

Event Horizon

**Volume 30, Number 1
November 2022**



From The Editor

Happy New HAA Membership Year! Enjoy the first Event Horizon of the new cycle!

As always, thanks to all who have contributed.

Clear Skies!

*Bob Christmas,
Editor*

editor 'AT' amateurastronomy.org



Chair's Report by Bernie Venasse

Don't forget to adjust your clocks and change your smoke detector batteries

Our October Annual General Meeting was held live at MIP for the first time since the onset of COVID-19. Attendance was about what was slightly higher than last month with the inclusion of quite a few new members. The AGM was short and sweet culminating with the confirmation of the 2022-2023 council membership. Following the AGM, I presented an outline and introduction of the council members and their positions and duties. A BIG Thank You to Chris Strejch who handled the on-site media controls and to Sue MacLachlin for moderating the ZOOM aspect of the meeting. Yes, we are still working on getting the audio systems working better... please bear with us!

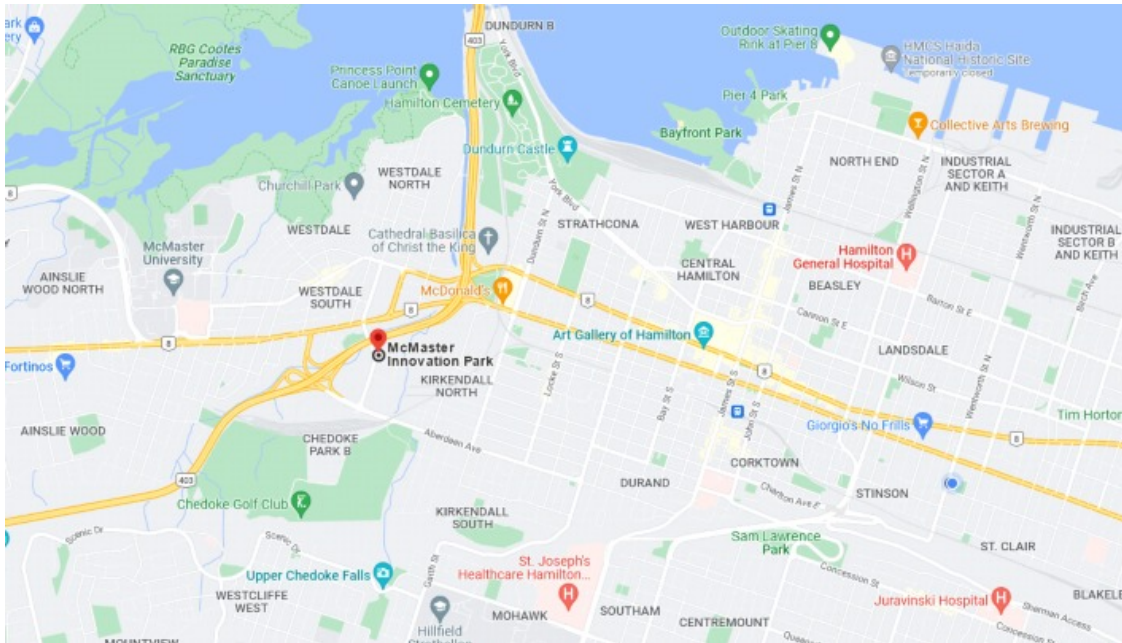
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Chair's Report (continued)



Our Next Meeting is scheduled for November 11, 2022, at McMaster Innovation Park. MIP is located at 175 Longwood Rd. S. in Hamilton. This will be a hybrid meeting combining a live audience with a Zoom presence. Doors open at 7:00 and the meeting begins promptly at 7:30. Our guest, *Parshati Patel* will be joining us via ZOOM from London, Ontario. Parshati will share various interesting aspects of star formation, especially the massive stars. These stars have disks of dust and gas around them which are hubs for planets to form,

making them interesting subjects to study and understand the planet formation process. She will discuss how telescopes such as the Hubble Telescope and James Webb Space Telescope help with understanding these processes.

In addition, Parshati will share the process of writing her first space-themed children's book 'My Book of Stars and Planets' which was published in 2021.

December 9th Meeting --- Cold Moon Social

Be sure to join us for our December COLD MOON Social.

It's that time.... Membership renewals were due October 31st.

Inreach and Outreach events

October 9, 2022, Lakeview Park Solar Observing. We had over 45 people stop to look through the telescope and learn more about the sun and Solar Astronomy. Several persons were unsure when we asked if they wanted to look at the sun through the telescope, not realizing that they could view the sun through properly outfitted equipment. There were several sunspot groups as well as prominences of various sizes and shapes surrounding about a third of the edge of the disk. Everyone was interested to know more about the upcoming solar events in 2023 and 2024.

What's happening around the club?

The Loaner Scope program is very active. If you would like to partake in this program, please contact Paula via loanerscope@amateurastronomy.org. A list of the available equipment can be found on the club web page at amateurastronomy.org.

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Masthead Photo: *The Andromeda Galaxy (M31)*, by Pavle Culum.

Taken through his Evostar 80ED scope with his ASI533MC camera on an EQ6R mount; stack of 1600 30-second exposures, with 20 flat frames and 40 bias frames.

Chair's Report (continued)

Worth Repeating

A reminder that a new interactive page for members of the HAA is open on Facebook. The members page can be found at 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 astronomy photos.

The new HAA 2023 Events Calendar will soon be available.

We are now less than 18 months 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

Membership growth... new members list... Welcome!!

We would like to take this opportunity to welcome new and/or returning members (Sept 29- Oct 29).

Luis Pineiro, Burlington. Family Membership
Jennifer Little, Lynden. Individual Membership.
Aleksandar Kopic, Burlington. Individual Membership.
Mary Knuth, Caistor Ctr. Individual Membership.
Kathryn Agler, Guelph. Individual Membership.
Deborah Taylor, Hamilton. Family Membership. Rejoined.
Gary Sutton, Hamilton. Individual Membership. Rejoined.
Roy Quigley, Canfield. Individual Membership.
Peter Noel, Mount Hope. Individual Membership.

HAA Helps Hamilton

Hey, guess what? We're coming back in person! The H.A.A. will once again be accepting and collecting 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](#).

If you can't make an in-person meeting, you can make a donation directly to your local food bank.



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 Paula Owen at loanerscope@amateurastronomy.org.

Telescopes are loaned out on a first come basis.



Hamilton Amateur Astronomers

**December Cold Moon Social
Friday December 9, 2022
McMaster Innovation Park
General Meeting 7:30 pm**

The regular meeting will include the opening announcements and the Sky this Month to allow for a longer break so members and guests can mingle over coffee and potluck treats. If you are able to contribute an item to the treat table such as seasonal baking/sweets, Timbits, a small tray of fruit or veggies, etc. please contact

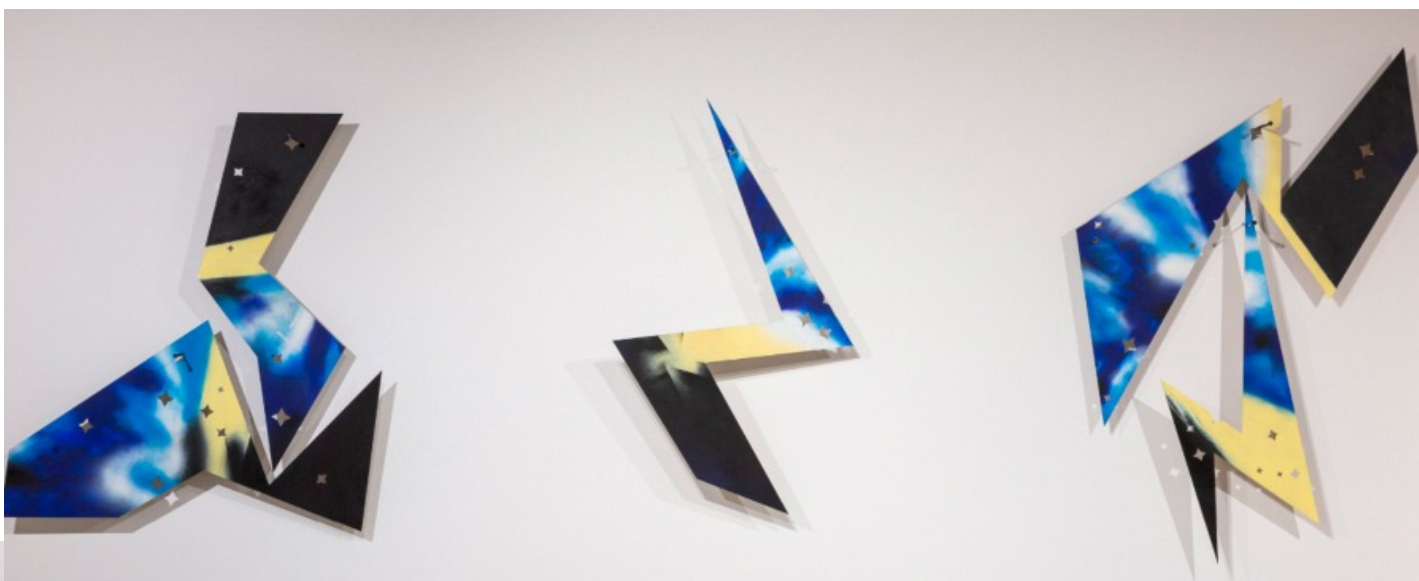
Sue MacLachlan at
smaclach@teksavvy.com

Coffee, tea, and water will be provided.



As always the HAA will be accepting non-perishable food items or cash donations for the Hamilton Food Share.

we are made of stardust



JASON BAERG (CREE-MÉTIS), KÍSĪK PIMISKANAW | PĪ' Aŋ' bē | SKY TRAIL, 2014. ACRYLIC ON LASER CUT STEEL. MUSEUM OF ART COLLECTION TRUST, 2021.

The McMaster Museum of Art has invited the HAA to its current exhibition:

we are made of stardust explores our relationship with the cosmos. Rooted in Indigenous cosmologies and astronomy, the artworks included in this exhibition visually express how Indigenous peoples make sense of their place in the universe through relating to and reflecting on the sun, the moon, the stars, and all celestial beings in the night sky.

<https://museum.mcmaster.ca/exhibition/we-are-made-of-stardust/>

Curated by: Rhéanne Chartrand

August 16, 2022 - December 02, 2022

If you would like to book a free tour (self-guided or guided), please contact:

Teresa Gregorio, Education Officer at the McMaster Museum of Art
gregort@mcmaster.ca

Museum hours: T, W, F: 11am-5pm; Th: 11am-7pm

“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 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.



[Home](#) [About](#) [Newsletters](#) [Gallery](#) [Club Events](#) [Resources](#) [Contact](#)

HAA Presents

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: haapresents@amateurastronomy.org.

