Event Horizon

Volume 28, Number 9
September 2021

From The Editor

The fall season is close at hand. Here's hoping for some better weather for astronomical activities, and on that note, guess what's back? The Loaner Scope Program!

Clear Skies,

Bob Christmas, Editor

editor 'AT' amateurastronomy.org

Chair's Report by John Gauvreau

Welcome back! I hope everyone has had a good summer. I looked at the last report I submitted in the newsletter back in June and I actually said we were still having some cool days. Wow, that seems like a long time ago now.

I have had a great summer and enjoyed some backyard observing. Jupiter has provided some spectacular views, as it is now just past opposition. Staying up late enough for it to rise above the trees in my yard is challenging but rewarding. I have watched it through my favourite refractor as well as had some great views through a nice 10" dobsonian. Just a couple of nights ago I had a chance to look at Jupiter through a 127mm maksutov. It was so easy to set up and have a quick look. When some clouds rolled in I took the scope inside but later in the evening it cleared and I would never have taken the time to set up my big scope a second time in one night, but taking the 127mm mak out a second time only took a couple of minutes and I had a great view of Jupiter and the moon. A small scope provides the great convenience of quick set-up and take-down and can encourage one to go out observing more often.

(Continued on page 2)

IN THIS ISSUE:

Chair's Report (continued)

I have also enjoyed some solar observing, although I notice a trend where the best solar activities happen either while I am at work or when it is night time here and observers on the other side of the world get the good view. How does the universe plan that? I think it's the same system at work that guarantees several days of rain whenever you buy new astronomy gear (sometimes it's several weeks of rain and cloud, depending on how expensive your new equipment is!). But, I did enjoy my best solar views of the year when a very active region persisted for several days. The prominence was huge and detailed!

HAA Meetings

Don't forget that next week we will be back with a regular zoom meeting. Friday September 10 will be the first of the season. Keep an eye out for an email with the zoom meeting link.

We still don't know when we will be back in person. As soon as it is safe to do so I will be happy to see you all. Right now though, our meeting space can't accommodate us all, so we will continue to meet via zoom and look forward to seeing smiling faces in the future.

Club Activities

We have been out observing as a club again (in person) and enjoyed a fun beginner group night (on zoom). More of both of those to come. We have also done some outreach via zoom and there will be more of that too.

Next month will see the annual elections to the club's council. There are 11 positions with specific responsibilities (like chair, or treasurer, or recorder) and there are spaces for 5 councillors without portfolio. This is a large club and it takes a lot of work to keep it going. Aside from the people who commit to being on council and giving of their time and efforts, we also need many people to work alongside council. Perhaps you don't want to commit to such a big undertaking, or don't have the time be there each month, or don't have a schedule that permits you to attend all the council meetings. We would still love to have you participate in any capacity you are comfortable with. It takes the whole club to make the club whole and we want you to participate at a level you are comfortable with. If you are interested in joining council or participating alongside as a non-council member please contact me. I would be very happy to hear from you.

I would also be happy to hear from you if you would be interested in helping your fellow observers get out observing at the club's dark sky site. It takes a few dedicated members to organize the observing sessions and I would be happy to talk to you if you think you would like to help out there.

Telescope Loaner Program

As you have heard, the loaner program is up and running. A big thank you to Melissa and Brian Whitman for taking on the program. They have been getting the equipment sorted, catalogued and organized. Everything is up and running (in part thanks to Matthew Mannering, who helped get one of the scopes back in good operating condition. Thanks Matthew!). A thank you also goes out to Jim Wamsley who for many years has managed the telescope loner program and seen the club scopes go into the hands of so many new and beginning members. Thanks Jim!

(Continued on page 3)

Masthead Photo: *Partial Annular Solar Eclipse at Sunrise, June 10, 2021,* by *John Gauvreau.*

Ray Badgerow's article on the June 10 Eclipse appears on page 15.
See more images of the eclipse on page 20.

Chair's Report (continued)

HAA Calendar

It's time to send in your calendar pictures! Another beautiful HAA wall calendar is in the works. Now is the time to get your best photos, drawings, and illustrations in to the calendar for consideration. The deadline is September 24th, so you only have a few weeks. We would love to see your work! Send them to 'calendar@amateurastronomy.org'.

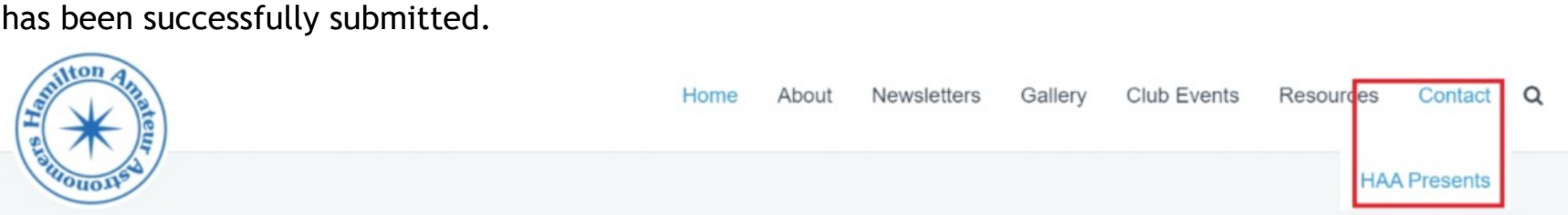
Conclusion

I look forward to seeing everyone at the next online meeting and hopefully out at the club's dark sky site observing. Please don't hesitate to get in touch via email (chair@amateurastronomy.org) about anything going on in the club. Enjoy the last few days of summer and see you soon.

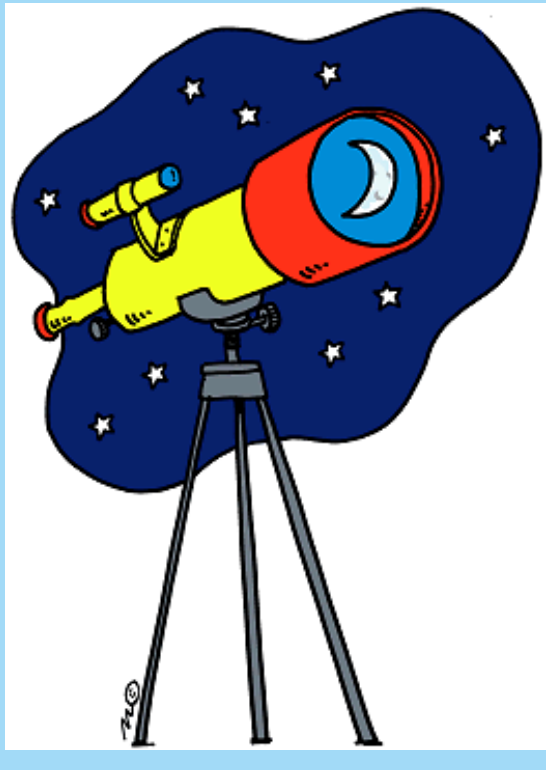
"HAA Presents"

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.



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.

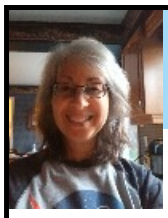


H.A.A.'s Loaner Scope Program

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.



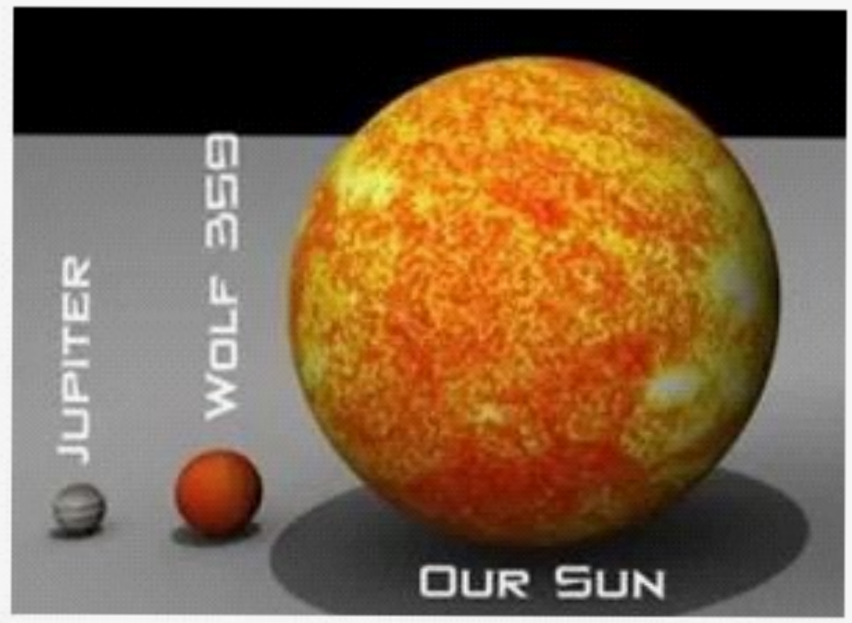
HAA Explorers by Jo Ann Salci

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

Welcome back! I hope you had a great summer and had a chance to enjoy the night sky. So far this year, we've explored our Earth, the Moon, the Sun, how stars are made and constellations. This month we will explore a question asked by Wesley, one of our HAA amateur astronomers: **Is there something named "Wolf" in the sky?** Yes, Wesley! There are lots of things in the sky named "Wolf". Let's explore six of them!

What's in a name?

1. In June we learned about different sizes of stars. Our Sun is a medium-sized star, which means that there are stars smaller and larger than our Sun. One of the smaller types is called a red dwarf star. An example of one is named ***Wolf 359***.



