



Event Horizon

Volume 30, Number 3
January 2023



From The Editor

Happy 2023, everybody.

Here's the January 2023 E.H. This month, there's an announcement about Astro 101, as well as some images from just moments after the Moon's occultation of Mars last month.

Enjoy!

*Bob Christmas,
Editor*

editor 'AT' amateurastronomy.org



Chair's Report by Bernie Venasse

Happy New Year!!!

Time spent... No refunds, sorry.

How quickly time flies... It seems to go faster the busier you are. This past year has seen many ups and downs. Some will remember 2022 with sadness, others with fondness. The speed with which we flip the pages of our calendars and day planners only serves to emphasize the need to plan your life and activities carefully, with an eye to Father Time. Take a few moments to consider what your goals are, what goals you had in the past and what goals are still only dreams or whimsies. Use your time wisely. Be sure to plan some time for fun and passions. Make goals that lead to self-improvement. Give of yourself, give to yourself and to others. Become the person that you want others to be.

(Continued on [page 2](#))

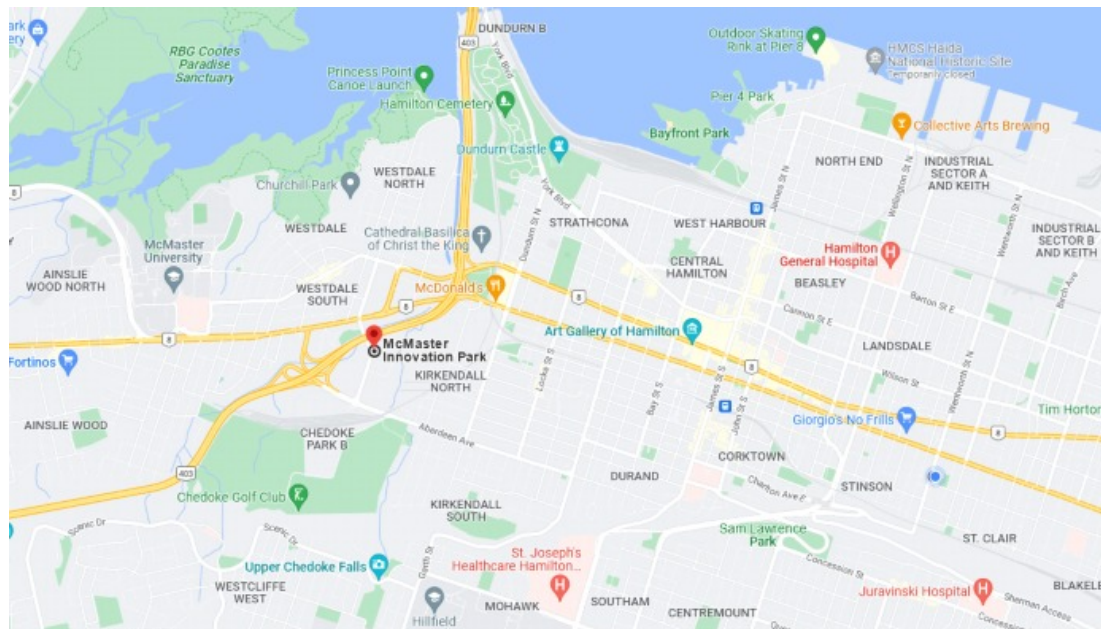
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Chair's Report (continued)

A BIG Thank You to Chris Strejch who handled the on-site media controls and to Sue MacLachlin for moderating the ZOOM aspect of the meeting. Yes, we are still working on getting the audio systems working better... please bear with us!



Our Next Meeting is scheduled for January 13, 2023, at McMaster Innovation Park. MIP is located at 175 Longwood Rd. S. in Hamilton. This will be a hybrid meeting combining a live audience with a Zoom presence. Doors open at 7:00 and the meeting begins promptly at 7:30.

Our speaker this month is *Bernie Venasse*, Chairman of the HAA. Bernie will be speaking about the joys and the hazards of winter astronomy.

Inreach and Outreach events

November 26, 2022, Grimsby Welcome Centre... Saturday was a windy, rather chilly evening. Passers-by were invited to enjoy the views of the Moon, Saturn, Jupiter, and Mars through the scopes of about a dozen members. When the traffic slowed down we retired indoors to the Tim's for some warm-me-ups and good conversation.

What's happening around the club?

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

Overdue Memberships...

We don't want to lose you but if your membership for 2022-2023 is not received your privileges will be suspended after **January 31, 2023**.

Renewal is quick and easy through Paypal on our website:

<https://www.amateurastronomy.org/membership/>

We hope to see your renewal soon...

(Continued on [page 3](#))

Masthead Photo: *The Moon from April 1977, by Jo Ann Salci.*

"I took this through my High School Astronomy Club Teacher's telescope. He developed the photo in his dark room. I'm so amazed at how well it turned out so long ago ;-) The Apennine Mountains, Eratosthenes (to the left) and Archimedes (above) craters are clearly viewed. My love for astronomy started a long time ago!" — Jo Ann Salci

Chair's Report (continued)

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

We would like to take this opportunity to welcome new and/or returning members (Nov. 25-Dec 29).

Jessica Stutz, Burlington. Family Membership.

Kevin Salwach, St. Catherines. Individual Membership. Rejoined.

Kristen Thompson, Hamilton. Family Membership

Taylor-Elaine DiLegge, Hamilton. Individual Membership.

Ken Cameron, Hamilton. Family Membership.

Peter Turnbull, Oakville, Individual Membership

Current membership:	61 Individual memberships	= 70
	32 Family memberships (x2)	= 78
	<u>1</u> Honorary membership	= <u>1</u>
	94 memberships	149

2021-22 Memberships to renew...	62
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Have a safe and prosperous 2023.

Clear skies, Bernie

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.



HAA's Loaner Scope Program

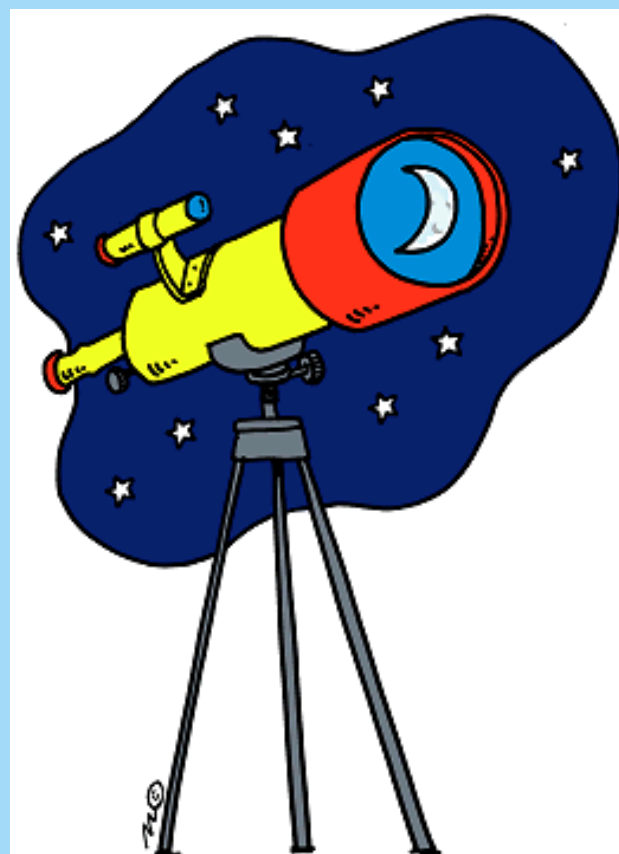
We at the HAA are proud of our Loaner Scope Program. It allows members who don't own a telescope to get more up close with the night sky, and it allows members to explore different types of telescopes! Paid members are welcome to borrow a telescope for one month.

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.



Astro 101

Don't know a black hole from a white dwarf? How about a planet from a planetary nebula? Wondering which end of the telescope to look through? Wondering which end is even supposed to point at the sky? Then Astro 101 is for you!

Astro 101 is a series of casual, online sessions aimed at the absolute beginner, who might be new to the club or new to the hobby.

Every year we host Astro 101 where we talk about things like how to use a telescope, what is in the sky to look at and how to find them. The sessions are interactive and casual. This means that although an experienced club member will lead each session, everyone is encouraged to participate, ask questions, offer input and just talk! And a joke is welcome (always)! This is a great way to get to know the hobby and your fellow club members.

We hope to start around the end of January or beginning of February and we get together online about once every two weeks. We will have enough sessions to get us through to late spring, and then we hope to finish with an observing session!

If this sounds like something you would like to participate in just get in touch (email astro101@mateurastronomy.org) and we will put you on the list. Then you will get emails with links to the online sessions.

Please feel free to get in touch if you have any questions or suggestions (yes, if there is a topic you want to talk about just let me know and we will do our best).

Hope to see you there.

– John Gauvreau astro101@mateurastronomy.org

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.



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

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

Giant Jupiter! 21

The planet Jupiter is the fifth planet from the Sun. Even though Jupiter is 593.47 million KM away from Earth, it is still very easy to see with your eyes! It is the brightest object in the sky after Venus! And with binoculars, you can even see Jupiter's four largest Moons.

As we move out from the Sun, it is the first of the gas giants in our solar system. It is named after the King of Gods in Roman mythology, as it is the largest of all the planets. In fact, it is 300 times the size of the Earth and it could hold more than 1300 Earths inside it! Jupiter travels around the Sun once in 11.9 Earth years. And it takes only 9 hours and 56 minutes of Earth time to spin on its axis once, the shortest day in our solar system. Because it spins so fast, there are very powerful winds on the planet, creating the easy-to-see bands of clouds, causing the planet to appear striped. These bands are called "belts", which appear dark and move east to west, and "zones", which are bright and move from west to east.

