



The Royal Astronomical Society of Canada NATIONAL NEWSLETTER

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COMMEMORATIVE COIN AND STAMPS ARE ISSUED FOR THE SOCIETY'S 150TH ANNIVERSARY

The 150th anniversary of The Royal Astronomical Society of Canada has been recognized by two major Canadian institutions.

On June 26, the Royal Canadian Mint unveiled a unique collectible silver \$20 coin at a special ceremony in Toronto. The coin's design is based on the Society's 150th anniversary logo. Mounted on the coin is a fragment of an actual meteorite.

"It is only fitting that the RASC's many scientific achievements be recognized on a vividly coloured coin, which breaks barriers of its own by featuring a shard of a real meteorite," says Sandra Hanington, president and CEO of the Royal Canadian Mint. The reverse side of the coin, designed by Canadian artist Alexandra Lefort, features a full-colour deep-space vista enhanced by engraved textural details. Prominent design elements include the Eagle Nebula and its pillars of interstellar gas and dust, which are known as the Pillars of Creation.

On June 29, at the General Assembly in Calgary, Canada Post introduced two astronomy stamps showcasing the majestic splendour of two spectacular phenomena: the Milky Way and the northern lights. Matt Quinn's stunning photo of the Milky Way was taken at Bruce Peninsula National Park, situated along southern Ontario's Niagara Escarpment. Alan Dyer captured a magnificent image of the northern lights in Churchill, Manitoba. Both photographs were taken in 2016.

—Randy Attwood, Executive Director, RASC



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CONTACT US

We invite all Centres to contribute articles about their latest activities. Have you had any public star parties, award ceremonies, special events or observatory activities? Photos are welcome. Please send articles and pictures to newsletter@rasc.ca.



Above: With a limited mintage of 5,500, the pure silver \$20 coin celebrating the 150th anniversary of The Royal Astronomical Society of Canada sold out before the end of June.

Right: A Souvenir Sheet

Official First Day Cover of these commemorative stamps can be purchased on the Canada Post website for \$2.70: www.canadapost.ca



COLOR INDICATORS: Design: Perseid Design; Stamps / Timbres: Milky Way / Voie lactée - Matt Quinn; Northern Lights / aurores boréales - Alan Dyer; Illustration: Irene Lasch

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AN RASC 150 OBSERVING PROJECT

VIEWING THE MOON ACROSS TIME

Observing is basic to the core of the RASC, as it has been from the beginning. We continue to be a Society of observers—it is even possible to view astrophotography within the spectrum of observing. The astronomically famous often report that their interest was first kindled through witnessing a particular celestial phenomenon. What about our founders? We are fortunate to have the graphic records of some of their observations from our first year. Among the activities included in the blueprint for their meetings was “viewing objects etc.”

What would it have been like to observe 150 years ago? If we could be transported back to 1868-69 to observe with them, we would probably note both familiar and unfamiliar aspects to their methods of viewing the heavens. Standing under the vault of the sky alongside Andrew Elvins and his colleagues would be a memorable way to mark our sesquicentennial. Could we learn anything of interest or value from taking our turn at the eyepiece with them?

There is a creative and disciplined way to come as close as possible to observing with our astronomical forerunners of 150 years ago. And that is what the RASC observing project Viewing the Moon Across Time is all about. An experimental archaeology of observing can bring us as close as we can hope to get to the observing experience of our Victorian predecessors.

An experimental archaeology of observing is a sort of experiment or run of experiments of any level of predetermined formality to restage: (i) a historic observation or type of observation or (ii) an observing technique(s) or (iii) observing with a type of apparatus—it may involve some combination of i-iii. Examples of possible research questions are: (1) Can the textual and graphic depictions of lunar landscapes from the 1860s be elucidated by using the same types of equipment used then, under similar observing circumstances? (2) Can the recording techniques used in the 1860s be adopted or adapted for present-day use? (3) How much do theoretical explanations, prevalent lunar iconographies and the expectations built on them affect what is seen at the eyepiece? The final question, involving elements of a cognitive archaeology of observing, may be among the most interesting to explore.

The resource page for this RASC 150 observing project, which can be found at www.rasc.ca/viewing-moon-across-time, offers guidance on how to design an experiment and provides examples, explanations, case studies from the literature of experimental and cognitive archaeology, sources for choosing appropriate observing tools, descriptions of techniques, observing agendas and the selenographic

TELESCOPIC APPEARANCE OF THE MOON.



