

# Event Horizon



**Volume 29, Number 7  
May 2022**



## From The Editor

Once again this month there's lots and lots of content on a huge variety of topics.

There is also an announcement that submissions for the 2023 Calendar are now being accepted.

Thanks to all who contributed!

*Bob Christmas,  
Editor*

*editor 'AT'  
amateurastronomy.org*



## Chair's Report by Bernie Venasse

*Welcome to Mid-Spring!!*

Welcome to May, 2022. With the milder and clearer nights I know that everyone is anxious to get back outside under the night sky and visit old friends again.

We are now less than 2 years away from the total eclipse on April 8, 2024, and planning is under way. I invite each of our members to participate in the planning of events and activities related to the eclipse. We will soon be putting together a task group that will help coordinate some of the planning. Want to help? Get in touch. [eclipse@amateurastronomers.org](mailto:eclipse@amateurastronomers.org)

A big thanks to Larry McHenry, our speaker in April, for his inspiring and entertaining views about "Observing the Moon for Beginners", You can learn more about Larry's astronomical interests online at his webportal: <http://www.stellar-journeys.org/>

The new HAA Lunar Observing Program is now active. You can find it and other programs on our website:

<https://www.amateurastronomy.org/haa-observing-programs/>

*(Continued on [page 2](#))*

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## Chair's Report (continued)

### Hamilton Amateur Astronomers Club Member Interactive

A new page for members of the HAA is open on Facebook. The members page can be found at [www.facebook.com/groups/hamiltonamateurastronomers](https://www.facebook.com/groups/hamiltonamateurastronomers). This is a group page for club members only. Please feel free to discuss anything astronomy related as well as post images of your gear or astrophotos.

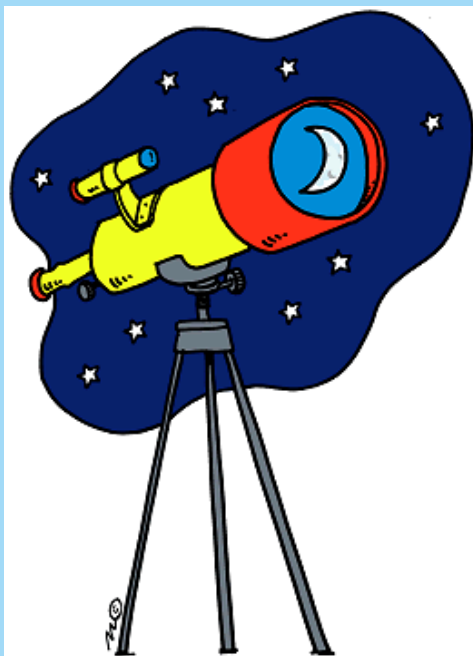
### Membership growth... new members list

We would like to take this opportunity to welcome new and/or returning members (March 1-April 25).

Matthew Trombetta, Stoney Ck.; Sean Robinson, Hamilton; Anastasia Morissette, St. Catharines; Thomas Burke, Hamilton; Milan Pilipovic, Ancaster; Patrick Northey, Hamilton; Marinda Corvera, Oakville; Daniel Baird, Oakville; Philip Gebhardt, Wainfleet; John Booth, Brantford; Maria Antelo, Hamilton; John Ceko, Hamilton; Douglas Sinclair, Dundas.

The club now has 72 individual memberships and 58 family memberships

### H.A.A.'s Loaner Scope Program



We at the HAA are proud of our Loaner Scope Program. It allows members who don't own a telescope to get more up close with the night sky, and it allows members to explore different types of telescopes! Paid members are welcome to borrow a telescope for one month. We have telescopes of varying expertise levels, a MallinCam, a spotter scope and various eyepieces. Please visit the HAA website for more information!

If you are interested in borrowing a telescope, please contact Melissa Whitman at

[loanerscope@amateurastronomy.org](mailto:loanerscope@amateurastronomy.org).

Telescopes are loaned out on a first come basis.

### HAA Helps Hamilton

While during the pandemic, the H.A.A. hasn't been able to collect donations from our members and guests for local food banks at our general meetings, the H.A.A. has always valued its relationships with food banks in the community, particularly [Hamilton Food Share](#).

In that spirit, we encourage you to continue making donations directly to your local food banks.



### **Masthead Photo:** *The Galaxies M81 and M82, by Michel Audette.*

Taken with 140ss vixen and asi2600mm. RGB filters 15 each colours. One night. 300 sec bin 1 max gain.

## 2023 HAA Celestial Events Calendar Image Submission Now Open

Believe it or not, it is time to start thinking about the HAA 2023 Celestial Events calendar. We have decided to open the image submission window earlier this year so, starting now, please feel free to submit as many images as you like to [calendar@amateurastronomy.org](mailto:calendar@amateurastronomy.org). The sky's the limit! Seriously, send in as many photos as you would like but please refrain from submitting images that have already been printed in one of our past Celestial Events Calendars. But please be aware that there is a limited amount of space in our calendar so we will probably not be able to print all of the images you send. That's OK though because there is always next year for any images that do not get selected this time.

Speaking of time, the timeframe for submitting an image is any time between now and midnight on September 11th, 2022. If your image is over 10 megabytes then please send it (or them if there are multiple images) via a download link such as WeTransfer. Images that are less than 10MB can be submitted through email with a maximum of 2 images per email messages (preferably as attachments rather than as embedded images).

Submissions (or download links) should be sent to [calendar@amateurastronomy.org](mailto:calendar@amateurastronomy.org) along with a short description of the main subject of your image, e.g., "M8", "Zodiacal Light", or "Total Lunar Eclipse".

The technical guidelines for submitted images are found below but please consider these to be guidelines only. Images that do not meet these guidelines are welcome. However, the more an image varies from the guidelines, the more likely that print reproduction of that image will be disappointing. Also, if you have any questions about the guidelines or terms used below, please feel free to ask.

Finally, THANK YOU to everyone who takes an astrophotograph, even if you decide not to submit them to the HAA Calendar for consideration. Your pursuit of an image helps us all. — *Editor, Calendar*

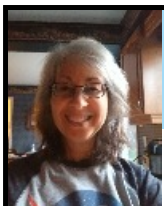
A brief review and discussion of these guidelines will be presented at the next HAA General Meeting.

- 1) Orientation - Landscape, i.e. the image is wider than it is tall. Non-landscape images will likely need to be cropped to fit onto a calendar page.
- 2) Aspect Ratio - 1.294:1, or 11" (28cm) x 8.5" (21.6cm) which is the same as letter-sized paper. As with orientation, images that do not conform to this aspect ratio will likely need to be cropped or have borders added to the edges of the image
- 3) Resolution - Our printer strongly recommends 300 pixels per inch for best results and a minimum of 150ppi. Images with significantly lower resolution will may appear fuzzy or out of focus when printed.
- 4) File Type - TIFF or PSD files are preferred. The use of jpg image file format will always result in the loss of image quality when the image is prepared for printing.
- 5) File Size - maximum 125MB (this would be a very large TIFF file). Images over 10MB should be submitted using a file transfer service such as WeTransfer. Images under 10MB can be submitted in an email with a maximum of 2 images per email.
- 6) Image Colour Depth - 14 to 16 bits (or higher - up to 32bits) per colour channel is preferred and a minimum 8 bits per channel is acceptable. This colour depth specification applies to greyscale (black and white) images as well.
- 7) Image Colour Space - In order of preference, CMYK (optimal), Adobe RGB or ProPhoto RGB, and sRGB are all acceptable image colour spaces. Please note that sRGB colour space submissions will likely result in some noticeable colour shifting when printed.

Overall Image Dimensions in pixels - Items 1, 2 and 3 above result in recommended dimensions of 3375 pixels by 2626 pixels and the minimum recommended dimensions for a full page image are 1687px by 1317px.

Both of the above overall size requirements include an allowance of 3.175mm or 1/8 inch on each side to aid in paper alignment. The printer refers to this alignment area around the outside of the image as "the bleed." It is strongly suggested that important elements of the image not be placed in the bleed area.

Images smaller than these overall size guidelines are very welcome but please be aware that images significantly smaller than 1687px by 1317px cannot be used as full page images. The absolute minimum image size requirement for potential inclusion in the calendar is 844px by 656px. An image that is between 1687px by 1317px & 844px by 656px will only have sufficient print resolution to appear on one of the gallery pages at the back of the calendar.



### ...A column for young astronomers - and those young at heart!

This month we are going to explore something we don't see very often in the Hamilton area...Aurora Borealis! What are they? Let's find out!

### Dancing with the Stars!

We cannot feel it, but the Sun is bombarding us with electrically charged particles every day...kind of like an invisible shower! Sometimes solar flares or coronal mass ejections happen and a large amount of x-rays, energy and particles are sent into space by the Sun.

Our Earth has a magnetic field which is like a protective shield and it deflects most of the Sun's particles away from the Earth. When a lot of particles are released on the side of the Sun facing Earth, they are attracted to these magnetic fields when they reach the Earth, anywhere from 1-4 days after a burst from the Sun.

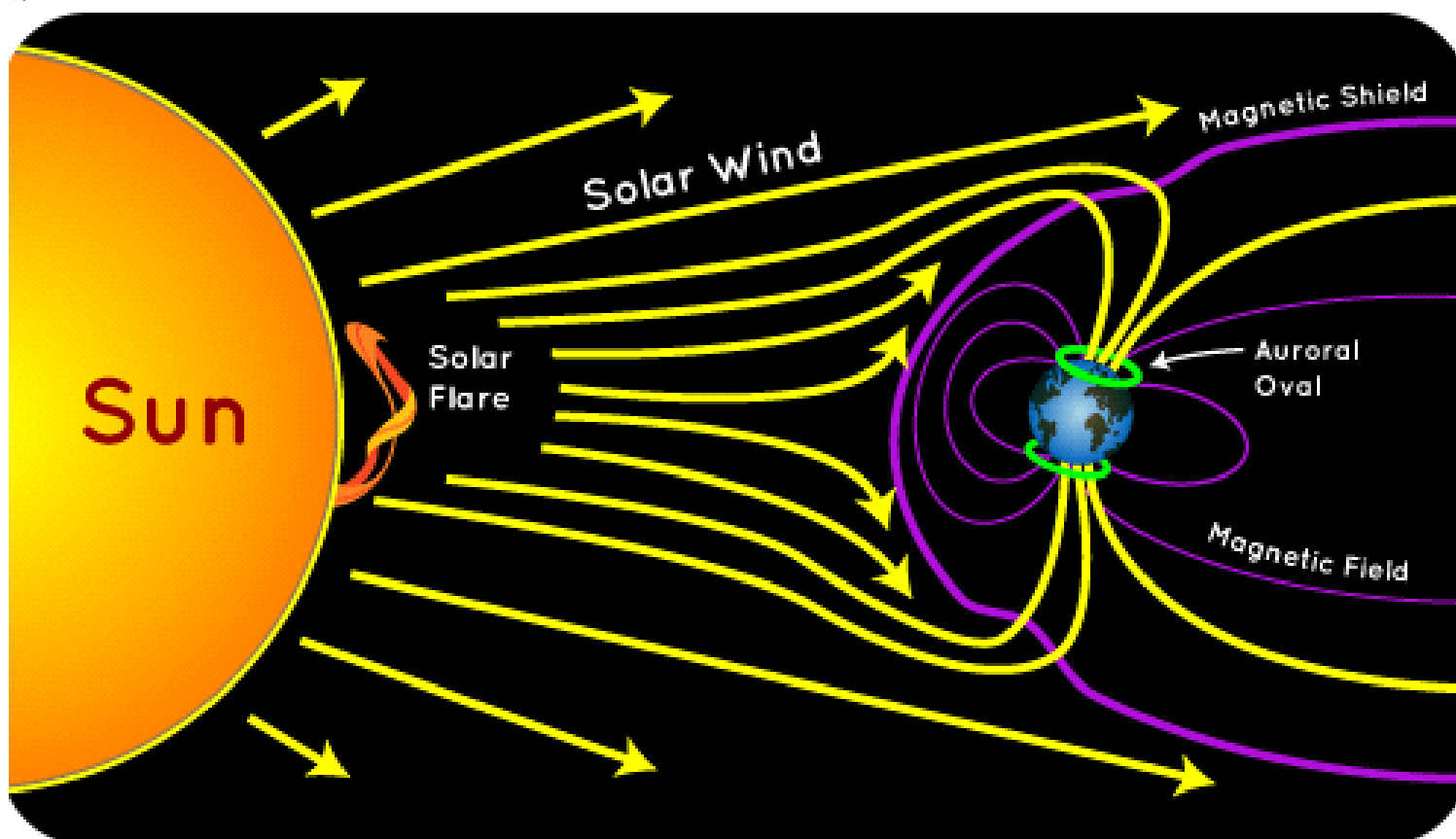


Image Credit: <https://spaceplace.nasa.gov/aurora/en/>

When the particles hit oxygen and nitrogen in our atmosphere, the oxygen and nitrogen light up! They are best seen when the sky is dark. Humans have watched these lights since prehistoric times and are seen in cave drawings from 32,000 years ago!