A comparison of Wolf 359 with Jupiter and the Sun. (David Jarvis)

This star is located in the constellation Leo and you can see in the picture above that it isn't much bigger than Jupiter! Red dwarf stars are dim, cooler than our Sun, and live a very long time. Why is this star named "Wolf 359"? A German astronomer named Max Wolf noticed this star back in 1917 and it was the 359th star he catalogued. This star is 7.9 light years from Earth, which is considered close in space. So, Wolf 359 is one of our Sun's closer star neighbours! Star Trek Next Generation and Deep Space 9 used Wolf 359 as the setting for two of their episodes.

2. In 2019, astronomers noticed that there are two exoplanets going around *Wolf 359*! They are called *Wolf 359b* and *Wolf 359c*. More on exoplanets in a later newsletter!

3. The opposite of red dwarf stars are huge stars named ***Wolf-Rayet stars*** (pronounced Ray-ay). These stars are 20 times the size of our Sun and are 10-40 times hotter. They're so hot that they burn out much quicker than smaller stars. Charles Wolf and Georges Rayet, French astronomers, discovered this type of star in 1867.

4. Pictured at right is a ***Wolf-Rayet galaxy***, a type of galaxy that has many of the very hot, large Wolf-Rayet stars.

Image credit: ESA/Hubble and NASA

5. The ecliptic is a way to describe the path of the planets and the Sun across the sky. The Ojibwe people describe this path as the Wolf's Trail. Here is a description from the booklet "Two-eyed Seeing: Ojibwe Astronomy and NASA Moon to Mars":

"Anyone who looks at the sky long enough will notice patterns. Planets we can see will move from east to west, passing through south, along

(Continued on page 5)

the same path through the sky. In Ojibwe this special 'path of the planets' is called the 'Maingan Mikan, Wolf's Trail' (the ecliptic).

So why a wolf's trail and not a deer trail or rabbit trail? The answer lies in the keen observation of the pattern of animal behavior unique to the wolf that mirrors the motion of the planets (retrograde motion). Most of the time the wolf will travel with the pack, but every once in while the lone wolf will rebel and travel off in a different direction before looping back. This rebellious movement of the planets is wolf-like."

6. And finally, ***Lupus*** is a constellation in the southern sky that is best seen from places in the south like Florida. Lupus is the Latin word for "Wolf".

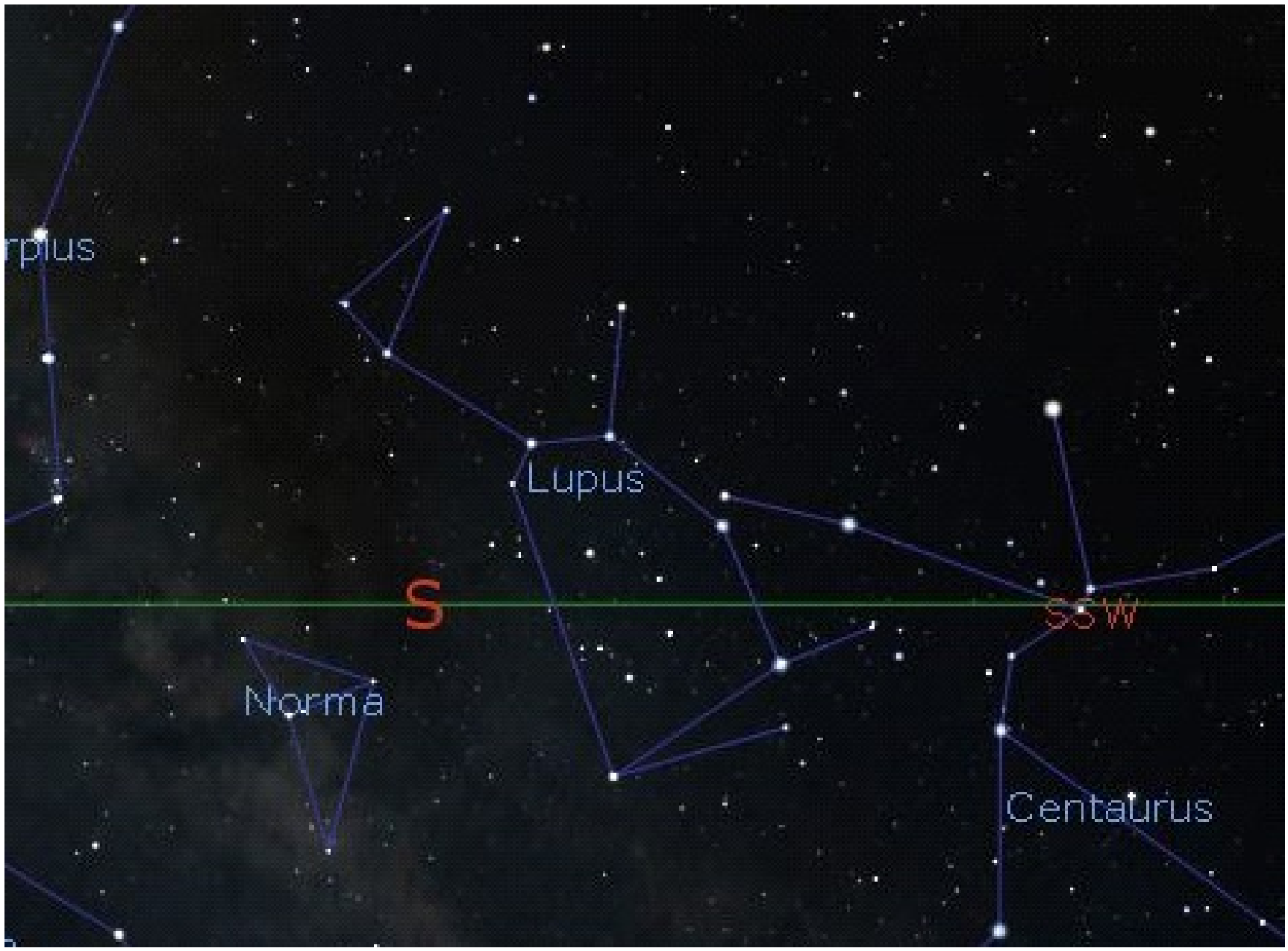


Image generated using Stellarium

These are just a few examples of a Wolf in the sky! See if you can trace a pattern in the stars that looks like a wolf to you! Thank you, Wesley for your amazing question!

(Continued on page 6)

Have fun matching these:

Red Dwarf Star	A planet that goes around a star other than our Sun.
Exoplanet	The distance a beam of light travels in one Earth year.
Light Year	When it looks like a planet like Jupiter (for example) has changed direction. It happens when Earth "passes" Jupiter on the inside orbit track around the Sun.
Ecliptic	Dim, cooler stars that live a long time.
Retrograde Motion	The path that the Sun and planets take across the sky.

Answers on page 8.

During September, check out:

1. September 9th at about 8:30 p.m.: The Moon and Venus in the southwestern sky:

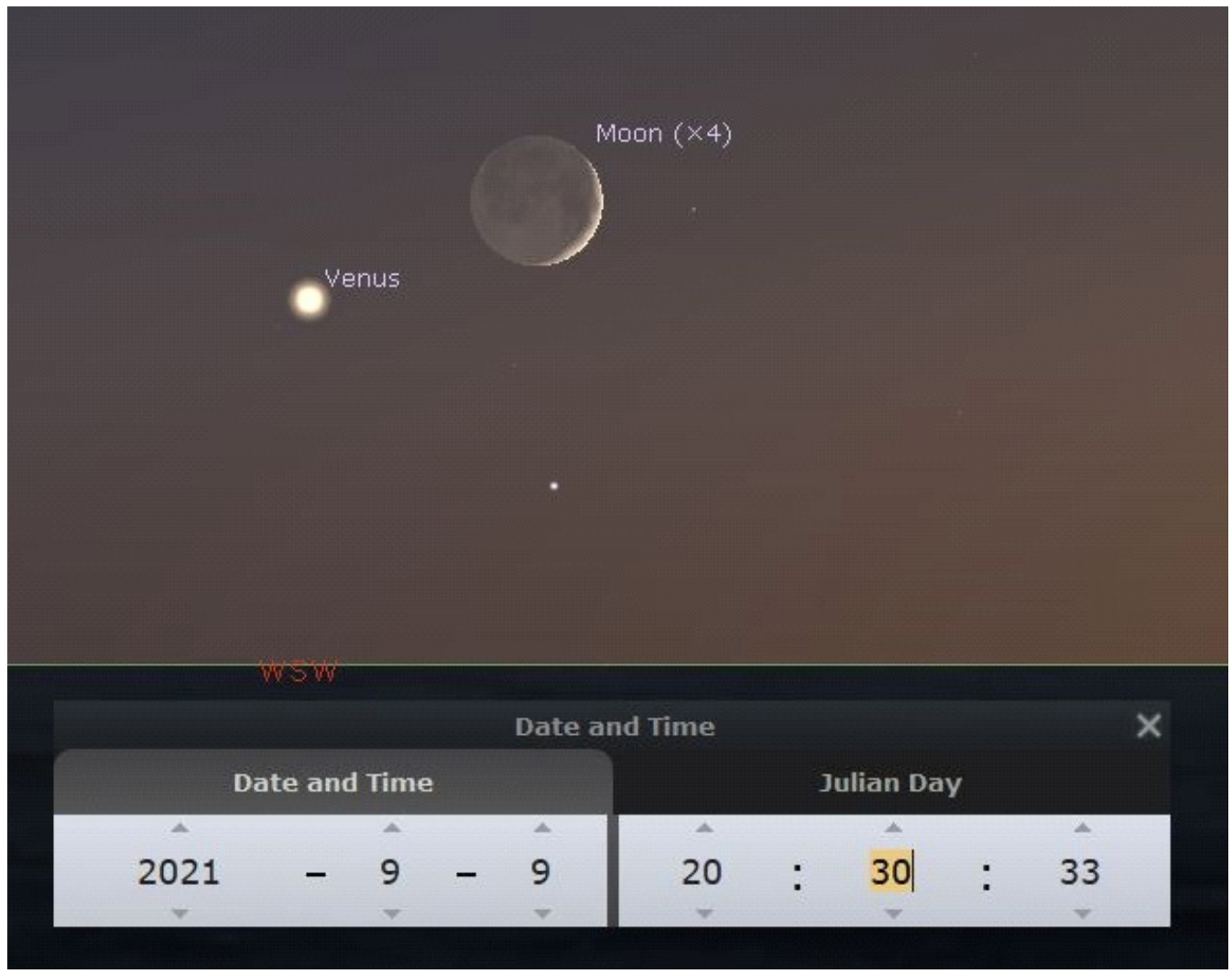


Image generated using Stellarium

(Continued on page 7)

