NEW TELESCOPES IN INDIA*

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(Received 2 July, 1985)

Abstract. The review covers the description and present status of the two optical/infrared telescopes designed and presently near fabrication in India. The 234 cm aperture optical telescope expected to be installed at Kavalur shortly has several interesting features in its control and data acquisition systems. Design features of the 122 cm Infrared Astronomical Telescope expected to be completed next year are described. The review also covers the Ooty Synthesis Radio Telescope and the Gauribidanur Low Frequency Array operating at 327 and 34 MHz, respectively, and a 10 m aperture millimeter wave telescope being built in Bangalore. Plans and preparations for still bigger systems for observations in different bands of Electromagnetic spectra are also briefly described.

For the major part of the last hundred years, observational astronomy in India was limited to the activities of two observatories at Kodaikanal and Hyderabad. But after independence in 1947, a determined thrust has been put to build up new astronomical observatories, where front line research will be possible. There have also been advances in the field of astronomical observations with balloons, rockets, and satellite-borne instruments, probing the portions of electromagnetic spectra inaccessible from the ground. The present report covers only the ground based installations, carrying out observations in those bands which reach the Earth’s surface through several transparent windows in the atmosphere.

The locations of the major installations are shown in Figure 1. Concentration is in the southern part of India, partly because almost the entire sky is accessible from these locations. The southernmost location is in Kodaikanal (+10°14’), where optical observations were started at the turn of the century and the first radio observations of the Sun from India commenced in 1952. The observatory now concentrates on observations of the Sun and the solar system in optical bands. A ‘Solar Terrestrial Physics’ unit is also located here which carries out regular observations of the geomagnetic and ionospheric variations connected with solar events.

Moving northwards, the next major installation is at Ooty (+11°23’) where the large steerable parabolic cylinder carries on investigations of the radio sources in the meter wavelength region. This telescope was totally designed and built in India and was commissioned in 1970. The instrument operates nominally at 327 MHz, and was originally designed for radio source studies by the Lunar Occultation technique. Recently this has been linked up with seven more smaller dishes and can now function as a synthesis telescope (Swarup, 1984).

† Report of the Kodaikanal and Madras Observatories for 1900–1901.
‡ Annual Report of Kodaikanal Observatory for the year 1952.
Still further north, we come across Kavalur Observatory ( + 12°34') which is the major optical observatory in India. The largest telescope at the moment is 102 cm Zeiss Ritchey-Chrétien reflector; there are two more, locally made, 75 and 38 cm reflector telescopes. In an adjacent building, installation of a 234 cm reflecting telescope has just started.

This telescope is of indigenous design and manufacture. Figure 2 shows an artist's sketch of the general arrangements of the optical elements and mounting. Equatorially mounted, with a 6 m horse-shoe as its north bearing, this is driven by large spur gears around both polar and declination axes. The driving motor set consists of two torque motors in opposition to reduce the gear backlash. Twenty bit absolute position encoders feed back position information to a set of microprocessors which control the driving rate with the help of a precision clock. A VAX 11/780 computer will exercise supervisory