

# Nova Notes

The Newsletter of the Halifax Centre of the Royal Astronomical Society of Canada



PO Box 31011, Halifax, Nova Scotia, Canada B3K 5T9 [www.halifax.rasc.ca](http://www.halifax.rasc.ca) [halifax@rasc.ca](mailto:halifax@rasc.ca)

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### From the Editor —

A new year. A new 366 days to get out under the clear skies and just enjoy this hobby. 2020 looks to be a pretty good year, too. With Venus being a highlight in the evening sky for the first of the year followed by a score of other great events that we can easily reference in *The Observer's Handbook*. We also get that extra day in 2020, thanks to the leap year!

Another thing that tends to happen in the new year are resolutions and I am not one to make them. However, instead of a resolution, like drink more water, or something similar. I'm making a list of astronomy challenges to try throughout the year.

First on my list is a continual report on Venus, to watch it change its phases and watch it fade off into twilight. Another thing on my list of challenges is to start my Messier list. I've looked at a handful of the M list objects, but it's just been for casual viewing. Now, I want to get my nose to the grindstone and start the observing certificate this year. I would also like to get cracking on *Observe the Moon*, too. Lots of goals and things to aim for thanks to membership in the RASC, such as fill out a log book and take part in the member's meeting observing challenges.

So, at the very least, I would encourage everyone who reads *Nova Notes* to at the very least to set a very easy challenge, and observe more this 2020. It's easy, fun and something we will all enjoy.

Here is to 2020 and enjoying all the clear nights it has to offer.

**Nova Notes: The Newsletter of the Halifax Centre of the RASC**

**PO Box 31011, Halifax, Nova Scotia, B3K 5T9**

**E-mail: [charleswhiteproductions@gmail.com](mailto:charleswhiteproductions@gmail.com) Newsletter Editor: Charles White**

Nova Notes is published five times a year, in February, April, June/July, September/October and December.

**The deadline for the next edition is 24 April 2020.**

The opinions expressed herein are not necessarily those of the Halifax Centre.

Articles on any aspect of astronomy and related activities will be considered for publication.

## St. Croix Observatory

Part of your membership in the Halifax RASC includes access to our observatory, located in the community of St. Croix, NS. The site has expanded over the last few years and includes a roll-off roof observatory with electrical outlets, a warm-room, and washroom facilities. We welcome you to bring your own equipment or to use the Centre's 400-mm Dobsonian telescope, 100-mm binoculars, and the recently acquired SCT and gear for astro-imaging.

Enjoy dark pristine skies far away from city lights and the company of like-minded observers searching out those faint "fuzzies" in the night. Most clear Moon-free nights, you will find our keen observers out there! Announcements of members visiting SCO are made on the Centre's Discussion List. If you are not a key holder and would like to become one or need more information, please contact the SCO Manager, John Liddard.

Meetings usually begin at 1:00 p.m. at Saint Mary's University in Room 101 of the Atrium Building (AT).

*All meeting locations and presentations subject to change*

## Meeting Dates for 2020

4 April  
2 May

### Halifax RASC Board of Directors, 2020:

Honorary President : Mary Lou Whitehorne	(Appointed)
President: Judy Black	(Elected)
Vice-President: Paul Gray	(Elected)
Secretary: Peter Hurley	(Elected)
Treasurer: Gregg Dill	(Elected)
National Council Rep: Pat Kelly	(Appointed)
Director: Pat Kelly	(Elected)
Director: Mathew Dyer	(Elected)
Director: Paul Heath	(Elected)
Director: Wayne Harasimovitch	(Elected)
Director: Tom Crosman	(Elected)
Director: David Hoskin	(Elected)
Librarian: Wayne Harasimovitch	(Appointed)
SCO Manager: John Liddard	(Appointed)
Observing Chair: Dave Chapman	(Appointed)
Outreach Chair: Paul Heath	(Appointed)
DSP Committee: Dave Chapman (interim)	(Appointed)
Nova Notes Editor : Charles White	(Appointed)

