A new item in the budget is a missile carrying frigate, for which $196 million in procurement funds have been slated in 1970. The Manned Orbiting Laboratory is up from $515 million to $576 million in 1970.

For research and development, the total funding required to complete programs approved or proposed in the year is $5.6 billion, an increase of $850 million over 1969.

Chief programs initiated in previous years and considered vital enough to be continued include conversion of more ballistic missile submarines from Polaris to Poseidon missile systems and replacement of Minuteman I with Minuteman III missiles. The Poseidon and Minuteman missiles will be equipped with multiple warheads and penetration aids to overcome enemy defenses. The RDT&E and procurement funds for conversion from Polaris to Poseidon missile systems is $492 million in this year's budget, $356 million in last year's. Other carry-overs are the F-111 planes, deployment of the Sentinel missile defense system and modernization of U.S. air defenses.

A portion of the $500 million increase in the defense research and development budget is due to financial adjustments which include greater funding of university projects and to funding for new centers-of-excellence Project Themis contracts. Expenditures for support of research in colleges and universities will increase in 1970 from $252 million to $275 million, but Defense Department spending in higher education will still be below its 1966 level.

Military sciences programs, which support most basic research, show an increase from $561 million to $617 million. Included under military sciences are programs such as the effects of boundary layer turbulence on aircraft, propulsion and explosive chemistry, superconductivity, electro-optics, information processing, acoustics and oceanography. More research will also be pursued in marine technology, missile guidance, propulsion and electronics.

ATOMIC

Over the 50 percent line

The Atomic Energy Commission, spending more but requesting less, finds itself over a line it did not want to cross. For years the AEC has boasted that it spent more on civilian uses than on weapons. In fiscal 1970 51.8 percent of its money will go toward weapon building and development.

The commission expects to spend $2.571 billion, if Congress approves. It is asking for appropriations of $2.438 billion: the rest would be money already on hand. Last year it spent $2.451 billion.

Over all, research and development programs will take some 67 percent of the total outlay. This is an increase of $16 million, about four percent. The commission admits that the cost of such activities is rising faster than the four percent rate, but that is true of research in most areas of the budget.

A major effort will be the 200-400 billion-electron-volt accelerator being built in Batavia, Ill. The AEC would like Congress to authorize the full remaining cost, $217 million (of a $250 million total), and actually appropriate $102 million. Congress in the past has been hesitant to put up more than one year's worth of money at a time.

Although most of the budget will go to weapons-related projects, the commission will be building fewer nuclear bombs. This gives it a major saving in the procurement of raw material, particularly uranium concentrates, which will run to $66 million, instead of the current year's $103 million.

The cost of testing weapons, including site preparation, should drop from $311 million to $275 million. This will include a one kiloton calibration shot this spring at Amchitka, Alaska.

In the reactor program, the money will continue to flow toward breeders, with $92 million scheduled. Total civilian reactor funds: $137 million.

A next generation of ship-driving reactors, including submarine and surface models, will be up $14 million from last year's $125 million.

While spending $286 on physics (up $11 million), the commission will invest $92 million in biology and medicine, an increase of $3.5 million.

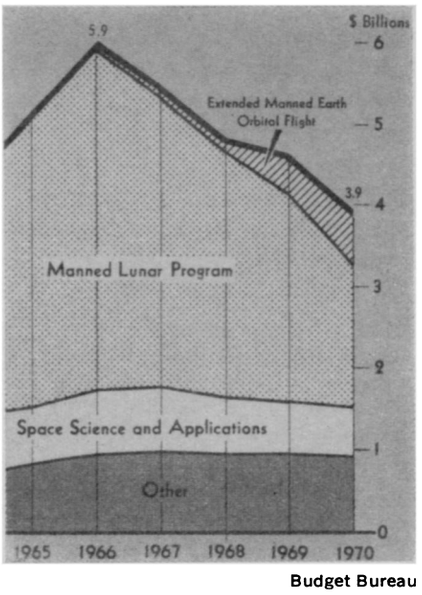
The Plowshare program, designed to develop civilian uses of nuclear explosives, will stay close to its 1969 funding rate of $14 million. This will include one scientific shot, and two or three carried on in partnership with interested industries.

