RESEARCH FACILITIES AND PROGRAMS

Needs in Astronomy

The National Academy of Sciences has established a panel under the chairmanship of Albert E. Whitford, director of the Lick Observatory, to estimate the need for major new astronomical facilities in the United States during the next five to ten years. Its task will be to recommend to the federal government a set of guiding principles and estimates of cost for effective use of federal funds in promoting the advance of astronomy. The panel will be concerned in particular with possible imbalances in federal support of independent and university-connected observatories, solar and galactic astronomy, optical and radio astronomy, and ground-based and space-based astronomical programs. It will also consider manpower needs and requirements for new ancillary devices such as high-speed computers, electronic image tubes, and radio-astronomy receivers.

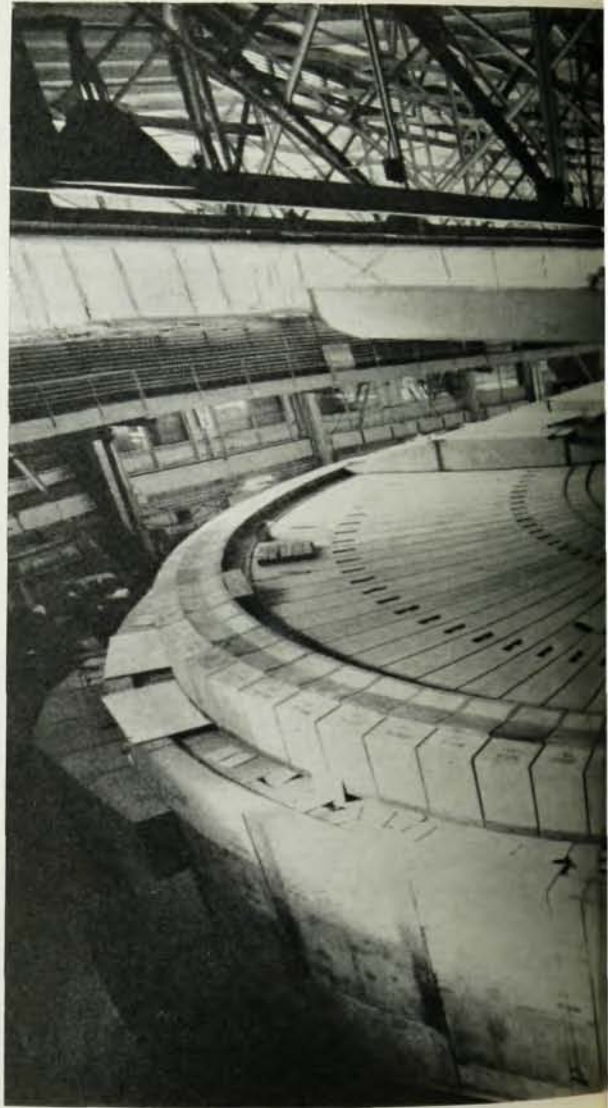
The Academy asks that the astronomers of the United States contribute their comments on the subject of the panel's inquiry to Dr. Whitford, in care of the Committee on Government Relations, National Academy of Sciences, 2101 Constitution Ave., N.W., Washington 25, D. C.

Other members of the panel, in addition to Dr. Whitford, are R. N. Bracewell of Stanford University, Frederick T. Haddock, Jr., of the University of Michigan, Frank D. Drake of the National Radio Astronomy Observatory, William Liller of Harvard College Observatory, W. W. Morgan of Yerkes Observatory, Bruce H. Rule of the California Institute of Technology, and Allan R. Sandage of Mt. Wilson and Palomar Observatories.

The Bevatron Reactivated

The Bevatron at the Lawrence Radiation Laboratory returned to service in mid-February after being shut down since June of last year for major overhaul and modifications. The modification program, which began in 1960, was carried out under the direction of Edward J. Lofgren, physicist in charge of the Bevatron, and was completed on schedule. The alterations were financed by the Atomic Energy Commission at a cost of $9.6 million, which is approximately equal to the original investment in the machine, and they were directed primarily toward improvement of beam intensity and control. Although the peak energy of the primary beam protons remains the same (6.2 BeV), the intensity at present is 8×10^{11} particles per pulse, four times the original beam intensity, and potentially it may be raised to 25 times the earlier level.

The major modifications include a new injector (a 19.5 MeV proton linear accelerator), rewinding of the magnetic pole faces to permit more precise control of the beam, improvements in the internal target system, the installation of apparatus to deflect the primary proton beam outside the chamber, the overhauling of the rf system and installation of new electronic equipment, increased shielding, and an increase of approximately 5000 square feet in the experimental space available in the Bevatron building. The external-beam system



An over-all view of the Bevatron at the University of California's Lawrence Radiation Laboratory in Berkeley during the two-year modification program that has now been completed. *LRL photo* is not yet complete but is expected to be ready for experimental use in July.

Because of the potential increase in beam intensity, the machine has been completely enclosed in concrete shielding. Formerly, a wall of concrete surrounded the outside of the Bevatron, with the top open. Some 13 000 tons of new concrete have been added to the 4000 tons used earlier. Shielding thickness is generally ten feet, with a minimum of seven feet in noncritical areas.

As a result of the alterations, it will be possible for three different experiments using the primary beam to be conducted at the same time. Relatively copious amounts of positive strange particles will be available. The K^+ intensity, for example, will be raised from about 50 particles per pulse to 5000 or more, yielding in turn, tertiary particles (e.g., K^0) in numbers adequate for study. In addition, higher-energy studies of secondary particles will be possible. The Bevatron previously produced pi mesons in sufficient numbers for good study at 2 BeV; now it will produce comparable numbers at 4 BeV.

Needs in Nuclear Structure

A committee of physicists convened by the National Science Foundation to study current research trends in nuclear-structure physics has expressed the view that the next few years should bring significant advances in the understanding of nuclear structure and has recommended that considerable support be committed to endeavors in the field. The conclusions expressed in the report of the committee are based on the group's examination and interpretation of recent theoretical and experimental developments in nuclear physics.

The report notes that in the theory of nuclear structure, the liquid-drop model, which is relatively unamenable to analysis by present mathematical techniques, is gradually giving place to the conception of