### Cover photo

M42

By Blair MacDonald

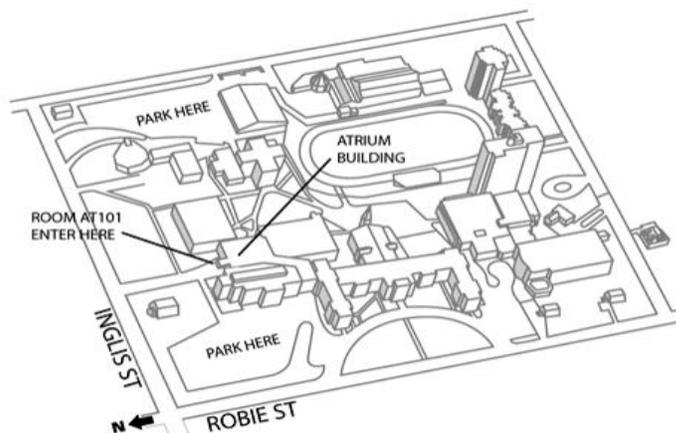
A snap of M42, the Great Orion Nebula. Be sure to check out the full version, and more great work in the Centre Showcase.

### Meeting Location:

Saint Mary's University

**Atrium Building (AT)**  
Room AT 101

The Atrium is located in front of the Patrick Power Library, between the Burke Building and Science Building.



Meetings are usually held on the first Saturday of the month, except for the months of July and August.

Board meetings begin at 10:30 a.m., usually in room AT217, and all members are welcome.

## January Members Meeting

Paul Gray, emcee and member of the Board of Directors, welcomed 40 members and 2 guests to the meeting at 1 PM. Paul Heath provided welcome packages to the guests.

Paul Heath, Outreach Chair, noted upcoming events – Saltscapes in April, International Observe the Moon in October, and the sidewalk observing session with APS (date to be determined). There is a Young Naturalist observing night on January 31; given they had about 100 attending in 2019, he requested volunteers to assist. He reminded members of outreach requests and reports, i.e., if they need assistance at events to put “Outreach Request” in the subject line or if reporting outreach events to put “Outreach Report” in the subject line of the email. Tony Schellinck announced that two of his SCANS courses would be taking field trips to York Redoubt. Depending on the number of registrants, he may require assistance last minute. Paul then read his *Food for the Soul* poem “Maritime Skies”, a light-hearted view of our often-cloudy night skies.

Blair MacDonald presented David Hoskin with the RASC Deep-Sky Astroimaging Award. David provided a brief description of the images submitted for this award shown to members. Blair noted two important facts about astroimaging:

- The first RASC member in Canada to receive an astroimaging certificate was Halifax Centre member Bruce Hamilton.
- There are only 2 RASC members in Canada to receive all 3 RASC awards (Deep-Sky, Solar System, Wide-Field) and they are both in Halifax Centre – Tony Schellinck, David Hoskin.

Dave Chapman, Observing Chair, presented the January edition of *What's Up?* The solar activity for the month was depicted in a graphic that has been made into a movie and is now on the RASC Halifax Centre YouTube site. He provided dates of the Moon phases and, despite the lack of sound, Dave was able to explain and pronounce their Mi'kmaq names. He outlined lunar observing targets in the *Explore the Universe* (ETU) observing program. The location of the planets during the month was explained and he noted that the moons of Uranus could be seen in telescopes due to the angle of Uranus.

He also provided ETU winter constellations, bright stars within these constellations, and deep-sky objects. Betelgeuse in Orion is the brightest variable star and he noted that it has dimmed from 1.4 to 1.6 in magnitude.

During his presentation, Dave challenged members to observe these in January:

- Observe the dimming (Jan 17, 8 PM – 1 AM) or brightening (Jan 22, 6 PM – 11 PM) of Algol (Beta Persei) – compare it to Rigel
- Jan 20 – Mars and Antares in close proximity
- Jan 25 – Mercury above the horizon around 5:20 PM
- Observe 3 lunar craters and 3 maria using binoculars
- Find the deep-sky object NGC 1502 in Kemble's Cascade (in Camelopardalis)

Dave Chapman, as Interim Chair of the Dark-Sky Committee, informed members that in October 2019, RASC Halifax Centre and Kejimikujik National Park and National Historic Site entered into a partnering agreement that clearly defines the relationship between the two entities in dark-sky events at the Park, such as the Dark-Sky Weekend. Dave, members of his Committee and those who conducted light audits at the Park were thanked for making this possible, a first in Canada.