2. September 16th at about 8:30 p.m.: Jupiter, Saturn and the Moon in the southeastern sky.

Image generated using Stellarium

Things to do until next time**:

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

1. Learn about other Solar Systems (Hint: This will help you understand exoplanets!):
https://spaceplace.nasa.gov/other-solar-systems/en/

2. Look for the Wolf's Trail on this Ojibwe Fall Night Sky Map:
https://www.nativeskywatchers.com/articles/OjibweFall-map-2020-10-15-20-v6-1MBversion.pdf

3. Watch this video that shows what retrograde motion looks like:
https://www.youtube.com/watch?v=TK9ozJYELR8

(Continued on page 8)

Finally:

What did our Sun say to our nearest dwarf red star, Proxima Centauri??

Answer: ¡¡looɔ os ǝɹɐ noʎ

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

Thank you to Mi for reviewing this article! 😊

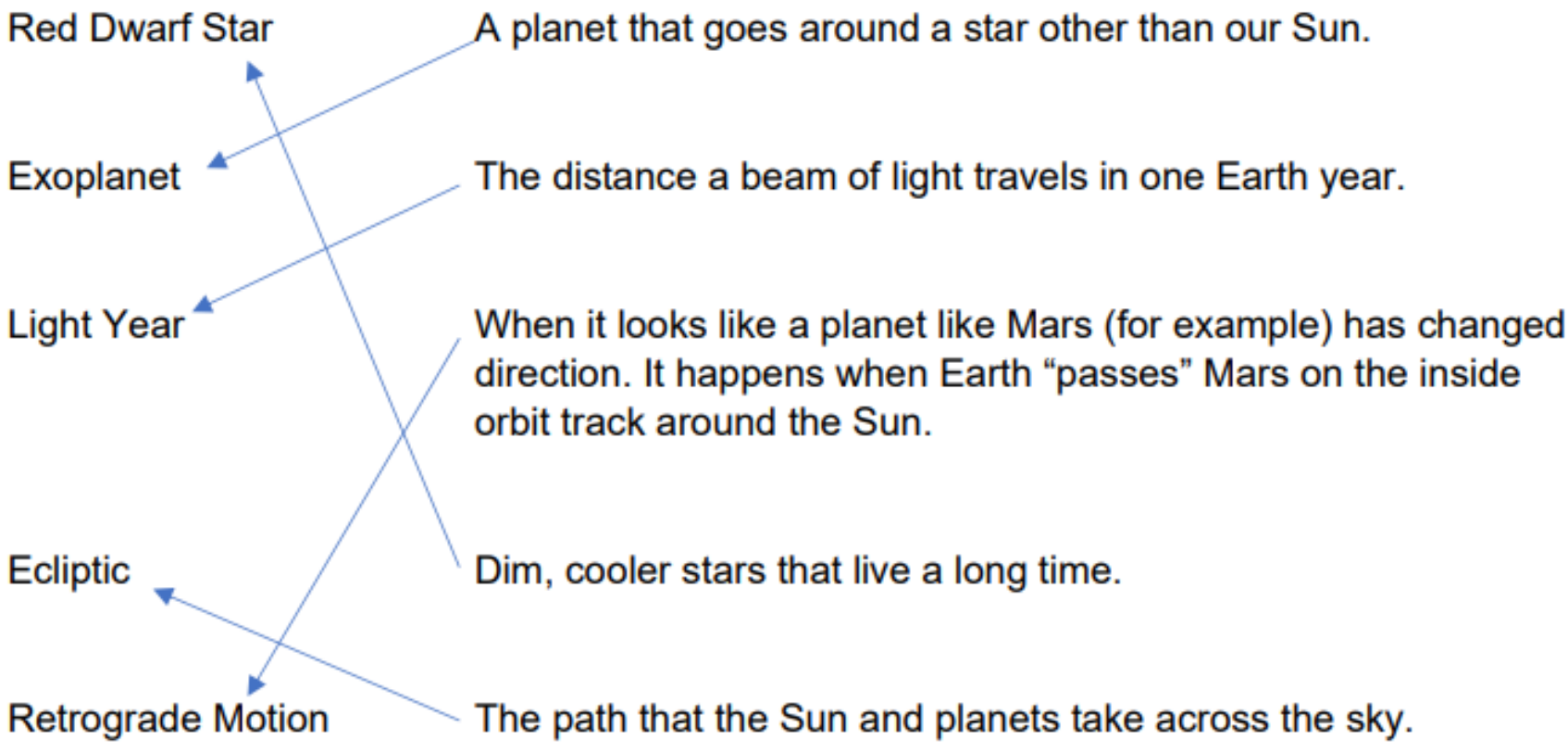
References:

https://www.drewexmachina.com/2019/11/13/the-real-wolf-359-revisited-new-planetary-discoveries/

https://www.nasa.gov/image-feature/goddard/hubble-view-wolf-rayet-stars-intense-and-short-lived

https://www.nativeskywatchers.com/articles/Booklet-Ojibwe-10-23-20-v9-screen-version.pdf

Matching Activity Answers:



The Sky This Month for September 2021 by Matthew Mannering

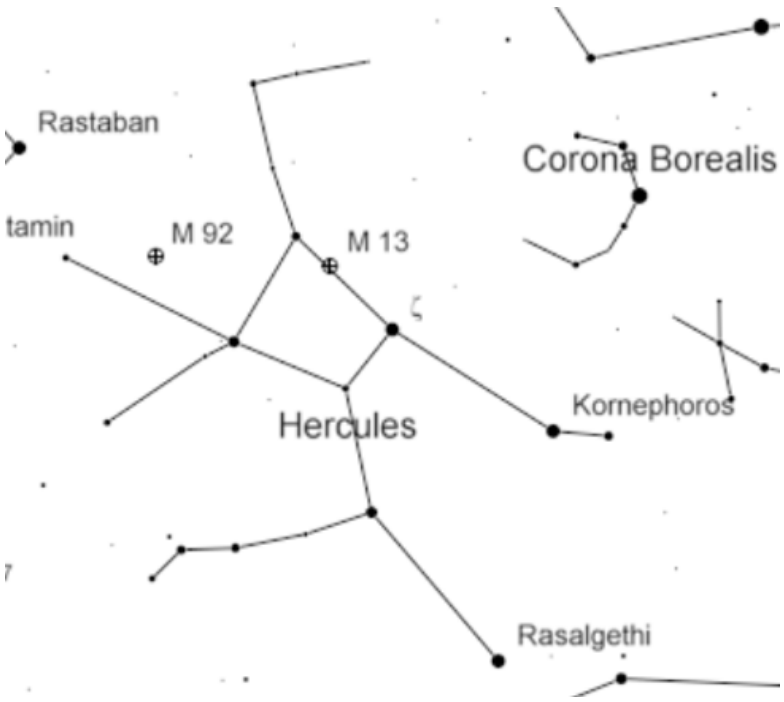
It's late August and I am wondering (the same way I do every year) where the summer went? This has been another strange summer with periods of intense rain and at other times, extreme heat and humidity. Oh, and don't forget the smoke from the forest fires out west. That combination of factors really messed up a lot of my observing. I found in many cases that the sky was covered in a thick haze and that made deep sky observing for faint fuzzies almost impossible.

In July, we attended the first star party at Backus Mill Conservation area. There was a small group of attendees as the weather outlook was quite grim. The first three nights were rainy and cloudy, but on Saturday the skies cleared, and everyone set up their equipment. We were all very excited until the sky clouded over again completely just at last light. We waited until about 10pm to see if it would clear and then disappointed, we packed up for the night. Luckily, it was a very nice group of people and we all sat around and had a good chat until late at night.

This summer, I wanted to try some mid-sized 15x70 binoculars that I could hand hold for short periods of time. I have a good pair of 10x50 binoculars that are very sharp and light weight but sometimes they don't go deep enough. In other words, some of the faint fuzzies are a little too faint and fuzzy for 10x50s. With the increased magnification (15x instead of 10x) and much larger objectives (70mm instead of 50mm), the targets are easy to find. I also wanted to use these binoculars on a tripod for bird watching from a fixed location such as a birding tower.

As some of you know, I normally use a large Dobsonian reflector and star hop to my targets. I use the binoculars to find new targets and then practice star hopping to the targets. I can then transition to the Dob and target acquisition is much easier.

Celestron makes two versions of their 15x70 binocular. They are called the 'Skymaster' and 'Skymaster Pro' series. Just for fun I decided to try out the 'Pro' version at KW Telescope and was very surprised to find that I liked them. Why was I surprised? The basic Skymaster binoculars (about $120) are known for their poor-quality control and inability to remain in collimation. I do not recommend them. The Pro series at $280 are a different beast altogether. The build quality is decent, and the optics are quite good for basic achromatic lenses. These binoculars don't have the fine resolution of expensive ED or full APO binoculars, but they perform perfectly fine for my intended uses, and I bought a pair.



