



Event Horizon



Volume 29, Number 8
June 2022



From The Editor

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

Thanks to all who contributed!

*Bob Christmas,
Editor*

editor 'AT'
amateurastronomy.org



Chair's Report by Bernie Venasse

Summer is upon us!

With spring upon us and summer months fast approaching we find ourselves planning activities, vacations, family events and observing. I hope that you will find a way to combine all these goals.

This edition of the EH is the pre-summer version and I have expanded my What's Up in Awards segment to include information for June, July, August, and September... Good luck and Clear Skies!

What's happening around the club?

Registrations continue for the September 23-25, 2022 Star Party. Contact Sue McLachlan for details.

Our club recorder, Brenda, has broken her baby toe. We all wish her a speedy recovery and hope that she can get to observing again soon.

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Chair's Report (continued)

The equipment loaner program is very active. If you would like to partake in this program, please contact Melissa via loanerscope@amateurastronomy.org.

A big thanks to Karim Jaffer, our speaker in May, for his inspiring and entertaining views about "Two-Eyed Seeing - Ancient and Indigenous Astronomy from across the Globe", You can learn more about Two-Eyed Seeing on YouTube at <https://www.youtube.com/watch?v=97aA0ZA1ZJs>

Our next meeting is scheduled for June 10, 2022. Our guest will be Dr. Paul Delaney... Amateur astronomers tend to be "night owls" forgetting about THE brightest star in the sky: our Sun. Observing the Sun is relatively easy being available every day of the year, can often be seen through modest cloud cover and does not interrupt those romantic dinners in the evening with your partner. A few precautions must be adhered to when observing the Sun, but tracking sunspots, observing solar prominences, chasing solar eclipses and venturing out at night to observe aurorae are all worthwhile and fulfilling aspects of observing our Sun. This talk will give a backgrounder about our nearest star and some of the values associated with observing it.

I have recently received the Binocular Master Observer certificate and pin from the Astronomical League. This award is the culmination of seven years of observing. The Binocular Master Observer Award will be given to an AL member who has completed at least eight of the League's binocular-based observing programs: <https://www.astroleague.org>

1. Binocular Double Star Observing Program... (Observe and sketch 50 double stars)
2. Advanced Binocular Double Star Observing Program (Observe and sketch 50 double stars).
3. Binocular Messier Observing Program... (Observe 50 Messier objects).
4. Binocular Variable Star Observing Program... (60 observations of at least 15 different variables).
5. Deep Sky Binocular Observing Program... (Observe the 60 deep sky objects listed)
6. Galileo Observing Program - Binocular Certification... (Repeat Galileo's Observations of the Heavens).
7. Lunar Observing Program or the Lunar Binocular Observing Certificate... (Observe 100 features on the moon).

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 Ring Nebula, M57, by Pavle Culum.*

Chair's Report (continued)

8. Solar System Binocular Observing Certificate... (Complete 20 requirements on the observing list).
9. Southern Skies Binocular Observing Program... (Halfway through this one... looking forward to going south and finishing it).

Worth Repeating

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

The new HAA Lunar Observing Program is active. You can find it and other programs on our website <https://www.amateurastronomy.org/haa-observing-programs/>

A reminder that a new 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.

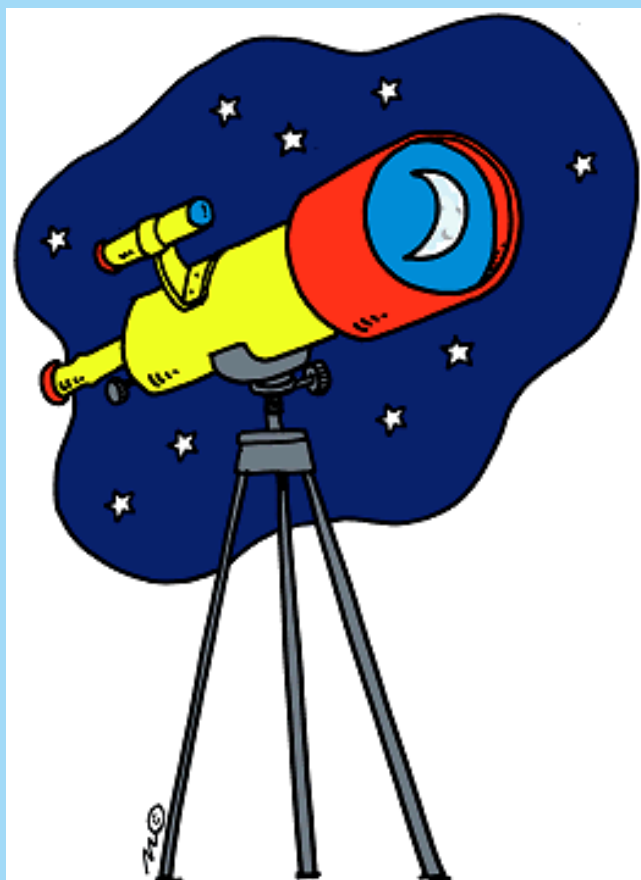
Membership growth... new members list

We would like to take this opportunity to welcome new and/or returning members:

Marco Constante, Hamilton, Individual membership;

Isabella Lopes-Daniele, Binbrook, Family membership... our BASEF winner... CONGRATULATIONS!!!

The membership now consists of 74 individual memberships and 59 family memberships.



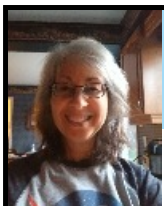
H.A.A.'s Loaner Scope Program

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.

Telescopes are loaned out on a first come basis.

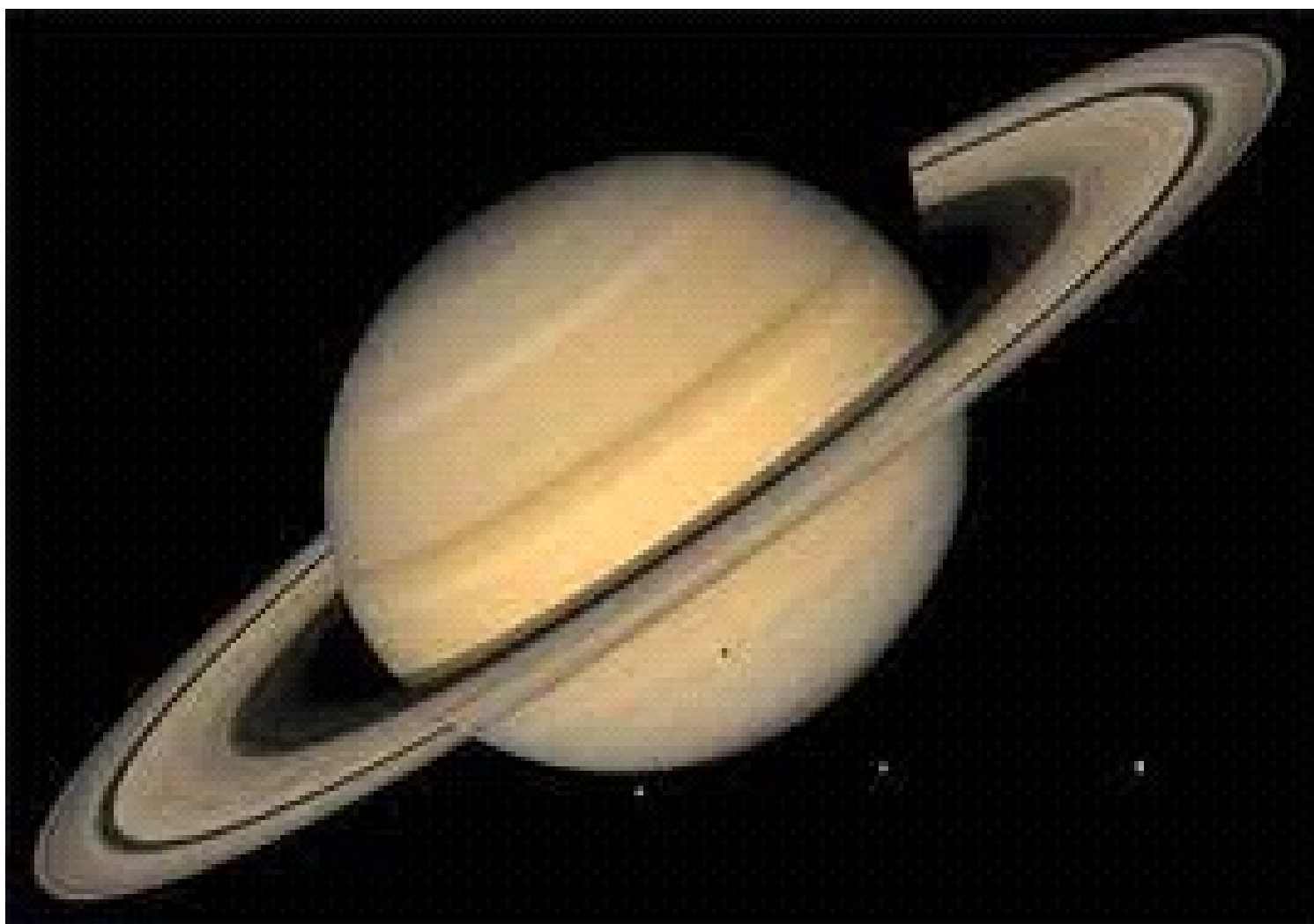


...A column for young astronomers - and those young at heart!

