

AURORA



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The Royal Astronomical Society of Canada - Windsor Centre

September 2019

Barnard's Star - 2019 Edition by Steve Mastellotto



Barnard's Star is about six light-years away from Earth in the constellation of Ophiuchus which makes it the fourth-closest star to the Sun. The three components of the Alpha Centauri system are closer which makes Barnard's Star the closest star visible from the Northern Hemisphere. Barnard's Star is a low-mass red dwarf star which makes it dim at about 9th magnitude despite its close proximity. It is named for American astronomer E.E. Barnard. He was not the first to observe the star but in 1916 he measured its proper motion or movement against the background sky as 10.3 arc seconds per year. This is the largest-known proper motion of any star relative to the Solar System.

The image above or more correctly the 10 images above were captured by Dave Panton (assisted by Al DesRosiers) and Steve Mastellotto. Since 2010 Dave captured an image of the field that contains Barnard's Star and for 2015 - 2019 Steve captured the images. 2010 was the first year of this personal project when Barnard's Star was in the lowest position in the above composite image created by Steve. In late July Steve captured the 2019 image (top position) which now represents 92.7 arc seconds of movement over the intervening years or a rate of 10.3 arc seconds per year. At this rate it will take about 175 years to span the width of the Moon.

Over the years Dave and Steve captured the images with slightly different set ups but in general the images are through the Celestron 14 inch scope at Hallam using Nikon and Canon digital cameras and about 2 minute exposures at ISO 800 or 1600. Focus is achieved using a Bahtinov mask.

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Calendar of Events

Our next meeting...

Tuesday October 15, 2019
7:30 p.m.

at
Ojibway Park Nature Centre
5200 Matchette Road

Main Speaker...

To Be Announced

Topic...

To Be Announced

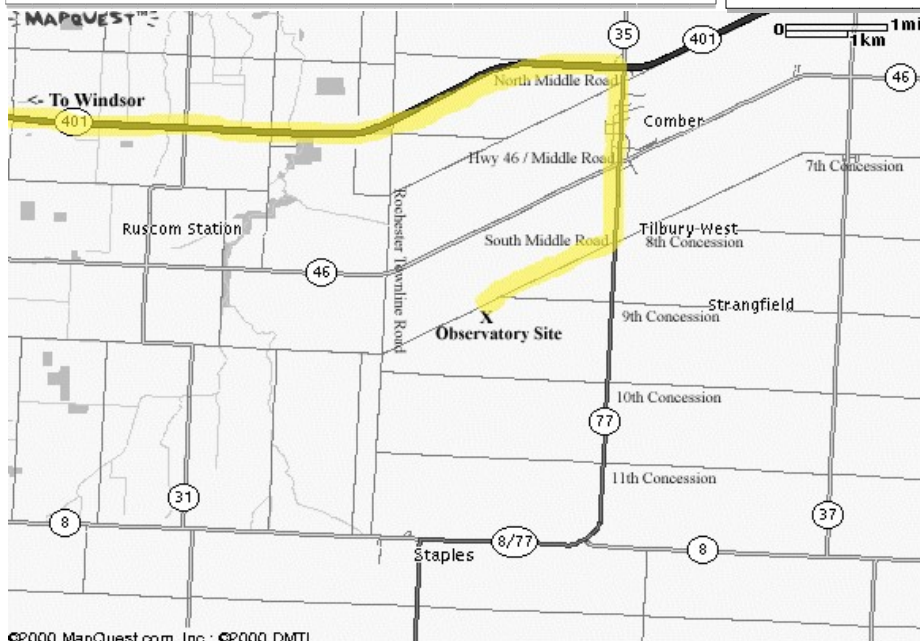
Activities...

Open Streets Windsor: On Sunday September 22nd we will have an information booth along with solar observing setup on Riverside Drive by the CBC building. Setup is at 9:00 a.m. and the event runs until 2:00 p.m..

Autumnal Equinox: The Sun will cross the Celestial Equator heading South on Monday September 23rd at 3:50 a.m. EDT.

