INTERNATIONAL

Australian Radio Telescope

Tests of the new Australian radio telescope at Parkes, New South Wales, have indicated that the instrument performs as sensitivitely as its planners had hoped. Since October 31 of last year, when it was formally commissioned, the telescope has been recording up to three times as many radio sources in a given part of the sky as were known to exist before. The 210-foot dish is now the world's second largest parabolic reflector; it is slightly smaller than the one at Jodrell Bank, although its sensitivity is rated higher.

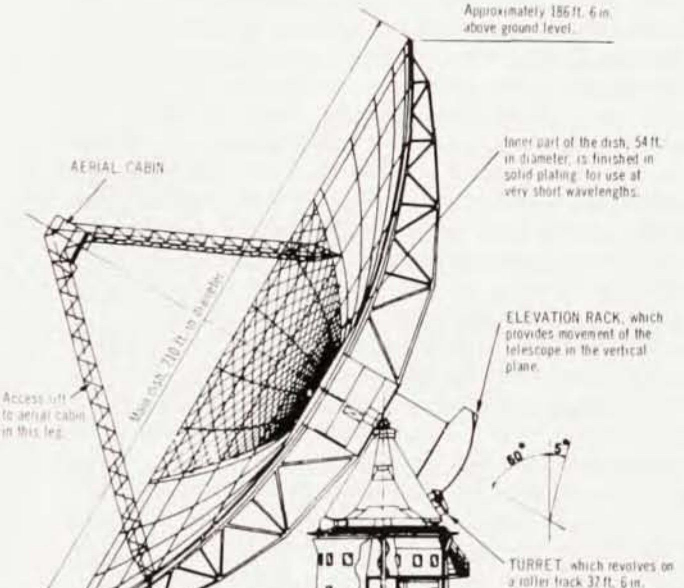
The Australian instrument was built for the radio astronomy group of the CSIRO Radiophysics Laboratory at Sydney at a cost of $1.8 million, of which the Rockefeller Foundation and the Carnegie Corporation contributed $500 000. The primary contractor was the Augsburg-Nürnberg Machine Company of West Germany. The CSIRO group, at its Radio Astronomy Field Station near Sydney, also has a 500-dipole Mills Cross, which operates at a wavelength of 3.5 meters and has been used to study radio stars, and a Christiansen Cross composed of thirty-two 19-foot parabolic aerials operating at 22 cm. The Mills Cross has been used in charting several thousand radio stars in the southern skies, but its sensitivity limits its use to the brighter sources. The new Parkes telescope is designed for full operation at 20 cm and "reasonable" performance down to 10 cm; its sensitivity is said to be good enough to receive signals originating 5 billion light years away, ten times farther than the world's largest optical telescope, the 200-inch reflector at Mt. Palomar.

Because of the extreme sensitivity of the new radio telescope, a site well removed from the manmade radiofrequency interference in and around Sydney had to be found. In addition, the parabolic mirror was designed for so close a surface accuracy (one-half inch or less) that it was desirable that the location be free of high winds, extreme temperature variation, and snow. The site chosen is on a bare, level plain in the Goobang Valley of central New South Wales, about 15 miles from the small town of Parkes. Ample space is available for installing ancillary equipment, and the spot is shielded from noise sources in the town by a ring of low hills. A mountain range separates it from Sydney (about 200 miles away) and other urban centers on the coast. It never snows at Parkes, and the temperature ranges from 40° to 110° F. Wind speed is below 10 mph for 87 percent of the time and almost never exceeds 20 mph.

The reflecting surface of the dish consists of steel mesh panels over the outer portion; the inner 55-foot portion is solid steel for greater precision at low wavelengths. The parabola is relatively shallow, having a focal length of 86 feet. Feed antennas and associated equipment are located in a cabin carried on a tripod attached at points 75 feet from the center of the dish. A lift in one of the legs provides access to the cabin.

The dish is mounted on altitude and azimuthal axes, supported by a single tower, which also contains the controls and main radio equipment. The altazimuth mounting was preferred to an equatorial mounting because of the greater accuracy obtainable and the greater ease of calibration corrections. An automatic coordinate converter has been developed for pointing and tracking. A "master equatorial", an optical system which orients itself according to equatorial coordinates, is installed at the center of motion of the paraboloid. When the master has oriented itself, a servo mechanism moves the dish so that its focal axis lines up in the direction selected by the master. The master equatorial and the error sensor that is coupled with it were constructed by Askania-Werke of Berlin. Fast slewing of the dish to a new position is controlled by a slaved model at the control desk.