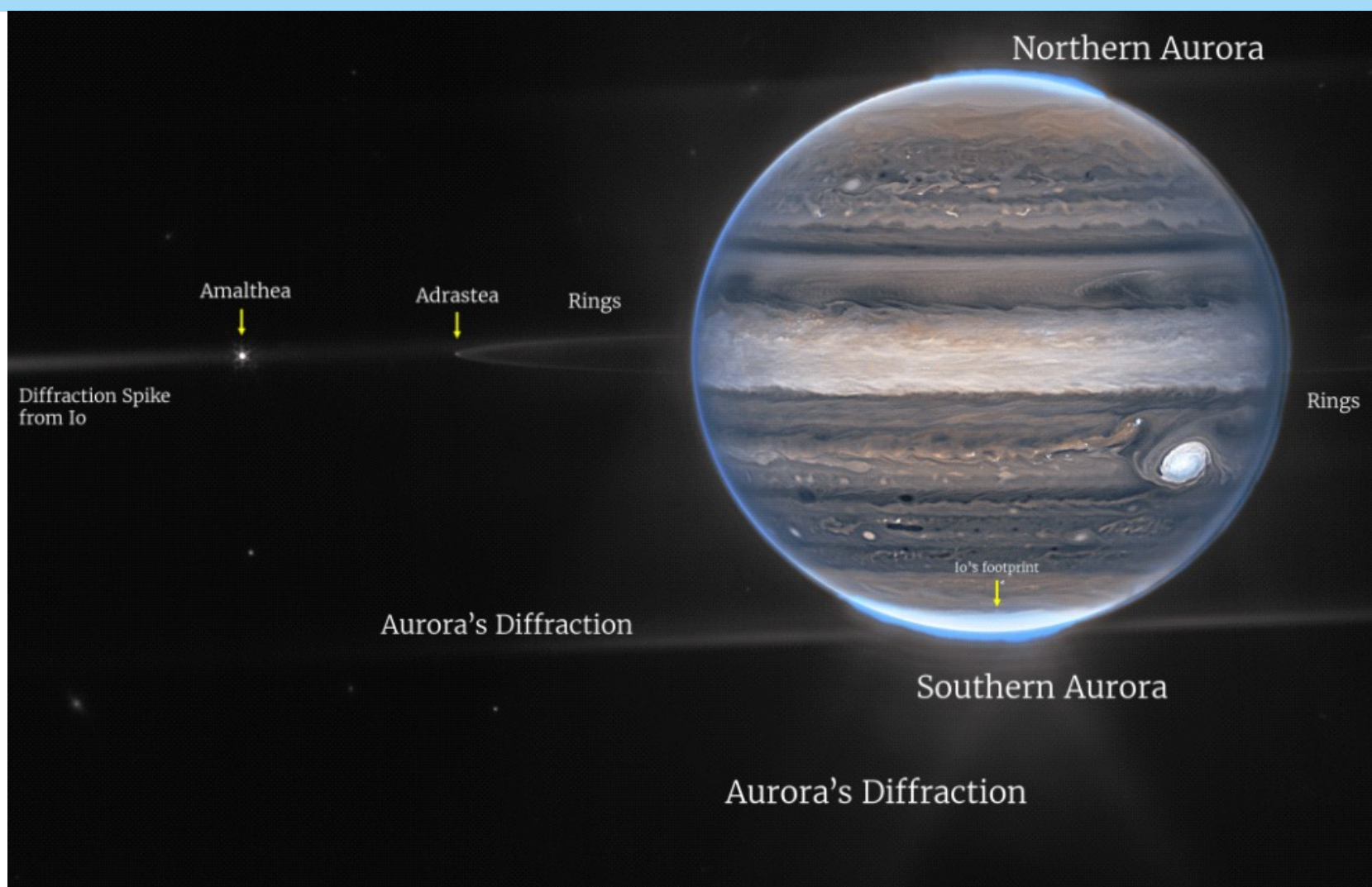
(Continued on [page 6](#))



Jupiter

Image Credit: www.solarsystem.nasa.gov

HAA Explorers (continued)



Jupiter as seen by the James Webb Space Telescope, August 2022

Image Courtesy: Webb NIRCams composite image from two filters – F212N (orange) and F335M (cyan) – of Jupiter system.

Credit: NASA, ESA, CSA, Jupiter ERS Team; image processing by Ricardo Hueso (UPV/EHU) and Judy Schmidt

The gasses that make up Jupiter are mostly hydrogen and helium, with some methane and ammonia. Hydrogen and helium are the same ingredients of the Sun, and if Jupiter was larger, it may have become a star! Because of Jupiter's large size, it has a LOT of gravity - about 2.4 times that of Earth's - enough to keep its 79 moons in orbit around it. This heavy gravity keeps hydrogen and helium as gasses at the surface, but deep inside the planet, the gasses become liquid from all the pressure. The Juno Mission in 2016, entered Jupiter's orbit. With information gathered by this mission, scientists are now able to study whether Jupiter has a rocky core or not.

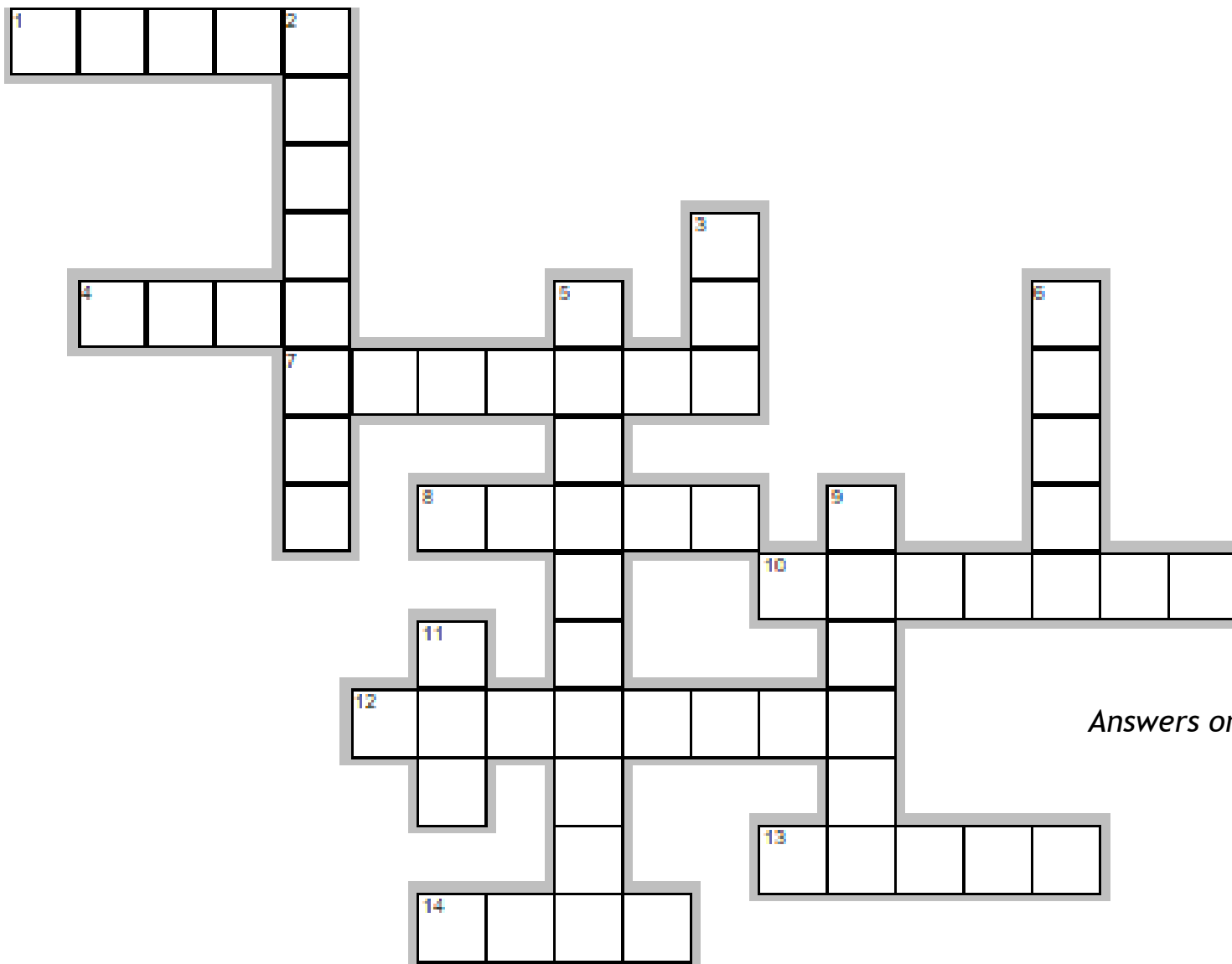
Unlike Earth, Jupiter does not have any seasons, as the tilt of its axis is only about 3 degrees. But like Earth, Jupiter has aurora! And a magnetic field!

One of my favourite things about Jupiter is its Great Red Spot, a giant storm bigger than the Earth that has been swirling on the planet for hundreds of years. It is the biggest storm in the Solar System, but astronomers are noticing that it is shrinking. Another favourite thing is that Jupiter has rings!! They were first seen in 1979 by Voyager 1. They are hard to see from Earth as they are made of small, dark dust particles that don't reflect light very well. The James Webb Space Telescope (JWST), with its powerful infrared cameras was able to "see" the rings! See the photo for the rings and the aurora...and a few Moons, too!

Speaking of Moons, Jupiter has many! The largest four moons were discovered by Galileo and are called the Galilean Moons: Io, Europa, Ganymede and Callisto. More on Jupiter's Moons next month!

(Continued on [page 7](#))

Giant Jupiter!



Answers on page 21.

EclipseCrossword.com

Across

1. Jupiter is the _____ planet from the Sun.
4. Mission orbiting Jupiter in 2016.
7. 2.4 times that of Earth's.
8. The largest of its kind in the solar system, also known as the Great Red Spot.
10. King of Gods in Roman Mythology.
12. One of Jupiter's four largest moons.
13. Caused by strong winds.
14. Uses powerful Infrared Cameras.