Council Meeting: The next meeting of Council will take place on Tuesday October 8, 2019 starting at 7:30 p.m. at Mike Mastronardi's work location - Stantec Consulting, 140 Ouellette Place.

Art Exhibit: We are running an astronomically themed art exhibit at the ArtSpeak Gallery on Wyandotte Street East in Windsor from November 3 - 10 and looking for both volunteers and your original photos, sketches, paintings, poetry, historical documents, scale or full size models, etc.



Hallam Observatory Site

Directions: The map at left shows the Comber area and it includes the major highways (401, 77, 8 and 46) that are in the area of the observatory.

The most direct route from Windsor is "highlighted" on the map which is to take Highway 401 East to Highway 77 South to South Middle Road. Turn right onto South Middle Road and go about 1 kilometer and just after the point where Concession 9 joins it (it is hard to see this intersection) you will find the observatory site on the South side (left) of the road. 3989 South Middle Road.

If you hit the Rochester Townline Road (you come to a stop sign) you have gone too far.

Submissions

Aurora is published monthly except for July, August and December. The September, October, January, March and May issues are full newsletters (usually 6 pages) with a number of member submitted articles. The November, February, April and June issues are short flyers (2 pages).

Submitted articles can be of any length from a paragraph to multiple pages. I can scan pictures and/or diagrams (both prints and film) to support your article and the originals will be returned to you.

Submission deadline is the 1st of the month.

Editor: Steve Mastellotto Email: mmastellotto@cogeco.ca

Membership

The Windsor Centre of The Royal Astronomical Society of Canada meets on the 3rd Tuesday of every month (except July and August) at the Ojibway Park Nature Centre. In addition to regular meetings the centre hosts a number of observing nights, a picnic and a December social. Members receive a copy of the Observer's Handbook, a subscription to SkyNews magazine and access to the Centre's library and telescopes. Optionally the RASC Journal is available in print form—online version free.

Annual Membership Fees: Please see the RASC website at www.rasc.ca for current rates.

Contact Greg Mockler (greg.mockler@live.com) or visit our website at: <http://www.rascwindsor.com> for more information.

June 2019 Meeting Minutes by Sandy van Gaalen

The monthly meeting of the **Royal Astronomical Society of Canada - Windsor Center** was held at the Ojibway Park Nature Centre on **Tuesday June 18, 2019**.

Windsor Centre **President, Mike Mastronardi** chaired the meeting and **called the meeting to order at 7:42 p.m.** and welcomed members and guests to the Ojibway Park Nature Centre.

Mike invited members to review **the minutes of the May 21, 2019** meeting which were printed in the June Aurora Flyer. **A motion to accept the minutes** was made by **Mahayarrahh Star Livingstone**, seconded by **Greg Mockler**. **MOTION CARRIED**.

Mike provided an overview of the meeting and then introduced our guest speaker.

Main Presentation

Mike welcomed **Janet Hart** to the floor for her talk **“Planetary Geology on Venus”**.

In the 30's and 40's many considered Venus to be a paradise and we were going to visit there someday. Maybe about 2 billion years ago Venus was more hospice. All the **terrestrial planets** are basically the same with an **inner core, mantle and crust**. Dense material sinks to the middle and less dense stays at the surface. Venus is our closest neighbor at 0.7 Astronomical Units (AU), the Earth being 1.0 AU. Venus' rotational speed, magnetic field and atmosphere is all **different than the Earth** and it lacks moons. Venus' rotational period on its axis is greater than the rotational time it takes to rotate around the sun.

The first space craft to land on Venus was the **Russian Venera 7**. It hit the surface at 17 km/s. We got data for 23 minutes from this. Seismic readings to see what is happening under the surface were taken for 120 days. **Venus does not have a magnetic field** (probably because it spins so slowly) and the atmosphere **reflects 75% of the sunlight**. Maybe the thick atmosphere creates a drag or maybe it was hit by something which slowed it down.

