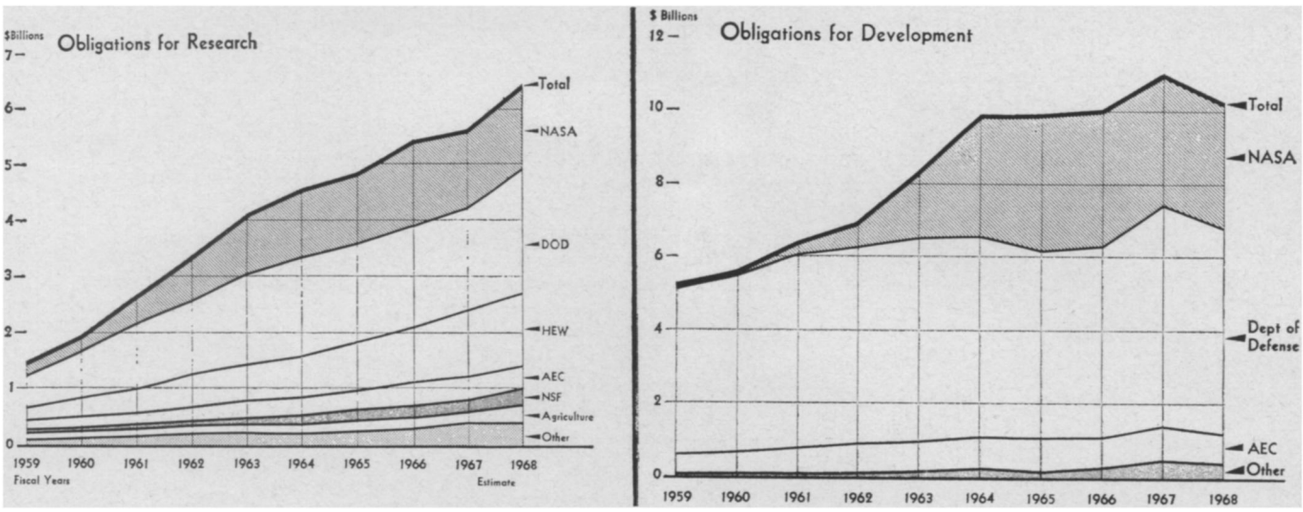
Science Money Up Only Slightly



Two charts from the President's budget message portray a growth in research, a drop in development money.

Congressional cutting is likely as President Johnson sends a record budget to the Hill.

The whet-whet of the economy knives could be heard all over Capitol Hill last week as President Johnson submitted a record budget that calls for "no cutback in science programs, but rather a generally modest level of growth." Although there is no such thing as a science budget per se, analysis of the figures shows a general growth level of five percent in Federal funding of research and development.

The allocation is not as much as the scientific community would like—many, including Dr. Donald F. Hornig and his predecessors as presidential science advisers, have urged a yearly growth rate of 10 to 15 percent "just to stay even."

Already, the parade of agency heads to Capitol Hill has started. Before committee after committee they will defend the President's budget, regardless of how they may have fought for a bigger slice earlier in the budgetary process. Grinding expense in Vietnam forced a great deal of paring by the President—and comment from both Republicans and Democrats in Congress indicates that all programs will get another searching look.

After the Congressmen hear the justifications they will vote to authorize the probably-revised spending. The money still isn't available to the agencies to use, however. Congress must also appropriate the funds in each case, a process that could go over to autumn.

Federal spending on research would go up under the $135 billion budget as submitted, while development costs would go down, chiefly reflecting the activities of the space agency and the Department of Defense, which, between them, spend 80 percent of Government development funds. Peak costs in the man-to-the-moon program and in development of special weapons for Vietnam have passed, allowing a development cut from $10.9 billion this year to $10.3 billion next year.

Research money obligated under the fiscal 1968 budget would increase from $5.7 billion to $6.4 billion, most of it in space, defense and health.

Federal grants to universities—about three-quarters of all university research funds—would increase about $100 million to a total of $1.7 billion. More than half would go to basic research, the rest to applied research, particularly medicine.

Budget watchers who hoped to learn the future of the supersonic transport and antiballistic missile were disappointed; both appear as "contingency" items. The 200-billion-electron-volt accelerator, however, would receive its planned $10 million in design money.

The budget leans toward practical sciences that might produce a quick, visible return. A systematic research program into the problems of the cities and their residents is urged. Air and water pollution claim increased budgets of $50 million and $306 million respectively.

The National Science Foundation, which last year got no increase at all, this year again asks for an additional $60 million to support basic research in oceanography, chemistry, atmospheric and social sciences. Its Project Mohole, sunk by the Congress last year, didn't even raise its head in the new money requests. Total NSF authorization would be $526 million.

The Defense Department asks Congress for $7.3 billion for research, development, test and evaluation. This is an increase of $92 million but so much more is being spent on two programs, the Nike-X antimissile and the Manned Orbital Laboratory, that the rest of the R&D program will actually get less than last year.

