

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 halifax@rasc.ca



Highlights

NOV / DEC 2021

VOL 52 NO 5



**FROM THE EDITOR
HALIFAX CENTRE
& SCO INFORMATION**

**FROM THE
PRESIDENT**

2



MEMBER NEWS

**MEMBER MENTIONS
MEMBERS' UNIVERSE**

5



**MEMBERS' MEETINGS
REPORTS**

30

In this issue:

From the Editor	2
Centre Information	3
A Message From the President	4
What's in a (Minor Planet) Name?	5
New Observer	6
All in the Eye of the Beholder	7
2021 Astrophoto Contest Results	8
The Space Cadet	11
Review: The Celestron Omni AZ 102 Refractor	13
3 Comets Compared	16
An Astrophotographer's Journey	17
RASC Halifax Member Mentions	21
Members' Universe	23
Food for the Soul	27
Book Review	28
November Meeting Report	30
December Meeting Report	32

Cover Photos:

Main Photo:

M33 by Fiona Morris

Thumbnails (l-r):

St. Croix Observatory
drawing by
Mary Lou Whitehorne

Minor planet (10047)
Davidchapman
Source: SkySafari!

Halifax Centre Logo

Note: All photos and original works in this edition are the copyrighted property of the photographers, writers and artists. Permission to use any of their photos for other purposes must be obtained from the photographer.

From the Editor

It has been almost one year since John McPhee and I took the helm as your co-editors. For the year, looking ahead, I envisioned the pandemic winding down, finally getting to come and meet everyone at Nova East and things returning to "normal." Of course those things did not happen, but there were so many good things that did happen.

Personally, I completed my second observing certificate, upgraded my equipment, or as I like to say, got a grown-up telescope or two, experienced my first Bortle 2 skies in the Adirondacks as an amateur astronomer, experienced the partial solar eclipse from the Jersey Shore, tracked sunspots and prominences, experienced the lunar eclipse in November and barely saw Comet Leonard twice.

I even reached a personal milestone of presenting my very first program "The Link Between Astronomical Events and Animal Behaviour." Thank you for indulging me as I excitedly connected two of my passions, and enjoyed all your feedback and comments that day.

What needs to be said is that this relative "newbie" could not have done it without you. Inspiration comes from so many places, be it on social media, Zoom, your articles, books and just casual conversations. I learn so much from each and every one of you, and that to me is the biggest asset to come from being a member of RASC Halifax Centre. Thank you, not only, for taking me into your community but for being so supportive and sharing so much knowledge.

John and I look forward to showcasing all your wonderful works in the upcoming year.

Keep inspiring, keep looking up!

Wishing you clear skies!



Lisa



To quote Robert Burns, "The best-laid plans of mice and men often go awry." That applies to events of the last two years, as well as viewing Comet Leonard this year.
Photo by Lisa Ann Fanning

Meeting Dates for 2022

- **January 8, 2022: Blair MacDonald (Pandemic Astrophotography), Chris Young (Astronomy Lore)**
- **The remaining 2022 dates will be announced following approval by the newly elected Board of Directors.**

In lieu of a face-to-face meeting, we will now be hosting Members' Meetings using Zoom. You do not require a Zoom account to join in but you are required to register for this webinar. The webinar is limited to 100 registrants - first come, first served. The panelists' presentations are being recorded and will become accessible via a link on YouTube. For more information, please visit <https://halifax.rasc.ca/index.php/activities/rasc-events>

More to come regarding the 2022 schedule!

For past meeting replays, visit our YouTube Channel

St. Croix Observatory

Part of your membership in the Halifax RASC includes access to our observatory, located in the community of St. Croix, N.S. 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 at scomanager@halifax.rasc.ca.

SCO is Open!

Go to our website (<https://halifax.rasc.ca>) for the latest SCO usage guidelines.



St. Croix Observatory drawing by Mary Lou Whitehorne

Halifax RASC Board of Directors, 2021

President: Judy Black	(Elected)
Vice-President: Patrick Kelly	(Elected)
Secretary: Peter Hurley	(Elected)
Treasurer: Gregg Dill	(Elected)
Director: Tim Doucette	(Elected)
Director: Mathew Dyer	(Elected)
Director: Wayne Harasimovitch	(Elected)
Director: Paul Heath	(Elected)
Director: David Hoskin	(Elected)
Director: Kathy Walker	(Elected)
Honorary President : Mary Lou Whitehorne	(Appointed)
Auditor (2020-2021): Ian Anderson	(Appointed)
Co-Chair, DSP Committee: Dave Chapman	(Appointed)
Co-Chair, DSP Committee: Tony Schellinck	(Appointed)
Librarian: Wayne Harasimovitch	(Appointed)
Observing Chair: Dave Chapman	(Appointed)
Outreach Chair: Paul Heath	(Appointed)
National Council Rep: Judy Black	(Appointed)
SCO Manager: John Liddard	(Appointed)
Co-Editor, Nova Notes: John McPhee	(Appointed)
Co-Editor, Nova Notes: Lisa Ann Fanning	(Appointed)

Nova East Star Party

SAVE THE DATE FOR 2022!

August 26-28, 2022

(New Moon August 27 @ 5:17 AM)



A Message from the President

I am excited to be entering into my third term as President of the RASC, Halifax Centre. Much has been learned from you over the past two years. Your excitement in discovery and willingness to share this and new information, not to mention your expertise, has been inspiring to many.

The Board of Directors was elected at our December Annual General Meeting. Welcome back to our returning members, and welcome aboard (pun intended) to those newly elected. I look forward to working with this amazing team of volunteers, and to all member input. The recently conducted member's survey has certainly provided some direction to the Board so look for some changes in the coming year.

2021 seems to have flown by quickly and will soon come to its natural end, and what a year it has been. The ups and downs of COVID restrictions did not prevent our members from looking up at home, at SCO and further afield. Just consider the number who took out binoculars and telescopes to complete one of the RASC observing awards. The number of winning photos submitted to the RASC and other national and international entities, and the number of submitted articles to SkyNews and the Journal of the RASC are examples of our continuing engagement. All the sharing of photos, sketches, observing tips, equipment fixing tips, and sales and swaps by members demonstrate the level of member activity. We may remember a previous premier's phrase, "stay the blazes home," but it didn't prevent us from remaining engaged in our hobby and, for some, profession. 2021 was far from a boring year!

Charles Dickens wrote: "The year-end brings no greater pleasure than the opportunity to express to you season's greetings and good wishes. May your holidays and new year be filled with joy." My wish is that some of the joy experienced over the holidays is in looking up. Remember the skies are open to enjoy or, because we live on the East Coast, we can at least revel in the sky's beauty when there's an opening in the clouds.

Stay safe. Stay healthy. Looking forward to another year of the opportunities for observing and being with fellow astronomers for those special "oh, wow!" moments – virtually and, hopefully someday soon, in person. May you have many special memories of family and friends, and the occasional look up.

Cheers to one and all!

Judy

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

PO Box 31011, Halifax, Nova Scotia B3K 5T9

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

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.

What's in a (Minor Planet) Name?

By Dave Chapman

Imagine my surprise when, on the 15th of October 2021, I received a cold call from Paul Gray (ex-president of RASC Halifax Centre) and Peter Jedicke (ex-president of RASC) while I was relaxing after a family dinner. It was an unusual pair of RASCals to be calling, and whenever PJ is involved, there is likely mischief afoot. They took tremendous glee informing me that the International Astronomical Union (IAU) Working Group on Small Bodies Nomenclature (WGSBN) had named a minor planet after me: (10047) Davidchapman. Needless to say, I was taken aback and delighted! I had become the sixth living Nova Scotian to be so honoured (more below).

I've received a lot of attention over my minor planet, but here I want to explain how the naming process itself works: how do minor planets get their names? (Minor planets are the same as asteroids, but "minor planet" is the preferred term these days.)

First, the minor planet must be discovered. When a small solar system body is discovered, and is not obviously a comet, it is given a provisional name such as 1986 QK2 (in my case). This name represents the date of discovery: the year, followed by a letter in the range A–Y (excluding L) that represents the half month of the discovery, then another letter in the range A–Z (excluding I) that represents the order of discovery within the half month. If there are more than 25 discoveries in a half month, the letters A–Z are recycled, with numbers added. For your homework, figure out approximately when 1986 QK2 was discovered.

