

The Value of Astronomy for a Civilized Society: Richard Adrian Jarrell 1946–2013

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Few are the scholars of whom it can be said that they crafted the dominant narrative of their discipline. Richard Jarrell was one of the few. *The Cold Light of Dawn: A History of Canadian Astronomy* (1988) remains the fullest account of the plantation, cultivation, and production of astronomy in Canada. The characteristically careful choice of a modest indefinite article for the subtitle does not obscure the watershed moment for the history of Canadian astronomy created by the work's publication. One could even speak of pre- and post-Jarrell eras. His contributions, however, went beyond authoring Clío's biography of her sister Urania's Canadian affairs.²

Before The Dawn of Astrophysics

Rich Jarrell's *alma mater* was Indiana University, from which he graduated with a degree in history in 1967, but—significant for his professional career—he also read astronomy. He came to Canada to pursue a graduate course of study at the recently established Institute for the History & Philosophy of Science & Technology (IHPST), on the St. George campus of the University of Toronto. Jarrell arrived at the IHPST the year following its establishment (1968), where, in due course, he received his M.A. (1969) and Ph.D. (1972).

In Jarrell's day, the best-known figure (and in some ways most notable character at IHPST) was the indomitable Stillman Drake, former financier, noted bibliophile, and remarkable autodidact disciple of Galileo. Drake, a highly productive scholar of international repute, was recruited to the faculty about the time that Jarrell arrived, and became his doctoral supervisor (Buchwald & Swerdlow 1994). Drake believed in the virtues of archival work, the examination of the earliest extant editions of texts in conjunction with relevant manuscript material, and the close, *very* close, reading of sources. The first goal was to understand the material as it would have been understood at the time of its creation, early reception, and initial application. It was a sort of historian's moral imperative, and a veritable debt of the present to the past. Drake's scepticism towards unguarded acceptance of the oft-repeated story as the *true* story was marked. This example of a creatively sceptical scholar embodying the virtues and vices of exceptional autodidacticism would not be lost on Jarrell (in truth every successful historian—as every successful astronomer—has at some point to become a disciplined autodidact). Perhaps the example of a great authority, however skeptical and careful a reader, idolizing a scientific hero partly



Figure 1 — Professor Richard A. Jarrell, with the statue of the Enlightenment naturalist Georges-Louis Leclerc, Comte de Buffon (1707–1788), in the Jardin des Plantes, Paris. Reproduced courtesy of Martha Jarrell.

of his own making also proved instructive for the young graduate student. It was a temptation Jarrell successfully avoided throughout his career.

Jarrell's doctoral thesis was *The Life and Scientific Work of the Tübingen Astronomer Michael Maestlin, 1550–1631*, which he defended early in 1972 (1972b). The external examiner was C. Doris Hellman (1910–1973) of CUNY, best known now for the published version of her thesis *The Comet of 1577: its Place in the History of Astronomy* (1944) and for her translation of Max Caspar's *Kepler* (1959/1993), works that both retain their value. Maestlin is chiefly remembered—if remembered at all by professional astronomers—as Kepler's teacher by those who rush over the period to arrive at Newton, Halley, and Herschel. He was in fact a significant figure in the development of early-modern astronomy, with a deserved reputation as an observer, a mathematician, and as a teacher who enjoyed a Europe-wide correspondence and the respect of Tycho Brahe (the last no easy feat). In his mid-20s, Jarrell had produced a major study of a notable figure in the discipline. A recent paper modifying one of Jarrell's judgements notes that his thesis: "...remains the best monograph about the Tübingen astronomer to date" (Granada 2014, 91). The tragedy here is that it never saw the light of day as a book.

Another key influence on Rich was John W. Abrams (1913–1981), a formally trained astrophysicist, who was the founding Director of IHPST, and a professor of Mechanical and Industrial Engineering at the University of Toronto. He had also been the chief operational analyst for the Supreme Headquarters Allied Powers Europe in Paris (SHAPE,

1958-1961), and chief of operational research at the Defence Research Board in Ottawa (1961-1962). Abrams was a scholar of wide interests, who advocated an interdisciplinary approach to the history of technology. His attention to the interaction of scientists and their apparatus in the production of science was shared by his student (Sinclair 1982)³.

