
Ragbir Bathal review of Peter Robertson, *Radio Astronomer: John Bolton and a New Window on the Universe*

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Peter Robertson is to be congratulated on writing a book on the life and scientific work of one of Australia's elite astrophysicists. He has done a remarkably good job in giving us not only aspects of his forceful personality and drive but also his scientific achievements. John Bolton was one of a small group of British intellectuals who had left Britain after World War II to make Australia their home. The other prominent ones were Joseph Pawsey and Paul Wild. They were all involved, in one way or another, in constructing, testing and using equipment for the war effort. All had a very strong foundation in university physics. While studying at Cambridge University, Bolton had absorbed the Cavendish string and sealing-wax tradition that was to prove very useful in his early experiments at the Dover Heights field station where he built rudimentary antennas.

It was at Dover Heights that Bolton, Gordon Stanley and Bruce Slee discovered a strong source of radiation emanating from Cygnus. This proved to be a fundamental discovery of the utmost importance. An analysis of the source revealed a rather surprising result: the Cygnus source was at a distance of 1,000 million light years. In their book, *Radio Astronomy*, Joe Pawsey and Ron Bracewell commented:

The identification of such a strong source ... carries with it an astonishing astronomical implication ... it maybe possible by radio means to extend the bounds of the observable universe beyond the optical means.

This discovery and the subsequent discoveries of other sources—Taurus A, Virgo A and Centaurus A—pushed Australia into the forefront of the new field of radio astronomy. As Robertson notes in his book, 'a new branch of astronomy had been founded—extragalactic radio astronomy' (p. 100). The youthful trio of John, Gordon and Bruce would go on to carve out distinguished careers in radio astronomy.

Despite his great success in finding radio sources that attracted international interest, there were other competitors in the radiophysics group who were competing for the same scarce resources. Bernie Mills, a highly innovative physicist, had been

experimenting with different arrays and came up with an innovative design in the shape of a cross, which consisted of a long array in both the north–south and east–west directions. Unfortunately, Bolton’s suggestion of a new radio telescope was rejected. Mills went on to become a professor in the physics department at Sydney University.

Despite Bolton’s disappointment, a new door opened up for him in the United States as the institutions there were gearing up to get into the new field of radio astronomy. Reviewing Bolton’s career, Robertson notes that he was appointed a senior research fellow at Caltech (California Institute of Technology). He was later promoted to the position of professor of radio astronomy and director of the Owens Valley Radio Observatory. While at Caltech he built the radio telescope at Owens Valley. He was awarded the California Scientist of the Year award by the California Museum of Science and Industry. Rudolph Minkowski, a distinguished American astrophysicist, had this to say about Bolton’s nomination:

John Bolton combines a broad and penetrating understanding of the scientific problems of radio astronomy with outstanding technical ability. He possesses the uncommon gift of solving instrumental problems, not by the brute force of large size, but by ingenious design of equipment ... In a short time his leadership has established in California one of the world’s most outstanding centres of research in radio astronomy.

Bolton stayed at Caltech for about six years before coming back to Australia to build his most ambitious radio telescope—the Parkes Radio Telescope. An international project, it became famous quite quickly with the discovery of a quasar. According to Bolton:

The occultation of 3C273 is one of the things [that] made it famous in its early days. However, there were a whole series of discoveries I think [that] were just as important. I would place, certainly on an equal footing, the discovery of polarization in the extragalactic radio sources as one of the fundamental discoveries. The mapping of the polarization gave us directly the mapping of the magnetic fields in these objects’.

Receiving images of the first moonwalk, the Parkes Radio Telescope hit the international headlines when it was used as a communication link in the Apollo program. Bolton was in charge of the operations at the Parkes Radio Telescope.

Bolton led a very productive life as one of the pioneers of Australian radio astronomy. He was recognised for his work in the scientific community, being awarded the Royal Astronomical Society’s gold medal. The citation read, ‘in recognition of your outstanding contributions to both radio and optical astronomy ... and your role in the development and inspiring leadership of two major radio astronomy observatories’. Robertson has written an excellent account of the scientific achievements of Bolton, a pioneer of radio astronomy in Australia and the United States. It is a book that should be read by people who are interested in the works of Australian scientists who have contributed to international astronomy.

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