

Event Horizon

Volume 31, Number 1
November 2023



From The Editor

Welcome to the new Membership Year!

Once again, a big Thank You goes out to those who have contributed!

Happy Reading and Clear Skies!

Bob Christmas,

Editor

editor 'AT' amateurastronomy.org

Chair's Report by Sue MacLachlan

The first thing that I would like to say as the new Chair of the HAA is that I am excited about the upcoming year. And, I wish to convey a tremendous thank you to everyone who has contacted me over the last little while and expressed their support; it is greatly appreciated and I may just have a little job for you.

I want to welcome all of the new and returning Council members to the 2023-2024 Council. I am looking forward to working with all of you over the coming year.

As you may know, at the end of the Annual General Meeting, the position of Secretary was left vacant. The Secretary's role is very important. He/She/They are responsible for maintaining all of the official records and documents related to the club. In addition, the Secretary conducts any necessary official correspondence and acts as a signing officer. If you would like more information, have any questions

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Chair's Report (continued)

about this position or perhaps are interested in volunteering for this position please contact me at chair@amateurastronomy.org.

Looking forward, there is a full slate of speakers for our Friday meetings for the upcoming year. Starting in November, *Doug Turner*, who is the editor of the Celestial Events Calendar, will be presenting this year's calendar along with a conversation with the club members who have an image in the 2024 calendar. An announcement about the exciting list of upcoming speakers for the rest of this year will be made at the November meeting. So, be sure to attend the meeting, either in person or via Zoom, to find out more. Did you know that Canada is going to be building a rover that is going to the Moon?

In December, our holiday season meeting will include The Sky this Month presented by *Matthew Mannering* followed by the HAA Social. I know how much amateur astronomers like to chat with each other so this is an excellent opportunity to come to the meeting and get to know others that share your interest in the hobby. Potluck seasonal treats are welcome and encouraged while the club will provide the coffee and tea.

The search for a new location is ongoing. Many members have engaged in some research of their own and have provided many great leads on potential locations. The New Location team is exploring all options, leaving no stone, or brick as the case may be, unturned. We hope to have some new location recommendations to share with members at the November meeting.

Our club's Council has approved the implementation of a Binbrook team. The Binbrook Team currently consists of 5 club members who will be coordinating the opening of the Binbrook Conservation Area for viewing opportunities for club members. Watch your email for announcements from them regarding excursions to the park. Please be aware that due to weather conditions the Binbrook team is going to concentrate on opening the park during the mid spring to early fall next year.

Council's thanks goes to the current members of the Binbrook Team who are: Jeff Parsons, Al Murphy, Andrew Brenyo, Paula Owen and Bernie Venasse.

Finally, I just want to say that I am always open to suggestions, comments, concerns, feedback and anything else that you might feel like sharing with Council about the club so please don't hesitate to contact me.

Take care,

Sue MacLachlan



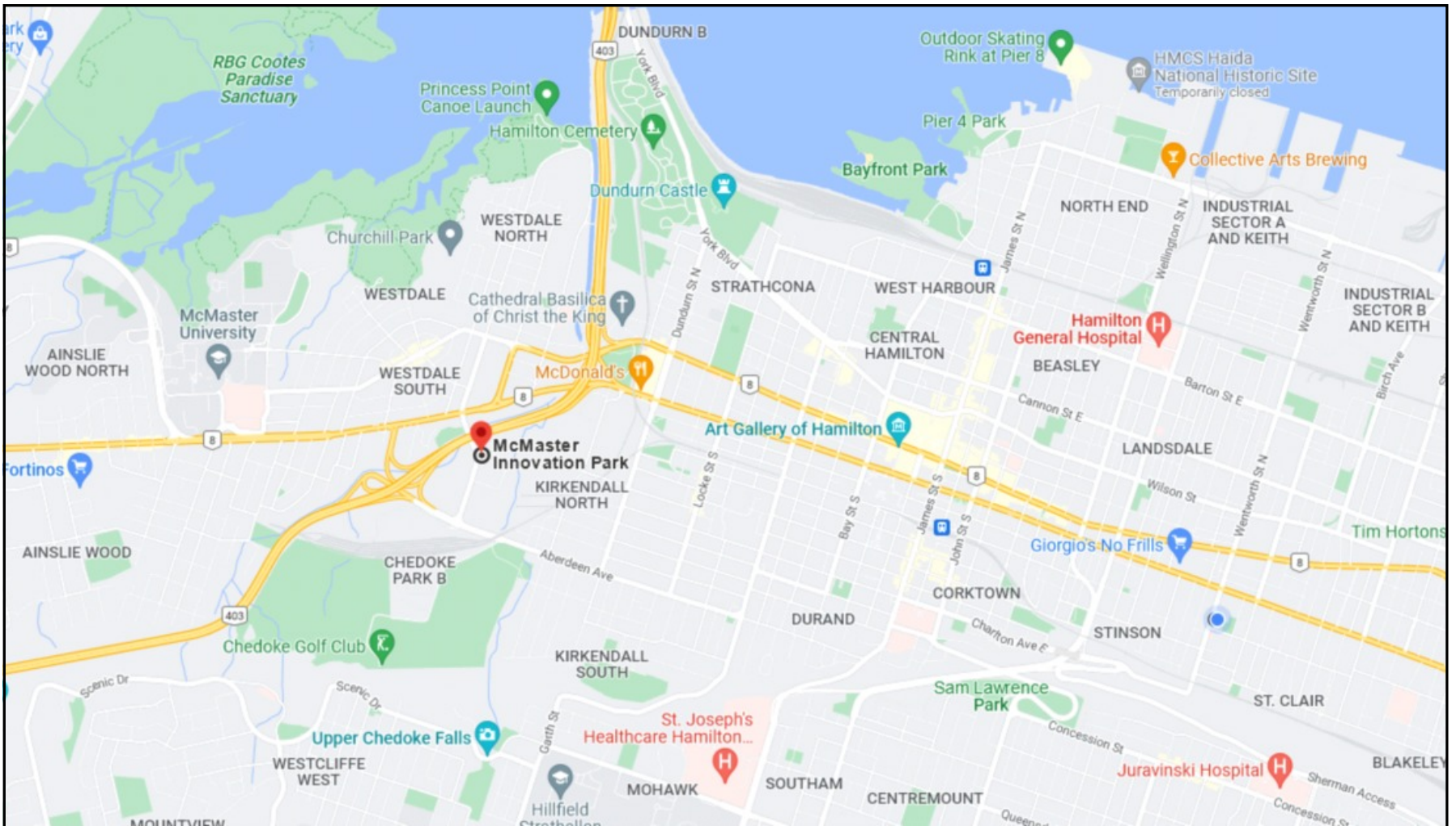
HAA Helps Hamilton

The H.A.A. is once again accepting and collecting donations from our members and guests for local food banks at our general meetings. The H.A.A. has always valued its relationships with food banks in the community, particularly [Hamilton Food Share](#).

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

Masthead Photo: *First Quarter Moon, October 22, 2023, by Bob Christmas.*

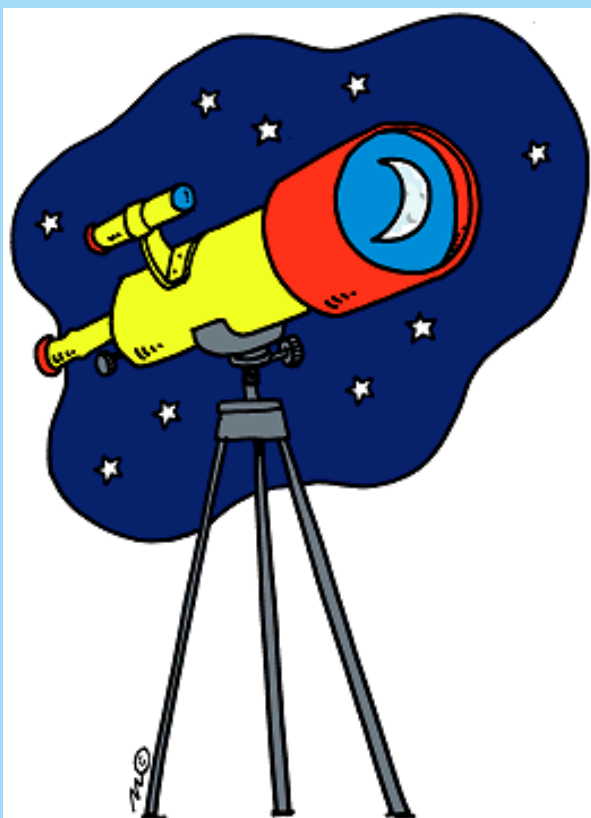
Taken through a Tamron 300mm lens with a Canon 40D camera. Single 1/250s exposure @ f/8 & ISO 200.



Meeting Location

Our upcoming meeting is scheduled for November 10th, 2023, at McMaster Innovation Park. MIP is located at 175 Longwood Rd. S. in Hamilton. Doors open at 7:00 and the meeting begins at 7:30.

HAA'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 scope, please contact Paula Owen at

loanerscope@amateurastronomy.org.

Telescopes are loaned out on a first come basis.



Seasonal Social

Friday December 8, 2023

7:30 pm at McMaster Innovation Park



THE MEETING WILL INCLUDE THE SKY THIS MONTH PRESENTED BY MATTHEW MANNERING FOLLOWED BY THE SOCIAL.

