RESEARCH FACILITIES AND PROGRAMS

Stanford's End Station

Stanford University has announced plans to build a new end station as an addition to the High-Energy Physics Laboratory which houses the University's billion-volt Mark III linear accelerator. Construction is scheduled to begin this summer and is expected to continue into the spring of 1963. The project, which will cost $650 000, contributed largely by the Office of Naval Research, will ease crowding in the Laboratory's experimental areas by providing an additional 11 400 square feet of working space. The result is expected to be a considerable increase in the number of experiments that can be conducted simultaneously.

The new facility, which will augment the Laboratory's present end station, will contain a target vault and a beam-switching vault, plus a loading area and counting room. Working areas will be below ground level, and the accelerator's electron beam will be conducted into the target area through an underground pipe. With its three-foot-thick concrete walls and a two-foot concrete roof, the new end station will require less radiation shielding around experimental setups than is needed in the present facilities.

A 1.5-billion-volt spectrometer for meson studies is among the items of new equipment to be built and installed in anticipation of improvements in accelerator techniques and components which may in the future lead to an increase in the energy of the Mark III linac. Stanford physicists hope to be using the new end station by the summer of 1963, although it may take two years to equip it fully.

Organizational Changes at NBS

The Radio Standards Laboratory of the National Bureau of Standards in Boulder, Colo., has been divided into a Radio Physics Division and a Circuits Standards Division. The move, according to a statement issued by the Bureau in March, is designed to increase the Laboratory's ability to meet the space-age needs of the electronics industry. The Radio Standards Laboratory, under the direction of J. M. Richardson, is responsible for providing "the central basis for the complete, consistent, uniform, and accurate measurement of physical quantities pertaining to radio science, and assurance of international coordination of such measurements".

The Radio Physics Division, under Yardley Beers, will carry out research involving the interaction of electromagnetic fields and matter with emphasis on possible applications to radio standards, frequency standards, time scales, atomic and aggregate properties of matter, and the constants of physics. The Division will also develop national standards, and will direct the dissemination and international coordination of the results.

The Circuits Standards Division, headed by G. E. Schafer, will conduct research and develop national standards of physical quantities pertaining to radio circuits and measurement techniques. The Division will also be responsible for disseminating such standards, primarily through its calibration services, and for insuring their international coordination.

In Washington, D. C., the Bureau's Organic and Fibrous Materials Division, headed by G. M. Kline, has been reorganized to provide better coordination and application of its research work on the five major industrial types of polymeric materials (rubber, textiles, paper, leather, and plastics). The Division previously has had a section representing each of these materials, and it has assisted industry in establishing national standards for measurement of the properties of the materials and in evaluating their physical and chemical performance. Because the polymeric materials are all based on natural and synthetic organic macromolecules, the fundamental measurement programs are closely interrelated, a fact that is reflected in the new sectional structure.

The Division now has a consultant (instead of a section) for each of the five main types of polymeric materials, and the following six new sections have been established to carry out experimental and theoretical research on the physical and chemical properties of polymers and the measurement processes involved:

1. Macromolecules: Synthesis and Structure (D. McIntyre, chief)
2. Polymer Chemistry (L. A. Wall, chief)
3. Polymer Physics (E. Passaglia, chief)
4. Polymer Characterization (N. Bekkedahl, chief)
5. Polymer Evaluation and Testing (R. D. Stiehler, chief)
6. Applied Polymer Standards and Research (R. B. Hobbs, chief)

Accelerator in Mississippi

An accelerator intended to provide intense radiation for solid-state studies is to be installed at the University of Mississippi in September, according to a recent announcement by the University's Department of Physics and Astronomy. Construction was started last month on a building to house the machine, which will supply 3-Mev electrons or positive ions at beam currents of 10 ma, making it possible to obtain as many as 10^{13} neutrons per second.

The $285 000 installation is supported by a state appropriation and by an Atomic Energy Commission contract of $92 500. A study of the effects of neutron irradiation on the resistivity of binary alloys will begin as soon as the accelerator is in operation. The senior investigator is Arthur B. Lewis.

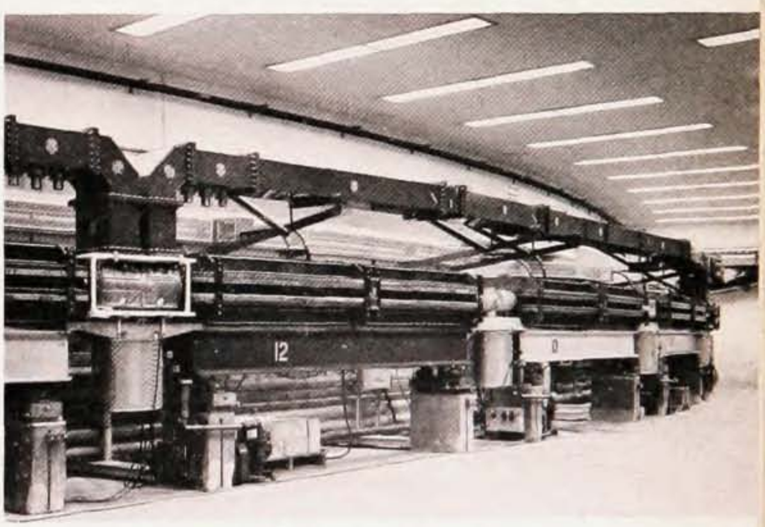
The Cambridge Electron Accelerator

On Wednesday, March 7, the first high-energy electrons were produced by the new electron accelerator which was designed, has been built, and will be operated in Cambridge, Mass., as a joint project of the Massachusetts Institute of Technology and Harvard University. In its trial operations, the machine produced a beam of 2.2-Bev electrons, and at that time it was expected that the maximum design energy of about 6-Bev would be reached within a matter of weeks. The instrument, a strong-focusing synchrotron featuring a number of sophisticated innovations, including a "choke" for storing magnetic energy which was suggested by E. M. Purcell of Harvard, is supported by the Atomic Energy Commission and was built at a cost of $12 million. (About six years ago, when the Commission formally announced having approved the construction of the machine, it was estimated that the cost would approximate $6.5 million and that it would be completed in about three and a half years.)

Cambridge electron accelerator is directed by M. Stanley Livingston of MIT (center), shown with two members of the joint committee on accelerator operating policies, Norman F. Ramsey of Harvard and Martin Deutsch of MIT.

As the most powerful accelerator of electrons in the world, the MIT-Harvard synchrotron is of great potential interest because of its proposed use in exploring the internal mysteries of subatomic particles by means of extremely high-energy electron-scattering experiments. It is also powerful enough to create all of the known particles and antiparticles in relative profusion. Aside from its distinction of being a giant among giants, the machine is a welcome addition to the family of diverse accelerators now in research use in the Cambridge area. Harvard's 95-inch cyclotron, which has been producing 125-Mev protons since 1949, is located in a building connected with the new electron synchrotron. Five other particle accelerators are operated by MIT's Laboratory for Nuclear Science. They include a twelve-year-old 350-Mev electron synchrotron, a 10-Mev electrostatic generator, a 17-Mev linear electron accelerator, a twenty-two-year-old cyclotron which produces 7.5-Mev protons and 15-Mev deuterons, and a 5-Mev electrostatic generator.

Experimental hall at Cambridge electron accelerator can accommodate as many as six simultaneous experiments, each involving a beam of high-energy electrons or photons.



A segment of the machine's 236-ft ring. Three of the 48 C-shaped magnets can be seen resting on numbered steel beams; at left is one of the 16 energy-boosting radiofrequency cavities.