Jarrell's first published paper appeared the year of his defence (indeed preceded it), and while not centred around Maestlin, was nonetheless on an early modern astronomical question, namely the dating of William Gilbert's *De mundo* (Jarrell 1972a). The subject of his thesis did feature in several published contributions, one on Maestlin's place in astronomy (Jarrell 1975b), and another on Maestlin within the Tübingen setting (Jarrell 1981). Jarrell was invited to contribute to the IAU's and IUHPS's (International Union for the History and Philosophy of Science) prestigious General History of Astronomy. This was meant to be the authoritative multivolume English language survey. Unfortunately, only three of the volumes were ever issued; fortunately one of them contained Jarrell's chapter on "The Contemporaries of Tycho Brahe" (of course Maestlin was among them; 1989b).

Jarrell's early won expertise in the area saw him appointed to the editorial team of Springer's *The Biographical Encyclopedia of Astronomers* (BEA; Hockey *et al.* 2007), as the content editor with responsibility for "Renaissance and Enlightenment Astronomers." Jarrell was also a major contributor of biographies to the project, although most were more contemporary than "Renaissance/Enlightenment" entries (31 of the former to 5 of the latter; interestingly enough, he didn't write the account of Maestlin; however, its author paid him bibliographical tribute). He reprised this task for the expanded second edition of BEA, which is expected out this summer (Hockey *et al.* 2014). Those of us whose contributions fell under Jarrell's oversight were grateful that he felt no need to impose a stamp of authority when none was needed—he was more of an Arago than a Le Verrier as editor, if one may be permitted the phrase (Lequeux 2008; Lequeux 2009).⁴

A New World

It cannot be said that the Canadian astronomical past was exhaustively chronicled by the time Jarrell was undergoing his scholarly formation, knee-deep in graduate work on the old-world achievements of Samuel de Champlain's contemporary, Michael Maestlin—far from it. There were few serious researchers who concerned themselves with the astronomical past of Jarrell's adopted country, virtually no research projects to gather, preserve, or analyze that heritage, and consequently, few publications of any real significance, particularly when compared to the state of things in other countries with traditions of front-line astronomical endeavour.⁵ This fact was all the more curious given Canada's high standing based on the relative quality and quantity of its advancing state-of-the-art astronomical research since the rise of the DAO in 1918

(at present, the evidence for this is quantitative for the period after the mid-1990s, and qualitative for the preceding period; Pudritz *et al.* 1999, 42-43; LRP2010 Crabtree; Pritchett *et al.* 2011, 22-23. Crabtree is currently extending the quantitative analysis to earlier periods).

Prior to attracting wider scholarly notice, uncultivated and latent fields are not as visible in the historical landscape as they appear in the cold light of hindsight. Jarrell made the most of finding himself before such an undeveloped vista, to produce what may prove to be his most significant body of work in astronomical history and heritage. His writings on Canadian astronomy can be considered under two thematic headings: institutions and disciplines. He tended not to structure studies around individual astronomers' biographies, although he made use of biographical data in recounting the origin and course of institutions and disciplines where relevant.⁶

Early on, Jarrell produced a two-part survey of "Astronomical Archives in Canada" (1975a; 1977a), a necessary prolegomenon to writing a history of Canadian astronomy. Many of his subsequent papers on Canadian astronomy—the fruit of work in those very archives—were first statements of inquiries, queries, and conclusions later handled in *The Cold Light of Dawn*. These include articles on the origins of the Dominion Observatory (1975c), the commencement of Canadian astrophysics at the hands of J.S. Plaskett and collaborators at the Dominion Observatory (1977b), and the reception of Einstein's theory of relativity in Canada (1979; Crelinsten (2006), an excellent monograph, confirms some of Jarrell's conclusions).