Venus is **heavily volcanic**. It has two continents - **Aphrodite and Ishtar** but does not contain any tectonic plates. The highest mountain is approximately 1 km high with a few craters (usually found in clusters). Large volcanic formations that look like pancakes, pancake domes, created from magma in a one-time event and average 300 km across. Venus also has **Coronae (upwellings of warm material below the surface)** which is unique to Venus. They are not found on the other planets.

Temperature on Venus is **extremely high 600 Kelvins**. The surface is hotter and as you go up in the atmosphere the temperature decreases. The surface pressure is 90 bars - Earth is 1 bar at sea level. The amount of CO₂ in Earth's atmosphere is 0.04 % while Venus' atmosphere is > 90%. Venus also lacks water vapour in the atmosphere. Venus weather; there is a lot of lighting everywhere with many clouds and acid rain. Green house effect from all the CO₂ prevents the heat from escaping back into space. The wind at the poles spins 60x faster than the planet rotates.

Tom Sobocan: The Fiftieth Anniversary of the Apollo. Tom showed pictures of Neil Armstrong, Buzz Aldrin and Michael Collins and of Apollo 8, 9, 10 and 11. Fifty years ago, Armstrong, Aldrin and Collins were the first men to walk on the moon. Armstrong's famous quote, **“That's one small step for a man, one giant leap for mankind”**.

Apollo 8 astronauts Frank Borman, Jim Lovell and William Anders, lifted off December 21, 1968. Apollo 8 did not land on the moon but paved the way for Apollo 11.

Apollo 9 astronauts Rusty Schweickart, David Scott and Jim McDivitt, the first manned flight of all Apollo lunar hardware in Earth orbit.

Apollo 10 Thomas Stafford, Gene Cernan and John Young, May 18, 1969 it orbited the moon. It was a test mission, testing all components and procedures. It was just short of actually landing on the moon.

Apollo 11 astronauts Neil Armstrong, Buzz Aldrin and Michael Collins, liftoff July 16, 1969. The first spaceflight to land on the moon and returned safely back to Earth.

Many members brought items of memorabilia in for viewing.

Mike read the application that was submitted in which **Randy Groundwater won the National Service Award** for outstanding service to the Society. **Congratulations Randy!**

Steve Mastellotto mentioned a **request for pictures** during the summer to use for the 2020 calendar.

The **50/50 draw** was won by **Lyn Hartt** - \$33.

On June 24th **Montessori School at Camp Cedarwin**.

Mike requested volunteers to come out and help **wash the deck at Hallam** at 9 a.m. Saturday June 22nd and we are also looking for volunteers to help out at the upcoming show at the **Artspeak Gallery** on November 3 – 9.

Director of Observing Report: Juliana Grigorescu. Juliana began the discussion asking members what they have been observing in the night sky...

- **Conjunction of Mars and Mercury** now
- **Leo** is still in the sky as is the summer triangle in the East
- **Double shadow transit** on June 11 with the two moons of Jupiter, **Ganymede and Io**. All the moons in the solar system are locked to their planet due to gravity.
- June 18th conjunction of the **Moon and Saturn** visible after 10:30 p.m.
- June 21st we will have 16 hours of daylight and 8 hours of night.
- June 23rd will be **Mercury at greatest elongation** this happens 6-7 times a year.
- **NGC6530** is nested inside the Lagoon nebula. The Lagoon nebula is halfway between Jupiter and Saturn.
- **Mercury and Mars** are visible in the evening sky and Venus in the morning sky
- **Jupiter** dominates the night sky and starts to move westward
- **Saturn** rings are more visible
- **Uranus** visible in the morning sky
- **Neptune** visible with the naked eye with reference star.

Juliana showed the **first image of a black hole** in M87, the event horizon and the shadow.

SpaceX launched 60 satellites into orbit. Too many satellites create light pollution.

Reminders: Astro Luncheon at **Skippy's Restaurant** every second Wednesday of the month, at noon. Located at 954 University Ave West, Windsor.

Mike thanked everyone for coming out to the meeting and reminded everyone that the **next regular membership meeting** would take place on **Tuesday September 17, 2019 at 7:30 p.m.**

Meeting adjourned at 10:21 p.m. June 18, 2019.