Down

2. One gas found on Jupiter.
3. Almost 10 Earth hours.
5. Help you to see Jupiter's Moons.
6. 11.9 Earth years.
9. Found at Jupiter's poles.
11. _____ Giant.

(Continued on [page 8](#))

HAA Explorers (continued)

Things to do until next time **:

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

1. **Visit this website** to learn more about Jupiter and how hot it is at its core:

<https://spaceplace.nasa.gov/jupiter/en/>

2. **Visit this website** to colour pictures of Jupiter including the South Pole (scroll down to Jupiter). The video has lots of information about the Juno Mission, too!

<https://spaceplace.nasa.gov/coloring-pages/en/>

3. **Watch this video** about the Great Red Spot:

<https://www.nasa.gov/feature/goddard/2021/hubble-shows-winds-in-jupiters-great-red-spot-are-speeding-up>

During January, check out:

1. **On January 7th around 8:30 pm**, check out the waning Gibbous Moon in the East near Castor and Pollux in the Constellation Gemini:



Image generated using Stellarium

(Continued on [page 9](#))

HAA Explorers (continued)

2. January 16th around 8:00 pm, check out Jupiter and Mars in the Southern sky:

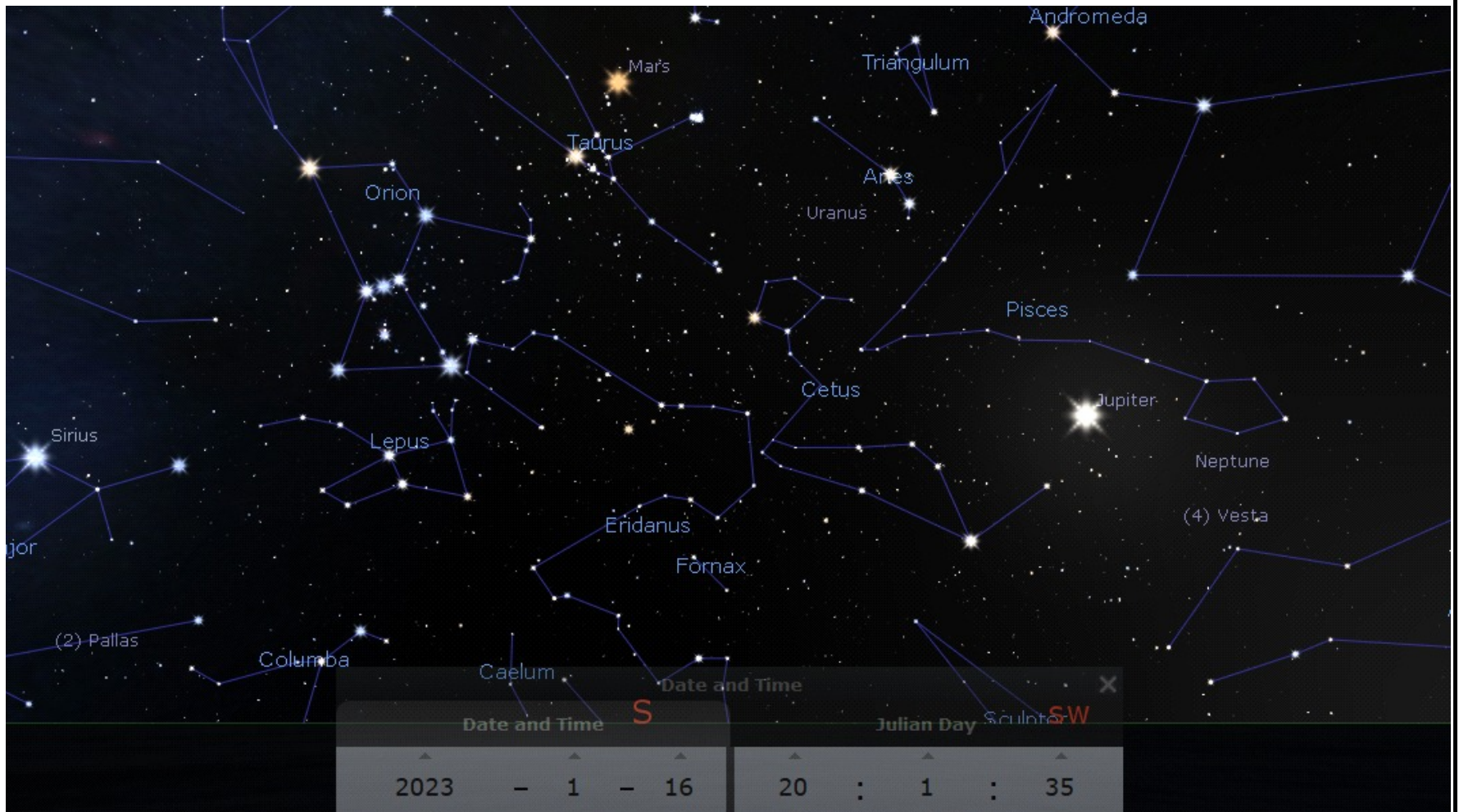


Image generated using Stellarium

Finally:

How does Jupiter hold up its pants so well? Answer below!

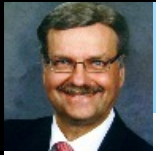
If you have a question that you would like answered in the newsletter, please send it to education@amateurastronomy.org

Answer: Because it has a LOT of belts!

Thank you to Ro for reviewing this article! 😊

References:

The Essential Guide to Space. Paul Sutherland. 2016.
How Space Works. DK Penguin Random House. 2021.
National Geographic Kids: Ultimate Explorer Field Guide: Night Sky. 2016.
National Geographic Kids: Ultimate Space Atlas, 2017.
RASC Observer's Handbook, 2022.



Happy New Year!

We probably all know that Winter begins with the Winter Solstice, usually around December 21, but did you ever think about why the year begins on January 1, exactly where it is? (about 10 days after the solstice?)

It turns out, after some puzzlement, and in consultations with the astronomers of the time, that Julius Caesar crafted an edict for a new calendar to begin on 1 January, 45 BC.

Clever, those Romans, knew they should count the years downwards? But that's a different story. (Actually they did not number the years, except in arbitrary ways to help determine intervals.) Taxes were assessed at 15 year intervals.

The years before 45 BC were called the 'years of confusion' with so much variation that historians have not been able to piece together when months were and which years had extra months added, so it's as much luck as judgement that we have the solstices around the 21st of June and December.

There is an astronomical observation, made in Egypt in 24 BC, which allows the calendar to be pinned down, since we can compute when that would have happened.

from Wikipedia:

“In 1999, a papyrus was discovered which gives the dates of astronomical phenomena in 24 BC in both the Egyptian and Roman calendars.

The correct Julian calendar was in use in Egypt in 24 BC,[40] implying that the first day of the reform in both Egypt and Rome, 1 January 45 BC, was the Julian date 1 January if 45 BC was a leap year and 2 January if it was not. This necessitates fourteen leap days up to and including AD 8 if 45 BC was a leap year and thirteen if it was not.

Note that there is only one year between June 30th 1BC and June 30th 1AD so the math is not as obvious as it looks, and 8 AD is a leap year.”

There was plenty of dithering and delay following the new calendar introduction, resulting in different regions having different month lengths, month names, etc, for a few years after 45 BC. This is the beginning of leap years, but interestingly, the days were numbered in different fancy ways, then, too complex to explain, so the leap day was actually inserted 6 days before the end of February, by making that day 48 hours long.

In fairness to the Romans, they knew that the year was a little less than 365.25 days, but did not consider it important enough to do longer term corrections, since they mostly counted from the time of a new Emperor, not from the start.

However, since then the calendar has kept track of the days, shifting, relative to the solstices, about 3 days per 400 years, until someone very far sighted decided it needed to be fixed, and January 1 was again moved in synchrony with its original placement.

This caused some issues, as they still wanted 1 month's rent for lodging even though the month was 10 days short of a full set of work days.

(Continued on [page 11](#))

The Sky for January 2023 (continued)

For various reasons, some countries delayed transitioning to the new Gregorian calendar for decades or centuries. In our (North American) case, about 70 years.

In the British Empire (including the American colonies), Wednesday 2 September 1752 was followed by Thursday 14 September 1752

So, Happy New Year. If you are still on the old Julian Calendar you have 13 days more to go; the Gregorian calendar is ahead.

JULIAN 1582		October				Gregorian 1582	
Sun	Mon	Tues	Wed	Thurs	Fri	Sat	
	1	2	3	4	15	16	
17	18	19	20	21	22	23	
24	25	26	27	28	29	30	
31							

This is a visual example of the official date change from the Julian calendar to the Gregorian.

Mars Occultation

Our club's high hopes of detailed observation and enjoyment of the Opposition Mars Occultation were dashed by only slightly discontinuous cloud cover, resulting in a peek a few minutes after Mars emerged from the occultation. (*Editor's note: See what some HAA members managed to get on pages 25 and 26.*)

Here's what you might have seen with a telescope and clear skies...

(Continued on [page 12](#))



A stunning look at the reappearance of Mars during an occultation by the moon in a photo by astrophotographer Andrew McCarthy.
© Andrew McCarthy/@cosmic_background

Image Credit: Andrew McCarthy

The Sky for January 2023 (continued)

Occultations of Mars are common enough, but ones near opposition will have to wait until 2059. I think we will use the next opportunity, on September 16th, 2023, where Mars' path behind the Moon will be more central. Almost all of north America will have the view, according to this graphic at <http://www.lunar-occultations.com/iota/planets/mars.png>:

Occultation of Mars, 1.7, on 2023 Sep 16



Occult 4.2022.11.10

UT = 19h 20.2m

Credit: lunar-occultations.com

Meteor Showers

Since our last meeting, we have had a chance to observe the Geminid Meteor Shower, under a favourable Moon phase, and I am eager to learn of anyone who observed a fireball or other meteoric event.

If you are reading this early in January, there is still a chance to see the *Quadrantids* meteor shower on January 3rd-January 4th. The rate of meteors is comparable to the Geminids and Perseids, so it's your best chance to see meteors this month.