The constellation Hercules with M92 & M13
Chart Credit: Bob Moler's Ephemeris Blog

This summer, it turned out that due to smog and humidity, a lot of evenings weren't worth getting out the big scope. I did however get out the big binoculars and spent hours just scanning the sky and learning how to find some new targets.

A couple of weeks ago some club members got together at our dark sky site and set up their scopes. It was just a few days after the peak of the Perseid meteor shower and we saw a few good ones. Of course, most of the time I was looking in the wrong direction but could still hear the Oohs and Ahhs. I think the best part of the evening was just having a chance to spend time with friends in person.

At the June meeting I mentioned that I wanted to spend some time seeing the sights in Ophiuchus. I was able to do that while sitting at my campsite at Wheatly Provincial Park a few weeks ago. I had also mentioned that after many years, I wanted to re-find the globular cluster M92 in Hercules. After Ophiuchus I went after M92. I found it

(Continued on page 10)

The Sky This Month for September 2021 (continued)

quickly, and even though the transparency was poor, it was still a very impressive sight. If you find just one new target this fall, make it M92. I intend to spend more time viewing M92, hopefully with much better skies. I enjoyed it even more than M2 and M15 both of which are impressive globulars.

The real 'stars' of the season though are the planets. Jupiter and Saturn are well placed as darkness falls and both have just passed the point of closest approach (opposition) to the Earth. Jupiter is one of the brightest objects in the night sky and easy to find if you look south after dark. Saturn, about an outstretched hand span to the right of Jupiter, is fainter and smaller in the eyepiece. Saturn's rings are starting to flatten but it's still an impressive sight. In just a few years we will see Saturn's rings edge on and that is something to see.

One of the great things about observing Jupiter involves the movement of the four large moons. There are four basic types of events, and several may occur at the same time:

- Transits of moons across the face of Jupiter.
- Transits of the shadows of the moons across the face of Jupiter.
- Occultations (disappearances) of the moons behind Jupiter.
- Eclipses of the moons when they move into Jupiter's shadow.

You don't need a big scope to see these events. An 80mm refractor can show you three out of the four possibilities. The hardest observation in my opinion is seeing one of the moons against the face of Jupiter. Most astronomy magazines will give you a list of all four types of events. The trick is to realize that the times are in Universal Time which is four hours ahead when we are in Daylight Saving Time and five hours when we are on Eastern Standard Time. To me the most interesting events involve the passage of a moon's shadow across the face of the planet. The event tables use the short form 'Sh' for a shadow transit. Remember to compensate for the time differential and then try to observe the transit. I have seen this many times and it never gets old.

Theoretically Venus, Mars and Mercury are all in the west shortly after sunset. Of the three planets, you won't have trouble seeing Venus, but the other two planets are going to be extremely difficult. In fact, Mars and Mercury are so low after sunset that I wouldn't bother with them. As always, take note of the phase of Venus and watch it change over the next couple of months. It is at ¾ phase now, but it will grow larger and change to a thin crescent before merging with the Sun at Inferior conjunction.

Neptune reaches opposition at mid month and should be resolvable as a planetary disc. But with a diameter of 2.3 arc seconds, you will find it to be a difficult observation. Unfortunately, in this region of the great lakes, the seeing only resolves down to 2 arc seconds so most likely Neptune will look like a deep blue star rather than a planet.

Uranus trails Neptune by about three hours. Both are visible through the night from about 10:30pm when Uranus climbs above ten degrees altitude in the East. Uranus has a diameter of 3.7 arc seconds and should be resolvable as a disc under good atmospheric conditions.

A very nice photographic opportunity presents itself on the evening of September 9th. The thin crescent Moon shines just above and to the right of Venus (see chart on page 6). Separation between the two is only 3.5 degrees so this should make a nice twilight shot with a pretty foreground. All you need is a camera and tripod, although these days many people are getting good results with the newest cell phones.

Hopefully, we will be able to get together sometime this fall for an observing session. Remember that there are always club members who are willing to help you learn how to use your equipment. In the meantime, find a few new targets in your books or magazines and get out there and observe.

What's Up in Awards? September 2021 by Bernie Venasse

Contents:

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

September
Constellations: Cepheus
Stars: Deneb
Double stars: Albireo, 61Cygnus
Object Pairs: NGC 6939, NGC 6946
Messier objects: Messier: 15

October
Constellations: Pegasus
Stars: Alpheratz
Double stars: delta Cepheus
Object Pairs: NGC 7788, NGC 7790
Messier objects: Messier: 15

HAA Messier Objects Observing Award

September Messier targets

Sagittarius is the home of many globular clusters which surround the center of the Milky Way Galaxy. Seven of these globulars appear in the Messier catalog. When you complete the search for these objects be sure to spend some time scanning this region with binoculars or a telescope and see what other sights you can discover. I guarantee you will not be disappointed.

M13 The great globular cluster in Hercules is bright enough to be seen with naked eye. M13 is partially resolvable in small aperture telescopes and becomes a fantastic swarm of tightly packed individual stars through large scopes.

M92 Another globular cluster in Hercules, 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. Through a telescope M14 is an even patch of light, the stars not resolvable except through large scopes.

(Continued on page 12)

What's Up in Awards? September 2021 (continued)

M22 This is the other great globular. Located just above the teapot asterism in Sagittarius, M22 can be seen without 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. 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. These are all easily seen in telescopes, though not easily resolvable.

October Messier targets

Our October sky includes two nebulae and the clusters that power them, four open clusters, a star cloud, and two globular clusters. Several of these are possible naked eye objects.

M24 This um…"object" is a section of the Milky Way in Sagittarius. It is easily seen with the naked eye as a fuzzy, oval patch about four times the size of the full moon. The best views are through binoculars or rich field telescopes. Includes several other objects including NGC 6603, Markarian 38, and Collinder 469.

M25 Find this open cluster just east of M24 in Sagittarius. Visible to the naked eye, M25 lies in the same binocular field as M24. A view through a telescope shows the nebulosity is in fact many faint stars that are not resolved in small instruments.

M18 This is a small open cluster just north of M24 in Sagittarius. Telescopes reveal this cluster for what it is - a small, sparse collection of fairly bright stars.

M17 Just north of M18 lies the Omega nebula. Possible to see with the naked eye, this nebula appears as a small faint patch of fuzz. A telescope will show the unique V shaped nebulosity that gives the cluster its name.

M16 Through a telescope M16 looks like a sparse open cluster of stars surrounded by faint wisps of smoke. IC 4703 is the diffuse emission nebula or HII region associated with Messier 16. It is the nebulous region surrounding Messier 16. These two objects make up the Eagle Nebula.

M26 Telescopes partially resolve this cluster and show several stars buried in a faint glow from the unresolved stars.

M11 Just north of M26 in Scutum lies the Wild Duck Cluster. Possible to see with the naked eye, telescopes resolve many of the stars in this very rich cluster.

M55 Possible naked eye object. Telescopes show a round patch of light - bright in the center and fading toward the edges. Large apertures are needed to resolve this globular.

M75 A telescope will show a small fuzzy with a bright center.

Pathways Observing Program

Observable this season: 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.

(Continued on page 13)

What's Up in Awards? September 2021 (continued)

The Planets… September 2021

Mercury Evening planet, rapidly deteriorating throughout the month, virtually setting with the Sun on 30 September.
Venus Low evening planet, setting an hour after sunset. A thin Moon is nearby on 9 and 10 September.
Mars The Red Planet is too close to the Sun to be seen this month.
Jupiter Bright evening planet, well-placed albeit low. A bright gibbous Moon is nearby on 17 and 18 September.
Saturn Well-positioned low evening planet. Bright Moon close by on 16 and 17 September.
Uranus On the threshold of naked eye visibility in Aries, morning planet Uranus is well placed this month.
Neptune Binocular planet Neptune reaches opposition on 14 September and is visible all night.

The Planets… October 2021

Mercury Poorly positioned at the start of October, returning to the morning sky for a good display from mid-month onwards.
Venus Evening planet, remains low after sunset. A 14%-lit waxing crescent Moon lies nearby on 9 October.
Mars Mars is in solar conjunction on 8 October and not visible.
J***upiter*** Evening planet, reaching greatest altitude early evening. A waxing gibbous Moon near on 14-15 Oct.
Saturn Evening planet, reaching highest altitude early evening. A waxing gibbous Moon near on 13-14 Oct.
Uranus Well-positioned morning planet, lying close to similarly bright Omicron (o) Arietis on 13 October.
Neptune Well-placed evening planet, reaching maximum altitude of over 30º in darkness all month.

Meteor Showers

Orionids Meteor Shower

Period of activity: October 2nd, 2021 to November 7th, 2021

Peak Night: Oct 20-21, 2021

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: 06:20 +15.5° - ZHR: 20 - Velocity: 41 miles/sec (swift - 67km/sec)

P***arent Object:*** 1P/Halley

Next Peak - The Orionids will next peak on the Oct 20-21, 2021 night. On this night, the moon will be 100% full.