They have a few different names and were named Aurora after the Roman God of Morning by Galileo in 1619:

Aurora Borealis (uh-ROAR-uh bore-eee-AL-iss), or Northern Lights: When the lights are seen from the northern half of the Earth, usually closer to the north pole.

Aurora Australis (uh-ROAR-uh aw-STRAL-iss), or Southern lights: When the lights are seen from the southern half of the Earth, usually closer to the south pole.

(Continued on [page 5](#))

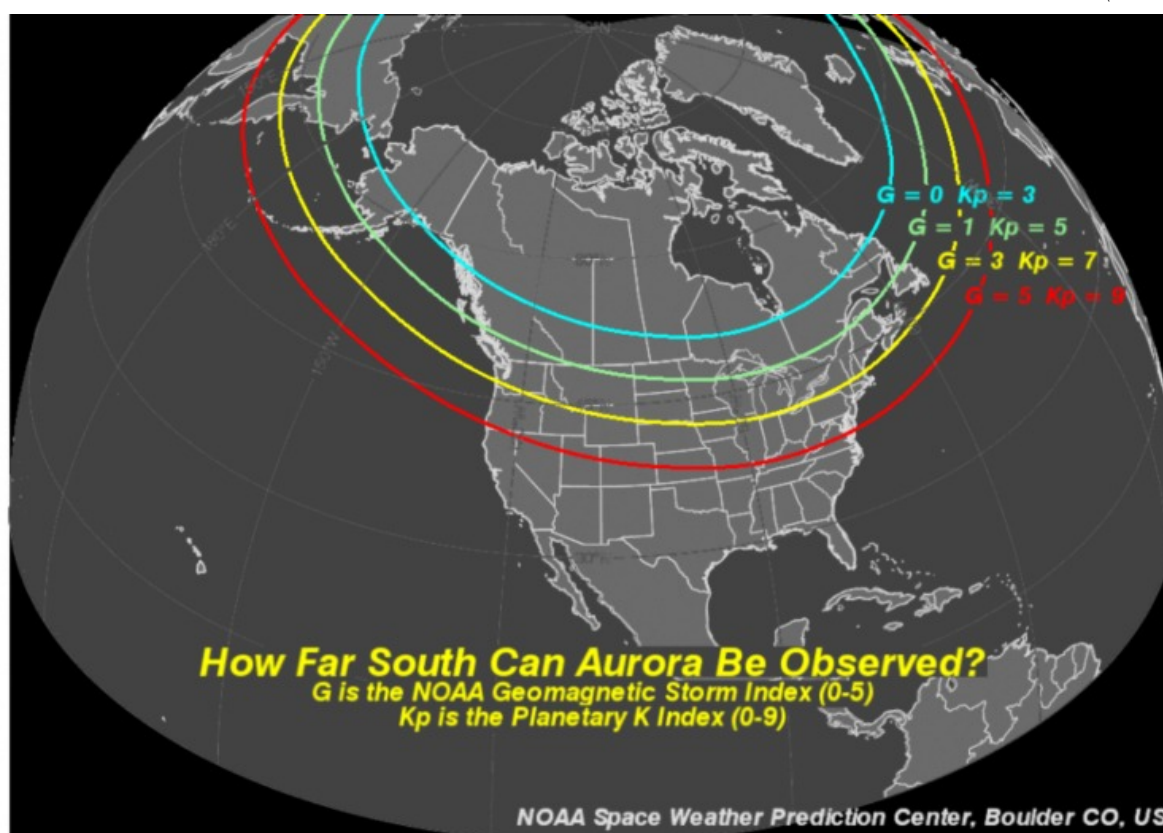




*Image Credit: NASA*

The lights can look like a moving, rippling ribbon in the night sky. They often appear green, red or blue and can be seen more often closer to Earth's poles. If the solar flares are large, the aurora may be seen further away from the poles...maybe even in our area!

There is an index called the KP index. It measures the level of disturbance in Earth's magnetic field and it can range from a 0-9. The higher the number, the further south the Northern lights can be seen! As you can see in the image below, the KP index would need to be KP 6 or 7 for us to see the aurora in the Hamilton area. *(Continued on [page 6](#))*



*Image Courtesy: NOAA Space Weather Prediction Center*

## HAA Explorers (continued)

The aurora can happen anywhere from 80kms (50 miles) to 500kms (300 miles) above the Earth. How high they are will determine their colours. For example, Oxygen will appear green between 80-220kms and red when higher at 200-500kms. Nitrogen can appear as blue and purple.

Other objects in our solar system have aurora, too! For example, Jupiter, Ganymede (one of Jupiter's moons) and Saturn have aurora! These objects also have magnetic fields.



*These swirls of red light are an aurora on the south pole of Saturn. Image courtesy of NASA/ESA/STScI/A. Schaller.*

### Things to do until next time \*\*:

**\*\* Check with your parents or caregivers before checking out websites.**

1. **Check out** [https://www.nasa.gov/mission\\_pages/sunearth/aurora-image-gallery/index.html](https://www.nasa.gov/mission_pages/sunearth/aurora-image-gallery/index.html) where you can see amazing photos of the aurora...even from the International Space Station!
2. **Visit this website** <https://www.spaceweather.com/> where you will find the most up-to-date forecasts for aurora and other things happening on the Sun.
3. **Make** your own pastel aurora: <https://spaceplace.nasa.gov/pastel-aurora/en/>

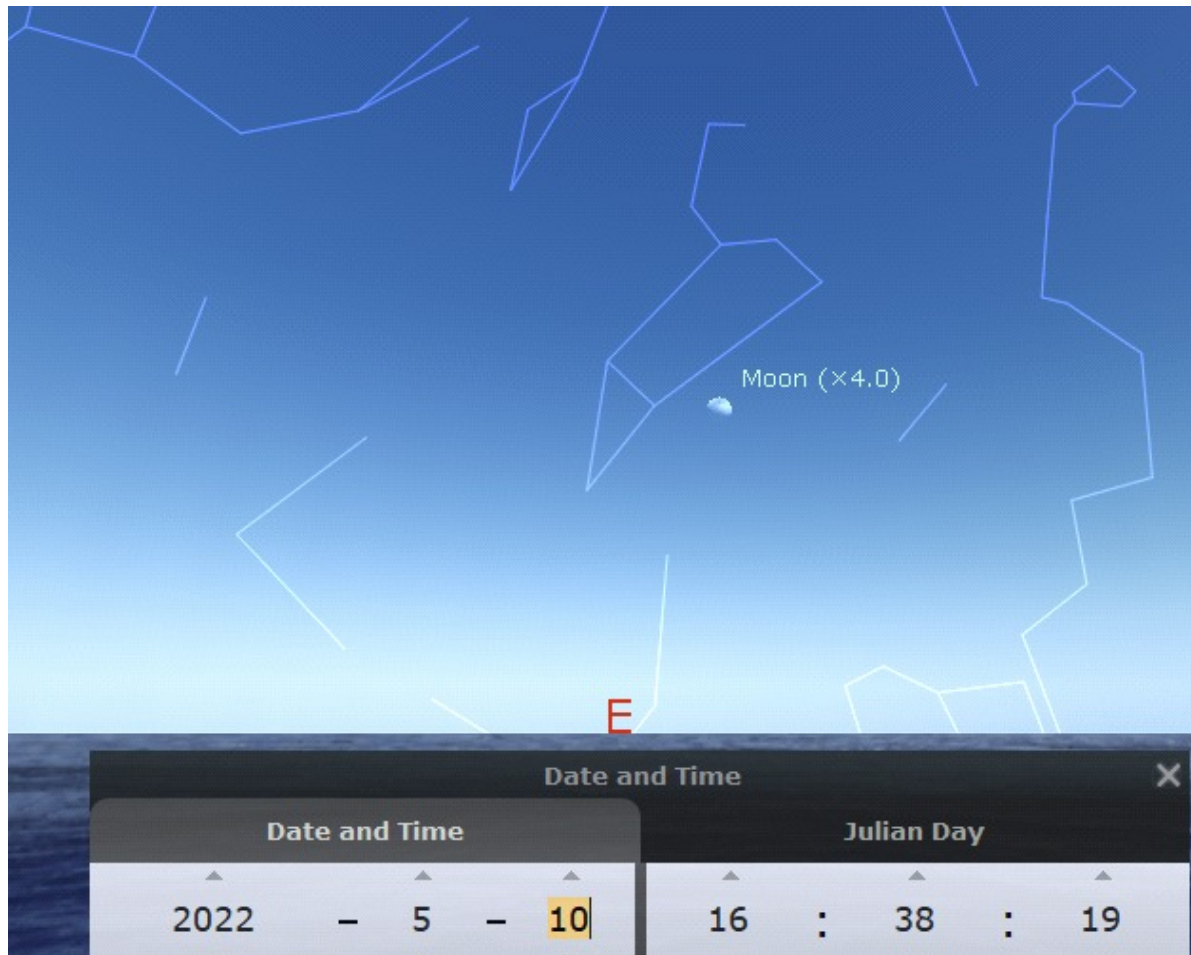
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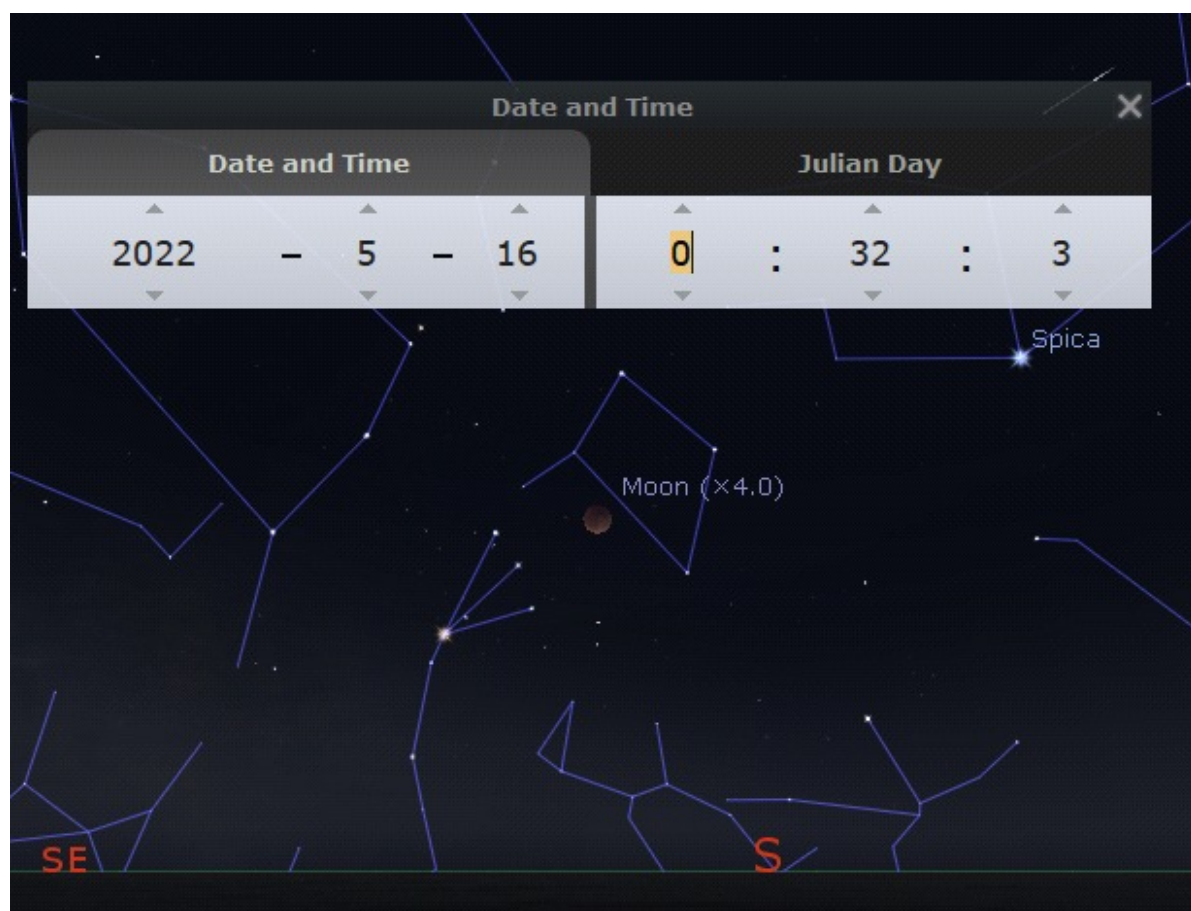
## HAA Explorers (continued)

