



episode 2 (2018 February) *C.A. Chant—communicating astronomy*

Heather: Hello everyone! Welcome to the second episode of the RASC 150 History Podcast, our series venturing into the known and unknown of the RASC's past. My name is Heather Laird, I am a Director of The Royal Astronomical Society of Canada, and my co-host is the RASC Archivist, Randall Rosenfeld. Ah, I see he is in need of some assistance in extricating himself from under a pile of RASC arcana [*sound of a monumental pile of books and papers collapsing, discommoding several annoyed colonies of dust bunnies*]. There we go... say hello, Randall!

Randall: [*some mumbled greeting, or other*]

Heather: Our first podcast was on the mid-Victorian beginnings of what in time became the RASC, and the work of our eight founders. For this second podcast, we focus on one person, Clarence Augustus Chant, who entered the life of the Society some two decades after the events recounted in the first episode. Chant was one of the significant shapers of the RASC, and, of astronomy in Canada. We survey some of his achievements and legacy, the positive and the not so positive, with an emphasis on Chant and the RASC, and we explore how he went about communicating astronomy. **Footnote warning!** The modern science of astronomy abounds with acronyms. The practice of communicating science to the public is now usually referred to as "Education and Public Outreach", which often appears as the acronym "EPO". Acronyms are hard to resist, aren't they, Randall?

Randall: Reviewing Chant's practice of EPO affords us an opportunity to glance at the difficulties historians face in trying to understand a person in his place and time, when time has passed, the place has altered, and the person is no more. How do we go about experiencing someone's effectiveness as an astronomy popularizer, when all we have are the incomplete static remains of their dynamic presentations? We'll return to this problem near the end of the podcast.

Heather: In discussing Chant, an obvious place to start is with the public statements of others about his place in Canadian astronomy. Helen Hogg's obituary for Chant published in *Science* in 1957, is titled "C.A. Chant, Father of Canadian Astronomy". In it, she quotes from a letter she received from Harlow Shapley, then Director of the Harvard College Observatory, who wrote <quote>"No one can so rightly be adjudged the father of his country's astronomy and astronomers as Dr. Chant"<close quote>. Helen Hogg's slightly hyperbolic obituary is the first instance in print we could find of Chant being called the "father of Canadian astronomy". It's striking that six decades later the ASTROLab du parc national du Mont-Mégantic's web resource *Canada under the stars* uses nearly the same title for its entry: "Clarence Augustus Chant (1865-1956): The Father of Canadian astronomy".

Randall: Not surprisingly, or perhaps fittingly, the honorific is used to describe Chant in several of the contributions to *Astronomy in Canada: Yesterday, Today, and Tomorrow*, a cooperative volume published by the Society in 1968 to mark both the centenary of Canada, and the centenary of the Society's roots. Ruth Northcott, a younger colleague of Chant's, stated in her piece <quote>: "*The purpose of the present article is...to do something which Dr. Chant out of modesty could not do in his own article—emphasize the different ways in which he made such a massive contribution to the Society and to astronomy in general in Canada that he earned the title "Father of Canadian Astronomy"*"<close quote>.

Heather: By 1988, when Richard Jarrell published what is now the standard history of Canadian astronomy, *The Cold Light of Dawn*, there was almost an expectation that the phrase would be used when Chant was discussed <quote>: "*While I am not enamoured of 'great man' theories of history, I am struck none-the-less with the pivotal roles played by J.S. Plaskett and by Clarence Augustus Chant, the latter of who established astronomy at the University of Toronto, and set up the David Dunlap Observatory. Chant has been called the 'father of Canadian astronomy'*"<close quote>.

Randall: The famously caustic Copernican scholar Edward Rosen even used the honorific in an entry for Chant in his *Annotated Copernicus Bibliography*—an ironic honour of sorts. I for one can't read "C.A. Chant, Father of Canadian Astronomy" without thinking of the title bestowed on some Roman emperors,

pater patriae, "father of the country". The imperial allusion, intentional or not, will seem apt in light of some of Chant's actions.

