CARMAN HUDSON COSTAIN, 1932–1989

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With the death of Dr Carman Hudson Costain on December 21, 1989, Canada lost one of its most senior and talented radio astronomers.

Dr Costain was born in Saskatoon, the youngest of the five children of Henry Hudson Costain and Mary Elida Costain. In 1950 he entered the University of Saskatchewan and during his undergraduate years worked as a research assistant in electronics in the Department of Physics of the University and at the Defence Research Board in Ottawa. While in Ottawa he assisted in the development of equipment for continuously recording the 50 Mc/s radiation from a radio star. He graduated with a B.A. in Physics in 1954 and an M.A. with specialization in radio astronomy in 1955. Following in his brother Cecil’s footsteps he then entered the University of Cambridge where he joined the radio astronomy group of the Cavendish Laboratory. At that time radio astronomy was still in its infancy and the group at Cambridge working under Martin Ryle (later Sir Martin Ryle) were pioneers in the field. Costain obtained his Ph.D. degree working under Dr F.G. Smith (later Sir Francis Graham Smith, the present Astronomer Royal) on the


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development of a novel radio telescope to map the emissions from the sky at a wavelength of 8 metres. This telescope was one of the first to employ the technique of "aperture synthesis", an idea for which Ryle was later awarded the Nobel Prize. Costain was the first Canadian to receive a doctorate in the young field of radio astronomy when he was awarded his degree in 1960.

In 1959 Costain joined the staff of the Dominion Radio Astrophysical Observatory, then under construction. He helped in the development of the first receiving and recording equipment for the 26-metre telescope. However, he immediately realized the potential of the White Lake site for low frequency radio astronomy and recommended the construction of a large array-type telescope for the measurement of galactic and extragalactic radiation at the very long wavelength of 13 metres. He argued for its immediate construction to take advantage of the reduced interference which would occur during the approaching sunspot minimum. He was so persuasive that approval for the project was quickly obtained and he devoted a great deal of effort to its realization. He was solely responsible for the conceptional design of the telescope – a T-shaped array of 624 dipoles supported by 1700 cedar poles – and for much of the detailed engineering and electronic instrumentation.

In the early 1970s Costain turned to another challenging project, the Multi-element Synthesis Telescope. This instrument originally consisted of three 8.5-metre parabolic telescopes, two of which were movable on an E-W track, but is now being expanded and will soon comprise seven paraboloids. Costain played a leading role in the original design and made valuable contributions to the development of the software, whose complexity increased as the instrument expanded.

In the period 1974 to 1982, Costain served on the Board of Directors of the Canadian Astronomical Society and was President of the Society from 1978 to 1980. During this period and subsequently, he vigorously promoted the concept of a Canadian "Long Baseline Array". Unfortunately, this project did not receive funding, although similar arrays are now nearing completion in other countries.

In 1984 Dr Costain was called to Ottawa to assist in the upgrading of the 46-metre radio telescope at the Algonquin Radio Observatory. While there he developed and executed an ingenious holographic method for measuring the surface accuracy of this very large telescope to a precision of a few tenths of a millimetre. This project was abruptly terminated in 1986 with the closing of the Algonquin Radio Observatory and Dr Costain returned to Penticton. At the time of his death he was engaged in the development of new techniques for improving the imaging properties of the Observatory's Synthesis Telescope. Largely through his efforts, this instrument is now the Observatory's principal instrument.

Carman took an active part in the social life of the City of Penticton. For many years he was a member of the Penticton Rotary Club. He was an avid golfer and,
like many boys who grew up on the Prairies, had a love of curling. In latter years he was a keen aviation enthusiast and, at the time of his death, was in the process of building his own aircraft.

Carman Costain was a gifted scientist who easily understood complex physical principles and their mathematical formulation. He was a recognized authority in antenna theory and, in particular, the application of the technique of “aperture synthesis”. He never lost sight, however, of the astronomical significance of these developments and took delight in the discoveries they made possible. He was an enthusiastic scientist who loved to discuss his work with anyone who would listen – scientist and non-scientist alike. Not surprisingly, therefore, he was an excellent teacher and lecturer.

Carman is survived by his four children – David, Leslie (Mrs Glen Woodman), Robin and Philip, and four grandchildren. Also surviving are four brothers and sisters – Merle (Moor) of Brantford, Lea (Atchison) of Ottawa, Cecil (former Head of the Time and Frequency Section of the National Research Council, Ottawa), and Russel of Prince Albert. He will be sadly missed by his family, by his friends in Penticton and Ottawa, and his many colleagues around the world.