NASA

Post-Apollo question mark

The manned lunar landing, as the National Aeronautics and Space Administration's proposed fiscal 1970 budget clearly reflects, is almost at hand.

As the fantastically complex, $24 billion Apollo program builds up to its climax, most of its bills have already been paid. For the budget year 1970, the space agency plans to spend only about $1.65 billion to cover as many as five landings on the lunar surface. In the present fiscal year, Apollo is costing more than $2 billion, and in fiscal 1968, it took a $2.56 billion bite out of the plunging space budget.



Budget Bureau

Apollo shrinks, post-Apollo grows.

With the leveling off of the Apollo program itself, and with preparations underway for post-Apollo activity such as orbiting workshops, the space agency's pocketbook may finally stop its drastic shrinkage, which has cut the NASA budget from $5.25 billion in fiscal 1965 down to $3.88 billion four years later.

Congress's approval, in fact, says acting agency Administrator Thomas Paine, "would halt a four-year downward trend in the NASA budget." Taking into account funds that were trimmed off in the Government-wide fiscal 1969 budget-cutting, but which will again be available next year, the Administration's budget request calls for a spending level of $3.878 billion, almost exactly the same as the present year.

After Apollo, which could last into calendar 1971, with team after team of astronauts setting up packages of scientific experiments at different locations on the moon, the manned space flight emphasis for the time being will be on using leftover Apollo hardware for research in earth orbit. The Apollo Applications Program's two major projects will be a huge workshop in orbit, made of an empty S-4B rocket stage, and a large telescope, mounted on the workshop, for detailed studies of the sun and stars. The budget request more than doubles 1969's, bringing the amount to almost $309 million.

While manned space flights may be keeping fairly close to earth in the early part of the coming decade, NASA has plans for unmanned probes to visit all but two of the eight other known planets in the Solar System.

Mars is the chief target, with a pair of Mariner spacecraft already set for this year, and another in 1971. A small

landing vehicle called Viking is planned for 1973 and two or three of a new Explorer series similar to the IMP-E spacecraft that orbited the moon in 1967 are also targeted for Mars.

Other Explorers are planned for Venus, and a 1973 Mariner mission is planned to swing by the mysterious planet, using its gravity to pick up speed to whip by Mercury, nearest planet to the sun. In 1972 or 1973, NASA plans to send one of the far-ranging Pioneer space probes out to the orbit of Jupiter, particularly to gather information on the asteroid belt that clutters up space in an orbit between the giant planet and Mars. This information will be vital in designing an even more elaborate mission, a grand tour that will visit the vicinities of Mars, Jupiter, Saturn and Uranus, taking advantage of a rare celestial line-up in the mid-seventies that will not occur again for almost 180 years.

Before NASA can send men to other planets, however, it is likely to need a booster even more powerful than the mighty Saturn 5, to get enough speed up to complete the mission in a reasonable length of time. A prime candidate is the NERVA nuclear rocket, which the agency has been trying to promote for years but which has been held to research-only levels for two years by lack of funds. The new budget request calls for a $5 million increase to $27.5 million in order to begin work on a flight-weight version, although it will only develop 75,000 pounds of thrust compared to the 200,000 pounds planned as recently as three years ago.

All the unmanned spacecraft will not be heading for deep space, however. NASA will continue launching its automatic solar and astronomical observatories, as well as geodetic and weather satellites. The biggest of the unmanned earth satellite items in the 1970 budget is $44.2 million, almost doubled from $24.7 million in FY 1969, for a pair of large Applications Technology Satellites designed to try out advanced ideas before they are put into operational use. Unlike their predecessors, ATS-F and ATS-G will carry large, 30-foot-diameter antennas for communications tests.

NIH

Hard choices made

Launched already into 1970 in terms of dollars and cents, the new National Institutes of Health are shifting gears to set priorities in the face of drawn purse strings.