So, who was C.A. Chant?

Heather: At a quick glance, it appears that the basic facts of his life and career are easily retrieved from the public record, in contrast to those of most of the people we discussed in the last podcast. What soon becomes apparent is that, while less obscure, available accounts of Chant's life often disagree in their details.

He was born in semi-rural Ontario in 1865, to parents of English stock, and died in 1956, just before the inauguration of the space age during the International Geophysical Year. He went through an elementary education fairly typical for his time and place, and showed some proficiency for mathematics and classics. Upon graduation from high school he was accepted into the University of Toronto, but lacked the funds to attend. So he worked as a school teacher until he could afford to embark on a university education. He graduated from the university of Toronto in mathematics and physics in 1890, the year the Astronomical and Physical Society of Toronto became incorporated, but he wasn't to join the Society till several years had passed. The astronomy available at the University was minimal, and chiefly consisted of spherical trigonometry, and its applications. Upon graduation he worked in the office of the Auditor General in Ottawa. He returned several years later to his *alma mater* to teach as a fellow in physics in 1891.

Randall: He rose through the ranks of the University of Toronto, and in his early years of teaching was attracted to the fields of geometrical and physical optics. He took a leave of absence (from 1900-1901) to obtain his doctorate in physics from Harvard—a year seems a remarkably short time now! His thesis was on "An Experimental Investigation into the 'Skin' Effect in Electric Oscillators; with a Method of Determining Wave-Lengths". Weighing in at only thirty-six pages of text, it was the length of a medium-sized research paper today; how times have changed! His first remarkable achievement was convincing the University of Toronto to establish a sub-department of Astrophysics within the Department of Physics. According to some accounts this happened in 1904, while other place it a decade later; whatever the correct date, the development was a first for Canada, as was his 1907 appointment as Associate Professor of Astrophysics. An

independent Department of Astronomy was created in 1918, but it only had a single faculty member until 1925—and that faculty member was none other than C.A. Chant! It remained the sole independent department of astronomy in Canada for many years, and certainly the largest.

Heather: The importance of the creation of an undergrad program in astronomy, and a department of astronomy with professorships in the discipline, cannot be overemphasized for the development of professional astronomy in Canada. That the department in the early years was seriously understaffed, insufficiently funded, poorly equipped, and unproductive in research was beside the point. What mattered is that many of the most important figures in Canadian astronomy went through the undergrad program, starting in the 1920s. As Helen Hogg remarked in 1957 <quote>: "*Over the years, most of the Canadian astronomers, including five of the Directors of the large Canadian observatories, were numbered among his pupils*" <close quote>. The deficiencies in the Department were progressively remedied during the later 1930s, with the most intractable, namely the lack of suitable research facilities, being the last to be ameliorated. Chant managed that with the bold cooperation of Jessie Donald Dunlap, in the creation of the David Dunlap Observatory.

Randall: As for the RASC, Chant was responsible for three major developments, which still play a major role in the Society today. One was the re-launch of a periodical for the Society. There had been an annual publication consisting of research papers and reports since 1890. It had run into trouble around 1904. Chant oversaw the final issue of the old format, *The Royal Astronomical Society of Canada Transactions for 1905*, and its revamping and re-launch as the *Journal of the Royal Astronomical Society of Canada* in 1907. While it is not, and never has been one of the leading astrophysical journals, it remains the only Canadian astronomical periodical of record, and has been occasionally the vehicle for some significant work.

Chant's second lasting development benefitting the RASC was the creation of the *Observer's Handbook*. It has become the leading English language yearly ephemeris for observers, and its publication has been nearly continuous since its introduction in 1907, the same year as the *Journal*.

Heather: Chant's third major innovation was an organizational one, which shapes the Society to this day. The creation of Centres was formalized under his Presidency in 1904. Today, most Society members belong to a RASC Centre, a regional node, somewhere in the country.