A minor planet is known by its provisional name until its orbit is determined well enough to accurately predict its future position. Dim minor planets are sometimes "lost" and rediscovered later, and sometimes the same body ends up with more than one provisional name. In my case, that would be 1992 ET8 and 1993 OH (more homework!). Once the minor planet has been observed through 4 or more oppositions, it is assigned a permanent designation in numerical order (10047 in my case). But we are not finished!

Unlike comets, which bear the name of the discoverer(s), minor planets are named after mythical or fictional characters, people, places, animals, and so on (it is true that most discoverers have minor planets named after them, but at the recommendation of others). Ten years after the permanent number is assigned, the discoverer (and only that person) can suggest a name to the IAU WGSBN; after that, it is open season! In the beginning, asteroids were all named after female classical deities: (1) Ceres, (2) Pallas, (3) Juno, (4) Vesta, etc. This rule was broken by the naming (433) Eros, the Greek god of love and ΣΕΧ (that is, Cupid to the Romans).

In the interest of brevity, I won't regale you with accounts of the various interesting names that the IAU has accepted—that's a reason to tune in to my mini-talk at the 2022 February 5 monthly meeting.



Minor planet (10047) Davidchapman next reaches opposition on 2022 September 4 in the constellation Aquarius at magnitude 16.4.
[graphic from SkySafari 7 Pro]

So how did minor planet (10047) get to be named after me? This is where Paul and Peter enter the story. In 2017, Peter co-ordinated an initiative whereby each RASC Centre would nominate a single name for a minor planet (the number to be chosen by the IAU). This list was submitted as a group to the IAU. Unbeknownst to me, and kept a secret until recently, the RASC Halifax Council chose my name! At the time, I made a different suggestion, and long wondered what had become of the idea. I bugged Paul repeatedly, and he repeatedly fibbed. Apparently, it takes some time for the IAU to deliberate on such matters, and they finally announced (10047) Davidchapman on 2021 October 15, the day I received my call. The new names are published about 12 times a year in a bulletin at <https://www.wgsbn-iau.org/>. If you study this year's bulletins #10, #11, and #12, you will notice there are several recent RASC-endorsed minor planet namings, all in the 100xx number range.

There are 15 minor planets with Nova Scotian connections, including six current N.S residents, two persons living outside N.S., four historical persons, two N.S. universities, and one N.S. town. Full information can be found through <https://rasc.ca/asteroids-canadian-connection>:

15 Minor Planets with Nova Scotian Connections

* current resident of Nova Scotia

In case you are wondering if the IAU will run out of minor planets to name, don't worry! Currently there are 1.1 million known small solar system bodies (including comets), 607 thousand numbered minor planets, and only 23 thousand named minor planets.

Here's the citation http://www.minorplanetcenter.net/db_search/show_object?object_id=10047

Here's the TV segment <https://www.cbc.ca/player/play/1965127235681>

Minor Planet (10047) Davidchapman

- Discovered in Chile 1986–08-28
- Orbit is 2 1/3 times wider than Earth's (between Mars & Jupiter).
- Orbit is nearly circular.
- Orbits the Sun every 3.6 years.
- About five kms across.
- Colour of aged asphalt

Congratulations New Observer!



Jeanette Kenny of Clementsport has successfully completed her Explore the Universe observing program and will be awarded her certificate and pin.

Congratulations Jeanette!

All in the Eye of the Beholder

By Judy Black

...or is it in the eye of the camera? Perhaps a little of both when it's the RASC Halifax Centre Astroimaging contest you're talking about.

The Centre's photo contest began before my time with the Centre (I joined in 2014) and it was an integral part of the Nova East Star Party. The winner of the contest was announced on the last night of the Star Party at Smiley's Provincial Park and was much anticipated, not only by the photographers but also by everyone in attendance.

Atlantic Photo Supply (APS) provided prizes for the contest and in the early years you had to attend Nova East to have your photo considered by the adjudicators. Our sincere thanks to Atlantic Photo Supply for their support over many years and for providing the winners with reprints of their photo.

Then the contest changed in 2018.

Thanks to the leadership of Melody Hamilton, a suggestion was made to the Nova East Planning Committee (NEPC) that a People's Choice Award be awarded as well. Whereas the submitted photos would still be adjudicated (objective evaluation), members would vote on what they felt was the best photo (subjective evaluation). Allen Sutherland of APS along with members Blair MacDonald and Mary Lou Whitehorne adjudicated the 2018 submitted photos for astronomical interest, technical merit, originality, and artistic value. Nova East participants viewed the photos at various times throughout the weekend and their votes were tabulated on Saturday evening. The winner of both the Astrophoto Contest and the first People's Choice Award was Kathy Walker for M13.

Then came total revision in 2019.

The contest became the RASC Halifax Centre Astroimaging Contest. Centre members and any Nova Scotia resident could now submit photos in one of 3 categories, each with specific criteria identical to those of the RASC national contest. Thanks to the work of Blair MacDonald and Jerry Black, these were approved by the Board of Directors (https://halifax.rasc.ca/images/documents/G8_Astroimaging.pdf), and the new contest was implemented at the pre-COVID 2019 Nova East Star Party. Photos were sent to the adjudicators with only a number attached to it along with the descriptors provided by the submitters and were separated by the categories in which they were entered. Names were never included.

In 2020 and 2021, due to provincial COVID-19 health restrictions, the contest was still held with adjudicators, and members voted albeit virtually through SurveyMonkey. One can only marvel how the astroimagers in our Centre have given us so many "oh, wow!" moments through their photography. Once winners were announced at a Member's Meeting, photographer names were added to all photos on the website. To view these incredible entries since 2019, please visit <https://novaeast.rasc.ca/index.php/contest>. Here is the summary of adjudicators and winners over the past 3 years.

2019 (announced at Nova East)

Adjudicators: Blair MacDonald, Mary Lou Whitehorne

Winners: Jerry Black (wide field); Jeff Donaldson (deep-sky); David Hoskin (solar system); Barry Burgess (People's Choice)

2020 (announced October 3 at the Member's Meeting)

Adjudicators: Blair MacDonald, Mary Lou Whitehorne

Winners: Jason Dain (wide field); Jeff Donaldson (deep-sky); David Hoskin (solar system); Jason Dain (People's Choice)

2021 (announced December 4 at the AGM and Member's Meeting)
Adjudicators: Blair MacDonald, Fiona Morris, Tim Doucette
Winners: Jason Dain (wide field, deep-sky, and solar system); Chris Kelly (People's Choice)



Wide Field
Image Title: Milky Way and Moon by **Jason Dain**
What the object is: Milky Way and Moon

Capture details: Taken March 8, 2021 near Bayswater, NS using a Nikon D850 and 20mm f/1.8 lens. I took 12x10s exposures at f/2.5, ISO 3200. I stacked the images in Sequator and edited the stacked master in Photoshop. I did a long exposure foreground but the moonlight was too extreme to use it.



Deep Sky

Image Title: Andromeda Galaxy by **Jason Dain**

What the object is: M42

Capture Details:

I chose the Andromeda Galaxy (M31) for my first true color image using my new mono camera and filters. For this image, I shot red, green, blue, luminance and Hydrogen images over the course of almost 20 hrs. I spent a good bit of time on my processing on this image to make sure I got the result I wanted. After a few false starts, I'm pretty happy with the end result.

The Andromeda Galaxy, is a barred spiral galaxy approximately 2.5 million light-years from Earth and the nearest large galaxy to the Milky Way. The galaxy's name stems from the area of Earth's sky in which it appears, the constellation of Andromeda, which itself is named after the Ethiopian (or Phoenician) princess who was the wife of Perseus in Greek mythology.