The radiant is near the North Star so you will see meteors anytime you look, but best to avoid the Moon. Either way, you are looking more northwards, away from the Moon.

The benchmark figure is to see 40 meteors per hour at the peak. I suggest you wish for clear skies at the next few events. The (your mileage may vary) "Zenithal Hourly Rate" of the Quadrantids is 120.

(Continued on [page 13](#))

The Sky for January 2023 (continued)

Carbon Stars

In my December live presentation, I mentioned carbon stars, and this is the best time to provide a link to the information available, if the clouds ever disperse.

This link, online, shows the top 100 carbon stars, by constellation, sorted by Right Ascension.

<https://www.astroleague.org/files/obsclubs/CarbonStar/CarbonStarList3.pdf>

An excerpt from the list is included here, showing all the carbon stars in Auriga (the Galactic Antipodes), and a few more at similar Right Ascensions.

21	EL Aur	05 03 23	+50 37 58	8.5-8.7	Irr.	Aur	C5(N3)	SAO 24981	HIP 23520	HD 32088
22	W Ori	05 05 23	+01 10 39	5.8-10.0	212	Ori	C5(N5)	SAO 112406	HIP 23680	HD 32736
23	TX Aur	050905	390008	8.5-9.2	Irr.	Aur	C5(N3)	GSC 2895: 203	HIP 23965	HD 33016
24	SY Eri	050948	-053055	8.3-10.0	96	Eri	C6(N0)	SAO 131832	HIP 24025	HD 33404
25	UV Aur	052148	323043	7.4-10.6	394	Aur	C6-C8(Nc)	SAO 57941	HIP 25050	HD 34842
26	S Aur	052707	340859	8.2-13.3	590	Aur	C4/5(N3)	GSC 2411:222		HD 35556
27	RT Ori	053313	070912	8.0-8.9	321	Ori	C6(Nb)	GSC 126: 161	HIP 26032	HD 36602
28	S Cam	054102	684755	7.7-11.6	327	Cam	C7(R8)	SAO 13563	HIP 26753	HD 36972
29	TU Tau	054513	242512	5.9-9.2	190	Tau	c5(N3)	SAO 77502	HIP 27135	HD 38218
30	Y Tau	054539	204142	6.5-9.2	242	Tau	C6.5(N3)	SAO 77516	HIP 27181	HD 38307
31	FU Aur	054808	303751	8.3-8.5	?	Aur	C7(N0)	SAO 58449	HIP 27398	HD 38572
32	TU Gem	061053	260053	7.4-8.4	230	Gem	C6(N3)	SAO 78066		HD 42272
33	FU Mon	06 22 23	+03 25 27	8.5 - 9.8	310	Mon	C8 (CSe)	GSC 136: 183	HIP 30301	HD 44544
34	V Aur	06 24 02	474223	8.5-13.0	333	Aur	C6 (N3)	GSC 3380: 1119	HIP 30449	HD 44388
35	BL Ori	062528	144319	6.0-7.0	154	Ori	C6 (Nb, Tc)	SAO 95659	HIP 30564	HD 44984
36	UU Aur	063632	382643	5.1-7.0	234	Aur	C7(N3)	SAO 59280	HIP 31579	HD 46687

Source: The Astronomical League (astroleague.org)

Carbon stars are stars which have burned a lot of their hydrogen, and have burned some of their helium to carbon, which then gets into the stellar wind and condenses with other carbon atoms into soot. These are variable stars, and there is a complex evolution backed by theory and modelling which I have not got memorized.

The take-home message though, is that the brightness and deepness of the red colour go together, so the dimmer, the more ruby red they appear.

(Continued on [page 14](#))

The Sky for January 2023 (continued)

The Planets and the Moon

If you have binoculars, it's not too late (but way more difficult now than last week, bar the clouds) to see all 8 planets in one evening, starting with *Venus* and *Mercury* just after the sun sets, and ending with *Mars*, which rises in the East to a decent altitude a few hours later.

As always, I suggest you create a Heavens-Above.com account which will allow you to put in your city, and get maps and finder charts for any astronomical event, or planet as viewed from your chosen location. (Buffalo or Toronto is adequate as a search city. There are too many Hamiltons.)

This multi planet challenge is actually just that, quite a challenge. By now, well nigh impossible. I plan to attempt it as soon as the sky clears at sundown, but I have only miniscule hopes of success with Mercury.

Consider something much more likely to succeed... watching the Full Moon rise, from a location where you have a clear eastern horizon. I think you will be impressed by how red the Moon is, and how dim it is, when it rises. I have been to some Moonrise gatherings where the Moon was fully above the horizon before I noticed it.

It is best to have a camera set up on a tripod and taking photos every few seconds, while you observe the horizon in the right direction.

The website <https://app.photoephemeris.com> provides excellent accurate estimates of the exact Moonrise time and azimuth. The location I suggest is Dundurn Park, since it overlooks the Burlington Bay, and has a long horizon. You will want to stroll a little further south from the parking lot, to get a clearer view of the distant lake.

A word of warning. You will see the Moon very far away, slightly sooner than the website suggests, and **very dim**.

(Continued on [page 15](#))