On the positive side of the ledger, these are significant achievements: the founding of the first department of astronomy in a Canadian university, the training of many who went on to professional careers in astronomy, the creation of what is still the second largest aperture optical telescope ever to be erected on Canadian soil, the creation of the two longest-lived Canadian astronomical publications, and the inauguration of a lasting regional structure for the RASC. Chant, one of Don Osterbrock's "*straitlaced, hard-working perfectionists, near caricatures of Victorian, small-town Ontario Protestants*", clearly accomplished much.

Randall: People are complex, and Chant was no exception. There is another side to the ledger of his achievements. To place him in his time, to depict him fairly in the round, and to truly appreciate what he brought about, it is necessary to acknowledge the flat side of his career. Helen Hogg's obituary for him in *Science* is telling. She talks of his organizational skill, his capacity for work, his concern for his students, his general erudition, his preoccupation with education and public outreach, and his "unswerving devotion to the cause of astronomy in Canada". What's significantly missing is any mention of achievements in scientific research, either the harvesting of data produced by ordinary science, or the discoveries and paradigm shifts of extraordinary science. He was neither a significant theoretical astrophysicist, nor a meticulous observer.

Chant was certainly aware of some of his limitations. When he became Canada's first professor of astrophysics in 1907, he realized that he didn't know much about the observational side of astronomy, that is, the professional art of observing. So he created an apprenticeship opportunity for himself under the tutelage of such masters of the craft as William Wallace Campbell and Robert Grant Aitken at the Lick Observatory. It was only of a month's duration, however. Was he an apt pupil? It's hard to say, but there are indications that that month was hardly long enough.

Heather: Chant got caught up in the rather exciting efforts of the astronomical community to conduct observational tests for Einstein's general theory of relativity. Learning that Campbell and colleagues were mounting an expedition to measure the deflection of light during the total eclipse of the Sun in 1922 from Australia, he secured berths for the Canadian party with the Lick group. Chant gives the impression in his autobiography that he played a major part in designing the "Einstein camera" that he employed. He didn't. Heber Curtis of Lick did. And Robert Trumpler of the same institution took the comparison plates. The less than stellar level of expertise of most of the Canadian party under Chant was a matter of some amusement. Curtis remarked to Campbell that <quote>: "*I suppose you have your hands full advising some of the weak sisters who are going to observe the eclipse...I have sent small volumes to one or two of them as well*" <close quote>. Overlooking the sexism of the period language, the import is clear. It couldn't be assumed that Chant and colleagues were professional-level observers. Thirty-five years after the eclipse, Jack Heard in his obituary for Chant claimed that the Canadian results "obtained an early verification of the Einstein theory of gravitation through the deflection of starlight by the mass of the sun". Unfortunately, the results may not have counted for much; one contemporary remarked that <quote>: "*...the Canadian results, as published, are very discordant, and can mean anything...*" <close quote>.

Randall: Nor was Chant's judgement always of the best. It would be reassuring to think that he was as discerning of the quality of other people's observations as were George Ellery Hale, Campbell, or Edward Emerson Barnard. Such was apparently not the case. His continued support for the very flawed planetary work of Percival Lowell, a man who'd decided what he'd see on the planets before he looked into a telescope, is hard to fathom. And there is at least one case when he'd let a notably inferior work by an amateur RASC member into the *Journal*, which attacked the results of a much more capable European astronomer of international repute. If the strategy was to raise notice for the Canadian publication offshore, and obtain a publishable rejoinder from the better-known astronomer, then it worked—but at the possible cost of diminishing respect for the *Journal*.

Heather: And when Chant became the dominant personality within the RASC, he was known to circumvent the Society's standard procedures, to our occasional disadvantage. He twice alienated significant property belonging to the Society,

without going through the proper channels, or consulting with his colleagues. We lost an excellent and imposing equatorially-mounted Brashear reflector, and our copy of the 1651 two-volume first edition of the complete works of Galileo Galilei through his actions.