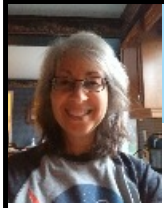
POTLUCK SEASONAL TREATS ARE WELCOME

COFFEE, TEA AND WATER ARE PROVIDED

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



HAMILTON
Food Share



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

We've learned about light and shadows (See the September 2023 HAA Explorers Article). We've learned about different types of Solar eclipses: Total, Annular, Partial or combinations (See the October 2023 HAA Explorers Article). This month we are going to explore in more detail about Total Solar Eclipses. What's so special about the Eclipse that's happening right here in April of 2024? Let's find out!

Totally Awesome Solar Eclipses!


They are the most awesome show that nature puts on for us! And we get to see one right here in our area on April 8, 2024!

First, a Safety Warning! The Sun is so bright that even a few seconds of looking at it can cause severe damage and you could lose your eyesight. DO NOT look directly at the Sun. The same goes for adults, so make sure they know, too! Astronomers use special filters which allow them to study the Sun. We will explore more about safety in upcoming articles.

What is so special, powerful and moving about a Solar Eclipse? Imagine a beautiful sunny day. As the Moon blocks the light from the Sun, areas on Earth that lie in the shadow (that's us!) will experience a gradually darkening sky where bright stars and planets appear, animals think it's nighttime and you may even see bats flying around, and the air gets cooler. Crickets will chirp and roosters may crow! There is a hush as birds think it's nighttime and stop their chirping. You will also hear a lot of cheering and clapping as people get very excited! And depending on where you are, all of this will only last a few minutes!

In Hamilton, Ontario, The Moon will begin covering the Sun on Monday, April 8th at 2:03 pm. It will take about 1 hour and 16 minutes to move to where it will completely cover the Sun. And then, it will only cover the Sun for **1 minute and 50 seconds (this is called Totality)**! And then it takes about 1 more hour and 12 minutes until the Moon has completely moved away from the Sun. So, at 4:31 pm the Total Solar Eclipse will be finished. It will have taken the Moon close to 2 ½ hours to travel across our Sun!

Apr 8, 2024 at 3:19 pm



Max View in Hamilton, Ontario

Global Event: Total Solar Eclipse

Local Type: Total Solar Eclipse in Hamilton, Ontario






Begins: Mon, Apr 8, 2024 at 2:03 pm

Maximum: Mon, Apr 8, 2024 at 3:19 pm 1.003 Magnitude

Ends: Mon, Apr 8, 2024 at 4:31 pm

Duration: 2 hours, 27 minutes

Totality: 1 minute, 50 seconds

Time	Phase	Event
2:03:53 pm Mon, Apr 8		<i>Partial Eclipse begins</i> The Moon touches the Sun's edge.
3:18:12 pm Mon, Apr 8		<i>Full Eclipse begins</i> The Sun becomes totally eclipsed.
3:19:07 pm Mon, Apr 8		<i>Maximum Eclipse</i> Moon is closest to the center of the Sun.
3:20:02 pm Mon, Apr 8		<i>Full Eclipse ends</i> The total eclipse ends.
4:31:11 pm Mon, Apr 8		<i>Partial Eclipse ends</i> The Moon leaves the Sun's edge.

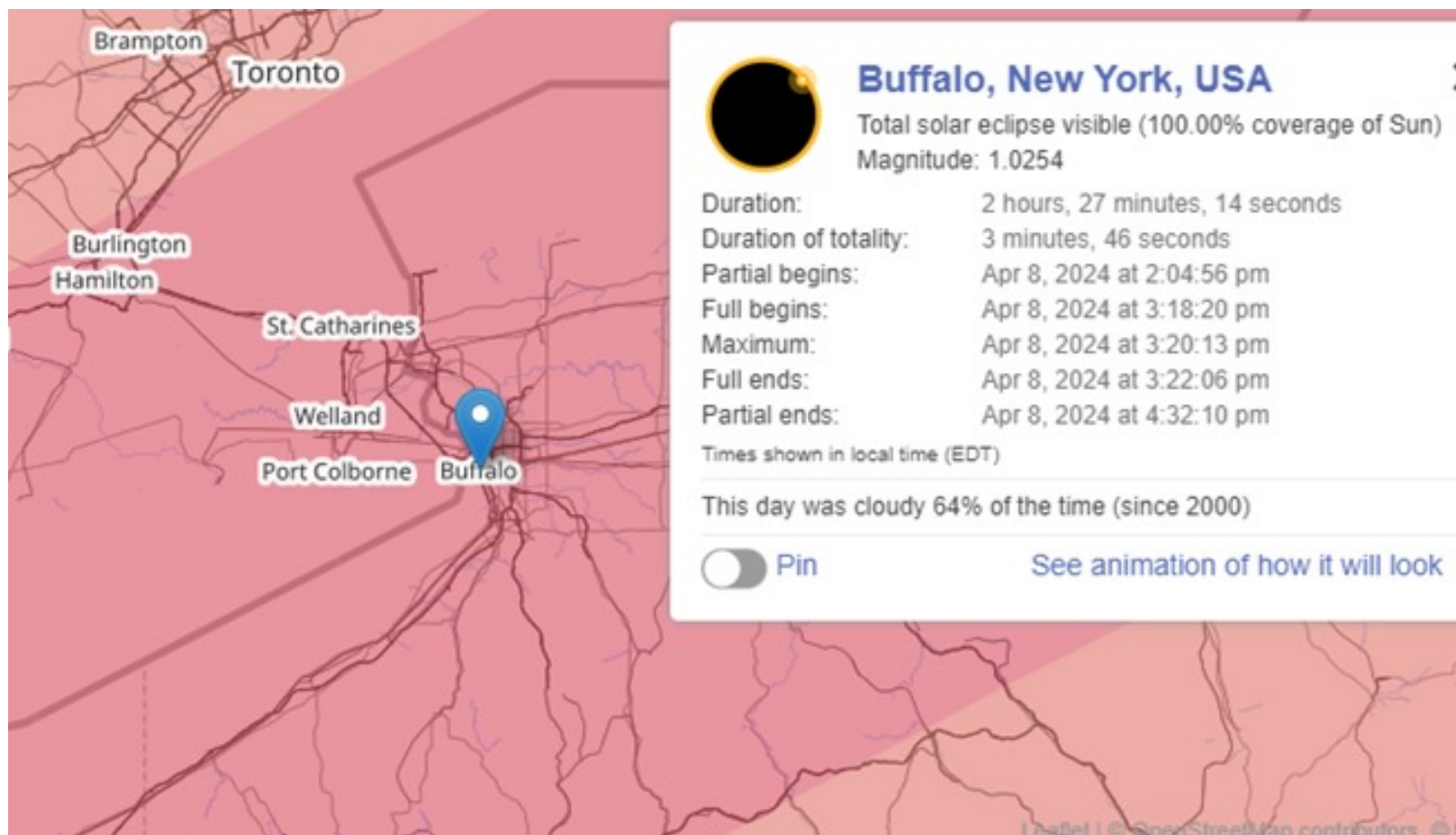
***Totality** is the length of time that the Moon completely covers the Sun. In Hamilton, Ontario, this will begin at 3:18 and 12 seconds pm and last until 3:20 and 2 seconds pm. A total of 1 minute and 50 seconds.*

Images here and chart at top of next page courtesy: TimeAndDate.com

(Continued on [page 6](#))

HAA Explorers (continued)

The closer a person is to the centre line of the Moon's shadow path (the Path of Totality); the longer Totality will last. For example, if you were in Buffalo, New York, which is not far from here, but closer to the centre line, Totality will last 3 minutes and 46 seconds!



It's all about the angles created by the Earth, Moon and Sun! Watch the video animation on this website to see how the Moon moves and covers the Sun (scroll down to the video on the page):

<https://www.timeanddate.com/eclipse/in/canada/hamilton?iso=20240408>

There are some really cool things to see as the Moon gets close to covering the Sun: Baily's Beads and the Diamond Ring.

In 1836, Francis Baily, an English Astronomer, noticed small beads of light shining from around the edge of the Moon as the Moon almost covered the Sun. It is light passing by the Craters and Valleys on the Moon!

Once Baily's Beads begin to disappear, a final single bright spot will remain along the edge of the Moon's shadow. This bright spot looks like a diamond ring! *(Continued on [page 7](#))*



The Baily's Beads Effect Image Credit: NASA



The Diamond Ring Effect
Image Credit: National Geographic Education

HAA Explorers (continued)



*Totality: The Sun's Corona and Prominences
Image Credit: NASA Solar System Exploration*

During the April 8, 2024 Total Solar Eclipse, Venus and Jupiter will be on either side of the eclipse and will be brightly visible!

This is truly an event not-to-be-missed!