During May, check out:

1. On Tuesday, May 10th around 4:30 PM, see if you can find the rising Waxing Gibbous Moon in the East



2. On Sunday night, May 15th, there will be a Lunar Eclipse (sorry it's on a school night!):



*Images generated using Stellarium*

*(Continued on [page 8](#))*

# Dancing Lights!

S	L	B	O	R	E	A	L	I	S	E	N	C	F
E	U	E	P	N	E	G	O	R	T	I	N	E	M
U	F	X	L	D	N	R	E	H	T	R	O	N	A
E	I	R	E	B	R	S	S	O	O	T	N	R	G
E	T	E	C	L	E	O	E	E	X	C	I	N	N
N	U	E	S	E	H	A	L	O	Y	T	T	X	E
T	A	R	E	S	T	U	C	I	G	E	N	P	T
G	E	R	S	Y	U	R	I	E	E	E	E	A	I
R	B	N	R	S	O	O	T	O	N	A	S	O	C
E	R	A	T	R	S	R	R	S	E	R	A	L	F
E	E	T	N	M	B	A	A	B	L	U	E	A	R
N	D	U	U	N	G	C	P	E	D	L	C	Y	F
E	A	T	U	A	A	U	S	T	R	A	L	I	S
L	P	U	R	P	L	E	A	T	U	T	O	S	I

PARTICLES  
NORTHERN  
MAGNETIC  
PURPLE  
BOREALIS  
AUSTRALIS  
OXYGEN  
SOUTHERN  
BEAUTIFUL  
AURORA  
NITROGEN  
BLUE  
GREEN  
FLARES  
RED

Answers on page 12.

© TheWordSearch.com

## Finally:

What did the Sun say to the Earth?

Answer: 'I'm turning on the lights!'

If you have a question you would like answered in the newsletter, please send it to [education@amateurastronomy.org](mailto:education@amateurastronomy.org).

Thank you to Ro for reviewing this article! 😊

## References:

Backyard Astronomers Guide. Dickenson and Dyer. Firefly Books. 2021.  
How Space Works. DK Penguin Random House. 2021.  
National Geographic Kids: Ultimate Explorer Field Guide: Night Sky. 2016.  
Nightwatch. Terence Dickenson. 1998.  
Philip's Essential Guide to Space. Paul Sutherland. 2016.



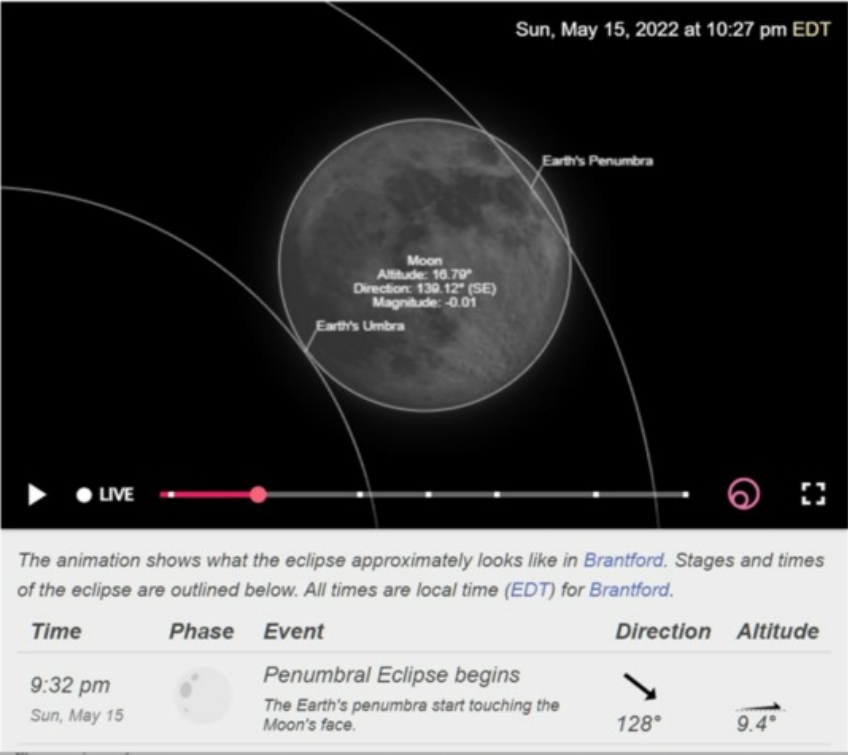


# The Sky This Month for May 2022 by Matthew Mannering

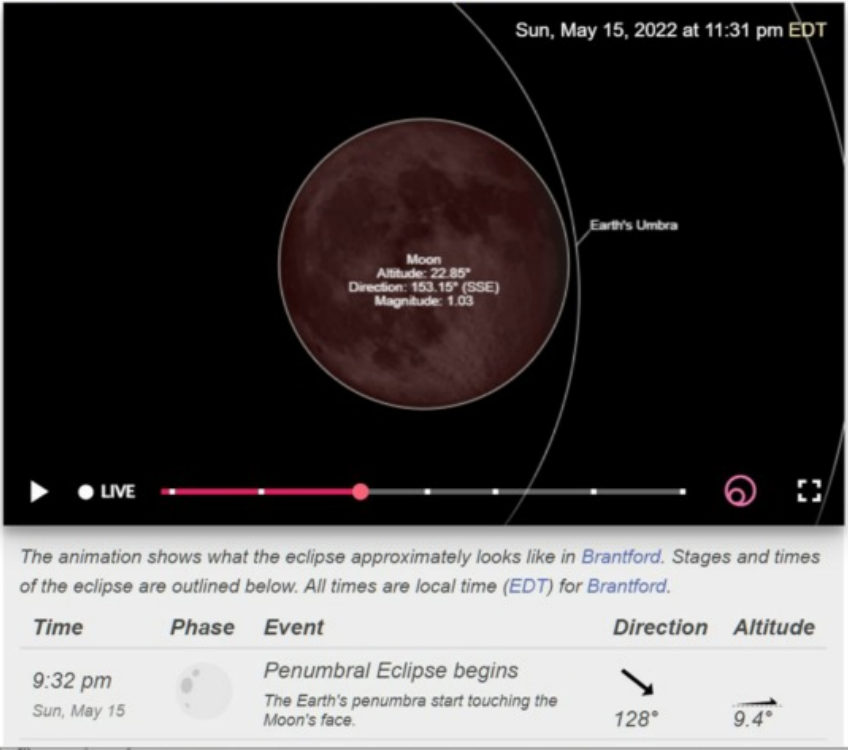
This month we are in for a special treat! On the evening of May 15th, we will experience a total Lunar eclipse. While enjoying the eclipse during totality, check out the Milky Way. Normally due to its brightness, the glow of the full Moon drowns out the Milky Way. However, during totality, the Milky Way should appear in all its glory. Once totality ends, the Milky Way will disappear behind the glow of the Moon. If you would like to try and photograph the eclipse, all you need is a camera and tripod. If you don't have the option of running the camera in full manual mode, try the 'night shot' option if your camera has it. Here is the timing for the eclipse:

**First contact of the Umbra at 22:27 on May 15th. Full eclipse begins at 23:29.**

May 15–16, 2022 — Total Lunar Eclipse — Brantford

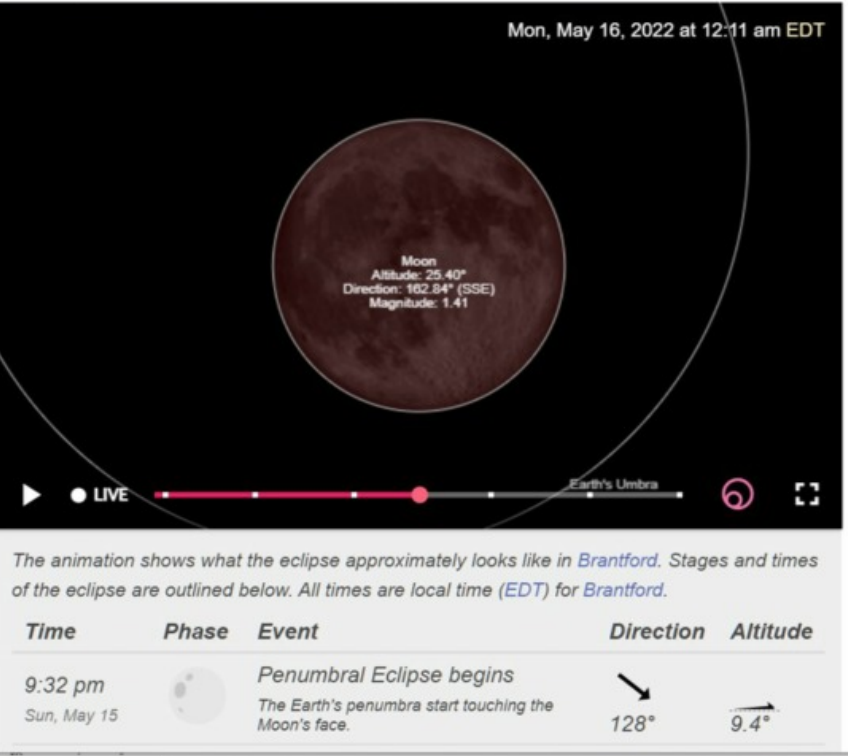


May 15–16, 2022 — Total Lunar Eclipse — Brantford



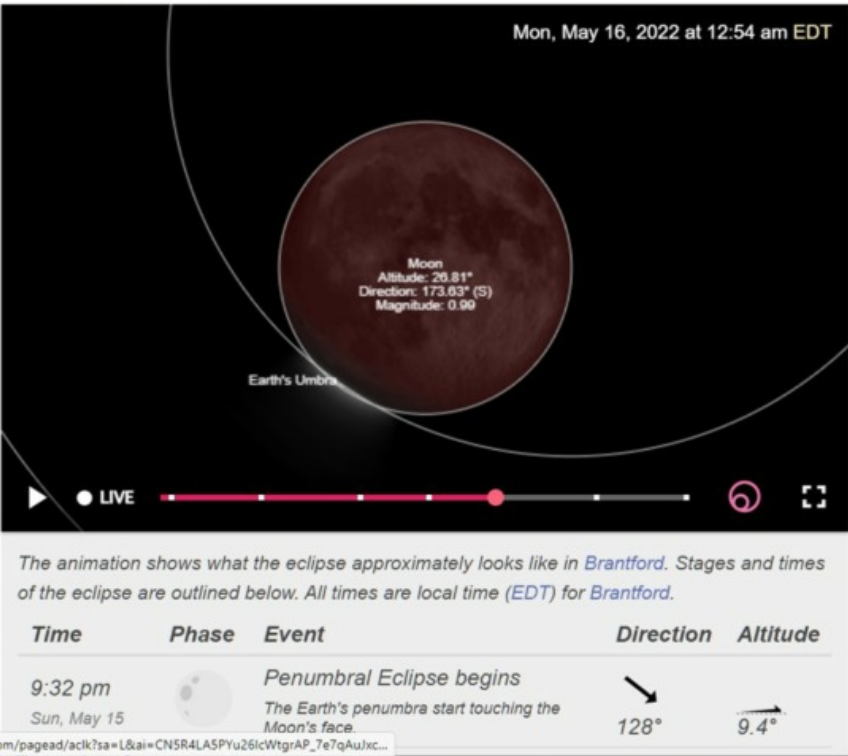
**Greatest eclipse at 00:11 on the 16th.**