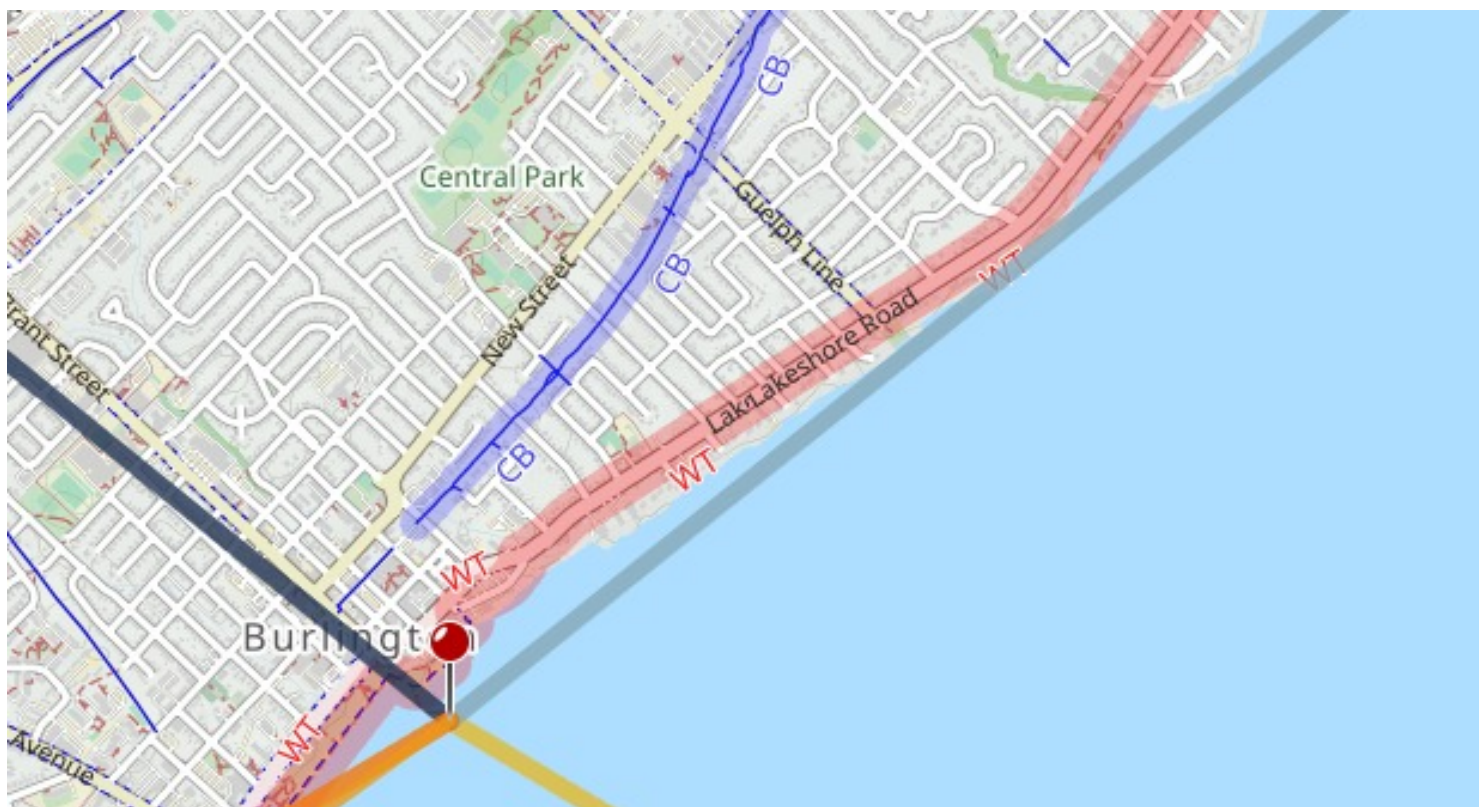


Maps generated using *Photographer's Ephemeris*

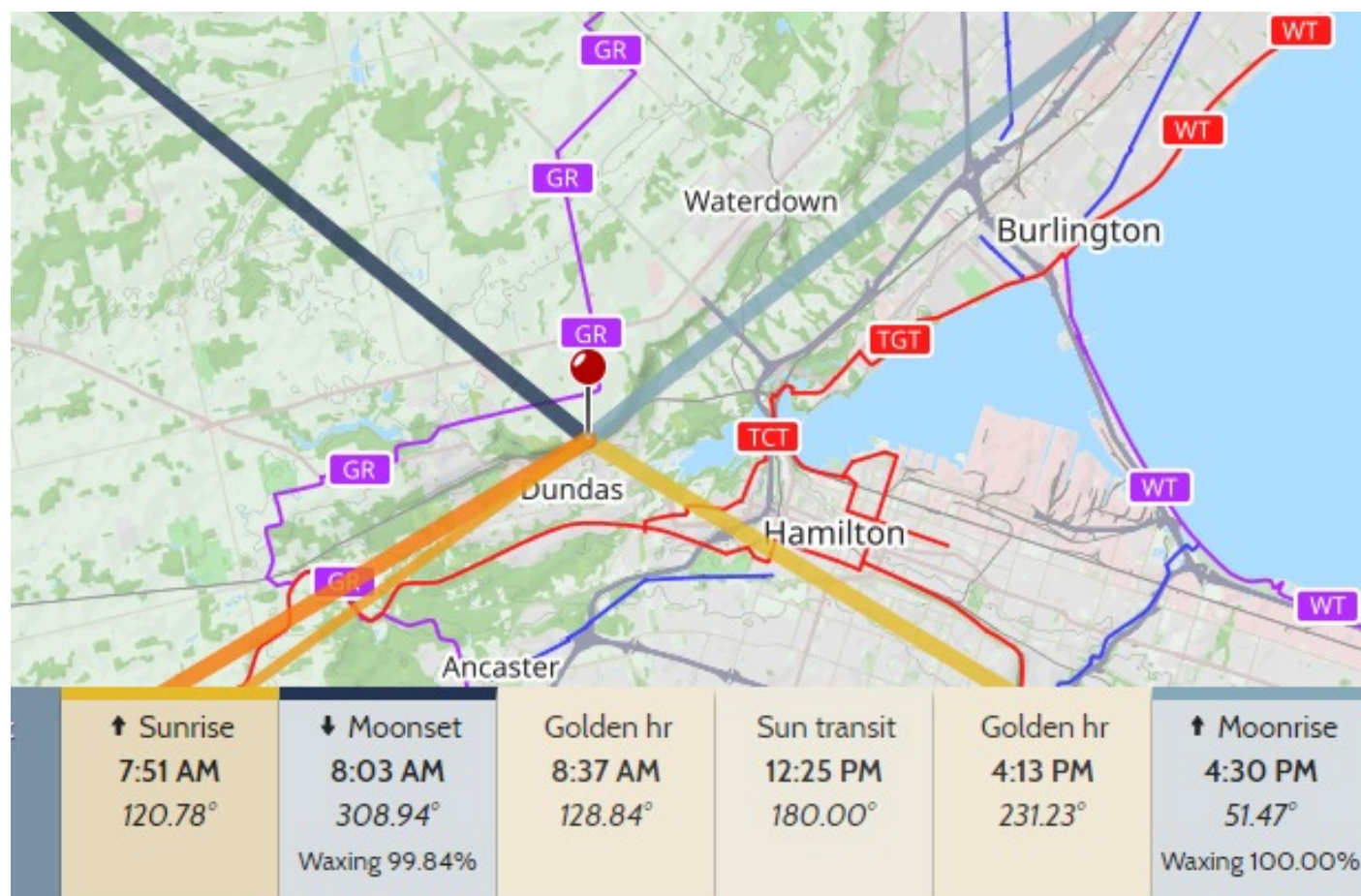
The Sky for January 2023 (continued)

Here (last page & below) are maps for our next moonrise. As an added bonus, if you bring binoculars, you can go planet hunting since the Sun will be setting near the same time, and there's a good western horizon across the street in the cemetery. On January 6th, first magnitude Mercury is still visible. Fortunately, there's no leaves on the trees, and few conifers, so you will get a view from just about anywhere along York Boulevard.

If I am not mistaken, parking there is free. Another possible location, with a lower vantage point, again skirting the shoreline, is the Burlington Pier (parking not free).



Another location often used is the Sydenham Road lookout in Dundas (parking free, but limited to about 3 vehicles). But this time from there, Moonrise will be over land. *(Continued on [page 16](#))*



The Sky for January 2023 (continued)

Back to Dundurn park...

So the Moon will rise at 4:30 PM, and the sun will set at 4:59 PM, giving you plenty of time to walk or drive across the street to the Hamilton Cemetery to see the sunset.

I will publish your Moonrise photos at our next meeting. Can you get a photo of the moon only partly showing above the lake? Perhaps you will get a triple Moon mirage? Or a disconnected half Moon above the horizon?

Here is a chart of the planets at 5:10 PM on New Year's Day (courtesy of Heavens-Above).

Mercury just gets worse and worse until on Friday it is already below the horizon by 17:10 Eastern Time.

It is rare to see green text for the altitude of all the planets at once, when the Sun is down (albeit freshly).

Year Month Day Time

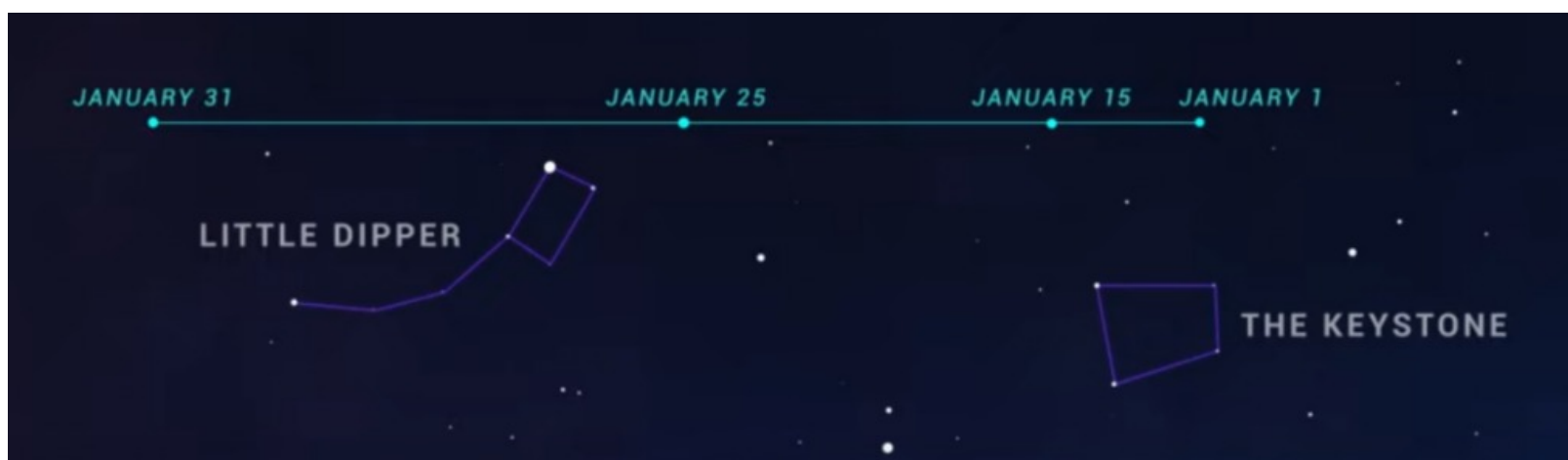
	Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Right ascension	19 ^h 37 ^m 47.4 ^s	20 ^h 2 ^m 32.0 ^s	4 ^h 25 ^m 33.1 ^s	0 ^h 5 ^m 40.1 ^s	21 ^h 39 ^m 54.2 ^s	2 ^h 49 ^m 49.3 ^s	23 ^h 34 ^m 35.0 ^s	19 ^h 59 ^m 39.7 ^s
Declination	-20° 21' 16"	-21° 53' 7"	24° 31' 9"	-0° 47' 4"	-15° 17' 9"	15° 56' 14"	-4° 2' 18"	-22° 53' 30"
Range (AU)	0.731	1.605	0.644	5.025	10.553	19.104	30.207	35.619
Elongation from Sun	12.0°	17.4°	147.6°	80.1°	41.3°	123.9°	71.7°	16.6°
Brightness	1.7	-3.8	-1.2	-2.2	0.8	5.7	7.9	14.4
Equatorial Diameter	9.20"	10.40"	14.55"	39.23"	15.75"	3.69"	2.26"	0.09"
Phase Angle	138.5°	23.8°	19.7°	11.3°	3.8°	2.4°	1.8°	0.5°
Constellation	Sagittarius	Sagittarius	Taurus	Pisces	Capricornus	Aries	Aquarius	Sagittarius
Meridian transit	13:13	13:37	21:59	17:40	15:14	20:23	17:09	13:34
Rises	08:36	09:05	14:18	11:43	10:15	13:22	11:25	09:09
Sets	17:50	18:08	05:44	23:36	20:14	03:29	22:52	18:00
Altitude	6.1°	8.5°	29.0°	45.4°	25.6°	40.7°	42.6°	7.2°
Azimuth	234.4°	228.8°	82.6°	169.4°	211.3°	108.3°	180.5°	228.8°

I like this website's continued loyalty to Pluto. As someone who has spent hours hunting Pluto (at Cherry Springs State Park) and found it twice, I support that attitude.

Judging by the times we live in, we might wait until 'life' is on Pluto (and consulted); Pluto will then be reinstated as a properly defined planet (i.e., anyone who says they live on a planet, lives on a planet).