The Defense budget allows $421 million for development of the Nike-X, compared with $168 million provided last year. Defense officials said that production of the antimissile system was not planned at the present time, but another $377 million was being set aside in fiscal 1968 in case plans should change.

The MOL comes in for $430 million, $200 million more than this year.

Basic research suffers in the DoD budget. Funds for military sciences programs, which support most basic research, drop from $620 million to $615 million.

One research program was boosted. This is Project Themis, which was given $20 million in 1967 to set up centers of study to develop research personnel;

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some 400 universities were invited to join the program, a part of a Government-wide search for more "centers of excellence." In fiscal 1968 the Themis project is budgeted for $30 million.

In the $2.49 billion Atomic Energy Commission request, up $293 million, small decreases in nuclear rocketry and procurement of raw materials are more than offset by increases in R&D funds for nuclear weapons, two new test sites, research on fast breeder reactors, support of physics research and development of civilian applications of nuclear explosives in the Plowshare program.

Along with design funds for the 200-billion-electron-volt accelerator to be built near Chicago, $4 million was requested for design of the Omnitron accelerator to be built at Berkeley, Calif., for research in nuclear chemistry and biomedicine.

In oceanography, where some 14 Federal agencies work, no large new programs are contemplated. But continuation of present work and expansion of the Navy's deep ocean technology will require $53.2 million more than in 1967, bringing the proposed budget for fiscal 1968 to $462.3 million.

Fiscal 1968 will also be the year the Sea Grant College program gets on its feet. Included in the request for the National Science Foundation is $4 million for the program's first regularly funded operations.

NASA—Over $5 Billion

Two weeks with pay on the moon and earth orbital stays of a solid year are forecast for American astronauts by the space budget proposed for fiscal 1968.

As submitted to the Congress, the appropriation for the National Aeronautics and Space Administration rises above the $5 billion mark, below which it slipped this year. A total of $5.05 billion is asked.

Congress, although in a budget cutting mood, is expected to give NASA most of what it wants. It cannot slice very hard at the Apollo man-on-the-moon program without increasing its ultimate cost and running the risk of slicing 130,000 jobs from, and mothballing a chunk of, the space industry

Both the 14-day lunar stay and the year in orbit are part of a plan to get more use out of expensive Apollo hardware, a plan that is getting by far the biggest boost of any item in NASA's budget—a whopping 568 percent.

This jump is so great that even though the Gemini program is over and the Apollo funding is down almost $310 million, NASA is asking $45 million more for manned space activities than it did for the current year.

To get an early start on the Apollo Applications Program, NASA has proposed that in calendar 1968 it send some of the AAP equipment aloft aboard practice flights of the Saturn rockets that will later provide the push to the moon. Such equipment, which would be "stored in orbit" until it was needed, might include a space workshop to aid astronauts in later missions.

Space science, including physics, astronomy, unmanned lunar and planetary probes and biosatellites, would also get a major boost.

The biggest new chunk of this money will go for a string of Mariner probes that will go to Venus in 1967 and Mars in 1969 and 1971, plus a Voyager that will orbit Mars and land a capsule on the surface. For the Voyager program, which has had only $11 million in fiscal 1967, NASA is requesting almost $72 million.

In aviation, NASA hopes for a giant boost from $35.9 to $66.8 million. Biggest specific program is research on the supersonic transport. In addition, the agency will take over the costs of operating the X-15 rocket plane.

Other items include a direct-broadcast satellite which could send radio programs into homes without bothering with ground stations; and engines to be put in the glide-tested M2 and HL-10 manned lifting bodies.

Orbiting Solar, Astronomical and Geophysical Observatories are tentatively scheduled for one or more flights a year through 1970. A solar probe called Sunblazer would pass within about 37 million miles of the sun, to study the solar atmosphere. Following the four Surveyors and two Lunar Orbiters set for calendar 1967, NASA wants one more of each the following year.

Life Sciences Support

Across the board, Federal expenditures for the health of American citizens would rise by $1.2 billion to a new high of $8.2 billion. Much of this would be applied to Medicare for the elderly and Medicaid for the needy, but health research would go up about five percent. This rate of spending would give a Federal commitment to the life sciences of triple the 1960 budget—totalling $1.45 billion.

Strong support of health research continues in the fiscal 1968 budget despite cutbacks in other areas. President Johnson asked Congress to increase the

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purse of the National Institutes of Health by 9.2 percent over last year's expenditures. NIH supports 40 percent of the nation's biomedical research.

NIH officials estimate that 40 percent of the $1 billion NIH appropriation will finance fundamental science. In line with the President's call for "payoffs" from health research, two areas were singled out for emphasis.

The two, pharmacology and toxicology, have been overshadowed by more glamorous work in heart, cancer and stroke research. Training programs in the two fields would get $6 million, an increase of $900,000. About $9 million, or $2.5 million more than last year, will be poured into research activities in these specialties.

