About $37,000,000 was allocated to the support of basic and applied research by the AEC for the 1952 fiscal year, the report states, of which about seventy-five percent was earmarked for research in AEC laboratories and the rest for contracts with universities and private research institutions. In the latter category, $2,800,000 went into contracts administered through a joint program with the Office of Naval Research. A closer association between physical research under contract and the immediate aims of the atomic energy development program was effected during the last six months of 1951, according to the Commission, on such matters as raw materials problems, zirconium production, radiation damage to materials, and the measurement of neutron cross sections.

During the period, six particle accelerators came into initial operation, while four accelerators at various universities and one at Brookhaven were under construction or being installed. Construction of the 63-inch cyclotron at Oak Ridge was completed, and preliminary testing was started early in January. The five other accelerators which came into initial operation during the period include the synchrotrons at the California Institute of Technology, the University of Michigan, and the Carnegie Institute of Technology, a Van de Graaff generator installed at Duke University, and the new University of Washington cyclotron.

Construction has been started on five new accelerators which are scheduled to be put in operation during 1952. An 18-inch cyclotron which will accelerate deuterons and protons is being built at Brookhaven and is expected to be completed sometime this spring. Three Van de Graaff generators are being assembled at the Universities of Notre Dame and Texas and at the Rice Institute, respectively, while a new linear accelerator is under construction at the University of Minnesota.

The years 1950 and 1951 were productive for the particle accelerator program, the AEC points out, in that a total of forty-one machines came into operation during the two-year period. Much of the current research effort with these accelerators, it is suggested, is being directed at improving and expanding data on cross sections for both fast and slow neutrons and in continuing research on problems relating to nuclear forces.

Existing plants have been operating at full capacity, according to the report, and at the same time the AEC's expansion program proceeded with three percent of the nation's total building expenditure during the last half of 1951 going to atomic energy facilities, and nearly two percent of the national construction force employed on AEC jobs. The President's recent request for an additional expansion program of from five to six billion dollars over a five-year period, which was based upon a joint study and recommendations made by the Defense Department and the AEC, approaches, but by no means meets, the proposal of Senator McMahon for atomic energy expenditures of six billion dollars annually. Nevertheless, even this relatively modest expansion effort seems capable of creating serious problems, at least in terms of manpower.

National Science Foundation

First Research and Travel Grants Awarded

While the President's Budget Message recommendation that an appropriation of fifteen million dollars be provided for National Science Foundation operations during 1952–53 was being considered by Congress, the Foundation's program in support of basic research was put into action. Twenty-eight grants, all in the field of biology, were awarded in February. The NSF Division of Mathematical, Physical, and Engineering Sciences has for some time been processing applications and it is expected that announcements concerning grants in these categories will be announced soon. Evaluation of the more than 2800 applications for NSF fellowships which have been received is being carried out by the National Research Council under contract with the Foundation, and hope has been expressed that some announcement concerning the fellowship awards can be made this month.

The Foundation announced early in March that travel grants had been awarded to four mathematicians to permit their attendance as members of the United States Delegation to the First General Assembly of the International Mathematical Union in Rome, Italy, March 6–8. These are the first travel grants to be made under the Foundation's program to provide for the attendance of American scientists at international scientific meetings.

Members of the NSF divisional committees for mathematical, physical and engineering sciences and for biological sciences have been appointed by Alan T. Waterman, director of the Foundation. The divisional committees have been established by the Foundation to serve in an advisory capacity on questions relating to the following three major activities of the Foundation: (1) Development of a national policy with respect to basic research in the sciences, scientific manpower, scientific education, and similar problems; (2) Support of basic research in the sciences through grants to universities and other research institutions; and (3) Awarding NSF Graduate Fellowships in science and engineering to relieve the critical shortage in trained scientists and engineers.