This month, one of our readers has asked questions about “Saturn’s Rings and other rings in our solar system”. Thank you, Victoria! Let’s explore!

Ring Around the Planet!

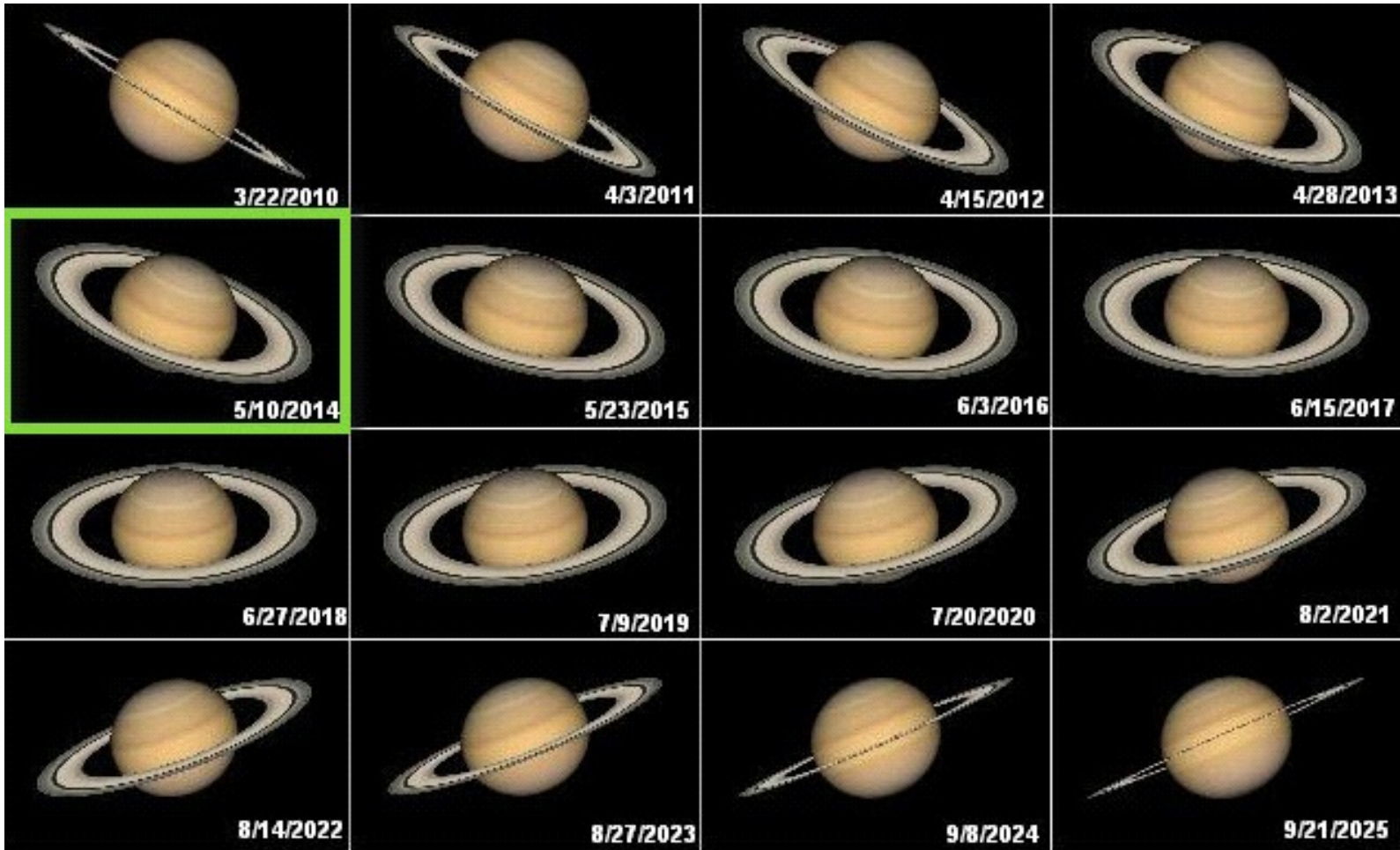
The planet Saturn can be seen with just your eyes. But to see its famous icy rings, binoculars or a small telescope are needed. It is believed that Saturn wasn’t “born” with these rings as they are much younger than the planet itself. Scientists don’t know for sure why Saturn has them, either. One idea is that the rings were formed when a moon was destroyed in a collision. They could also be made from the leftovers of comets and asteroids (remember exploring them in the April HAA Explorers article?). The rings are made from chunks of ice, dust, dirt and also rocks covered with ice. These fragments can be dust-sized or as big as a mountain and are constantly moving in an orbit around Saturn. How do we know all of this? Robotic spacecraft, such as Voyager and Cassini have traveled to Saturn. They have explored many things about Saturn and we have learned a lot about the rings.



Ring-a-Round the Saturn
Photo Courtesy NASA.Gov

Saturn’s rings are 400,000 km wide (4 1/2 Earths wide), but very thin at only about 100m thick (just a little bigger than a CFL Football field)! Our view of Saturn changes every year, as Saturn’s tilt on its axis changes as it orbits the Sun once every 29 years. Three years from now, in 2025, we will get to see how thin Saturn’s rings are!

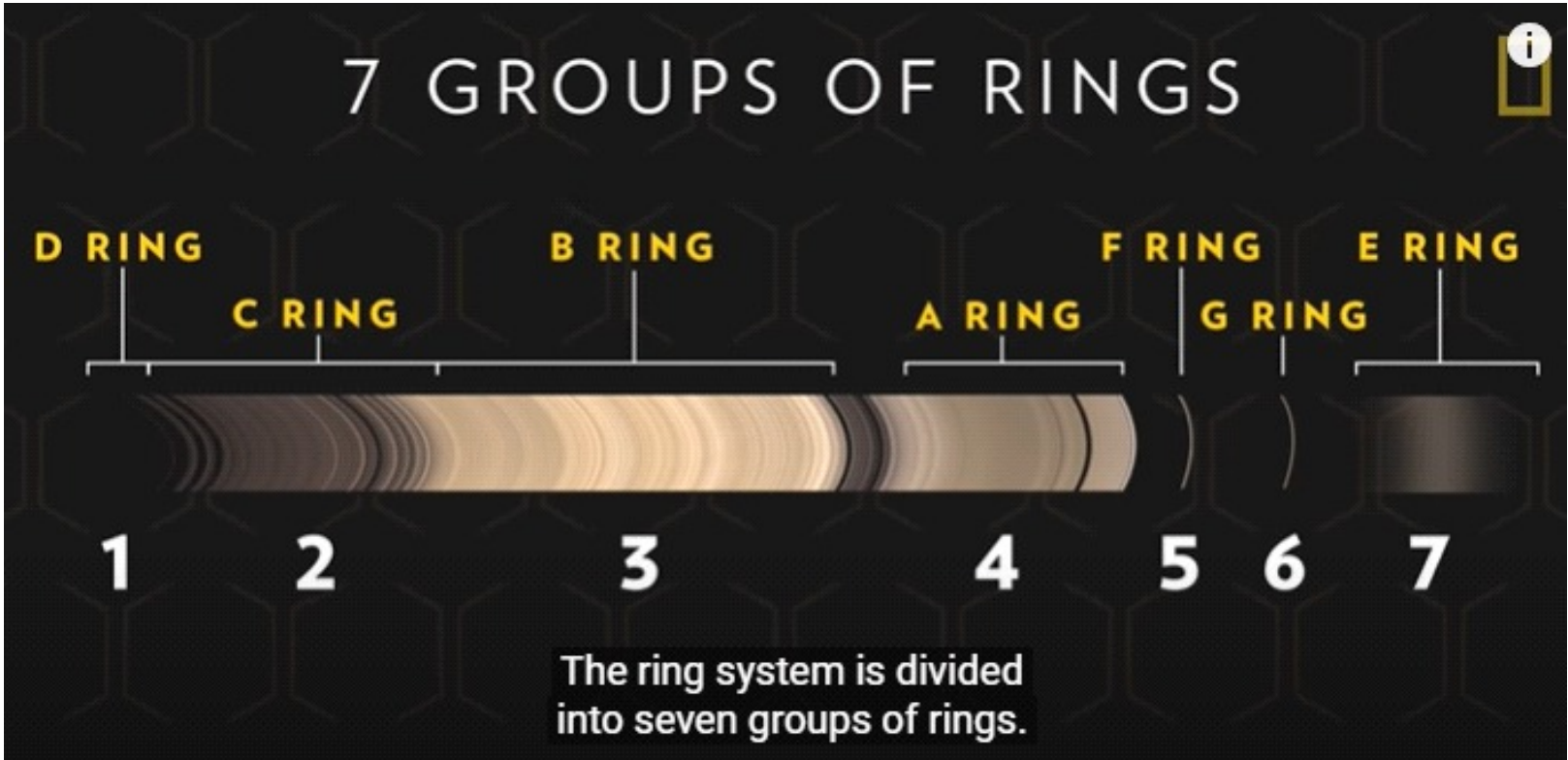
(Continued on [page 5](#))



Astrophotography: Saturn over Five Years – Canadian Astronomy
Photo Courtesy Canadian Astronomy Wordpress.com

Saturn’s rings are named after the letters of the alphabet, in order of their discovery. The A and B Rings are the brightest and are separated by a gap called the Cassini Division. The rings are made up of smaller rings called ringlets, plus smaller gaps. There are even moons that orbit between the rings in these gaps! In fact, some of these moons are called “shepherd moons”, because their gravity keeps the ring’s particles on their path, just like a herding dog shepherds sheep!

