outcome at best will be a compromise. But, if it comes about, it will be a meaningful compromise. It will supply the proponents of the oath with the token assurance they regard as important that the Defense Education Act will not serve as a source of financial support to such disloyal students as there may be. It will supply opponents of the oath with the more substantial gain that needy students will no longer have to swear they are not planning to overthrow the government before they can be eligible for a loan.

Test Ban Research: Program Calls for More Than Double Planned Spending

The White House last Saturday released an outline of a greatly expanded program to improve the system for detecting underground nuclear explosions. The program showed a heavy increase in planned spending not only over this year's $10 million pilot program, but over the program (roughly $30 million) discussed at the test ban hearings on Capitol Hill last month.

The new program calls for spending $66 million in fiscal 1961. An unspecified but large proportion of this money will go into preparing and carrying out a series of underground conventional and nuclear test explosions. There is, of course, no fallout or health menace from such explosions, and it is partly the very fact that all radiation from underground tests is confined within a small space deep underground that makes enforcing a test ban so difficult.

The Russians agreed to the use of nuclear as well as chemical test explosions last week. A series of scientific meetings was scheduled to start Wednesday (11 May) to begin working out the details of a cooperative research program with the Russians, including the touchy problem of developing a system to assure the rival powers that no one is using the research program to gather data useful in weapon development.

Timing of the Announcement

The timing of the White House announcement, combined with the haste of the press services in getting the story on the wire, led to headlines suggesting that the U.S. planned to resume tests outside the international research program and to speculation that the announcement was intended as some sort of reprisal to the Russian's shooting down an American plane. None of this was helped by the phrasing of Presidential Press Secretary James Hagerty's remarks intended to clarify the official announcement. In an apparent effort to emphasize the peaceful character of the tests, Hagerty succeeded only in generating news stories linking the proposed explosions to the U.S. atoms-for-peace program. As a result the State Department had to issue a hasty announcement pointing out that the tests were only those the Russians had agreed to and had no connection with the Project Plowshare tests the Administration has had under consideration for some time.

A year ago the Berkner Panel had recommended that some nuclear explosions should be made as part of the detection research program. The White House announcement simply indicated that we were planning to go ahead on our own proposal, now approved by the Russians.

Nuclear vs. Conventional Tests

There are clear advantages in using atomic explosions in a research program designed to find ways to detect such explosions. You would need to build a chamber the size of a large office building 2000 or 3000 feet underground to hold 20,000 tons of TNT for a test explosion. A nuclear device of the same yield could be lowered down a hole 30 inches in diameter. But aside from such practical considerations, it is believed that the strength and patterns of shock waves from nuclear and chemical explosions are not identical. It may turn out to be fairly easy to use chemical explosions and to extrapolate the strength factor to get results equivalent to a nuclear explosion. There is much less likely to be a workable way to extrapolate the wave patterns, and it is the detailed analysis of the wave patterns that offers one of the most hopeful means of distinguishing nuclear explosions from earthquakes.

What the scientists want to learn is, first, how do the seismic reactions of nuclear and chemical explosions differ, if, as is suspected, they do differ? Secondly, how can nuclear blasts be distinguished not only from earthquakes but from large conventional explosions, such as those used in mining operations? Tests with both nuclear and conventional explosives will obviously be needed to answer these questions.

After long consideration the Russians last Wednesday finally agreed that nuclear tests would be necessary. But to the general public a nuclear test is a nuclear test. That the U.S. plans to explode some nuclear devices makes more of an impression than the distinction that these will be part of an internationally agreed to program and will be underground tests from which there is no fallout. So it is understandable, if nevertheless unfortunate, that the nuclear tests rather than the research program should have gotten a major share of the headlines.

Advanced Research Projects Agency

Regarding the size of the program, both Hans Bethe, the leading scientific backer of the test ban, and Edward Teller, its leading opponent, have strongly recommended a greatly increased effort in detection research, as have the members of the Congressional Atomic Energy Committee. It was fairly well known that the Administration was working out a program calling for substantially more spending than that outlined before the committee 3 weeks ago.

While the details have not been released, the program is expected to draw on the experience developed in the oil and gas industry, where analysis of the shock waves produced by test explosions is used to help locate oil bearing strata, and on government offices such as the Coast and Geodetic Survey and the Bureau of Standards. The Survey will be used in gathering data on the frequency of earthquakes in various parts of the globe, the Bureau in developing more precisely calibrated and generally improved seismographs. But administration of the program will be in the hands of the Advanced Research Projects Agency, a special research group within the Defense Department which reports directly to Herbert York, director of defense research and engineering, and to the Secretary of Defense. In the past ARPA has been used to get high-priority projects under way, after which they were transferred to one of the services for further development, although there is no intention of doing this with the seismic research program.

ARPA will handle the entire test detection program (Project Vela) which includes not only the seismic research for underground tests, but development, still in the pilot stage, of systems for detecting explosions millions

of miles in space; such space shots, including, of course, the instrumentation to send back data, are theoretically possible today and are expected to be practical within a few years.

