

and it has been used to locate the radio-emissive regions in the solar atmosphere. A similar antenna for the Algonquin Radio Observatory will ultimately take the form of a cross or "T" to produce a narrow pencil-shaped beam.

Observations of the sun at longer radio wavelengths (several meters) began in 1948 and have been extended at the new site. These observations are concerned with events in the solar corona at heights up to several solar radii above the optical surface. The events are likely caused by the ejection of particles into the corona from disturbances near sunspots. Information on the magnetic fields in the corona may be derived from these observations. A simple interferometer was used to study the extent of the radio emission during the solar eclipse of July 1963 and to observe the radio emissions from the planet Jupiter.

Galactic and Extra-Galactic Radio Astronomy.—The facilities of the Algonquin Radio Observatory will include three outstanding instruments for general radio astronomy. A precision parabolic radio telescope, 33 feet in diameter, has been in operation since 1963 and can be used at wavelengths as short as 1.5 cm. It is well suited for accurate mapping of selected regions of the sky and has revealed more detail in its first surveys than had been detected in previous studies.

A precisely calibrated horn-reflector antenna is used to provide accurate measures of the amount of radio energy received from the stronger astronomical sources. The measures are of intrinsic value and, in addition, are of importance in that they provide an international standard for the calibration of other, larger radio telescopes.

The major instrument of the Observatory is to be a 150-foot diameter paraboloid with completion scheduled for 1966. The emphasis will be on microwave observations at wavelengths between 3 and 21 cm. The size and precision of this instrument will permit detailed mapping of a large number of interesting regions, including many of the weaker radio sources not observable with a smaller instrument.

Meteor Astronomy.—A program of meteor research is active at the Springhill Meteor Observatory operated by the National Research Council at a location some 25 miles south of Ottawa. Here radar equipment of several types records the flux of meteoric particles into the earth's atmosphere. This program was started shortly after the end of World War II and was put on a continuous recording basis at the beginning of the International Geophysical Year. Some ten million meteors have been recorded on IBM data-processing equipment. In addition, spectrograph records of meteors are correlated with the data from the radar record and with the visual observations carried out simultaneously by a team of eight observers. The aim of this research is to learn more about the physical reactions that take place in the earth's upper atmosphere and to study various properties of the small, solid particles which exist in interplanetary space.

Astronomy at Queen's University

Work in astronomy began in 1861, took a large step forward with the construction of the first Observatory in 1906 and a further step forward in 1955 with the construction of the present Observatory and the establishment of the Radio Astronomy Research Group. The new telescope is a 15-inch reflector equipped with various photographic, photoelectric and spectroscopic devices. It is used mainly as a teaching instrument both for undergraduate students, including a number of school teachers who attend the Queen's Summer School, and for graduate students working on various research projects.

Astronomical research is mainly in the field of radio astronomy where the departments of physics, electrical engineering and mathematics combine their interests. Studies of the ionosphere employing radio astronomy techniques have included a wide variety of observations. The present research is directed mainly toward the design and construction of large-aperture antenna systems suitable for extra-galactic measurements. This work includes both the engineering problems associated with antennas and receivers and the