Armchair Challenge

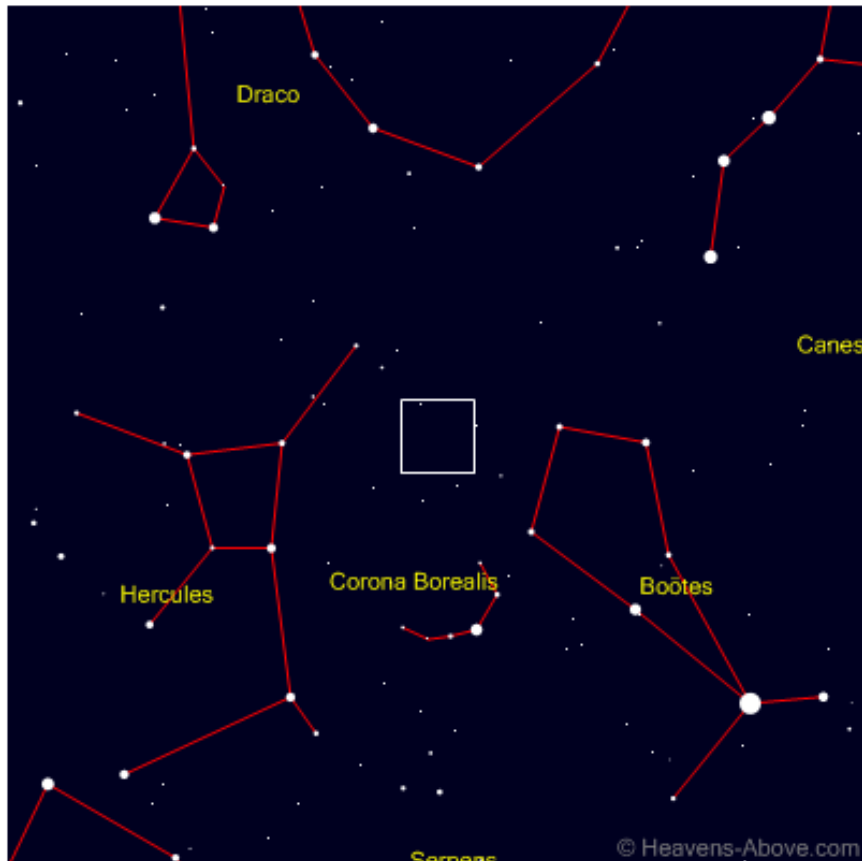
Each Month of 2023, there will be a monthly challenge item, for us Armchair astronomers to get out and look up. They won't always be after our monthly meeting, so it will be good to check here early in the Month for news and advance warning. Here is the January Armchair Challenge object, *Comet C/2022 E3 ZTF*. (Continued on [page 17](#))



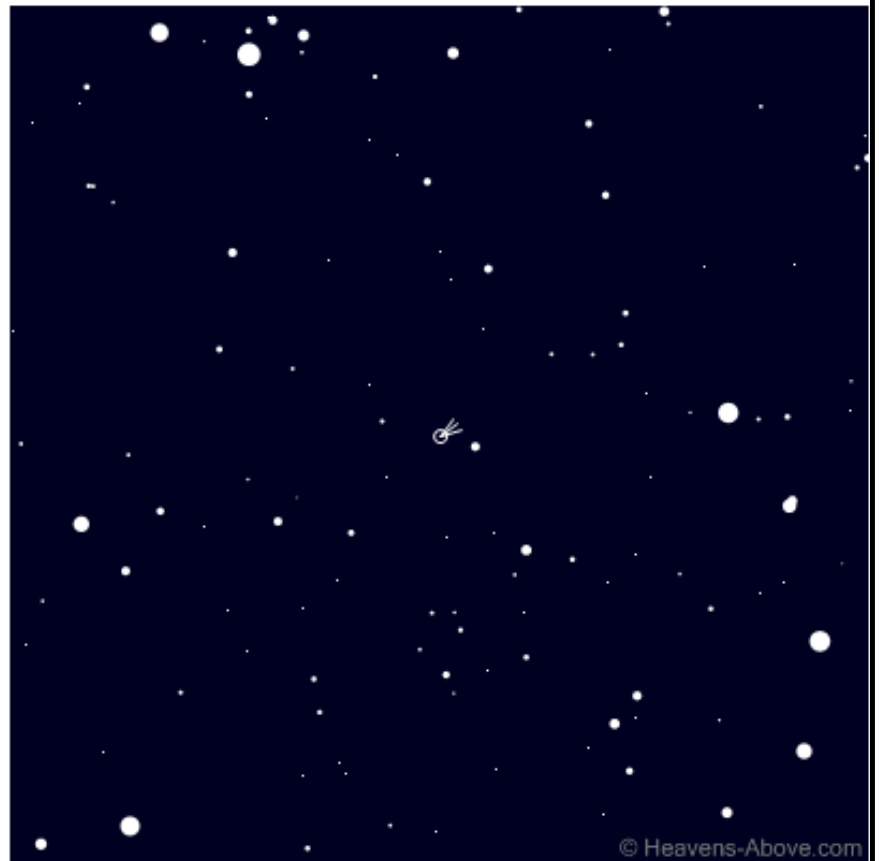
The Sky for January 2023 (continued)

Comet C/2022 E3 ZTF

Year Month Day Time



Coarse finder chart
(Field of view: 60°, Max. star mag.: 5)



Fine finder chart
(Field of view: 5°, Max. star mag.: 10)

You will need your Heavens-above finder chart for the time you plan to observe. Here's an example for the evening of our meeting.

To appreciate a comet, you need dark skies, and I expect this comet will call for a visit to the Binbrook Conservation Area to properly appreciate it.

Stay tuned as the month progresses. The Saturday night after our January meeting will be near the new moon.

Other Observing

As the seasons warm up, there will be chances to do astronomy from the parking lot after our meetings, and from Binbrook Conservation Area in the case of events on other days.

The McMaster Innovation Park parking lot is large enough and has patchy light coverage. It's adequate for planets and double star observing.

I would not expect success for a comet or carbon star observation, but we can try. At 8.5 magnitude, we should be able to see stars in favourable directions.

Until we meet again, I wish you all Clear Skies!



Contents:

What's up in awards? Rising Star Program: January-February
 Pathways Observing Program targets... January-February
 Messier Observing Program: January-February... Including target hints!!
 The Planets, Comets, Upcoming Meteor showers, Award Programs

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

RASC

Jo Ann Salci

Exploring Exoplanets (on-line course)

Swapna Shrivastava

Explore the Moon

Explore the Universe

Bernie Venasse

Explore the Universe

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

January

Constellations: Auriga, Orion, Taurus

Stars: Aldebaran, Betelgeuse, Capella, Rigel

Double Stars: gamma Leporis

Object Pairs: M42 / M43

Messier Objects: M35, M42, M45

February

Constellations: Gemini, Canis Major

Stars: Pollux, Sirius

Double Stars: Castor, Aldura

Object Pairs: NGC 2437 / NGC 2438

Messier Objects: M35, M42

Pathways Observing Program

Group A

Observable in January, February, March

Winter Constellations: Find, observe, sketch: *Taurus, Orion, Gemini.*

Stars: Find, observe, sketch: *Capella, Sirius, Betelgeuse.*

Asterisms: Find, observe, sketch: *Head of the Whale, Winter Triangle, Winter Hexagon*

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

(Continued on [page 19](#))

HAA Messier Objects Observing Award

January Messier targets

- M33** This is a very large (about the size of the full moon) face on spiral galaxy in the constellation Triangulum. The best and easiest views of M33 can be found with a pair of binoculars. Look for a large, round hazy patch of light with little detail at first glance. M33 can be glimpsed with the naked eye in dark clear skies. Finding M33 in a telescope can be a challenge because of its size. Use the widest field eyepiece you have and look for a change in light level to identify the galaxy.
- M103** This is a small, sparse open cluster in Cassiopeia. Through a telescope the cluster is very sparse, four bright stars amidst the slight glow of much fainter companions.
- M52** A small to mid-aperture telescope will begin to resolve this cluster. Look for a triangular patch of light with some stars clearly resolved, but most of the cluster members provide only a hint of graininess.
- M76** Known as the Little Dumbbell, this planetary nebula in Perseus is one of the dimmest objects in the catalogue. Look for a small, faint, oblong patch of light. Not an obvious object, if you don't see it at first try varying magnifications to bring it out. Fortunately, M76 is located near a bright star which aids in locating the correct field to search.
- M34** This is a large and bright, but sparse open cluster located in Perseus. Visible as a faint patch of light to the naked eye, it is obvious and easy to resolve in binoculars. In fact, binoculars provide a better view of this cluster than most telescopes.
- M74** This galaxy in Pisces is a smaller and fainter version of M33, a face on spiral galaxy with low surface brightness. M74 is arguably the most difficult object to find in the Catalog. You will need very dark, clear skies to easily see it, anything less than perfect conditions will make M74 nearly impossible to find. Look for a very faint fuzzy star, which is the bright central condensation, surrounded by a very faint glow. Try all your tricks on this one; star hop to the correct field, try varying magnification, tap the scope to detect the galaxy through its motion. If all of the above fail, try again another night or seek darker skies.
- M77** This is a small faint galaxy in Cetus. Through a telescope look for a fuzzy, oval shaped patch of light, bright in the center, fading towards the edges.

February Messier targets

- M1** The Crab nebula is a supernova remnant in Taurus. It is a hazy patch in small telescopes, large scopes can resolve some detail.
- M45** The Pleiades are a large open cluster in Taurus. Easy to resolve six stars naked eye. Binoculars provide the best view. Large telescopes can show some nebulosity.
- M35, M37, M36, M38** A series of open clusters in the winter Milky Way. M35 is in Gemini, the others are in Auriga. All can be seen naked eye as faint fuzzy stars, low power telescopes can resolve these rich clusters.
- M42, M43** M42 is the great Orion Nebula. It can be seen as small fuzzy patch naked eye and the view is superb in most any scope. M43 is a small region of nebulosity next to M42, and probably requires the use of a telescope to view. Use low to moderate powers for the best view of this pair.

(Continued on [page 20](#))

What's Up in Awards? January-February 2023 (continued)

M78 A small emission nebula in Orion. It is best viewed in a telescope at moderate powers.

M79 This is one of the smallest and dimmest globular clusters in the catalogue. It is best viewed in a telescope at moderate powers.

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

Mercury: A great planet for evening viewing. Mercury nears Venus on 1 January, after that it is hard to see. Poorly placed at the end of the month.

Venus: A brilliant planet for evening viewing. Venus is near Mercury on 1 January and Saturn on 22 January. Best at the end of the month.

Mars: Well-positioned evening planet, reaching 60° altitude. Shrinks from 14-10 arcseconds over the month.

Jupiter: Evening planet best at the start of the month, then losing altitude. Moon close on 25 and 26 January.

Saturn: Best viewing at the start of the month. Near Venus on 21 and 22 January and the Moon on 23 Jan.

Uranus: Well-placed evening planet shining at mag. +5.7. Occulted by the Moon on 1 January.

Neptune: Deteriorating evening planet, close to Jupiter. Losing altitude by the end of the month.