The telescope is maneuverable through a range of altitude covering 60 degrees from the zenith. The possibility of sighting within thirty degrees of the horizon was given up for the sake of the increased structural accuracy obtainable by placing the support point close to the ground and keeping down the overhang. Since the instrument is located at about 33° south latitude, the sixty-degree sighting range available allows coverage from the south celestial pole to declination +27



Orthogonal projection of the Parkes radio-telescope in Australia shows main features of construction and mounting.

(Australian News & Information Bureau)

degrees. The planners felt that the sky north of + 27 is well covered by northern-hemisphere radio observatories.

The antenna is sensitive enough to pick up information signals from planetary probe rockets, and part of its time may also be used in a search for intelligent signals from outer space. In view of the telescope's capability of seeing 5 billion light years into the universe, however, its chief contributions are expected to result from studies of such important cosmological problems as the distribution of galactic hydrogen (which gives no light and can only be studied by radio) and the nature of things in the universe far beyond the range of optical instruments. It is hoped that signals having distant points of origin will shed more light on the expanding-universe hypothesis and that evidence will be found to determine whether the density of the universe is relatively constant or generally decreasing —that is, whether new matter is being created to fill the void or whether the universe is less dense as it expands. Optical astronomers are unable to detect any significant variations in matter density at different distances or in diverse directions but their range of sight is too short to allow any satisfying conclusions to be drawn from negative evidence. Research programs using the radio telescope were to be initiated early this year, after completion of the operational tests. According to E. G. Bowen, chief of CSIRO's Radiophysics Division, the tests themselves have yielded enough new information to require several months of evaluation.

Southern Astrograph Project

Yale University has announced that negotiations are being completed for lease of a site in western Argentina for the construction of an astronomical observatory to be used in surveying the star fields of the southern sky. The principal instrument is to be a twin 20-inch astrographic camera with a focal length of 12 feet. Construction of the optical system is in progress at the Perkin-Elmer facilities in Norwalk, Conn.; mechanical parts will be furnished by the Rotterdam firm of Rademakers Metaalbedrijf.

The proposed Southern Astronomical Observatory will be located on a 100-acre site approximately 100 miles southwest of San Juan, Argentina, at an elevation of about 8000 feet above sea level. It will be operated jointly by Yale and Columbia Universities, with the close cooperation of the University of Cuyo in Argentina. The Southern Astrograph project, which was made possible by a $750 000 Ford Foundation grant to Yale in 1960, will extend to all of the southern sky an undertaking which was begun for the northern sky by the Lick Observatory at Mount Hamilton in California.

In 1926, Yale established an astronomical observing station at Johannesburg, South Africa, and in 1946 Columbia joined in the program. The station was transferred six years later to Mount Stromlo in Australia, where it is still in operation. The Australian observatory, according to the Yale announcement, will be discontinued when the new observatory in Argentina commences operations.

Biophysics

The formation and constitution of a proposed US National Committee for Pure and Applied Biophysics is currently the concern of the ad hoc Committee on International Relations of the National Academy of Sciences—National Research Council. The Biophysics Committee is to be the group representing the interests of American biophysicists in the work of the International Organization for Pure and Applied Biophysics, which was established during a meeting in Stockholm last summer by the representatives of 26 nations.

The aims of the new international organization, as outlined in its statutes, are to organize international cooperation in biophysics and to promote communication between the various branches of biophysics and allied subjects, to encourage within each country cooperation between the societies that represent the interests of biophysics, and to contribute to the advancement of biophysics in all its aspects. Officers recently elected to the Council of the international organization are: president, A. Engström, Department of Medical Physics, Karolinska Institute, Stockholm, Sweden; vice president, A. Katchalsky, Polymer Department, Weizmann Institute of Science, Rehovot, Israel; honorary vice president, Sir Gordon Sutherland, National Physical Laboratory, Teddington, Middlesex, England; and secretary-general, A. K. Solomon, Biophysical Laboratory, Harvard Medical School, Boston, Mass. Prof. Solomon also serves as chairman of the NAS-NRC ad hoc Committee on International Relations.

A German Society of Biophysics, according to an announcement carried recently in the *German Science Bulletin,* has been founded in Frankfurt to promote research in biophysics and to aid in establishing contacts between German scientists working in different areas of biophysics. The organization (Deutsche Gesellschaft für Biophysik) is under the chairmanship of Boris Rajewsky, director of the Max Planck Institute of Biophysics.

Swedish Physics Text Planned

Representatives of the Physics Departments of Sweden's four liberal-arts universities (Uppsala, Stockholm, Lund, and Gothenburg) met recently at Uppsala University to complete the outlining of a new physics textbook which is scheduled for publication this year. It will be issued as a three-volume work by the Almqvist & Wiksell Publishing Co. of Stockholm. A fourth volume is to follow which will contain solutions to physical problems, complementing the theoretical material in the main text.

The work will be the first modern physics text