It has already been remarked that the appearance of Jarrell's *The Cold Light of Dawn: A History of Canadian Astronomy* (1988) was a landmark event in the field. It was a larger and more ambitious survey than anything that had been attempted hitherto, and has not been subsequently superseded. He succeeded in providing Canada with a workable narrative of its astronomy from what he took to be the earliest colonial period (Cabot/Cartier in 1497/1534) to the discovery of SN 1987a. This was a major accomplishment. In common with most other pioneering efforts, there were errors of commission and omission, which Jarrell readily acknowledged—indeed, some of his significant later work was filling a few of the gaps he had left in the 1988 edifice, so to speak. The reviews were positive; Don Osterbrock, the former Director of Lick, remarked (1988) in *Science* that:

The book is well written. There are a few minor errors of fact. . . . His description of J.S. Plaskett and J.A. Pearce's observational confirmation of the picture of differential galactic rotation, one of the great triumphs of Canadian astronomy, is particularly clear and vivid. . . . Overall it is a good book. . . . The Cold Light of Dawn should be read by Canadian scientists and historians of science, and by everyone with an interest in the history of science in Canada.

David DeVorkin, now the senior curator of the history of astronomy and space sciences at the Smithsonian National Air and Space Museum, in a review (1990) in *JRASC* noted:

Any attempt at a disciplinary history of a nation's scientific heritage is, at the very least, demanding and fraught with potential hazards and pitfalls. It is only too easy to fall into the trap of chronicling the achievements of individuals and institutions...without adequate reflection and analysis. Too much history is written this way...Very happily, Richard Jarrell's effort suffers from none of these negative characteristics and is replete with those that mark it as a fine work, establishing for the first time not only a broad-brush sense of Canadian astronomy, but a firm stage from which further research will no doubt build.

And Alan Batten (1990) in the *Journal for the History of Astronomy* observed:

Most Canadian observational astronomers have seen the light of rather more cold dawns than they care to count, and the title of this first general history of Canadian astronomy to be published will immediately, if somewhat paradoxically, make them warm to the theme...Disagreements about how to relate recent events are inevitable, but outright errors are few and none that I noticed is important...I consider myself reasonably well informed on the history of Canadian astronomy, but I learned new things from this book and came to look at others in a new light. This book...will be essential reading for those who wish to pursue the subject further.

Jarrell's post-*Cold Light* publications amply demonstrated that his interest in the broad and narrow subjects of his monograph didn't wane upon its appearance and reception.⁷ He continued to write about the triumvirate of major Canadian installations culturally ancestral to the CFHT—the DO, DAO, and the DDO (1989a; 1991b; 1993; 1996; 1997a; 1999b; 2009b; Langford 1997, 189-190, 192-193). Certain sub-disciplines of Canadian astronomy attracted his particular attention after *Cold Light*; meteoritics and radio astronomy.

In his work on Canadian meteoritical science (2009a), Jarrell proposed a two-part division of meteoritics, with activity in the “first phase” (1933-1990) dominated by government scientists led by Peter Millman and associates, and a “second phase” (1990-) in which leadership passed to university-based scientists. He was led to posit the surprising conclusion that substantial lines of academic filiation, project continuity, and common goals between the two phases were notably absent, or if present, were tepidly weak. Given that more work is needed to evaluate the utility and indeed validity of his proposed model, it is unfortunate that he only managed to deal with the “first phase” at any length in print.

Radio astronomy had exercised a fascination on Jarrell for years, and he increasingly explored aspects of the topic in

presentations and articles working up to his next monograph (e.g. 1991a; 1997b), which was to be a book-length survey of the history of radio astronomy in Canada. This topic is prime unmapped territory for a survey, aside from work done chiefly by Art Covington (e.g. 1975; 1984; 1988), A.J. Butrica (1996), and Woody Sullivan (2009). It is salutary to realize that Jarrell's book would have been the first monograph devoted to the history of any branch of Canadian astronomy. We don't make it easy for the public to know us; the historical record of astronomy in Canada remains seriously under-reported and furtive.

One beneficial result of Jarrell's research into the history of our radio astronomy was his work in gathering the oral histories of radio astronomers. His audio recordings provided the impetus for what became the CASCA Heritage Committee's video interview project, which was successfully developed thanks to the work of Randall Brooks and Paul Feldman, and latterly Elizabeth Griffin (Cassiopeia).⁸ This important ongoing project owes much to Jarrell's example and initiative.