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

Mercury: Poor morning positioning and brightness make Mercury hard to see this month.

Venus: Bright evening planet. Near Neptune on 14/15 February, closing on Jupiter at the end of February.

Mars: Well-placed and good altitude when due south. Shrinks from 10 to 8 arcseconds throughout February.

Jupiter: Bright evening planet loses altitude throughout the month. Near Venus on 28 February.

Saturn: In conjunction with the Sun on 16 February and not visible this month.

Uranus: Evening planet. Uranus reaches 50° altitude in darkness at the start of the month but drops rapidly thereafter.

Neptune: Poorly located in the evening sky. Close encounter with Venus on 14/15 February, just 20 arcminutes apart. But the UK will miss the closest approach of 47 arcseconds.

Comets January-February 2023 via Seiichi Yoshida – Click here:

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

Meteor Showers via American Meteor Society

Quadrantids

Period of activity: December 26th, 2022, to January 16th, 2023

Peak Night: Jan 3-4, 2023

The Quadrantids have the potential to be the strongest shower of the year but usually fall short due to the short length of maximum activity (6 hours) and the poor weather experienced during early January. The average hourly rates one can expect under dark skies is 25. These meteors usually lack persistent trains but often produce bright fireballs. Due to the high northerly declination (celestial latitude) these meteors are not well seen from the southern hemisphere.

Shower details - Radiant: 15:20 +49.7° - **ZHR:** 120 - **Velocity:** 25 miles/sec (medium - 40.2km/sec)

Parent Object: 2003 EH (Asteroid)

Next Peak - The Quadrantids will next peak on the Jan 3-4, 2023, night. On this night, the moon will be 92% full.

(Continued on [page 21](#))

What's Up in Awards? January-February 2023 (continued)

Please feel free to contact me with any questions or comments at chair@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.



Home About Newsletters Gallery Club Events Resources **Contact** Q

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.

Page 7 Jupiter Crossword Answers:





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

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

Spot the Messenger: Observe Mercury

David Prosper

Most planets are easy to spot in the night sky, but have you spotted Mercury? Nicknamed *the Messenger* for its speed across the sky, Mercury is also the closest planet to the Sun. Its swift movements close to our Sun accorded it special importance to ancient observers, while also making detailed study difficult. However, recent missions to Mercury have resulted in amazing discoveries, with more to come.

Mercury can be one of the brightest planets in the sky – but also easy to miss! Why is that? Since it orbits so close to the Sun, observing Mercury is trickier than the rest of the “bright planets” in our solar system: Venus, Mars, Jupiter, and Saturn. Mercury always appears near our Sun from our Earth-bound point of view, making it easy to miss in the glare of the Sun or behind small obstructions along the horizon. That’s why prime Mercury viewing happens either right before sunrise or right after sunset; when the Sun is blocked by the horizon, Mercury’s shine can then briefly pierce the glow of twilight. Mercury often appears similar to a “tiny Moon” in a telescope since, like fellow inner planet Venus, it shows distinct phases when viewed from Earth! Mercury’s small size means a telescope is needed to observe its phases since they can’t be discerned with your unaided eye. Safety warning: If you want to observe Mercury with your telescope during daytime or before sunrise, **be extremely careful**: you don’t want the Sun to accidentally enter your telescope’s field of view. As you may already well understand, this is extremely dangerous and can not only destroy your equipment, but permanently blind you as well! That risk is why NASA does not allow space telescopes like Hubble or the JWST to view Mercury or other objects close to the Sun, since even the tiniest error could destroy billions of dollars of irreplaceable equipment.

Despite being a small and seemingly barren world, Mercury is full of interesting features. It’s one of the four rocky (or terrestrial) planets in our solar system, along with Earth, Venus, and Mars. Mercury is the smallest planet in our solar system and also possesses the most eccentric, or non-circular, orbit of any planet as well: during a Mercurian year of 88 Earth days, the planet orbits between 29 million and 43 million miles from our Sun – a 14-million-mile difference! Surprisingly, Mercury is not the hottest planet in our solar system, despite being closest to the Sun; that honor goes to Venus, courtesy its thick greenhouse shroud of carbon dioxide. Since Mercury lacks a substantial atmosphere and the insulating properties a layer of thick air brings to a planet, its temperature swings wildly between a daytime temperature of 800 degrees Fahrenheit (427 degrees Celsius) and -290 degrees Fahrenheit (-179 degrees Celsius) at night. Similar to our Moon, evidence of water ice is present at Mercury’s poles, possibly hiding in the frigid permanent shadows cast inside a few craters. Evidence for ice on Mercury was first detected by radar observations from Earth, and followup observations from NASA’s MESSENGER mission added additional strong evidence for its

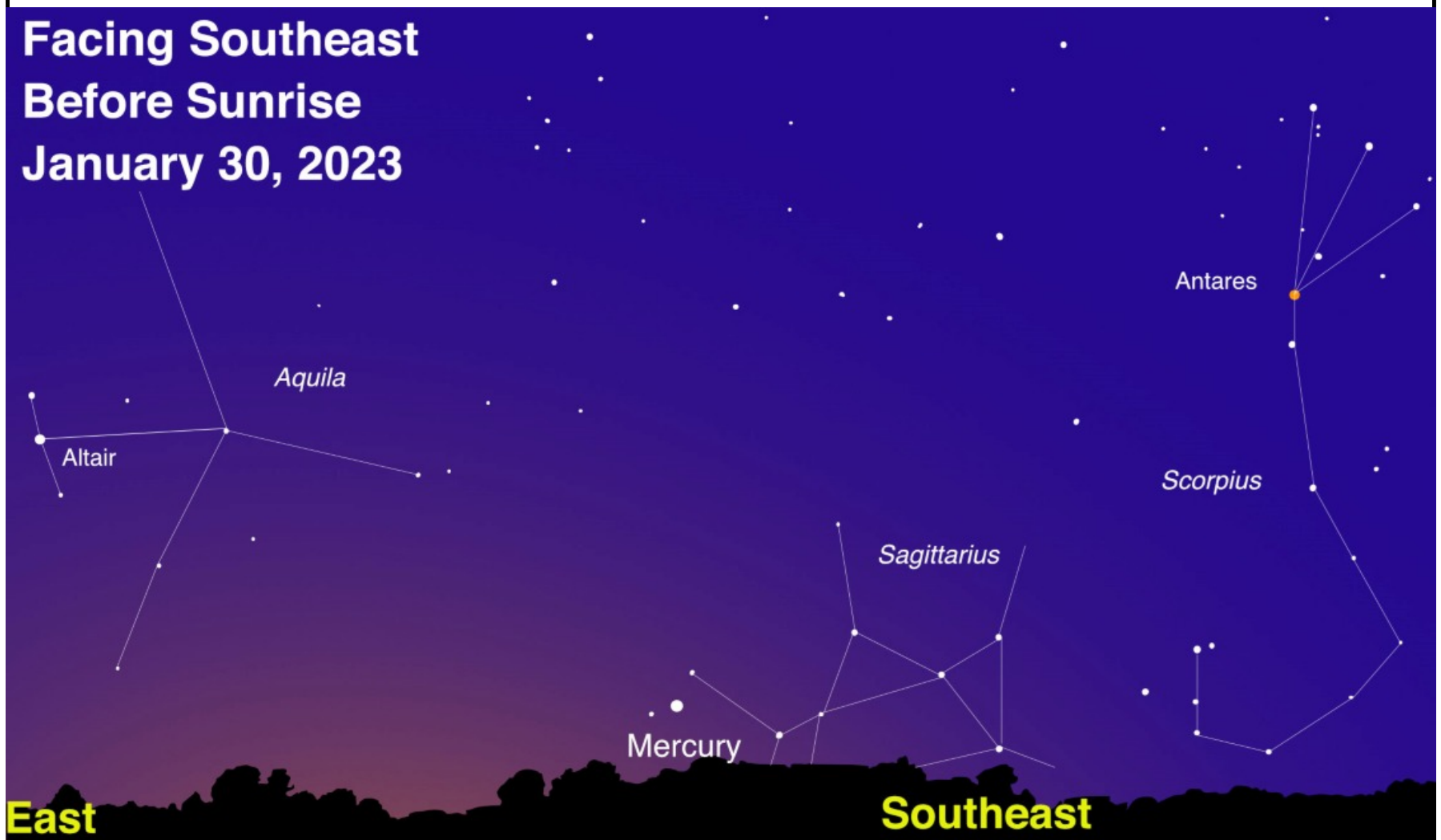
(Continued on [page 23](#))

NASA Night Sky Notes (continued)

presence. Mercury sports a comet-like tail made primarily of sodium which has been photographed by skilled astrophotographers. The tail results from neutral atoms in its thin atmosphere being pushed away from Mercury by pressure from the nearby Sun's radiation.

NASA's Mariner 10 was Mercury's first robotic explorer, flying by three times between 1974-1975. Decades later, NASA's MESSENGER first visited Mercury in 2008, flying by three times before settling into an orbit in 2011. MESSENGER thoroughly studied and mapped the planet before smashing into Mercury at mission's end in 2015. Since MESSENGER, Mercury was briefly visited by BepiColombo, a joint ESA/JAXA probe, which first flew by in 2021 and is expected to enter orbit in 2025 - after completing six flybys. Need more Mercury in your life? Check out NASA's discoveries and science about Mercury at solarsystem.nasa.gov/mercury/, and visit the rest of the universe at nasa.gov.