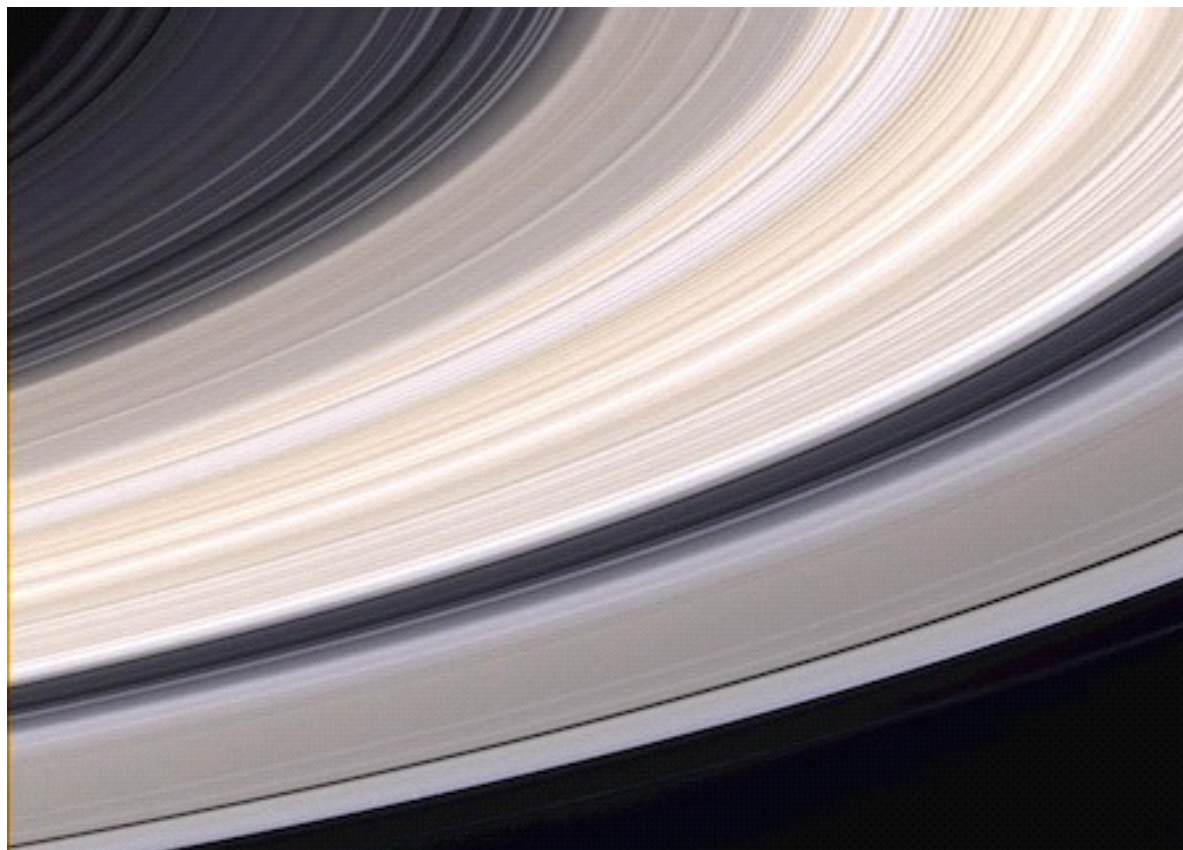
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Saturn 101
National Geographic

HAA Explorers (continued)

What colour are the rings?? To us on Earth, they look mostly white because of the reflection of the ice particles. But, the Cassini Spacecraft with its much closer view, was able to detect pale colours of pink, gray and brown.



*The Cassini spacecraft took this picture of Saturn's rings. You can see the grey and tan colors.
Image Credit: NASA*

Did you know that other planets also have rings? Jupiter, Uranus and Neptune also have rings, although they are difficult to see from Earth. Jupiter's rings are faint and were first seen in 1979 by the Voyager 1 Spacecraft. Jupiter's rings are made from dust particles. The rings of Uranus are made from dark particles of ice and rocks. And Neptune has a system of five dark and dusty rings. The Sun is believed to have had rings when the solar system was forming and Earth was created from the debris orbiting in one of those rings. And Earth may have even had a ring a long time ago, and that ring became our Moon!

Enjoy the rings of Saturn now, because new research is showing that the rings are disappearing and will be gone in 300 million years! Thank you, Victoria, for your amazing questions! They helped us learn more about Saturn's rings!

Things to do until next time **:

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

1. Check out this video to learn more about Saturn and its rings:

<https://www.youtube.com/watch?v=epZdZaEQhS0>

2. Visit this website to learn more about Saturn and to see how thin you can make its rings:

<https://spaceplace.nasa.gov/all-about-saturn/en/>

3. Make your own Saturn model: <https://spaceplace.nasa.gov/saturn-model/en/>

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Draw a Ring around Words seen in this Article!

- MarsSunVenusEarthPlutoNeptune
- JupiterMercuryUranusGalaxyCassiniGaps
- MoonsPlanetSnowIcyJewelleryPink
- AlphabetCloudsCFLSaturnColdRocks

Answers on page 11.

During June, check out:

1. On June 12th around 7:30 pm, check out the Waxing Gibbous Moon as it rises:



Image generated using Stellarium

(Continued on [page 8](#))

HAA Explorers (continued)

2. Now that school is out and you can stay up later, check out the Summer Triangle on June 30th at 10:30 PM. The stars to look for are Deneb in Cygnus the Swan, Vega in Lyra, and Altair in Aquila:

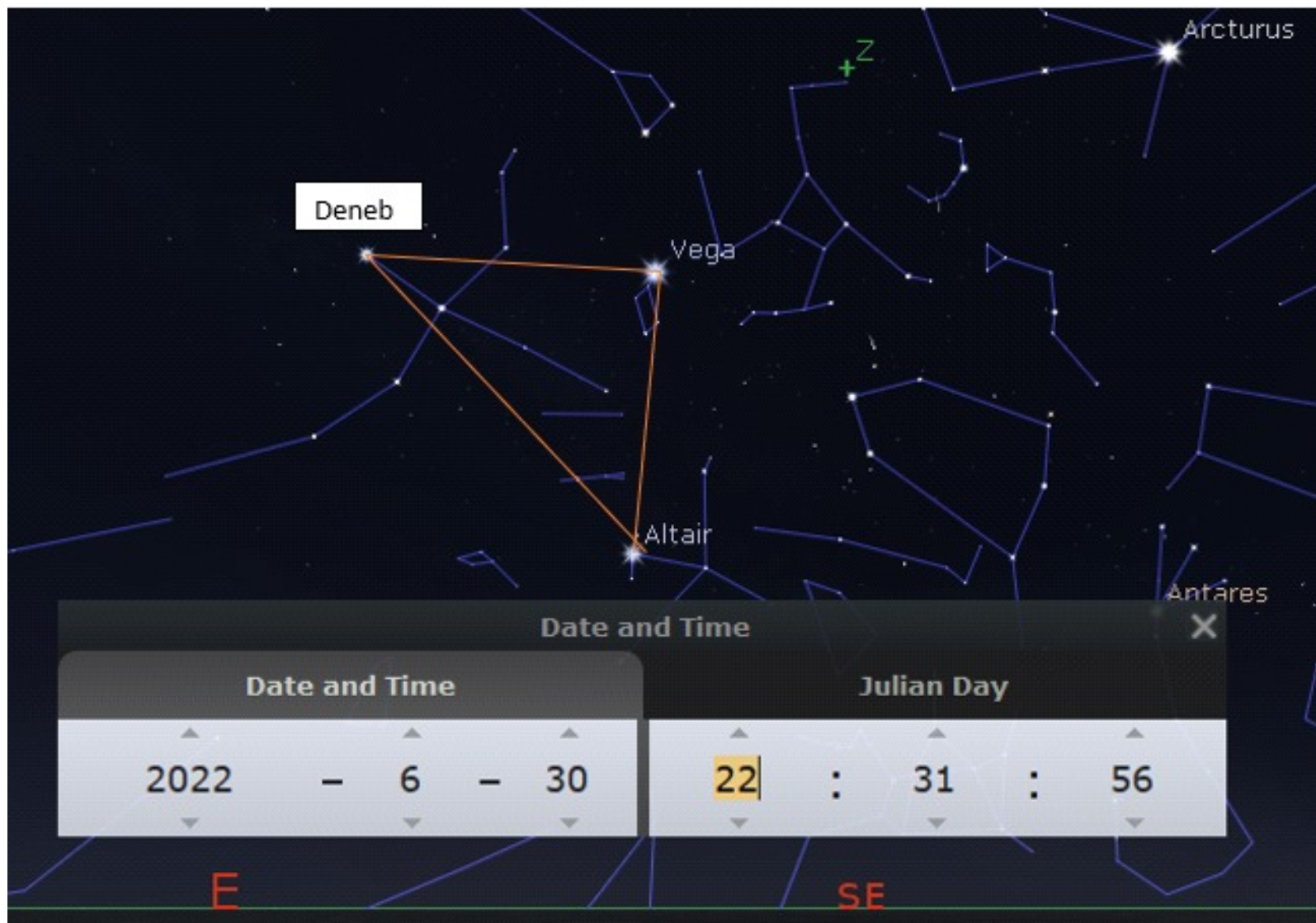


Image generated using Stellarium

Finally:

What's the richest planet?