Judy Black, President, wished everyone a happy new year and welcomed them to 2020 which she hoped would be an exciting one for the Centre. She reminded members of the new website and highlighted the library page that provided information on all the books. Books could be viewed online and lend requests could be made between meetings. She also noted the scrolling book covers on the upper right of the masthead. Judy introduced the newly elected and appointed members of the Board for 2020. She was excited about the relationships being built by the Centre, one with Kejimikujik as Dave had explained earlier and the other with the Discovery Centre. There is a task team meeting the Centre later this month. She repeated the reminder regarding outreach request and report emails.

She then explained how members could join the RASC online or by mail. Exciting news is that the Board is investigating the possibility of providing electricity at SCO; if any member is an electrician, their assistance in this determination would be appreciated.

Paul Gray then brought members attention to the sale of both the Explore the Universe (ETU) guide and the RASC 2020 Calendar.

Wayne Harasimovitch, Librarian, stated there were big changes to the library. Members could now request a loan online or by using the hard book in the library cart. A task team will be culling the remaining library collection in the coming month.

Paul Gray then brought members attention to the American Association of Variable Star Observers (AAVSO) variable star charts where he focused on Betelgeuse. He encouraged members to go out and view Betelgeuse and to compare it to Pollux and Aldebaran.

Before the social break with snacks provided by Pat Kelly, Paul Gray provided the month's montage of images from David Hoskin, Jerry Black, Dave Chapman, Fabian Pittman and Bruce Hamilton. The imagers in attendance gave a brief description of their photo. Judy Black then took a head count for those going to dinner.

Paul Heath explained how to engage a young audience when explaining various star sizes, their magnitudes and the constellations. Six volunteers then engaged in a constellation competition. Two teams were challenged by Paul to build a constellation using Styrofoam balls and wooden skewers and to explain the story behind it. The outcome was two new constellations – Duck with a Sailboat and the Halifax Cannon with the adjacent Cannonball Star Cluster. Fun was had by all!

Pat Kelly presented two sections of the *Observer's Handbook* regarding double stars – *Double and Multiple Stars*, and *Coloured Double Stars*. Approximately 85% of stars are found in double or multiple star systems. He explained two types of double stars – binary (i.e., gravitationally bound and revolve around a common centre of mass) and optical (visually close together but different distances from Earth). The best-known example of a visual double is Alcor-Mizar in the

Big Dipper's handle in which Mizar itself is a binary double. Double stars could also be different colours such as Cygnus' binary star Albireo (the brighter star appears yellow; the fainter star appears blue).

Some math was involved when he explained the predicted position angles and separations of binary stars. He also explained how the orientation of the stars as viewed through different types of telescopes had to be considered, and that refracting telescopes were best for viewing the Moon and stars. The tables relating to double and multiple stars and to coloured double stars were briefly explained.

He was asked if there was a RASC double star observing certificate. He stated not yet but that the RASC Observing Committee would announce it once the method of recording observations was determined.

Show-and-Tell? Two members were very excited to explain their recent acquisitions:

- Tony Schellinck sang the praises of his 10x42 Canon image-stabilized binoculars. He began observing 15 years ago with telescopes but prefers binoculars. He strongly urged members to carry binoculars with them wherever they go. His 10x42 binoculars have 6.5° FOV, L-level lenses, field flatteners and electronics; they work with and without glasses. They're easy to transport and carry, and they can be easily shared with other observers.

- David Hoskin began observing five years ago. His first Christmas present from his brother was a unit for polar alignment. He used a right-angle attachment for his camera then adapted it by using a pill bottle. This removed the need to bend low to polar align while the camera was on his equatorial mount. Second was a present to himself – an ASI 290MM mono guide camera that allowed for 170 frames per second. Third was a 1980's vintage 100 mm Schmidt-Cassegrain telescope originally built by Bausch & Lomb. It came with 18 mm and 30 mm eyepieces, was electrically driven by an AC motor, will track, has an all-metal construction, and can be used tabletop or on a mount. The original owner's manual came with an introduction from Isaac Asimov.

## **February Members Meeting**

Paul Gray, emcee and Vice-President, welcomed 35 members and 2 guests to the meeting at 1:15 PM. Paul Heath provided welcome packages to the guests.