Things to do until next time **:

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

1. Check out the Canadian Space Agency Website about Eclipses:

<https://www.asc-csa.gc.ca/eng/astronomy/eclipses/solar-eclipses.asp>

2. Check out the NASA Spaceplace Website about Solar Eclipses:

<https://spaceplace.nasa.gov/eclipse-snap/en/>

3. Watch the [first time a solar eclipse was filmed in motion](#) (May 28, 1900)!

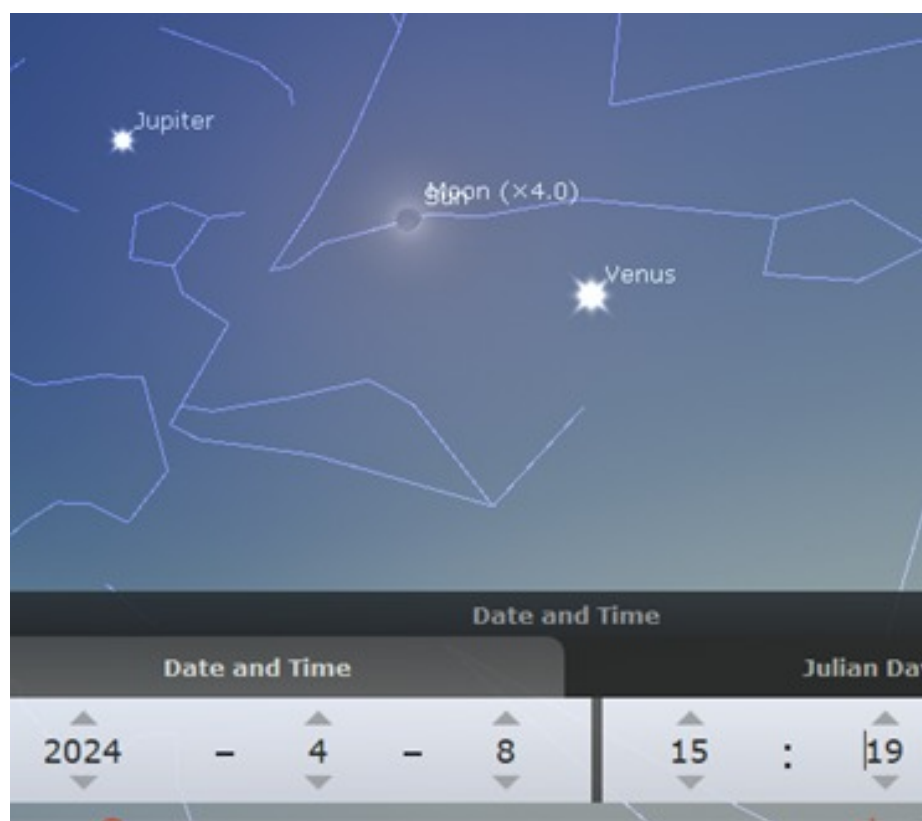


Image generated using Stellarium

(Continued on [page 8](#))

HAA Explorers (continued)

During November, check out:

1. On November 11th around 7 pm, check out Jupiter, Saturn, the bright stars Altair and Vega. Make your own asterism! I made a big smile! 😊



2. On November 23rd around 7pm, see how the Moon has joined my smile asterism? 😊



Images generated using Stellarium

(Continued on [page 9](#))

Totally Awesome Total Eclipses!

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

APRIL
SHADOW
SOLAR
BAILYS BEADS
MOON
CENTRE
ROOSTERS
PATH
CORONA
MINUTES
PLANETS
TOTALITY
CRATERS
ECLIPSE
PROMINENCES
MAXIMUM
FULL
PARTIAL
ANGLES

© *TheWordSearch.com*

Answers on page 29.

Finally:

How do you organize a solar eclipse party?

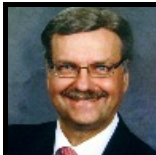
You Planet! 🤪

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

Thank you to Ro for reviewing this article! 😊

References:

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- Astronomy Handbook. James Muirden. Arco Publishing, NY. 1982
- The Backyard Astronomer's Guide. Dickinson and Dyer. Firefly, 2021.
- Exploring the Sky: 100 Projects for Beginning Astronomers. Richard Moeschl. Chicago Review Press, 1989.
- Great Experiments with Light. Scholastic. 2000.
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- National Geographic Kids: Ultimate Space Atlas, 2017.
- National Geographic Kids: Ultimate Explorer Field Guide, 2016
- Nightwatch. Dickinson. Firefly. 1998.



Last Month's Armchair Astronomer Challenges

Alas, last month's Armchair Astronomer Challenges (AAC) (both of them) were clouded out.

First was the annular solar eclipse at 1PM on Saturday October 15th. From my location, the Sun finally came out at about 5:30 PM. If you even thought about it, and remembered it was cloudy, or peeked outside anytime between noon and 2 PM, count yourself victorious in the Armchair Astronomy Challenge for October.

As your consolation prize, the eclipse was streamed online from someplace that did not have AAC's (and no clouds too). The location is Kerrville, Texas. That city is on the path of both the October eclipse and next April's total eclipse. That is not a coincidence. Another advantage is you can watch the video without wearing eclipse glasses. Your computer screen will not be bright enough to cause eye injury.

<https://www.youtube.com/watch?v=LLY79zjud-Q>

The benefit of watching the recording is you can jump around in time. You can also see the same eclipse from different cities at different times. Just don't read the subtitles. :D Probably generated by 'AI' trying to lull us into a false sense of superiority.

The Other Armchair Astronomer Challenge

On October 21st the Orionids Meteor Shower peaked. That said, it's a very wide shower, so there should still be some in the sky for a few more days. Alas, the morning of October 22 was cloudy well past 2 AM, and when I set up in the evening of October 22 for another shot at the meteors, I scored zilch. Nada. Not even sporadic meteors. I will admit I was at home in Burlington at the time, (explaining lack of sporadics) but the Orionids are usually fairly bright. If you want to coast around the Sun for 76 years (or many times that much) you need some body mass. Grains of sand will be literally blown off course. The Orionids also leave trails in the (where dark) skies.

Comets

There are no notable comets in the sky lately. We will keep watch for comet Nishimura when it becomes a photographic target.

Note in the chart below, that some comets have not been seen for weeks, despite their estimated brightness putting them near the top of the list. They are too close to the Sun to be observed from Earth or from cautious satellites.

The SOHO observatory has only about a 10 degree field of view near the Sun, so would miss a lot of comets.

Comets

(Continued on [page 11](#))

This table shows the brightest currently observable comets. Click on the name of the comet to get more details, including finder charts.

Comet	Brightness	Date of last reported observation	Angular separation from Sun	Altitude	Azimuth	Constellation
C/2023 P1 Nishimura	6.0	2023-Sep-28	21°	-43.4°	270° (W)	Hydra
2P Encke	8.4	2023-Oct-13	10°	-27.6°	285° (WNW)	Virgo
C/2023 H2 Lemmon	9.4	2023-Oct-23	62°	14.1°	326° (NNW)	Canes Venatici
103P Hartley	9.8	2023-Oct-23	88°	-33.1°	19° (NNE)	Cancer
C/2020 V2 ZTF	10.1	2023-Oct-20	124°	-4.9°	145° (SE)	Phoenix
12P Pons-Brooks	10.9	2023-Oct-22	74°	50.8°	289° (WNW)	Hercules
C/2021 S3 PANSTARRS	12.4	2023-Oct-19	45°	-67.8°	280° (W)	Antlia

Chart generated using Heavens-Above

The Sky for November 2023 (continued)

The ISS Visible Passes

The International Space Station (ISS) orbits the Earth high enough to be seen reflecting sunlight in the morning and evening. It was launched on an orbit that would take it past Russian launch sites, so we benefit from it being overhead. The Hubble Space Telescope, on the other hand, was on a much lower inclination orbit, that takes it only as far north as the Shuttle launch site.

There are approximately 2 week intervals where it can be seen in one then the other timeframe.

The ISS charts on Heavens-Above only project 10 days in advance, since orbit lifting operations happen frequently and eventually affect the timing.

Use this link (<https://heavens-above.com/PassSummary.aspx?satid=25544>) to get the latest passes of the ISS. You will have to indicate your location or it will assume the Equator in the Atlantic ocean at 0 degrees longitude. You don't need a login. Just click on the (0.0000 ...)

and zoom out then click on Hamilton...

Or just try pressing this button...

User:	anonymous	Login
Location:	Unspecified	(0.0000°N, 0.0000°E)
Time:	01:36:36	(UTC+00:00)
Language:	English	▼

Eventually you will need to scroll down and press the 'update' button:

/// WHAT3WORDS

Latitude degrees
Longitude degrees
Elevation meters
Name
Time zone



Developed and maintained by Chris Peat, Heavens-Above GmbH. Please read the [FAQ](#) before sending e-mail. [Imprint](#).



...resulting in something like this:

User:	anonymous	Login
Location:	Unnamed	(43.5804°N, 79.3858°W)
Time:	21:39:20	(UTC-04:00)
Language:	English	▼

...anywhere within 50 km of your location is fine for most observations in Heavens-Above.

Beware Daylight Savings Time in some of the charts.

So, once your location is set, you can call up the ISS chart (next page).

The chart shows that all the bright passes are in the early morning. For most of us, that's not conducive to getting friends to watch for it.

Check back and use the links in early November for a better chance at this spectacle.

Planets

Jupiter is nearing opposition, on November 3, so that means that Jupiter is basically visible all night.

Uranus is also nearing opposition, on November 13, but you will need binoculars or a telescope for it.

(Continued on [page 12](#))

The Sky for November 2023 (continued)

ISS - Visible Passes

Search period start: 23 October 2023 00:00 < >
 Search period end: 02 November 2023 00:00
 Orbit: 417 x 418 km, 51.6° (Epoch: 23 October)

Passes to include: visible only all

Click on the date to get a star chart and other pass details.