Answer:

Saturn, because it has many rings!

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

Have a Wonderful Summer exploring the Night Sky!

Thank you to Mi and Ro for reviewing this article!



References:

<https://spaceplace.nasa.gov/saturn-rings/en/>

How Space Works. DK Penguin Random House. 2021.

Saturn 101: National Geographic. <https://www.youtube.com/watch?v=epZdZaEQhS0>

National Geographic Kids: Ultimate Space Atlas, 2017.

National Geographic Kids: Ultimate Explorer Field Guide: Night Sky. 2016.



The Sky This Summer for June 2022 by Matthew Mannering

Last month, on the evening of May 15th, there was a total Lunar eclipse. Unfortunately, most people in southern Ontario were under total cloud cover for the duration of the event. However, a small group of us took a chance and were seated down by the inner bay at Port Rowan on Lake Erie. Dan, Chris, Denise, Janice and I were soon joined by other people. The cloud cover wasn't as dense at the lake side, and we were able to see the show. The eclipse was very dark and once it became total the Moon disappeared behind the cloud. At about 11:45pm we collectively decided that was the end of the show, packed up the camera gear and headed back to our camp sites.

And now a topic I never thought I would be covering in "The Sky This Month". This spring and summer it appears as if *Ticks* are everywhere! Please be sure to check yourself after each hike or astronomy session. They are even showing up in people's gardens. In all the years I have been hiking I have never been nailed by one of these little blood suckers. This year, I have already been bitten by two of them. We have Tick Kits in the trailer and at home and I suggest you get them as well. Blacklegged Ticks do have the ability to pass on Lyme disease. If you are bitten and become concerned, take a picture of the Tick with your cell phone and send it to etick.ca. They will reply and let you know if it is a Blacklegged Tick and if that is the case, you should phone your doctor who may prescribe an antibiotic. I had a reply from etick.ca within one day. Ontario.ca has a web page dedicated to Lyme disease and Ticks. Scroll down the page to see how to properly remove the Tick. Yuch!!!

Now back to astronomy. The sky this summer has some very nice events to look forward to. August in particular seems to be very busy, but let's start with June.



The Lunar Eclipse of May 15/16, 2022
Image Credit: Matthew Mannering

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The Sky This Summer for June 2022 (continued)

JUNE

June brings us the summer solstice on the 21st. The long hours of daylight in June mean that your observing window of darkness is very short. True darkness starts at about 11:30pm and ends around 3:30am. This gives you lots of time to set up equipment after supper, but I find the extended waiting time tedious.

Normally, there will be at least one or two planets available to view in the evening dusk sky. This year, the planetary parade starts after midnight so that is no help at all.

The Moon is available in the pre-nighttime skies up until midmonth after which it rises with the planets. On the plus side, the planets do give an amazing show starting on the 16th and extending through month end. At about 5:15am on any of these mornings, look to the east and you may see Mercury very low in the sky. Then, turning slowly to the south, you should see Venus, Uranus, Mars, Jupiter, Neptune (visible in binoculars) and Saturn all rising in an arc along the ecliptic. Now look down toward your feet and you will have seen all eight planets!

JULY

In terms of special events, July looks very ho-hum this year. I'm afraid you will have to settle for numerous globular clusters, open clusters, large nebulae, planetary nebulae, double stars and quite a few awesome galaxies. The following notable objects are listed from west to east. I won't pretend to even try to list them all. I will leave the double stars and galaxies for you to find.

Globulars

- M53 and NGC 5053 (much dimmer and 1° east)
- M3
- M13 and M92
- M5
- M4
- M107, M12, M10, M9, M19, M62 and M14
- NGC 6522 and NGC 6528 (just west of the spout of the Teapot (Sag), only ½° apart deep in the Milky Way)
- M28, M22, M55
- M2, M15

Open Clusters

- Melotte 111
- Collinder 316
- M6 (Butterfly), M7, M23
- M24, M11 (Wild duck)
- Collinder 399 (The coathanger)
- Anywhere along the length of the constellation Cygnus
- NGC 457 (Owl or ET)
- The Double Cluster (NGC 869 and 884)

Large and Planetary (P) Nebulae

- M8 (Lagoon), M20 (Trifid)
- M16 (Eagle), M17 (Swan)

(Continued on [page 11](#))

The Sky This Summer for June 2022 (continued)

- NGC 7009 P (Saturn)
- M57 P (Ring), M27 P (Dumbbell)
- The Veil (NGC 6960, 6974, 6992)
- The North American (NGC 7000)
- NGC 6826 P (Blinking)
- The Heart and Soul (IC 1805, 1848)
- NGC 6543 P (Cat's Eye)

AUGUST

On the mornings of August 1st and 2nd, Mars and Uranus will be separated by less than 1.5° . Look for them in the southeastern predawn (5am) sky about halfway to the zenith. Mars shines about 165x brighter than Uranus, so the earlier you can get up, the easier it will be to see the pairing.

Friday night August 12th is the peak of the Perseids meteor shower. Unfortunately, the Moon will be full, but the brightest streaks of light should be readily visible. This year, the club hopes to have a members' night to mark the event. Keep a look out for emails regarding the event, closer to the night of the Perseids. Saturn rises at about midnight in late June and reaches opposition on August the 14th. The rings will be tilted at about 13° from edge on and the planet plus rings will have an apparent diameter of 43.7 arc seconds. This means that Jupiter and Saturn (including rings) will appear to be the same size in your telescope eyepiece.

Also in August, there is a nicely placed double shadow transit on Jupiter. The show starts at about midnight Monday the 15th and ends at 1:30am on the 16th. As a bonus, SkySafari shows the Great Red Spot (GRS) of Jupiter between the shadows. Note that GRS positions are approximations based on the current known longitude of the spot.

That's it for this summer. Please have a safe and happy season of astronomy. I hope to see some of you in person soon and don't forget the star party in September. If you are interested and haven't signed up yet, look on the HAA website for details.

Page 7 Draw-a-Ring-Around-Words answers:

Draw a Ring around Words seen in this Article!

Mars

Sun

Venus

Earth

Pluto

Neptune

Jupiter

Mercury

Uranus

Galaxy

Cassini

Gaps

Moons

Planet

Snow

Icy

Jewellery

Pink

Alphabet

Clouds

CFL

Saturn

Cold

Rocks



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Messier Observing Program: June-September... 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

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June

Constellations: Bootes, Corona Borealis, Hercules

Stars: Arcturus

Double Stars: Zuben el Genubi

Object Pairs: NGC 5024, NGC 5053

Messier objects: M8

August

Constellations: Lyra, Cygnus, Aquila, Sagittarius

Stars: Altair, Vega

Double Stars: epsilon-1, -2, Lyrae

Object Pairs: NGC 6475/Cr 355

Messier objects: M11, M57

July

Constellations: Corona Borealis, Hercules, Lyra, Scorpius, Ophiuchus

Stars: Antares

Double Stars: delta Bootis

Object Pairs: NGC 5676/IC 1029

Messier objects: M4, M6, M7, M8, M13

September

Constellations: Cepheus

Stars: Deneb

Double Stars: Albireo, 61 Cygni

Object Pairs: NGC 6939/NGC 6946

Messier objects: M15

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.

(Continued on [page 13](#))

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

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.

HAA Messier Objects Observing Award

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.

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.

July Messier targets

M3 This globular cluster in Canes Venatici is one of the brightest objects in the sky. In binoculars this object is definitely not star-like, but more like a bright, small snowball. Easy to see. Small telescopes will begin to resolve M3 into individual stars. The hardest part of this object is locating it in a portion of sky that contains few bright landmarks.

M53 This is another globular cluster in Canes Venatici. While not quite as big or bright as M3 it is still an obvious binocular object. Resolvable in smaller telescopes, it is an easy object to find sharing the same low power telescope field as fifth magnitude Alpha Coma Berenices.

M5 A big, bright globular cluster located in Serpens Caput. M5 is as nice as M3 but lies near a fifth magnitude naked eye star (5 Serpentis) making it an easy object to find.