May 15–16, 2022 — Total Lunar Eclipse — Brantford



**Totality ends at 00:54.**

May 15–16, 2022 — Total Lunar Eclipse — Brantford

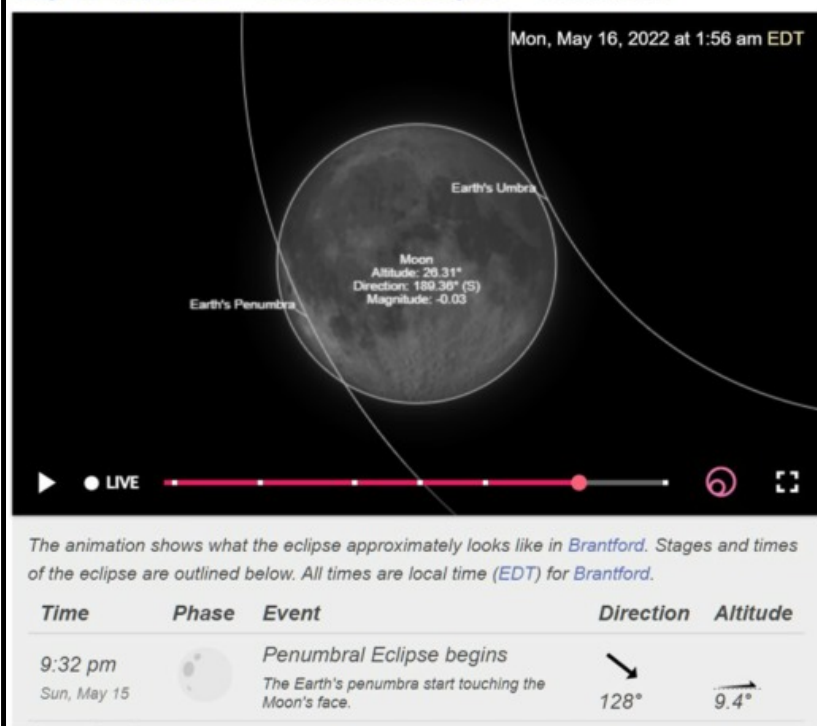


(Continued on [page 10](#))

## The Sky This Month for May 2022 (continued)

### Umbra exits the Lunar disk at 01:55.

May 15–16, 2022 — Total Lunar Eclipse — Brantford



*Thin crescent Moon on April 28.  
Credit: Matthew Mannering*

On the morning of April 28, Janice and I were able to get out and see Jupiter, Venus, Mars and Saturn. Jupiter and Venus were still about  $2.5^\circ$  apart. Our pictures didn't turn out very well because of dawn spreading across the sky. However, we did notice the Moon rising and I was able to take a nice picture.

For the last week and a half, Mercury has been visible in the evening. On April 29th, a small group of observers from the club were able to catch a glimpse of Mercury just above the treeline with the Pleiades star cluster up and to the right. There was significant sky glow, and the transparency was poor, so the view was terrible, but it still counts as an observation. Here is an image Janice took with Mercury only just above the treeline and wires.

On the same evening, I was able to see the Sombrero galaxy (M104), the Star Gate (an asterism between Corvus and Virgo), the double star Castor and the galaxy M66 in the Leo Trio.

One of our members was going after galaxy M49 in the Virgo galaxy cluster using her 300mm dob. This was a real challenge due to poor sky transparency, but she persevered and eventually found it. One of the challenges when observing the Virgo cluster is the abundance of galaxies all in a small area of the sky. It isn't always easy to know if you are looking at the correct one. We spent some time matching the



(Continued on [page 11](#))

(bottom right) Mercury and the Pleiades April 29, 2022  
Image Credit: Janice Mannering



## The Sky This Month for May 2022 (continued)

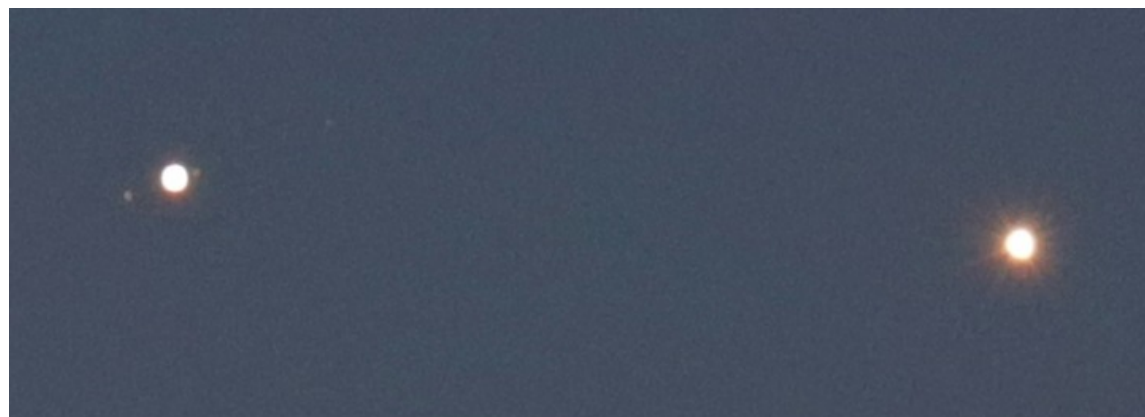
star field in the eyepiece to the map in SkySafari to confirm it was indeed a match.

Janice and I spent a considerable part of the evening relearning the eccentricities of our Meade EQ mount. It has some very peculiar software in the hand controller that makes aligning the mount a significant challenge. I think we will need to write down a sequence of steps that allows us to align by choosing the stars we want to use. Allowing the mount to pick the stars never seems to work out as the second star is usually at the Zenith (straight up). To align to that star, you must lay on the ground and use the hand controller to centre the star. Needless to say, this isn't the preferred method (sarcasm intended).

We ended up getting home at about 12:30am only to get up again (April 30th) at 4:30am to see the close approach of Venus to Jupiter. The two planets were separated by only one Moon diameter. Further along the plane of the ecliptic, Mars and Saturn were also visible until the coming dawn washed out the sky.



*Jupiter, Venus, Mars and Saturn early morning April 30, 2022*      *Image Credit: Matthew Mannering*



*Jupiter and Venus*      *Image Credit: Janice Mannering*

Using a long lens on her camera, Janice was able to pick up three of Jupiter's moons. In this image, Ganymede is to the left of Jupiter and Io and Callisto are to the right.

We only had three hours sleep between viewing sessions, so we went home and got straight back to sleep.

(Continued on [page 12](#))



## The Sky This Month for May 2022 (continued)

The morning parade of planets continues well into June. Keep the morning of May 29 at about 4:30am in mind, as Mars and Jupiter will be separated by only  $0.6^\circ$ .

### Moon Phases

8th: First Quarter (waxing)

16th: Full Moon

22nd: Last Quarter (waning)

30th: New Moon

### Lunar Libration greatest visible extents

Libration, or the apparent wobble of the Moon, allows us to get a peak at portions of the far side of the Moon. In most cases, we get to see an extra 6 to 8 degrees of the surface when the libration is at its greatest in any direction.

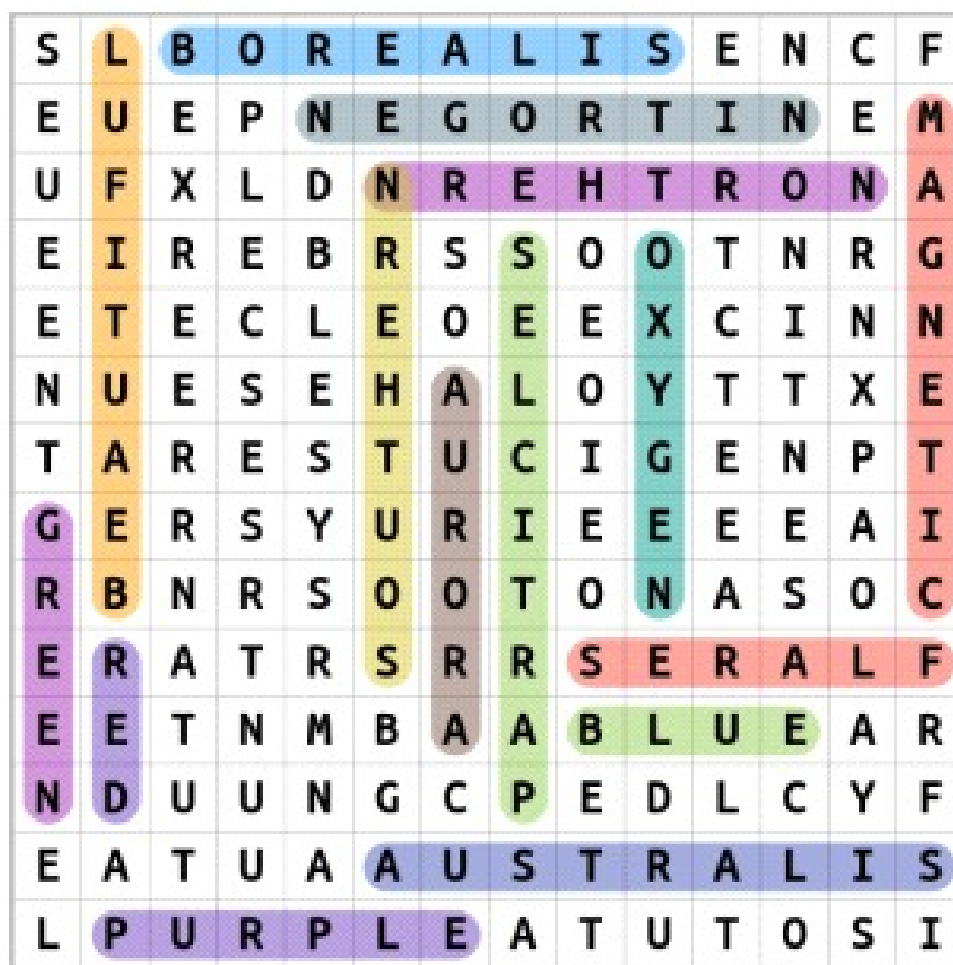
9th: Southern limb

12th: Western limb

22nd: Northern limb

24th: Eastern limb

Page 8 Word Search Solution:





## Contents:

What's up in awards?

Rising Star Program: May, June

Pathways Observing Program targets... May, June

Messier Observing Program: May, June... Including target hints!!

Comets

Upcoming Meteor showers

## What's Up in Awards?

The Hamilton Amateur Astronomers Observing Programs are designed to provide direction for amateur astronomer's observations and to reward their accomplishments. A certificate is awarded when the goals of the observing program are met. The HAA offer various certificates based upon achieving specific observing goals. There is no time limit for completing the required observing but good record keeping is required. Each observer must perform all the requirements of each Observing Program themselves. However, observers are able to receive help from (an)other observer(s) as they learn to find and identify different objects. Each observer will then need to locate and observe the object on their own to meet the goals of the program. Observing logs will be submitted to and examined by the HAA Observing Programs Project Coordinator to confirm all observations before a certificate is granted.

This column tells you which objects are visible this next month for the HAA Observing Programs and other sights of interest.

## HAA Rising Star Observing Award

### May

Constellations: Ursa Minor, Leo

Stars: Spica

Double Stars: Mizar

Object Pairs: M85/M86

Messier objects: M51

### June

Constellations: Bootes, Corona Borealis, Hercules

Stars: Arcturus

Double Stars: Zuben el Genubi

Object Pairs: NGC 5024, NGC 5053

Messier objects: M8

## Pathways Observing Program

Observable in May, June

Group A,

Spring Constellations: Find, observe, sketch: *Ursa Major, Bootes, Virgo.*

Stars: Find, observe, sketch: *Polaris, Arcturus, Spica.*

Asterisms: Find, observe, sketch: *Big Dipper, Virgo Diamond, Sickle.*

Planet: Any one planet that is remaining in the list.

Observable in July-August-September

Group B,

Summer Constellations: Find, observe, sketch: *Hercules, Cepheus, Scorpius.*

Stars: Find, observe, sketch: *Altair, Vega, Antares.*

Asterisms: Find, observe, sketch: *Dragon Head, Hercules Keystone. Summer Triangle.*

Planet: Any one planet that is remaining in the list.

