CANADIAN RADIO ASTRONOMY – PAST, PRESENT, FUTURE?

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The first detection of extraterrestrial radio waves was made in the early 1930s (Jansky, 1932, 1933) yet there was apparently no contemporary mention of the discovery in the JOURNAL of the Royal Astronomical Society of Canada. This is surprising since many articles and notes dealt with topics well removed from conventional astronomy of the day. For instance, we find papers on "Invisible Starlight", "The Electronic Telescope" and "... Correlation of Cosmic Phenomena with Radio Intensities ...". None of these, however, are concerned with the startling news of the birth of radio astronomy which had just appeared in other journals.

Sixteen years elapsed before the JOURNAL published its first radio astronomy papers (Williamson, 1948, Northcott and Williamson, 1948). The first of these was a review of developments in radio astronomy which had been made immediately after the war. In the second paper, several existing maps of radio emission from the Milky Way were re-plotted on galactic coordinates with an attempt at a consistent flux scale. Meanwhile, A. E. Covington at the National Research Council in Ottawa was beginning a series of solar microwave measurements which is still continuing (Covington and Medd, 1949).

By the mid 1950s it had become apparent that radio astronomy would make great contributions to many branches of astronomy and physics yet Canada's efforts were confined to solar observations. To alleviate this situation, plans were made by C. S. Beals of the Dominion Observatory and W. A. Cumming of the National Research Council to provide substantial new observational facilities in Canada. This led to the establishment of radio observatories at Penticton, B.C. and Algonquin Park in Ontario. Subsequent development of Radio Astronomy in Canada has been reviewed by Covington (1967), Locke (1967), Halliday (1965), and, more recently by Hogg and Hogg (1980) and Vallée (1982).

Although the two observatories had been originally established in separate government departments, cooperation between them has always been excellent. As a result, a Canadian group which included Queen's

University and University of Toronto was the first to use successfully the techniques of long-baseline interferometry to measure the angular diameters of quasars.

A program for measuring variable radio sources which began soon after completion of the Algonquin Radio Observatory's 46 m telescope is continuing. However an increasing portion of the observing time is now devoted to studying radio spectra of interstellar molecules such as HC_9N and $HC_{11}N$. At Penticton, most effort in recent years has been devoted to building and operating a four-element synthesis interferometer which is ideal for mapping supernovae remnants and ionized hydrogen regions in the galaxy. A 4.6 m diameter mm-wave telescope installed at University of British Columbia in 1970 has been used for studies of CO and other molecules. This telescope operates at a much higher frequency than any other Canadian radio telescope.

The modest observing facilities once operated by Queen's University and by the University of Toronto have been disbanded and astronomers from these and other Canadian institutions have, in recent years, been making increased use of the superior facilities available abroad. This trend may, however, be reversed within the next few years if two major projects, presently in design stages, are carried out. One involves resurfacing the Algonquin 46 m antenna to make it into a large mm-wave telescope. The other project involves building a new eight-antenna array to form a giant radio telescope stretching from Vancouver Island to Newfoundland. It will be able to resolve detail in distant galaxies and quasars with unprecedented sensitivity and resolution. The future of radio astronomy in Canada depends upon the success of these projects.

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