on programs—NSF's share, with the exception of the airplanes—has been going down from $618 million in fiscal 1972 to $579.6 million in fiscal 1974.

What will become of the proposed NSF budget? If the past is any guide, the House and Senate will try to increase it, perhaps by as much as $50 million.

OMB may well continue to impound funds or delay them. Asked about this, Stever said he had assurances that OMB was committed to the full fiscal 1974 amount. But he later added "I have my suspicions." OMB witholding could well cancel out any congressional increases.

Most important, however, is the three-way fight brewing over NSF's future mission. The Administration's announcement that Stever and NSF will take over the science advisory role clearly indicated a new dimension for the agency. Meanwhile Senator Edward M. Kennedy (D–Mass.) whose bill, S32, would establish a new, applied wing within NSF, can be expected to try to move it through Congress this session. And the Republican legislators this year intend to submit an alternate bill dealing with NSF's role to the Congress too. If any rash reorganization of NSF comes about, it could affect how much money it finally receives.

—DEBORAH SHAPLEY

Inflation

No one should read the federal budget, or any R & D funding statistics, without bearing in mind the impact of inflation on all the numbers involved.

The federal budgets, with some exceptions in the Department of Defense, do not include inflation rates in their calculations of spending trends so readers must calculate them in as they proceed, to evaluate the actual worth of the funding. The difficulty lies in knowing which inflation rates to apply.

In 1973, the country's general rate of inflation was frequently mentioned as standing near 5 percent. The Administration hopes to cut that rate to 3 percent by 1 July 1973—at the start of fiscal 1974.

However, there is no single rate of inflation that applies everywhere; different fields of science have different rates of inflation, according to Edward C. Creutz, assistant director (research) of the National Science Foundation. Some fields of science use more equipment than others, and he says the cost of equipment, particularly of very sophisticated equipment, inflates more rapidly than do salaries and expenses. Thus, funding for high-energy physics, inflates not at the general, 5 percent, rate but at about 2 percent higher, or 7 percent. Creutz says that a rate of 2 percent higher than the normal rate is a sound, "across the board" number to use for inflation in equipment-intensive fields.

Funds for less equipment-intensive fields, such as mathematics and theoretical astronomy, inflate at the general rate, since the money is spent for salaries and expenses. Scientific salaries are not inflating as fast as they were a few years ago, however, because there is currently a surplus of scientists for some fields, Creutz says.

So for fiscal 1973, an inflation rate of 5 to 7 percent should be applied depending on the field of R & D. Should the Administration succeed in lowering the general rate in fiscal 1974, rates of 3 to 5 percent should be applied.

—D.S.

Energy

With nationwide shortages of fuel oil this winter spurring public fears of an energy crisis, the Administration's new budget propitiously asks Congress for $772 million to support energy-related R & D—an increment over the current fiscal year of $130 million. The new budget conveys continuing confidence on the part of the White House that the nuclear breeder reactor will meet the nation's long-term needs for electrical energy, but, for the short term, the budget carries quite a different message. In essence, the White House wants the nation's utilities to place more reliance on coal—as opposed to oil and natural gas—to meet energy demands through the mid-1980's. And the budget contains some sizable sums to buy the technology to make this new reliance possible.

As the budget's section on R & D puts it:

> Improved technology cannot, by itself, solve all energy and related environmental problems. But it can contribute to substantial reduction of their impact, particularly by the production of clean energy from coal—our most abundant fuel source.

The nation's known coal reserves exceed 500 billion tons, enough to last at the current rate of production for 800 years or more. Much of this, however, is bituminous coal containing up to 10 percent sulfur, an amount that makes it wholly unacceptable for use in most urban areas, especially in the Northeast, where strict limits on emissions of sulfur oxides are enforced. The President's Council on Environmental Quality has estimated that between 1970 and 1985 coal's contribution to the nation's total energy supply will slip from 20 to 17 percent unless economical methods are developed to overcome the sulfur problem.

Accordingly, the 1974 budget asks Congress for $129 million for fossil fuel R & D, an increase of nearly 20 percent over the current year. Most of this would be spent by the Interior Department through contracts to industrial firms; special emphasis would be placed on developing methods for "precombustion cleaning of coal to meet environmental standards." Such methods include gasification and liquefaction of coal and solvent extraction of sulfur from raw coal. A total of $60 million is earmarked for development of this technology in fiscal 1974, an increase of $15 million.

At the same time, the Administration will phase out a program in the Environmental Protection Agency that sought to develop means of scrubbing sulfur oxides from

Energy research and development.

Program	Obligation in millions of dollars*		
	1972 Actual	1973 Estimate	1974 Estimate
Fossil fuel energy			
Production and utilization of coal	74	94	120
Production of other fossil fuels	13	13	9
Nuclear energy			
Liquid metal fast breeder reactor	236	272	323
Nuclear fusion	53	66	88
Nuclear fuels process development	35	42	62
Other nuclear power	87	98	90
Solar and geothermal energy	3	8	16
Other energy related programs	37	50	63
Total	537	642	772

* Includes funds for conduct of R & D and related facilities. Detail may not add to totals due to rounding.

the stack gases of industrial and power plants. Thus industry is presented with a choice of pursuing stack gas technology on its own—an unlikely prospect, given current problems with the technology—or of banking on the success of "clean coal" technologies. The net effect may be a powerful inducement to accelerate coal mining in the vast and largely untouched deposits of the central plains and the Rocky Mountain states.

