

The first astronomical observatory in Canada was founded at Fredericton, N.B., in 1851 with latitude and longitude determinations the prime incentive in the early years. Other small observatories followed—at Quebec City in 1854, at Kingston in 1875 and at McGill University in 1879.

Modern astronomical research in Canada is concentrated in certain federal agencies and in universities. The Dominion Observatory at Ottawa, Ont., and the Dominion Astrophysical Observatory at Victoria, B.C., comprise a Branch of the Department of Mines and Technical Surveys. The National Research Council is active in the field of radio astronomy through its Division of Radio and Electrical Engineering. The David Dunlap Observatory of the University of Toronto is a centre for astronomical research as well as for the teaching of astronomy in the University's Department of Astronomy. All of these institutions are equipped with major observing instruments. Other universities with less extensive research facilities in astronomy include Queen's University and the University of Western Ontario.

**The Dominion Observatory.**—The early history of the Dominion Observatory dates back to 1885 when the first modern longitude surveys were begun in order to define certain tracts of land involved in railway construction in British Columbia. This eventually led to the establishment of the Dominion Observatory on its present site in Ottawa in 1905. Research in positional astronomy and in the new field of astrophysics became important functions of the Observatory while geodetic surveying was separated from the Observatory and became part of another Branch in 1917. In addition to its work in astronomy, the Dominion Observatory has three Divisions engaged in research in geophysics (see pp. 22-23).

Apart from research work, the Observatory performs an educational service to the public. Saturday evenings from April to October, inclusive, are set aside for this purpose and visitors are given an opportunity to view celestial objects through the 15-inch telescope and to learn something about the operation of the Observatory and its research. During the remainder of the year groups may visit the Observatory at pre-arranged times.

**Positional Astronomy and Time Service.**—Determination of the precise positions and proper motions of the stars, although less spectacular than some other aspects of astronomy, is nevertheless one of the foundations of the science and an important task of most national observatories. Observation is made of the time at which a star crosses the meridian and of its angular distance from the equator. The minute change in these values with passing years is the proper motion of the star. Results from many observatories are incorporated into star catalogues used internationally for navigation, surveying, time-keeping and the optical tracking of artificial satellites.

The Observatory now uses a mirror transit instrument for fundamental positional work. A plane mirror with an attached graduated circle is pivoted on an east-west axis. The mirror reflects light from a star on the meridian into either one of two fixed 10-inch aperture horizontal telescopes which lie on a north-south line facing in toward the mirror. The transit of the star and the position of the circle are recorded photographically by remote control.

Provision of a national standard of time is another basic function of the Dominion Observatory. Although a meridian circle can determine time, since 1952 astronomical observations for time have been carried out with a special instrument, the photographic zenith tube. Light from a star near the zenith enters the 10-inch lens of the telescope, goes down the tube to the horizontal surface of a pool of mercury in a basin and is reflected back to a photographic plate in the focus just below the lens. The plate follows the moving image of the star for 20 seconds and records the image as a small dot; the motion is accurately timed by a clock. Lens and plate are then rotated 180 degrees about the vertical and another exposure made. Repetition of the cycle leaves a pattern of four images