(Continued on [page 14](#))

### HAA Messier Objects Observing Award

#### *May Messier targets*

- M51** The famous Whirlpool galaxy in Canes Venatici is a bright face-on spiral with a smaller elliptical companion, NGC 5195. Look for a pair of fuzzy patches of light. The slightly larger and brighter one is M51. Make sure to spend some time here as there is almost always some spiral structure to be seen. On good nights the detail can be unbelievable. This is a difficult but very possible object in binoculars; appearing as a hazy patch of light.
- M63** Another spiral galaxy in Canes Venatici smaller and fainter than M51 but seen more edge-on, so the galaxy appears as an elongated patch of light with a bright star at one end. Further observation will show a faint halo around this patch. This is a difficult object in binoculars.
- M94** Just past M63 is another galaxy in Canes Venatici. Look for a bright, fuzzy star to find the core of M94, surrounded by a faint haze. A tough binocular object.
- M101** I consider this face-on spiral galaxy in Ursa Major one of the most difficult Messier objects to find in a telescope. This is a large, faint patch of light almost as big as the full moon. There is no real condensation, so use low power and look for a brighter part of the sky, more of a change in contrast than an object at first glance, which is the galaxy. Dark skies really help in the search of this one.
- M102** Not an official Messier object in most references, we will look for the galaxy NGC 5866 which is a somewhat standard insertion. Look for a small, faint patch of light that looks like a short, fuzzy line.
- M64** In a telescope, this galaxy in Coma Berenices is a fairly bright, slightly oval shaped, patch of light. Look for the dark lane which gives this galaxy the common name Black Eye. The galaxy appears as a faint, fuzzy patch in binoculars.
- M85** This elliptical galaxy lies in Coma Berenices just north of the Virgo Cluster of galaxies. It appears as a bright but small, patch of light with a bright, stellar core.
- M49** This is an elliptical galaxy in Virgo just south of the main cluster of galaxies. M49 is round patch of light with bright center gradually fading to a round halo. M49 looks like a faint, fuzzy star in binoculars.
- M61** This is a face on spiral galaxy just south of M49 in Virgo, but much fainter. Look for a faint, round fuzzy patch of light.
- M104** This is the well-known Sombrero galaxy in Virgo. It is a bright, edge-on, spiral galaxy which looks like a bright, elongated streak. It is very possible to see in binoculars.

#### *June Messier targets*

- M84, M86** A pair of small fuzzy balls with bright, almost stellar cores. Both easily fit into the same low power field of view. M86 is slightly brighter and more oval than round M84.
- M87** Another round, fuzzy ball, with a bright core. Slightly brighter than both M84 and M86.

(Continued on [page 15](#))



## What's Up in Awards? May-June 2022 (continued)

**M89, M90** Both of these galaxies fit into the same low power field of view. M89 is another round fuzzy ball similar to M84, while M90 appears as an oval patch of light larger than M89. M90 has a bright central region.

**M91** A faint, slightly irregular oval hazy patch of light.

**M88** A small oval shaped fuzzy patch with a bright stellar core. Similar in size and shape to M90. It can fit into the same field of view as M91.

**M58** A slightly oval shaped fuzzy patch of light with a bright central region.

**M59, M60** M59 and M60 can both easily fit into the same field of view. M59 is a small, hazy, oval patch. Not all that easy to see. M60 is another fuzzy, oval patch of light; larger and brighter than M59.

**M99** A bright round fuzzy patch of light.

**M98** This galaxy appears as a bright pencil like streak of light.

**M100** A round hazy glow of light, bright in the center but gradually fading towards the edge.

### The Planets... May 2022 via (BBC) Sky at Night Magazine

**Mercury:** Impressive evening planet at start of May, near the Pleiades.

**Venus:** Morning planet, near Jupiter on 1 May. 10%-lit waning crescent Moon nearby on 27 May.

**Mars:** Morning planet. Close encounter with Jupiter at end of May.

**Jupiter:** Morning planet, near Venus on 1 May and Mars on 29 May. Waning Moon nearby on 25 May.

**Saturn:** Low altitude morning object. Waning gibbous Moon on 22 May.

**Uranus:** Uranus lines up with the Sun on 5 May and not visible this month.

**Neptune:** Neptune is a morning planet, but not visible this month.

### The Planets... June 2022 via (BBC) Sky at Night Magazine

**Mercury:** Best at end of month at mag. -0.6, rising 70 minutes before Sun.

**Venus:** Morning object. 7% waning crescent Moon nearby on morning of 26 June.

**Mars:** Appearing close to Jupiter at the start of June.

**Jupiter:** Morning planet, near Mars at the start of June. Last quarter Moon nearby on 21 June.

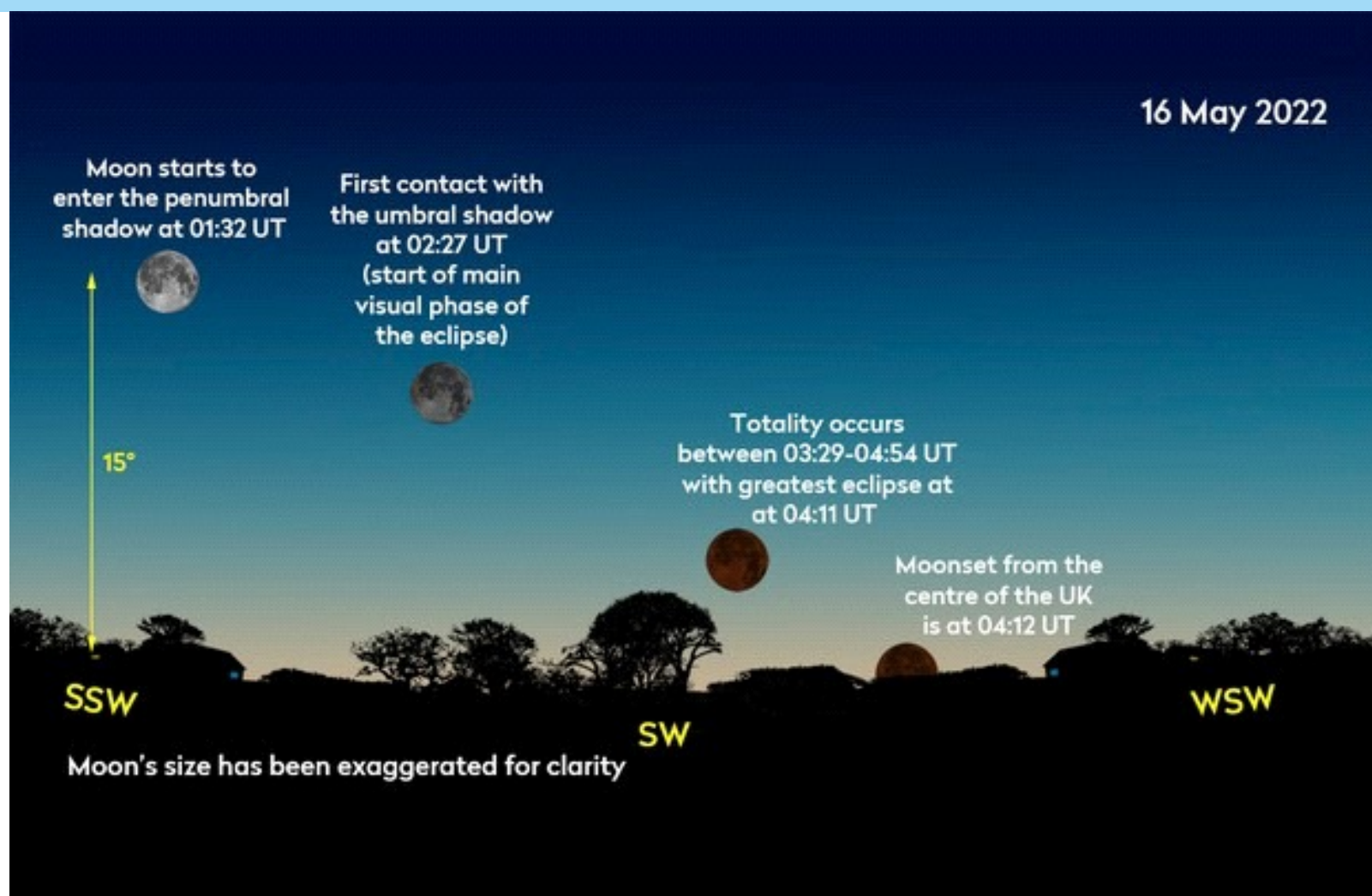
**Saturn:** Morning planet. Waning gibbous Moon nearby on the mornings of 18 and 19 June.

**Uranus:** Morning planet Uranus is not visible this month.

**Neptune:** Neptune is a morning planet, but not visible this month.

(Continued on [page 16](#))

## What's Up in Awards? May-June 2022 (continued)



*Watch out for a total lunar eclipse on 15 & 16 May. This chart of the view from the UK.  
Credit: Pete Lawrence*



*Keep an eye out for  
noctilucent clouds.*

*This NLC display was  
captured by Hannah  
Rochford, Gower,  
Swansea, Wales,  
4 June 2021.*

*Equipment: Canon 5D  
MkII DSLR, Sigma 150–  
600mm lens*

*(Continued on [page 17](#))*



## What's Up in Awards? May-June 2022 (continued)

Comets May-June 2022 via Seiichi Yoshida <http://www.aerith.net/index.html>

Mag = Magnitude, h= Highest altitude in that month observed at 35° N

	Evening			Midnight			Morning		
	Comet	Mg	h	Comet	Mg	h	Comet	Mg	h
2022 May	<a href="#">C/2021 O3 (PanSTARRS)</a>	5	43	<a href="#">C/2021 O3 (PanSTARRS)</a>	7	36	<a href="#">C/2021 O3 (PanSTARRS)</a>	6	29
	<a href="#">C/2017 K2 (PanSTARRS)</a>	8	18	<a href="#">C/2017 K2 (PanSTARRS)</a>	8	65	<a href="#">C/2017 K2 (PanSTARRS)</a>	8	66
	<a href="#">C/2019 L3 (ATLAS)</a>	10	34	<a href="#">C/2019 T4 (ATLAS)</a>	11	26	<a href="#">22P/Kopff</a>	11	18
	<a href="#">45P/Honda- Mrkos-Pajdusakova</a>	10	7	<a href="#">C/2021 P4 (ATLAS)</a>	12	5	<a href="#">C/2021 P4 (ATLAS)</a>	12	10
	<a href="#">C/2019 T4 (ATLAS)</a>	11	43	<a href="#">19P/Borrelly</a>	12	3	<a href="#">9P/Tempel 1</a>	12	20
	<a href="#">C/2021 P4 (ATLAS)</a>	12	21	<a href="#">117P/Helin- Roman- Alu 1</a>	13	16	<a href="#">C/2021 A1 (Leonard)</a>	13	16
	<a href="#">19P/Borrelly</a>	12	37	<a href="#">73P/Schwassmann-Wachmann 3</a>	13	16	<a href="#">117P/Helin- Roman- Alu 1</a>	13	26
	<a href="#">73P/Schwassmann-Wachmann 3</a>	13	56	<a href="#">C/2019 U5 (PanSTARRS)</a>	13	83	<a href="#">C/2019 U5 (PanSTARRS)</a>	13	57
	<a href="#">C/2019 U5 (PanSTARRS)</a>	13	83	<a href="#">C/2021 A1 (Leonard)</a>	13	17	<a href="#">C/2020 V2 (ZTF)</a>	13	19
	<a href="#">C/2020 V2 (ZTF)</a>	13	64	<a href="#">C/2020 V2 (ZTF)</a>	13	44	<a href="#">C/2020 K1 (PanSTARRS)</a>	13	74
	<a href="#">C/2020 K1 (PanSTARRS)</a>	13	20	<a href="#">C/2020 K1 (PanSTARRS)</a>	13	57			
	<a href="#">116P/Wild 4</a>	13	65	<a href="#">116P/Wild 4</a>	13	23			
2022 Jun	<a href="#">C/2017 K2 (PanSTARRS)</a>	8	48	<a href="#">C/2017 K2 (PanSTARRS)</a>	8	64	<a href="#">C/2017 K2 (PanSTARRS)</a>	8	57
	<a href="#">C/2021 O3 (PanSTARRS)</a>	10	63	<a href="#">C/2021 O3 (PanSTARRS)</a>	10	46	<a href="#">C/2021 O3 (PanSTARRS)</a>	10	30
	<a href="#">C/2019 L3 (ATLAS)</a>	10	4	<a href="#">C/2019 T4 (ATLAS)</a>	11	8	<a href="#">22P/Kopff</a>	11	32
	<a href="#">C/2021 P4 (ATLAS)</a>	11	19	<a href="#">C/2021 P4 (ATLAS)</a>	12	2	<a href="#">169P/NEAT</a>	12	12
	<a href="#">C/2019 T4 (ATLAS)</a>	11	39	<a href="#">73P/Schwassmann-Wachmann 3</a>	12	6	<a href="#">9P/Tempel 1</a>	12	29
	<a href="#">73P/Schwassmann-Wachmann 3</a>	12	43	<a href="#">117P/Helin- Roman- Alu 1</a>	13	25	<a href="#">117P/Helin- Roman- Alu 1</a>	13	25
	<a href="#">45P/Honda- Mrkos-Pajdusakova</a>	12	8	<a href="#">9P/Tempel 1</a>	13	3	<a href="#">C/2020 K1 (PanSTARRS)</a>	13	67
	<a href="#">117P/Helin- Roman- Alu 1</a>	13	9	<a href="#">C/2020 K1 (PanSTARRS)</a>	13	73	<a href="#">C/2019 U5 (PanSTARRS)</a>	13	28
	<a href="#">C/2020 K1 (PanSTARRS)</a>	13	51	<a href="#">C/2019 U5 (PanSTARRS)</a>	13	62	<a href="#">C/2020 V2 (ZTF)</a>	13	7
	<a href="#">C/2019 U5 (PanSTARRS)</a>	13	84	<a href="#">C/2020 V2 (ZTF)</a>	13	23	<a href="#">C/2022 E3 (ZTF)</a>	13	73
	<a href="#">C/2020 V2 (ZTF)</a>	13	47	<a href="#">19P/Borrelly</a>	13	1	<a href="#">C/2021 A1 (Leonard)</a>	13	14
	<a href="#">19P/Borrelly</a>	13	29	<a href="#">C/2022 E3 (ZTF)</a>	13	86			
	<a href="#">C/2022 E3 (ZTF)</a>	13	47	<a href="#">116P/Wild 4</a>	13	2			
	<a href="#">116P/Wild 4</a>	13	39	<a href="#">C/2021 A1 (Leonard)</a>	13	17			