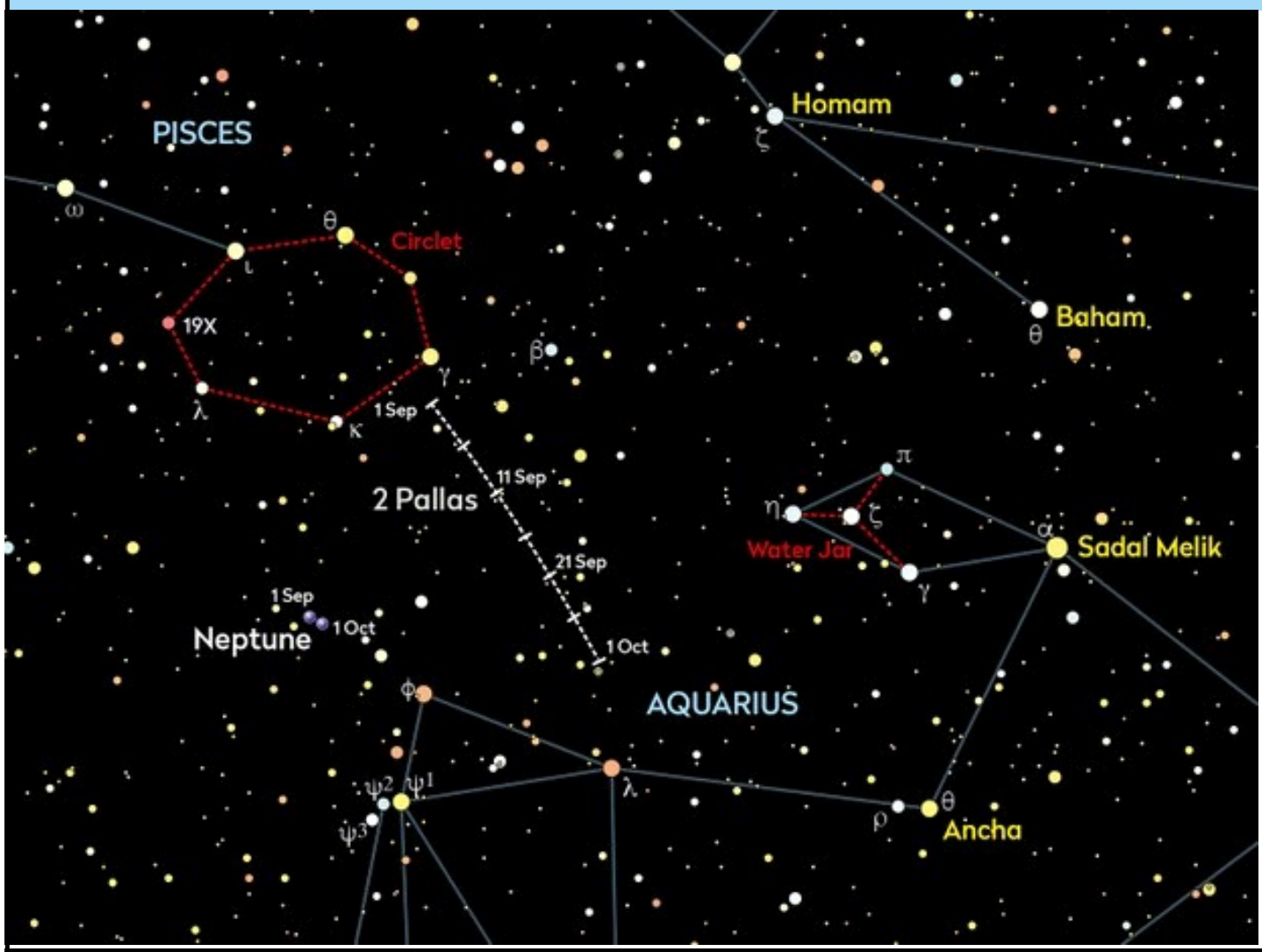
Also…

The minor planet *2 Pallas* at opposition on 11 September 2021, shining at mag. +11 in Pisces (see page 14).

A rare double transit of *Ganymede*'s and *Callisto*'s shadows on Jupiter occurs on the evening of 4 October 2021 (see page 14).

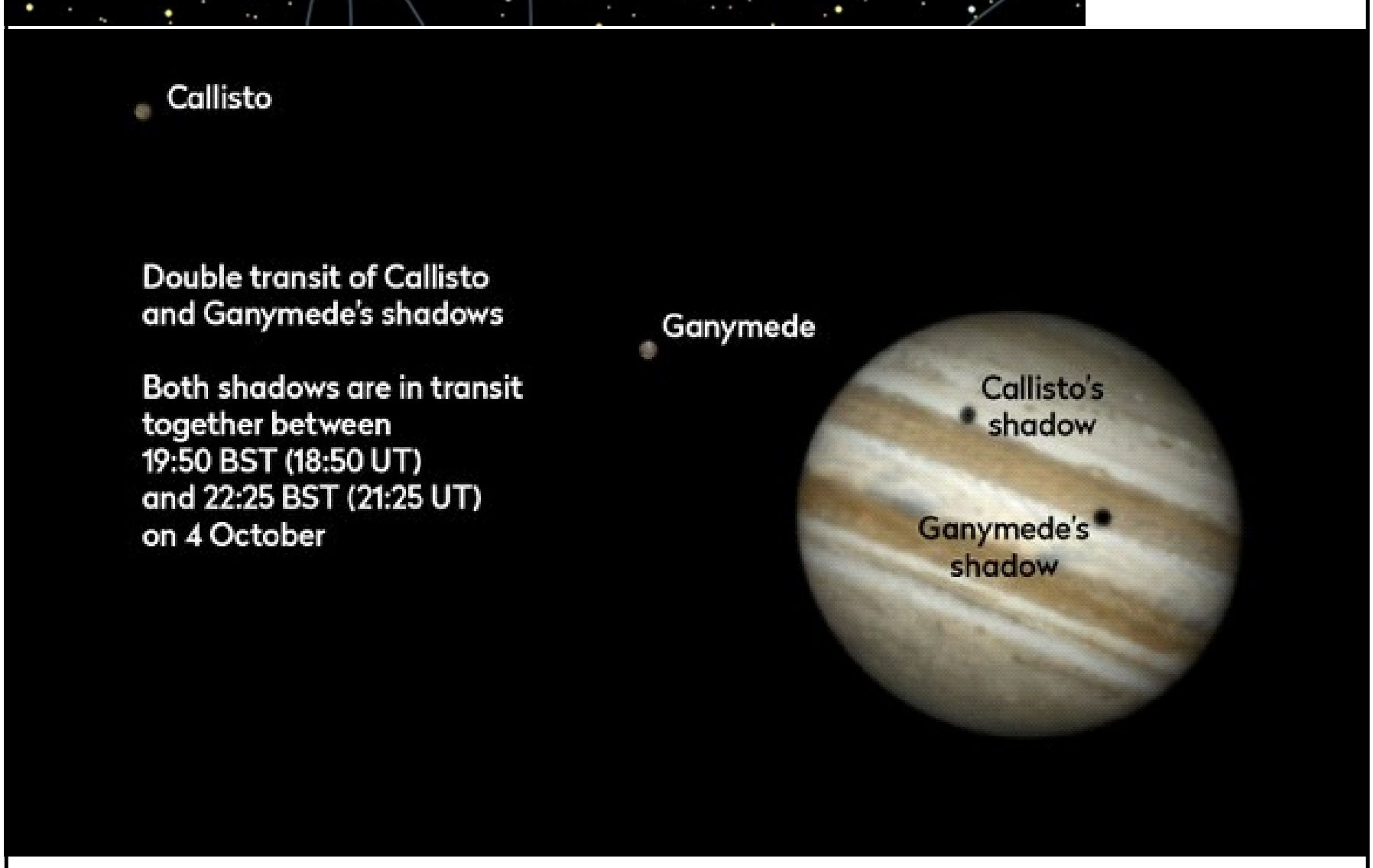
(Continued on page 14)

What's Up in Awards? September 2021 (continued)



See if you can spot minor planet 2 Pallas at opposition on 11 September 2021, shining at mag. +11 in Pisces.