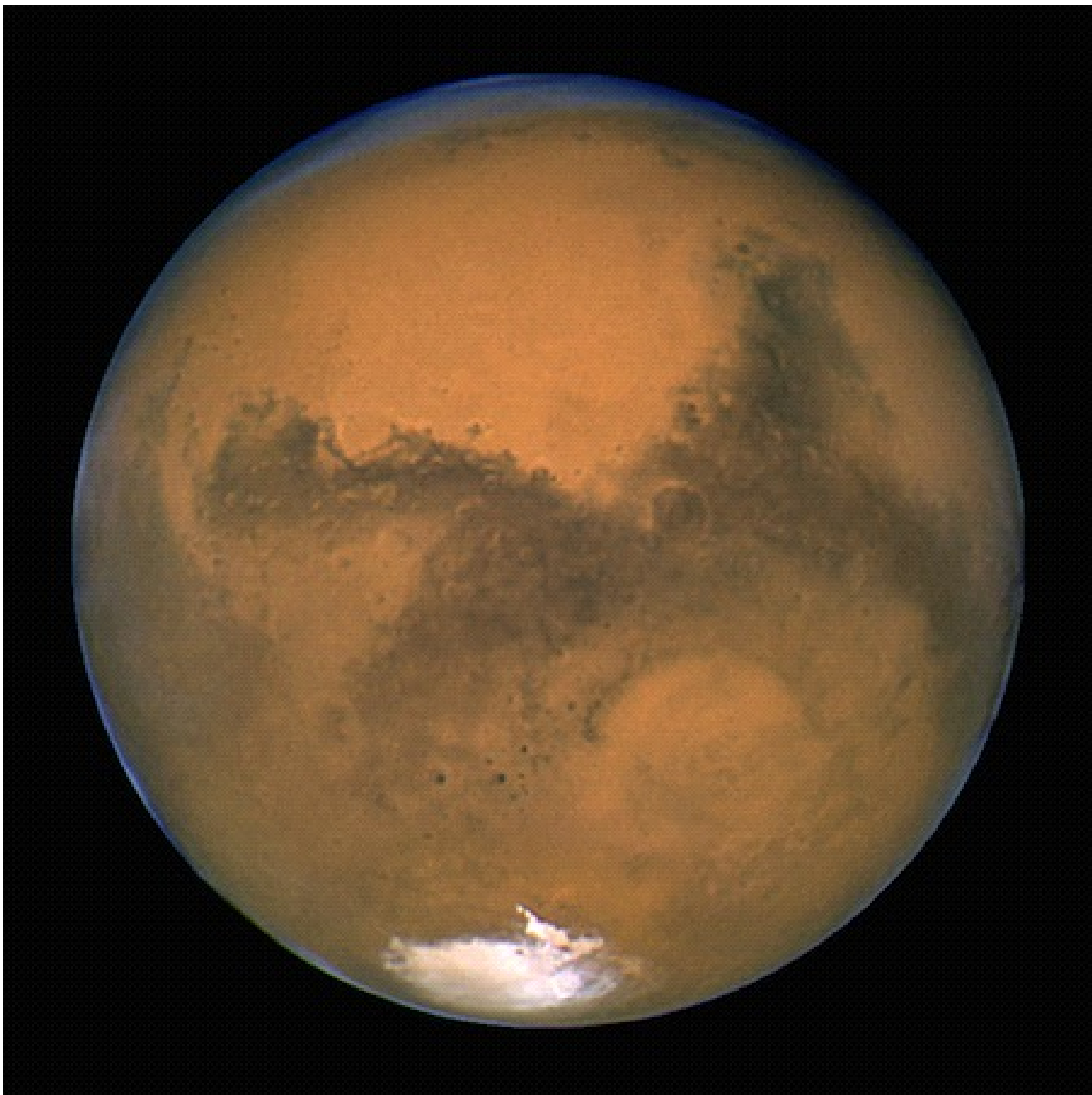


...A column for young astronomers - and those young at heart!

Continuing on in our Solar System, we will be exploring the planet Mars this month! Let's go!

Red Mars! ♂

The planet Mars is the fourth planet from the Sun. It is named after the Roman god of war. It takes Mars 687 Earth days to go around the Sun once. And it takes about 24.6 hours to spin on its axis once, very close to one day on Earth. One day on Mars is called a "Sol". Mars is similar to Earth in a number of ways: it has seasons because its axis is tilted; it has clouds and an atmosphere (although, it's thin and made mostly of Carbon Dioxide); it has polar ice caps; and it has dust storms, canyons and mountains.



Mars

Image Credit: NASA Spaceplace

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HAA Explorers (continued)

It even has volcanoes! The largest volcano on Mars - and in the solar system - is called Mount Olympus or Olympus Mons. It covers an area the size of Italy!

That is where the similarities end. Mars is cold and looks like a rocky, sandy desert. It has a red colour which is from the iron rust on its surface. It's about half the size of Earth. And there are not yet any signs of life. Mars has no magnetic field, so ultraviolet light can get through and kill any microbial life. It's thought that Mars once had water on its surface. Now there are only small amounts in the form of thin clouds and icy dirt. There are signs of rock glaciers: slow moving rivers of permafrost. Because of the dust in the atmosphere, sunrises and sunsets can appear bluish! The largest known canyon in our solar system is found on Mars. It's called Mariner Valley or Valles Marineris. It is the length of the United States and is 5 miles deep and 370 miles wide!

Mars has two lumpy moons named *Phobos* and *Deimos*, named after Greek gods. Their names translate to *Fear* and *Panic* in English. It is thought that they were once asteroids captured by Mars. Phobos orbits close to Mars and takes only 8 hours to go around once. It rises in the West and sets in the East twice a day! Deimos has a 32-hour orbit.

Mars has been seen in the sky since ancient times. The best time to view it is every two years at opposition when its orbit is closer to Earth. Opposition means that the Sun, Earth and Mars are in a line, with Earth in

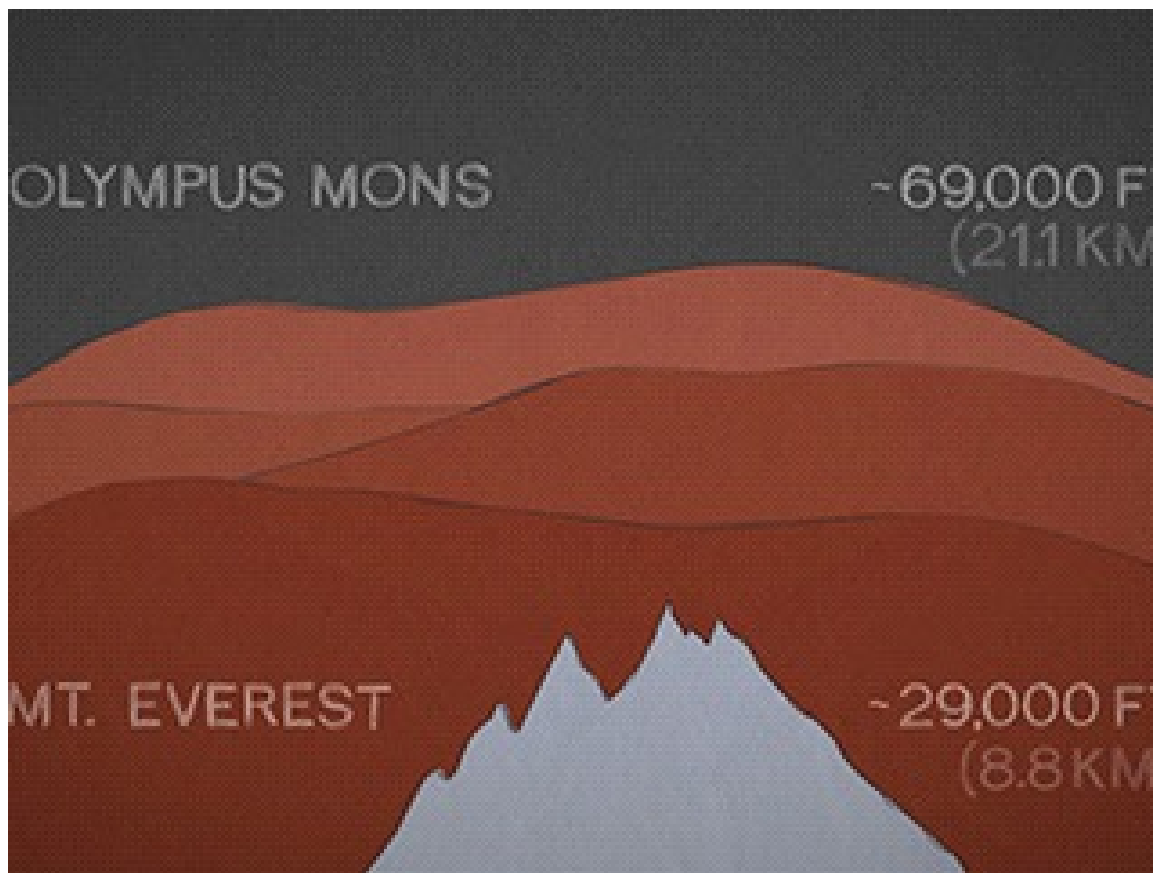


Image Credit: NASA Solar System Exploration



Image Credit: NASA Solar System Exploration

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HAA Explorers (continued)

the middle. The next time this happens is next month on December 8th of 2022!!!!