(Continued on [page 18](#))



### Meteor Showers via American Meteor Society

#### eta Aquariids

**Period of activity:** April 15th to May 27th, 2022

**Peak Night:** May 4-5, 2022

The eta Aquariids are a strong shower when viewed from the southern tropics. From the equator northward, they usually only produce medium rates of 10-30 per hour just before dawn. Activity is good for a week centered the night of maximum activity. These are swift meteors that produce a high percentage of persistent trains, but few fireballs.

**Shower details - Radiant:** 22:30 -1° - **ZHR:** 40 - **Velocity:** 40.7 miles/sec (swift - 65.5km/sec)

**Parent Object:** 1P/Halley

**Next Peak** - The eta Aquariids will next peak on the May 4-5, 2022 night. On this night, the moon will be 15% full.

### Observing Award Recipients

We would like to give recognition and congratulations to any member who completes an award program regardless of the sponsoring organization. Congratulations to the following:

#### HAA

##### Rising Star Awards

001 Jean Jefferson

002 Kevin Salwach

003 Jo Ann Salci (Nov 2021)

#### Astronomical League

Bernie Venasse

Binocular Double Star Observing Program 143

Binocular Variable Star Observing Program 051

Binocular Solar System Observing Award 183-B

Sketching Observing Program 052

Meteor Observing Program 207

Galileo (Binocular) Observing Award 75-B

#### RASC

Jo Ann Salci

Exploring Exoplanets (on-line course)

Swapna Shrivastava

Explore the Moon

Explore the Universe

Bernie Venasse

Explore the Universe

Please feel free to contact me with any questions or comments at [chair@amateurastronomy.org](mailto:chair@amateurastronomy.org)

— Bernie



# The Search for Life on Mars, Part 1 by Doug Currie

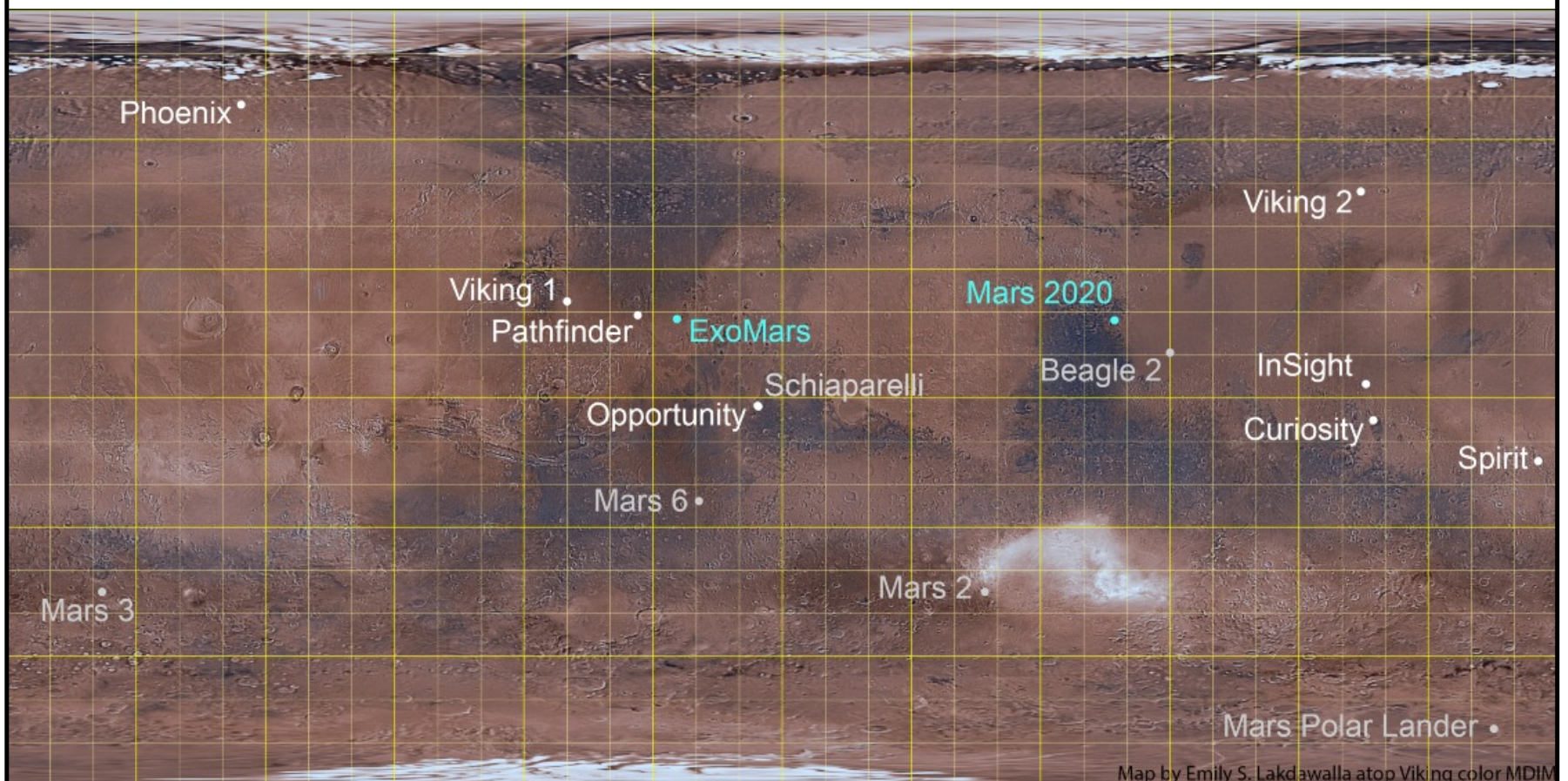
## Early Search for Life on Mars

The polar caps of Mars were discovered in the 1600s and near the end of the 1700s famous astronomer William Herschel provided evidence they alternatively grew and reduced during each Martian year (of almost 700 earth days). By the mid 1800s astronomers had also discovered that Mars had a tilt on its axis similar to Earth's and that it had a day of just over 24 ½ hours that was just a little longer than an earth day of not quite 24 hours. These pieces of information as well as the still low resolution observations of light and dark areas on Mars that were then thought to be areas of land and water led to optimistic ideas that there could be substantial life on Mars.

## Viking Probe Results

The Viking set of Mars missions by US space agency NASA was a very extensive and ambitious mission to explore Mars, especially for the time it arrived at Mars in 1976 that is now over 40 years ago. There were two orbiters and two landers. The Viking 1 lander came down at a site in the Chryse Planitia or plains of gold region of Mars. The Viking 2 lander came down at a site in the Utopia Planitia or plains of utopia region of Mars. Both landers had capabilities to search for at least microbial life on Mars. There were two main instruments to look for life on Mars on each lander a gas chromatograph and a labeled release experiment. Both landers and the orbiters continued in operation on or above Mars for several years, some into the 1980s. Ultimately it was determined by the majority of the astronomical or science community that life was not detected on Mars by Viking. This was because they viewed the gas chromatograph results as negative and the labeled release results as due to contamination from earth although they gave some possible indications of life. There was the discovery of some simple chlorinated organic compounds chloromethane and dichloroethane but these were thought to be contaminants from earth of chemicals used in cleaning.

(Continued on [page 20](#))



*Map Credit: Emily S. Lakdawalla atop Viking color VDIM*



### The Search for Water in Mars' History

There has been a long history of the search for water on Mars. Some of the ideas in this area have turned out to be misguided. As I have mentioned earlier, one of the early ideas about surface water on Mars was that the light areas were land especially desert like land areas and the darker areas were bodies of water. To build on this, in the late 1800s an Italian astronomer names Shiaparelli named a lot of long, straight, narrow features he thought he saw on Mars (sometimes between the dark areas) canali which is Italian for channels. However in a major language communication error American astronomer Percival Lowell got caught with the optimism of the day for life on Mars and the Italian word for channels, canali, sounding more like the English word for canals. Of course canals are associated with major engineering projects and intelligent change of the environment on Earth and the word canali became associated with a hypothetical race and dying civilization of intelligent Martians to science fiction writers like H.G. Wells and his famous book War of the Worlds or even for serious astronomers and other scientists of that time in the early 1900s.

However, eventually reality came and it was not quite so interesting or intriguing. This reality was from the first orbiter of Mars, Mariner 10. It saw many craters on Mars but also a number of dried up river valleys or perhaps shorelines that could and still can quite readily be interpreted by the erosion of formerly flowing and accumulated liquid water on the surface of Mars when Mars might have then had more liquid water on its surface, a thicker atmosphere including liquid water clouds and an active water cycle with regular water rain on its surface. In 2008 the Phoenix lander did confirm water ice just near the surface of Mars near the north pole of Mars. Somewhat later the twin Spirit and Opportunity rovers each found evidence of features made by liquid surface water in their locations early in Martian history. The Spirit rover landed in or around Gusev Crater and the Opportunity rover landed in the Meridiani Planum region of Mars.

Since then the Curiosity rover, that landed in Gale Crater in 2012, has confirmed there was at one time a lake of water in much of that crater. This water over time gave much deposit in the crater including much of the central mountain, Mount Sharp, in Gale Crater that the Curiosity Rover continues to ascend in its study of Mars including the search for past life in its many layers of sedimentation. There were also clays and carbonates in some areas of Mount Sharp and Gale Crater that indicated the presence of past. In some areas of Gale Crater past habitable environments were found with neutral pH or drinkable water. I believe this drinkable water was found in a mudstone area of Gale Crater. Curiosity continues to look for signs of past life, including sometimes checking what water was formerly was present where the rover was and how habitable environment the immediate environment might be. The Perseverance rover is also partly now looking for evidence of past water and a habitable environment as it is now very near and about to start to examine the former river delta from once flowing liquid water into Jezero Crater.