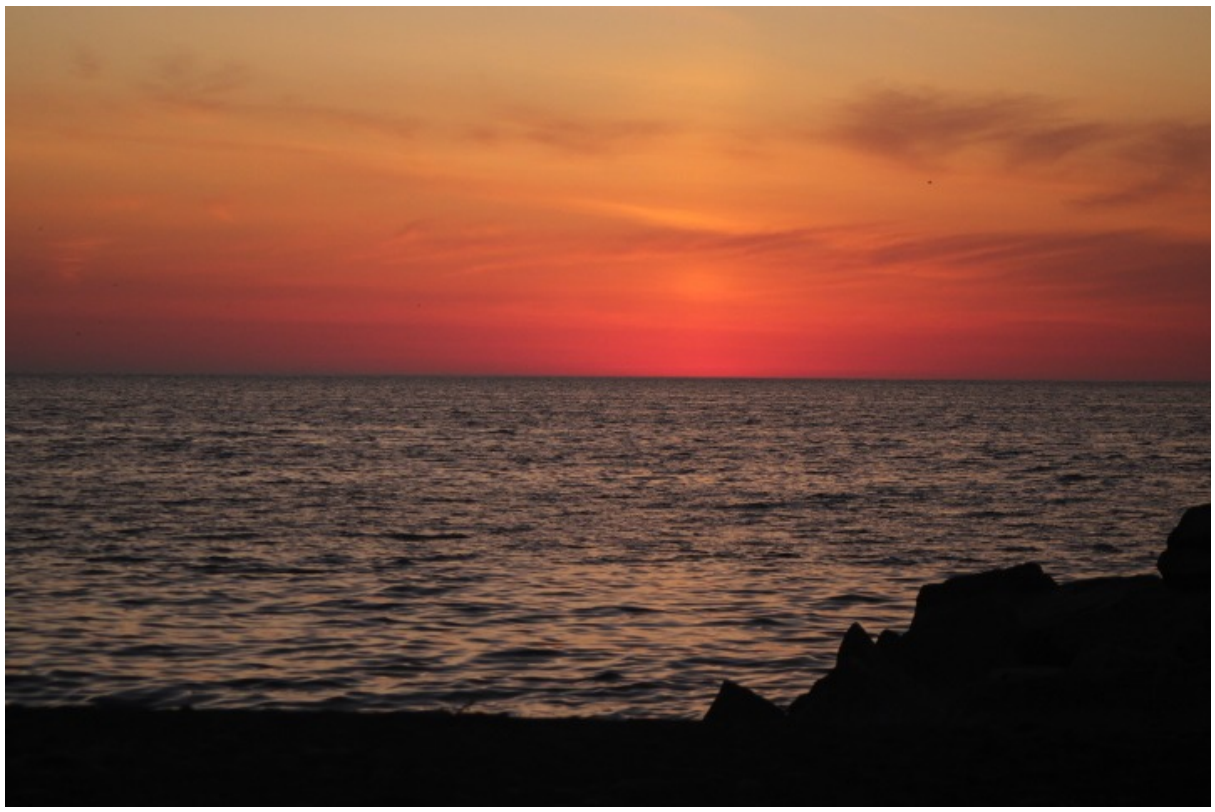
Credit: Pete Lawrence

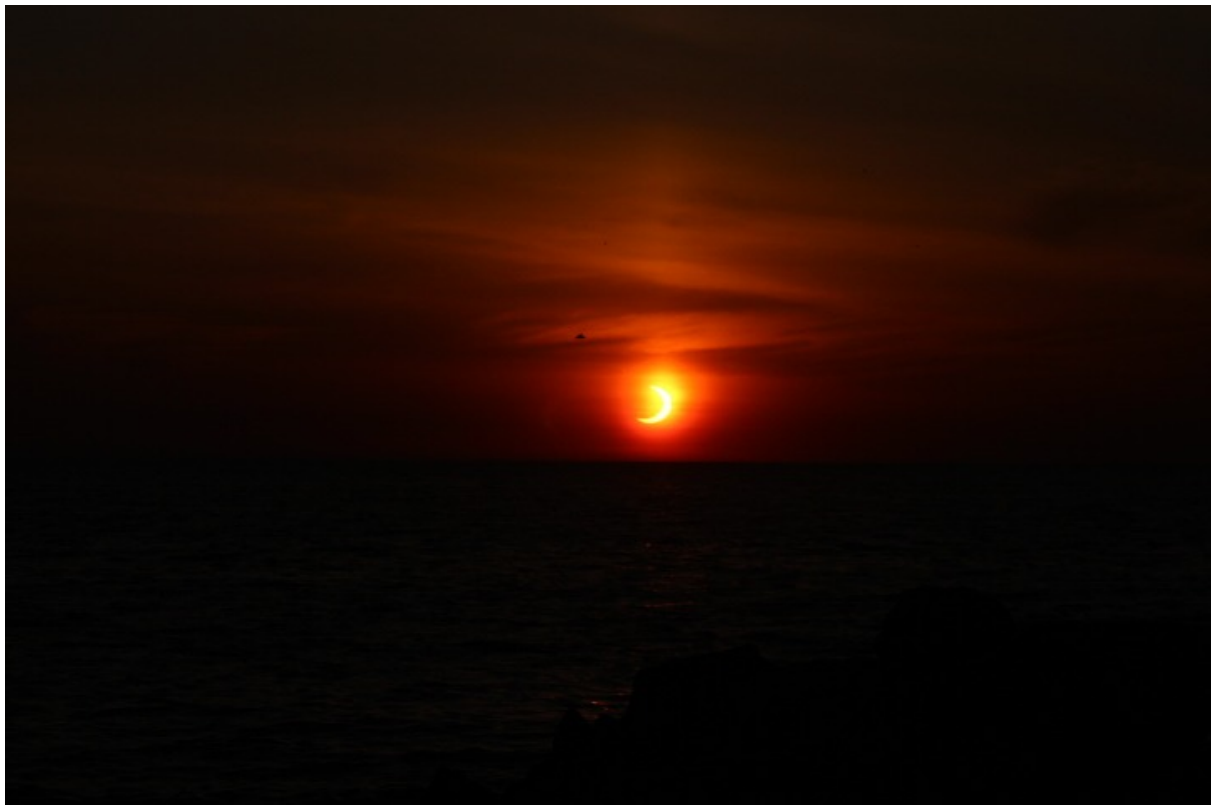


A rare double transit of Ganymede's and Callisto's shadows occurs on the evening of 4 October 2021. Credit: Pete Lawrence

June 10th Annular Eclipse from Hamilton by Ray Badgerow

My plans for viewing the annular eclipse on June 10th from Northern Ontario had to be changed to the poor weather prospects on eclipse day, forcing me to cancel my trip on the evening of Sunday, June 6th. The weather that week was hot and unsettled, and as luck would have it, a cold front went through Northern Ontario that day and rained out the entire region. The webcam at the Rene Fontaine Municipal Airport in Hearst showed clear, sunny skies the day before the eclipse.





I went to bed early the night before and rose at 4am before departing for the lakeshore. As I approached the escarpment, the presence of clouds near the horizon worried me about being able to see anything. I parked at Van Wagner's Beach near Hutch's and setup my camera waiting for the sunrise. I took a few test shots with my DSLR on manual showing shore birds in the water. As dawn approached, small groups of people arrived for the eclipse, and a pillar of light appeared over the lake, a sundog, marking the location of sunrise.

At 5:38am, the sun began rising over the lake as the right horn appeared over the horizon, within minutes at maximum the partially eclipsed Sun was over Lake Ontario. The cloud layer was thick enough to view the partial eclipse with the naked eye, totally unfiltered!!! Within a half hour as the Sun rose higher the partial eclipse came to an end, I shot my last pictures. When the eclipse was over, I packed up my camera gear, went home for breakfast, uploaded my images to the computer, and filed a report on the SEML.

According to all reports, the partial phase was observed from Southern Ontario, the Northeastern United States, NWT, and Europe. In the end, how many people actually observed the annular eclipse..32…on board the Sky and Telescope flight E219 from Minneapolis, Minnesota. I am now making plans for 2023 and 2024. Saros series 147 will be returning to Southern Ontario with an annular eclipse at sunset from the Hamilton area on July 1st, 2057.

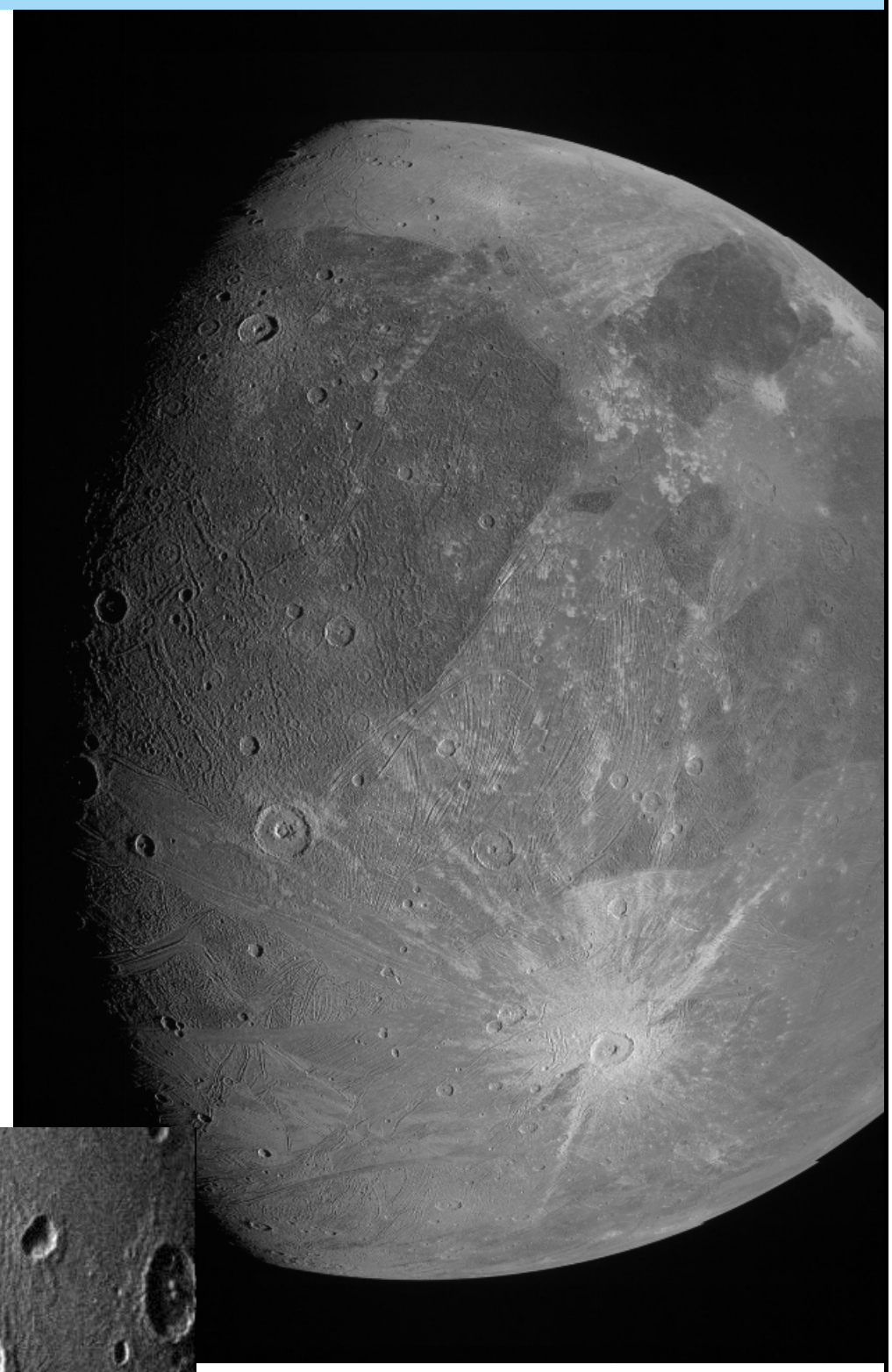
Image Credit: Ray Badgerow (both)

Juno Mission Flies Past Ganymede by Ray Badgerow

The Juno spacecraft, orbiting Jupiter since 2016 made a flyby of Jupiter's largest moon on June 7th at a range of 1038 km, marking the beginning of the extended mission. This was the closest view of Ganymede for over 20 years since the Galileo mission. This region of Ganymede, on the Jupiter-facing hemisphere was first viewed by the Voyager 1 spacecraft on March 6,1979. During the flyby, several instruments studied the moon, examining its surface and the magnetic field environment. This flyby had the effect of reducing the orbital period from 53 to 43 days, setting up future encounters with the Galilean moons. The next encounter is a flyby of Europa on Sept.29, 2022 at a range of 398 km.