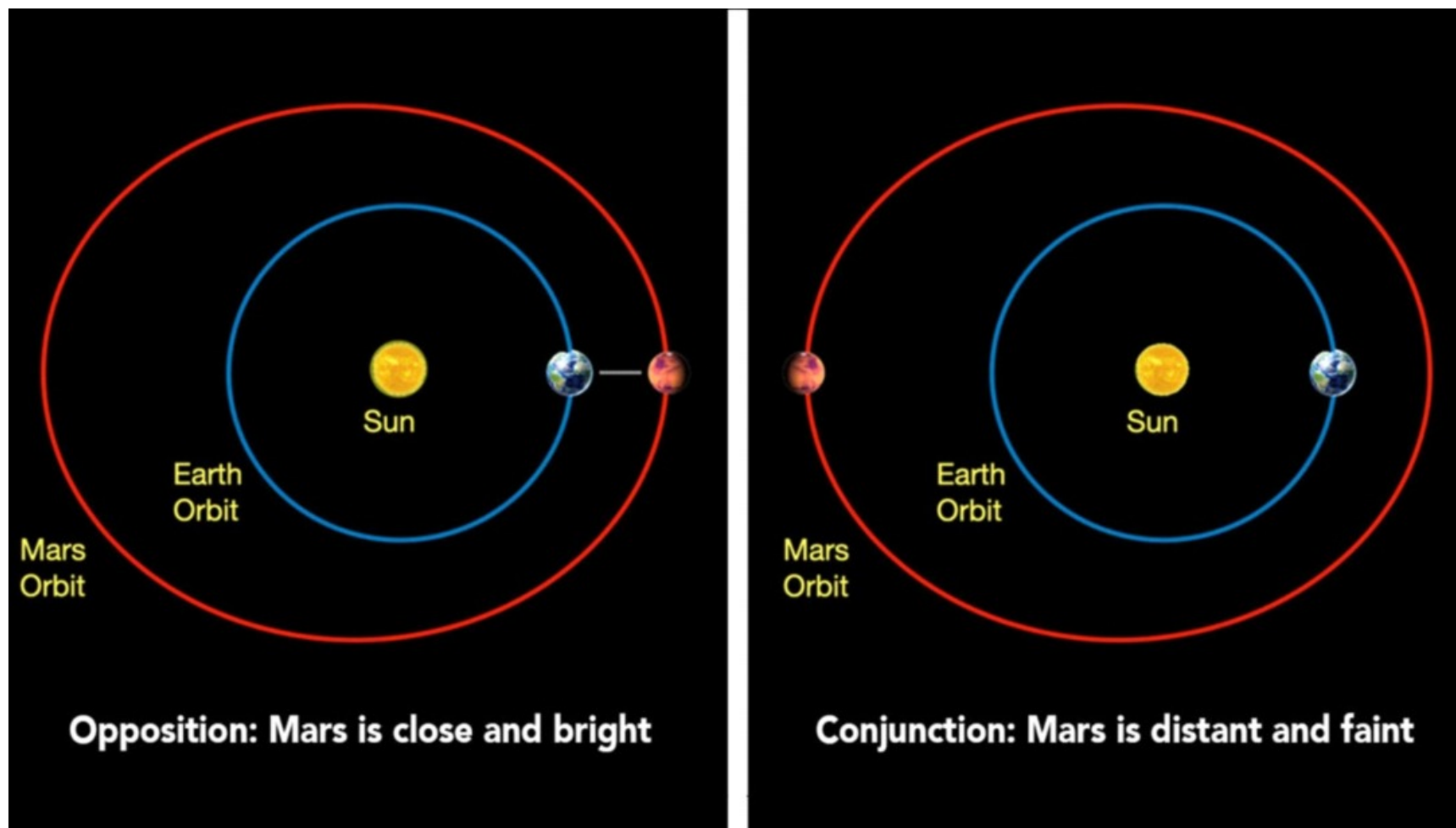


Image Credit: HowStuffWorks

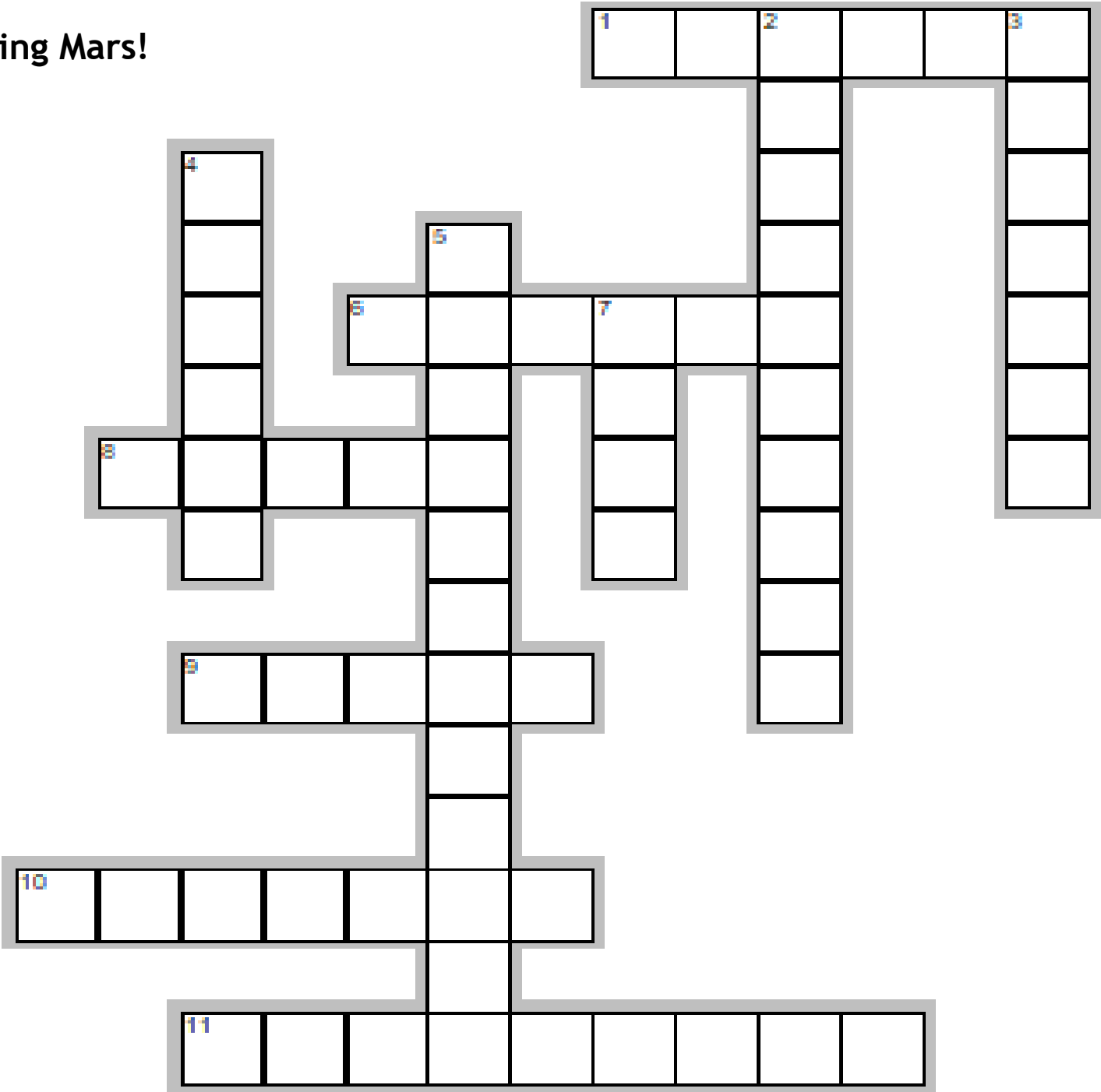
Humans have not yet set foot on Mars, although many probes, landers, orbiters and rovers have visited! In fact, 20 orbiters have visited Mars...more than any other planet! Perseverance and Ingenuity are the most recent NASA vehicles to land on the surface of Mars. Ingenuity is the first powered, controlled flying object sent to another planet.



NASA's Ingenuity Helicopter
Image Credit: NASA Solar System Exploration

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Crossing Mars!



EclipseCrossword.com

EclipseCrossword.com

Across

- 1. Orbits Mars in 8 hours.
- 6. A moon of Mars.
- 8. Mars has two of these.
- 9. Mars once may have had this.
- 10. Olympus Mons.
- 11. Helicopter on Mars.

Down

- 2. When Mars is best viewed.
- 3. Mars' tilted axis causes this.
- 4. Valles Marineris.
- 5. A rover on Mars.
- 7. Fourth planet from the Sun.

Answers on page 17.

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HAA Explorers (continued)

Things to do until next time **:

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

1. Visit this website to learn more about Mars: <https://spaceplace.nasa.gov/all-about-mars/en/>
2. Watch this video of Dust Devils on Mars: https://www.youtube.com/watch?v=Yewm_rkqvHI
3. Drive a rover on Mars: <https://spaceplace.nasa.gov/explore-mars/en/>

During November, check out:

1. On November 11th around 8:30 pm, check out Mars near our Moon!



Image generated using Stellarium

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HAA Explorers (continued)

2. On November 20th around 8:30 pm, check out three planets in the East and Southern sky: Mars, Jupiter and Saturn!

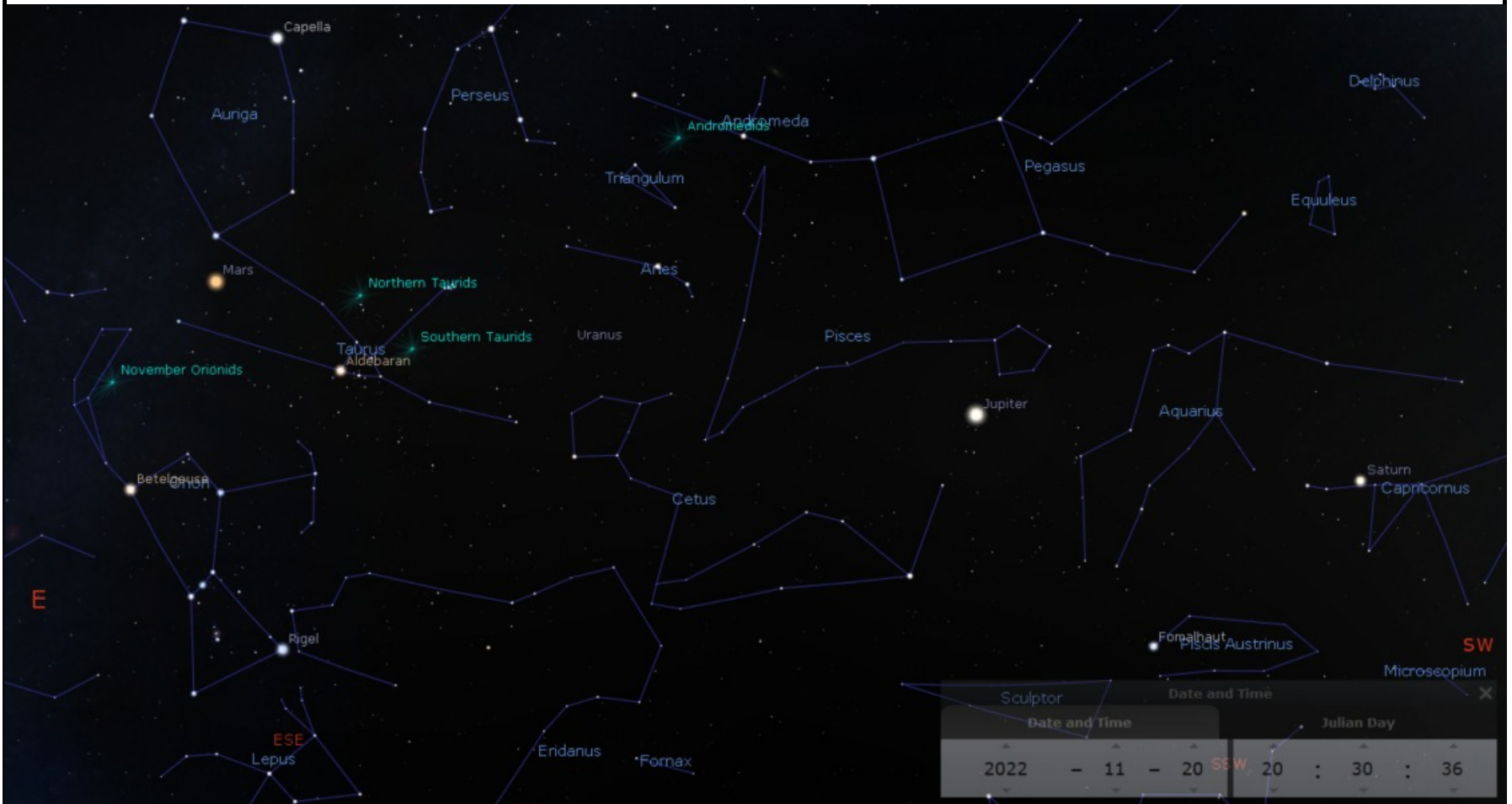


Image generated using Stellarium

Finally:

What is an astronaut's favourite snack? Answer below!

If you have a question that you would like answered in the newsletter, please send it to education@amateurastronomy.org

Answer: A Mars bar!