The Universe Beyond Canada

Jarrell's interests in the astronomical history and heritage of the modern period extended beyond the borders of Canada. He well realized that an effective “national” history of astronomy is adrift in its own peculiar space if it's not anchored to its international context.

His contribution to the American Astronomical Society's Historical Astronomy Division (HAD) centennial project, *The American Astronomical Society's First Century*, was an ample paper on the Canadian members of the AAS (1999a). Amusingly enough, one reviewer of the volume (the late Peter Hingley) remarked that the title Jarrell chose for his contribution, “Honorary American Astronomers: Canada and the American Astronomical Society,” would set Canadian teeth on edge!

Not surprisingly, interest in radio astronomy engendered several presentations in this area. In “Radio Astronomy's Debut at the American Astronomical Society” (1999c), Jarrell maintained that a Canadian *équipe* gave the first such paper in 1947, and the high point of radio astronomy at the AAS in that pioneer phase was the 1949 meeting hosted by the Dominion Observatory, which featured visits to the Canadian radio astronomy facilities in the Nation's capital, and among other papers, a meteoritics session that included a report by McKinley on some of his radio observations. The formal representation of radio astronomy at AAS meetings then dwindled on the vine for the better part of a decade. This may have had something to do with the standing of the radio astronomy community among astronomers, something he explored in his next paper (2005).

Canadian involvement in the 1910 meetings of the International Union for Cooperation in Solar Research (Hale's child and predecessor of the IAU) and the Astronomical and Astrophysical Society of America (now the AAS) was also examined in print (2010). Jarrell took the opportunity to outline the role (not negligible) played by a young, ambitious, and capable J.S. Plaskett in gaining berths on international committees furthering radial-velocity measurements and concurrently advancing his career and the science. He also touched on the role of Plaskett's colleagues and protégés and the exemplary role of the DAO's 72-inch telescope in spawning progeny at home and abroad (this last was also dealt with in a paper given at the 189th AAS meeting in Toronto; Jarrell 1996).

As Willy Hartner before him, Jarrell was also concerned with the human values of the scientific enterprise. At a symposium held at Carleton University to celebrate the centenary of the incorporation of the RASC, he delivered "The Value of Astronomy for a Civilized Society"—certainly the best title among his papers, and one of his most wittily written pieces (1990). It is also one of his most serious. At one point, he asks:

Let us suppose that a future finance minister, in search of profound budget cuts... discovers astronomy in his supply bill. What would we say, if pressed to justify this support for astronomy?... Government scientific institutions were created with the practical payoff in mind; after all, our premier research organization, the National Research Council, was established to coordinate and encourage industrial research, not to undertake fundamental studies of nature... (317).

He proceeds to speculate on what would happen if a government so minded attempted to re-engineer the Herzberg Institute into a for-profit enterprise. With the changed conditions that nearly a quarter of a century brings, his words have a prophetic chill to them.

What answer, then? Jarrell quotes someone who was eminently successful in procuring funding for a non-applied, pure-research, big-science installation:

It is in such additions to the cause of pure scientific research that the real progress of a country may be truly judged and if, as has been often said, the degree of civilization of a nation is measured by its support for astronomy, Canada takes a high rank and all Canadians should be proud of the position their country has taken and now holds in astronomical research (321).

That man was John Stanley Plaskett, and the observatory was the DAO, but Plaskett wrote at what seems a time of myth, when cabinets supported such expenditures for reasons of national prestige, a time when opposition benches wondered why a bigger telescope wasn't commissioned for

the predecessor DO. The response to the hypothetical finance minister that Jarrell advances is that astronomy as a pure research science reflects:

...the noblest intellectual, creative and emotional aspects of our species... We know, although perhaps we have not articulated this knowledge, that astronomy is important to a civilized people. If astronomy disappeared as a professional and amateur activity in Canada, we know that civilization as we know it would also have ceased to exist (319-323).

It is a loss that we can no longer ask Jarrell what we might do if such an answer could no longer carry the day.

