

## GENERAL SCIENCE

# 15% of Budget for R&D

Of the \$98.8 billion Federal budget for fiscal 1964, \$14.9 billion has been allotted to science and technology, 200 times more than two decades ago, Watson Davis reports.

► RESEARCH and development, which means science and technology, now amounts to nearly 15% of the Federal Government budget, a matter of \$14.9 billion out of the \$98.8 billion administrative total for fiscal year ending in mid-1964.

Two decades ago in 1940 it was a mere \$75 million, so that where a dollar was spent just before World War II, there will be \$200 for research and all sorts of technological "hardware" to put research into practice, advances largely in defense, space and atomic energy.

Defense, space and atomic energy will spend, as they do now, about 90% of research and development funds.

Military men, Government officials and industrialists alike consider R&D use of Government money profitable investment for the present and future. Development is predominantly such things as weapons, atomic reactors and moon rockets, but even more important are modestly bought research results that may give new industries and weapons for the future.

The R&D funds contemplated for the next fiscal year are Department of Defense \$7.6 billion, National Aeronautics and Space Administration \$4.2 billion, Atomic Energy Commission \$1.5 billion and the balance of \$1.6 billion for other agencies.

The expenditures for development are different from those for research. Included in the R&D figures are expenditures for experimental work that includes such things as reactors, missiles, and a host of other developments of "hardware" and mechanisms useful in the defense effort.

For basic or "pure" research, the kind of untrammelled investigations that are more likely to be productive of new knowledge, the Federal Government in a peak year spends about one dollar out of each ten used for research and development, excluding expenditures for the physical plant in which research and development is conducted. This is the very considerable sum of about a billion dollars.

The Federal funds for basic research are 44% allotted to educational institutions, 30% to Federal agencies, 14% to profit organizations and 12% to other agencies. Somewhat more than half of the basic research funds are devoted to the physical sciences, including mathematics and engineering, a little more than a quarter to the life sciences, and the rest among psychological, social and other sciences.

The inquiry into scientific problems without primary consideration of the so-called "practical" results is the life blood of scientific, medical, industrial and even national progress. From such basic or "pure" research come the great new developments, the "breakthroughs," that change the course of

living for the whole world. For example, the fission of uranium discovered in a German laboratory under Hitler's unseeing eyes was the beginning of the whole atomic energy development. The discoverers had no thought that they were making possible the atomic bomb.

Exploration and investigation motivated simply by the desire to know is the most powerful factor in scientific progress.

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## SPACE

## \$6.1 Billion Budget For Space Research

► A RECORD-BREAKING \$6.1 billion has been budgeted for space research by President Kennedy.

This is a jump of almost \$2 billion over present space expenditures. Most of the new spending would go to support the U.S. project to land men on the moon before 1970.

The \$6.1 billion total includes space spending proposals for five agencies, the largest amount \$4.2 billion being for the National Aeronautics and Space Administration with the Department of Defense second in line with \$1.6 billion. The Atomic Energy Commission is third, with \$247 million.



Lockheed Missiles and Space

**GOLD TARGET**—Kent Harris, nuclear physicist at Lockheed Missiles and Space Company, completes a gold sphere target in an experiment for the Atomic Energy Commission that provides a new "radiation yardstick" for designers of atomic reactors.

The President said in his budget message that it would be "false economy" to put the fiscal brakes on America's drive to the moon. He forecast "further significant advances" in the space program.

NASA disclosed at a briefing that it plans to expand the Ranger program of unmanned exploration of the moon to a total of 24 spacecraft. Five, all failures, have already been launched. James E. Webb, NASA administrator, said the job would cost less than \$20 billion, but unofficial guesses have ranged as high as \$100 billion. Mr. Webb said that space budgets may level off at around \$6 billion a year after 1967 if no new grant programs, such as manned exploration of Mars, are undertaken.

The NASA budget would provide for expansion of the NASA-Marshall Space Flight Center at Huntsville, Ala. The largest item in Marshall's proposed research is for the big Advanced Saturn moon rocket, which will require nearly three quarters of a billion dollars during 1964.

Most of the space spending by the Atomic Energy Commission has gone and will go for nuclear propulsion rockets and for nuclear power systems to run equipment.

The AEC space budget of \$247 million includes \$35 million as a start toward the construction of a new type of reactor, called the spectral shift control reactor. The shift reactor is basically a pressure water converter reactor using a mixture of both light and heavy water as moderator-coolant. The concept promises more efficient burning of nuclear fuel, thus extending the reactor core lifetime.

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## METEOROLOGY

## New Budget Provides for Weather Forecast Study

► INCREASING USE of weather satellites and giant computers to give more accurate weather forecasts for everyone is the aim of \$377 million for meteorology in the new budget. The budget asks for \$22.6 million more for weather in fiscal 1964.

Weather satellites, like the Tiros and Nimbus series, will improve both short-range and long-range weather forecasts. Large computers, used operationally for many years, will now play a more important role in research toward understanding basic weather processes.

Continued progress toward automation through broader use of electronic data processing techniques for weather observing, forecasting and communications is planned.

The U. S. Weather Bureau, the Air Force and the National Aeronautics and Space Administration are the main supporters of both operations and research and development in meteorology, contributing a total of \$275 million through their programs.

However, the U. S. Department of Agriculture, Atomic Energy Commission, National Bureau of Standards, Army, Navy, Federal Aviation Agency, Department of Health, Education and Welfare, Department of Interior, National Science Foundation and the Coast Guard also contribute.

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