Newly appointed members of the divisional committee for mathematical, physical, and engineering sciences are: A. Adrian Albert, professor of mathematics, University of Chicago; Jesse W. Beams, chairman of the School of Physics, University of Virginia; William L. Everitt, dean of the College of Engineering, University of Illinois; Leo Goldberg, chairman of the department of astronomy, University of Michigan; Morrough P. O'Brien, chairman of the department of engineering, University of California at Berkeley; George B. Pegram, vice president emeritus and special advisor to the president of Columbia University; Charles C. Price, head of the department of chemistry, University of Notre Dame; William W. Rubey, principal geologist, U. S. Geological Survey, Washington, D. C.; Cyril S. Smith, director of the Institute for the Study

of Metals, University of Chicago; Samuel S. Wilks, professor of mathematical statistics, Princeton University; and E. Bright Wilson, Jr., department of chemistry, Harvard University.

Research Corporation Award

Won by Libby for Dating Technique

Willard F. Libby, professor of chemistry in the University of Chicago's Institute for Nuclear Studies, received the 1951 Research Corporation Award at ceremonies held in New York City on February 26th in recognition of his work in developing a method and apparatus for determining the ages of archaeologically interesting objects by measuring the residual carbon radioactivity of the specimen. The award, consisting of a plaque, a citation, and $2500, was presented by Joseph W. Barker, president and chairman of the board of Research Corporation, during a dinner at the Waldorf-Astoria attended by some 150 scientists and educators. Karl T. Compton, chairman of the corporation of the Massachusetts Institute of Technology, served as toastmaster. The dinner also celebrated the fortieth anniversary of the founding of Research Corporation, a non-profit foundation established in 1912 by Frederick Cottrell which distributes its total net income as grants in aid of research to colleges, universities, and scientific institutions.

The radiocarbon dating method was first proposed by Libby about five years ago when he suggested that the carbon contained in living matter might include a small proportion of carbon-14, having a normal half life of more than five thousand years, which had been formed by cosmic ray bombardment of atmospheric nitrogen and absorbed by plants as carbon dioxide in the photosynthesis process. The carbon-14, converted by the plant into edible carbohydrates and eaten by animals, would then in part return to the atmosphere through respiration, and in the course of time an equilibrium concentration of the radioisotope would be established for all living matter. Experimental confirmation of this hypothesis was in fact obtained by analysis of new wood from various parts of the world, the result being that within the limits of experimental error each sample showed a constant level of radioactivity. Further tests of the method have been made with ancient specimens, the ages of which had otherwise been established, with results that have been shown to be in striking agreement with well-founded archaeological data.

Once the plant or animal dies, the radiocarbon content is no longer replenished and drops below the normal equilibrium concentration for living matter as carbon-14 decays back into nitrogen-14 by beta-ray emission. The radiation of the carbon-14 can be measured by means of a Geiger counter, providing that both counter and specimen are well shielded to eliminate the normal radioactivity which exists as a background in the atmosphere. Libby's apparatus consists essentially of an outer shielding of eight inches of iron, a group of several anti-coincidence counters to intercept as much as possible of the background radioactivity that has penetrated the iron casing, and a special screen wall counter in which the sample itself becomes a part of the counter wall so that the comparatively weak radiation from the radiocarbon need not pass through any intervening shielding.

Radiocarbon dating laboratories have been established at Columbia and Yale Universities, the Universities of Chicago and Michigan, and most recently at the University of Pennsylvania. Each has chosen a different region of study, and the programs of the various laboratories have been considered as cooperative enterprises bringing together the skills of physicists, chemists, biologists, archaeologists, anthropologists, and historians. Results obtained with the dating technique have already established the time of the Ice Age as being 10,000 years instead of 25,000 years ago, dated the world's oldest known village, confirmed the date of one

W. F. Libby, right, shown as he received the 1951 Research Corporation Award in recognition of his work in developing a method for dating archaeological objects. The presentation was made by Joseph W. Barker, left, president and board chairman of Research Corporation, during the dinner marking the foundation's 40th anniversary. MIT Chairman K. T. Compton, second from left, served as toastmaster, and S. K. Allison, director of the Institute for Nuclear Studies at Chicago, received copies of Dr. Libby's plaque and citation on behalf of the University of Chicago.