THE REFLECTOR TELESCOPE OF THE TAUTENBURG OBSERVATORY

THE new 2-metre reflector telescope installed at the Tautenburg Astronomical Observatory (near Jena) on October 19, 1960, is unique in many respects. The telescope made by VEB Carl Zeiss JENA on the lines suggested by Dr. Kienle combines different optical systems and permits study of celestial objects both collectively and individually.

Optically, the construction of the Telescope is governed by the Schmidt system in which a photographic assembly of 4-metre focal length and an aperture ratio of 1 : 3 is formed consisting of a spherical main mirror 2 metres and a correction plate 1·34 metres in diameter. In this form, the Schmidt system of the Telescope represents the largest in the world and allows investigation of wide regions of the firmament, recording them on 24 × 24 cm. photographic plates.

For the individual examination of celestial objects, the Quasi-Cassegrain system is available, where the main mirror combines with a hyperdeformed convex counter-mirror 400 mm. in diameter, imparting to the system a focal length of 20 metres. This system is predominantly used in photoelectric photometry and spectrography.

The Quasi-Coude system is constructed on similar lines but is distinguished by a longer focal length of 92 metres and a fixed place of observation where instruments of highest sensitiveness may be installed, such as, for instance, high dispersion spectrographs which are not required to take part in the motion of the telescope during the observation.

Mechanically, the construction of the Universal Telescope consists of a tube body of roughly ten metre length and square cross-section and of a fork-type of mounting device (Fig. 1). This mounting device is of the equatorial type which permits of directing the tube to the desired object and keeping the same within the visual field during the time of observation. The moving parts of the Telescope weigh 65,000 kg. and special provisions in the form of hydraulic thrust bearings permit the telescope to follow the stars with the precision of an astronomical clock. Floating on a film of oil of 0·05 mm. thick, the telescope is moved with the requisite accuracy by a precision worm wheel which is 2,160 mm. in diameter and the teeth of which average less than 0·5 seconds of arc from the theoretical distance. By means of an electrical transmission device the movement of the heavy tube body (26,000 kg.) about the declination axis, same as the movement about the polar axis, is transmitted to a central and several branch switchboards from which the instrument is fully electrically adjusted for the astronomical co-ordinates of the objects under observation. By means of a large number of compensation devices the adjustment and seating of the optical elements will be preserved with greatest accuracy in all positions of the Telescope and under varying temperature conditions.

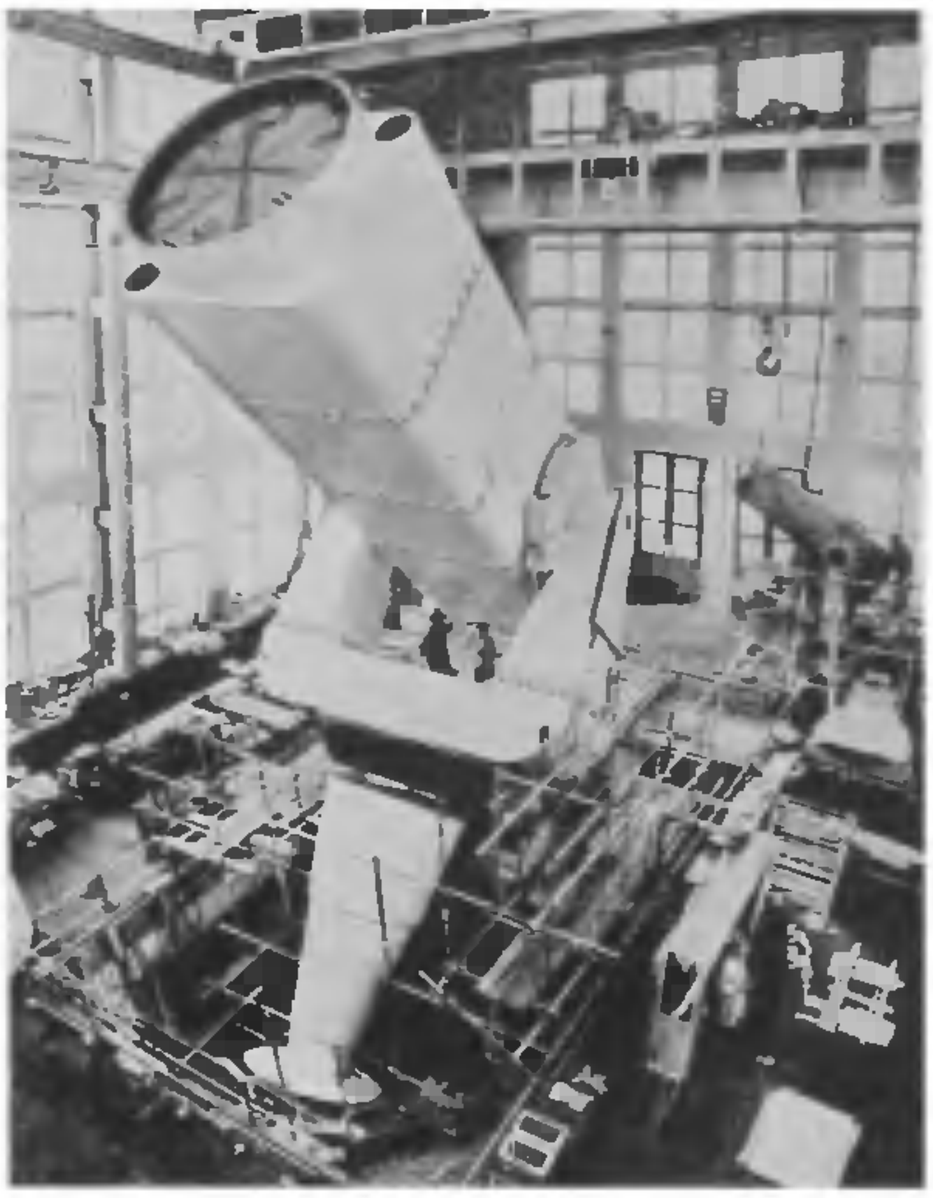

FIG. 1

The main mirror weighing 2,370 kg. as well as the correction plate, made of UV-transmissive optical glass, having a thickness of 38 mm. and the different auxiliary mirrors were cast by the VEB JENAER Glasswerk Schott und Gen. The grating spectrographs, still in the course of production, will give stellar spectra of a maximum length of 1,500 mm. The camera mirror of the Coude spectrograph will be 1,200 mm. in diameter thus approaching in its dimensions that of a medium size telescope.

The complete equipment will be housed in an observatory dome 20 meters in diameter and of a total weight of 175 tons. The dome will be heat insulated and maintained at a constant temperature—the night temperature—thus guarding the mechanical and optical parts against an adverse influence of temperature fluctuations.