RESEARCH FACILITIES AND PROGRAMS

During the next three years the 6.2-Bev Bevatron is to undergo extensive renovation at the University of California's Lawrence Radiation Laboratory. The planned modifications will permit the performance of a greater number and wider range of high-energy experiments with the proton accelerator and are expected to improve the machine's over-all efficiency and usefulness. The project, which will probably extend through the early part of 1964, will cost about $9.6 million (roughly the same as the original cost of the machine), and will be financed by the US Atomic Energy Commission.

Although the Bevatron has pioneered a new phase of nuclear physics during the past six years, making possible the discovery of the antiproton, the antineutron, and other particles, better performance will nevertheless be needed, according to Laboratory Director Edwin M. McMillan, if the Bevatron is to keep pace with the rapidly advancing field of high-energy physics. The changes, which will consist chiefly of engineering modifications, will not increase the energy of the machine, but are expected to result in a hundred-fold increase in the intensity of the proton beam. At the present time, ten bursts of protons are fired each minute by the pulsed machine, and there are about 10^{11} protons in each burst. After the modifications have been made, it is hoped that some 10^{13} protons will emerge in each burst. A completely new injection system will be installed which will consist of a new ion gun and a new linear accelerator for injecting protons into the Bevatron at an energy of about 20 Mev.

At the same time, experimental facilities associated with the Bevatron will be approximately doubled. New beam areas will be added so that a number of experiments can be set up at the same time, tested, and "debugged" before taking up any machine time. Many experiments will be run on a beam-sharing basis, receiving, for example, every other pulse from the machine. An external proton beam will be added to facilitate the carrying out of certain types of experiments, including those which require the detection of particles with extremely short half-lives.

The accelerator itself will be made more efficient through the revision of certain components of the main magnet power supply and the rebuilding of many other parts of the machine. Plans for improving the control system call for the development of better facilities for monitoring a number of variables in the machine's operation, such as the strength of the magnetic field, the number of protons in the beam, and the position of the beam in the tank. These changes will permit the operators of the Bevatron to provide more precisely the type of beam needed for specific experiments. The first step in the program will be to erect thicker concrete shielding, including a concrete roof, around the machine's 10 000-ton magnet to protect personnel against the increased radiation to be generated when the beam intensity is increased. The additional weight of the concrete roof will, in turn, require that the foundations be extensively reinforced.

California Institute of Technology dedicated a new research laboratory and a new accelerator at separate ceremonies held in Pasadena last month. The five-story Alfred P. Sloan Laboratory of Mathematics and Physics, converted from Caltech's old high-voltage experimentation laboratory, will provide 50 000 square feet of floor space for the school's fast-growing mathematics program and for expanding work in theoretical and experimental physics. The building houses a new low-temperature laboratory and a new accelerator laboratory, and the upper three floors contain offices for faculty members and graduate students in mathematics, as well as conference and seminar rooms, a lecture hall, and a library. The new structure was made possible by a gift to Caltech from the Sloan Foundation of New York.

The accelerator, a 12-Mev electrostatic generator, is scheduled to go into operation next spring. Dedicated as the "Office of Naval Research Tandem Accelerator", the machine and its accessory instrumentation were installed with the aid of an ONR grant to Caltech.

Hamilton Standard Division of United Aircraft Corporation announced in November the formation of a research laboratory which is to be directed by Charles F. Squire, formerly professor of physics at the Rice Institute. The Division is involved primarily in the areas of jet aircraft, missiles and space systems, and aircraft propellers. Scheduled programs will include work in thermodynamics, heat transfer, electron optics, solid-state physics, physical chemistry, and thermoelectricity. The laboratory, which is now being constructed at Hamilton Standard's main plant at Windsor Locks, Conn., will also support the Division's efforts in electronics, ground support equipment, missiles and space systems, electron beam technology, and advanced product planning.

The Electrada Corporation of Los Angeles has announced plans for a new "Photo-Optronic Laboratory", described as "one of the first commercial undertakings to study the nature of light in its application to electronics and chemistry". The laboratory, now under construction at Culver City, Calif., will be equipped to perform very precise measurements of the physical and chemical effects of light (such as the speed and resolution of film emulsions and other light-sensitive coatings)