



# Event Horizon

Volume 29, Number 5  
March 2022



## From The Editor

Welcome to March, Daylight Savings Time, and Spring!

This month's E.H. is a thick edition with lots of content!

Thanks to everyone who contributed!

Happy Reading!

*Bob Christmas, Editor*

editor 'AT'  
[amateurastronomy.org](http://amateurastronomy.org)



## Chair's Report by Bernie Venasse

Our February Zoom meeting was another great success. We enjoyed a bevy of speakers.

Jo Ann Salci spoke to us about her beginnings in this hobby and her eventually becoming a GOOBER. Brett Tatton of the Bluewater Astronomical Society followed with his enthralling presentation of his Bowling Ball Mount. John Gauvreau spoke about Love IN astronomy which ended with a discussion about the ladies of Harvard University Observatory. John Hylanialuk told his story about an occultation observation.

*Our Next Zoom meeting is scheduled for March 11, 2022, at 7:30pm.*

Our guest speaker this month is *John Read*.

John A. Read fell in love with astronomy in his late twenties after viewing Saturn in a small telescope. A few years later, he quit his job in the Fortune 500 to  
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## Chair's Report (continued)

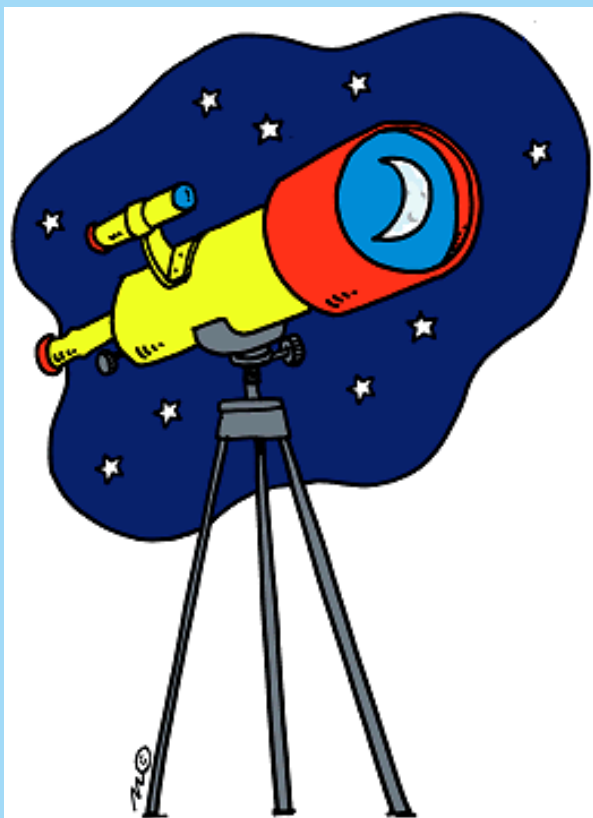
become a full-time astrophysics student, author, YouTuber, and father of three. He has written 14 books about space, with another due out this summer. In 2020, Read was the recipient of the Simon Newcomb Award, for his books, from the RASC.

**Title:** Goal Oriented Observing

**Summary:** How do you get the most of a night under the stars? How do you make sure you never run out of things to explore? If you're looking to broaden your stargazing experience, having a specific set of goals is the way to go. That's why so many astronomical organizations have observing programs. In this talk, author and astronomer John A. Read will discuss three programs, common among these organizations: Explore the Universe, Explore the Moon, and the Messier objects. He's written several books with the goal of simplifying the stargazing experience. *110 Things to See with a Telescope*, *50 Things to See on the Moon*, and *Learn To Stargaze - No Telescope Required* (coming summer 2022). With the use of these simple guides, you'll be accomplishing your stargazing goals before you know it.

A friendly reminder that all our meetings will be held online through the Zoom platform for the foreseeable future. If you have had any questions about joining in please feel free to get in touch and we will help you. And don't forget that you can always email [zoomsupport@amateurastronomy.org](mailto:zoomsupport@amateurastronomy.org), to get help joining the meeting, even once the meeting has started.