Civil Service Raises Pay for Scientists and Engineers

On the basis of findings of its annual survey of government and industry experience in the recruitment of employees in shortage-category fields, the Civil Service Commission has announced that minimum pay rates for engineering and certain kinds of physical-science positions will be raised to the top of grades GS-5 and GS-7—$4940 and $5880, respectively. The higher rates, for new employees and for employees now holding such jobs, become effective with the first pay period in May. The commission is authorized to raise pay rates within Classification Act pay grades when the government is at a competitive disadvantage with private employers and the federal need is acute.

The adjustments are expected to aid the government in recruiting about 3200 engineers and 1200 scientists during the next year, at an estimated additional cost of $1,980,000. Approximately 8700 engineers and scientists now serving in affected positions will have their pay adjusted under the new formula, at an estimated first-year additional cost of $2,214,900. Current rates of pay for these positions are $4490 at grade 5 (4th step) and $5430 at grade 7 (4th step).

The CSC's latest study showed a decrease in acceptance rates by persons offered federal employment in these shortage-category occupations and a widened gap between industry's median starting pay and the rates government agencies could offer for these jobs. Evidence also is accumulating that private employers will offer still higher salaries to June 1960 graduates in these shortage fields.

Recruitment Drops in Both Areas

While the 1959 engineer-scientist acceptance rate—the percentage of acceptance of firm offers of appointment—decreased for both government and industry recruitment, the decrease was greater for government than for industry. Industry's acceptance rate in 1959 decreased only 3 percent—from 46 percent in 1958 to 43 percent in 1959; government's acceptance rate decreased by 5 percent—from 40 percent in 1958 to 35 percent in 1959.

The decrease in acceptances of federal employment was sharper for engineering positions (from 37 percent in 1958 to 31 percent in 1959) than for physical-science positions (from 49 percent in 1958 to 45 percent in 1959). The commission points out that the government's recruiting efforts actually were less fruitful than the statistics reflect because many of the top-quality engineering and physical-science candidates interviewed by federal recruiters indicated their disinterest, primarily because of salary, even before an offer of employment could be made and therefore were not recorded in the acceptance-declination tabulation.

Positions covered by the CSC action include all professional engineering positions in grades 5 and 7 and positions at those grades in the following Classification Act occupational series: architecture, landscape architecture, patent examining, patent adviser, physics, geophysics, chemistry, metallurgy, astronomy, meteorology, geology, geodesy, actuary, mathematics, oceanographer (physical), mathematical statistician, and technologist (eight specific specialties).

Academy Radiation Committees Issue Reassuring Reports

The National Academy of Sciences–National Research Council has issued a set of summary reports by its six Committees on the Biological Effects of Atomic Radiation, supplementing the committees' original reports published in 1956. An accompanying "Report to the Public" states, in an introduction: "The steady accumulation of scientific information since 1956 has not brought to light any facts that call for a drastic revision of earlier recommendations."

The "Report to the Public" also notes, among a number of considerations that prompted publication of the supplementary reports, the broadening uses of atomic radiation for peaceful purposes and the intensifying public concern with the resulting hazards. Some of the committees' findings are as follows.

There is some new evidence that genetic effects from low radiation doses may be less than previously estimated.

The committee continues to recommend that the average gonadal dose for the general population during the first 30 years of life not exceed 10 roentgens of man-made radiation, and that it be kept as far below this level as is feasible.

There is experimental evidence to show that radiation-induced tumors do not begin to develop immediately after the radiation has been absorbed.

No new evidence has appeared to show that nuclear tests have affected the weather.

The significant long-range effects of the presence of radioactive isotopes in foodstuffs have yet to be determined.

The disposal of radioactive wastes has not resulted in any significant hazard to the public, its environment, or its natural resources.

There is nothing inherent in the radioactive-waste control problem requiring restriction of the nuclear-energy program, provided adequate measures are taken to protect public health and safety.

Present indications are that limited quantities of radioactive materials can be safely released in the oceans.

The six academy committees cover the fields of genetics, pathology, meteorology, agriculture and food supplies, disposal and dispersal of radioactive wastes, and oceanography and fisheries. Appointed in 1955 by Detlev W. Bronk, president of the National Academy of Sciences, they were asked to conduct a continuing appraisal of the effects of atomic radiations on living organisms and to identify questions on which further intensive research was urgently needed. From the outset, the work of the committees has been supported by funds provided by the Rockefeller Foundation.

AAAS Theobald Smith Award in the Medical Sciences

The Theobald Smith Award of $1000 and a bronze medal, which has been given yearly since 1937 (except for a lapse during the war years) by Eli Lilly and Company of Indianapolis, under the auspices of the American Association for the Advancement of Science, will be given at the association's 127th meeting in New York, 26–31 December. Travel expenses will be paid by the donors to enable the recipient to receive the award in person.

Nominations are now being requested for the award. They may be made by