(Continued on [page 14](#))

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

- M68** An eighth magnitude globular cluster in Hydra, M68 is a difficult binocular object for Northern observers. It appears as a faint fuzz-spot in binoculars. You may need to use averted vision or large binoculars to find this one. Appearing as a round fuzzy patch in an 8" telescope, you will need a much larger aperture to really resolve it.
- M83** A face-on spiral in Hydra. M83 is fairly easy in binoculars as a faint, fuzzy, patch of light. In a telescope look for a large patch of light with a bright center.
- M4** A big, bright, globular in Scorpius. Easily located near Antares. This is an easy binocular object appearing as a round snowball. Partially resolvable in a telescope, the identifying feature of this globular is a line of bright stars crossing the center.
- M80** This is the smallest and faintest globular cluster this month. Located in Scorpius, M80 is a very tough binocular object appearing as a faint star with slight fuzziness around the edges. This is confirmed with a telescope, M80 has a bright central condensation in the middle of faint fuzz. It is one of the Messier objects that even through a medium telescope still looks like a comet.

August Messier targets

- M10, M12** This pair of globular clusters in the middle of Ophiuchus are easily swept up in binoculars. Through an 8" telescope M12 is well resolved while M10 is slightly more fuzzy looking. Both become very bright towards the center.
- M107** A small, fairly faint globular cluster in Ophiuchus. It is a tough binocular object, appearing as a very small faint patch of light possibly requiring averted vision. In a telescope, M107 is a larger and brighter fuzzy patch of light than what can be seen in binoculars.
- M9** Another small, relatively faint globular cluster in Ophiuchus. M9 is very similar to M107, only slightly brighter. Another tough, but possible binocular object.
- M19, M62** Another pair of globular clusters in Ophiuchus separated by about four degrees. Fairly easy to find in binoculars, they are smaller than M10 and M12 thus not quite as obvious. These clusters are not resolvable through small scopes, and appear as round fuzzy patches brightening towards the center. M19 is slightly brighter than M62.
- M6, M7** This is a pair of large, bright open clusters in Scorpius visible to the naked eye. Binoculars provide the best view of these clusters. Both are completely resolvable in 10x50 binoculars and can be fit into the same field of view. M7 is the larger and brighter of the pair.
- M8** This is a bright emission nebula in Sagittarius, easily visible to the naked eye. The common name of M8 is the Lagoon nebula. In binoculars M8 is an oval cloud of light larger than the full moon with several bright stars embedded within it. A telescope makes this nebula larger and brighter but does not really improve the view.
- M20** Another diffuse nebula in Sagittarius only 1.4 degrees northwest of M8 and is called the Trifid nebula. This is easily seen in binoculars looking like a cloud of smoke around some bright stars. A view through a telescope appears much the same, although try to pick out the three dust lanes that gives M20 its name. This is a somewhat difficult object to see right away, at first glance it looks like the optics are in need of cleaning and are causing the light from the bright stars to "smear".
- M21** This is a small, but bright open cluster in Sagittarius right next to M20. Binoculars show a very small bright patch partially resolvable. Small telescopes easily resolve all of the clusters members. M8,

(Continued on [page 15](#))

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

M20, and M21 are all within the same binocular field and lie in a very rich region of the Milky Way. This view is one of the finest to be found.

M23 This is a large open cluster in Sagittarius. Through binoculars M23 is a large, hazy patch of light almost the size of the full moon. A telescope at low powers easily resolves this cluster among a rich background of other stars.

September Messier targets

M13 The great globular cluster in Hercules is bright enough to be seen with naked eye. Binoculars easily show this cluster as a bright fuzzy ball. M13 is partially resolvable in small aperture telescopes and becomes a fantastic swarm of tightly packed individual stars through larger scopes.

M92 Another globular cluster in Hercules, M92 is easy to find in binoculars appearing slightly dimmer and smaller than M13. As with M13 it is partially resolvable in small scopes and is a fine sight in large instruments.

M14 A small, bright globular cluster in Ophiuchus. It is a difficult binocular object, look for a small fuzzy patch of light. Through a telescope M14 is an even patch of light, the stars not resolvable except through large scopes.

M22 This is the other great globular in our tour this month. Located just above the Teapot asterism in Sagittarius, M22 can be seen with no optical aid. M22 is easy to find in binoculars, and easy to resolve in telescopes, with about the same impressiveness as M13.

M28 Located near M22 in Sagittarius, this is a small bright globular. A tough binocular object, look for a small fuzzy patch. Easily seen in a telescope, but requires large apertures to resolve individual stars.

M69, M70, M54 All of these are small bright globular clusters laying along the bottom of the teapot in Sagittarius. Very similar in appearance to M28, these are all tough binocular objects requiring dark skies and possibly averted vision to see. M54 is slightly brighter and appears more star-like through binoculars than the other globulars. These are all easily seen in telescopes, though not easily resolvable.

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.

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

Mercury: Low morning planet early July and low evening planet at the end of the month. Tricky to see.

Venus: Morning planet rising nearly two hours before sunrise. Thin crescent Moon nearby on 26 and 27 July (see diagram at top of page 16).

(Continued on [page 16](#))

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



There's a great opportunity to spot bright morning planet Venus near a thin Moon on 26 and 27 July 2022. View approximately 80 minutes before sunrise. Moon's size exaggerated for clarity.

Credit: Pete Lawrence

Mars: Brightening morning planet. Close to Uranus at the end of July.

Jupiter: Bright morning object in Cetus, the Whale, improving throughout the month. Waning gibbous Moon close on 19 July.

Saturn: Improving morning planet. Bright gibbous Moon nearby on 15/16 July.

Uranus: Morning planet, improving through July. Mars very close at the end of the month.

Neptune: Neptune is best seen at the end of the month, south of the Circlet asterism in Pisces.

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

Mercury: Eastern elongation on 27 August (27.3° from the Sun) but poorly placed for UK viewing.

Venus: Bright morning planet. Waning crescent Moon nearby on 25 and 26 August.

Mars: Bright morning planet. Near Uranus at the start of August and the Pleiades on 18 August.

Jupiter: Bright morning planet, reaching 40° altitude in dark skies from mid-month. Waning gibbous Moon near on 15 August.

Saturn: Opposition on 14 August. From the centre of the UK, Saturn reaches an altitude of 21° .

Uranus: Morning planet, becoming well placed towards the end of August. Mars nearby at the start of the month.

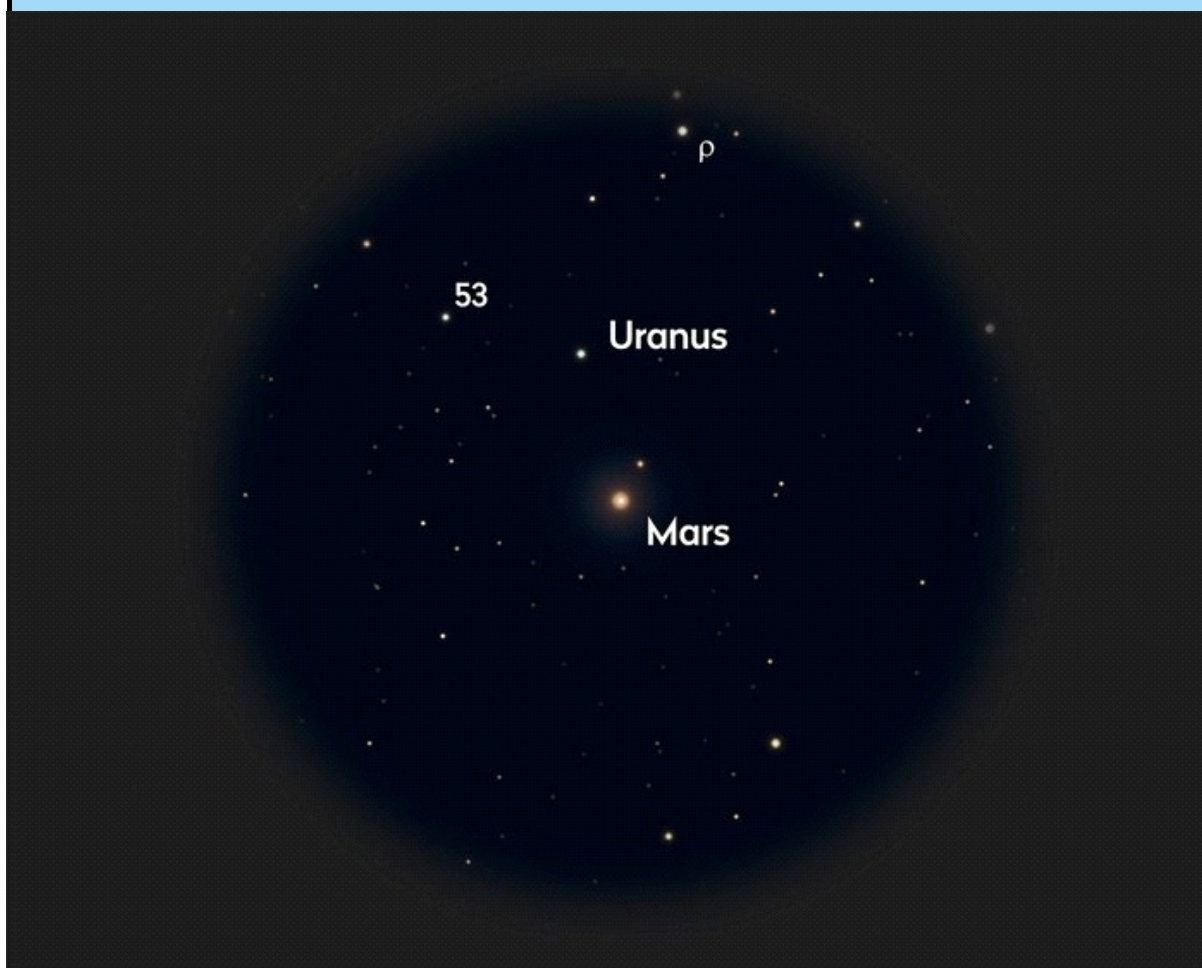
Neptune: Morning planet reaching an altitude of over 30° in true darkness from mid-August.