The number of available and potential drugs today is many times what it was even 10 years ago, yet work in the basic physiology of drug behavior has not kept pace. Safer, more effective drugs are expected to come when science has better understanding of exactly how drugs are metabolized and under what circumstances they are hazardous.

In another move to strengthen the chain of scientific discovery, the General Research Support Grants Program anticipates spending $11 million, a jump of $7 million over 1967, on its Health Sciences Advancement Awards. This is designed to help upgrade the quality of science education all over the country, and strengthen weaker disciplines such as biology, and physiology. Advancement Awards will go to medical schools and graduate departments which will then disperse funds to best meet their needs. Until recently, money has been appropriated only for specific research projects.

Regional medical programs to combat heart disease, cancer and stroke got in for $64 million, an increase of $19 million over 1967.

ASTROPHYSICS

Data, Not Answers

Astronomers may have detected the largest explosion ever known—short of the "Big Bang" in which the universe was created, and even that inconceivable fireball may have left remnants now being measured.

Evidence for the large explosion comes from the study of quasars, which intrigue scientists by their quality of becoming more confusing as more data on them is assembled. At first thought to be the universe's most distant objects, the quasars now have no agreed distance from earth.

Sources of tremendous energy output, both in light and in radio waves, the mysterious objects, discovered in 1962, were among the subjects of a symposium on Relativistic Astrophysics in New York last week.

Three new observations were reported—all of them unexplained.

One was the sudden growth in brightness of quasar 3C 446, reported by Dr. Allan R. Sandage of Palomar Observatory. The object increased in light emission by 3.2 magnitudes—about 20 times. This could be the most violent explosion yet detected.

Also reported was the recently discovered background radiation that may be the remnant of the primeval fireball in which the universe was formed. Over a wavelength range from 21 centimeters down to nearly one millimeter, background radiation has been observed with a spectrum that corresponds to a black body with a temperature of about three degrees Kelvin—close to but significantly above absolute zero. Scientists want further readings in more wavelengths before declaring this cold message evidence of a beginning of the cosmos. Finding that the radiation comes equally from all parts of the sky would be strong evidence that the expansion of the universe has been uniform in all directions throughout its history. Evidence both for and against uniform distribution was presented.

One mysterious quasar was reported to show two different distances from earth, depending on how its light is measured.

When the light of any star or galaxy is spread out, it has a rainbow array of colors from red to ultraviolet, which is called a continuous spectrum. Within the spectrum, certain lines appear. Some represent elements in the star, and are called emission lines; others caused by matter between the source and earth are called absorption lines.

The quasar Pks 0237 minus 23 shows one red shift when its light is measured by emission lines, another when absorption lines are examined. If both observations are correct, as they are believed to be, then one part of the quasar is receding from earth 15,000 miles per second more slowly than the rest of it.

No explanation for this effect is available, but suggestions have been made that it could result from matter thrown out of the quasar or from materials falling into the object from beyond.

Dr. Maarten Schmidt of The California Institute of Technology reported discovery of the double red-shifted quasar to the symposium, based on studies made by Dr. Halton C. Arp of Mt. Wilson and Palomar Observatories, Dr. John G. Bolton of the Parkes Observatory in Australia, Dr. Thomas D. Kinman of Lick Observatory and Dr. Margaret Burbidge of the University of California at La Jolla.

Dr. Sandage also reported that he had made a tentative optical identification of a source in Cygnus previously detected only by its X-ray emission. This is only the third X-ray source to be optically identified.

PUBLIC POLICY

Science Toys Urged For Poorer Nations

Birth control and chemistry sets might help the underdeveloped nations out of their current plight, it was suggested in Washington last week.

In a session convened by the House Science Committee, foreign and domestic scientists conferred about the technological gap between advanced and other nations. All agreed it was too large and getting larger each year.

Dean Rusk, Secretary of State, urged the widest dissemination of birth control information to help head off famine. "The entire human race," he said, "must look at the future arithmetic" which shows food supplies falling behind population growth.

Scientists from India and Latin America joined Mr. Rusk in voicing alarm at the widening gap between rich and poor nations. Substantial advances in education and research at home and heavy aid from outside will be needed just to keep up, they said.

S. Husian Zaheer of India referred to all present programs of aid to his country's science as "very laudable . . . but a drop in the ocean considering the immensity of the problem."

Carlos Chagas of Brazil found the situation critical. A gap increases every day between the Latin American nations and the developed countries."

Both Zaheer and Chagas pointed to a lack of scientific interest or awareness among their people as a major problem.

The noted American astronomer Fred L. Whipple suggested that one attack might be found in toys. Remembering how his own bent toward science was formed by toys he played with as a child—a construction set, chemistry set and a telescope, Dr. Whipple suggested that manufacturers in underdeveloped countries be subsidized for production of scientific toys.