The rationale for accelerated coal production is not purely technological, however. In an energy message planned for later this winter, the President is expected to characterize increased coal production as a boon for national security and the U.S. balance of payments, to the extent that clean coal can reduce U.S. reliance on foreign petroleum and natural gas of low sulfur content.

Other, alternative sources of energy also receive new support in the 1974 budget. Money for solar energy and geothermal R & D would double to $16 million, and the Atomic Energy Commission is to receive $323 million for its work on the breeder, raising the government's contribution by 20 percent. Nonmilitary R & D on controlled fusion would increase $7 million to a 1974 total of $44 million. The Administration also lumps the millions it is spending on laser-triggered fusion weapons under the heading of "clean energy" programs, on the grounds that such work might produce spin-off of interest to the civilian effort.

The new budget also creates a $25 million "central fund" for energy in Interior to support the "exploitation of promising technologies." This new money would seem to vest Interior with new authority over energy R & D, an arrangement that is consistent with the President's announced intention of transforming Interior into a Department of Natural Resources with central authority over national energy policy, both nuclear and nonnuclear.

—ROBERT GILLETTE

Environment

Is there anyone here who understands this book? These numbers don't make any sense to me.—William Ruckelshaus, Administrator, Environmental Protection Agency (EPA), in discussing a portion of the budget with newsmen.

Mr. Ruckelshaus's tongue was planted firmly in cheek, but his complaint is nonetheless a common one. Federal budget documents are as much a masterwork of public relations as a proposal to Congress, and their lucidity sometimes rivals that of the Penn Central Railroad's annual report. But so far as one can divine from the voluminous documents released last week, the sector of the federal budget loosely described as "natural resources and environment" fared as well as any other category in a year when the watchword, more than ever, is inflationary control.

President Nixon has withheld about half the $11 billion authorized last year by Congress—over his veto—for water pollution control. At the same time though, the White House proposes to more than double the amount actually to be spent on pollution abatement (mostly for municipal sewage plants). This amount would rise from $727 million in fiscal 1973 to $1.6 billion in fiscal 1974.

In addition, the White House places a figure of $1.012 billion on its request for environmental R & D in fiscal 1974, an increase in obligations of $60 million. Much of this increase apparently would go into energy R & D.

A billion-dollar figure for environmental R & D may be a bit misleading, however, in two respects. For one, the definition of R & D is stretched to include such government services as maintenance of a weather satellite system and topographic mapping by the Geological Survey. Moreover, a close reading of the budget reveals several significant reductions in areas classically defined as R & D. Not the least of these involves a major "redirection" of the EPA's research program that tends to shift the agency away from development of pollution control technology and toward a narrower mission of supporting the agency's regulatory functions.

Thus, in fiscal 1974, the EPA's obligations for R & D would drop by $25 million to a level of $148 million. The single greatest cut, and potentially the most controversial, is an 88 percent or $15 million reduction in EPA's support of solid waste processing technology. In a news conference, Ruckelshaus maintained that this "new technology is in hand" and that it was now up to local communities to adapt it to their solid waste problems. This view, however, is not universally shared within the agency. "Obviously," one EPA official said privately, "this is a devastating reduction."

At the same time, the White House budget office proposes to cut 30 percent or $3 million from EPA's work on cleaner, alternative automobile engines and to terminate the agency's $5-million program to develop devices for scrubbing sulfur oxides from industrial stack gases. Ruckelshaus said that the EPA has fulfilled its responsibility of nurturing this technology to a point where "only engineering problems remain," although he acknowledged that the severity of these problems is a matter of great controversy in industry.

Other EPA research programs in radiation, pesticides, noise, water quality, and the social effects of pollution would remain static or rise slightly in the new budget.

Elsewhere, the Interior Department cut $24 million from its Office of Saline Water, marking the end of a desalination demonstration program. The $2 million that remains will be applied to "basic" research in desalination. In what appears to be a pattern throughout the environmental sector of the budget, this reduction was offset by the creation in Interior of a $25-million contingency fund for energy R & D. Thus, a few selective increases appear to balance out a few selective cuts, leaving the overall funding picture essentially static.—R.G.

Military

With an initial "post Vietnam" budget of $81.1 billion, the U.S. military establishment would have by far the largest peacetime budget ever, yet it is caught in an increasingly tight and troublesome fiscal situation. For the Pentagon the "peace dividend" comes largely in the shape of a struggle to meet huge payroll and retirement benefit costs, bear up under inflation, and, at the same time, modernize its forces by buying incredibly expensive new weapons—for instance, $19-million fighter aircraft (the F-14) and $1-billion submarines (the Trident).

In fiscal 1965, the last year before the massive U.S. involvement in Vietnam, the military budget was about $50 billion. By fiscal 1969, at the peak of the Vietnam war, the military budget—all of these figures include military assistance to foreign nations and defense-related