

In accordance with the wishes of the donor, the Observatory is open to the public on Wednesday afternoons throughout the year and for the first two hours of darkness on Saturday evenings from Apr. 1 to Oct. 31.

RADIO ASTRONOMY AT THE NATIONAL RESEARCH COUNCIL*

Within the past decade the rapidly developing techniques of the radio laboratory have been used to further understanding of the universe in the sense of observational astronomy. The incorporation of the techniques of a new science within one of the oldest of sciences has arisen because both the light and the radio emission from a celestial object are electromagnetic disturbances which travel with the same velocity (186,000 miles per second) but have different wavelengths (or frequencies).

Solar Radio Astronomy.—In 1946 the Radio and Electrical Engineering Division of the National Research Council commenced investigations on the emission of radio waves from the sun on a wavelength of 10.7 centimetres. The techniques and equipment which had been designed for radar sets in the Division were modified for use in this new field. The initial work was carried out at the Metcalfe Road Field Station, Ont., but because considerable microwave radio interference was experienced at this station a new site was acquired in 1948 at Goth Hill in South Gloucester, Ont., located fourteen miles south of Ottawa and this is the present location of the solar noise observatory.

The Observatory is now operating two radio-telescopes which monitor the total emission from the sun: one is the original four-foot parabolic reflector which has been in service since 1946; the second is a recently installed reflector of ten-foot diameter. A third radio-telescope, a 150-foot-long array, has been used to give directional information of radio waves from the sun, and is currently being modified in order to improve the resolving power.

The long series of regular observations of the sun at a wavelength of 10.7 centimetres, noted above, will be continued into the future. Comparison with optical observations made at other observatories has shown that there are three components of radio noise: an emission originating from the undisturbed solar atmosphere, an emission varying slowly from day to day which originates from the vicinity of sunspots, and a somewhat rare impulsive component of short duration which is associated with the appearance of solar flares. These emissions have been shown to originate at a level associated with the solar chromosphere—the transition layer above the photosphere and below the corona. The continuous monitoring of the radio emission on this wavelength appears to provide convenient indices of solar activities and will be of use in the fields of ionospheric research, the solar origin of cosmic rays, auroral studies and magnetic storm analysis. In each of these fields special events on earth may be traced to the occurrence of a flare on the sun.

Meteor Radio Astronomy.—In 1947 the Division of Radio and Electrical Engineering together with the Dominion Observatory initiated a combined program of meteor research. A 33 Mc/s radar set was developed at the Metcalfe Road Field Station so that echoes from meteors passing through the upper atmosphere could be readily detected. Visual, photographic and spectrographic work was also conducted. One of the most important contributions of this program to astronomy has been the conclusion that few if any meteors down to the eighth magnitude can be of interstellar origin. A few determinations of the complete orbits of meteors have been made by triangulating points of the ionized meteor path from three independent radar stations and have yielded elliptical orbits.

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