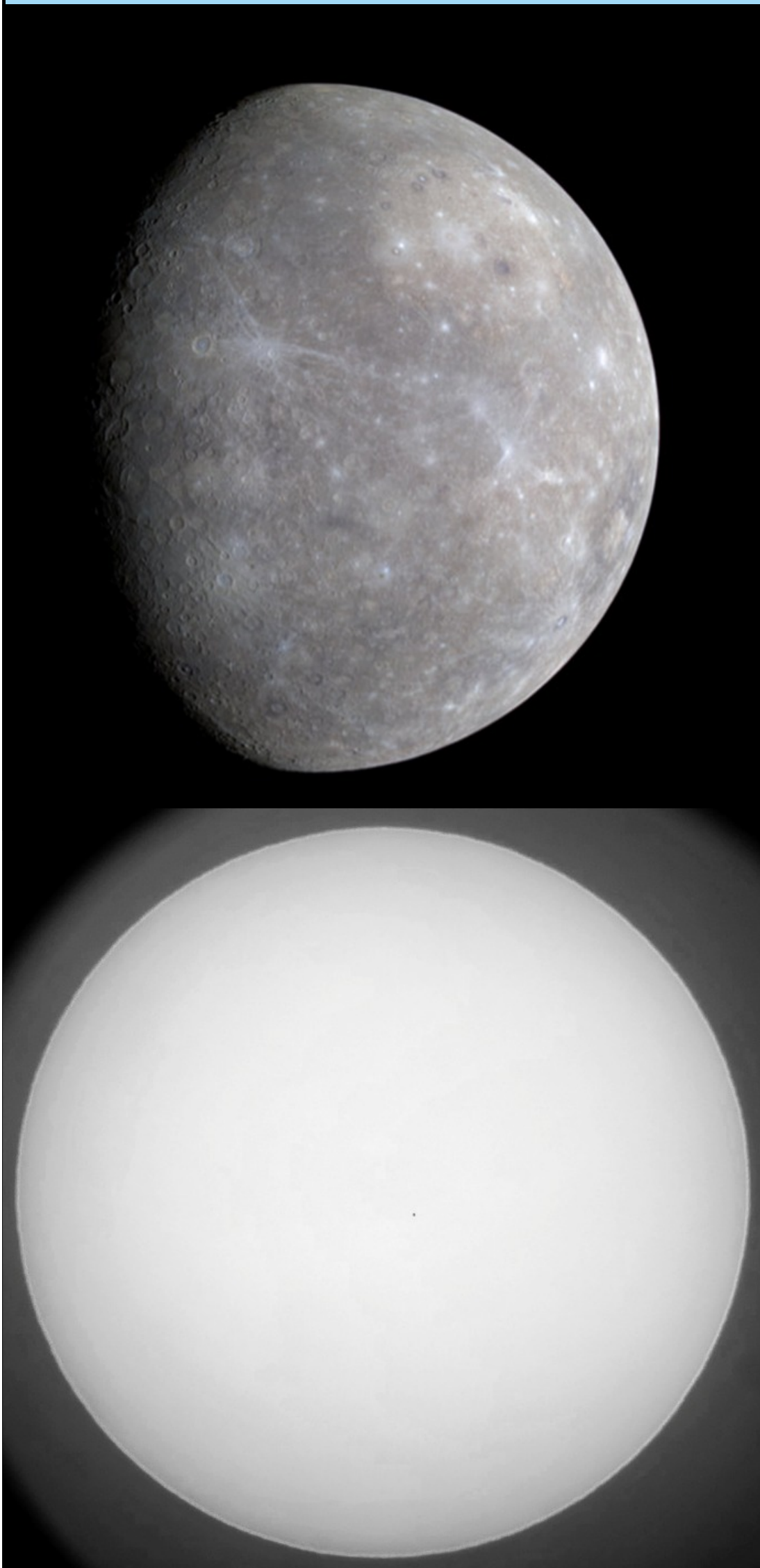
Facing Southeast Before Sunrise January 30, 2023



Mercury reaches maximum western elongation on the morning of January 30, which means that your best chance to spot it is right before sunrise that day! Look for Mercury towards the southeast and find the clearest horizon you can. Observers located in more southern latitudes of the Northern Hemisphere have an advantage when observing Mercury as it will be a bit higher in the sky from their location, but it's worth a try no matter where you live. Binoculars will help pick out Mercury's elusive light from the pre-dawn glow of the Sun.

Image created with assistance from Stellarium

(Continued on [page 24](#))



Mercury is hot, small, and heavily cratered across its gray surface, as seen in this image from NASA MESSENGER. Mercury is the most heavily cratered planet in our solar system, since it lacks either a substantial atmosphere or geologic activity to erode surface features like craters - similar in certain aspects to the surface of our own Moon.

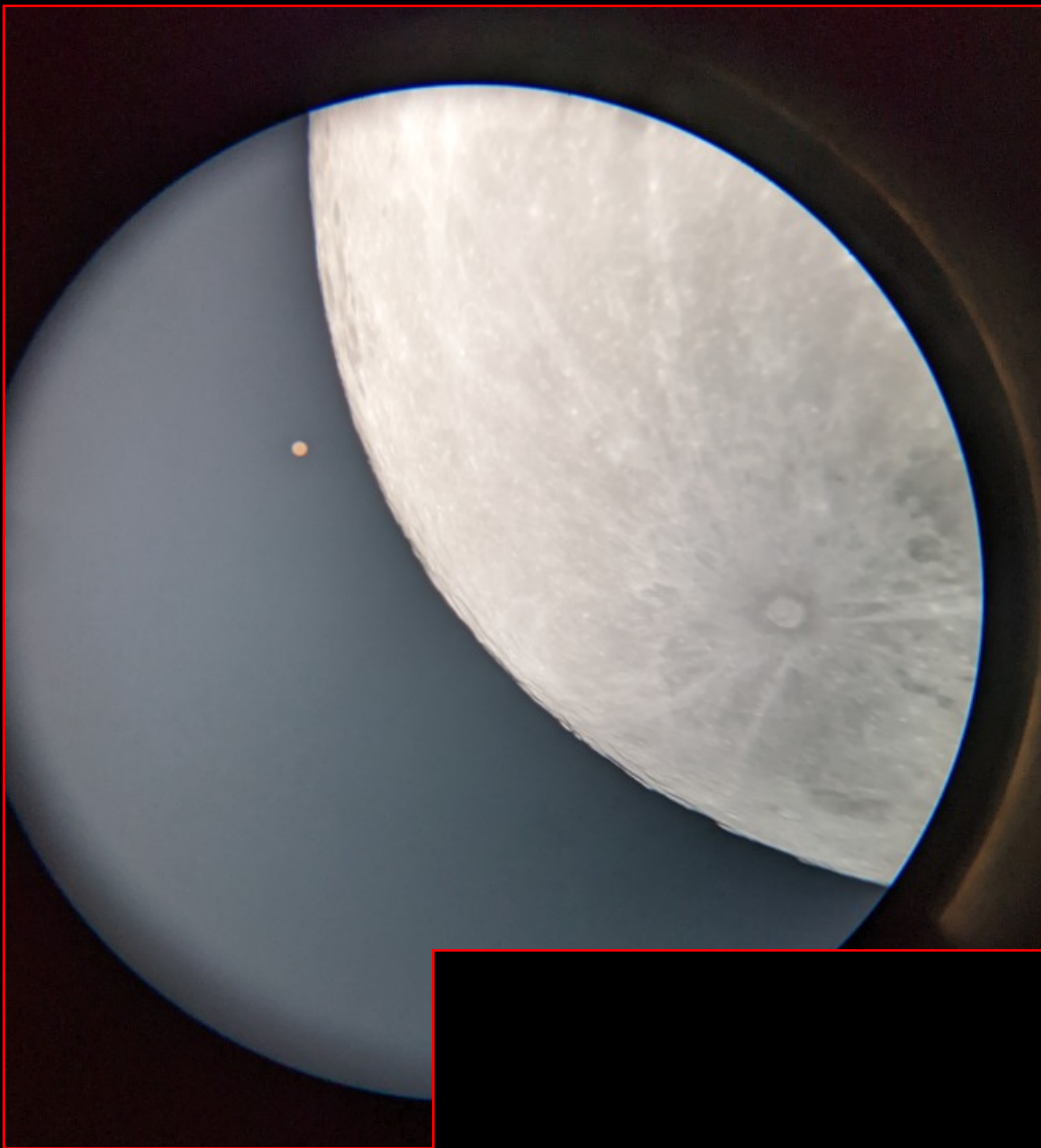
Credit: NASA/Johns Hopkins University Applied Physics Laboratory/Carnegie

Source:

<https://solarsystem.nasa.gov/resources/439/mercurys-subtle-colors/>

On rare occasion, Earthbound observers can observe Mercury, like Venus, transiting the Sun. Mercury frequently travels between Earth and the Sun, but only rarely does the geometry of all three bodies line up to allow observers from Earth to view Mercury's tiny shadow as it crosses our star's massive disc. You can see one such event in this photo taken by Laurie Ansorge of the Westminster Astronomical Society on November 11, 2019. If you missed it, set a reminder for Mercury's next transit: November 13, 2032.

The Moon and Mars December 7, 2022 Members' Gallery



left:

**Mars, just after being occulted
by the Moon**

by Reid McNaughton

Taken with his Google Pixel 5
phone at the eyepiece of his C8
scope at 11:21pm

right:

**Mars, just after being
occulted by the Moon**

by John Gauvreau

Taken with his Canon 80D
DSLR and 70-300mm zoom
lens (set at 300mm)





The Moon and Mars, after the Occultation (Mars indicated)

by Chris White



The Moon and Mars, after the Occultation

by Matthew Mannering

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— Galaxies
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 - **Jan 25: From Human Computers to Supercomputers: Astronomy in the 20th Century**
- ***Masks strongly encouraged for duration of all shows.***
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www.physics.mcmaster.ca/planetarium

UPCOMING EVENTS

January 13, 2023 - 7:30 pm – H.A.A. Meeting at McMaster Innovation Park. Our speaker will be H.A.A. Chair *Bernie Venasse*, who will talk about winter astronomy. **This will be a “hybrid” meeting, with the attendance option of in-person or online via [Facebook](#) and [Zoom](#).**

February 10, 2023 - 7:30 pm – H.A.A. Meeting at McMaster Innovation Park.

2022-2023 Council

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

www.amateurastronomy.org

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

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

The Harvey Garden HAA Portable Library



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