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

Mercury: Poor at start of month but improves toward the end of September in the morning sky.

(Continued on [page 17](#))

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



Uranus (mag. +5.8) and Mars (mag. +0.2) appear separated by 1.3° on the morning of 2 August 2022. The view here simulates the view through 7x50 binoculars at 02:00 BST.

Credit: Pete Lawrence

Venus: Morning planet. Ultra-thin waning crescent Moon close on 25 September (see diagram below).

Mars: Brightening planet in Taurus. Appears 11 arcseconds across at the end of September.

Jupiter: Opposition on 26 September. Attains a peak altitude of 37° from the centre of the UK.

Saturn: Well positioned planet. Bright waxing gibbous Moon nearby on evenings of 7 and 8 September.

Uranus: Lunar occultation on 14 September. Covered for 50 mins by 77%-lit waning gibbous Moon.

Neptune: Reaches opposition on 16 September, attaining highest altitude of 30° in true darkness.



Spot a 0.6%-lit waning crescent Moon pre-sunrise on 25 September 2022. Warning: Only attempt to find Venus and the Moon when the Sun is below the horizon. This view simulates the view low above the east horizon through 7x50 binoculars, approximately 40 minutes before sunrise (Moon's appearance exaggerated for clarity).

Credit: Pete Lawrence

(Continued on [page 18](#))

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

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

Southern delta Aquariids

Period of activity: July 18th, 2022 to August 21st, 2022

Peak Night: Jul 29-30, 2022

The Delta Aquariids are another strong shower best seen from the southern tropics. North of the equator the radiant is located lower in the southern sky and therefore rates are less than seen from further south. These meteors produce good rates for a week centered on the night of maximum. These are usually faint meteors that lack both persistent trains and fireballs.

Shower details - Radiant: 22:42 -16.3° - **ZHR:** 16 - **Velocity:** 25 miles/sec (medium - 40km/sec)

Parent Object: 96P/Machholz?

Next Peak - The Southern delta Aquariids will next peak on the Jul 29-30, 2022 night. On this night, the moon will be 1% full.

alpha Capricornids

Period of activity: July 7th, 2022 to August 15th, 2022

Peak Night: Jul 30-31, 2022

The Alpha Capricornids are active from July 7 through August 15 with a "plateau-like" maximum centered on July 31st. This shower is not very strong and rarely produces in excess of five shower members per hour. What is notable about this shower is the number of bright fireballs produced during its activity period. This shower is seen equally well on either side of the equator.

Shower details - Radiant: 20:26 -9.12° - **ZHR:** 5 - **Velocity:** 14 miles/sec (slow - 22km/sec)

Parent Object: 169P/NEAT

Next Peak - The alpha Capricornids will next peak on the Jul 30-31, 2022 night. On this night, the moon will be 5% full.

Perseids

Period of activity: July 14th, 2022 to September 1st, 2022

Peak Night: Aug 11-12, 2022

The Perseids are the most popular meteor shower as they peak on warm August nights as seen from the northern hemisphere. The Perseids are active from July 14 to September 1. They reach a strong maximum on August 12 or 13, depending on the year. Normal rates seen from rural locations range from 50-75 shower members per hour at maximum. The Perseids are particles released from comet 109P/Swift-Tuttle during its numerous returns to the inner solar system. They are called Perseids since the radiant (the area of the sky where the meteors seem to originate) is located near the prominent constellation of Perseus the hero when at maximum activity.

Shower details - Radiant: 03:13 +58° - **ZHR:** 100 - **Velocity:** 37 miles/sec (swift - 59km/sec)

Parent Object: 109P/Swift-Tuttle

Next Peak - The Perseids will next peak on the Aug 11-12, 2022 night. On this night, the moon will be 100% full.

(Continued on [page 19](#))

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

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

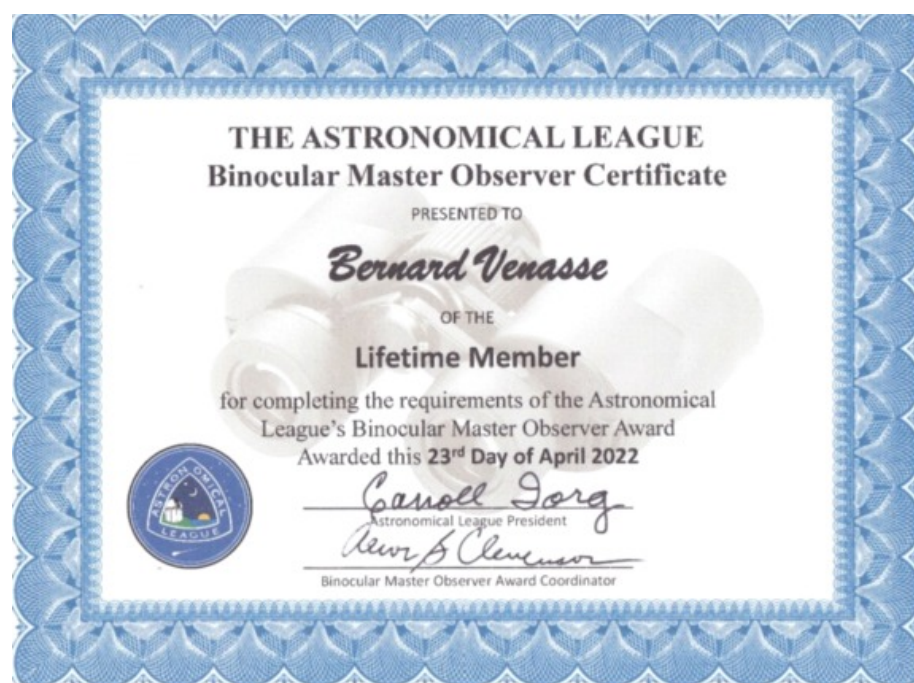
Rising Star Awards

- 001 Jean Jefferson
- 002 Kevin Salwach
- 003 Jo Ann Salci (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



Binocular Master Observer Award and Pin ... New!!...

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



Earth Grazing Eclipses II - Non Central by Ray Badgerow

Another type of Earth grazing eclipse occurs when the central axis of the moon's shadow (ant)umbral fails to touch down on the Earth's surface, with the point of greatest eclipse on the terminator with 0 altitude. These events are so rare that there are just 94 to be found in the 5 Millenium Catalogue, 68 annular and 26 total. The last such event occurred on April 29, 2014 visible from a remote area of Antarctica. The next 2 eclipses, a non-central total and annular will occur on April 09, and Oct 03, 2043 respectively.

These eclipses are designated A+, T+ (northern hemisphere), A-,T- (southern hemisphere). During the time period from 0-3000, there are 7 non-central eclipses over Canadian territory, all annular.

Date	Type	Gamma
0152 Apr 22	A+	0.9996
0825 Feb 21	A+	1.0001
0872 Aug 08	A+	1.0113
1429 Aug 30	A+	0.9988
1511 Oct 21	A+	1.0058
2159 Jan 19	A+	0.9974
2941 Jun 16	A+	1.0004

(Continued on [page 21](#))

