particularly tricky, because the 1973 budget, which would normally be a standard reference against which to measure the upward and downward trends in the 1974 HEW money bill, does not really exist. It is the budget the President vetoed last summer. It has never been revived. Instead, NIH and all other agencies in HEW have been living on a "continuing resolution," which means that spending has been held, more or less, to 1972 levels.

As a result of this unusual and highly confusing situation, there are three different sets of 1973 figures one can use as a yardstick for measuring the 1974 budget. There are the figures in the original 1973 budget, the one Nixon sent to Congress last January just as he is sending the 1974 budget to the Hill now. There is the "revised" 1973 budget which is listed in the 1974 budget and which the Administration now considers the one that counts. It's figures are consistently lower than those originally presented for 1973. And, there is the 1973 budget according to the Congress of the United States. It's figures are consistently higher than either of the other two.

By looking at the various numbers as they apply only to the budgets for the NIH's institutes and research divisions, one can get an idea of the numbers games there are to be played. The total request in the 1974 budget is $1.531 billion. The total request in the revised 1973 budget is $1.483 billion. Thus, the new NIH budget is $48 million more than the old one. However, if you compare the 1974 figure with the original 1973 request ($1.570 billion), you get a different answer: $1.570 (1973) − $1.531 (1974) = −$0.39

Viewed that way, NIH comes out way behind, particularly because these figures do not include inflationary factors. If you look at NIH from the perspective of what Congress wanted, the situation is poorer yet. Congress passed a bill appropriating $1.783 billion to NIH for 1973. By that measure, the President's 1974 request puts research $252 million behind.

Whatever set of figures you use to evaluate the situation, it is obvious that federal spending for medical care and for biomedical research is declining. Neither area was accorded any special treatment in the Administration's overall plan to trim federal spending. Certainly, this will offend those who used to be the recipients of federal largesse. Along these lines, the Administration will continue to push for development of controversial Health Maintenance Organizations which involve pre-paid care. However, it will bow out of graduate training and its concomitant institutional support altogether (*Science*, 26 January). Some institutional support will come through capitation grants, but they will be funded only at 1973 levels which many schools consider inadequate. Furthermore, the Administration has acted to reduce capitation. It will limit those funds to the country's 125 schools of medicine and osteopathy and 58 schools of dentistry. Nurses and other health professionals are now out of the capitation picture. Whether these budgetary actions will really have an irreparable and adverse affect on the progress of biomedical research and the quality of medicine is hard to gauge, to put it mildly. But one aspect of all this that the biomedical brass finds most distasteful is the fact that they are really not in on the decision-making any more. For political reasons, for example, cancer and heart disease are targeted to be conquered and the implication is that, with enough money and good management, they will be. The OMB apparently believes this. Most scientists still do not, but their opinions carry little weight.

—BARBARA J. CULLITON

Science Foundation

The proposed budget for the National Science Foundation (NSF) for fiscal 1974 will be going up and down at the same time. In terms of actual spending, there will be a 2 percent rise to $584 million. In obligations, which include future spending, NSF will seek $641.5 million, or $33.2 million less than it did last year, and $8.7 million less than Congress appropriated when it voted $650.2 million for NSF's 1973 budget.

This has happened partly because this year NSF didn't get its full appropriation. The OMB held in reserve about $62 million of NSF's budget during fiscal 1973. The Administration plans to spend that money instead during fiscal 1974. Hence it can seek a lower new appropriation. This system of reducing new appropriations is being used throughout the budget this year.

At a press briefing on the budget, NSF director H. Guyford Stever maintained that NSF's basic research was being sustained in fiscal 1974. Most NSF basic research is funded through the Science Research Project Support (SRPS) program which seeks a 5 percent increase to $275 million. But if current 5 percent general inflation rates persist into fiscal 1974, this increase will be absorbed by inflation.

There are no new staff slots or funds for NSF to take over the functions of the now-abolished Office of Science and Technology. The White House announced on 26 January that Stever would be the new science adviser and NSF would assume OST's role. However, without new funds for this change, it is unclear how NSF can effectively don such a new, broadened role.

What will be cut back in fiscal 1974? The 1973 NSF budget was artificially swollen by about $20 million which paid for three ski-equipped C 130 aircraft for Antarctic research. More important for the future, graduate student support will decline by $4.8 million with the finish of the graduate traineeships. Institutional grants for science will decrease by $2 million to $6 million. NSF will seek $3 million only in special foreign currency for international programs; last year it sought $7 million.

There are some interesting increases reflecting NSF's interest in the newer so-called "practical" programs. The Very Large Array telescope will need $10 million in fiscal 1974 for construction. RANN, or Research Applied to National Needs, will get a healthy $9 million boost—largely in its hardware-oriented advanced technology applications section. Most of the basic science areas in SRPS receive $1 million raises; but engineering and social sciences did much better with $2.6 million and $2.1 million increases, respectively. The technology assessment program —one of the few relics of last year's Presidential Technology Message—will still be funded at $2 million, and the money for the R & D incentives program, which for a time had most of its $18 million 1973 appropriation held up by OMB, now expects to get $15 million before the end of fiscal 1973 and $18 million in fiscal 1974. Science education, which had $30.8 of its funding held up last year by OMB, will receive that money during fiscal 1974 along with a smaller new amount of $29 million—a clear example of how OMB holds on funds are being applied to the 1974 budget.

The NSF budget also illustrates the lesson that such documents cannot be read too skeptically. NSF's lead chart shows steady increases in NSF's "direct program funds" from $600 million in fiscal 1972 to the $641 sought for fiscal 1974. But in terms of budget authority—the ceilings

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.