Paul Heath, Outreach Chair, noted upcoming events – Saltscapes in April, International Observe the Moon in October, and the sidewalk observing session with APS on February 5 (weather permitting). The Young Naturalists Club (YNC) observing night on January 31 was a tremendous success with about 115 family members attending. Paul then read his *Food for the Soul* poem “Gather to the Stars” in honour of the YNC event.

Dave Chapman, Observing Chair, presented the February edition of *What's Up?* He thanked Jerry Black for posting the *What's Up?* on the Centre's website for viewing; all links in the presentation on-line will work. He then noted that with a later sunset and an earlier sunrise there is a longer period of sunlight (perfect for starting seedlings). He provided dates of the Moon phases and used the RASC videos to pronounce the Mi'kmaq names for the Snow-blinding Moon (full Moon on Feb 8/9) and the Maple Sugar Moon (New Moon on Feb 23). He outlined several observing targets in the *Explore the Universe* (ETU) observing program. Zodiacal light can be seen in a dark sky on February 28. He also provided ETU winter constellations and their bright stars, and deep-sky objects. Comet PANSTARRS C/2017 T2 will be around for a while, it seems to be stationary but, it does, in fact, move slowly, and it may brighten.

During his presentation, Dave presented a challenge to members. The person who completed 2 of the challenges by the March 7<sup>th</sup> Members' Meeting (and can prove they did so) will win a copy of the ETU Guide. Complete 3 and Dave promised there would be chocolate!

- Observe 3 lunar craters and 3 mare using binoculars
- Observe phases of Venus and Mercury
- Find Kemble's Cascade (in Camelopardalis) and its deep-Sky object NGC 1502
- Observe the dimming of the Algol (Beta Persei) (Feb 9, 6 PM – 11 PM) or its brightening (Feb 11, 8 PM – 1 AM)

Judy Black, President, welcomed members and guests to the February meeting. She introduced members of the Board before providing the Update. There are now email addresses to contact the Outreach Chair and Observing Chair as well as through the Centre (via the President) and Librarian. There is also a new Outreach section on the website in *Activities*.

She highlighted the library page and noted there are books in the archives that can still be requested. If a book is in the archives, it would have the following statement at the beginning of the description: *THIS BOOK IS LOCATED IN THE HALIFAX CENTRE ARCHIVE CABINET and may be borrowed by submitting a "Borrow Request"*. To find books in the archives, scroll down to the Library Search box and type in “archive cabinet”.

She was excited about the relationship being built with *The Discovery Centre*, something that had been attempted for several years. Two members of our Centre (Peter Hurley and Wayne Harasimovitch) will be discussing a joint venture with the Discovery Centre to be held on April 26 with the focus on the crescent Moon and Venus. Members will be kept posted.

She then gave members the head's up about Nova East 2020 being held on August 21-23, 2020 at Smiley's Provincial Park. A 7-member committee has been formed; interested members were welcomed to join. She encouraged guests to join and showed them how to do so online and via mail-in form. A reminder of the next meeting was provided (with Pat Kelly ensuring the room number was correct – thank you, dear editor!).

Paul Gray provided a slide show with several photos from members over the past month.

For the monthly presentation from the Observer's Handbook, Paul Gray presented the 3-page section about Meteors. He encouraged everyone to go out and view them. He first defined terms meteoroid, meteor, bolide (fireball) and meteorite before explaining the easy way to observe meteors:

- Lawn chair or zero gravity chair
- Blanket
- Friends (if willing to invite them)
- Watch the show!