Thank you to Ro for reviewing this article! 😊

References:

Astronomy for Kids. Astronomy Magazine. 2019.
The Backyard Astronomer's Guide. Dickenson and Dyer. 2021.
The Essential Guide to Space. Paul Sutherland. 2016.
How Space Works. DK Penguin Random House. 2021.
National Geographic Kids: Ultimate Explorer Field Guide: Night Sky. 2016.
National Geographic Kids: Ultimate Space Atlas, 2017.
RASC Observer's Handbook, 2022.



The Sky for November 2022 by Steve Germann

This is my first article in the Event Horizon for a few years, as your new Observing Director.

I am Steve Germann, a past Councillor at Large, HAA Chair, Observing Director, Treasurer, Observing Director, and general member.

I have a 16 inch Meade Lightbridge telescope and a SkyStopper, and about 5 other scopes.

As explained in our last in-person meeting, as an Observing Director, my role is to help give some 'direction' to our 'observing'. This will have the side effect of giving our club members a shared topic to discuss, and will encourage us all to participate in some non-armchair astronomy.

For the first few months at least, you will not have to venture far from your armchair to achieve the rewarding experience of observing something timely and interesting.

I was motivated to go and first attend an HAA event, public outreach, at the prospect of seeing 'Saturn at its best for the next 15 years'. I must admit that the 15 year part is what got me into my car. I am sure glad I went to see it, at Bayfront Park in Hamilton, that day in 2004.

I remember how long it took me to find M57, the Ring Nebula, the first time I tried. Not knowing what I was seeking and how bright it would be, made detection more of a case of, "I wonder if I am actually looking in the right direction"? Once I actually found it, it was prominent enough, but through the skyglow in Hamilton, it was subtle.

My astro-enthusiasm during my membership in the club has been focused on finding things in the sky, and discerning them despite some difficulties. Notably, I have observed Pluto on 2 occasions, and I will admit it was difficult to achieve and took quite a few consults to the star charts under very dark skies.

Early on in my observing history, I chose to embark on a program to observe all 110 Messier objects, in numerical order, starting with M1 and M2, observed at Starfest in 2007. At the time, my standard was discernment and simple detection, as opposed to detailed observations. Basically, "See it and move on to the next one, if possible". That project took 2 years, as not every Messier object is available every night, and some are lost near the sun for months at a time or require particularly dark skies to be seen at other times.

Last Month, at our October in-person meeting I announced the first of our monthly observing targets. That one was Halley's Comet. Not the comet's tail, but instead the glow of pieces of the comet burning up in our atmosphere, as the Orionid Meteor Shower, based on fragments of Halley's Comet, came our way on the 21st of October, and for a few weeks before and after. You might still see the odd Orionid meteor in the sky even in November. They are particularly bright, and appear to originate in the sky from a point north of the constellation of Orion.

In fact, they are all moving parallel, but just like looking down a hallway or at sunbeams peaking through clouds, there is a 'vanishing point' where all the lines appear to come from, and we call this the radiant of the meteor shower.

If in fact you observed any Orionid meteors, I request you send me a short email, to observing@amateurastronomy.org and let me know what day, and preferably, what time you saw it, and any other details you remember. So far I have 2 reports. Thank you! I will summarize them at our monthly meeting in November.

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The Sky for November 2022 (continued)

It is also an observation to say you were looking on a certain date, in a certain part of the sky, for a certain duration, and did not see any.

I had to smile tonight as i saw this article in a local city's web news.



Published October 30, 2022 at 2:25 pm



Residents getting up in the very early morning hours next Tuesday (November 8) will get to see something special: The second lunar eclipse of the year.

The key detail is, they showed a picture of a *solar* eclipse, to advertise a lunar eclipse. While that might motivate people to get out and look, it generates ultimate disappointment, which is one of my pet peeves with astronomy in mainstream media.

Astronomy is fun and interesting, but not THAT fun and interesting, unless there is understanding of what's being seen.

First a few words about what a solar and lunar eclipse are:

We are riding on 'Spaceship Earth' and our position in space, relative to the Sun and Moon, determine what we can see in the sky.

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The Sky for November 2022 (continued)



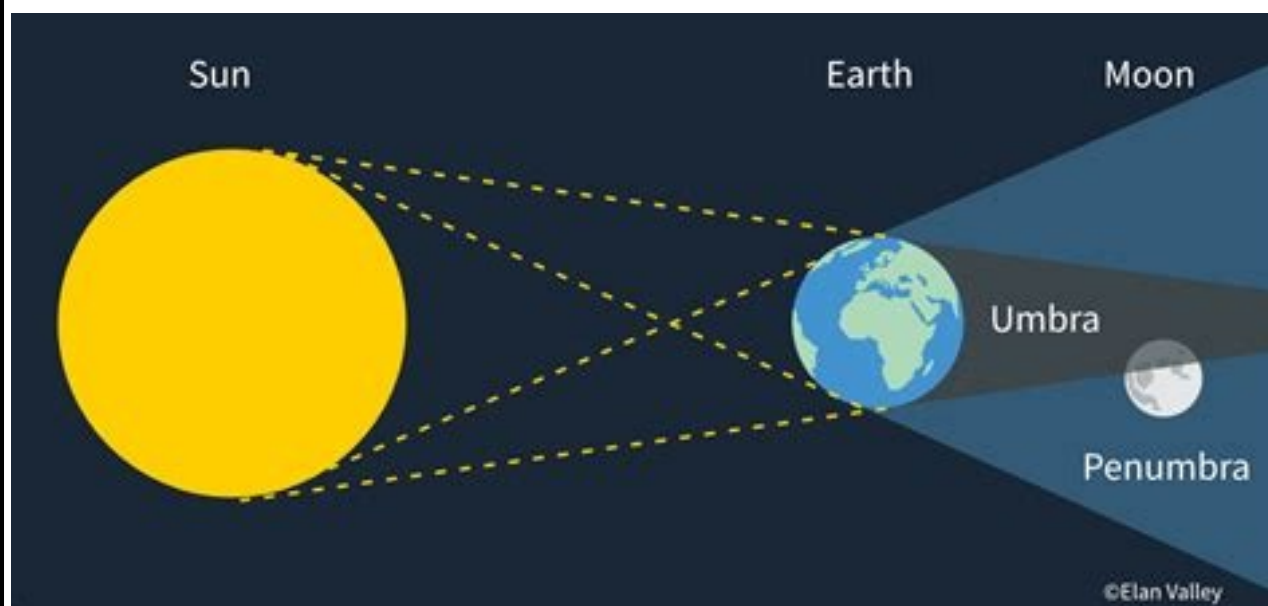
*Credit:
quizlet.com*

Rarely, our 3 celestial spheres are (almost) on a straight line in space.

The Earth can be between the Sun and Moon, or the Moon can be between the Earth and Sun.

On November 8th, it is the Earth that will cast its 'large' shadow onto the area of space where the moon happens to be, and the moon will not be sunlit, even though hours before the side facing earth was near fully illuminated. Here are diagrams, not to scale:

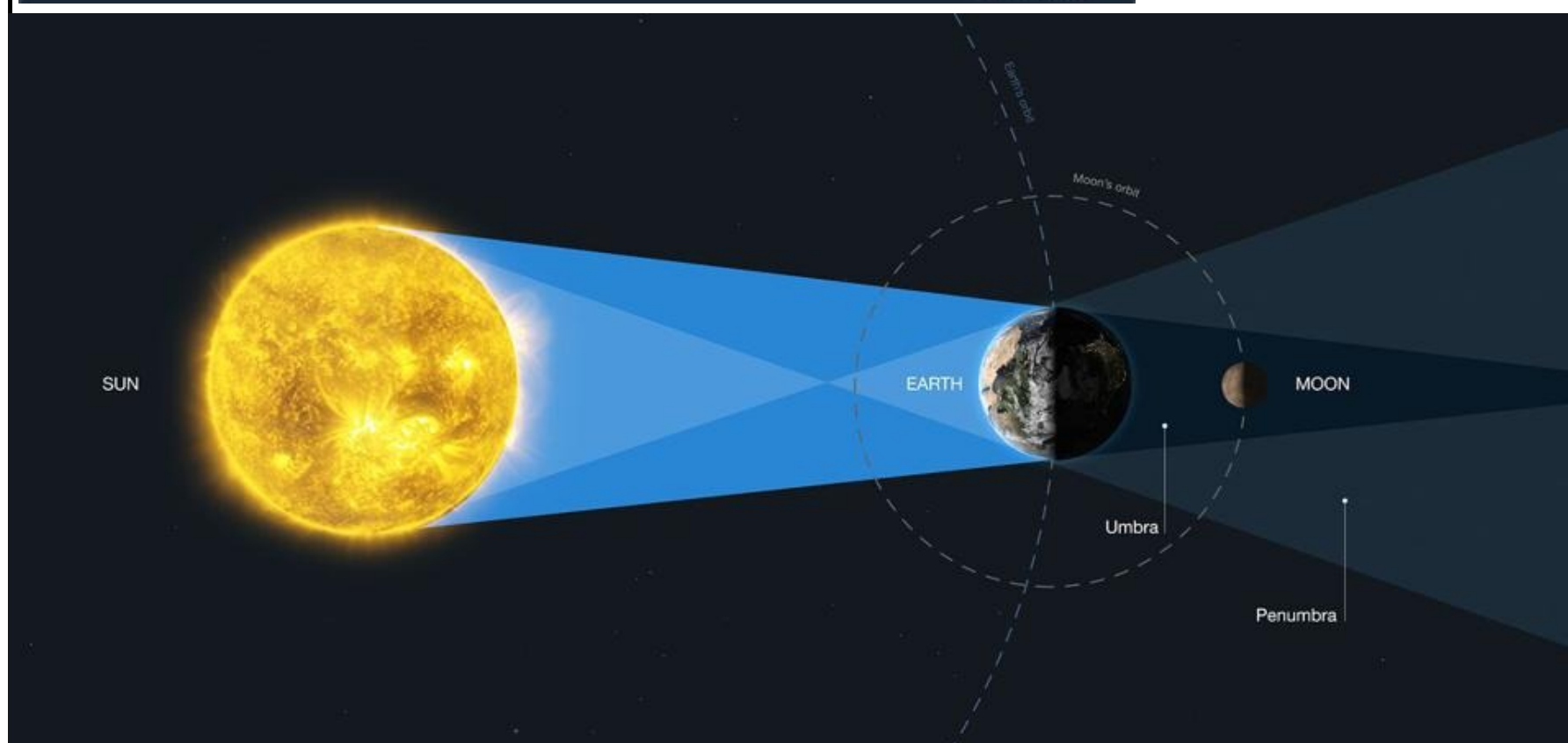
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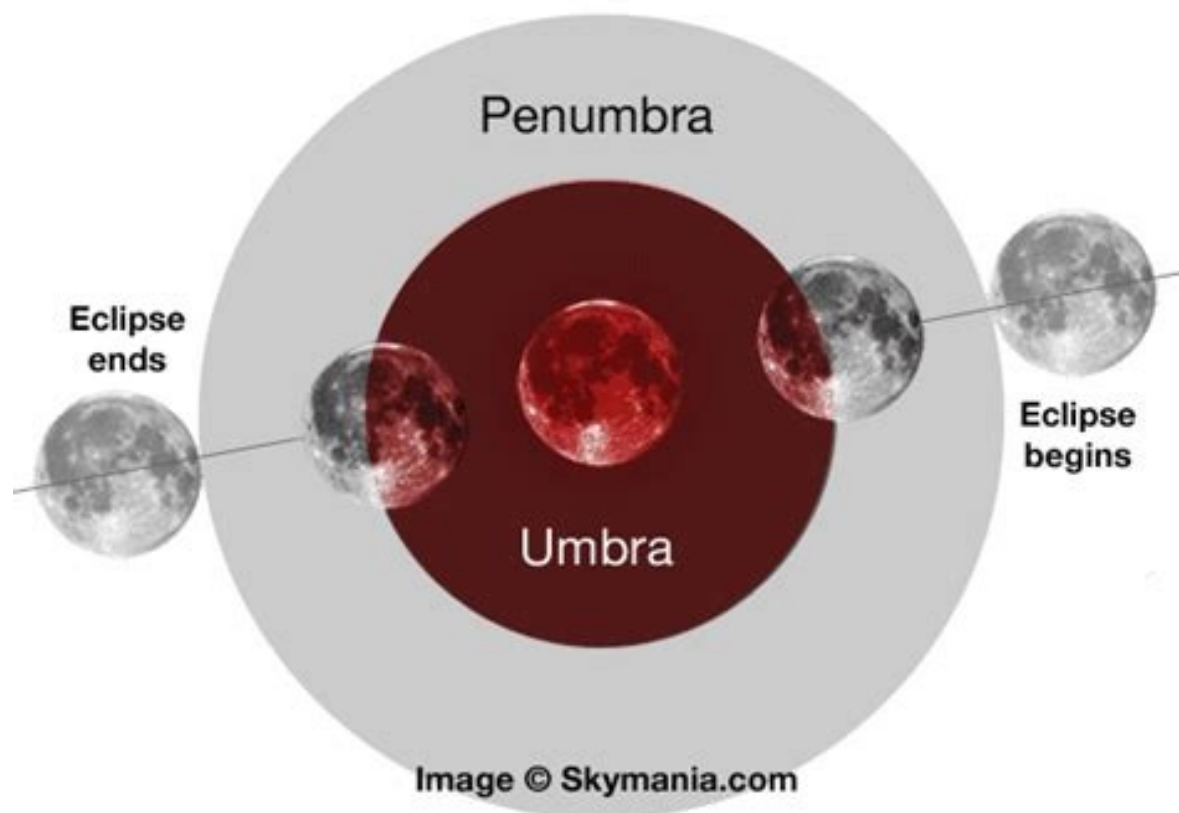
Credits:

left: Elan Valley

*below:
ESA/Hubble,
M. Kornmesser, CC BY 4.0*



A total eclipse of the Moon



The ancient Greeks saw that the edge of the earth's shadow on the Moon was a curve, and estimated it to be 4 times the diameter of the Moon. This was remarkably accurate.

This diagram illustrates the relative size of Earth's shadow at the distance of the Moon.

And below is a photograph of a previous eclipse at 3 different times.

On the morning of November 8th, if there are no clouds, you will be able to repeat this observation, by observing the partial eclipse at about 4 am, with the Moon fully involved at 4:30 AM. And then the total eclipse at about 5:16 am.

It will be dark, and the Moon will be in the western sky.

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Image Credit: Fred Espenak

The Sky for November 2022 (continued)

If in fact you observe that, you have achieved the role of an amateur observer, and rightly have something to talk about!

If you can snap a photo with your phone of the partial stage of the eclipse, you can save and send it to me. I can receive texts on 905 333 6472. The ancients did not have cellphones or cameras, and had to do their observations with their eyes and tools they made themselves.

Here are a few scientific things you can do in the process...

Look for the edge of the earth's shadow on the moon. Do you see any colour change in the sunlight hitting the moon in a stripe just near the edge of totality? You might see a blue tinge to the light, theorized to be the earth's atmosphere filtering the light near that line. After totality, the Moon is lit by the equivalent of a 'circular sunset and sunrise' all around the edge of the earth.

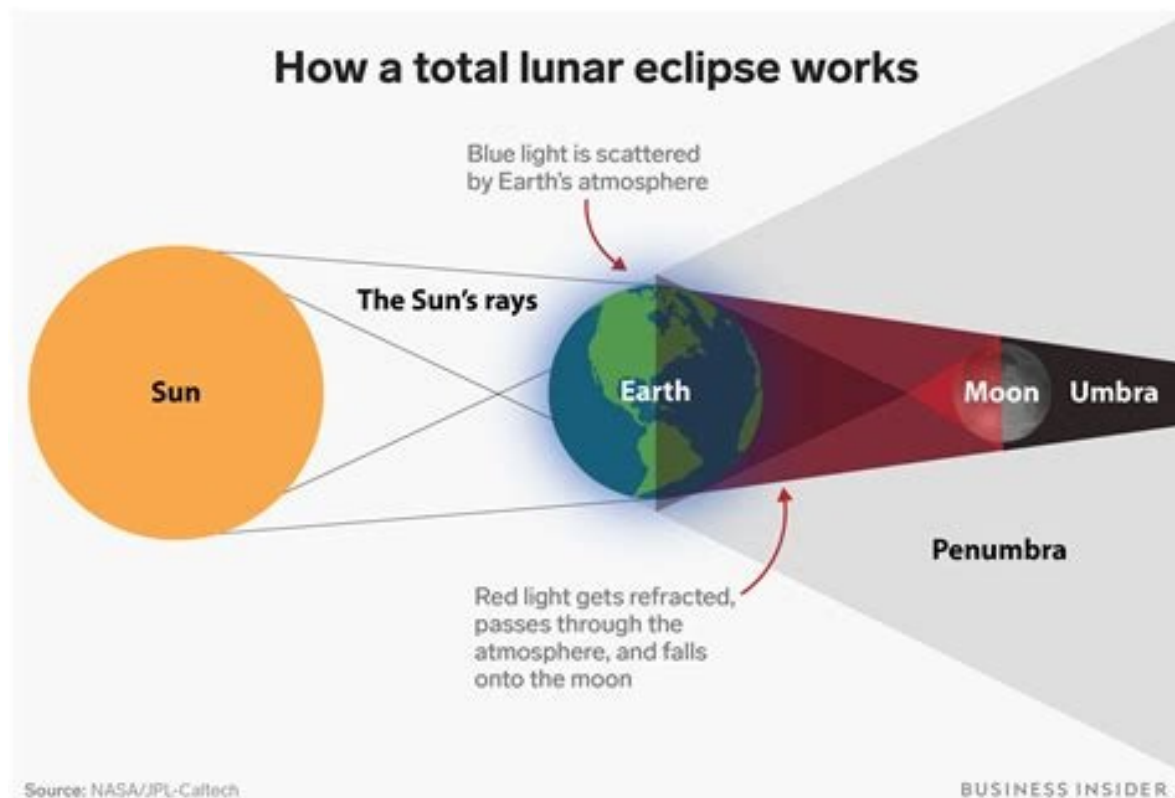


Image Credit: NASA/JPL Caltech

This diagram explains why the moon will look red.

If you were on the Moon at that time, you would see the earth surrounded by a red rim.

Do we have any lunar rovers that can observe that? They would have to be on the near side, so the Chinese rover cannot do it.

Instead, from here on Earth, we see the moon lit red.

Viewed from the Moon, as the sun goes even farther from the edge of the earth, well behind it, the sunset effect gets less, and the moon gets even dimmer and less

red. Thus when the Moon passes through the center of the Umbra it is particularly dark.

Since the moon is facing the dark side of the earth at the time, there is very little 'earthshine' on the moon, and you would not expect to see much on the moon even with a telescope. Furthermore, what light is reaching the moon is coming straight down, casting no shadows, making even large features on the moon very difficult to see.

You might observe differences due to roughness of the terrain or the kinds of rocks and dust in an area. Can you observe the maria on the moon under these conditions? Make a note how difficult it was to see features on the Moon, and how much you could see.

One thing that will be lighting up the moon is light pollution from earth.

So here is your challenge: Set your alarm for about 4 am on November 8. At least look out a west facing window to determine if the sky is clear or not. If it is cloudy, note that as an 'observation' and you are done. If it is clear, look for the edge of the earth's shadow on the Moon. Note any colour change at the edge of the umbra on the Moon, and note whether you think the shadow is curved. At first, the Moon will

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The Sky for November 2022 (continued)

be mostly lit. As time gets closer to 5:16 AM the bright part of the moon (in the penumbra of the Earth's shadow) will get smaller.

Hold a round object at arm's length and compare it to the curvature of the earth's shadow, and note down your comparison. We can do some math later to determine some calculations about the relative size of earth and moon. Try using a 25 cent coin or a dime for comparison. Is earth shadow's radius bigger or smaller than your coin's when it is held at arms length? How close does the coin have to be to match the curvature? If you can make it match, try to measure the distance from your eye to the coin. Note the time you looked, and what you saw, and send your report to 'observing at amatureastronomy.org' so we can collate the results. I promise not to name names. You can brag about your own fishes.

Since this eclipse is very early in the morning, I don't recommend we assemble outdoors somewhere for a group observing session. It's going to be very cold on the 8th, and we can see almost as much from anywhere in town. In the past, for evening Lunar eclipses, we have gathered at the alternate site near Binbrook. I am not recommending that this time.

One more item of science you can do... if you photograph the moon during totality, it is facing earth, entirely *not* lit by the sun, and in a dark sky. (Night time) This *only* happens during a lunar eclipse.

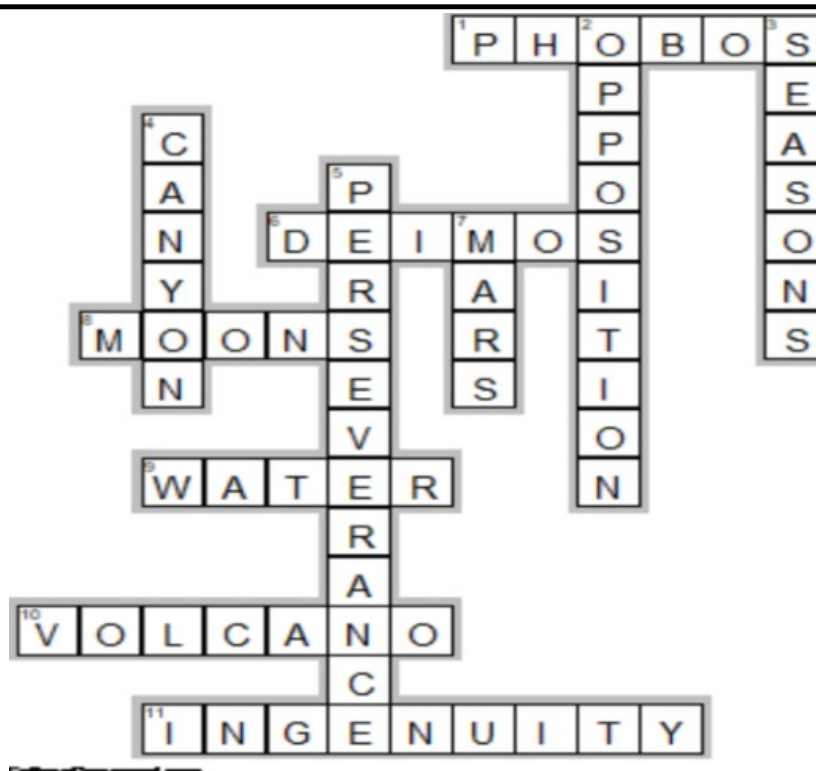
There are space rocks striking the Moon all the time, just as there are hundreds of meteoroids striking the earth every second. You might observe a bright flash on the Moon when a small space rock hits the moon during this time. That would be a rare sight to behold. If you film through a telescope on a tracking mount during the eclipse, I bet you will see a flash from an impact. That could easily be an 'Astronomy Photo of the Day'. Fame, anyone?