Exposure: ~20 hrs of exposures (5 hrs across RGB, 10 hrs luminance and 4.5 hrs of Hydrogen)

Telescope: Skywatcher Esprit 100 ED APO

Imaging Camera: ZWO ASI 2600MM Pro

Guiding: Skywatcher EVOGuide Scope with ASI120MM camera

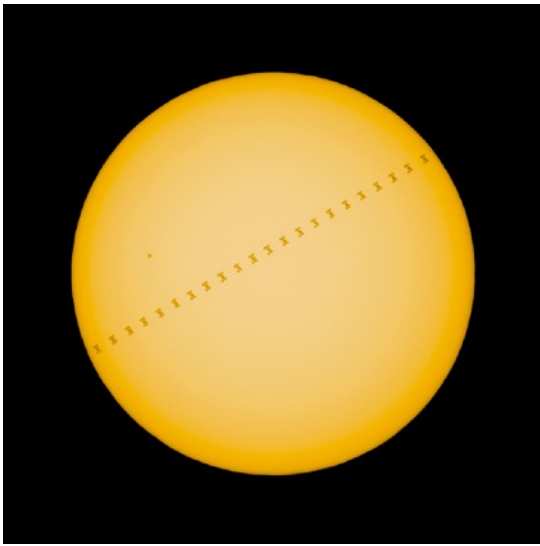
Filter: Optolong LRGB + Ha 7nm

Mount: Skywatcher EQ6R-Pro

Calibration: Flats and flat darks

Hardware Control: ASIAIR Pro, Pegasus Power Box and ZWO EAF

Processing: The selected images were pre-processed and processed using Pixinsight.



Solar System

Image Title: ISS Solar Transit by **Jason Dain**

What the object is: ISS Solar Transit

Capture details:

I set my camera to record video at 4K, 30 FPS where each frame was at 1/3200th of a second, f/9 and ISO400. I used my Nikon D500, tc14iiiie teleconverter and 500mm f/4 lens for the job. I started my video and let it run and watched in amazement as the ISS flew by in about 3/4 of a second.

Using PIPP processing software, I extracted and aligned the 22 frames that had the ISS in them and exported them. I then loaded them into Photoshop, selected all of the images and used Darken mode to create the stack. I then applied some coloration, noise reduction and contrast adjustments to get the result you see here. Next target is the ISS passing the full moon!



People's Choice Award

Image Title: "Touching the Cosmos" by Chris Kelly

Object: Milky Way and Peggy's Cove Lighthouse

Details:

October 5th, 2021 at 10:56pm. Peggy's Cove, NS
Nikon D750 + Nikkor 20mm f1.8 ED + standard tripod

3 images. 1 Sky and 2 foreground to deal with blown highlights due to the flood light

Sky: 20mm, f2, 20 seconds, ISO 3200

Foreground: 20mm, f2, 20 seconds, ISO 500 and 20mm, f2, 10 seconds, ISO 500

Images blended in photoshop and post-processed in Lightroom.

Looking forward to 2022 and the amazing sights that will be in the eye... of the camera and the beholder.

The Space Cadet

By Mary Lou Whitehorne FRASC
Honorary President, RASC Halifax

Once upon a time ... no, wait, that's how fairy tales start. This could be a fairy tale, but it isn't. Some years ago, under contract to the Canadian Space Agency, I ran a teacher resource centre, located in Halifax at the Discovery Centre, that served the four Atlantic provinces. There were four other resource centres, and together we served all of Canada. The Canadian Space Resource Centres (CSRC) are now defunct, replaced by a website.

The CSRCs developed and presented workshops and classroom teaching materials on many space-related subjects: aeronautics, astronautics, microgravity, rocketry, robotics, remote sensing, astronomy, and so on. We worked with teachers and students at all grade levels.

There were some perks to the job. We worked with Canada's astronauts on developing interactive educational materials that related directly to their space shuttle flights, and that also connected to the Canadian school science curriculum. There were trips to NASA's Johnson Space Center that included visits to a number of the shuttle flight training simulators, visiting the Neutral Buoyancy Lab, and touring a full-scale mock-up of the International Space Station. Who among you would not enjoy a live performance by the astronaut band, appropriately named Max-Q, which was headlined by Canada's own Chris Hadfield?

Discovery Centre attracts and recruit volunteers. One such volunteer was more than slightly space crazy, and so gravitated (pun intended) toward the CSRC. Laura was effervescent with energy and enthusiasm for anything to do with space exploration. She was determined that her career would be focused skyward, and she set to work to make it happen. Not content with Canada's space-related opportunities, she focused her gaze on NASA.

In my capacity as Regional Director of the Atlantic CSRC, I encouraged this bright, delightful and space-crazy teenaged girl to reach for the stars. OK, I confess, her energy was irresistible. Laura did a lot of work to further her own goals. Because she worked so hard, I did what I could to help her get into NASA's Space Camp, at the U.S. Space & Rocket Center in Huntsville, Alabama, first as a student camper and then as a camp leader.

Later, I wrote a reference letter in support of her application to the Royal Military College in Kingston, ON. It is not easy to be accepted to the RMC. I felt the weight of that letter as I wrote it, knowing the importance of striking all the right notes. Laura was accepted—she was jubilant—and off she went to work even harder on the next step of her life goal.

Her career careened around a bit. We kept in touch sporadically. I knew she had applied and been accepted into training at Marshall Space Flight Center in Huntsville, as an ISS Payload Rack Officer. Early in the morning of November 8 of this year, Laura's space dreams finally came true. As of that date, she became a fully certified ISS Payload Rack Officer (PRO, in NASA's famous "TLA*-speak"), working full time at Marshall Space Flight Center.

She contacted me a few hours later with her exciting news, and thanked me for encouraging and mentoring her along the way. She sent me audio clips of the moment of her certification, including congratulations from crews on the ground and on orbit. What a moment! For both of us!

We never know when a nudge, or an encouraging word, or a supporting letter, will make the difference. I am really proud of this young, engaging, enthusiastic ISS Payload Rack Officer. Her feet remain firmly on the ground, but her spirit, her mind, and her work, are most certainly on orbit. Go, Laura, go!



Laura, at her ISS PRO final certification at Marshall Spaceflight Center. She is in the middle, holding a framed copy of the log of her first command. This occurred at 6:30 a.m., and several of her off-duty colleagues came to work early to be there for Laura's big moment. Her ear-to-ear grin is hidden behind her mask.



The author's collection of mission patches and pins from mission-related work at the CSRC Atlantic. These are prized items that can, and do, inspire and encourage young people like Laura to pursue careers in science and technology.

Relevant links:

Space Camp, Huntsville: <https://www.spacecamp.com/space>

Marshall Space Flight Center: <https://www.nasa.gov/centers/marshall/home/index.html>

Payload Rack Officer: https://www.nasa.gov/sites/default/files/files/POC_factsheet.pdf

*TLA: three letter acronym

Review: The Celestron Omni AZ 102 Refractor – A Respectable Entry Level Telescope from Costco!

By David Hoskin

Several years back, I purchased a second-hand 80mm short-tube refractor, the Orion ST80A, for use as a grab-and-go scope when I did not wish to set up and use one of my larger telescopes for just a short observing session. This little telescope, on a tuned and modified SkyWatcher AZ3 alt-azimuth mount, was great for a quick peek at the Moon or the Pleiades. However, I found myself wishing for a grab-and-go telescope with a bit more aperture that I could use while my imaging rig was gathering photons. The Celestron Omni AZ 102 refractor telescope, which Costco currently sells in-store for \$249.99, looked like it would meet my needs. I was fortunate to find this telescope used, but in mint condition, for substantially less on Facebook Marketplace. This model is unique to Costco and has been discontinued by Celestron, most likely to eliminate competition with the newer Celestron Inspire 100AZ refractor telescope. However, the OTA paired with a different mount, the Celestron AstroMaster 102AZ refractor telescope, is available from other retailers such as B&H Photo.



First impressions were positive. The metal OTA is nicely finished, dark blue with metal flakes, and sports a substantial metal dew shield, a cast-in finder bracket, and a 2" metal rack and pinion focuser with a 1.25" adapter. A CG-5 saddle plate is fixed to the side of the OTA, which attaches to the included alt-az mount and is also compatible with other mounts. The interior of the OTA is painted flat black and has 3 baffles. The objective is a fully coated, 102mm achromatic doublet. Focal length is 660mm, so the telescope is fairly "fast" at $f/6.5$. The alt-az mount has worm gears on both axes that provide smooth motion when tracking targets, while slip clutches in both axes allow for quick and easy pointing.