Legacy

Jarrell's legacy lies in enabling us to know significantly more about our astronomical heritage through his publications, through his example of teaching, and through his service to the scholarly community. If he had done nothing else, *Cold Light* and the genesis of CASCA's ongoing video-interview program would be a fully sufficient legacy. As a member

Continued on page 162

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of the CASCA Heritage Committee (he was the longest-serving chair; *Cassiopeia*), the AAS HAD (including a term on its executive committee), and the Toronto Centre of the RASC, he contributed in various ways: organizational skill to the first two, and the reporting of research to all. Jarrell had many projects in course. He was involved in the preliminary stages of covering the Canadian portion of the HAD's Astronomy Genealogy Project; fortunately HAD member Peter Broughton is taking up where Jarrell left off. What of his *Nachlass*? It is to be hoped that the major works on which he had progressed will find those to carry them forward, particularly his monograph on the history of radio astronomy in Canada.

If astronomy has value for a society, then its history matters. Jarrell's historical work was nothing if not civilized.

Acknowledgements

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www.kcvs.ca/martin/astro/ecass/issues/2014-ve/brief/griffin/jarrell.pdf

(accessed 2014 May 25)

CSTHA | AHSTC, In Memory of a Discipline Builder: Richard Adrian Jarrell (1946-2013), Y. Gingras

<http://cstha-ahstc.ca/2014/01/16/in-memory-of-a-discipline-builder-richard-adrian-jarrell-1946-2013/>

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www.aip.org/history/nbl/oralhistory.html

(accessed 2014 May 26)

Endnotes

- 1 This memoir is a cooperative project of the CASCA Heritage Committee and the RASC History Committee.
- 2 This memoir is chiefly concerned with Jarrell's contributions to the history of astronomy. His work on the history of science and technology—perhaps one should say *histories* of science and technology—touched many areas other than astronomy. For a sympathetic account of his work in other areas see CSTHA | AHSTC.
- 3 I wish to thank Dr. David Pantalony, Curator, Physical Sciences and Medicine, Canada Science and Technology Museum, for pointing out Abrams's significance for Jarrell; email from D. Pantalony to R.A. Rosenfeld, 2014 June 3. Dr. Pantalony also remarked that "Rich was a key influence on the development of research and collecting policy at my museum. In the early days of the history of science in Canada, he was one of the few scholars who took Canadian history of science seriously. He was therefore a leading inspiration in the development of our Collection Development Strategy."
- 4 Other astronomy and astrophysics encyclopedias that Jarrell contributed to are Langford 1997 (see note 7 infra), and Murdin 2001, with articles on "Calendar in the Middle East and Europe," "Distances (from Antiquity to 1900)" written with Michael Hoskin, and "The Telescope (to 1950)."
- 5 Helen Hogg, Allie Vibert Douglas, Art Covington, and Ed Kennedy, figures of an older generation, started publishing on topics in the history of Canadian astronomy decades before Rich Jarrell became active, although their productive careers overlapped. None had the advantage of Jarrell's training in historical sciences. When writing of Canada's astronomical past, Ed Kennedy may have excelled Helen Hogg as to quantity, but certainly not as regards quality. Several of the offerings in the RASC's contribution to Canada's centenary, *Astronomy in Canada: Yesterday, Today and Tomorrow*, edited by Ruth Northcott (1968), include some history. Jack Heard's reminiscences originally published in the *DDO Doings* (eventually collected and republished by Don Fernie in 1979) were by their very nature the stuff of history. Don Fernie did not hesitate to treat Canadian subjects in his popular historical expositions. Alan H. Batten, Martin Beech, Roy Bishop, Randall Brooks, Peter Broughton, and Howard Plotkin began producing work of lasting value a little after Jarrell started. Throughout the years, JRASC has featured a smattering of papers of variable quality by others on aspects of Canada's astronomical history—the good, the bad, and the ugly. And so it goes.
- 6 Exceptions are his doctoral thesis, and biographical entries for reference works—he latter dictated by genre.
- 7 He published another, briefer survey in Langford 1997, 110-114, his most substantial contribution to that work.
- 8 Email from R. Brooks to R.A. Rosenfeld, 2014 May 24. Interestingly enough, Dr. Brooks notes that the American Institute of Physics's Oral History Interviews program (Niels Bohr Library and Archives) was not in the first place the inspiration and model for the CASCA video interview project.

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