Following a move begun by former director Dr. James A. Shannon, the powerful institutes, for 20 years a prime force in basic research, are matching their resources to the most pressing demands of the health community, making choices that promise results in the short run, although the long-term effect cannot be foreseen. The total NIH budget is up $90 million, to a total of $1.5 billion.

Coping with an increase of funds for biomedical research of only $21.2 million, NIH chose to funnel its money into existing priority programs such as cancer chemotherapy, heart disease and rapidly expanding efforts to find new methods of fertility control. Young basic scientists applying for training grants and fellowships will pay the price of that choice, though on the non-research side, the institutes will make a concerted effort to handle the manpower shortage by assisting medical, dental and related professional schools.

The schools, representing a total enrollment of 80,000, are slated for portions of a $96.4 million package destined to go for faculty salaries, curriculum improvement and research into ways of shortening the training period without impairing quality. The package represents a jump of $30.4 million, a 49 percent expansion over the 1969 program.

On the research side, the National Cancer Institute anticipates raising its obligations by $2.983 million in fiscal 1970, says NIH budget officer Lee May, with emphasis on drug therapy, radiation treatment and lung cancer studies. The coronary drug program of the National Heart Institute stands to gain $1 million over last year, with the heart institute as a whole prepared to spend $163 million in 1970—a boost of $2.131 million.

Other institutes in which research programs will gain include the National Institute of Dental Research (up $504,000), the National Institute of Allergy and Infectious Diseases with a $749,000 raise ($200,000 marked for transplantation immunology work), and National Institute of Child Health and Human Development, by far the most favored with a boost of $7.6 million. Of that, $2.747 million are set aside for population research, much of which will be carried out under the new CHHD Center for Population Research.

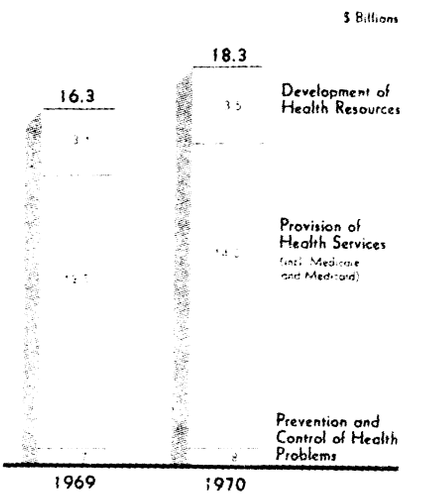
In 1969, NIH awarded 6,966 training grants and fellowships worth $198 million. Faced with economic facts of life, it plans to award 688 fewer in 1970, to the tune of $190 million.

Theoretically, May explains, the Bureau of Health Manpower, slated to jump $39 million in obligational funds next year to $245 million, will make up for some of the loss by granting support that might otherwise have come from individual institutes.

In the last few years, the total of NIH grants, including training grants, fellowships and awards to individual scientists to carry out specific research projects, has dropped in spite of small but regular increases in the budget. May points out that the cost of each award has risen, even if numbers haven't. In 1968, 11,182 grants cost $804 million; in 1969, 10,598 grants will total $814 million; in 1970, 10,549 grants are expected to cost NIH $824 million.

HEALTH CARE

Something for everybody



Budget Bureau

Government increases health outlay.

Decent medical care for every citizen is the ambitious goal set forth by President Johnson in his budget message, and the allotment of funds for Medicare, Medicaid, veterans and children seems adequate on the surface to make this possible.

Outlays for health services will rise to $14 billion in 1970, with $9.8 billion going for the Medicare and Medicaid programs, and $3.1 billion for the health care programs of the Veterans Administration and the Department of Defense.

The President points out that an estimated 9.5 million aged persons will get assistance in paying their hospital and doctor bills through Medicare payments and that Medicaid will provide medical assistance for more than 10 million needy persons.

Although expenditures for the 1970 Health, Education and Welfare programs total $51.8 billion, which is an increase of $5.6 billion, obligations by HEW for research and development, including facilities, will decrease by $36 million to a level of $1.339 billion in 1970.

Major biomedical research and development efforts will continue to be concentrated on mental illness, cardiovascular disease and cancer. Other biomedical research and development that will receive emphasis include in-