However, I had to slightly loosen the nut on the altitude shaft to make altitude adjustments easier when not using the slow-motion controls. The white light-weight metal tripod has adjustable legs, although I do not recommend fully extending the legs as this leads to excessive telescope shake under windy conditions or when focusing the telescope. Adding some additional weight to the accessory tray and a few nylon washers to the accessory brackets helps to reduce telescope shake. A further improvement that I have yet to try would be to fill the tripod legs with sand to stiffen them and add additional weight.



An instruction manual, a smartphone adapter for afocal imaging, a red-dot finder, an erect image diagonal, 20mm and 10mm eyepieces, and a rudimentary screwdriver complete the package. The erect image diagonal does the job but is made of plastic, except for the glass prism, and is very light in weight. The 1.25" Kellner eyepieces are coated and have sturdy plastic bodies with metallic chrome-plated barrels that are threaded for eyepiece filters; unfortunately, both eyepieces lack rubber eyecups.



The next clear night, I moved the telescope out to the patio for its first light. At 4.6 kilograms, this really is a grab-and-go scope. I was able to easily carry it in one hand, leaving the other hand free to open and close doors. After aligning the red dot finder, I inserted the 20mm eyepiece and pointed the telescope at the first quarter Moon. Focusing was very smooth and the resulting view through the eyepiece was tack sharp with lots of contrast. Craters and other lunar features were clearly defined.

The smartphone adapter allowed me to use my Samsung smartphone to capture a pleasing image of the Moon. Inserting the 10mm eyepiece, I pointed the telescope at Jupiter and was pleased to see the four Galilean moons, as well as the two major cloud bands at moments of good seeing. Pointing the telescope at Saturn revealed the planet's rings. A 2x Barlow is recommended for observing the gas giants since both planets were quite small at 66x. The 20mm eyepiece is the better of the two eyepieces, giving a brighter image with a wider field of view. Moving on to deep-sky objects, I found that the Double Cluster, the Beehive Cluster, and the Pleiades were framed nicely in the 20mm eyepiece. Stars were pinpoint and showed good color. The Orion Nebula showed a decent amount of nebulosity, even from my light-polluted backyard. Using the 10mm Plossl eyepiece, I was able to resolve the four stars of the Trapezium.

Although the stock erect image diagonal and eyepieces are adequate starter accessories, this telescope really benefits from a good quality star diagonal and a couple of Plossl eyepieces. Nevertheless, as purchased, this is a versatile entry-level rich-field refractor that can also be used for lunar and planetary observing. In fact, I doubt that there is a better option in this price range, especially with the current shortage in good-quality entry-level telescopes.



3 Comets Compared

By Roy Bishop

Thank you, Roy Bishop for sharing your thoughts on some of our recent comet visitors on the Halifax RASCals board on December 18, 2021 at 1:16 PM:

“On December 12 Dave Chapman posted a composite image (attached) created by Rutger Bus of Comet Watch showing how the best comet of 2021 (Leonard) compared to the best comet of 2020 (NEOWISE).

On July 26 last year I posted a composite image (attached) that I created showing how the best comet of 2020 (NEOWISE) compared to the best comet of 1996 (Hyakutake).

In my post last year I said:

The attached composite of two of my photos shows NEOWISE and Hyakutake, when each was at its best. Fortuitously, the pointer stars of the Big Dipper appear in both photos, so I shrank the NEOWISE photo until the spacing of the pointer stars was the same in both photos (you can easily verify that). Thus the two comets appear at the same scale.

In a letter to me in April 1996, the late, indomitable, member of the Halifax Centre, Nat Cohen, said of Comet Hyakutake:

“At last that which we have been promised for so long has transpired. I perceive this to be a real comet.”

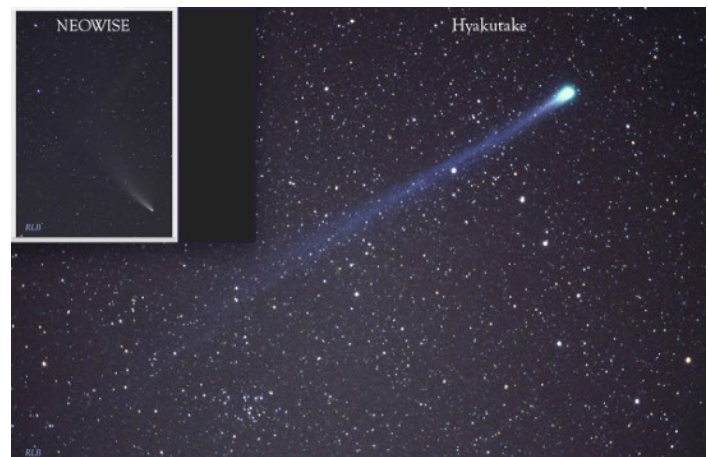
. . . and as Dave Lane quoted Nat last week:

“A comet is not a comet unless it makes you fear your maker.”

Nat died the year of Comet Hyakutake, a quarter-century ago this Monday.”



Composite image created by Rutger Bus of Comet Watch showing how the best comet of 2021 (Leonard) compared to the best comet of 2020 (NEOWISE)



Composite of composite of two photos showing NEOWISE and Hyakutake by **Roy Bishop**

An Astrophotographer's Journey

By Blair MacDonald

Being one of those science nerds growing up as a young lad almost in my teenage years during the Moon landings, I developed an interest in space exploration and astronomy in general at an early age. Many years later, the most wonderful woman in my world, my wife Karen, bought me my first telescope as a Christmas present and I don't think she has forgiven herself yet! The scope was a shiny red 4.5 inch Tasco reflector and was a department store scope in every sense of the term.

That Christmas night was clear, cold and long enough ago that climate change was not even a thing yet. Once it got dark I headed out to our yard with my new favorite toy and a shovel so I could clear a spot to have a look. The 0.965 inch Huygens eyepieces had the field of view of a soda straw and slightly worse optical qualities, but to me enjoying my first view of the Moon, this was better than any picture I had ever seen. I ran inside to get my wife out for a look. Karen, who had just finished her medical degree, promptly told me that as a newly minted MD she possessed one of the two signatures required to have me committed, and knew people that would supply the second one. Walking through the cold snow to the back corner of our yard and hunching over a telescope was not high on her list of ways to spend an evening.



Figure 1 - My first telescope from many years ago.

My first deep sky target was the Orion Nebula and after one view, even from the city, I was hooked. After a little research and a few phone calls I was able to find a supply of adapters and T-rings that allowed me to connect our SLR camera (notice the lack of a D in the camera type) up to the little scope. Using the slow-motion controls I manually tracked M42 during a 20-minute exposure shivering most of the time. Dashing into a local camera store the next morning I dropped off my precious film on the way to work and picked up the pictures on the way home. Lots of light pollution, bad focus, poor hand tracking and lousy colour, but I had my very first astrophoto!

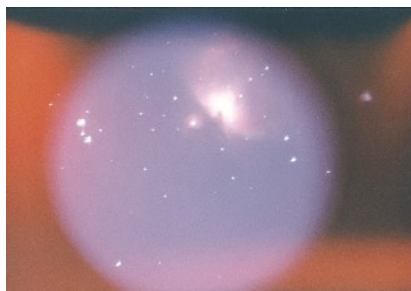


Figure 2 - 20 minute hand tracked (no motor drive) exposure of M42 taken on 400 ASA film.

Five cameras and three telescopes later I've got some better images of the same target, but this first image holds a special place in my collection.



Figure 3 - Things have improved over the years with higher quality optics, better mounts and modern CMOS cameras. I now routinely get images like this from the city.

That little red Tasco gave me years of viewing pleasure and I became known as that “Tasco guy” at Halifax Centre observing sessions. With a few upgrades, a new finder and better eyepieces, the little scope was everything I needed to get me started in the hobby.

Eventually it was time for an upgrade and I acquired a Meade eight-inch Schmidt Newtonian reflector on a “reasonable” Meade GEM computerized mount. Polar alignment took forever and the optics were less than perfect (it was a Meade after all), but the setup was a big improvement over my Tasco and my images improved immediately. About this time Kodak started making Ektar 1000 film and that combined with f/4 optics made for reasonable exposure times allowing me to drive to a dark site, set up, polar align then image for a few hours and still get enough sleep to make it to work the next morning.