Date	Brightness (mag)	Start			Highest point			End			Pass type
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.	
23 Oct	-0.8	05:04:07	16°	E	05:04:07	16°	E	05:05:06	10°	ENE	visible
23 Oct	-3.3	06:37:03	22°	W	06:38:50	44°	NNW	06:42:05	10°	NE	visible
24 Oct	-3.3	05:51:18	55°	NNE	05:51:18	55°	NNE	05:54:08	10°	NE	visible
25 Oct	-0.7	05:05:25	15°	ENE	05:05:25	15°	ENE	05:06:06	10°	ENE	visible
25 Oct	-2.4	06:38:21	19°	NW	06:39:47	26°	NNW	06:42:41	10°	NE	visible
26 Oct	-2.3	05:52:21	29°	N	05:52:21	29°	N	05:54:39	10°	NE	visible
27 Oct	-0.5	05:06:17	12°	NE	05:06:17	12°	NE	05:06:37	10°	NE	visible
27 Oct	-1.9	06:39:13	15°	NW	06:40:43	20°	N	06:43:17	10°	NE	visible
28 Oct	-1.8	05:53:04	21°	N	05:53:04	21°	N	05:55:06	10°	NE	visible
29 Oct	-0.4	05:06:53	10°	NE	05:06:53	10°	NE	05:06:56	10°	NE	visible
29 Oct	-1.8	06:39:48	14°	NW	06:41:33	20°	N	06:44:06	10°	NE	visible
30 Oct	-1.6	05:53:34	19°	N	05:53:34	19°	N	05:55:39	10°	NE	visible
31 Oct	-2.0	06:40:13	15°	NNW	06:42:13	24°	NNE	06:45:01	10°	ENE	visible
01 Nov	-1.7	05:53:57	21°	NNE	05:53:57	21°	NNE	05:56:22	10°	ENE	visible

Chart generated using Heavens-Above

Here's where to look for Uranus this month.

The other planets are in the sky, and by midnight, all the planets from Jupiter outward are at easily observable altitudes above 30 degrees.

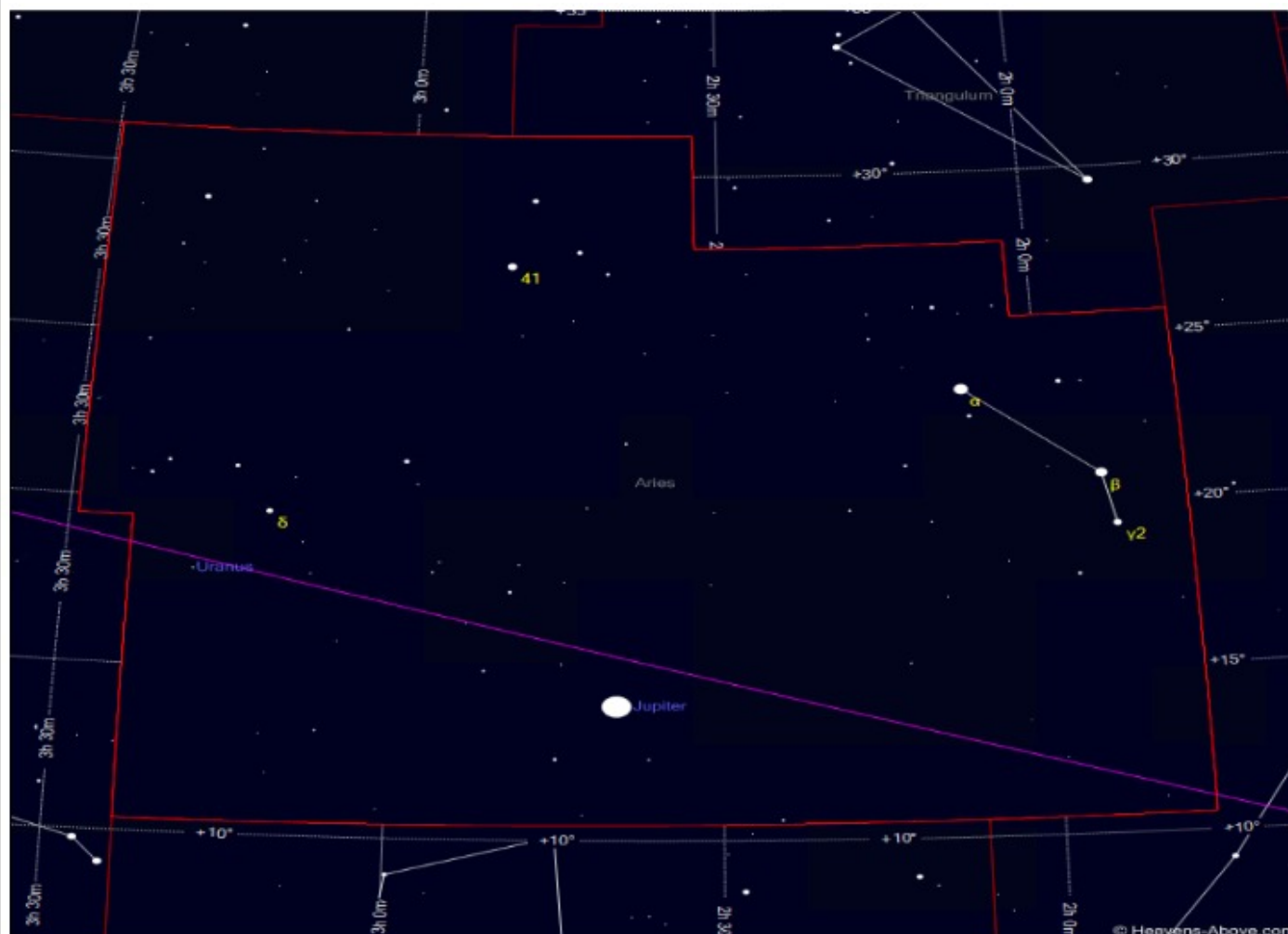


Image generated using Stellarium

Abbreviation Ari
 Genitive Arietis
 Area 441 square degrees (Rank 39)
 A little mythology

(Continued on [page 13](#))

The Sky for November 2023 (continued)

There are few bright stars in Aries to guide you, but Jupiter is there, and that means less distraction when you have the binoculars on target.

Roughly midway between Jupiter and Aldebaran in Taurus, above the Jupiter - Aldebaran line, and below the Jupiter - Pleiades line.

*Image generated using
Stellarium*



Can you see the colour of the planet? Your binoculars will also easily show Jupiter's Moons.

If only red marks were handy in the sky... The key thing is, Uranus has magnitude 5.65, and it's going to be bright in binoculars.

While you are in the area, sweep over to the Pleiades and take in the dozens of stars there.

The Armchair Astronomer Challenge for November 2023

This month gives us a new challenge, similar to October. A little bit dimmer but plenty of meteors if you are willing to watch for them. The *Leonid Meteor Shower* will peak overnight on November 17th-18th, and Leo goes high in the sky this time of the year. The radiant rises by 11 PM.

You will have no problem with the Moon. It's new on November 13th. The first quarter Moon will be setting in the west, while you look Northeast. Ignore advice claiming you should look for meteors in the morning. That's for wimps. Get out there after 11 PM in the evening. We are not in the hobby for counting barely detectable faint shooting stars. We want solid easily seen authoritative shooting stars. Those, though lesser in number, can be seen with the Moon up, and from downtown, provided it is clear. Those are the properly satisfying meteors which lead to enjoyment of Astronomy.

However, if it's cloudy, even the best meteor shower will be obscured to all but radio wave meteor reflection detectors.

(Continued on [page 14](#))

The Sky for November 2023 (continued)

Here are the particulars of this Month's challenge. (You can score kudos for checking for clouds anytime after 11 PM on the day of the peak, and score joy if it's clear.)



Image Credit: TimeAndDate.com

The Interactive Meteor Shower Sky Map shows the position of the radiant (the circle) in the night sky above Buffalo (Change location). Note that meteors can appear in any part of the sky, not just near the radiant. Select dates above the sky map. *Need some help?*

Moonrise

The Full Moon will rise on November 27th at 4.43 PM. The Sun will still be up. You will need a 'low altitude' vantage point, so that when you see the Moon, its light is not going through a huge extra amount of atmosphere. I suggest the *beachfront* near Hutches (see below), one of our usual haunts.

As is usual for a Full Moon, the sunset is not much different. In this case, 4.46 PM.

The azimuth of 53 degrees is almost Northeast, ruling out most other vantage points, including the Dundas lookout.

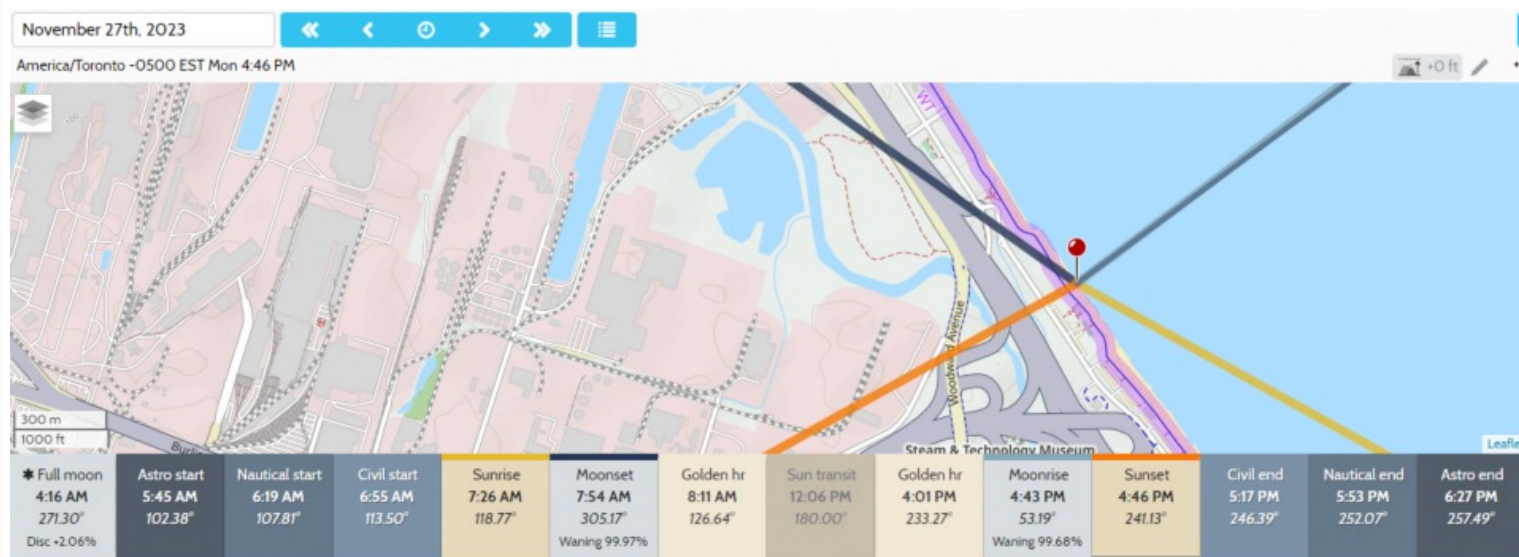


Image generated using Photographer's Ephemeris

I wish for you that skies clear when you look, and that you look at the best times!



