heed, is expected to take up his duties about mid-February.

The sentiment at the Foundation, as expressed by one official long associated with Mohole, is that "everyone made lots of mistakes." At this point, everyone involved is eager for peace and progress, and it would therefore appear that Mohole now has reasonable prospects for proceeding, with nothing but technical difficulties to occupy its time and energies. However, on the basis of past performance, even the most thorough-going optimist could not be blamed for withholding judgment.

—D. S. GREENBERG

(This concludes a three-part series on Project Mohole.)

Budget: Requests for R&D Funds Edge above $15 Billion Mark for a Fiscal Year of "Austerity"

Because of the most unusual circumstance that President Johnson is submitting his first budget in a Presidential election year, this budget, which was unveiled this week, is naturally receiving close scrutiny as a political and economic document.

Economy has been a Johnsonian watchword since he was propelled into office just 2 months ago and now he has presented what he calls a "restrictive budget." He proposes a somewhat reduced administrative budget for the 1965 fiscal year—$97.9 billion compared with $98.8 billion last year—and a cut in the number of federal civilian employees. As a result of an anticipated increase in federal receipts the President foresees a '65 deficit of $4.6 billion or about half the estimated $9 billion deficit for the current fiscal year, which ends 30 June.

At the same time, President Johnson pledged himself to austerity without stagnation and made his "attack on poverty" a dominant theme in the budget message. As a result the budget is being examined carefully to see how the administration proposes to do more for less.

At this stage, however, it is extremely difficult to put the budget into close focus. The federal agencies are ordered to keep mum on their own budgets until the big budget goes to Congress, primarily because the administration, understandably, wants to exploit the occasion to speak in general terms, to discuss round numbers and big ideas. Major agencies with vast and complicated budgets, such as the Defense Department and National Aeronautics and Space Administration, hold full-scale press briefings in the days immediately before the release of the budget, but in many cases it is still too early in the game to get anything but provisional answers to questions on specific programs. This year, the job of early analysis is even more troublesome than usual because the budget appendix, the fairly detailed form of the budget which is about the size of the telephone directory of a medium-sized city, is not yet available. This is proof of a kind that the new President and his advisers did tear up the budget in some places and insist on revisions.

It should be remembered, however, that the budget as a document with retrospective tables is a more reliable guide to what happened than to what is going to happen. Circumstances alter budgets and the national economy and the international situation are unpredictable. In matters of federal spending it is the President who proposes and the Congress which disposes, and last year Congress appropriated some $6.5 billion less than President Kennedy requested.

Budget Expenditures for Research and Development (in millions of dollars).

Fiscal year	Defense	NASA	AEC	HEW	NSF	Other	Total
1960	5654	401	986	324	58	315	7,738
1961	6618	744	1111	374	77	356	9,278
1962	6812	1257	1283	512	105	409	10,373
1963	6849	2552	1335	621	142	483	11,983
1964	7450	4400	1543	754	175	561	14,883
1965	7107	4990	1557	796	204	633	15,287

Signs and Portents

The budget and the message which accompanies it, however, are still worth examining for signs and portents of the administration's intentions and probable priorities.

For those speculating about the course of science policy in the Johnson administration, the omens in the budget are not strikingly clear. Spending on science is up, but the sharply rising curve of recent years would flatten decidedly next year although it is likely that the same thing would have happned if this had been a Kennedy budget.

The total request for federal expenditures on research and development for fiscal 1965 is $15.3 billion as compared with an estimated $14.9 billion to be spent in the current fiscal year, an increase of only 3 percent in '65 over '64 as compared with a 24 percent rise in '64. This leveling off can be traced mainly to the peaking of the space budget and to changes in the goals of defense research. Growth in the science budget in the coming year, if the Johnson recommendations prevail, would still be attributable to expansion of NASA research and development activities.

Five agencies dominate the science budget: the Department of Defense, NASA, the Atomic Energy Commission, the Department of Health, Education and Welfare, which is the parent agency of the National Institutes of Health, and the National Science Foundation. Figures for federal R&D expenditures for the four previous years and estimated figures for the current and coming fiscal years are given above.

The lumping together of funds for basic research and development and for construction of R&D facilities has long clouded the picture of federal support of science. This year in the compact official paperback, *The Budget of the United States Government* (available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C.; $1.50), separate totals for research, development, and facilities are offered for the first time.

The subtotal for research in the 1965 request is $4.3 billion compared with an estimated $4.1 billion expenditure in the current year; for development, $9.8 billion for '65 compared with $9.7 billion in '64, and for R&D facilities, $1.5 billion in the next fiscal year compared with $1.1 billion this year.

According to the special analysis contained in the budget summary mentioned above, almost two-thirds of federal funds for research and development are spent through contracts with private industry. Slightly more than 20 percent goes into R&D activities by scientists and engineers in federal laboratories and only some 13 percent of federal R&D funds are spent through contracts and grants to universities and other nonprofit institutions.

Also provided this year is a table showing expenditures for conduct of

Expenditure for Conduct of Basic Research (in millions of dollars).