Figure 4 - Horse Head Nebula on Ektar 1000 film

Around the turn of the century I took the plunge into electronic imaging. I acquired my first CCD camera, a Meade 416XT and joined a dedicated group of beta testers for the company. This camera was a monochrome beast, plagued by software bugs and was better at frustrating the user than it was at taking images. Being the stubborn type I did manage to get more than a few pictures off the camera.



Figure 5 - M27 made using red, green and blue filters with a Meade 416XT

Compare this early M27 shot to one I recently captured with much better optics and a modern CMOS DSLR and you can see the difference modern equipment and a tad more experience makes.



Figure 6 - M27 taken with a Canon 60Da

After several telescope, mount and camera upgrades I ended up with the system I use today, a SkyWatcher Esprit 120 on a Celestron CGX-L mount guided with an Orion SSAG and an 80mm guide scope. With the addition of a tablet computer, running ASCOM, and a scope buggy I now have a portable observatory capable of taking images that only a few years ago would have required a professional observatory and hundreds of thousands of dollars worth of cameras and computers. Best of all I can wheel it out of my garage, get it aligned and be imaging in under 20 minutes.



Figure 7 - My present setup. The Scope Buggy lets me wheel the scope from my garage to my driveway and be imaging within 20 minutes.

The Esprit offers pinpoint stars and very low distortion at the frame edges; a great combination for a series of mosaics covering larger targets like the North America Nebula and M31.



Figure 8 - North America Nebula imaged from Marion Bridge. The image is a 3 by 3 mosaic that looks great as a canvas print on our wall.



Figure 9 - M31 mosaic imaged from Marion Bridge. It is another 3 by 3 mosaic and hangs on our wall next to the North American Nebula shot.

When the pandemic hit, like the rest of us I was limited in my ability to travel to dark skies in pursuit of my hobby so I added an Optolong L-eNhanse light pollution filter to my equipment as it looked like we were all going to be stuck imaging from the city for a while. The combination of tack-sharp APO optics and modern narrow-band filters allows capturing and producing images taken under urban skies that rival what I could have gotten from the darkest skies just a few years ago.



Figure 10 - The Witch's Broom portion of the Veil Nebula shot from my light-polluted driveway.

Along with greatly reducing the effect of urban light pollution, the L-eNhanse filter adds narrowband detail even when used under darker skies.

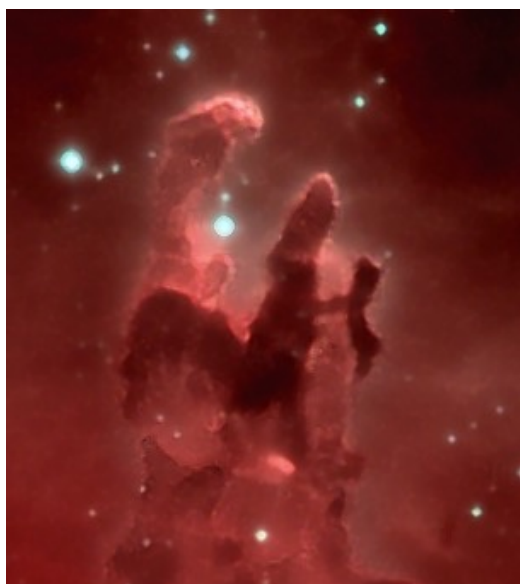


Figure 11 - 'Pillars of Creation' shot from SCO with the humble telescope.

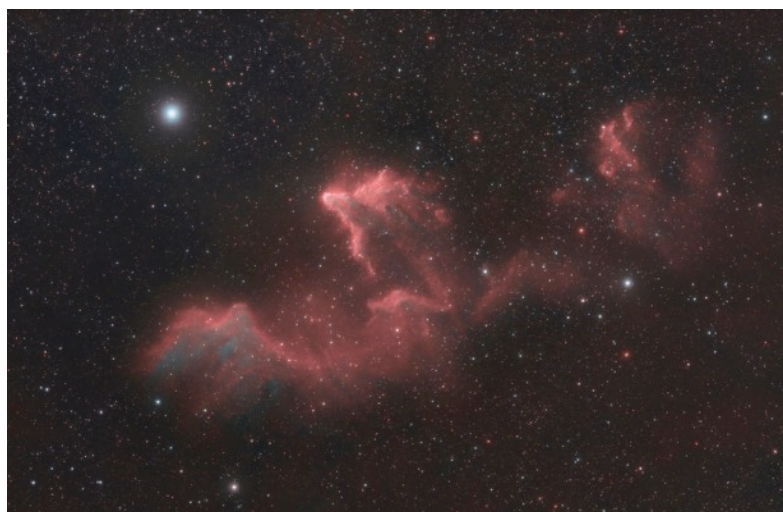


Figure 12 - The Ghost of Cassiopeia, shot from our cottage in Marion Bridge

During the 30-plus years that I've been involved in astrophotography, I've had the opportunity to meet and learn from some of the great names in amateur astronomy and in the last few years I've been given the honour of paying it forward, helping the next generation of talented astrophotographers just starting out in the hobby. During the time I've been imaging, the technology available to me has changed drastically from film cameras coupled with a Tasco telescope, to extremely sensitive CMOS cameras and apochromatic refractors riding on computer controlled mounts; I wonder what advances the next 30 years will bring to the next generation of astrophotographers?

RASC Halifax Member Mentions



Our very own David Chapman was featured on several news programs when word got out that he had an asteroid named for him. (For more information, see page 5)

Image Source: <https://www.cbc.ca/player/play/1965127235681>



On December 1, Dave Chapman, discussed the fine work of Mi'kmaw Moons with Cathy LeBlanc and Holly on CBC Radio 1 Halifax Main Street and on RASC Canada on December 2.

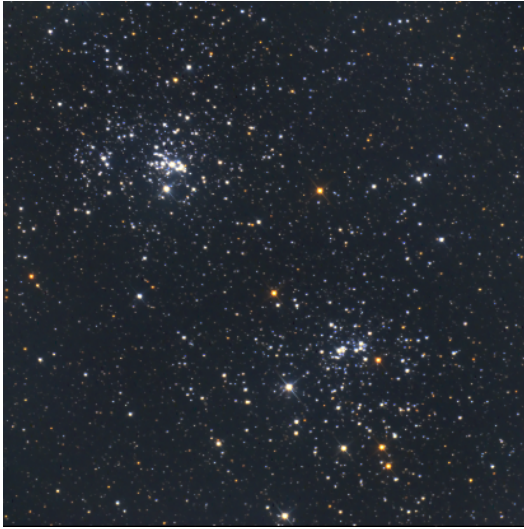
RASC Halifax was well represented these past few months on earthsky.org



earthsky.org says: View at EarthSky Community Photos. | David Hoskin in Halifax, Nova Scotia, Canada, captured these photos of Ceres and Aldebaran on October 30, 2021, and November 2, 2021. He wrote: "A comparison of the two images taken approximately 74 hours apart shows the movement of Ceres relative to the bright star Aldebaran, as the dwarf planet moves through the constellation Taurus. Ceres is much smaller than our moon but accounts for about 25% of the mass of the asteroid belt!" Thank you, David! <https://earthsky.org/todays-image/ceres-and-aldebaran-conjunction-photos/>



earthsky.org says: View at EarthSky Community Photos. | Lisa Ann Fanning in Monmouth County, New Jersey, took these images of the lunar eclipse on November 19, 2021. She wrote: "Compilation of eclipse images approximately 10 minutes apart." Thank you, Lisa! <https://earthsky.org/todays-image/lunar-eclipse-photos-nov-18-19-2021/>



earthsky.org says: View at EarthSky Community Photos. | **David Hoskin** in Halifax, Nova Scotia, Canada, took this image of the Double Cluster on November 4, 2021. David wrote: "The Double Cluster in the constellation Perseus is comprised of two impressive close-together open star clusters, NGC 869 and NGC 884. These stellar jewels can be seen with the unaided eye from a reasonably dark site and are wonderful in binoculars or a rich-field telescope." Thanks again, David! <https://earthsky.org/space/november-deep-sky-nebulae-clusters/>



earthsky.org says: View at EarthSky Community Photos. | **David Hoskin** in Halifax, Nova Scotia, Canada, took this image of the Ghost of Cassiopeia on November 12, 2021. David wrote: "IC63 is an emission nebula located in Cassiopeia. The nebula's eerie shape is the reason that it is referred to as the Ghost of Cassiopeia. The bright blue-white star [on the left] is Gamma Cassiopeiae, which emits powerful ultraviolet radiation that is slowly eroding the nebula, in spite of it being several light years from the star." Thank you, David! <https://earthsky.org/space/november-deep-sky-nebulae-clusters/>



earthsky.org says: View at EarthSky Community Photos. | **David Hoskin** in Halifax, Nova Scotia, Canada, caught Comet Leonard on November 7, 2021 and wrote: "Comet Leonard (C/2021 A1) imaged this morning just before dawn. The comet is currently in Ursa Major and has an observed magnitude of 10.8, visible with a telescope aperture of 6" or greater. The comet is predicted to brighten until 13 December, at which time it may be visible with binoculars." Thank you, David!