What's Up in Awards? November-December 2023

by Bernie Venasse

Contents:

What's up in awards?

Rising Star Program: November-December

Pathways Observing Program targets... November-December

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

The Planets, Comets, Upcoming Meteor showers, Award Programs

What's Up in Awards?

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

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

HAA Rising Star Observing Award

November

Constellations: Cassiopeia

Stars: Alpheratz

Double Stars: delta Cephei

Object Pairs: NGC 7788/NGC 7790

Messier objects: M52

December

Constellations: Taurus, Perseus

Stars: Hamal

Double Stars: Alcyone

Object Pairs: NGC 1325/NGC 1332

Messier objects: M45

Pathways Observing Program

Group C

Observable in October, November, December.

Winter Constellations: Find, observe, sketch: *Perseus, Cygnus, Lyra*

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

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

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

HAA Messier Objects Observing Award

November Messier targets

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

(Continued on [page 16](#))

What's Up in Awards? November-December 2023 (continued)

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

December Messier targets

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

The Planets... November 2023 via (BBC) Sky at Night Magazine

- 3 November: Jupiter reaches opposition.
- 10 November: Excellent transit of Ganymede and its shadow from 17:15 UT.
- 13 November: Uranus reaches opposition.
- 17/18 November: [Leonid meteor shower](#) peak (favourable).

(Continued on [page 17](#))

What's Up in Awards? November-December 2023 (continued)

Mercury: Evening planet, not really viable this month due to low altitude after sunset.

Venus: Bright morning planet, visible against dark skies all month.

Mars: Solar conjunction on 17 November. Too close to the Sun to be seen this month.

Jupiter: Superbly placed, reaching opposition on 3 November. Attains 50° altitude when due south.

Saturn: Well-placed evening planet. Moon close on 20 November.

Uranus: The planet is at opposition on 13 November. It sits 2.2° south of Botein (Delta (δ) Arietis).

Neptune: Well-placed evening planet. All month Neptune reaches its highest position in darkness. Binoculars will be needed in order to see the planet this month.

The Planets... December 2023 via (BBC) Sky at Night Magazine

- 9 December: Morning waning crescent Moon near Venus.
- 13 December: Earliest sunset of the year.
- 13/14 & 14/15 December: [Geminid meteor shower](#) peak (favourable)
- 21 December: Vesta reaches opposition (see chart below).
- 30 December: Latest sunrise of the year.

Mercury: Best in the morning sky on 31 December, Mercury is visible one hour before sunrise low above the southeast horizon.

Venus: Bright morning planet, best at start of December when near Spica (Alpha (α) Virginis). The Moon is close on 9 December.

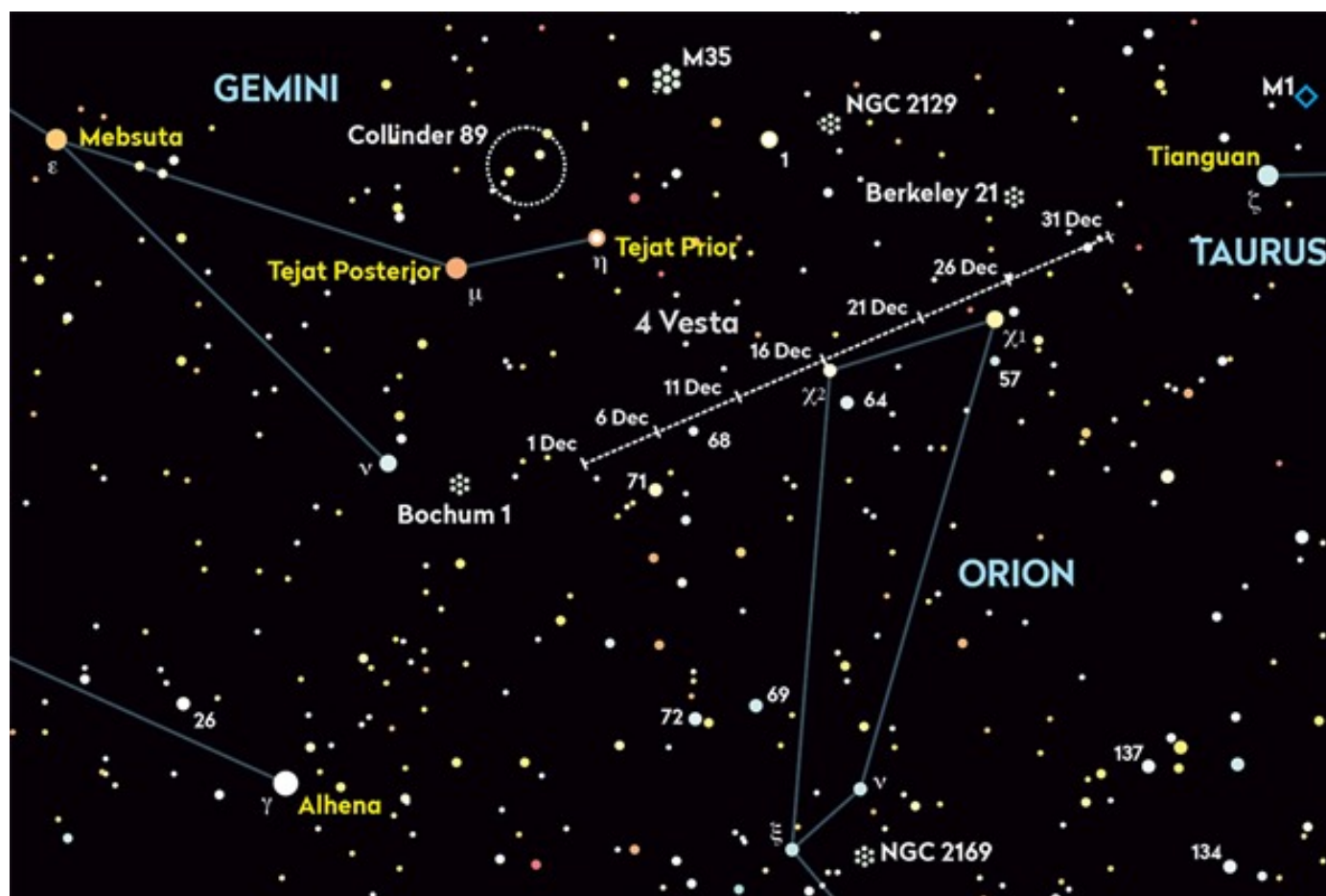
Mars: Currently in the morning sky, but too close to the Sun to see well.

Jupiter: Superb, bright, evening planet. The Moon lies nearby on the evenings of 21 and 22 December.

Saturn: Well-placed in early December but loses altitude later in the month. The Moon is close on 17 December.

Uranus: Well-placed evening planet, near Jupiter. 3° south of Botein (Delta (δ) Arietis).

Neptune: Evening planet south of the Circlet. Loses altitude towards month end. (Continued on [page 18](#))



Minor planet Vesta reaches opposition on 21 December 2023 when it will shine at mag. 6.3 against the stars of northern Orion. Credit: Pete Lawrence

What's Up in Awards? November-December 2023 (continued)

Comets October-November 2023 via Seiichi Yoshida – Click here:

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

Meteor Showers via American Meteor Society

Orionids

Period of activity: September 26th, 2023 to November 22nd, 2023

Peak Night: Oct 20-21, 2023

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

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

Parent Object: 1P/Halley

Next Peak - The Orionids will next peak on the Oct 20-21, 2023 (Fri-Sat) night. On this night, the moon will be 37% full.

Southern Taurids

Period of activity: September 28th, 2023 to December 2nd, 2023

Peak Night: Nov 4-5, 2023

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

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

Parent Object: 2P/Encke

Next Peak - The Southern Taurids will next peak on the Nov 4-5, 2023 (Mon-Tue) night. On this night, the moon will be 54% full.

Northern Taurids

Period of activity: October 13th, 2023 to December 2nd, 2023

Peak Night: Nov 11-12, 2023

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

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

Parent Object: 2P/Encke

Next Peak - The Northern Taurids will next peak on the Nov 11-12, 2023 (Sat-Sun) night. On this night, the moon will be 2% full. The Northern Taurids will next peak on the Nov 11-12, 2023 (Sat-Sun) night. On this night, the moon will be 2% full.