At The Eyepiece: Deep Sky Lyra - Part 2 by Mike Ethier

In the last issue we had a look at some of the well-known objects in the constellation of Lyra. Lyra is a perfect constellation for beginners to explore thoroughly. It is relatively small, easy to recognize, and is often directly overhead, affording optimum viewing. Depending on the size of your telescope, a list of objects can be prepared to keep you busy over several observing nights. With the 12", there are hundreds of objects to see, so an observer must use a selection process or go mad. I usually choose the latter, but am happy to offer some recommendations.

Let's begin with Lyra's 2nd planetary nebula, pn 6765. Located an easy star hop from M 56, Lyra's other NGC planetary nebula is worth a look, at least with a 12" scope or larger on a dark night. Located at 100x (15 mm eyepiece), at 67" and mag. 12.9 it is about 1/3 the size of M 57, though significantly dimmer. At 125x (12mm) I used a nebula filter, getting good direct views. Expecting a round or oval object, I was surprised to observe a slash, like an elliptical galaxy. At times I thought I saw a central star, but this observation could not be repeated on subsequent evenings. Located within a triangle of brighter stars (mag. 10-11), it was observed up to 200x, with better views using the filter. The shape now reminded me of the body of an Astroscan telescope, being in two parts joined together, one of them round and larger, and the other much narrower, like a short neck protruding. Is this a double planetary? A puzzling but fun object to observe, and no doubt somewhat overlooked.

Oc 6791 is one of the best open clusters out there for larger scopes, so use at least an 8" mirror for this one. Even the 12" does not fully resolve it, at least in my best sky. First viewed in 1992 with the 8" scope, it took 150x back then to even begin to resolve it. I can't wait to see this in a much larger scope! At low power (and 12"), a large, hazy cloud of dim whiteness can be seen. Official size varies between 10' and 20', depending on which information source is used. I tend to go for the 20'. There is certainly a very dense core to this cluster, but the haze spreads out well beyond the main section. At 125x it begins to resolve, and even more so at 150x. Take your time and let your eye do its work, and very faint stars will pop out all across the object. Think of it more like a tough globular and you will get a better idea of how to respond to it. At 200x I enjoyed remarkable views, though there was still unresolved haze back in there. I observed it over many nights, and the cluster is a good indicator of how suitable the sky is that night for deep sky observing. It is more difficult to resolve than many globular clusters, so be patient and wait for your best night.

Oc 6743 is perhaps justifiably overlooked, nonetheless these are the objects I often enjoy tackling, for that very reason. When I keyed in 6743 on my object locator keypad, I was informed it was non-existent. Good thing Uranometria knows more than my keypad! Though hardly a traditional cluster, and certainly not something you would proudly show your grandmother, the little group fits a familiar pattern for observing pros. A bright star (mag 8) sits right in the middle of a very faint star cluster, dimming its members and hiding some, too. Best at 150x, I counted 18 very faint stars surrounding the bright one. I also used the cluster to star-hop to a nearby faint galaxy (eg 6740).