Randall: Well, we all have our less than stellar moments. Returning to the positive, we've not found any evidence that Chant's actions were ever motivated by jealousy, or that he got in the way of anyone, amateur or professional, who wanted to advance astronomy. Wielding all that power in the Society, and in the Canadian astronomical community, and *not* using it in a petty way speaks volumes for his character. And his EPO efforts were largely beneficial—to him, and to the community!

Heather: He made use of various media of the day, apparently with good effect. One example is the written word. In 1928 he published the first edition of *Our Wonderful Universe*, his popularization of astronomy in book form. It proved very successful. The reviewer for the *Publications of the Astronomical Society of the Pacific* noted <quote>: "Dr. C. A. Chant, Professor of Astrophysics in the University of Toronto, has given us, recently, a delightful little book on Astronomy, written in such a clear and charming style that it forms a most welcome addition to the literature of popular science...So well has the author accomplished his task that the book is to be highly recommended...as offering... a splendid introduction to the mysteries of the sky"<close quote>. It was translated into five different European languages, and appeared in several editions. In his autobiography, Chant remarked that a staff member of the United States Naval Observatory, who had responsibilities for EPO, "obtained half a dozen copies of the book at a time in order to supply them to his visitors". The book, incidentally, made Chant a considerable amount of money. And, somewhat surprisingly, a British art publisher has recently reprinted the book (unrevised!).

Randall: Chant made use of other media. *Our Wonderful Universe* grew out his design of an EPO tool relying on visual display, his commercial set of *One Hundred Astronomical Lantern Slides*, with accompanying handbook. They didn't sell as well in the States as they did here, due to their cost. Eventually, the Ontario Department of Education took over their manufacture and distribution. Chant was at the tail end of the great Georgian and Victorian tradition of scientific lecturers,

who employed various apparatus of scientific display. Glass slides were part of that tradition, and were regular aids in more formal educational settings as well.

Heather: Finally, there is the spoken word itself, one of the outstanding Victorian mediums for EPO. The best scientific lecturers in the 18th, 19th, and early 20th centuries had huge followings, and could do quite well off their earnings. Others saw scientific lecturing not as a major source of income, but as a calling, borne of their research, like Michael Faraday, or Sir Robert Ball.

Chant seems to have had a reputation as a lecturer. In the minutes of a Society meeting of 1899 November 14, it is reported that <quote>: "*It had been announced that Mr. C.A. Chant, B.A., Lecturer in Physics, would deliver a lecture on "The diffraction of light"; invitations had been issued to all friends of the Society, and a large audience was present. Mr. Chant's paper was illustrated by a very elaborate series of lantern slides, and was thoroughly appreciated. The special thanks of the Society were voted to the lecturer for the pains taken to make the subject easily understood*" <close quote>. This is education offering enlightenment, entertainment, and display.

Randall: A lecture is something which happens in real time, it is a performance with various elements in play; the choice of words, the style of delivery, the quality of the speaker's voice, the degree and kinds of interactions with the audience, the decor and sound of the auditorium, the visual appeal of the slides or other apparatus, the lecturer's sense of timing, and the coordination of the various elements. Even a high definition audio or visual recording does not reproduce the immediacy and fullness of experience of being physically present for a lecture. In Chant's case, we don't have high-definition recordings of his performances. How then, can we recapture what he was really like as a live communicator of astronomy? Is there, in fact, some way this could be imaginatively done? Even with one of his texts in the hands of a good and intelligent actor, speaking in a surviving space Chant could have used, would the experience be of more than antiquarian value? We leave these questions to you to decide.

Heather: Thanks to everyone who tuned in, and we hope you enjoyed this podcast. If you have any questions, please visit www.rasc.ca/rasc-2018-podcasts for contact details.

Our next podcast is scheduled for a month from now, and is on the first RASC star parties, and the rise of that activity in the Society.

Our sound engineer is Chelsea Body, and our theme music is by Eric Svilpis.