(Continued on [page 19](#))

What's Up in Awards? November-December 2023 (continued)

Leonids

Period of activity: November 3rd, 2023 to December 2nd, 2023

Peak Night: Nov 17-18, 2023

The Leonids are best known for producing meteor storms in the years of 1833, 1866, 1966, 1999, and 2001. These outbursts of meteor activity are best seen when the parent object, comet 55P/Tempel-Tuttle, is near perihelion (closest approach to the sun). Yet it is not the fresh material we see from the comet, but rather debris from earlier returns that also happen to be most dense at the same time. Unfortunately, it appears that the earth will not encounter any dense clouds of debris until 2099. Therefore, when the comet returns in 2031 and 2064, there may not be any meteor storms, but perhaps several good displays of Leonid activity when rates are in excess of 100 per hour. Each passing year also presents new possibilities from old debris fields. In 2022, model calculations of Maslov (2007) and Sato (2021) show an approach of the 1733 dust trail on November 19. Maslov gives 06h UT, Sato obtains 06h20m – 06h27m UT ($\lambda = 236.^\circ 576$ and $\lambda = 236.^\circ 581$; different ejection velocities). The possible activity level depends on the ejection velocity (which has a negative sign in this case and observations of meteors from such trails are scarce). Maslov adds: meteors should be bright, a ZHR of 200+ seems possible despite the uncertainties. Sato comments: ZHR may reach 50+ because the model suggests that the dust tends to be concentrated. An encounter with the 1600 trail (weak rate possible near November 18, 07h UT; $\lambda = 235.^\circ 6$) is found by Vaubaillon (2021). A weak rate enhancement may be visible due to the 1800 trail later on November 21, 15h UT (Maslov, 2007). The Leonids are often bright meteors with a high percentage of persistent trains.

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

Parent Object: 55P/Tempel-Tuttle

Next Peak - The Leonids will peak the night of Nov 17-18, 2023. On this night, the moon will be 23% full.

Geminids

Period of activity: November 19th, 2023 to December 24th, 2023

Peak Night: Dec 13-14, 2023

The Geminids are usually the strongest meteor shower of the year and meteor enthusiasts are certain to circle December 13 and 14 on their calendars. This is the one major shower that provides good activity prior to midnight as the constellation of Gemini is well placed from 22:00 onward. The Geminids are often bright and intensely colored. Due to their medium-slow velocity, persistent trains are not usually seen. These meteors are also seen in the southern hemisphere, but only during the middle of the night and at a reduced rate.

Shower details - Radiant: 07:24 +32.3° - **ZHR:** 150 - **Velocity:** 21 miles/sec (medium - 34km/sec)

Parent Object: 3200 Phaethon (asteroid)

Next Peak - The Geminids will peak the night of Dec 13-14, 2023. On this night, the moon will be 1% full.

Ursids

Period of activity: December 13th, 2023 to December 24th, 2023

Peak Night: Dec 21-22, 2023

The Ursids are often neglected due to the fact it peaks just before Christmas and the rates are much less than the Geminids, which peaks just a week before the Ursids. Observers will normally see 5-10 Ursids per hour during the late morning hours on the date of maximum activity. There have been occasional outbursts when rates have exceeded 25 per hour. These outbursts appear unrelated to the perihelion dates of comet

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What's Up in Awards? November-December 2023 (continued)

8P/Tuttle. This shower is strictly a northern hemisphere event as the radiant fails to clear the horizon or does so simultaneously with the start of morning twilight as seen from the southern tropics.

Shower details - Radiant: 14:36 +75.3° - **ZHR:** 10 - **Velocity:** 20.5 miles/sec (medium - 33km/sec)

Parent Object: 8P/Tuttle

Next Peak - The Ursids will peak the night of Dec 21-22, 2023. On this night, the moon will be 74% full.

Observing Award Recipients

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

HAA Pathfinder

A01 Anastasia Morissette

HAA Rising Star Awards

001 Jean Jefferson

002 Kevin Salwach

003 Jo Ann Salci

HAA Messier Award

No recipients

HAA Lunar Award

No recipients

RASC

Jo Ann Salci

Exploring Exoplanets (on-line course)

Swapna Shrivastava

Explore the Moon

Explore the Universe

Bernie Venasse

Explore the Universe

Explore the Moon (*new this month*)

Astronomical League

Bernie Venasse (2023)

Sunspotters Observing Program

Hydrogen Alpha Solar Observing Program

Lunar Evolution

Asteroid Observing Program-Gold

Master Observer-Silver

Please feel free to contact me with any questions or comments at awards@amateurastronomy.org
– Bernie

“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.



HAA Dark Sky Party at Andromeda Meadow 2023 by Andrew Brenyo

This year those HAA members attending the star party, located on property owned by the Skelton family and generously shared with the club, were treated to three awesome clear and dark nights. Unseasonably warm days and mildly cool, albeit, dewy nights lead to many varying activities and many members observing and imaging into the early morning hours.

Friday, September 22, saw the arrival of fourteen members with various forms of camping equipment and accommodations. One member made use of one of the many hotels in the nearby town of Wiarton. Matthew and Janice expertly guided members to a favourable spot for an unimpeded sight of the North Star and a wide open view of the southern skies that best suited their camping and astronomical equipment. All forms of camping were well considered by Sue and Doug: tents were located to the southwestern side of the meadow while pull trailers and motor homes were to the east. Everyone had a beautiful and open space to set up camp and to polar align their telescopes to the NCP before night fall. The meadow was like a plush carpet of low cut grass which made this task very quick, easy and enjoyable to do.

A centre lane for safely walking between camps was well established by the organizers using red flags to enable stargazers to visit and share their telescopes throughout the day and the night. No walking into storage cases, tables, chairs or telescopes while making your way to portable washrooms at this star party. The night sky was indeed amazing! The Milky Way lit up the meadow like millions of tiny patio lights on a warm August night - a sea of twinkling stars above. One must really be there to experience the incredible visibility of a Bortle 4 dark sky. The finer details of the Milky Way were evident, it was not a uniform glow, but made up of clearly defined darker patches and streaks closer to the core of the galaxy. "Wow, what a sight!" as one first timer marveled.

The night started with the waxing moon phase, the first quarter on the rise, which gave planetary observers like Marcus and Maija excellent views until it was lost behind low trees at around 10:30pm. Brett also rolled out his huge 28" Dobsonian telescope for all to enjoy, with an equally huge eyepiece used to observe first the Moon and then for larger grander views of Saturn and Jupiter.

For the nocturnal nature enthusiasts in the crowd we heard many coyotes in the distance. By the time the Moon had finally set and its glow diminished enough for imaging we were serenaded for most of the night by their eerie, but often harmonious chorus of yelps and howls. No need for late night coffee as our awareness of the wildlife in the area was enough to keep us awake and alert while attending to our astronomical equipment outside.

Al Murphy practised and perfected his polar alignment and went on to image the Ring Nebula. His 8" VISAC reflector telescope with a Pentax DSLR camera gave him a striking one shot image of the nebula. Both Al

and Andrew concentrated on one shot astrophotography during the weekend with excellent polar alignment and guiding for very long exposures.

Pavle and Andrew had challenged themselves with imaging the Iris Nebula. Pavle targeted the Iris nebula and the wider darker regions of the nebula using a 60mm quintuplet APO telescope. He automated his imaging with the ASI Air Plus platform hub so that he could be away from his equipment while he stayed at a hotel in Wiarton. His resulting image is shown on page 25. Meanwhile, Andrew imaged the Iris Nebula with a 1.5x extender lens attached to a 10" reflector telescope and using a Canon DSLR camera for imaging. The resulting image below Pavle's is a single 20 minute exposure.

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HAA Dark Sky Party at Andromeda Meadow 2023 (continued)



*Back row: Matthew; Andrew; Tom, Dev and their dog Pepper; Brett; Marcus and Maija; Ed
Front row: Janice; Maria; Doug; Lorraine; Al. Image Credit: Sue MacLachlan*

Saturday morning was a busy time at the coffee tent once the aroma of freshly brewed coffee permeated the living quarters of the most dedicated late night astronomers.

Electrical power was available for all to use at the coffee tent. Both generators for battery recharging were running at full output, but their noise was lost in the colourful apple trees of the old orchard at a distance from the tents and camps. Two dining tents with picnic tables were made available for these activities and to meet throughout the day; especially comfortable for the much anticipated Chinese Food Buffet dinner that evening.

Several telescopes were already set up for solar viewing. The Mannering camp had an awesome solar scope set up for viewing sun spots. Matthew was on hand to guide and adjust the scope for those who gathered during this very sunny and clear day.

Our location, Skinner's Bluff, also offered some great daytime activities like bird watching, apple picking (Maria promises some apple butter for next year's meet) and world class hiking. The Bruce Trail is fantastic to hike offering some phenomenal views of Georgian Bay and featuring some spectacular geologic crevasses and cliffs. Maria, an avid hiker, walked a serious amount of the Bruce Trail from the parking lot at Kilometer Reference 156.1 to Kilometer Reference 154.3. Including side trails in a return loop along the picturesque side roads. She clocked 12 kms. Way to go! She invites everyone to join her on future hikes - she will be your guide.

After lunch everyone was well rested and it was time to make a trek to a local observatory. The amazing E.S. Fox Observatory is located west of Wiarton and is not far away at all.

The group dinner was relaxed and a much higher Moon gave way to a later astronomy evening. By now everyone who wanted to view more than the Moon had to wait until its glow dissipated around 11:30pm. A bigger issue tonight, for some, was the dew that was present the previous night and how to combat it.

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HAA Dark Sky Party at Andromeda Meadow 2023 (continued)

Other than having a dew heater some chose to improvise and use items on hand. Al and Pavle used silicone sheets on their guide scopes while Andrew used a yoga mat as a telescope dew shield with much success. The dew problem didn't seem to bother Tom who was using a different type of telescope. His Unisteller telescope comes with a dew shield and has a unique design. The imaging camera is built into its long tube and much like Pavle's imaging technique he also uses many subs at short exposures to produce an image. However, unlike Pavle's set up, Tom's image stacking was accomplished by software and hardware also built into the telescope. His image of the Skull Nebula is featured on page 25.