Jovian moon Ganymede, from the Juno spacecraft.

Image Credit: NASA/JPL-Caltech/SwRI/MSSS



This image of the night side of Ganymede was acquired with the Stellar Reference Unit.

Image Credit: NASA/JPL-Caltech/SwRI

A Tribute To My Wife Jean by Mike Jefferson

Some people have have a knack for knowing what things are right for you and when you should experience them - because they are good for you. Jean is one such person!

The second last eclipse is one such example. She had been hinting that she would like to visit her church headquarters in Lee's Summit, Missouri. As it happened, the eclipse was to pass directly overhead! I thought that we might be lucky and get it. However, it rained all night before and continued until 40 minutes before first contact. Then the skies cleared and it was the most beautiful eclipse that I have ever experienced. How could we be so lucky, because right after 4th contact, the clouds rolled back in. I think she has an 'in' with someone 'up there' !

Several years back, the opportunity came up to join the Second Sacramento Mountains Spectroscopy Conference. Jean and I went to a local travel agent that we know to make arrangements. She did not go for spectroscopy. She used her time talking to people in the lobby, reading local newspapers and exploring the hotel (Encanto) grounds.

The third conference was right in the middle of the pandemic and was on ZOOM only. She insisted I 'attend' that one, too, which I did and derived much from both of them.

When the most recent eclipse came along, people had all manner of wild plans for how they would drive up to northern Ontario or drive up and rent bush plane services to get above the clouds! Jean said I would check the #403 - Southcote Road overpass. A visual check the day before said it might be good. I got Jo Ann Salci to come over in the morning right before the eclipse - AND - it was the perfect locale. Jo Ann got great cell-phone pictures and I had superb views through my #14 welder's filter. Jean struck another home run for me!

How could any amateur astronomer be this lucky this many times in a row? He could if his partner is Jean.

It is no accident that she goes by jeansblessings@gmail.com because they are .....*Blessings*!

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.

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!

Catch Andromeda Rising

David Prosper

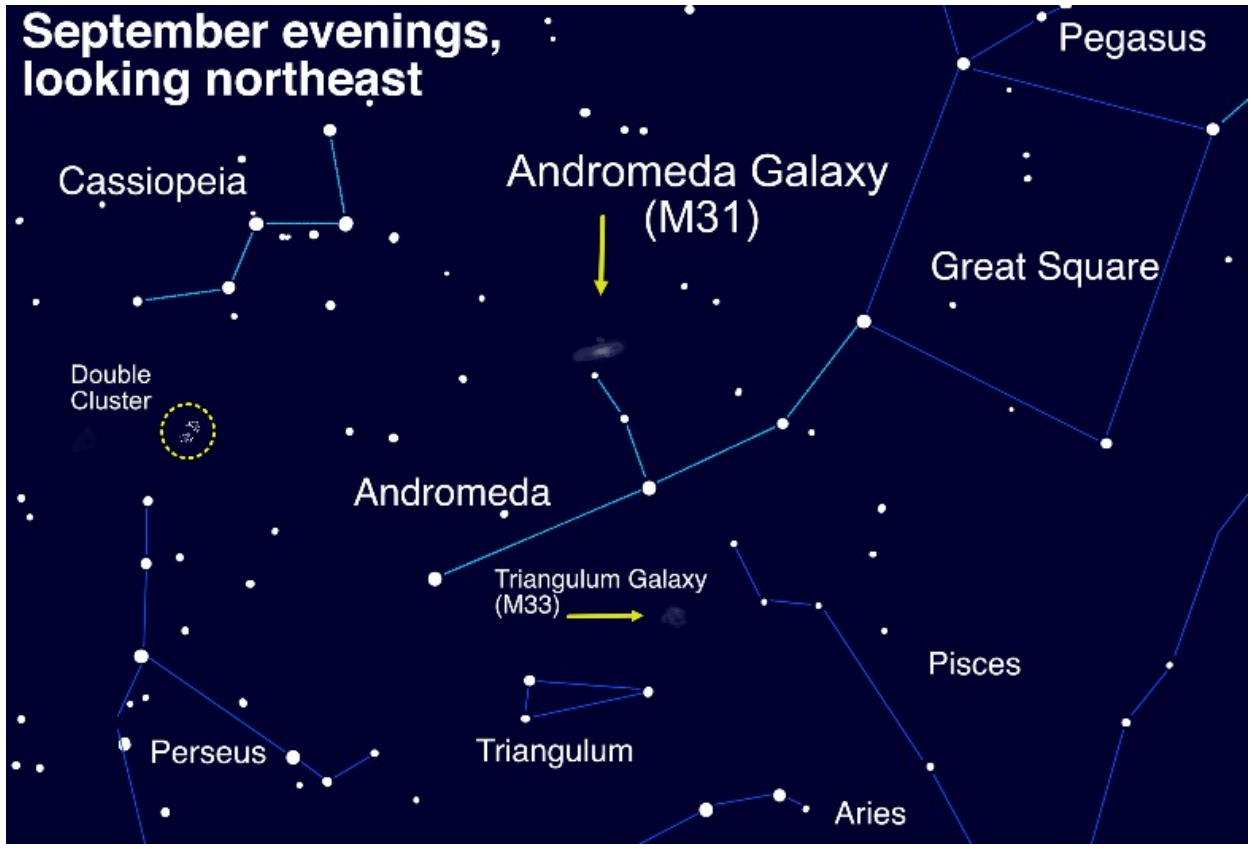
If you're thinking of a galaxy, the image in your head is probably the Andromeda Galaxy! Studies of this massive neighboring galaxy, also called M31, have played an incredibly important role in shaping modern astronomy. As a bonus for stargazers, the Andromeda Galaxy is also a beautiful sight.

Have you heard that all the stars you see at night are part of our Milky Way galaxy? While that is mostly true, one star-like object located near the border between the constellations of Andromeda and Cassiopeia appears fuzzy to unaided eyes. That's because it's not a star, but the Andromeda Galaxy, its trillion stars appearing to our eyes as a 3.4 magnitude patch of haze. Why so dim? Distance! It's outside our galaxy, around 2.5 million light years distant - so far away that the light you see left M31's stars when our earliest ancestors figured out stone tools. Binoculars show more detail: M31's bright core stands out, along with a bit of its wispy, saucer-shaped disc. Telescopes bring out greater detail but often can't view the entire galaxy at once. Depending on the quality of your skies and your magnification, you may be able to make out individual globular clusters, structure, and at least two of its orbiting dwarf galaxies: M110 and M32. Light pollution and thin clouds, smoke, or haze will severely hamper observing fainter detail, as they will for any "faint fuzzy." Surprisingly, persistent stargazers can still spot M31's core from areas of moderate light pollution as long as skies are otherwise clear.

Modern astronomy was greatly shaped by studies of the Andromeda Galaxy. A hundred years ago, the idea that there were other galaxies beside our own was not widely accepted, and so M31 was called the "Andromeda Nebula." Increasingly detailed observations of M31 caused astronomers to question its place in our universe – was M31 its own "island universe," and not part of our Milky Way? Harlow Shapley and Heber Curtis engaged in the "Great Debate" of 1920 over its nature. Curtis argued forcefully from his observations of dimmer than expected nova, dust lanes, and other oddities that the "nebula" was in fact an entirely different galaxy from our own. A few years later, Edwin Hubble, building on Henrietta Leavitt's work on Cepheid variable stars as a "standard candle" for distance measurement, concluded that M31 was indeed another galaxy after he observed Cepheids in photos of Andromeda, and estimated M31's distance as far outside our galaxy's boundaries. And so, the Andromeda Nebula became known as the Andromeda Galaxy.