Here's some math. A 100 gram space rock might hit the moon once per hour. Where it hits, traveling at roughly 40 km/s, it will deposit 80 megajoules. At least 1 percent of that will be light. The number of photons in your eye will be at least 1500. Dark adapted eyes can see about 10 photons per second minimum, (per receptor) so you might in fact see the flicker.

Each Month, I will be highlighting once-in-a-lifetime (or once in a blue moon, as they say) observing challenges.

It's time to get up from the armchair and into the light of the starry night.

Page 9 Mars crossword answers:





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Rising Star Program: November-December

Pathways Observing Program targets... November-December

Messier Observing Program: November-December... Including target hints!!

The Planets, Comets, Upcoming Meteor showers, Award Programs

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

November

Constellations: Cassiopeia

Stars: Schedar

Double Stars: Almach, Mesarthim

Object Pairs: M31/M32, NGC 133/NGC 146, NGC 436/NGC 457

Messier objects: M33

December

Constellations: Taurus, Perseus

Stars: Hamal

Double Stars: Alcyone

Object Pairs: NGC 1325/NGC 1332

Messier objects: M45

Pathways Observing Program

Observable in October-November-December

Group C,

Autumn Constellations: Find, observe, sketch: *Perseus, Cygnus, Lyra.*

Stars: Find, observe, sketch: *Algol, Deneb, Fomalhaut.*

Asterisms: Find, observe, sketch: *Great Square, Northern Cross, Circlet.*

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

HAA Messier Objects Observing Award

November Messier targets

M57 This smallest planetary nebula in the Messier Catalog is the famous Ring nebula in the constellation Lyra. Low power telescope views show a very small blue/green disk, not much bigger than a star. Medium to high power will magnify the size of the nebula while leaving the surrounding stars the same size, confirming you have found it.

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What's Up in Awards? November-December 2022 (continued)

- M56** Look for a small round ball of light, slightly brighter in the center.
- M27** Also known as the Dumbbell nebula, the largest planetary nebula in the Messier Catalog. This object lies in the constellation Vulpecula. In a small to medium sized telescope it appears as a rectangular patch of light. In large scopes It may even appear round with a bright rectangular, or dumbbell shaped core.
- M71** Lying in Sagitta, this globular cluster appears as a faint oval hazy patch of light in a telescope.
M30 Telescopes show a small fuzzy ball of light, bright in the center fading to the edges.
- M72** This is a small faint globular cluster in Aquarius. Look for a faint oval patch of light, gradually brighter towards the middle.
- M73** This asterism is located near M72 in Aquarius. In a low power telescope view it looks like a very small fuzzy patch of light at first glance. When stared at it reveals itself as a small collection of stars. Medium to high power shows the view best described by Messier "cluster of three or four stars...containing very little nebulosity".

December Messier targets

- M2** This is a small, bright globular cluster in Aquarius. A low power telescope field will show a round fuzzy patch, brighter in the center and fading to the edge, in a field with no other bright objects.
- M15** This globular cluster in Pegasus is very similar to M2 in size and brightness, except it is surrounded by several bright stars. Best view is through a telescope at medium to high power.
- M29** This galactic cluster is a small, sparse group of stars in Cygnus. A telescope will easily resolve the members of this cluster.
- M39** Dark skies will allow this large, bright cluster in Cygnus to be seen with the naked eye as a hazy patch of light. Binoculars easily resolve this cluster into its bright and widely scattered members and provide a better view than can be seen with most telescopes.
- M31** This is the famous Andromeda Galaxy, our closest galactic neighbor, and the largest, brightest galaxy to be seen in the northern sky. The ability to see M31 with the naked eye provides a good test of the darkness of your skies. M31 is so large that binoculars provide the best view, allowing the entire galaxy to be seen in one field of view. Look for an elongated patch of light, with a bright, round central core.
- M32** This is an elliptical companion galaxy to M31. Through a telescope look for a slightly oval ball of fuzz in the same low power field as the core of M31.
- M110** Another elliptical companion galaxy to M31, lying on the opposite side of the core as M32. Through a telescope look for a large, oval patch of light. Although M110 is as bright as M32 it is much larger and thus has a lower surface brightness making it a difficult object in light polluted skies.

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

Mercury: Poorly placed morning planet at the start of November, poorly positioned evening planet at end.
Venus: Too close to the Sun in the evening sky to be seen safely.

(Continued on [page 20](#))

What's Up in Awards? November-December 2022 (continued)



Magnitude -1.5 Mars and the Moon have a close encounter on the morning and evening of 11 November. This view simulates the view through 7x50 binoculars on 11 November, 05:30 UT.

Credit: Pete Lawrence

Mars: Brilliant orange planet. Rises early evening, reaching 60° altitude in dark skies.

Jupiter: Bright evening planet. Waxing gibbous Moon near Jupiter on the night of 4/5 November.

Saturn: Well placed at the start of the month, losing altitude by the end. Waxing Moon nearby on 1 and 29 November.

Uranus: Reaches opposition on 9 November in southern Aries. Should be visible to naked eye.

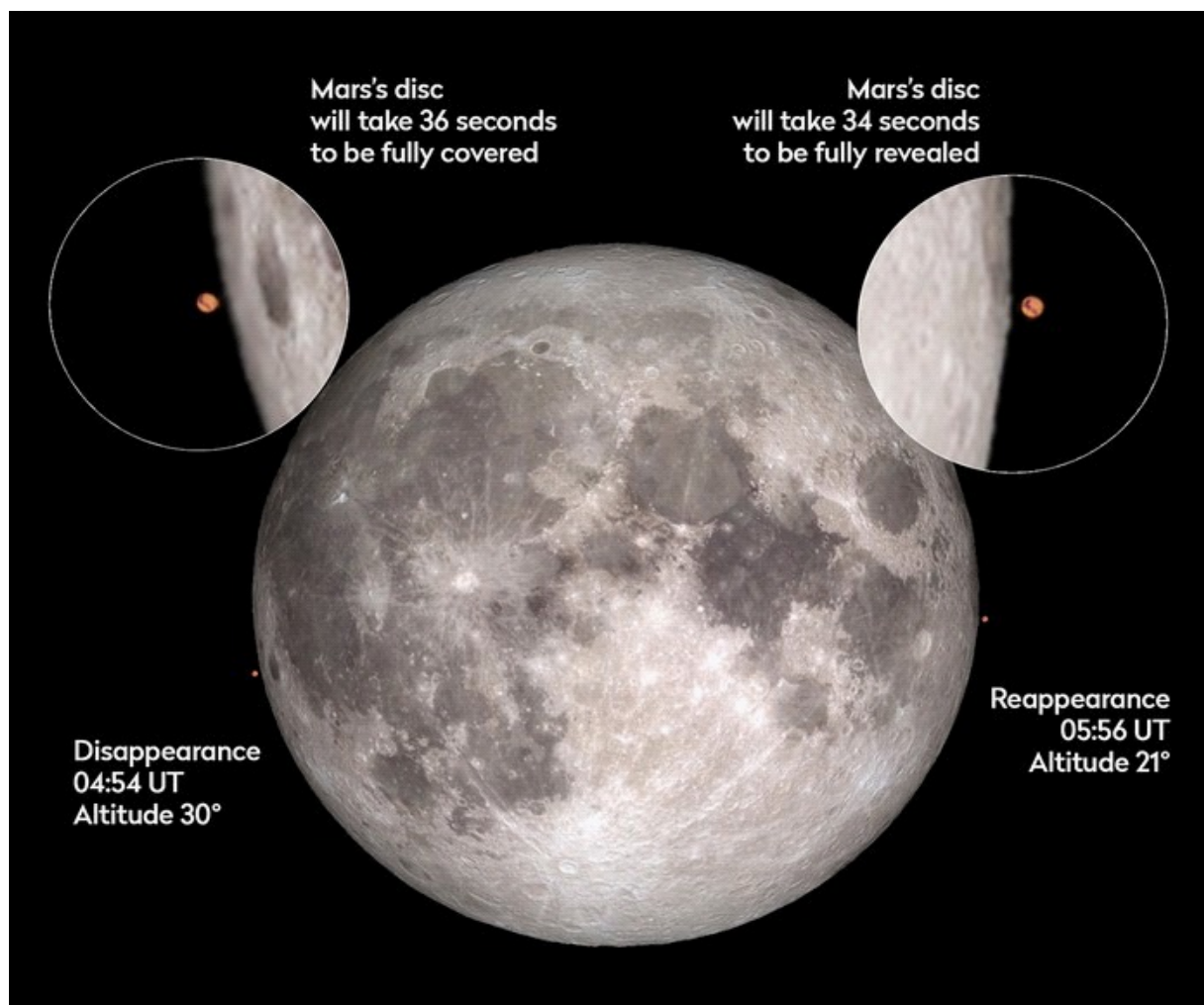
Neptune: Well placed for observation. Mag. +7.9 Neptune and -2.5 Jupiter appear 6.2° apart mid-month.

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

Mercury: Poor positioning at start of December, improving through the month, jostling with Venus in the evening twilight.

Venus: Evening planet. Near Mercury in the latter half of December, when it sets 70 minutes after sunset.

Mars: Bright planet reaching opposition 8 December. Occulted by the full Moon on the morning of 8 December.



There's an opportunity to observe a lunar occultation of Mars as it reaches opposition, 8 December 2022. Times correct for centre of UK and will vary up to a few minutes depending on location.

Credit: Pete Lawrence

(Continued on [page 19](#))

What's Up in Awards? November-December 2022 (continued)

Jupiter: Bright evening planet. Waxing Moon nearby on the evenings of 1 and 29 December.

Saturn: Evening planet but past its best. 15%-lit waxing crescent Moon nearby on the evening of 26 December.

Uranus: Well placed evening planet. Occulted by the almost full Moon on the afternoon of 5 December.

Neptune: Best at the start of December. Jupiter lies 8° east at the end of December.

Future Visible Comets via Seiichi Yoshida – Click here for the chart:

<http://www.aerith.net/comet/future-n.html>

Meteor Showers via American Meteor Society

Orionids

Period of activity: September 26th, 2022 to November 22nd, 2022

Peak Night: Oct 20-21, 2022

The Orionids are a medium strength shower that sometimes reaches high strength activity. In a normal year the Orionids produce 10-20 shower members at maximum. In exceptional years, such as 2006-2009, the peak rates were on par with the Perseids (50-75 per hour). Recent displays have produced low to average displays of this shower.