Clockwise from top: Moon, by John Emslie(?), from *Astronomical and Geographical Diagrams* (London: J. Reynolds, 1849); reproduced courtesy of *Specula astronomica minima*. Moon, from A. Keith Johnston's *School Atlas of Astronomy* (Edinburgh and London: William Blackwood and Sons, 1856); reproduced courtesy of *Specula astronomica minima*. Andrew Elvins and his refractor, circa 1901, Lambton Mills, Ontario; reproduced courtesy of the RASC Archives.

iconography of the past. It also explains how restaging past observations may lead to recovered or even new science.

While actual time travel back to 1868 to have tea with Andrew Elvins and his colleagues and discuss astronomy sadly remains out of reach in this year of our sesquicentennial, the next best thing—trying to walk in the footsteps of our predecessors as observers—is possible. Why not give it a try?

—R.A. Rosenfeld, RASC Archivist



IS THERE LIFE ON OTHER WORLDS?

At the end of my public lectures, one of the most frequently asked questions is, “Do you believe there is life elsewhere in the universe?” Well, for me as a scientist, “belief” depends on evidence.

▶ There are tens of billions of galaxies in the visible universe, each with hundreds of billions of stars.

▶ Observations pioneered by Canadian astronomers and continued by spacecraft such as the Kepler space telescope have shown that there are planets (called exoplanets) and exoplanetary systems around a large fraction of the stars in our galaxy.

Some exoplanets are Earth-like in size and temperature and orbit long-lived stars, including a planet around Proxima Centauri, our Sun's nearest neighbour.

▶ These planetary systems are governed by the same laws of physics and chemistry as ours is, and most of them are made of the same mix of chemical elements as our solar system.

▶ As for life: The complex molecules of life, such as amino acids, form naturally and easily. This was shown by a famous experiment carried out by Stanley Miller and Harold Urey

in 1952 and was confirmed by the discovery of these same complex molecules in carbonaceous chondrite meteorites, such as the one that fell on the frozen surface of Tagish Lake, British Columbia, in January 2000, and by the discovery of complex molecules in interstellar space by radio astronomers, including Canadian astronomers collaborating with Canadian Nobel Laureate Gerhard Herzberg.

▶ Paleontologists can trace the development of life on Earth through fossils, from recent ones back to the oldest, simplest organisms—some of them in Canadian rocks over 3.5 billion years old.

OBSERVING NEWS

RASC Observing Certificates Earned in April–May 2018

The RASC has dozens of active members who have distinguished themselves by earning observing certificates. See www.rasc.ca/certificate-programs for more details.

Explore the Universe:

Christopher Cottle (Calgary) and Judy Black (Halifax)

Explore the Moon—Binocular:

Victoria Kayser (unattached, Toronto)

Explore the Moon—Telescope:

Charles Ennis (Sunshine Coast)

Messier Catalogue: Rod DeVries

(Calgary, Cypress County, Alberta)

Follow us on Twitter

Using the @RASC account, the RASC Observing Committee now announces observing certificates as they are earned, as well as noteworthy observing opportunities, with the hashtag #RASCobserving.

Note on Explore the Universe (EtU) Observing Program

In early 2018, the EtU observing-program document (www.rasc.ca/explore-universe) was updated and reformatted (version 6). Observers are encouraged to download this latest version. There were a few corrections made, and the text has been clarified in many places (especially double stars), but the overall objectives remain the same. Soon, we hope to be able to provide a revision to the French-language version, the first such revision since the program's inception. The Observing Committee continually revises all the observing-program documents in response to information provided by observers, so please do not hesitate to contact us at observing@rasc.ca.

—Dave Chapman, Chair, RASC



Unfortunately, the evidence is not complete. No life or signs of life have been found beyond Earth.

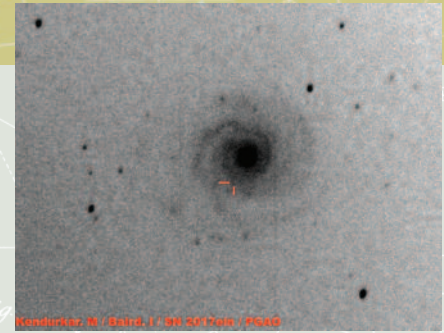
Scientists cannot presently say, either from experiment or from theory, how complex molecules become simple, self-reproducing “living” cells on Earth or elsewhere. Despite popular belief, there is no evidence that extraterrestrial life has visited Earth. I wish! So my answer to the question can only be “probably.”