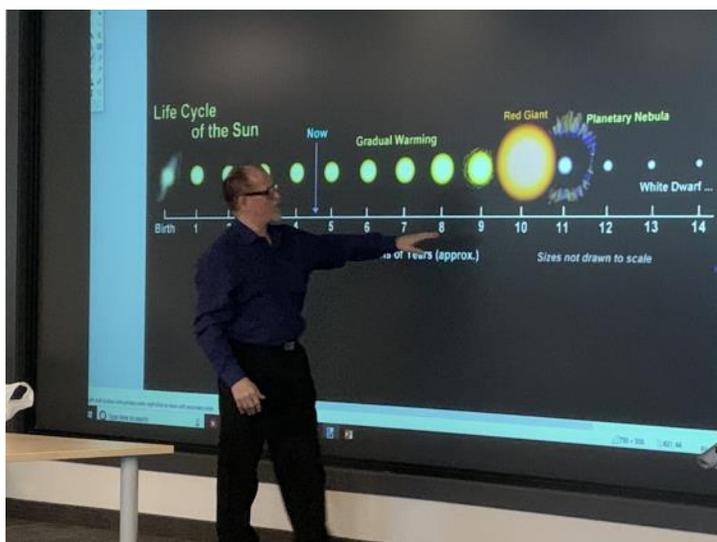
- Notebook (aka logbook) or voice recorder (with the intent to enter into logbook later)
- Coffee!! Hot drinks at the least!

He explained the two terms related to meteor showers – showers and sporadic. He noted that each shower may have a characteristic colour; for example, the Perseids tend to be yellow whereas the Quadrantids are a gold-yellow. He explained the table of meteor showers for 2020 contained in the chapter. He hopes to get a group together at SCO to view a meteor shower, perhaps on April 21-22 to view the Lyrids (near the New Moon on April 22).

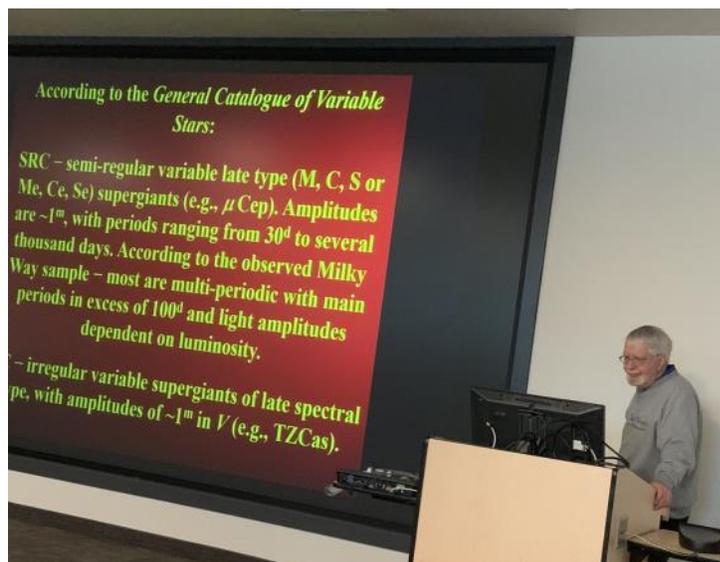
Members then broke for social time. Thanks again to Pat Kelly for providing the treats and beverages.

Paul Heath noted that one of the questions asked about the 4.5 billion-year-old Sun was when it would become a supernova. He briefly explained that because of the Sun’s composition, it would expand at around the age of 10 billion and then shrink until around 14 billion years, but it would never become a supernova. He used a string that extended from his Sun at the front of the room to the back corner, how it would lose some of its material for a period of time and then shrink to the size of a white pinhead.

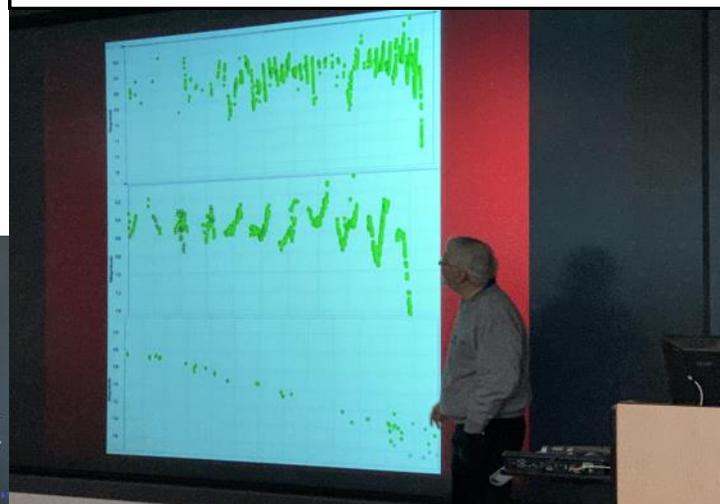
Mary Lou Whitehorne, Honorary President,



introduced our guest speaker, David Turner, who is an expert in variable stars. His presentation was entitled, *What’s Happening the Betelgeuse?* He noted he had been observing Betelgeuse for