I will now mention the two brightest galaxies in Lyra, and then

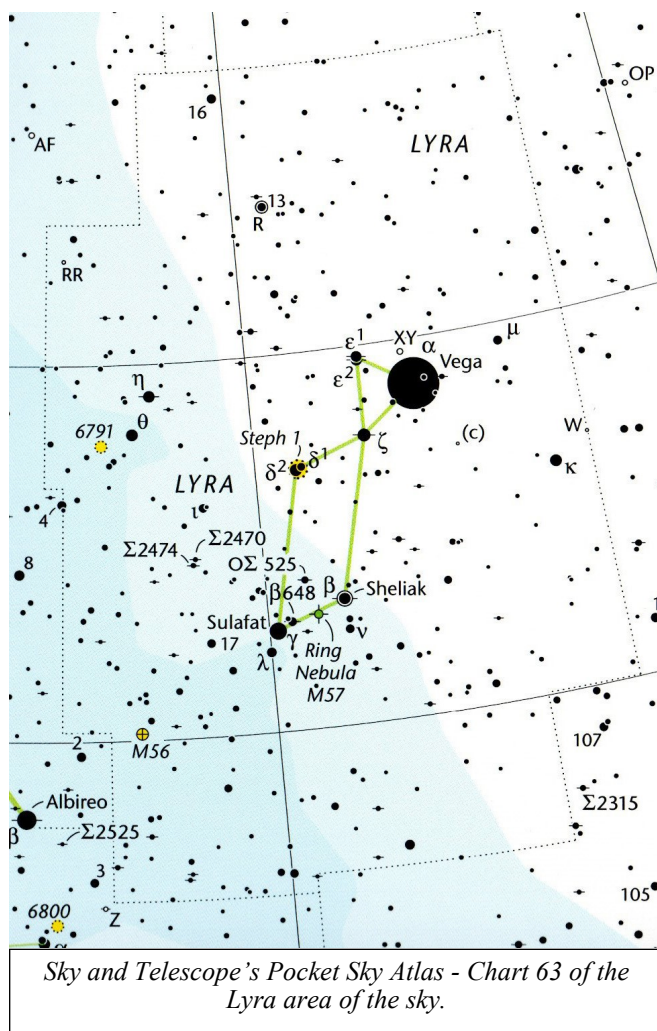
one of the most interesting. Eg 6703 is a veritable beacon of light compared to the other NGC galaxies of Lyra. It is also the only Lyra galaxy I saw in previous studies with my Edmund 8" scope. It is in the same field of view at 150x with eg 6702, which is the second brightest galaxy in Lyra. Neither object is particularly fascinating, but they make for a good comparison. Situated in a lovely star field, 03 is round and distinctly brighter, while 02 is more oval. Our final galaxy is eg 6745, located north-preceding variable star V547, and lying closer to a magnitude 9 star. This elongated galaxy was seen well at 125x, 150x, and 200x, and is the most interesting galaxy in Lyra for casual observers. It lies between two faint star groups. There is a remarkable Hubble Heritage photo of it, showing 3 galaxies colliding. None of this can be gleaned at the eyepiece, at least in modest sized scopes. However, something strange about it is evident. Use the highest power feasible. The galaxy is easy to find using the Uranometria star atlas.

I personally choose to observe by constellation boundaries, and always have one or two ready to go. My autumn work will be in Perseus and Cetus; winter is Orion. I recently concluded my seven-year

journey through the spring constellation of Leo, and have moved on to Coma Berenices. My summer work continues in Draco, along with a very detailed and massive list of double stars, which will be the basis of my next article. Till then, clear skies.

Messier of the Month: M 56 in Lyra

Messier 56 is a wonderful globular star cluster in Lyra, and can be observed from late spring well into the autumn, often right overhead. Though not as bright or famous as M13 in Hercules, this cluster packs a visual kick in scopes of 6" and higher. I recently had a great time observing it under ideal skies using Deb's 6" Dob. Bright and compact at low powers, it began to resolve



Sky and Telescope's Pocket Sky Atlas - Chart 63 of the Lyra area of the sky.

At The Eyepiece (continued)

at the edges nicely at 100x. Though there is lots of room for improvement, the view is perfectly lovely.

My first fantastic view of this cluster was way back in late July of 1978, from Lake Penage, just west of Sudbury. The cluster was magnificent at 169x, with a very bright center, which remained mostly unresolvable. It was, however, very mottled, and seemed at any moment ready to burst into tiny suns. The edges resolved really well, even at very low power. The center was not simply a round ball of bright haze, however, but was broken into rough edges and dark lanes. M 56 is no disappointment in an 8" mirror.

gc 6779/M 56 in Lyra is the 2nd finest deep sky NGC object in the constellation (oc 6791 is 3rd, and M 57 is first). Unresolvable in a 4" scope, the 6" and 8" ones do a pretty good job with the outliers, but not so well with stars in the core. My 12" mirror gives a remarkable view, aided by an adjacent bright star that allows for perfect focusing (many globular clusters seem to offer this handy feature). Using up to 200x the cluster is still bright, and resolving all across the center, which breaks into uneven segments of stars and haze, with dark lanes separating them. I found it harder to focus at 250x, though the object was still good at this range for an experienced eye. It is a very compact group, but its overhead sky position gives it a huge advantage over brighter and larger globular clusters further south on the horizon. I hope you enjoy a view of it soon.