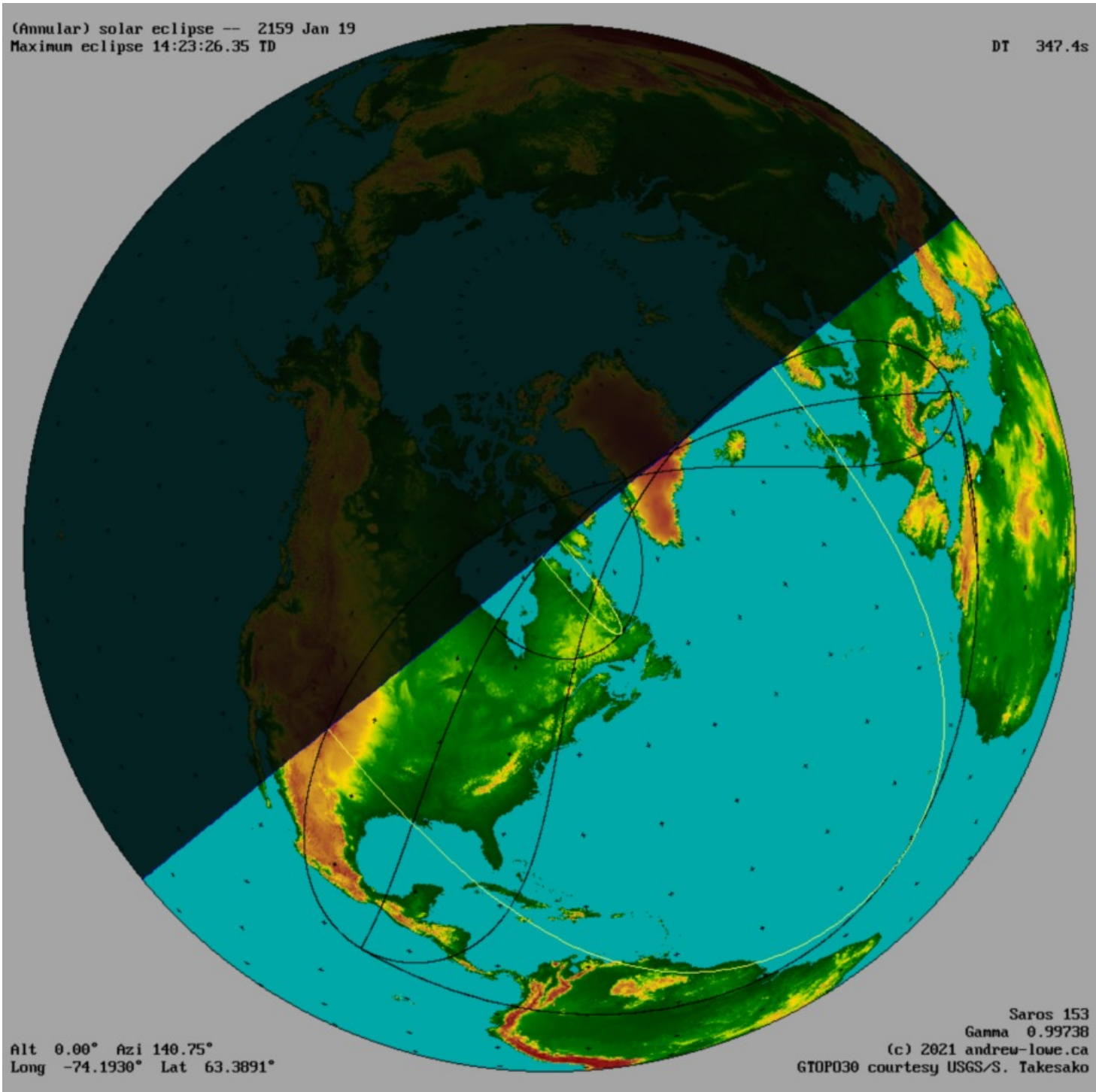


Diagram courtesy of Andrew Lowe: [Andrew Lowe's Minor Planet Home Page \(andrew-lowie.ca\)](http://andrew-lowie.ca)

Earth Grazing Eclipses II - Non Central (continued)

Since these eclipses are denizens of the polar regions, we can speculate that over the centuries the Inuit of the far north may have witnessed some of these events without realizing their significance, such as seeing a total solar eclipse near the horizon. Are there any northern communities that will experience multiple events...yes!

Dawson City, YK	6	0123,0246,0361,0825,1523,2680
Mayo, YK	6	0123,0246,0361,0825,1523,2680
Sach's Harbour, NWT	6	0152,0246,0361,0825,1511,1845
Burwash Landing, YK	5	0123,0246,0825,1523,2680
Beaver Creek, YK	5	0123,0246,0825,1523,2680
Paulatok, NWT	5	0152,0361,0825,1511,1523
Fort McPherson, NWT	5	0246,0361,0825,1523,2680
Tsiigetitchic, NWT	5	0246,0361,0825,1523,2680
Ulukhatok, NWT	5	0152,0246,0361,1511,1845
Aklavik, NWT	4	0246,0361,0825,1523
Inuvuik, NWT	4	0246,0361,0825,1523
Tuktoyaktuk, NWT	4	0246,0361,0825,1523
Yellowknife, NWT	4	0123,0246,1523,2680
Hanes Junction, NWT	4	0123,0246,1523,2680
Faro, YK	4	0123,0246,1523,2680
Ross River, YK	4	0123,0246,1523,2680
Cambridge Bay, NU	4	1494,1511,1845,2449
Gjoa Haven, NU	4	1429,1511,1845,2449
Baker Lake, NU	4	1429,1511,1845,2449
Colville Lake, NWT	3	0246,0825,1523
Fort Good Hope, NWT	3	0246,0825,1523
Resolute, NU	3	0361,1494,1845
Isachsen, NU	3	0361,1494,1845
Rankin Inlet, NU	3	1511,1845,2449
Chesterfield Inlet, NU	3	1511,1845,2449
Puvirnituq, NU	3	0213,2159,2449
Inukjuak, NU	3	0213,2159,2449
Iqaluit, NU	3	0213,2159,2941
Pangnirtung, NU	3	0267,2159,2941
Inukjuak, NU	3	0213,2159,2449
Fort Ross, NU	2	1494,1845
Arctic Bay, NU	2	1494,1845
Nanisivik, NU	2	1494,1845
Taloyak, NU	2	1494,1845
Nauyasat, NU	2	1845,2449



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 to find local clubs, events, and more!

Solstice Shadows

David Prosper

Solstices mark the changing of seasons, occur twice a year, and feature the year's shortest and longest daylight hours - depending on your hemisphere. These extremes in the length of day and night make solstice days more noticeable to many observers than the subtle equality of day and night experienced during equinoxes. Solstices were some of our earliest astronomical observations, celebrated throughout history via many summer and winter celebrations.

Solstices occur twice yearly, and in 2022 they arrive on June 21 at 5:13 am EDT (9:13 UTC), and December 21 at 4:48pm EST (21:48 UTC). The June solstice marks the moment when the Sun is at its northernmost position in relation to Earth's equator, and the December solstice marks its southernmost position. The summer solstice occurs on the day when the Sun reaches its highest point at solar noon for regions outside of the tropics, and those observers experience the longest amount of daylight for the year. Conversely, during the winter solstice, the Sun is at its lowest point at solar noon for the year and observers outside of the tropics experience the least amount of daylight- and the longest night – of the year. The June solstice marks the beginning of summer for folks in the Northern Hemisphere and winter for Southern Hemisphere folks, and in December the opposite is true, as a result of the tilt of Earth's axis of rotation. For example, this means that the Northern Hemisphere receives more direct light from the Sun than the Southern Hemisphere during the June solstice. Earth's tilt is enough that northern polar regions experience 24-hour sunlight during the June solstice, while southern polar regions experience 24-hour night, deep in Earth's shadow. That same tilt means that the Earth's polar regions also experience a reversal of light and shadow half a year later in December, with 24 hours of night in the north and 24 hours of daylight in the south. Depending on how close you are to the poles, these extreme lighting conditions can last for many months, their duration deepening the closer you are to the poles.

While solstice days are very noticeable to observers in mid to high latitudes, that's not the case for observers in the tropics - areas of Earth found between the Tropic of Cancer and the Tropic of Capricorn. Instead, individuals experience two "zero shadow" days per year. On these days, with the sun directly overhead at solar noon, objects cast a minimal shadow compared to the rest of the year. If you want to see your own shadow at that moment, you have to jump! The exact date for zero shadow days depends on latitude; observers on the Tropic of Cancer (23.5° north of the equator) experience a zero shadow day on the June solstice, and observers on the Tropic of Capricorn (23.5° south of the equator) get their zero shadow day on

(Continued on [page 23](#))

