search on problems which arise within the transmission lines, transformers and machines of the power system, and the latter for research on effects which come from outside the power lines, such as those caused by lightning. The 60-cycle equipment will be capable of providing a voltage of 750,000 volts single phase, of 433,000 volts three phase, which is sufficiently high to test equipment for higher voltages than any now in commercial use. The maximum now used in the United States is 287,500 volts at Boulder Dam. The impulse testing equipment in the new laboratory will simulate natural lightning up to a maximum of 3,000,000 volts. There is no comparable laboratory in any university east of the Rockies and there is only one with similar facilities on the Pacific Coast.

Besides the research program, the laboratory staff will undertake tests of apparatus for commercial purposes, such as insulators, bushings, switching equipment and transformers. It is planned to extend a spur of the Lehigh Valley Railroad tracks into the laboratory, so that large pieces of equipment may be brought in and tested without being removed from the freight cars.

Power will be applied from the University Power Plant, where the necessary facilities are already available. A motor generator will be inserted in the line so that effects of the laboratory will not be reflected back into the university lighting system. Construction of the entire project will begin at an early date.

THE INDUSTRIAL X-RAY UNIT OF THE GENERAL ELECTRIC COMPANY

AN x-ray unit, producing energy equal to $90,000,000 worth of radium, was dedicated on December 17 by the General Electric Company as part of its program commemorating the fortieth anniversary of its research laboratory. Rated at 1,000,000 volts, the unit exceeds by 600,000 volts the rating of the largest previous industrial unit and cuts the time of taking a picture through four inches of steel three feet away from one hour to less than two minutes.

The new equipment will greatly speed up the vital inspection of great steel castings used in mammoth turbines, in all high-pressure marine turbines, and in countless other ways to insure high quality in prime mover machinery. X-ray examination of steel castings has been an established practice for several years. Through application of this method, flaws which would otherwise pass undetected are discovered and rectified before the machinery goes into actual service. Many thousands of dollars have been saved industry through the use of x-rays.

Until now, the largest industrial unit in use anywhere in the world has been a 400,000-volt unit now superseded by the new outfit in the Schenectady works of the General Electric Company. With the new million-volt unit, an exposure of less than two minutes accomplishes the purpose. With the 400,000-volt unit, three hours and a half were required to make a picture through five inches of steel. With the new one, only five minutes are required. The exposure time must be increased two and one-half times per inch of steel to be pictured.

The unit is housed in a special building of its own. Unique construction features are employed to make it the safest possible building for the operation of high-voltage x-ray equipment. For example, the walls of the structure are of solid concrete, 14 inches thick, plus 12 inches of brick on the interior, making a total thickness of more than two feet or the equivalent of approximately four inches of lead. To further prevent any stray x-rays from escaping into surrounding manufacturing buildings, the foundations of the structure extend five feet below the surface of the ground in a solid mass. With such protection, all possible chances of the still mysterious x-rays causing personal injury to any one working in the vicinity are eliminated.

GRANTS OF THE CARNEGIE CORPORATION OF NEW YORK

ACCORDING to the annual report of Dr. Frederick P. Keppel, president of the Carnegie Corporation, grants amounting to $4,692,682 were made during 1939–40. Of this sum $347,520 was appropriated for library interests, $218,000 for adult education, $459,500 for the arts, $2,026,947 for research, studies and publication and $1,613,715 for general interests.

Appropriations for scientific work listed in the appendix of the report include:

University of Montreal, the development of library of Botanical Institute. $8,000.

Montreal Botanical Garden, the development of library and educational program. $6,200.

New York Museum of Science and Industry. $40,000.

American Association of Museums. $37,000.

American Museum of Health, studies in the field of health education. $30,000.

Carnegie Foundation for the Advancement of Teaching, for the development of the program in mental hygiene and education. $5,000.

Carnegie Institution of Washington. $982,000.

The Johns Hopkins University, research in embryology. $7,500.

The Massachusetts Institute of Technology, high voltage nuclear research project. $6,000.

National Research Council. $105,000.

National Academy of Sciences. $50,000.

Australian National Research Council, anthropological research. $10,000.

American Neurological Association, research on heredity of mental diseases. $3,000.

Dental Research, various institutions. $173,000.

Harvard University, endowment of the School of Dental Medicine. $650,000.