks to proceed with development of the M-X experimental missile in fiscal 1980. The M-X will be a more accurate and lethal follow-on to today's Minuteman III missile, the mainstay of the U.S. land-based force. The Administration has separated the M-X development from the more politically charged issue of how to deploy the M-X. The fiscal 1980 budget seeks another $134 million to continue study of whether to base M-X missiles in trenches, silos, on airplanes, or aboard submarines to avoid their destruction in a Soviet first strike. A basing decision is due in April.

Another interesting clue to future weapons development could come from a pair of items in the Navy's R & D budget, to cost $10 million each, for experimental work on strategic and tactical submarine technology. Both the Navy's existing programs, the Trident and 688-class attack submarines, have been criticized for being too costly and behind schedule, but the Navy maintains that these are the best designs. The $20 million would go for study of miniaturization of submarine components, including their nuclear power plants, according to DOD officials. Such work could give the Navy the technological alternative of building smaller, less costly, and therefore more submarines.

This year's defense budget, like last year's, is generous with funds for cruise missiles—the new technology which the Administration decided would replace the strategic manned bomber, the B-1. But a testament to the tenacity of politically popular defense programs is the fact that the Air Force research budget has a $5 million item for a "new manned bomber"—that is, a follow-on to the B-1—as well as at least $67 million for continuing studies relating to the B-1.

The Administration seems to be bending before pressure to step up research on charged particle beam (CPB) weapons, which many scientists have scoffed at despite military claims that the Soviets have a substantial CPB technology lead. Funds for "Chair Heritage," the principal U.S. CPB research program, will double from $12 to $24 million in fiscal 1980. The program has been transferred from the Navy to the Defense Advanced Research Projects Agency (DARPA). Together with Army and Air Force research, the total U.S. CPB effort will be approximately $30 million.

DARPA will continue the rapid growth it has experienced as a result of the Administration's wish to improve the technology base of U.S. defense. In fiscal 1979 the Administration sought a hefty increase for the agency; then Congress increased its budget still more, to $377 million. The new budget would raise DARPA to $462 million, an increase of 23 percent over fiscal 1979.

—DEBORAH SHAPLEY

Environment

When the budget is finally set each December, top officials in the Office of Management and Budget (OMB) head for a retreat outside Washington to mull over potential changes in the budget process. Last year at this time, OMB officials there—at the urging of shrewd administrators of the Environmental Protection Agency (EPA)—discussed toxic substances regulation as a budget growth area, as well as one that required policy determinations on a broad scale. As a result, the toxic substances programs in seven agencies* were, for the first time, considered as one item in the current budget.

EPA officials, not surprisingly, were pleased with the overall result: they will be able to hire 167 new employees to deal with toxic substances (a 30 percent increase); spend $44 million more (75 percent); and make an extraordinary claim on $15 million in the budget of the National Cancer Institute (NCI). Overall, the agency got a $71-million increase in operating funds, which amounts to an increase (6 percent, to $1.3 billion) that will not quite keep pace with inflation but is considered good relative to the deep cuts this year in the budgets of larger, more established agencies. "We are very pleased to still be gaining resources," says William Drayton, EPA's top budget official.

One of the agency's largest increases is in research and development, particularly on the effects of toxic substances on human health. "We have to start arriving at some conclusions," Drayton says. "Decisions will not wait. And we would all feel a little more comfortable if we had a few facts." As a result, the agency is committing $24 million more to research in 1980 on the health effects of pollution and toxic substances and additional amounts to research on air pollutants, noise, and nonionizing radiation. As a result of the cross-agency comparisons—where each agency was given the opportunity to critique the programs of others—EPA will also be working a lot closer with the National Institute for Occupational Safety and Health, the National Institute for Environmental Health Sciences, and NCI on the scientific bases for its standards.

NCI, in particular, will give up control of part of its own budget to EPA, for epidemiological and "total body impact" research, as well as other areas yet to be settled. NCI did not suffer the arrangement gladly. Its budget official was reported as saying of the cross-agency comparisons that led to EPA's control, "We didn't get much from the whole thing, and my feeling is that OMB didn't get much from it either." Also, Arthur Upton, NCI's director, favored more unrestricted basic research for his agency. EPA officials, who asked not to be quoted, had a different view of it. "Nobody has messed with their budget before, and they haven't been focusing enough on environmental research," said one. Characterizing the OMB decision as a "discipline, not a disruption," the official went on to say that "there has been a certain element of bruise at NCI, but we want to work together now."

EPA did well in other areas, in addition to research, as a result of cross-agency comparisons with nonregulatory agencies. "We hope the process continues and expands," Drayton says. Other major funding increases will be in the following areas:

- Radiation programs, largely for development of a standard for radioactive waste disposal (a 66 percent increase);
- Noise programs, which previously were a low EPA priority, but were given a boost by new legislation last year and public opinion polls showing high concern for noise pollution (an 18 percent increase); and
- Safe drinking water, largely for additional research and state implementation plans (a 15 percent increase).

Reductions will occur in funding for solid waste programs, primarily in resource recovery and despite a big boost in funding for the 1976 solid waste act; energy programs, some of which are being picked up by the Department of Energy; pesticide programs, reflecting the winding down of certain research on potentially highly toxic pesticides and on integrated pest management; and grants for construction of municipal waste-treatment plants.—R. JEFFREY SMITH

*The Environmental Protection Agency, the Food and Drug Administration, the Occupational Safety and Health Administration, the Consumer Product Safety Commission, the National Institute for Occupational Safety and Health, the National Cancer Institute, and the National Institute for Environmental Health Sciences.