Messier 56 stats: Vis. Mag. 8.4; Size 8.8; Mag. of brightest stars 13.2.

Hallam Observatory Fee

A reminder that the Hallam Observatory annual access/key fee of \$60 is due October 1st. Please see our Treasurer Greg Mockler at the September meeting to pay for your key. If you no longer wish to have your own access to the observatory please turn in your key to Steve Mastellotto.

Key access to Hallam Observatory is available to all RASC Windsor Centre members in good standing who have been members for at least 1 year and complete a training session on the observatory equipment. Note that an additional \$10 key cutting fee applies.

IMPORTANT: Charitable Donations

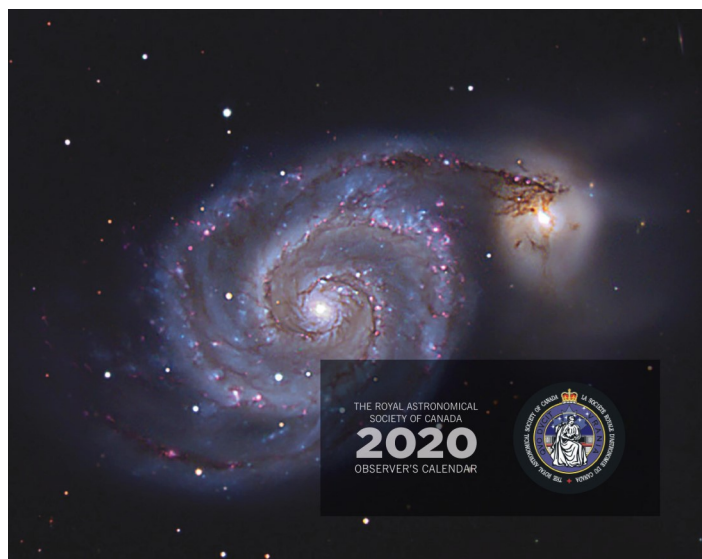
We need your help - To break even in a typical year we need to raise about \$1,000 over our normal income sources. In the past we have had garage sales, winery events and other fund raisers. These events are a lot of work for a few people as it is difficult to get enough people involved in planning and staging an event. Alternately we are asking our members to look at making a charitable donation. If most members contributed a few dollars (even \$25 or \$50) we would raise more than what a special event generates. Any donations made before the end of the year will be eligible for a charitable donation receipt which can be used on your 2019 tax return.

If you have any questions, please contact Greg Mockler, your earnest treasurer.

Calendars



RASC Windsor Centre - We will once again be producing a calendar featuring the astrophotography of Windsor Centre members. We are trying to estimate the interest level so please see our Treasurer, Greg Mockler at the September meeting if you are interested in purchasing the 2020 calendar. Steve Mastellotto will have a copy of past calendars available for you to review. The bulk order will be made in time for delivery at the October meeting. **Price will be \$20.00** (same as last year) which includes all postage, handling and taxes.



RASC National - Our Treasurer, Greg Mockler is taking orders for the 2020 RASC Calendar. **Price will be \$20.00** which includes all shipping, handling and taxes if he gets over 10 orders - this is the same price as last year and is substantially less than the \$26.22 (includes shipping, handling and taxes) by ordering directly from the National Office. Please see Greg at the September meeting.

Astrophotos



A number of weather related photos came through the group over the Summer in particular were these shots from July 2 by **Mitch Arsenault (Top)** and **Jeff Peacock (Middle Left)** of a shelf cloud and **Susan Sawyer-Beaulieu's** resulting rainbow **(Bottom Left)**. **Brian Simpson** captured the Ring Nebula M57 (Middle Right), **Pete Barbaro** caught the opposition of Jupiter (Middle Right) and **Mahayarrahh-Starr Livingstone** captured details of the moon around the crater Clavius.