Above: David Turner gives his presentation on Betelgeuse.  
 Below: The light curve of Betelgeuse from data that was collected by David. The recent dip is evident in the far right.  
 Left: Paul Heath gives his presentation on the Sun.



the past nine years and nothing of note had happened until this year. He presented the graph of Betelgeuse magnitudes for the past several years from the American Association of Variable Star Observers (AAVSO) that showed a fairly consistent pattern in its magnitude until it took a sharp dive this year. He then explained why it probably would not go *kaboom!* in the near future. He explained the difference between a semi-regular variable late type supergiant and an irregular variable supergiant. The nature of supergiant variable stars is still rather uncertain and yet they do pulsate.

When Betelgeuse or other red stars are low in the sky, the Earth's atmosphere affects our perception of their brightness. However, red stars vary less than blue or white stars when viewed through the atmosphere and therefore it may make more sense to compare it to another red star. The human eye is capable of estimating relative star brightness to within  $\pm 0.1$  to  $\pm 0.07$  magnitude when one views near the faint eye limit. For many bright variable stars, he discouraged the use of a telescope or binoculars and encouraged naked eye observations.

He closed by stating that in an era when long-term monitoring of bright stars is no longer done by professional astronomers, observations by "amateurs" become all the more important. He then challenged members with this question: Are you ready to contribute observations to the AAVSO international database? After a brief Q&A, members applauded David for his presentation.

## A Cloud Chamber Primer

by Roy Bishop

### 1. What is a Cloud Chamber?

A Cloud Chamber is a climate-controlled box that reveals the paths of high-speed, subatomic particles that happen to zip through its sensitive layer, somewhat like when an invisible, high-flying airplane leaves a white vapour trail along its flight path.

### 2. Why is there a Cloud Chamber in the Discovery Centre?

A Cloud Chamber provides the only opportunity to see the tracks of some of the subatomic particles flying all around us, 24/7. You cannot see, hear, smell, taste, or feel the thousands of individual subatomic particles that strike you every second, but the Cloud Chamber reveals their presence, and does so instantly. And it is a real display, *not* a simulation!

### 3. What am I seeing in the Cloud Chamber?

Lasting only a few seconds, each of the fuzzy, slowly falling, misty lines is the fleeting track of a



*Above: The trails are evidence of subatomic particles, moving through the area.*

single, high-speed, subatomic particle, revealed by a narrow cloud of droplets that form along its path.

### 4. What kinds of particles make tracks in a Cloud Chamber?

Only fast-moving particles that have an electrical charge (such as electrons, protons, alpha particles, and muons) leave tracks. They are called *subatomic* particles because they are much smaller than an atom.

### 5. What are electrons, protons, alpha particles, and muons?

Electrons and protons, together with neutrons, are the building blocks of atoms. Electrons form the bulk of an atom. The tiny, heavy centre of an atom, the atom's nucleus, is made of protons and neutrons. Neutrons do not leave tracks in a cloud chamber because neutrons are not electrically charged. An alpha particle is the nucleus of a helium atom (without the two electrons needed to complete an atom of helium). Muons are like heavy electrons, and once formed, they quickly decay into electrons.

### 6. How does a Cloud Chamber work?

The bottom of the chamber is kept very cold. Alcohol vapour in the chamber becomes supersaturated in a layer near the cold surface. When a high speed, electrically-charged, subatomic particle zips through the cloud chamber, it knocks electrons off the alcohol and air molecules along its path, leaving those molecules as electrically-charged *ions*. The ions act as condensation centres for the supersaturated alcohol vapor, resulting almost instantly in a tiny alcohol droplet forming on each ion, thereby

revealing the path followed by the high-speed particle.

### **7. What sort of tracks do particles make in the Cloud Chamber?**

Alpha particles make thick, usually straight tracks. Low-energy electrons make thin, crooked tracks. □ High-energy electrons and muons make thin, straight tracks. □ Gamma rays (photons) can also make tracks, but being uncharged they do so indirectly when they eject fast electrons from atoms in the chamber.