The Smith camp had three telescopes set up for the weekend with a range of apertures from a 4" SCT reflector to a much larger 8" Celestron. Ed was able to work comfortably between his telescopes throughout the night with his large campsite and then retreat to his well appointed compound and tent. And speaking of comfort, he had no problems tenting it in the cold as he was keen to mention his sleeping bag was rated to -30C.

Sunday started off with seeing a few camps pack up and head back to the city. However, there are always surprises to the end of any wonderful adventure.

The morning was routine with coffee, conversation and captivating stories from the previous night of stargazing. There was one story of a coyote coming into the meadow in the wee hours of the morning. Tom may have spotted a coyote at the extreme end of the trailer/motor home area. Although, I doubt it would have come any closer with his feisty dog Pepper acting as an early warning system. And besides, I was in and out of my vehicle all night long to make noise as I made adjustments to my equipment and as always doing red light surveys to make sure we were not intruded upon by anything larger than a coyote. With one segment of the Bruce Trail to be conquered, Maria rode her bike to the Curly Harnden Side Trail parking lot and walked from the 161.1 Kilometer Reference to the 163.5 km marker. By making a return loop via the Lens Holley Side Trail she traveled a total of 6.4 kms.

Lorraine, also a hiker, took advantage of all of the trails in and around the meadows property itself. There are a series of short loop trails into smaller meadows off of the main area.

However, as everyone was enjoying themselves, by late afternoon we got word that Brett had an accident while away from the star party. He had been helping someone dismantle some equipment at a nearby observatory and had short fall off a wooden deck. Sue was receiving hospital updates on a regular basis throughout the evening.

With this new situation developing, it was decided by all that evening to take a break from the astronomy as many packed up and prepared for departure the next day.

A perfect moment to light a campfire!

Janice built and maintained a large and warm fire as we all sat around and shared stories. But as to not be without purpose, Sue had charged everyone with the question, "What kind of house would you build on this site?" The answers and ideas ranged a bit, but many in the group all felt an Eco Design was essential and suitable given its proximity to the ecologically sensitive lands and nearby Bruce Trail.

Monday was packing time while waiting to hear of Brett's condition. The dew was heavy and it was a long wait until equipment dried off enough to pack.

Good news! Brett had returned and was in pain from a broken rib and bruised hip, but was well enough to pack up his telescope equipment, although at a much slower pace than his usual spry and energetic self. The same team who set up the star party and also dismantled and packed it up deserve a round of applause and appreciation - it is a big undertaking!

And last, but not least, we thank all of those HAA club council members Sue, Doug, Matthew and Janice involved with the organizing of this and last year's star party. Their thorough setup and smooth running of the camp, including endless coffee during the mornings, made each morning special.

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Gallery – Photos and Comments:

“When Maija and I signed up for the Dark Sky star party, we really didn’t know what to expect. The idea of camping out with fellow astronomy buffs for a couple of nights under dark skies was enough to get us on board. We’re very new to astronomy, and weren’t sure how we’d fit in, but we needn’t have worried! Everyone was very welcoming and were happy to talk about their setups and hopes for the weekend. Folks were there with a full range of observing styles, from strictly visual with dobsonians to completely computerized rigs with digital guidescopes and cameras. Brett (name) from the (Bluewater/Huron County Club) was there with their 28” Wagner telescope. It’s a unique experience visually observing deep-sky objects through a scope of that size while standing on an 8’ stepladder!

While the half-moon made early observing more challenging, the skies were clear, and the seeing was good. Once the moon set, it got even better.

Our tour of the (name) observatory at the outdoor learning centre was a highlight of our Saturday. It’s an amazing facility for public outreach and observing, and has a remarkable range of equipment, from the 28” Wagner to a Lund 80mm solar telescope, and many dob and SCT scopes.

Dinner Saturday night was a lot of fun, with good Chinese food from a local restaurant, and great conversation. The viewing Saturday night was hampered a bit by higher humidity, but we still managed to get quite a few of the targets from Matthew’s list before we had to concede defeat and retire.

All in all it was a great weekend, with friendly and interesting folks. We look forward to being able to participate next year!” – Marcus and Maija



Messier 57 (Ring Nebula) Image Credit: Al Murphy

“The HAA star party at Skinner’s Bluff this past weekend was awesome! Great weather, great people, and totally dark skies. Sign me up for next year. I got a chance to practice setting up my scope, polar alignment, star alignment, dew management (or lack thereof) , a bit of auto guiding, and some imaging (poorly) . I learned a ton of things, I got a ton of encouragement, and I met a bunch of new friends. A totally wonderful weekend!”

– Al Murphy

“Last week of September I had the privilege to attend my very first star party. As I primarily do astrophotography, my initial goal was to use this opportunity to image objects that would be nearly impossible to capture from my light polluted

Burlington backyard. However once I arrived at the location I realized this would be much more than just taking photos. The folks who joined the party were extremely welcoming and friendly, and were very eager to show me their equipment and talk about their enjoyment of astronomy. I had the opportunity to assist in setting up the giant 26” dob, as well as enjoy the amazing views it provided. Sue showed me around the night sky, assisting me in star hopping and locating many objects with a set of binoculars. The

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HAA Dark Sky Party at Andromeda Meadow 2023 (continued)

experience of seeing these objects with my own eyes definitely trumps the astrophotography experience - there is a different kind of connection to the sky and the cosmos as a whole having those old photons hitting my eye directly. And of course, seeing for the first time the Milky Way with unaided eye was an experience in and of itself, and one that I won't soon forget.

Overall I had an absolute blast connecting with other members of the club. I was lucky enough to get a good final image out of my own gear as well, making me envious of the pristine dark skies that the location provides. Thank you to the organizers and everyone who showed up, and I am very much looking forward to the next star party!" – Pavle Culum

"The image of the Skull Nebula is one that I find very interesting because I was also by luck able to catch the minor planet named Innes as it wandered by. It left the streak as I captured it for an hour."

– Tom Burke

*(right)
NGC 7023 (Iris Nebula) and the
wider Sh2-136 Ghost Nebula
by Pavle Culum*



*(below left)
NGC 246 (Skull Nebula)
by Tom Burke*

*(below right)
Photo below: NGC 7023 (Iris
Nebula)
by Andrew Brenyo*





Extent of Occurrence of Binary Star Systems

It has long been known that most stars in our Milky Way galaxy and many other parts of the universe are fainter and lower mass red dwarf stars. According to the article: “Most Milky Way Stars are Single” in Phys.org at <https://phys.org/news/2006-01-milky-stars.html> then this fact of most stars are red dwarf stars combined with the recent determination that most red dwarf stars are single stars means that at least two thirds or at least 67% of star systems in the Milky Way galaxy are single star systems. This could still be consistent with 85% of stars occurring in double or triple star systems as stated by the Royal Astronomical Society of Canada (RASC) and elsewhere such as the RASC article <https://www.rasc.ca/double-stars>.

Types of Binary Star Systems

- Similar Mass (Size)
- Similar Temperature (Colour)
- Different Mass (Size)
- Different Temperature (Colour)
- Near Separation
- Wide Separation

Popularity of Observing Binary Stars by Amateur Astronomers

There continues to be a long-standing popularity of observing binary stars as there are many binary star systems that can readily be seen in small telescopes. The contrast or similarity in brightness of the component stars is quite clear in modest telescopes as well as the change in orbital positions. It would likely be considered a type of variable star for especially close together binary star pairs that have their orbits inclined or almost edge on as seen from earth and undergo regular eclipses and therefore variations in their combined brightness. I believe this is a category of variable stars under the AAVSO or American Association for Variable Star Observers that has a substantial amateur astronomer representation.

Observations of Observing Binary Stars by Professional Astronomers

Except in special cases, observing binary star systems is not a priority for professional astronomers. Part of the reason is that it is very time and telescope resource intensive and it can and is often done to a good quality level by the relatively many more serious amateur astronomers.

Some Examples of Nearby Binary Star Systems

Sirius A and B at 8.65 light years distance, Alpha Centauri A and B at 4.36 light years if the smaller and much more distant but still gravitationally associated star Proxima Centauri is not included, WISE 1049 - 5319 A and B at about 6.59 light years, 61 Cygni A and B at 11.40 light years, Procyon A and B at about 11.44 light years, BD + 59 1915 A and B (G 5 A and B) at about 11.49 light years, Kruger 60 A and B at about 13.08 light years, Ross A and B at about 13.49 light years and Wolf 424 A and B at about 13.98 light years

Some Examples of Binary Star Systems Including Brighter or More Famous Stars

Sirius A and B at 8.6 light years combined magnitude -1.5, Alpha Centauri A and B at 4.3 light years at combined magnitude -0.3, Alpha Canis Minoris A and B (Procyon) at 11.5 light years at combined magnitude 0.4, Alpha Crucis A and B (Acrux) at about 320 light years at combined magnitude 0.6, and Alpha Scorpii A and B (Antares) at about 600 light years at combined magnitude 0.9.