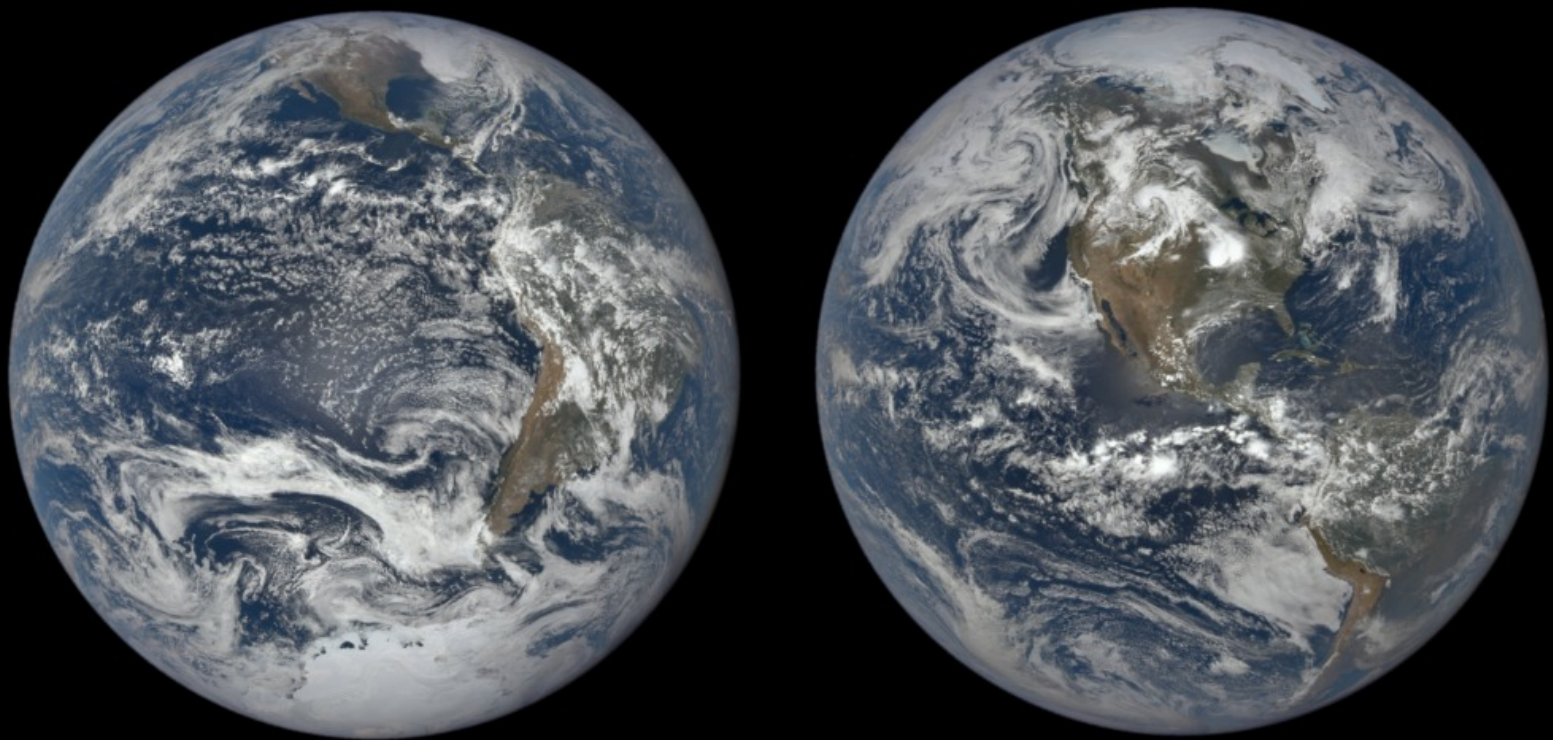
NASA Night Sky Notes (continued)

December's solstice. Observers on the equator experience two zero shadow days, being exactly in between these two lines of latitude; equatorial zero shadow days fall on the March and September equinoxes.

There is some serious science that can be done by carefully observing solstice shadows. In approximately 200 BC, Eratosthenes is said to have observed sunlight shining straight down the shaft of a well during high noon on the solstice, near the modern-day Egyptian city of Aswan. Inspired, he compared measurements of solstice shadows between that location and measurements taken north, in the city of Alexandria. By calculating the difference in the lengths of these shadows, along with the distance between the two cities, Eratosthenes calculated a rough early estimate for the circumference of Earth – and also provided further evidence that the Earth is a sphere!

Are you having difficulty visualizing solstice lighting and geometry? You can build a “Suntrack” model that helps demonstrate the path the Sun takes through the sky during the seasons; find instructions at stanford.io/3FY4mBm. You can find more fun activities and resources like this model on NASA Wavelength: science.nasa.gov/learners/wavelength. And of course, discover the latest NASA science at nasa.gov.

(Continued on [page 24](#))



These images from NASA's DSCOVR mission shows the Sun-facing side of Earth during the December 2018 solstice (left) and June 2019 solstice (right). Notice how much of each hemisphere is visible in each photo; December's solstice heavily favors the Southern Hemisphere and shows all of South America and much of Antarctica and the South Pole, but only some of North America. June's solstice, in contrast, heavily favors the Northern Hemisphere and shows the North Pole and the entirety of North America, but only some of South America.

Credit: NASA/DSCOVR EPIC

Source: <https://www.nasa.gov/image-feature/goddard/2021/summer-solstice-in-the-northern-hemisphere>



A presenter from the San Antonio Astronomy Club in Puerto Rico demonstrating some Earth-Sun geometry to a group during a “Zero Shadow Day” event. As Puerto Rico lies a few degrees south of the Tropic of Cancer, their two zero shadow days arrive just a few weeks before and after the June solstice. Globes are a handy and practical way to help visualize solstices and equinoxes for large outdoor groups, especially outdoors during sunny days!

Credit & Source: Juan Velázquez / San Antonio Astronomy Club



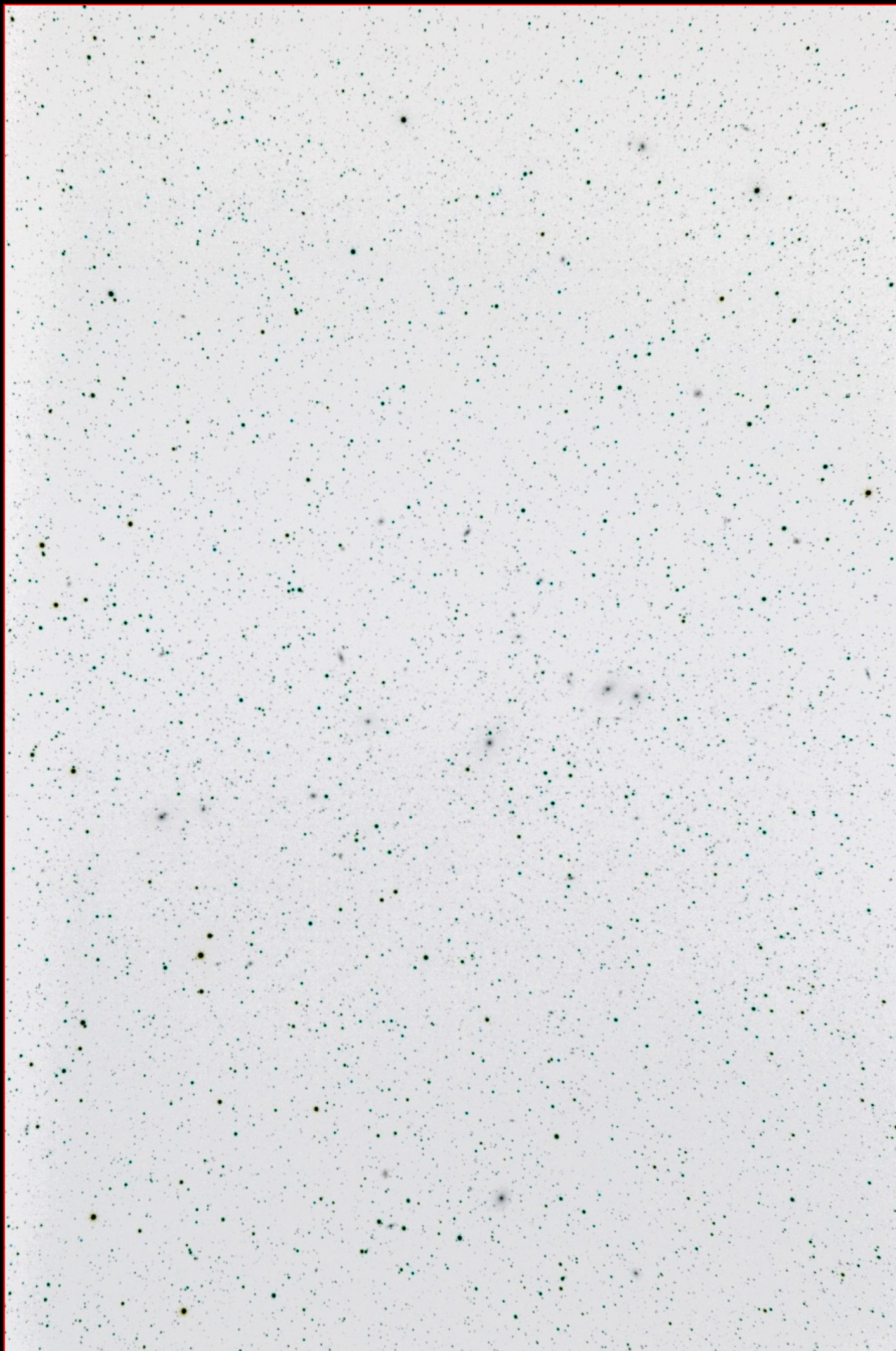
The Moon Before the Lunar Eclipse, May 15, 2022.

by Matthew Trombetta.



Caroline's Rose Cluster (NGC 7789), September 30, 2021, by Peter Wolsley

Taken with a QHY294C through an 8"EdgeHD+ scope. 23 Minutes 20 seconds total exposure time.



The Virgo Galaxy Cluster (reverse-video), April 28, 2022, by Bob Christmas
Taken with a Canon 40D through a Canon 100mm lens. 24 x 2 minutes; 48 minutes total exposure time.

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.

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- Enables automatic alignment of your Celestron computerized telescope (see compatibility list). Objective Lens Focal Length: 40mm (1.57").
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Contact: Bernie Venasse
chair@amateurastronomy.org

“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.



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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.

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. 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 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.

**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
or

Matthew Mannering at
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

June 10, 2022 - 7:30 pm – Virtual Online H.A.A. Meeting. Our main speaker will be *Paul Delaney*, who will talk about solar observing.

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

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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



Contact Information

E-mail: library@amateurastronomy.org