### **8. Where do high-speed, subatomic particles come from?**

Nearly all things in our everyday world — rocks, air, plants and people — are slightly radioactive. That is, they emit high-speed subatomic particles, such as alpha particles (helium nuclei), beta particles (electrons, positrons), neutrinos, and gamma rays (photons). Such particles and others also shower down upon us from the sky, produced when cosmic rays strike Earth's upper atmosphere.

### **9. What are cosmic rays?**

Cosmic rays are very energetic atomic nuclei traveling through interstellar and intergalactic space at almost the speed of light. The majority (about 90%) are hydrogen nuclei (protons). Most of the remainder are helium nuclei (alpha particles), with much smaller numbers of the nuclei of practically all the other chemical elements.

### **10. Where do cosmic rays come from?**

One source of the most energetic cosmic rays is supernova explosions, the catastrophic end of the life cycle of massive stars. Black holes in the centres of galaxies are another probable source, as material swirls around a black hole prior to disappearing. Another source is solar flares that occasionally bombard Earth with energetic protons.

### **11. What happens when a cosmic ray hits Earth?**

When a very energetic proton from outer space strikes the nucleus of an atom of nitrogen or oxygen high in Earth's atmosphere, the collision produces a narrow, cone-like shower of hundreds of secondary subatomic particles that speed downward toward the ground. Many of these particles decay into muons long before they reach the ground. Muons, together with photons (light)

generated high in the sky, provide the dominant resulting radiation at ground level, along with neutrons, electrons, and positrons (anti-matter electrons). On average, approximately one very energetic muon per square centimetre per minute arrives at ground level.

### **12. Why are rocks, soil, pavement, and concrete, radioactive?**

Rocks (the source of much of soil, pavement and concrete) contain greater or lesser amounts of the chemical elements uranium, thorium, and potassium, all three of which are radioactive. Radon, a highly radioactive gas that is produced in the decay chains of uranium and thorium, can accumulate in basements, becoming a significant health hazard.

### **13. Why do people emit subatomic particles?**

Every plant or animal contains the elements carbon and potassium, each of which has a naturally occurring, unstable (radioactive) isotope: Carbon-14 and Potassium-40, respectively. Every second, within your body, several thousand of these nuclei undergo radioactive decays.

### **14. Why is there radioactive Carbon-14 in You?**

Although it has a half-life of only a few thousand years, Carbon-14 is continually being produced by cosmic rays bombarding nitrogen nuclei in Earth's atmosphere. Being carbon, Carbon-14 becomes thoroughly mixed with the carbon circulating in the environment. Plants take in carbon dioxide, and animals eat plants.

### **15. Why is there radioactive Potassium-40 in You?**

The Potassium-40 on Earth was produced in stars that existed before the Sun and Earth formed almost five billion years ago. Potassium-40 has a half-life of more than a billion years, so there is still some left on Earth today. Being potassium, it is part of the potassium in the environment, and potassium is one of the chemical elements essential for life. The Potassium-40 nuclei in your body are the still-warm embers of long-expired stars that lit the night before Earth and the Sun existed.

## 16. Anti-matter and You

In one of its decay modes, naturally occurring Potassium-40 creates and emits a positron, an anti-matter electron. That happens once or twice every minute in a human being. Every anti-matter electron you produce quickly meets an ordinary-matter electron (you have lots of those!), and the two particles annihilate in a flash of two gamma rays.

## 17. How long have Cloud Chambers been around?

The first Cloud Chamber for showing the paths of charged particles was devised in 1911 by C.T.R. Wilson, a physicist in Scotland. Wilson received the 1927 Nobel Prize in Physics for his invention. Alexander Langsdorf developed the first Diffusion Cloud Chamber, similar to the one in the Discovery Centre, in 1936.

## 18. Are Cloud Chambers still being used for research?

No. Today electronic detectors provide more accurate information about the tracks of subatomic particles, can handle data at a much faster rate, and the information goes directly to computers for processing, interpretation, and storage. But unlike in a Cloud Chamber, you cannot see the tracks!

