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Book Review:

Peter Robertson - *Radio Astronomer. John Bolton and a New Window on the Universe*

by Dr Claire Hooker (2017)

Peter Robertson: *Radio Astronomer: John Bolton and a New Window on the Universe*. NewSouth Publishing: Sydney, 2017. 428 + viii pp., illus., ISBN: 9781742235455 (HB), \$59.99.

The founding and flourishing of an entirely new field, radio astronomy, must rate among the most impressive episodes in the history of Australian science. Radio astronomy was as deeply symbolic of a new sense of national confidence in its early years, as it was a signal of the sweeping social changes to economy and society that transformed the nation after the war. Prior to the war, it was nearly impossible for a graduate to find employment as a physicist. Afterwards - could there be a stronger symbol of Australian aspirations, or of investment in research, than the famous 'Dish' telescope at Parkes? Or, as it turns out, any better exemplification of the archetypal Australian hero—ingenious, laconic, humorous, astonishingly stubbornly dedicated—than its Yorkshire émigré designer and first director, John Bolton?

Peter Robertson, who has published a history of the Parkes telescope, has now produced a matching biography of Bolton. Both books have been welcomed for their public memorialising of this too-easily forgotten part of Australia's history. Hitherto, while comprehensively covered by Woody Sullivan's magnum opus *Cosmic Noise* (2009) and in the now-dated sociology of science classic *Astronomy Transformed* (Mulkay and Edge 1976), the history of radio astronomy has been the preserve of technical experts only. Written in an easy lucid prose, this book aims to reclaim Bolton for public history as well as to celebrate, for astronomers, all that one of their most important colleagues achieved.

One of the charms of the story of radio astronomy lies in its small, string-and-sealing wax beginnings, and how this nonetheless produced discovery after discovery, completely reshaping conceptions of the Universe. Bolton was a key player in this story, and one of the advantages provided by this biography is the capacity to assess Bolton's contribution coherently—something difficult to pick out of the more comprehensive historical works.

John Gatenby Bolton (1922–1993) came from reasonably humble origins in Sheffield, United Kingdom. The war years in the UK introduced him to radar research, gave him hands-on electronics experience, and brought him to Australia, where he joined the small group of former radar researchers who were beginning the first radio observations of the sun.

His early determination to achieve the best possible measurements for puzzling discrete sources then thought to be 'radio stars', eventually resulted in the unexpected discovery that they were galaxies, a momentous indication of how radio study could extend and revolutionise understandings of the Universe. The search for, and identification of, such sources remained Bolton's central interest. This led—among many other achievements—to the slow, collaborative discovery of quasars, for which observations made during Bolton's 6 years as first builder and then director of the Owens Valley Observatory at Caltech (the California Institute of Technology) were critical.

Bolton is remembered above all for the Parkes 'Dish' telescope, the first version of which he built with three colleagues by digging a hole in the ground and constructing a reflecting surface from steel strips formerly used for binding packing cases. Under his direction, the Parkes telescope located over 8000 sources and trained a global new generation of radio astronomers. Among other contributions to NASA Apollo missions, the Dish famously relayed Neil Armstrong's first steps on the moon in July 1969.

Scientists are not easy subjects for biography, since the core dramas of their lives tend to be technical rather than personal, and choosing what details to leave out is a challenge. The primary source materials for the book are extensive, and were gathered in multiple libraries and archives, and supplemented by a number of interviews. Robertson has gone to some lengths to be even-handed, and in fact this is the dominant stylistic feature of the book. He prioritises accessibility over depth and technical detail, which makes him brief, though well rounded, in mention of the personalities, politics, and personal matters relevant to Bolton's interests and choices. And accordingly, story is engaging, and allows a lay reader to grasp the fundamentals of how radio astronomy developed, what the main puzzles and challenges were, and why Bolton's contributions mattered. Astronomers will enjoy it too.

However, by aiming for balance and pleasant reading, Robertson sacrifices something of Bolton's own boldness. Thus he mentions, but does not probe, the complexities and sometimes distressing aspects of Bolton's relationship with various colleagues; while his retelling of scientific insights made - or missed - are not deepened by analytic discussion. Those familiar with the technical details of the early years—now extensively covered in journal publications as well as in Sullivan's book— may well feel that some episodes are oversimplified. For example, Bolton's role in the identification of a source in Sagittarius is arguably overstated.

Nonetheless, a likeable, amusing and quietly impressive figure emerges from the anecdotes strung through the pages. Robertson's eye for what is essential in his story is nowhere better exemplified than in the many quite wonderful epigraphs that surmount the chapters. These almost provide an analytic frame just by themselves, and help the reader gain a rounded grasp of this key figure in scientific history.

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