Editorial

Variable Stars: The View from Up Here

John R. Percy
Editor-in-Chief, *Journal of the AAVSO*

Department of Astronomy and Astrophysics, and Dunlap Institute for Astronomy and Astrophysics, University of Toronto, 50 St. George Street, Toronto, ON M5S 3H4, Canada; john.percy@utoronto.ca

Received November 16, 2018

Last year (2017), Canada celebrated its 150th birthday. This year (2018), the Royal Astronomical Society of Canada (RASC) does likewise. In recent *AAVSO Newsletters*, I've written short articles about both Canadian astronomy (April 2017) and about the RASC (January 2018). In this article, I will complete the trilogy with a brief overview of variable star astronomy in Canada. I'm only skimming the surface; there are many more people and achievements which deserve mentioning.

This article is also appropriate because, on June 13–16, 2019, the AAVSO Spring Meeting will be held in Toronto, jointly with the RASC annual General Assembly. AAVSO and RASC previously met together in 1940, 1957, 1961, 1965, 1974, 1983, 1999, and 2007, so this joint meeting is certainly due. It was at the 1974 joint meeting in Winnipeg that I first met former AAVSO Director Janet Mattei, and we soon became collaborators and good friends.

RASC is exemplary in its balance between local and national activities, notably its national publications. The *Journal of the RASC* (*JRASC*) was the "voice" of the AAVSO for decades: in addition to publishing general notes on variable star astronomy for over a century, *JRASC* published bi-monthly "Variable Star Notes" from AAVSO Directors Margaret Mayall and Janet Mattei from 1952 to 1981, and reported on AAVSO meetings from 1937 to 1946 and from 1952 to 1966. That's one of the ways that I first learned about the AAVSO!

RASC's annual *Observers Handbook* has always included several pages on variable stars and variable star observing, contributed by AAVSO. It includes basic information on variable stars, beginners' charts, predictions for periodic variables, and short essays on variables of special interest (for 2019, it's Nova Circini 2018). The RASC website also has useful information for potential variable star observers: www.rasc.ca/vs-overview We do not have a "variable star section"; we encourage our variable star observers to contribute through the AAVSO.

Amateur Variable Star Astronomy

We must surely begin with the enigmatic Joseph Miller Barr (1856–1911), from St. Catherines, Ontario (Percy 2015). He published papers on variable and binary stars in journals including the *Astrophysical Journal*, and has an astronomical "effect" named after him (the "Barr effect" is an apparent non-random distribution in the orientation of spectroscopic binary star orbits, probably caused by the distortion of spectral lines by gas flows in the system). But why did he never ever appear at any astronomical meeting? Was he disabled? Female? Or just reclusive? Bert Petrie was an early AAVSO observer (observer code PER) when he was an undergraduate at the University of British Columbia, using a telescope loaned by AAVSO. He published "Variable Star Observing for Amateurs" at the age of 20 (Petrie 1926), and made 137 visual observations before going on to become one of Canada's most eminent professional astronomers.

David Rosebrugh was born in Canada, but moved to the US, and became an AAVSO "star": a prolific observer, author, Secretary (1937–1945), and President (1948–1949), but remained a lifelong member of RASC.

In mid-century, Montreal became a hotbed of observational activity, including variable star observing, led especially by Isabel Williamson. This produced three AAVSO presidents: Frank de Kinder (1967–1969), Charles Good (1971–1973), and George Fortier (1975–1977). It also produced David Levy, one of the best-known amateur astronomers in the world.

Across Canada, visual variable star observers have racked up significant totals: Warren Morrison (197,712), Steven Sharpe (117,139), followed by Miroslav Komorous, Patrick Abbott, Richard Huziak, Christopher Spratt, Daniel Taylor, Patrick McDonald, Bernard Bois, and Raymond Thompson. Ray Thompson went on to become Canada's leading PEP observer with 8,231 observations; he ranks third among individual observers, all-time, world-wide. George Fortier was a pioneer in this field. Steven Sharpe is also our leading DSLR observer, with 9,533 observations. Vance Petriew and Richard Huziak have taken advantage of dark Saskatchewan skies to amass 311,973 and 144,378 CCD observations, respectively. Michael Cook, Walter MacDonald, Damien Lemay, and David Lane round out the list of those who have made over 10,000 CCD observations. Warren Morrison was also discoverer of Nova Cyg 1978, and the 1985 outburst of the recurrent nova RS Oph. Several Canadian amateurs have been involved in recent supernova discovery projects, including 10-year-olds Kathryn and Nathan Gray (with much attention from the media!). Paul Boltwood was deservedly known for his significant contributions to both hardware and software, and his application of these to photometry of active galactic nuclei. On the solar side: current AAVSO sunspot group leader Kim Hay has made over 2,500 solar observations.