*Editors Note: You can visit a cloud chamber at Discovery Centre in Halifax that was donated by Dr. Bishop to inspire our next generation of scientists, leaders and innovators. Thank you, Roy!*



*Above: Dr. Roy Bishop explaining the cloud chamber to RASC members Robert Bussi eres, Jerry Black, Matt Dyer and Pat Kelly.*

## FOOD for the SOUL

By Paul Heath

### *Maritime Skies*

I heard the stars this night would shine,  
Out my window I looked at nine  
The glow of street lights shone back at me,  
From the thick and clouded canopy.

I heard the stars would fall swift this night  
With burning swords rushing bright.  
The glow of city lights shone back to me,  
From the thick clouded canopy.

I heard a star was dimming fast,  
I looked to judge its fading light,  
So brief a view did entice with sucker holes  
once, twice, thrice,  
Too swift to judge this failing light.

I heard a pairing would occur,  
Her shining light with His bright thin shining  
smile.  
Surprise and joy the sight was seen,  
I rushed calling loud to show this wonder  
bright  
Before the swooping clouds cut off the  
sight.

I heard the stars would shine one night,  
I have heard it Was a wondrous sight.  
I wonder now, how bright the Clouds  
Will be tonight.

## Zodical Light

By Dr. Roy Bishop

*Editor's Note: These thoughts from Dr. Roy Bishop, were from the RASC email forum.*

Regarding seeing the February/March evening zodiacal light from SCO, even if SCO had an open western horizon, the glow from the snow-covered, flood-lit Martock ski hill only 10 km west of SCO would spoil the view of the zodiacal light.

I have the same problem: Wolfville (beyond which is Port Williams, New Minas, Kentville and Coldbrook) is 10 km west of my observatory. Bruce and Melody are blessed in that west of metropolitan Litchfield is the Bay of Fundy with nothing but water for more than 100 km.

"The treed western horizon at SCO" has another benefit in addition to hiding Martock. I shall elaborate.

I recall the clear night of October 28, 1994 (now more than a quarter century ago!) when a few members of the Halifax Centre were roaming central Nova Scotia looking for an observatory site for the Centre. A high, open hill at Gore was first on our list. The view at Gore to the west, north and east was spectacular with a low, distant horizon, but six problems were apparent: (1) the Halifax Centre did not yet own any land at Gore; (2) the drive from Halifax to Gore was long time-wise, involving some two-lane, secondary roads; (3) at Gore the slope of the hill cut off the lower portion of the southern sky; (4) a noticeable bubble of light pollution from HRM was apparent in the south; (5) headlights of cars on the long, straight road from Kennetcook are aimed directly at the Gore site; and (6) the NW wind responsible for the transparent sky that evening nearly blew us off the hill, ruling out the use of telescopes! I suggested looking at a place I knew near St. Croix (I had worked there in 1956, with a hand scythe, clearing underbrush from beneath the power line that runs from the hydroelectric generator in the large dam to the village).

We went to St. Croix that same night. A short distance into the "dam road", treed hills to the west and north eliminated the wind, the southern horizon was low and dark, car headlights were rare, and of course, highway 101 led directly

from Halifax almost all the way to the site. Two other nice features discovered later were that, rather than paying thousands of dollars for a piece of land at Gore, the SCO site could be leased for a dollar a year, and it came with a friendly fellow named Jamie Carmichael who drives past SCO every day and keeps an eye on it.

All that Halifax Centre members had to do was: choose the best site for an observatory; clear the forest for a driveway, a parking lot, an observing area, a view southward; and construct an observatory building plus two additional buildings, one for warmth and one for storage and a toilet. Those several tasks were accomplished between June 1995 and November 1996, with the exception of the storage shed which I believe was completed later. Dave Lane and Dave Chapman were Centre presidents in those years and deserve much credit for making SCO a reality.

SCO opened with a Halifax Centre picnic on the day of the 1997 summer solstice, Saturday June 21. The "official" opening took place at solar noon (13:18 ADT). SCO's 25th anniversary occurs two years from now.

## Halifax Centre Showcase

Thanks as always to those who submitted to the showcase for this edition of Nova Notes.

**Cover photo:** M42 - Blair MacDonald  
Clavis and Lunar highlands - David Hoskin  
Kemble's Cascade - David Hoskin  
Venus - David Hoskin  
M101 - David Hoskin  
Supernova in NGC 4636 - David Hoskin