But progress is being made. My colleagues and others are studying the atmospheres of exoplanets and may eventually find signatures of biogenic molecules such as oxygen. Landers on Mars—or eventually Jupiter's moon Europa or Saturn's Enceladus—may discover evidence for simple life. Origin-of-life studies by chemists and biologists are progressing slowly but steadily, along with molecular-biology studies of how terrestrial life evolved. SETI, the search for extraterrestrial intelligence, continues. Astronomers keep their eyes and minds open to any other clues about life in the universe. Indeed, all of astronomy contributes, either directly or indirectly, to our understanding of life in the universe. So there is much to be done by scientists of all kinds, today and tomorrow. Stay tuned!

—John Percy, University of Toronto



RASC NEWSLETTER



SUPERNOVAS FROM PRINCE GEORGE

I have been fascinated by the field of astronomy since childhood. Every night from my home, I would watch the stars. I have been educating myself about theory and observations using different telescopes since I was in my late teens. Currently, I am an international student pursuing a career in physics and astronomy, with the dream of working with the best people and equipment around the globe.

In 2014, at the age of 19, I joined an amateur astronomy club. We used to go out of the city and find dark skies to stargaze and to observe using a small 5-inch telescope. It was an amazing experience to see, for the first time, distant galaxies, stars and nebulae. The first observation we made was on December 7, 2014, when we

saw Comet C/2014 Q2 Lovejoy. After a couple of months, I started working on some international research projects and published my first paper on comets at the Physical Research Laboratory of the Indian Space Research Organisation.

Through social media, I found some astronomy projects that helped me gain more knowledge about astronomy. Finally, in July 2015, I had an excellent opportunity to participate in a worldwide observing campaign in support of the European Space Agency's Rosetta mission to Comet 67P/Churyumov-Gerasimenko.

After that exciting project, I moved to Prince George, British Columbia, to continue my studies in astrophysics. There I discovered the observatory of the RASC Prince George Centre. In 2016, I started volunteering at the observatory for the open-house events held every Friday. It's been 2½ years now, and I am working as a director at the Prince George Astronomical Observatory, conducting research in an excellent facility with excellent people.

In 2017, I started working with Robert Nelson, a PhD in physics from the University of British Columbia and a founder of the Prince George Astronomical Observatory. We share an interest in research on variable stars and eclipsing binary stars. We search for new variable stars using a technique called "data mining." In December 2017, we published our first discovery of a Delta Scuti type candidate star in the constellation Canis Minor. Robert and I are still working on the project and hope to find more variable stars in the coming years.

Top: Supernova SN2017eaw in NGC6946. Above: Supernova SN2017ein in NGC3937.

Apart from my variable-star research, I also enjoy studying supernovas and creating a map of the sky in visible wavelengths. Using the Prince George Astronomical Observatory's 0.61-metre telescope and a wide-field camera, Ian Baird and I are doing observations to produce a map of the sky from our location. We also monitor bright supernovas in the northern hemisphere. One night recently, we observed the supernovas SN2018aoq in NGC4151 and SN2017eaw in NGC6946. We were recording the supernovas' magnitudes (brightness) as well as the time in days, weeks or months. We determined that SN2017eaw, which was discovered on May 14, 2017, is fading at a rate of about 0.01 magnitude per day.

It is important for astronomers around the world to continue to monitor and collect data on supernovas so that we can develop a better understanding of our universe. For our part, we will continue to map the sky, monitor supernovas and search for new variable stars.

Clear skies!

—Malhar R. Kendurkar
Director, Prince George
Astronomical Observatory

RASC NEWS

RASC ARCHIVE OPEN HOUSE A SUCCESS!

Over 50 people attended the RASC Archive History Centre open house on Saturday, May 12. Thank you to all our members who came out to join us in the celebration.



MP James Maloney (Etobicoke-Lakeshore) addresses the visitors. Also present are RASC President Colin Haig (left) and Executive Director Randy Attwood (right).

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