Shower details - Radiant: 06:21 +15.6° - **ZHR:** 20 - **Velocity:** 41 miles/sec (swift - 66 km/sec)

Parent Object: 1P/Halley

Next Peak - The Orionids will next peak on the Oct 20-21, 2022 night. On this night, the moon will be 21% full.

Southern Taurids

Period of activity: September 28th, 2022 to December 2nd, 2022

Peak Night: Nov 4-5, 2022

The Southern Taurids are a long-lasting shower that several peaks during its activity period. The shower is active for more than two months but rarely produces more than five shower members per hour, even at maximum activity. The Taurids (both branches) are rich in fireballs and are often responsible for increased number of fireball reports from September through November.

Shower details - Radiant: 03:35 +14.4° - **ZHR:** 5 - **Velocity:** 17.2 miles/sec (slow - 27.7 km/sec)

Parent Object: 2P/Encke

Next Peak - The Southern Taurids will next peak on the Nov 4-5, 2022 night. On this night, the moon will be 87% full.

Northern Taurids

Period of activity: October 13th, 2022 to December 2nd, 2022

Peak Night: Nov 11-12, 2022

This shower is much like the Southern Taurids, just active a bit later in the year. When the two showers are active simultaneously in late October and early November, there is sometimes a notable increase in the fireball activity. There seems to be a seven year periodicity with these fireballs. 2008 and 2015 both produced remarkable fireball activity. 2022 may be the next opportunity.

(Continued on [page 22](#))

What's Up in Awards? November-December 2022 (continued)

Shower details - Radiant: 03:55 +22.8° - **ZHR:** 5 - **Velocity:** 18 miles/sec (slow - 30 km/sec)

Parent Object: 2P/Encke

Next Peak - The Northern Taurids will next peak on the Nov 11-12, 2022 night. On this night, the moon will be 88% full.

Leonids

Period of activity: November 3rd, 2022 to December 2nd, 2022

Peak Night: Nov 17-18, 2022

The Leonids are best known for producing meteor storms in the years of 1833, 1866, 1966, 1999, and 2001. These outbursts of meteor activity are best seen when the parent object, comet 55P/Tempel-Tuttle, is near perihelion (closest approach to the sun). Yet it is not the fresh material we see from the comet, but rather debris from earlier returns that also happen to be most dense at the same time. Unfortunately, it appears that the earth will not encounter any dense clouds of debris until 2099. The Leonids are often bright meteors with a high percentage of persistent trains.

Shower details - Radiant: 10:17 +21.6° - **ZHR:** 15 - **Velocity:** 43.5 miles/sec (swift - 70km/sec)

Parent Object: 55P/Tempel-Tuttle

Next Peak - The Leonids will next peak on the night of Nov 17-18, 2022. On this night, the moon will be 36% 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 Pathfinder

A01 Anastasia Morissette

HAA Rising Star Awards

001 Jean Jefferson

002 Kevin Salwach

003 Jo Ann Salci (November 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

Variable Star Observing Program 54

Open Cluster Observing Program (Advanced) 106

Advanced Observer Award 61

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

— Bernie



The Search for Life on Mars, Part 3 by Doug Currie

(editor's note: You can read "The Search for Life on Mars, Part 1" in the May 2022 Event Horizon, pages 19 - 21) and "The Search for Life on Mars, Part 2" in the September 2022 Event Horizon, pages 20 - 22.)

Search for Life on Mars' Surface by Other Nations

Chinese Martian Lander/Rover

The Chinese Martian rover successfully landed on Mars in 2020 the same year that the NASA Perseverance rover did and as far as I know is still operating well. The name of the Chinese rover is Zhurong and the name of the main Chinese spacecraft associated with it is Tianwen-1. The location on Mars of the Mars lander and rover is southern Utopia Planitia or Utopia Plain.

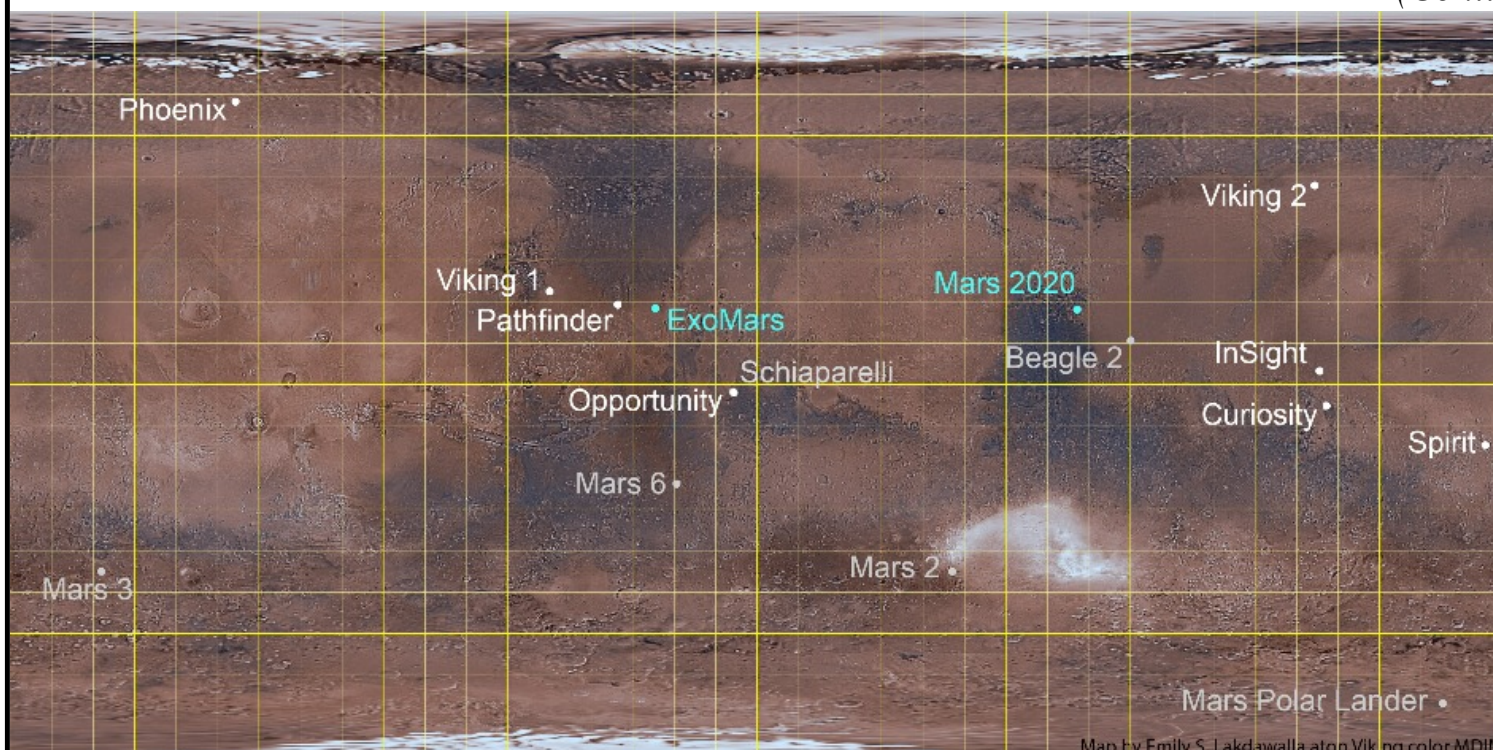
Europe's ExoMars Martian Rover

Europe's ExoMars rover has again been delayed in its launch. The rover has been renamed Rosalind Franklin after a female British chemist who worked on DNA. The two main instruments on the ExoMars or Rosalind Franklin rover that are to especially to be used in the search for organic material possibly related to at least past Martian microbial life are the Raman Laser Spectrometer (RLS) and the Mars Organic Molecule Analyzer (MOMA). The function of the RLS particularly relevant to the search for organics or evidence of at least past life is that: "It will help to identify organic compounds and search for life by identifying the mineral products and indicators of biological activities (biosignatures). The function of the MOMA relevant to the search for organics and life is the following: "MOMA is the rover's largest instrument, housed within the ALD (Analytical Laboratory Drawer). It will conduct a broad-range, very-high sensitivity search for organic molecules in the collected sample. It includes two different ways for extracting organics: laser desorption and thermal volatilization, followed by separation using four GC-MS (Gas Chromatograph Mass Spectrometer). The identification of the evolved organic molecules is performed with an ion trap mass spectrometer." The Russian made lander is named Kazachok. The intended landing on Mars for the lander and rover is Oxia Planum. It was scheduled to be launched on a Russian rocket but space co-operation on the ExoMars mission or otherwise between Russia and Europe continues to face extra tension and obstacles due to the ongoing invasion operation of Russia in Ukraine.

Possible Future Discoveries in Search for Martian Life

The discovery of the source of methane emissions from subsurface, will be determined to be whether or not it is biological (abiotic) or biological such as from microbes breathing out methane (methanogens).

(Continued on [page 22](#))



Map Credit:

Emily S.
Lakdawalla
atop Viking
color VDIM

Why I Support and am Not Concerned About the Discovery of Life on Mars Even Though I am a Bible Believing Christian

One basic reason I support and am not concerned about the possible discovery of even indigenous or native life on Mars, even though I am a biblical Christian, is that any simple life such as bacteria would not have a spirit and could not knowingly sin and would not need to be saved in God's sight such as through the death and resurrection of His Son Jesus Christ on Earth 2,000 years ago. Another basic reason I support and am not concerned about the possible discovery of native life on Mars even as a Christian is that the confirmed discovery of life on another planet would not necessary be proof of evolution happening spontaneously on many worlds with habitable environments but could also demonstrate the wisdom and power of our Creator God in making life on different worlds in the universe or heavens He created. Another main reason I support and am not concerned about the possible discovery of even simple native life on Mars, even though I myself am a Bible believing Christian, is that there are several scriptures throughout the Bible that mention God's creation of all things in the heavens as well as all things on Earth in the same context. It is generally agreed that the reference of the things on Earth include the plant and animal and even human life on Earth (as well as the inanimate things on Earth like mountains, seas, rivers, continents, oceans, lakes, ice caps etc. and there is certainly the possibility from the context of these verses that the parallel references to the things in the heavens of God's creations could include plant and animal or microbial life or even intelligent mortal life on planetary bodies or on large moons of planets of other stars or of our sun besides the inanimate planets, stars, moons, comets, galaxies etc. of the heavens or of the universe. A couple examples of Bible verses mentioning the creation by God of the heavens and the earth and the things or host in both of them are the following:

*Thus the heavens and the earth were finished, and all the host of them.
And on the seventh day God ended his work which he had made; and he rested on the seventh day from all his work which he had made.
And God blessed the seventh day, and sanctified it; because that in it he had rested from all his work which God created and made.
These are the generations of the heavens and of the earth when they were created, in the day that the LORD God made the earth and the heavens.
Genesis 2:1-4*

*Remember the Sabbath day, to keep it holy.
Six days shalt thou labour, and do all thy work:
But the seventh day is the Sabbath of the LORD thy God: in it thou shalt not do any work, thou (you), nor thy (your) son, nor thy daughter, thy manservant, nor thy manservant, nor thy maidservant, nor thy cattle, nor thy stranger (foreigner) that is within thy gates (on your property);
For in six days the LORD made heaven and earth, the sea, and all that in them is, and rested the seventh day: wherefore the LORD blessed the Sabbath say, and hallowed it.
Exodus 20:8-11*

*And (the apostles Peter and John) being let go, they went to their own company, and reported all that the chief priests and elders had said unto them.
And when they heard that, they lifted up their voice to God with one accord, and said, Lord, thou art God, which hast made heaven and earth, and the sea, and all that in them is:
Acts of the Apostles 4:23-24*

*Which when the apostles, Barnabas and Paul, heard of, they rent (tore) their clothes, and ran in among the people crying out,
And saying, Sirs, why do ye (you) these things? We also are men of like passions with you, and preach unto you that ye should turn from these vanities (idols or other gods) unto the living God, which made heaven, and earth, and the sea, and all things that are therein; Acts 14:14-15*



This article is distributed by NASA Night Sky Network (NSN).

Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!

Cepheus: A House Fit for a King

David Prosper

Sometimes constellations look like their namesake, and sometimes these starry patterns look like something else entirely. That's the case for many stargazers upon identifying the constellation of Cepheus for the first time. These stars represent **Cepheus**, the King of Ethiopia, sitting on his throne. However, many present-day observers see the outline of a simple house, complete with peaked roof, instead – quite a difference! Astronomers have another association with this northern constellation; inside its borders lies the namesake of one of the most important types of stars in modern astronomy: Delta Cephei, the original **Cepheid Variable**.

Cepheus is a circumpolar constellation for most observers located in mid-northern latitudes and above, meaning it does not set, or dip below the horizon. This means Cepheus is visible all night long and can be observed to swing around the northern celestial pole, anchored by Polaris, the current North Star. Other circumpolar constellations include Cassiopeia, Ursa Major, Ursa Minor, Draco, and Camelopardalis. Its all-night position for many stargazers brings with it some interesting objects to observe. Among them: the “Garnet Star” Mu Cephei, a supergiant star with an especially deep red hue; several binary stars; several nebulae, including the notable reflection nebula NGC 7023; and the “Fireworks Galaxy” NGC 6946, known for a surprising amount of supernovae.

Perhaps the most famous, and certainly the most notable object in Cepheus, is the star **Delta Cephei**. Its variable nature was first discovered by John Goodricke, whose observations of the star began in October 1784. Slightly more than a century later, Henrietta Leavitt studied the variable stars found in the Magellanic Clouds in 1908 and discovered that the type of variable stars represented by Delta Cephei possessed very consistent relationships between their luminosity (total amount of light emitted), and their pulsation period (generally, the length of time in which the star goes through a cycle of where it dims and then brightens). Once the period for a Cepheid Variable (or **Cepheid**) is known, its luminosity can be calculated by using the scale originally developed by Henrietta Leavitt, now called “Leavitt’s Law”. So, if a star is found to be a Cepheid, its actual brightness can be calculated versus its observed brightness. From that difference, the Cepheid’s distance can then be estimated with a great deal of precision. This revolutionary discovery unlocked a key to measuring vast distances across the cosmos, and in 1924 observations of Cepheids by Edwin Hubble in what was then called the Andromeda Nebula proved that this “nebula” was actually another galaxy outside of our own Milky Way! You may now know this object as the “Andromeda **Galaxy**” or M31. Further observations of Cepheids in other galaxies gave rise to another astounding discovery: that our universe is not static, but expanding!

Because of their importance as a “standard candle” in measuring cosmic distances, astronomers continue to study the nature of Cepheids. Their studies revealed that there are two distinct types of Cepheids: Classical and Type II. Delta Cephei is the second closest Cepheid to Earth after Polaris, and was
(Continued on [page 26](#))

NASA Night Sky Notes (continued)

even studied in detail by Edwin Hubble's namesake telescope, NASA's Hubble Space Telescope, in 2008. These studies, along with others performed by the ESA's Hipparcos mission and other observatories, help to further refine the accuracy of distance measurements derived from observations of Cepheids. What will further observations of Delta Cephei and other Cepheids reveal about our universe? Follow NASA's latest observations of stars and galaxies across our universe at nasa.gov.

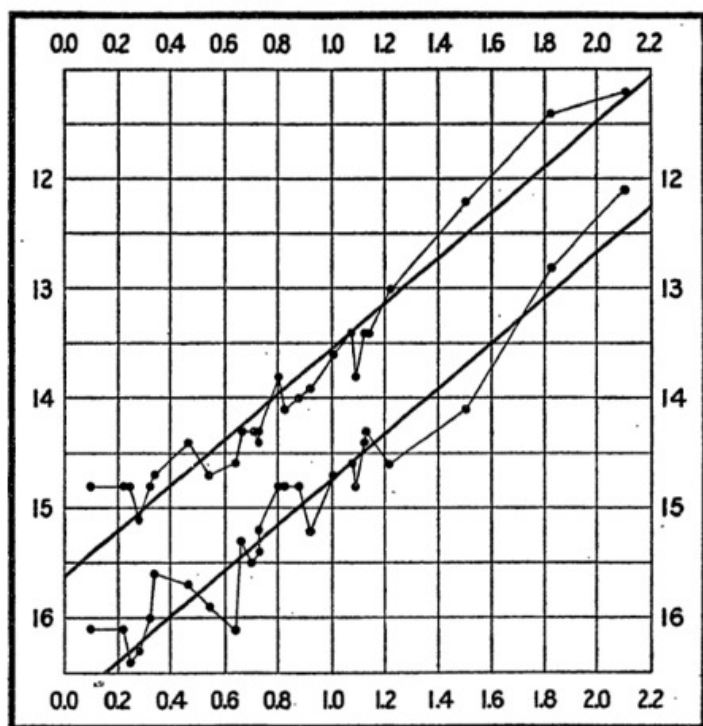


FIG. 2.

above: The stars of Cepheus are visible all year round for many in the Northern Hemisphere, but fall months offer some of the best views of this circumpolar constellation to warmly-dressed observers. Just look northwards! Image created with assistance from Stellarium: stellarium.org.

left: This historical diagram from Henrietta Leavitt's revolutionary publication shows the luminosity of a selection of Cepheid Variables on the vertical axis, and the log of their periods on the horizontal axis. The line drawn through these points shows how tight that relationship is between all the stars in the series. From Henrietta Leavitt and Edward Pickering's 1912 paper, "Periods of 25 Variable Stars in the Small Magellanic Cloud," a copy of which can be found at: <https://ui.adsabs.harvard.edu/abs/1912HarCi.173...1L/abstract>

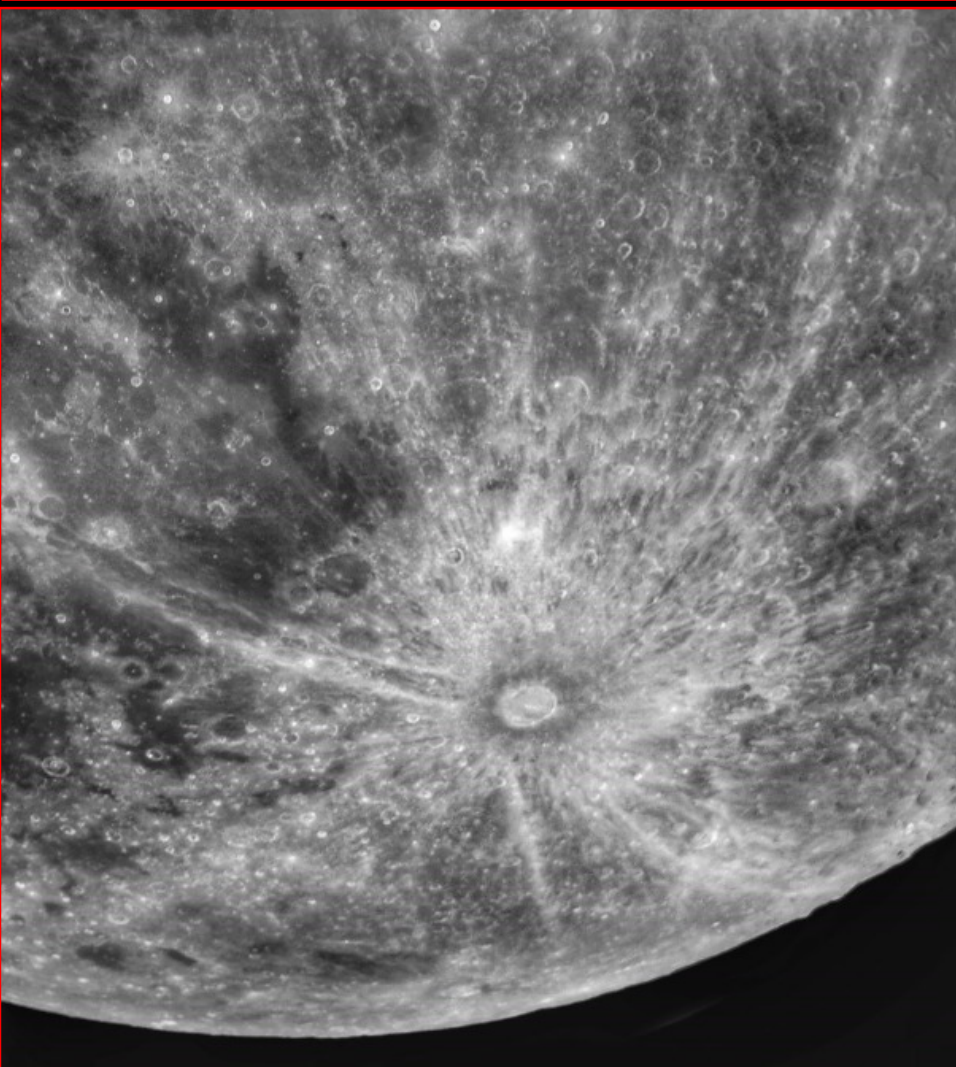


above:

**Star Clusters NGC 6633 & IC 4756, in
Ophiuchus and Serpens**

by Bob Christmas.

Taken with a Canon 40D DSLR through a
Canon 100mm telephoto lens at f/2.8 on an
SP mount.
10 X 2 minutes, 20 minutes total, at ISO 800.



left:

Lunar Crater Tycho, by John Gauvreau



Jupiter



Neptune



Saturn



Mars



left:

Jupiter, by Michel Audette

With an excellent view of the Great Red Spot.

above:

“Spots in the Sky”
Binocular views of the planets

by **Chris White**



William J. McCallion Planetarium

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— Galaxies
 - Nov 9: **Know our Universe at different scales**
 - Nov 16: **What's Up in the November Sky?**
 - Nov 23: **Behind the Lens: Women's Contribution to Astronomy**
 - Nov 30: **Oh my goodness! What happened to the Sun?**
- **Masks strongly encouraged for duration of all shows.**
- For more details, visit
www.physics.mcmaster.ca/planetarium

UPCOMING EVENTS

November 11, 2022 - 7:30 pm – H.A.A. Meeting at McMaster Innovation Park. Our main speaker for the November meeting will be *Parshati Patel*. This will be a “hybrid” meeting, with the attendance option of in-person or online via [Facebook](#) and [Zoom](#).

December 9, 2022 - 7:30 pm – H.A.A. Meeting at McMaster Innovation Park.

2022-2023 Council

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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



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