Professional Variable Star Astronomy

Canada has produced its share of professional variable star astronomers, despite being climatically underprivileged. Most notable is Helen Sawyer Hogg. She was born and educated in the US, but spent most of her career (1935–1993) at the University of Toronto. She was a pioneer woman in the physical sciences, an internationally-recognized researcher on variable stars in globular clusters, and a weekly columnist on astronomy in the *Toronto Star* (Canada's largest-circulation newspaper) for over 30 years. She served as President of the AAVSO (1939–1941), and of the RASC (1957–1959), and was founding President of the Canadian Astronomical Society, our professional organization, in 1971–1972. In 1976, she was appointed Companion of the Order of Canada, the highest rank in the Order—our equivalent to knighthood.

Equally eminent, though not active in the AAVSO or RASC is Sidney van den Bergh, honoured for his research on stars and galaxies, including supernovae, Cepheids, the period-luminosity (Leavitt) relation, and the extragalactic distance scale.

My colleague Don Fernie served as President of RASC (1974–1976), as well as President of the International Astronomical Union's (IAU) Commission on Variable Stars. He was a photometrist who published widely on Cepheids and other pulsating stars, and also on the history of astronomy. In the 1960s and 1970s, he and his colleagues (including me) took advantage of the long-term availability of the David Dunlap Observatory's spectroscopic and photometric facilities to supervise a series of landmark doctoral thesis projects on the long-term behavior of variable stars: Mira stars (Tom Barnes, Richard Crowe, Nancy Remage Evans), RR Lyrae stars (Christine Coutts Clement), Classical Cepheids (Nancy Remage Evans, Robert Gauthier), Population II Cepheids (Serge Demers), RV Tauri stars (David DuPuy), other yellow supergiants (Armando Arellano), RCB stars (Vicki Watt), RS CVn stars (Dorothy Fraquelli, Bill Herbst), other eclipsing binaries (Paul Hendry). There were other variable star theses, based on purely spectroscopic observations of, for example, binary and peculiar stars, or obtained with other facilities such as the University of Toronto Southern Observatory in Chile; and, although Toronto has been Canada's most prolific "variable star factory," other universities across the country have contributed, also.

Jaymie Matthews was the public "face" of Canada's MOST (Microvariability and Oscillations of STars) variable star satellite, though Slavek Rucinski was the "brains" behind MOST and its successor, the BRITE constellation of variable star nanosatellites. Jaymie is currently President of the IAU Commission on Pulsating Stars.

And let's not forget Ian Shelton, the primary discoverer of Supernova 1987A, Peter Stetson who developed DAOPHOT—one of the most useful tools for CCD photometry of variable stars—and Arthur Covington, who pioneered the radio study of variable solar activity, starting after WWII. Peter Millman, a world expert on meteors, published several papers on variable stars, served on AAVSO Council from 1947 to 1949 and from 1958 to 1960, and was a strong supporter of "citizen science." Doug Welch is an example of a professional who began as a keen amateur. He served three terms on AAVSO Council, was an advisor on several AAVSO projects, and to the short-period pulsator section, and has contributed to many areas of variable star research, including Cepheids, RR Lyrae stars, RCB stars, supernovae and their light echoes. He is currently a Dean and Vice-Provost at McMaster University.

There are also expatriate Canadians such as Wendy Freedman, co-recipient of the Gruber Cosmology Prize for her work in using HST and Cepheids to establish the extragalactic distance scale, and the age of the universe; and David Charbonneau and Sara Seager, two of the leaders in studying the nature and properties of exoplanets, including through their transits. In Canada, interest in variable stars—including exotic kinds—continues, across the country. My colleagues are leaders in the study of things like supernovae, pulsars, X-ray bursters, and the latest mystery, fast radio bursts—as well as a few of us who continue to study less-exotic types of variables. And our amateur observers are as busy and productive as ever!

Acknowledgements

I thank Elizabeth Waagen for providing up-to-date statistics on Canadian observers' totals, and Elizabeth and Mike Saladyga for reading a draft version of this editorial.

References

Percy, J. R. 2015, *J. Roy. Astron. Soc. Canada*, **109**, 270.
Petrie, R. M. 1926, *J. Roy. Astron. Soc. Canada*, **20**, 42.

John Percy is a variable star astronomer who has served as President (1989–1991) of the AAVSO, and President (1978–1980) and Honorary President (2013–2018) of the RASC. He has received both the Merit Award and the William Tyler Olcott Award from the AAVSO.