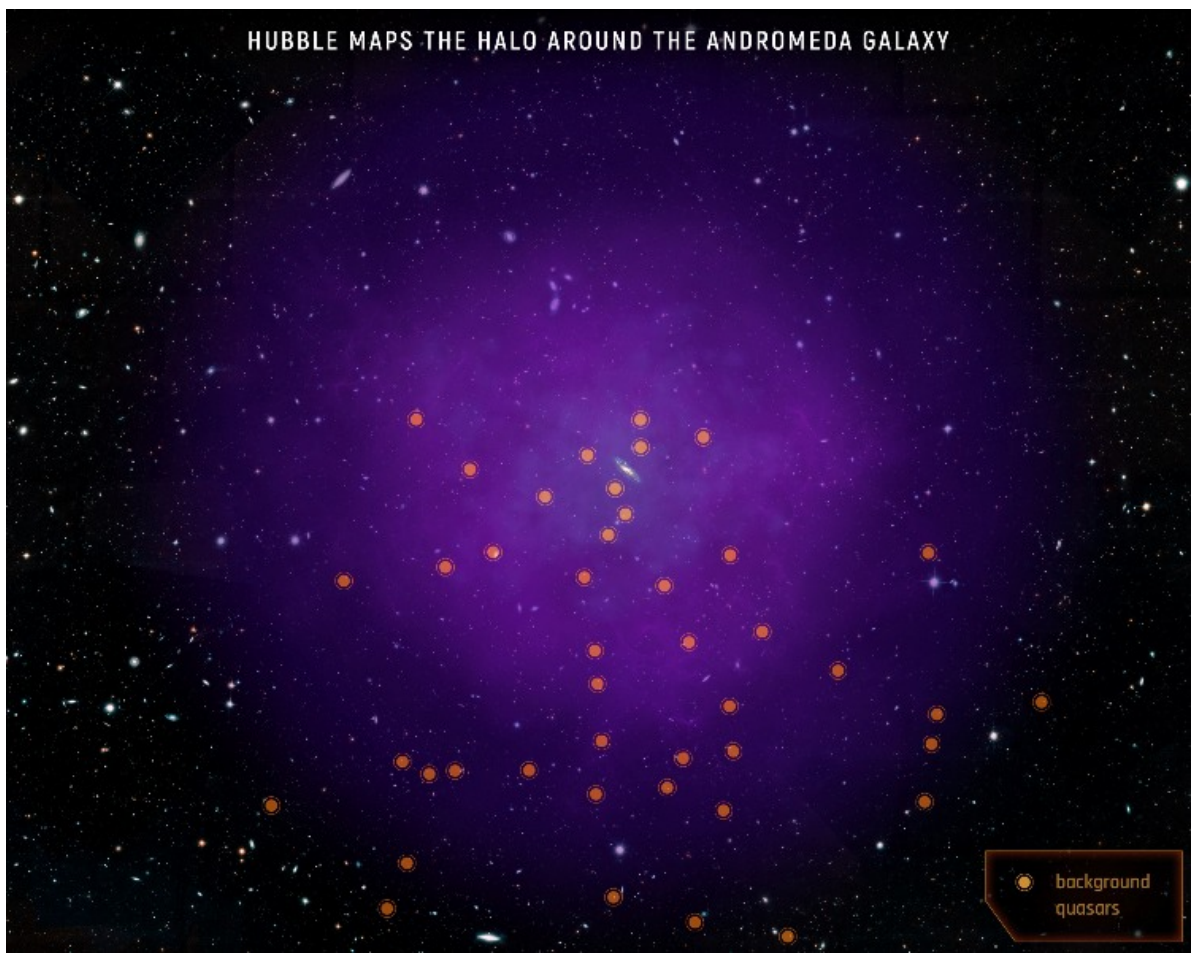
(Continued on page 19)

These discoveries inspire astronomers to this day, who continue to observe M31 and many other galaxies for hints about the nature of our universe. One of the Hubble Space Telescope's longest-running observing campaigns was a study of M31: the Panchromatic Hubble Andromeda Treasury (PHAT): bit.ly/m31phat. Dig into NASA's latest discoveries about the Andromeda Galaxy, and the cosmos at large, at nasa.gov.



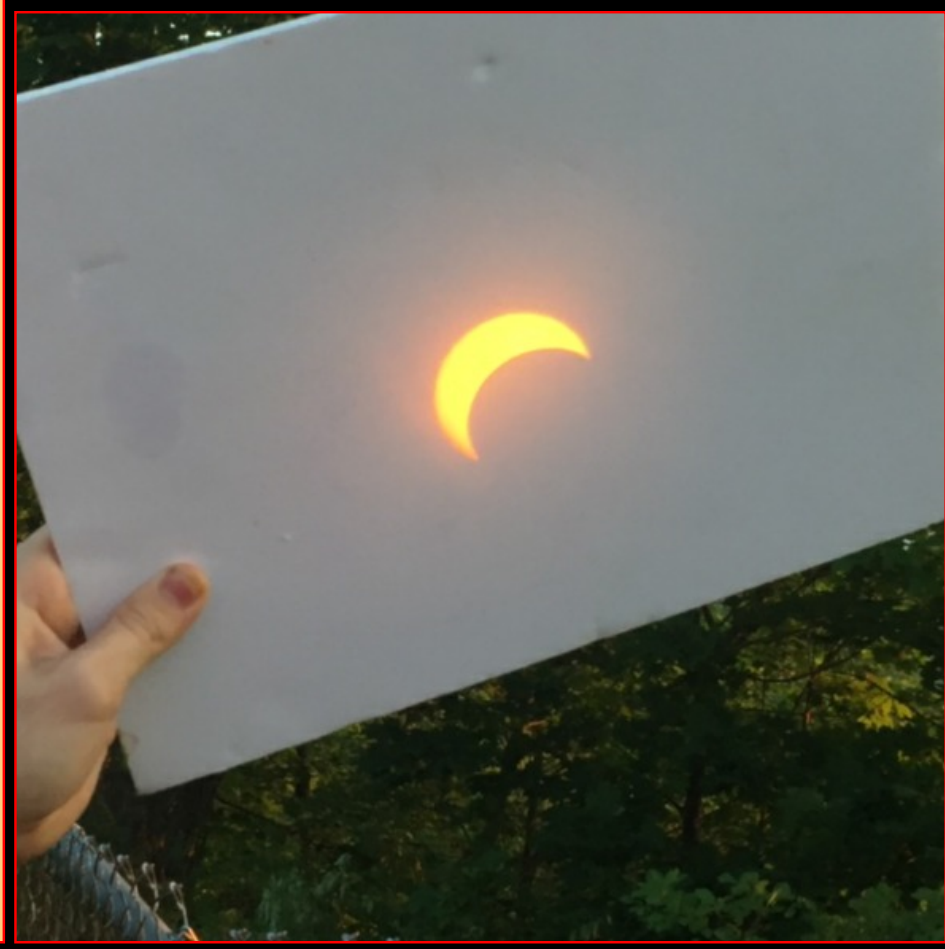
Spot the Andromeda Galaxy! M31's more common name comes from its parent constellation, which becomes prominent as autumn arrives in the Northern Hemisphere. Surprising amounts of detail can be observed with unaided eyes from dark sky sites. Hints of it can even be made out from light polluted areas.

Image created with assistance from Stellarium



While M31's disc appears larger than you might expect (about 3 Moon widths wide), its "galactic halo" is much, much larger – as you can see here. In fact, it is suspected that its halo is so huge that it may already mingle with our Milky Way's own halo, which makes sense since our galaxies are expected to merge sometime in the next few billion years! The dots are quasars, objects located behind the halo, which are the very energetic cores of distant galaxies powered by black holes at their center. The Hubble team studied the composition of M31's halo by measuring how the quasars' light was absorbed by the halo's material.
Credits: NASA, ESA, and E. Wheatley (STScI)
Source: https://bit.ly/m31halo

Annual Solar Eclipse, June 10, 2021



far left — **Progression of Eclipse Sunrise,** by **Chris White**

left — **Projection of eyepiece view of Eclipse on a piece of foamboard,** by **Melissa & Brian Whitman**

bottom — **Crescent Sunrise during Eclipse,** by **Bob Christmas**

Eye Candy the Members' Image Gallery

top — **Nova RS Ophiuchi** on August 13, 2021, by **Peter Wolsley**

Taken through a Celestron 8" EdgeHD scope with a QHY294C camera; 4 x 200 seconds for 800 seconds total.

middle — **Jupiter in August, by John Gauvreau**

Taken by eyepiece projection though a 10" dobsonian & 5mm eyepiece with a Canon 80D DSLR & 40mm lens.

bottom — **Ring Nebula (M57), by Alex Kepic**

Taken through a Celestron C8 AVX with a ZWO ASI224MC camera.

UPCOMING EVENTS

September 10, 2021 - 7:30 pm — Virtual Online H.A.A. Meeting for members. 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

Due to the COVID-19 Coronavirus pandemic, all *in-person* Hamilton Amateur Astronomers meetings are suspended until further notice.

2020-2021 Council

Chair	John Gauvreau
Second Chair	Jim Wamsley
Treasurer	Ann Tekatch
Digital Platforms Director	Christopher Strejch
Membership Director	Leslie Webb
Observing Director	Matthew Mannering
Education Director	Jo Ann Salci
Event Horizon Editor	Bob Christmas
Recorder	Brenda Frederick
Secretary	Denise White
Publicity Director	Mario Carr
Councillors at Large	Barry Sherman Bernie Venasse Melissa Whitman Mike Jefferson Steve Germann Sue MacLachlan Swapna Shrivastava

Check out the H.A.A. **Website**
www.amateurastronomy.org

Follow us!

Contact Us
Hamilton Amateur Astronomers
PO Box 65578
Dundas, ON
L9H 6Y6

www.amateurastronomy.org

General Inquiries:
secretary@amateurastronomy.org

Membership:
membership@amateurastronomy.org

Meeting Inquiries:
chair@amateurastronomy.org

Public Events:
publicity@amateurastronomy.org

Observing Inquiries:
observing@amateurastronomy.org

Education:
education@amateurastronomy.org

Newsletter:
editor@amateurastronomy.org

Digital Platforms Director:
webmaster@amateurastronomy.org

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

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

The Harvey Garden HAA Portable Library

Contact Information

E-mail: library@amateurastronomy.org