<https://earthsky.org/astronomy-essentials/comet-leonard-might-become-2021s-brightest-2022/>



earthsky.org says: View at EarthSky Community Photos. | **David Hoskin** in Halifax, Nova Scotia, Canada, took this image of the Triangulum galaxy on December 5, 2021. David wrote: "The Triangulum galaxy (Messier 33) is a spiral galaxy located in the small triangle-shaped constellation Triangulum. This galaxy, which is about half the size of our Milky Way galaxy, is 2.73 million light-years from Earth." Thank you, David! <https://earthsky.org/clusters-nebulae-galaxies/triangulum-galaxy-m33-a-binocular-challenge/>

Members' Universe



Fiona Morris captured the Northern Lights as she saw them for the first time ever on Nov. 3, 2021



On November 20, **Tim Doucette** captured "A nice calm night before the storm. Planets are lined up! From left to right, Jupiter, Saturn, & Venus."



Jerry Black writes: Another day, same old galaxy far far away...

From 4 nights in suburbia, M31, the Andromeda galaxy, a barred spiral galaxy approximately 2.5 million light-years from Earth and the nearest large galaxy to the Milky Way. A larger version of this may be viewed (and zoomed into by clicking) at http://sciencedowneast.no-ip.ca/zenphoto/index.php?album=Messier-List/M31-Andromeda-Galaxy&image=masterLight_BIN_1_EXPOSURE_300_00s_FILTER_LPR_RGB_1_integration_DBE_DBE_329-2_w.jpg

329 images @300 sec = 27.4 hours
ISO 3200
Camera Nikon Z7 [8856 x 5504]
Optics Skywatcher Esprit 120mm Refractor
Filter Radian Triad Ultra Quad-Band Narrowband Filter
Guiding Phd2 using a ZWO 224MC on an Orion 60x240mm Guide scope
Controller Images taken using Kstars on an Odroid-N2 (Raspberry Pi clone)
Location Nova Scotia.
Processed / Mangled in PixInsight and Lightroom.

This Light Pollution filter used is a Quad band filter with narrow bands,

- Hydrogen-beta: 5nm
- Oxygen III: 4nm
- Hydrogen-alpha: 4nm
- Sulfur II: 4nm

Consequently, as Blair MacDonald has pointed out, with this filter I should probably be using 15 minute subs to increase the Signal to Noise Ratio.

I'm in the process of collecting 15 minute subs to see if I can improve this image. My guiding recently is around 1.5 arc sec, so perhaps that's an equally important issue to

Do you have something you would like to share in an upcoming edition of *Nova Notes*?

Send your photos, poems, articles and other works to

novanoteseditor@halifax.rasc.ca

Friend of *Nova Notes*, **Kathy Walker** writes “ It has been a productive year for me, with over 60 images completed.” We are always pleased to see your results, Kathy!



Heart Nebula by Kathy Walker

This image highlights the pillars at the centre of the Heart Nebula, IC 1805, a star-forming region in Cassiopeia. The bright star cluster adjacent to the pillars is known as Melotte 15. Imaged on Sept 30th and Oct. 21st, 2021 at Hall's Harbour. 8" Newtonian. Total integration time is 5h 50m. Processed as HOO-RGB.



Messier 42 Orion by Kathy Walker

The famous Great Orion Nebula. It is a challenge to accommodate the entire dynamic range of this nebula, because the bright parts are very bright, and the dim parts are very dim. I used a range of exposure times from 10 seconds to 5 minutes to capture the full range. Imaged Nov 8th and 11th at Hall's Harbour. 8" Newtonian. Total integration time is 3h 25m. Processed as HOO-RGB.



HFG-1 and Abell 6 by Kathy Walker

These two planetary nebulae are quite faint, but make an impressive view because they are close together in the sky in Cassiopeia. HFG-1 is the larger nebula at upper left; Abell-6 is the smaller nebula at lower right. HFG-1 is moving rapidly through space, at several tens of km per second, producing a bow shock wave of interstellar gas, and leaving a trail of ionized hydrogen behind it. Imaged Oct 6th-8th at Hall's Harbour. 8" Newtonian. Total integration time is 18 hours. Processed as HOO-RGB.

Jaime Whynot takes us to the moon with her photo series taken on December 13, 2021:

All photos were taken with the following equipment, unless otherwise noted:

- Skywatcher 200p 8 inch Dob
- 17mm Orion Sirius Plossl, 1.25"
- Celestron X-Cel 2x Barlow (except the first photo)
- Celestron Neutral Density Moon Filter
- Celestron NexYZ smartphone adapter
- iPhone 8



78.5% Waxing Gibbous Moon



Copernicus crater



Clavius and Bullialdus craters

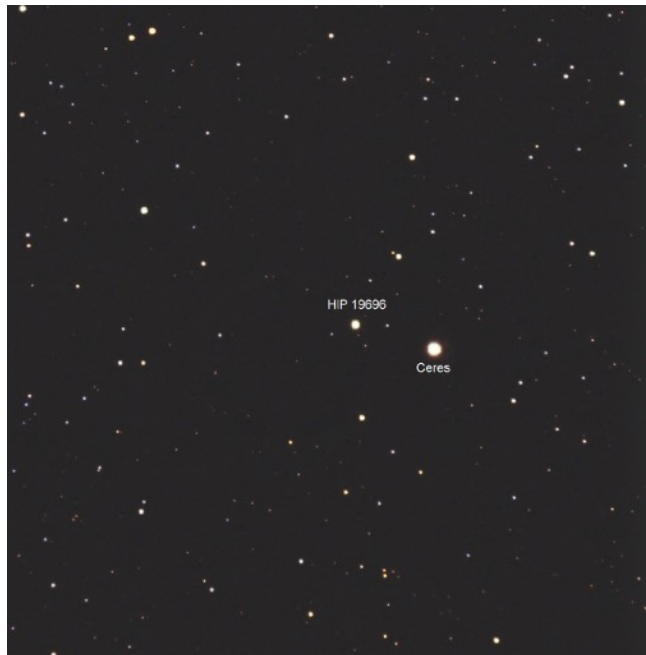


Plato crater and Straight Range

David Hoskin offers these wonderful images he has recently taken.



Cocoon Nebula



Ceres soon after opposition



Flame Nebula and Horsehead Nebula in Hydrogen Alpha

Food for the Soul: The Poetry of Paul Heath

EYES UPLIFTED

By Paul Heath

The silhouette upon the hilltop sat
Raising towards the sky,
Ah – ooww, ah - yoowww
Lifted, echoing to Moon's full light.

Elders, by the glowing embers sit
Arms rising to the sky,
'Hunters, there the chase continue'
A silhouette, of glittering Stars takes form.

Waves, gleam and glitter and swirl
Tossed upon the sandy shore by full Moon's light,
Yet as the wave retreats,
The sands still swirls and glitters and gleams
Silvered forms entwined,
New life, within the wet sands conceal.

Eons and ages pass,
Each night by fires blaze and embers glow
We sat, by the sparkling roof above, ensnared.