### Claimed Evidence for Ancient Life in Martian Meteorites

There have been a number of meteorites that have been found on Earth that have been determined to come from Mars. Many of these meteorites were found on top of the ice sheet in Antarctica because there are not many, if any, rocks or stones from Earth there so any rocks found there are automatically suspected to be of extraterrestrial in origin. There is some knowledge of the different ratio of isotopes, or versions of chemical elements, from Mars and this knowledge has allowed scientists to determine that a number of rocks found in Antarctica are from Mars. That cold, dry environment on the Antarctic ice sheet provides good preservation of these meteorites. Some meteorites, including from Mars, have also been found in especially sandy deserts such as the Sahara desert in Africa. According to the web site Wikipedia, up to 2018 there have been found 224 meteorites on Earth that have been determined to come from Mars.

*(Continued on [page 21](#))*



## The Search for Life on Mars, Part 1 (continued)

Probably the most famous of these meteorites came from the Allen Hills area of the Antarctic ice sheet and is designated ALH84001. This meteorite contained a number of what looked like segmented mini-bacteria but most researchers have now concluded that these features are made by abiotic or non life involved processes. There were two other features of this meteorite that were initially thought to indicate it could demonstrate at least past life on Mars. One was its particular ratio of chemical isotopes and the other is possibly the great age associated with it, even compared to other meteorites from Mars. The promising isotope ratio, possibly great age and segmented what looks like nanoworms are now not thought to indicate life from Mars by the majority of the scientific community but is still controversial. This ALH84001 was announced on the mass media at the time in 1996 as evidence for life. Even though the majority of the scientific community doesn't now accept this meteorite as evidence of life its discovery and examination did lead to greater interest and determination of some of the aspects of what has become known as astrobiology or the search for life beyond Earth.

### The Phoenix Discovery of Perchlorates in Martian Soil

There were two main discoveries by the Phoenix lander on Mars. It is still the lander or rover to give back data from the surface of Mars closest to the polar region. The formal name for the landing area of the Phoenix lander was Vastitis Borealis or northern plains. The Phoenix lander did make a definite discovery of water ice just below the top Martian surface with a scoop or shovel it was equipped with. One can see the white water ice in some of the pictures from it in the area that the shovel scooped up. Phoenix did have a chamber to examine surface material. As a result Phoenix was the first lander or rover on the surface of Mars to determine that there are substantial amounts of the chemical perchlorate in the surface material of Mars. (Perchlorate is a very strong salt that can and does destroy larger organic material in the surface material when that material also includes perchlorates and is heated above about 300 degrees Centigrade. (The gas chromatograph experiment ovens in the later Curiosity and earlier Viking rovers or landers heated sampled material to well above these temperatures.)

### Discovery of Methane Emissions on Mars from a Distance

There have been several convincing claims of the detection of methane emissions from Mars from a distance. Most of these claims were many years ago. Some of these detections were from major telescopes on the surface of Earth but some were from spacecraft in orbit around Mars. The earthbound telescope that discovered methane on Mars was associated with the NASA Goddard Space Flight Center. These observations were in 2003 and the NASA Infrared Telescope Facility and the W. M. Keck telescope both on Mauna Kea, Hawaii apparently discovered a spike in methane (CH<sub>4</sub>) emissions at a level of several parts per billion. These methane emissions on Mars were from its Arabia Terra, Nili Fossae regions and the south-east part of the Syrtis Major region. The orbiting spacecraft in the area of Mars that made most of the discoveries of these methane emissions was the European Space Agency (ESA) Mars orbiter Mars Express. Mars Express in 2003 and 2006 observed high levels of methane emission from the Terra Sabae, Nili Fossae and Syrtis Major regions of Mars. (The Terra Sabae region is adjacent to and just to the south of the Arabia Terra region of Mars.)



## Making The Best Of It by Mike Jefferson

Easter Night gave me some opportunity to get into a little astronomical activity that had been missing from my life (probably yours as well) given the spate of miserable observing skies and the daily grind that we have been enduring over the last couple of years.

At last, a break! Yes, I had been inside at the computer, and doing some 'blinking spectral comparisons' (Not to go into this here. For more information/explanation, if interested, email or call me (905-648-8919) and we can talk about turning your computer into a 'blink comparator/microscope'.

About 10:00 PM-DST, I decided to take a look. The Moon still had not risen and the skies were black. After double-checking from the unlit driveway, things were "looking up", to quote Mario Carr and Jack Horkheimer. So I set out a deck chair, went back inside, donned a parka and gloves and took the 8X56 out of the cupboard. Were the skies really that good? Well, they were not bad. However, there was our now very familiar sky-fog, which has segments of the sky darting in and out of visibility. So, you do what you can with what you have. After holding onto my richfield instrument until my gloved hands were getting cold, I decided to call it a night - a little more than an hour.

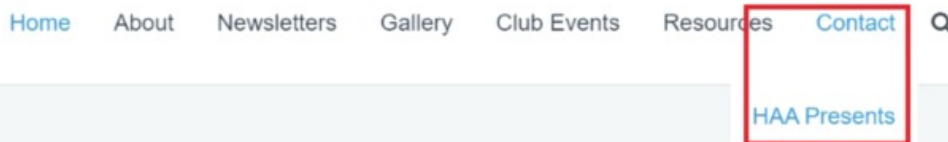
What had I seen? Outdoors with the binocular, and indoor consultations with my Whittakers and Firefly Deluxe planispheres, showed Orion and Auriga just over the western horizon and Ursa Major, Ursa Minor and Polaris overhead. There was lots more darting in and out of cloud and sky fog, but accurate identifications were difficult given the conditions. There was no Milky Way detail seen at all.

I think i was just investigative and lucky.

### “HAA Presents”

Members of the public of any age in the GTHA can now request an in-person (once it is safe to do so) or virtual presentation from the HAA directly on our website.

Simply navigate to [www.amateurastronomy.org](http://www.amateurastronomy.org) and select “Contact” from the top menu bar and then click on “HAA Presents” (see image below). You will be presented with a request form and once all required fields are entered, click on the “Submit” button and you will see a confirmation message that your request has been successfully submitted.



Once received, our Public Education Director, Jo Ann Salci, will respond to your request within 5 business days to discuss next steps. If you have any questions, feel free to send an email to



**This article is distributed by NASA Night Sky Network.**

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach.

Visit [nightsky.jpl.nasa.gov](https://nightsky.jpl.nasa.gov) to find local clubs, events, and more!

### Night Lights: Aurora, Noctilucent Clouds, and the Zodiacal Light

David Prosper

Have you spotted any “night lights”? These phenomena brighten dark skies with celestial light ranging from mild to dazzling: the subtle light pyramid of the zodiacal light, the eerie twilight glow of noctilucent clouds, and most famous of all, the wildly unpredictable and mesmerizing aurora.

Aurora, often referred to as the northern lights (aurora borealis) or southern lights (aurora australis), can indeed be a wonderful sight, but the beautiful photos and videos shared online are often misleading. For most observers not near polar latitudes, auroral displays are relatively rare and faint, and without much structure, more gray than colorful, and show up much better in photos. However, geomagnetic storms can create auroras that dance and shift rapidly across the skies with several distinct colors and appear to observers much further away from the poles - on very rare occasions even down to the mid-latitudes of North America! Geomagnetic storms are caused when a magnetic storm on our Sun creates a massive explosion that flings a mass of particles away from its surface, known as a Coronal Mass Ejection (CME). If Earth is in the path of this CME, its particles interact with our planet’s magnetic field and result in auroral displays high up in our ionosphere. As we enter our Sun’s active period of its 11-year solar cycle, CMEs become more common and increase the chance for dazzling displays! If you have seen any aurora, you can report your sighting to the Aurorasaurus citizen science program at [aurorasaurus.org](https://aurorasaurus.org).

Have you ever seen wispy clouds glowing an eclectic blue after sunset, possibly towards your west or northwest? That wasn’t your imagination; those luminescent clouds are noctilucent clouds (also called Polar Mesospheric Clouds (PMC)). They are thought to form when water vapor condenses around ‘seeds’ of dust from vaporized meteorites - along with other sources that include rocket launches and volcanic eruptions - around 50 miles high in the mesosphere. Their glow is caused by the Sun, whose light still shines at that altitude after sunset from the perspective of ground-based observers. Noctilucent clouds are increasing both in frequency and in how far south they are observed, a development that may be related to climate change. Keeping in mind that observers closer in latitude to the poles have a better chance of spotting them, your best opportunity to spot noctilucent clouds occurs from about half an hour to two hours after sunset during the summer months. NASA’s AIM mission studies these clouds from its orbit high above the North Pole: [go.nasa.gov/3uV3Yj1](https://go.nasa.gov/3uV3Yj1).

*(Continued on [page 24](#))*



## NASA Night Sky Notes (continued)

You may have seen the zodiacal light without even realizing it; there is a reason it's nicknamed the "false dawn"! Viewers under dark skies have their best chance of spotting this pyramid of ghostly light a couple of hours after sunset around the spring equinox, or a couple of hours before dawn around the autumnal equinox. Unlike our previous two examples of night lights, observers closer to the equator are best positioned to view the zodiacal light! Long known to be reflected sunlight from interplanetary dust orbiting in the plane of our solar system, these fine particles were thought to originate from comets and asteroids. However, scientists from NASA's Juno mission recently published a fascinating study indicating a possible alternative origin: dust from Mars! Read more about their serendipitous discovery at: [go.nasa.gov/3Onf3kN](https://go.nasa.gov/3Onf3kN).

Curious about the latest research into these night lights? Find news of NASA's latest discoveries at [nasa.gov](https://nasa.gov).

(Continued on [page 25](#))



*The zodiacal light extends into the Pleiades, as seen in the evening of March 1, 2021 above Skull Valley, Utah. The Pleiades star cluster (M45) is visible near the top.*

*Credit and source:*

*NASA/Bill Dunford*

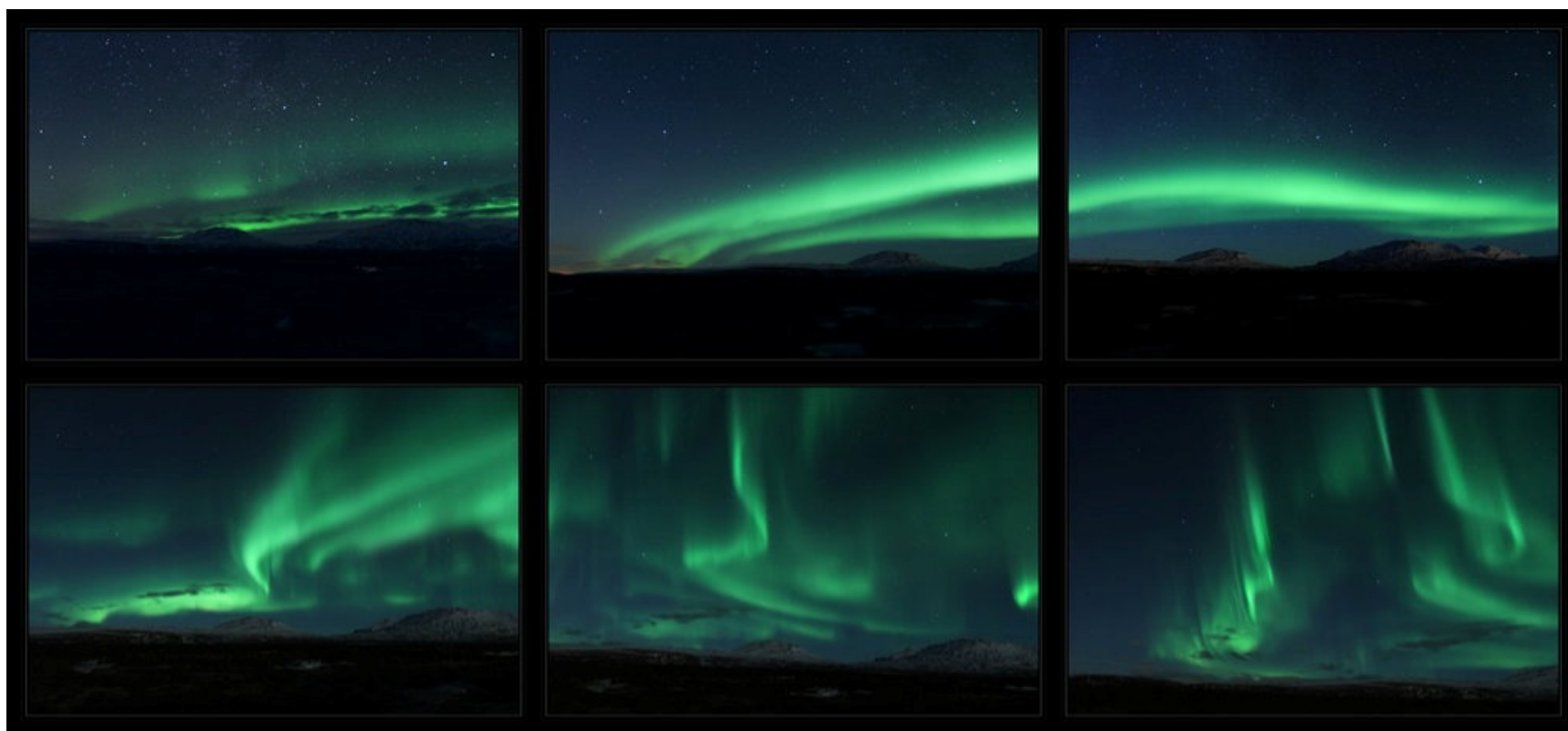
<https://www.flickr.com/photos/gsf/51030289967>