Agency	1963 actual	1964 estimate	1965 estimate
Defense	193.0	204.5	219.9
NASA	525.1	727.0	790.2
AEC	218.9	238.9	268.3
HEW	195.1	223.1	237.2
NSF	99.6	126.8	143.0
Other	118.2	136.5	150.2
Total	1349.9	1656.8	1808.8

basic research, which is defined as "research directed toward the increase of knowledge in science where the primary aim is fuller understanding of a subject rather than practical application." The table is reproduced above.

In recent years, about half of the federal R&D budget has been absorbed each year by the Defense Department. The total R&D budget, of course, has been climbing rapidly, and as research activities have burgeoned in other agencies in the past decade, the Defense Department's proportion of the total declined. This year there have been some significant shifts and changes within the defense R&D budget. Expensive development on some maturing weapons systems has ended, some projects like those involving the Skybolt and Typhon missiles have been cancelled, and R&D work on newer systems like the Nike-X antimissile-missile system are at relatively less costly stages. The result has been a cut in the request for development funds for Defense from $5.7 billion in fiscal '64 to $5.3 billion for '65.

The Defense Department's R&D policy may well become a subject of partisan political dispute this year if the controversy over United States capacity to deliver nuclear weapons continues to mount. Senator Goldwater, an Air Force reserve major general, has raised questions about the reliability of U.S. strategic missiles, adding fuel to criticism by air-power advocates who deplore the absence from the production lines or even the drawing boards of a successor to the B-52 and B-58 nuclear bombers. It remains to be seen whether or not the critics will be mollified by the Secretary of Defense's assurance of U.S. missile dependability and the move late last year to begin serious studies on an "advanced manned precision strike system," presumably a high-speed aircraft armed with missiles and capable of operating at very low altitudes to penetrate radar and anti-aircraft missile defenses.

The air-power issue extends to space, where last year the Air Force lost the Dyna-Soar project to develop a craft to operate on the fringes of space and in the earth's atmosphere, but gained the commission to develop a Manned Orbiting Laboratory, a two-man spacecraft designed to investigate the military usefulness of space. The budget calls for expenditures for research on the military uses of space of $1.5 billion in '65, a level maintained for the past 2 years. Criticism of restraints on military spending in space has been simmering for some time in Congress, and it is possible that the heat of election year will bring it to a boil.

Budgeting for the nonmilitary uses of space also seems to have been affected by the spirit of economy as well as by the treatment of NASA by Congress in the last session. The administration is asking for $5.3 billion for NASA in fiscal 1965 plus a $141 million supplementary appropriation before the end of the current fiscal year. Even if Congress votes the full amounts requested it is evident that NASA will be lashed to an extremely tight schedule if it is to achieve a manned landing on the moon in 1970. And a feeling is growing in Washington that because efforts in space seem invariably to take longer and cost more than estimated, a successful landing by the end of the decade is, increasingly, a long shot. With the pressure on the NASA budget, programs such as those involving research in space which does not contribute directly to the Apollo manned landing program and spending on space applications (meteorological and communications satellites for example) appear to be in for reductions, but it is difficult now to gauge the full import of these cuts.

AEC Economics

The Atomic Energy Commission will trim its expenses by its plan to stretch out purchases of uranium and cut back production of plutonium and, on balance, expects to reduce its '65 budget to $2.7 billion, down $50 million. Despite the cuts, the AEC is requesting a $25 million increase in research funds in the physical sciences to a total of $222 million and a $9 million boost in funds for research in biology and medicine to $80 million for 1965.

Health research just keeps rolling along. The total for federal support of medical and health-related research in all would rise about $100 million to $1.3 billion under the President's recommendations, with most of the increase represented, as usual, by a raise in the NIH research budget from $728 million to $812 million for '65.

In prescribing for the National Science Foundation, the administration asked for a total of $487 million, some $134 million more than was appropriated for fiscal 1964, but $102 million less than was requested for the year by the Kennedy administration. These figures represent not expected expenditures, but "new obligational authority," that is, money to be voted but not all spent within the fiscal year. The recommended increases would be distributed over most of NSF's activities, but a major portion, about $46 million, would be added to the agency's program which provides matching grants for construction and equipping of science facilities in colleges and universities. Some $26 million of the increase would be directed into funds for fellowships and traineeships. A still unspecified proportion of the new funds would be used for Project Mohole.

NSF's prospects for getting an increase of the dimensions requested depend on whether interested and influential members of the public will rally behind it, whether the administration will really push for it rather than lending pro-forma support and, ultimately, whether Congress will accept it. Last year funds for a big increase in support for graduate study in engineering, mathematics, and the physical sciences were not provided because none of the necessary conditions were fulfilled.

Another case in point is the proposal for shelter construction under the Civil Defense program. Last year $175 million was asked for shelter construction and, while a House committee authorized this amount, no money has yet been appropriated. A request for another $175 million figure is in the '65 budget.

Whatever their merits, some items seem to appear perennially in budgets without winning appropriations, in a sort of always-a-bridesmaid cycle. And it remains to be seen which proposals in the Johnson budget will be like the lady in the 17th century song who "men admire but not desire," or at least do not pursue very ardently.

—JOHN WALSH