With tales of hunts and heroes and monsters fair
We joined the glittering motes to tales,
Until so entwined became,
The Stars held safe our Souls.

We are the Light Collectors,
Searching the skies for the faintest mottes of light.
With molded glass, we sweep the heavens,
Recording each and every bright sparkle found.

We are the Light Collectors,
Younglings, racing the darkening fields,
With nets and open hands, ensnaring
Those fallen, blinking stars, to fill our glass lanterns
And light our quiet porches, with blinking, flashing star light.

We are the Light Collectors,
Meticulous in our seeking,
Till AWE Struck, we stand
Looking upward, as our Sun and Earth battle across the sky,
Throwing captured rainbows, in waves and pulsing curtains before our eyes.

We are the Light Collectors,
Calculating the paths of dust laden trails,
To count those myriad flashes
Of a fiery swords remains.

We are the Light Collectors,
Younglings, stretched out upon the soft summer grasses
Filling our minds with the swollen majesty
Of a newly discovered, rising Full Moon.
It casting deep black, shadows of the solitary pine
Across the suddenly, day lit meadow.

LIGHT COLLECTORS

By Paul Heath

We are the Light Collectors,
Younglings, stretched out upon the soft summer grasses
Filling our minds with the swollen majesty
Of a newly discovered, rising Full Moon.
It casting deep black, shadows of the solitary pine
Across the suddenly, day lit meadow.

We are the Light Collectors,
Aging, yet holding youngling's wonder to our breast
And while the world in darkness slumbers,
We gather in the sparkling motes, that tell of all the Eons past.
Filling our spirits with the glittering wonder of the skies,

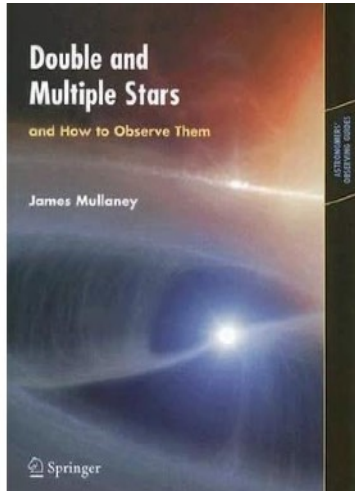
WHY?
For We, are the Light Collectors, and Wonder fills the Skies.

Book Review:

Double and Multiple Stars and How to Observe Them

James Mullaney Springer 2005

By Tony McGrath



As a newcomer to the world of double star observing, I found James Mullaney's treatment of the subject just right for the beginner. The book is concise and written from the perspective of a practical visual observer. It provides information on not only what stars to observe, but also an introduction to the details of what you are seeing through the eyepiece. Mullaney is very much the practical observer, having logged over 20,000 hours of stargazing time and published numerous books and articles. His passion for "seeing double" comes through in his effort to engage and motivate the observer.

In the world of double stars and multiple star systems, nomenclature can at times prove confusing. Systems of two or more stars are called multiple star systems. The term binary star refers to a system of two stars orbiting around a common barycenter. Binary stars are generally classified as either optical, spectroscopic, photometric or astrometric determined by how they can be observed. The term double star is often used synonymously with binary star. Double star

can also mean an optical double, referring to a chance alignment of two stars along our line of sight. As it turns out there are very few optical doubles, with at least half of all stars part of a binary system.

It is interesting to note, that in the late 19th and early 20th century the astrometry of stars was one of the pillars of professional astronomy. The measurement of a star's position and motion was carried out by professionals using instruments such as the Yerkes 40 inch refractor and the Lick 36 inch refractor. In the early 20th century, as humans began to realize their place in the cosmos, the efforts of the professional astronomers began moving away from astrometry towards the "realm of the nebulae." Astrophysics began to dominate the field, and astrometry declined at professional observatories. As James Keeler noted in 1897, "astrophysics seeks to ascertain the nature of the heavenly bodies, rather than their positions or motions in space—what they are, rather than where they are." Today the observation of double and multiple stars is primarily the purview of amateur astronomers, with astrometry being accomplished by automated satellite-based observatories.

The book is divided into two parts, the first of which introduces the science of double and multiple stars. It was interesting to learn that double stars have contributed much to our understanding of the universe. At least half of all stars are binary, and being gravitationally bound, they have provided a mechanism for astronomers to conclusively determine stellar mass, estimate the distance to stars, and led to the discovery of the Mass-Luminosity relation.

Mullaney's descriptions are clear and concise, providing introductory information on the various sub classes of double and binary stars. I found the information on contact binaries particularly fascinating. These objects are sufficiently close that gravitational forces distort the stars' spherical shape into ellipsoids (Roche lobe), and under the right conditions, their outer atmospheres may in fact exchange mass! Mass exchange between contact binaries can set off dramatic and sometimes violent outbursts of radiation. There is also some observational evidence that there may even be neutron stars and black hole binaries.

Part 2 is dedicated to the observation of double and multiple stars. Notwithstanding the astrophysics, the book is really aimed at the visual observer. The section on training your eye/brain combination to improve visual acuity, detection threshold and color is particularly interesting. I never realized there were exercises, which you can do to improve visual acuity! Mullaney also provides introductory

information on topics such as sky conditions, telescope types, eyepieces, collimation and record keeping. All of this would be familiar to any experienced observer.

The book concludes with a wonderful section on observing projects, where the author suggests several projects for consideration. Chief among these are Color Studies, Resolution Studies and Micrometer Measurements. For each he provides some background information and references to get things started.

Irrespective of your interest in any specific project, he recommends that your first order of business should be to start with a sightseeing tour to survey the brightest and finest doubles. To facilitate that task, and perhaps the greatest feature of the book, are two observing lists. The first is a list of the 100 finest double and multiple stars ordered by constellation. Compiled for use with small telescopes in the range of 60 – 100 mm, it provides magnitudes, separations, spectral class, and a brief description for each entry. For those encouraged by this list of showpieces, an appendix is provided with a further listing of 400 entries.

As I looked through my logbook recently, I realized that practically all my observing time has been spent observing solar system objects, open & globular clusters as well as galaxies. The double stars I am familiar with are few. They are indeed memorable, with grand names and colors....Alberio, Almach, Castor & Rasalgethi. This book has helped me realize that there is much more to attract someone to this area of observing.



In closing it is also worth noting that Mullaney with co-author Wil Tirion produced the first edition of **The Cambridge Double Star Atlas**. That edition was the first modern star atlas focused on double star observing since **Norton's Star Atlas** dropped double star information from their work. It plots about 2,400 pairs, providing a “celestial roadmap” for the double star observer, and is available today in its second edition.

November Members Meeting

November 11, 2021 (23 attendees)

To watch a replay of the meeting, please visit <https://www.youtube.com/watch?v=107WXVyoGs&t=3451s> on the RASC Halifax YouTube Channel.

President's Remarks

RASC Halifax President Judy Black welcomed everyone to the monthly meeting, she explained the benefits of membership and reviewed the agenda.

Indigenous Land Acknowledgement - "RASC, Halifax Centre would like to begin by acknowledging that we are in the Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People. This territory is covered by the "Treaties of Peace and Friendship," which Mi'kmaq and Wolastoqiyik (Maliseet) Peoples first signed with the British Crown in 1725. The treaties did not deal with surrender of lands and resources but in fact recognized Mi'kmaq and Wolastoqiyik (Maliseet) title and established the rules for what was to be an ongoing relationship between nations.

"RASC as well as RASC Halifax Centre believes in and practises inclusivity and diversity. All are welcomed regardless of age, disability, gender, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, ethnic origin, colour, nationality, national origin, religion or beliefs or sex and sexual orientation. And we are opposed to all forms of unlawful, unfair discrimination."

Special Presentations

- Dave Lane (RASC Halifax Centre) - "*The Mini-Robotic Observatory (MRO)*" Dave will describe how to use the inexpensive "doghouse" style fully robotic and LIVE web browser accessible observatory at SMU. Although Dave will talk mainly about the mini-robotic telescope, it will be relevant to ARO and BGO, too.
- Lisa Ann Fanning (RASC Halifax Centre) - "*The Link Between Animal Behaviour and Astronomical Events*" Lisa Ann will describe how her passions for astronomy and animal migration have intersected. She will describe the correlation between moon cycles and bird migration, and the correlation between whale strandings and sunspot activity.
- Chris Young - "*Astronomy Lore*" The Daughters of Nash and a Little Desert Navigation & Inuit and the Northern Lightsee

Food For the Soul

Paul Heath presented his poem "*Eyes Uplifted*," which can be read on page 27.