(Continued on [page 27](#))

Planets of Binary Star Systems Part 1 (continued)

Extent of Orbital Alignment for Eclipses as Seen from Earth of Binary Star Systems

An approximate basis of calculating the percentage of likelihood that a binary star system will be sufficiently inclined to Earth is given by the ratio $D/2a$ where D is the diameter of the star or primary star and a is the semi-major axis length of the secondary star or planet. This works out to between about 15% and 0.5 % for sun-like stars out to the distance of the habitable zone for transiting planets. This figure would likely be somewhat higher for two stars in a binary star system at least for one component as a sun like star and the other star comparable in size to the sun. However, for stars extremely small like neutron stars or extremely large like red supergiants these ratios could be more extreme. (The above paragraph based on the article: "What percent of star systems have orbits in the right orientation to find exoplanets through the transit method?" By Russell Carr, Pittsfield, New Hampshire at link:

<https://www.astronomy.com/science/what-percent-of-star-systems-have-orbits-in-the-right-orientation-for-scientists-to-find-exoplanets-through-the-transit-method/>

History of Ideas for Planets of Binary Star Systems

It was previously thought planets in these systems not very likely. It turns out planets in binary star systems are relatively common.

History of Ideas About Companion Star to Our Sun

There has been historically a minor school of thought that our sun has a stellar companion or is in a binary star system with the other star quite faint and some distance from our sun. This has probably been ruled out in modern astronomy but there is still a realistic possibility that there is one or two substantial mass or size planets, even more massive than earth, in the distant parts of our solar system beyond the orbit of the planets or dwarf planet Pluto.

Nomenclature For Planets of Binary Star Systems

Nomenclature for planets orbiting one star

These are called S-type (binary star) planets because they orbit one of the stars of the binary star system.

They would be called *circum-primary* if the planet or planets orbit the main (heavier and probably larger) star of the binary star system (this would be written: Star Name A b (c or d or e etc.) where A is the main star component of the binary star system and lower case b, c, d, e etc. would be the 1st, 2nd, 3rd, 4th etc. planets discovered orbiting that star.

They would be called *circum-secondary* if the planet or planets orbit the secondary (lighter and probably smaller) star of the binary star system (this would be written: Star Name B b (c or d or e etc.) where B is the secondary star component of the binary star system and lower case b, c, d, e etc. would be the 1st, 2nd, 3rd, 4th etc. planets discovered orbiting that star.

Nomenclature for planets orbiting both stars

These would be called *circum-binary* if the planet or planets orbit both the primary (heavier) and secondary (lighter) stars of the binary star system (this would be written: Star Name AB b (c or d or e etc.) where AB designate both the primary and secondary stars components of the binary star system and lower case b, c, d, e etc. would be the 1st, 2nd, 3rd, 4th etc. planets discovered orbiting that star.

(Continued on [page 28](#))

Planets of Binary Star Systems Part 1 (continued)

In this nomenclature, S likely stands for star or stellar where a planet orbits one star in a binary system and P likely stands for planet or planetary like a planet orbiting both stars as if it's a planet orbiting one star in a single star stellar system.

There could possibly be Figure 8 orbits around and between both stars of binary star systems where both stars have comparable mass.

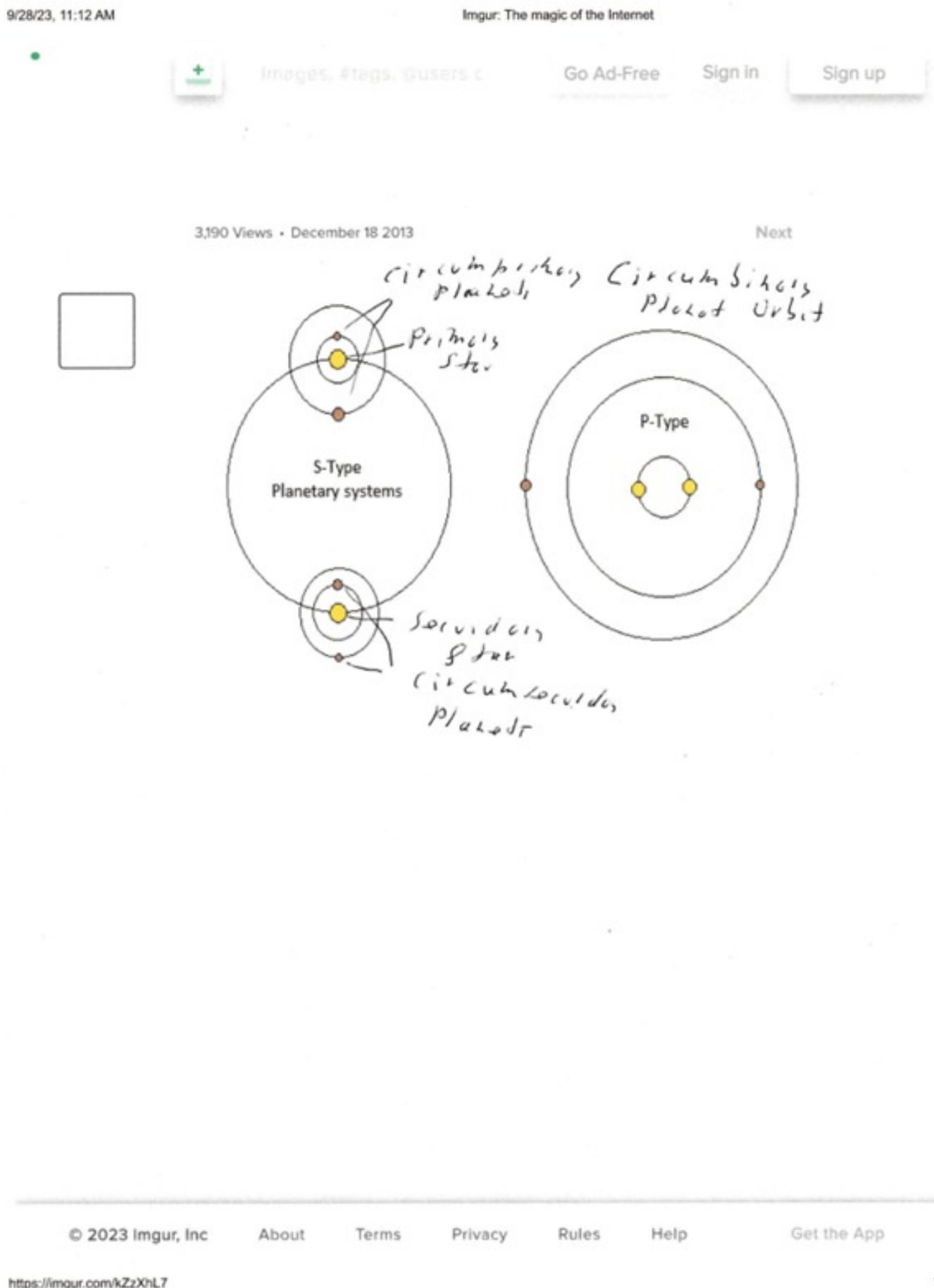


Illustration of main types of binary star planet orbits
Illustration Credit: Imgur – the Magic of the Internet <https://imgur.com/kZzXhL7>

HAA Outreach Presentations with Vulnerable Sectors

The HAA executive has created a policy for any HAA member who wishes to do outreach presentations to vulnerable sectors, which includes children under 18 years of age and vulnerable adults. This does not include our general club outreach activities.

Presentations include in-person or virtual sessions where parents/guardians may not be present. As it is not always possible to anticipate caregiver attendance at outreach activities for children under the age of 18, or vulnerable adults, it is therefore a requirement for HAA member-volunteers who work with these vulnerable populations to complete a Police Vulnerable Sector Check.

These can be obtained only in your region of residency. Costs vary from one area to another. They will be kept on file by the HAA Education Director. No details regarding the findings of the check will be made in any way public or viewed beyond the HAA Education Director.

The HAA will reimburse any member who wishes to do outreach presentations to vulnerable individuals, provided a receipt is submitted.

Please contact Jo Ann Salci if you have any questions about this policy and/or if you wish to put your name forward to help with outreach activities to young people! This policy is effective immediately.

Word Search Answer key from page 9:





William J. McCallion Planetarium

McMASTER UNIVERSITY, HAMILTON, ONTARIO

- Public shows Wednesdays and some Saturdays
- Public transit available directly to McMaster campus
- Tickets \$7 per person; private group bookings \$150
- Different shows every week
- Upcoming shows include:
 - **Nov 1 & 18:** **Introductory Astronomy for Kids — Galaxies**
 - **Nov 8:** **Oh my goodness! What happened to the Sun?**
 - **Nov 15:** **Ancient Astronomy: Earth's First Scientists**
 - **Nov 22:** **How do we know Earth revolves around the Sun and other Solar System questions**
 - **Nov 29:** **What's up in the December sky?**
- For show times and further details, visit www.physics.mcmaster.ca/planetarium

UPCOMING EVENTS

November 10, 2023 - 7:30 pm – H.A.A. Meeting at McMaster Innovation Park. The H.A.A.’s *Doug Turner* will talk about the 2024 H.A.A. Calendar. **This will be a “hybrid” meeting, with the attendance option of in-person or online via [Facebook](#) and [Zoom](#).**

December 8, 2023 - 7:30 pm – H.A.A. Meeting at McMaster Innovation Park. This will be our December “Seasonal Social”.

2023-2024 Council

Chair	Sue MacLachlan
Second Chair	Christopher Strejch
Treasurer	Vacant
Digital Platforms Director	Christopher Strejch
Membership Director	Paula Owen
Observing Director	Matthew Mennering/ Steve Germann
Education Director	Jo Ann Salci
Event Horizon Editor	Bob Christmas
Recorder	John Gauvreau
Secretary	Vacant
Publicity Director	Mario Carr
Councillors at Large	To be confirmed by the new council

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

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Meeting Inquiries:
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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