*Comet NEOWISE flies high above a batch of noctilucent clouds in this photo from Wikimedia contributor Brwynog.*

*License and source CC BY-SA 4.0*

*[https://commons.wikimedia.org/wiki/File:Comet\\_Neowise\\_and\\_noctilucent\\_clouds.jpg](https://commons.wikimedia.org/wiki/File:Comet_Neowise_and_noctilucent_clouds.jpg)*



*A sampling of some of the various patterns created by aurora, as seen from Iceland in 2014. The top row photos were barely visible to the unaided eye and were exposed for 20-30 seconds; in contrast, the bottom row photos were exposed for just 4 seconds- and were clearly visible to the photographer, Wikimedia contributor Shnuffel2022.*

*License and source: CC BY-SA 4.0 [https://commons.wikimedia.org/wiki/File:Aurora\\_shapes.jpg](https://commons.wikimedia.org/wiki/File:Aurora_shapes.jpg)*

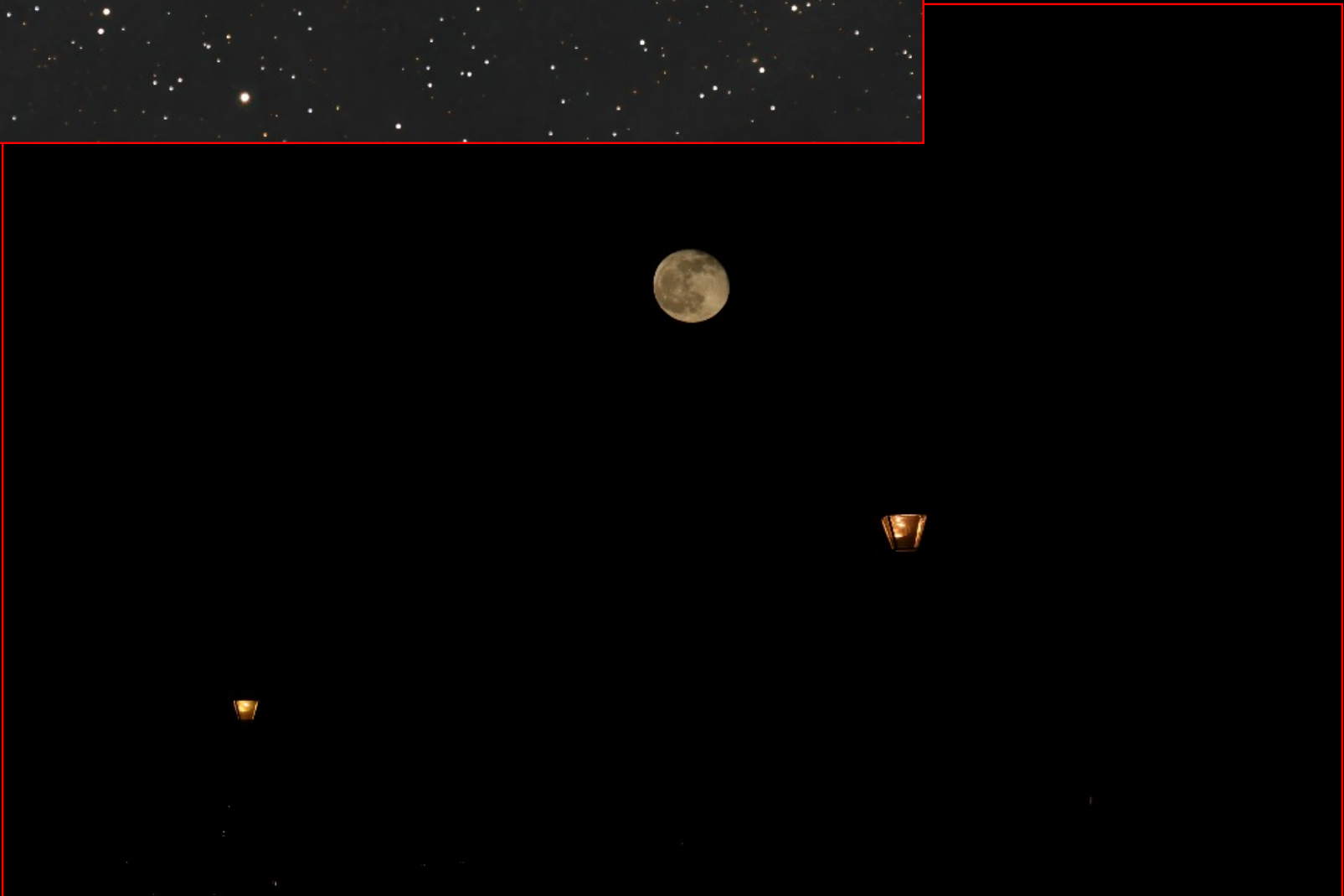




**M101, The Pinwheel Galaxy,  
by Pavle Culum.**

Taken with an ASI533MC camera  
through a Sky Watcher 80ED  
scope on an HEQ5 mount.

Exposures: 89 x 300 s;  
445 minutes total; plus darks,  
flats and dark-flats.



**Waning Gibbous Moon Rising, April 17, 2022, by Sylvie L. Gionet**

Taken with a Canon EOS Rebel T6i with an EF-S55-250mm telephoto lens.  
Settings and Exposure: 1/125 second at f/11 and ISO 200



## Congratulations are in Order!

With the social isolation of the past few years, it has been difficult to keep up with everyone. Including our astronomy peers. How much do we know about each other's astronomy interests, pursuits and accomplishments?! Many of us enjoy certain areas of astronomy and pursue them in great detail. Others are happy to enjoy the sky in its entirety. Observing the sky is the common thread!

By now, many of you have heard of Goal Oriented Observing. Did you know that one of our members was recently recognized for his Goal Oriented Observing by the Royal Astronomical Society of Canada (RASC)?!

How proud we are that Bernard (Bernie) Venasse is a member, and currently Chair, of our beloved Hamilton Amateur Astronomers Club! Congratulations Bernie! Below is an excerpt from the April Edition of the RASC Newsletter, where you can read about Bernie's extensive list of observing accomplishments:

## “Observing Committee Digest

"The more we, too, look at the night sky the more we will enjoy it." - Leo Enright

### Awarded Certificates

Let us celebrate the new and recent visual observing applicants below:

- Finest NGC: Chris Vaughan of the Toronto Centre
- Explore the Moon-Telescope: Mark R. Barclay of the Saskatoon Centre and Brian Barber of the Victoria Centre
- Explore the Moon-Binocular: Matt Stroh, a National member in Alberta
- Explore the Universe: Zoë Amelja Kenney, a member of the public, based in Québec  
Bernard Venasse, a National member from Ontario
- Double Stars: Denis Pilon of the Regina Centre

### Other Programs

We've a very special announcement regarding Bernard Venasse (a National member from Ontario). We learned he is a highly-decorated observer in the Astronomical League (AL). He holds certificates for:

- Binocular Messier Observing Program
- Lunar Observing Program
- Outreach Award
- Universe Sampler Observing Program
- Comet Observing Program - silver
- Solar System Observing Program - Telescopic
- Double Star Observing Program
- Messier Observing Program
- Constellation Hunter Northern Skies Observing Program
- Observer Award
- Binocular Double Star Observing Program
- Comet Observing Program - gold
- Galileo's T.O.E.S. Observing Certificate
- Messier Observing Program - honorary

(Continued on [page 28](#))

- Galileo Observing Program - Telescopic
- Deep Sky Binocular Observing Program
- Globular Cluster Observing Program
- NASA Observing Challenges - Apollo 50th
- Herschel 400 Observing Program
- Caldwell Observing Program - silver
- Master Observer Award
- Beyond Polaris Observing Program
- Asterism Observing Program
- Urban Observing Program
- Advanced Binocular Double Star Observing Program
- Outreach Award - stellar
- Outreach Award - master
- Binocular Variable Star Observing Program
- Solar System Observing Program - Binocular
- Sketching Observing Award Program

This is an extraordinary accomplishment. Congratulations, Bernard! We love to hear of RASC members completing certificates from astronomy societies and clubs around the world. Let us know what you've completed or are working on."

## For Sale

### *Celestron StarSense AUTOALIGN*

#### *Celestron 94005*

*NEW in Package, Unused*

*Current retail at KW \$574.00 plus tax*

***YOUR PRICE: \$450.00 no tax.***

#### *About this item:*

- Enables automatic alignment of your Celestron computerized telescope (see compatibility list). Objective Lens Focal Length: 40mm (1.57").
- No need to identify or locate any star in the sky-StarSense automatically aligns your telescope, so you can begin observing in minutes.
- Aligns in 3 minutes or less.
- Provides advanced mount modeling—align on numerous stars throughout the sky for extremely precise GoTo pointing accuracy.
- Starsense hand controller included.



**Contact: Bernie Venasse**  
***chair@amateurastronomy.org***

**Come and join the HAA for  
a weekend of star gazing  
under the dark skies at  
Andromeda Meadow.**



Excellent dark sky for visual  
observing and astrophotography.

2 Local Observatory Tours

Saturday Potluck Dinner

Registration opens in April  
2022 for HAA members only

#### **Accommodations**

##### **Onsite**

15 back in travel trailer sites  
20 ground camping sites

##### **Off site**

Motels, B&B's, cottage rentals, Airbnb, and camp-  
ing/trailer parks in and around Wiarton, Ontario.

**A small fee will be charged to all campers and non-  
campers to cover the cost of the porta potties.**

**Come and make new friends  
under the stars!**

**Date: September 23 to September 25, 2022**

Extension to September 26 available

**Where: 483161 Colpoys Range Road  
South Bruce Peninsula**

Between Wiarton and Big Bay Ontario

# **HAA Dark Sky Star Party**



**All skill levels from beginner to  
experienced are welcome!**

#### **Questions? Contact**

Sue MacLachlan at  
[starparty@amateurastronomy.org](mailto:starparty@amateurastronomy.org)  
or

Matthew Mannering at  
[observing@amateurastronomy.org](mailto:observing@amateurastronomy.org)

#### **Onsite Amenities**

Porta-potties  
Generators for charging as-  
tronomy equipment during  
the day.

No electricity  
No running water  
No flush toilets or showers



## UPCOMING EVENTS

May 13, 2022 - 7:30 pm – Virtual Online H.A.A. Meeting. Our main speaker will be *Karim Jaffer*, and the topic will be *Ancient Peoples*.

Due to the COVID-19 Coronavirus pandemic, the meeting will be conducted on the platform Zoom. Be on the lookout for an invitation e-mail with a meeting link. You may download the Zoom app for various platforms from Zoom's [Download Center](#).

We hope to return to in-person meetings very soon!

### 2021-2022 Council

Chair	Bernie Venasse
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Check out the H.A.A. Website

[www.amateurastronomy.org](http://www.amateurastronomy.org)

Follow us!



#### Contact Us

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#### Membership:

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#### Digital Platforms Director:

[webmaster@amateurastronomy.org](mailto:webmaster@amateurastronomy.org)

All active HAA members have the privilege of access to an exclusive HAA members only dark sky location.

Be on the lookout for e-mails with dark sky observing details. Space is limited.

### The Harvey Garden HAA Portable Library



Contact Information

E-mail: [library@amateurastronomy.org](mailto:library@amateurastronomy.org)