What's Up in the Sky? with Dave Chapman

Dave Chapman provided his monthly rundown of what's up in the night sky for November 2021, he highlighted objects included in the *Explore the Universe* observing program. His presentation can be viewed in the meeting video or accessed directly on the RASC Halifax Centre website.

Notes from the Board/ Questions

AGM is December 4th - reports precirculated
Members will be notified of slate of Elected and nominees
Phil Groff will be the speaker at the Members' meeting

The Centre Survey was administered to understand what members would like to see at meetings. The survey will be sent out again for those who did not have a chance to participate the first time.

The latest edition of *Nova Notes* is posted and submissions for the Nov/Dec edition is due by midnight December 18, 2021. Email novanoteseditor@halifax.rasc.ca

St. Croix Observatory

- Revised use guidelines as restrictions change.
- Phase 5 - Proof of vaccination for members and their guests.

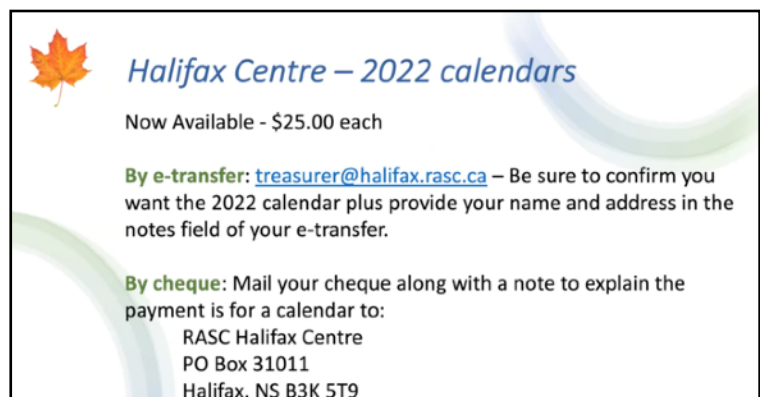
Halifax Centre Stars

Members Michael Gatto and Fiona Morris are featured in the 2022 RASC calendar (May and September respectively.)

3 Members (Blair MacDonald, David Chapman and Michael Gatto) are published in the JRASC, October 2021

Blair for "*Removing Background Banding*," David for "*Gegenschein, Mars and a Mystery Solved*," and Michael for his sketch "*Alpine Valley Sketch*."

2022 Calendars are available for sale.
Visit the Halifax Centre website for details



Halifax Centre – 2022 calendars

Now Available - \$25.00 each

By e-transfer: treasurer@halifax.rasc.ca – Be sure to confirm you want the 2022 calendar plus provide your name and address in the notes field of your e-transfer.

By cheque: Mail your cheque along with a note to explain the payment is for a calendar to:
RASC Halifax Centre
PO Box 31011
Halifax, NS B3K 5T9

SCO Fundraising Committee (Astrophoto Fundraiser)

Halifax Centre astroimagers are again donating their incredible photos! (Blair MacDonald, Jason Dain, Jerry Black and David Hoskin) To donate yours, contact president@halifax.rasc.ca 8" x 10" images are for sale \$30 each. For more info, visit the Halifax Centre website, under "Quick Info"

RASC Awards Deadline for submission December 31, 2021 - send nominations to Chris Gainor cgainor@shaw.ca

Insider's Guide to the Galaxy with Host Chris Vaughan. November 9 session - Lunar Geology (replay available on YouTube)

Upcoming meetings (will be announced by the board in 2022, but see below for a preview)

Heads Up! 2021 / 2022 Meeting Dates & Events

Members' Meetings are usually held on the first Saturday of the month, unless it falls on a holiday weekend.

December 4 (+ AGM)
Dr. Phil Groff, RASC Executive Director

January 2022
Blair MacDonald (*Pandemic Astroimaging*)
Chris Young (*Astronomy Lore*)

February 2022
Keegan Oickle (*Youth Committee & Special Projects*)
Dr. Jennifer West (*Magnetic Tunnel Project*)
David Chapman (*Amusing Astronomy Stories*)

March 2022
David Shuman (*NASA Missions*)
Chris Young (*Astronomy Lore*)

Dates TBD
Randy Attwood (*2024 Total Eclipse*)

December Members Meeting

December 4, 2021 (31 attendees)

To watch a replay of the meeting, please visit <https://www.youtube.com/watch?v=jCy06Ca0JtM> on the RASC Halifax YouTube Channel.

NOTE: The December Members Meeting followed the AGM which can be viewed here on YouTube <https://www.youtube.com/watch?v=znhKY54xH9k>

President's Remarks

RASC Halifax President Judy Black welcomed everyone to the monthly meeting, she explained the benefits of membership and reviewed the agenda.

Indigenous Land Acknowledgement - "RASC, Halifax Centre would like to begin by acknowledging that we are in the Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq People. This territory is covered by the "Treaties of Peace and Friendship" which Mi'kmaq and Wolastoqiyik (Maliseet) Peoples first signed with the British Crown in 1725. The treaties did not deal with surrender of lands and resources but in fact recognized Mi'kmaq and Wolastoqiyik (Maliseet) title and established the rules for what was to be an ongoing relationship between nations.

"RASC as well as RASC Halifax Centre believes in and practises inclusivity and diversity. All are welcomed regardless of age, disability, gender, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, ethnic origin, colour, nationality, national origin, religion or beliefs or sex and sexual orientation. And we are opposed to all forms of unlawful, unfair discrimination."

Special Presentations

- Dr. Phil Groff (RASC) - "What's New in the RASC?"
Phil provided an update on the RASC activities and what to look forward to in 2022.

Food For the Soul

Paul Heath presented his poem "*Light Collectors*" which can be read on page 27.

What's Up in the Sky? with Dave Chapman

Dave Chapman provided his monthly rundown of what's up in the night sky. For December 2021, he highlighted objects included in the *Explore the Universe* observing program. His presentation, including

hyperlinks, can be viewed in the meeting video or accessed directly on the RASC Halifax Centre website.

Updates from the Board

Member survey - Posted in June (15 responses received) and November (9 additional responses received) Responses collated, and the board is reviewing

The latest edition of *Nova Notes* is posted and submissions for the Nov/Dec edition is due by midnight December 18, 2021. Email novanoteseditor@halifax.rasc.ca

Halifax Centre Stars

Jeanette Kenny - earned her Explore the Universe certificate and pin

2021 Calendars are still available for \$12

2022 Calendars are available for sale - information available on the website on how to order.

SCO Fundraising Committee (Astrophoto Fundraiser)

Halifax Centre astroimagers are again donating their incredible photos! (Blair MacDonald, Jason Dain, Jerry Black and David Hoskin) To donate yours, contact president@halifax.rasc.ca 8" x 10" images are for sale \$30 each. For more info, visit the Halifax Centre website, under "Quick Info"

RASC Awards Deadline for submission December 31, 2021 - <https://www.rasc.ca/rasc-awards> send nominations to Chris Gainor cgainor@shaw.ca

Upcoming meetings (will be announced by the board in 2022)

Join RASC - you can join online or via mail-in form - see the RASC website for more information. If financial assistance is requested, email mempub@rasc.ca

Astroimaging Contest

Sponsor: Atlantic Photo Supply

3-category Adjudicators: Blair MacDonald, Fiona Morris, Tim Doucette

24 photos entered

3 categories - Deep-Sky, Solar System, Wide Field

+ People's Choice Adjudicators: Members of the RASC Halifax Centre

And the winners are..... Jason Dain for Deep-Sky, Solar System, Wide Field and Chris Kelly for the People's Choice - To view the winning images, please see pages 7-10



All the best of the holidays



Happy Hanukkah
(Nov 28 – Dec 1)



Kwanzaa
(Dec 26 – Jan 1)



Merry Christmas
(Dec 25)

HAPPY
New Year