**SAVE THE DATES:**      **September 23rd to 25th, 2022**      **Details to Follow!**



### H.A.A.'s Loaner Scope Program

We at the HAA are proud of our Loaner Scope Program. It allows members who don't own a telescope to get more up close with the night sky, and it allows members to explore different types of telescopes! Paid members are welcome to borrow a telescope for one month. We have telescopes of varying expertise levels, a MallinCam, a spotter scope and various eyepieces. Please visit the HAA website for more information!

If you are interested in borrowing a telescope, please contact Melissa Whitman at

[loanerscope@amateurastronomy.org](mailto:loanerscope@amateurastronomy.org).

Telescopes are loaned out on a first come basis.

**Masthead Photo:** *The Fox Fur and Cone Nebulas*, by Rich and Rosemary Kelsch.

Taken through a Celestron RASA 8, with a ZWO ASI 1600MMP camera, on a Losmandy G-11 mount. This is a combination of 7 hours of Ha (12nm bandpass) and 6 hours on a ZWO ASI294 MCP, with the NBZ filter, all with 5 minute subs.



# Announcing a Contest for Amateur Astronomers

5-12 Years Old

Submit an entry for your chance to win a prize!

*Eligibility: Ages 5-12 years; membership in HAA is not required*

1. Sketch a picture of your favourite constellation.
2. Tell us why it's your favourite.
3. Tell us a story about it.
4. After looking at the night sky, create your own asterism, draw a sketch and tell us about it.

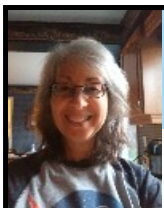
The winning entry will be selected by random draw and may be featured in an upcoming newsletter, plus, the winner will receive an astronomy-related prize!



*Image generated using Stellarium*

Read this month's HAA Explorer article for more information about constellations and asterisms.

**Submit your entry by March 26th to [education@amateurastronomy.org](mailto:education@amateurastronomy.org)**



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

Last month we learned about Taurus, “The Bull”. We’ve also learned about Lupus “The Wolf”. Taurus and Lupus are just a few of the many animal constellations in the night sky. Let’s explore!

### Animals in the Sky?!?!

Did you know that there are 40 constellations in the sky named after animals?? That’s almost half of the 88 modern constellations identified by the International Astronomical Union (IAU)! There is everything from an eagle (Aquila) to a fox (Vulpecula). There is even a fly (Musca)!

*We explored Orion and Taurus over the past few months.  
How many animals can you see near them in this small section of sky?*



*Image generated using Stellarium*

*Answer: Canis Minor (Lesser Dog), Monoceros (Unicorn), Canis Major (Greater Dog), Lepus (The Rabbit or Hare), Columba (Dove), Cetus (The Whale or Sea Monster), Pisces (Fishes), Aries (Ram) and Taurus (Bull).*

Well, I must confess...I am a dog-lover and my favourite constellations are the dogs, Canis Major and Canis Minor (not to be confused with Canes Venatici, the hunting dogs)! Although, in Greek mythology, Canis Major and Canis Minor **are** hunting dogs for Orion. They may also be waiting for food scraps from the Gemini twins! The constellation Gemini is above Orion.

Canis Major has the very bright star, Sirius (pronounced **sear**-ee-us), sometimes called the Dog Star. It’s located in the collar of Canis Major. It is the brightest object in the night sky after the Moon and Planets. (Sirius Black in the Harry Potter series was named after this star!)

The bright star in Canis Minor is called Procyon (pronounced **pro**-see-on). It’s the 8th brightest star in the sky. There are only 2 stars in the Canis Minor constellation!

*(Continued on [page 5](#))*

## HAA Explorers (continued)



*Canis Major*



*Canis Minor*

A straight line drawn through Orion's belt will take you to Sirius. And a straight line from Bellatrix through Betelgeuse will take you to Procyon.



*Images generated using Stellarium*

*(Continued on [page 6](#))*



# HAA Explorers (continued)

And if you draw imaginary lines between Betelgeuse, Sirius and Procyon, you will see the asterism called the Winter Triangle. An asterism is a shape seen in the sky that is not an official constellation. You can create your own asterisms!

Image generated using Stellarium



## Match Maker!

These are constellations we can see from our area. Match the constellation name with the animal:

Aquila

Bull

Aries

Greater Dog

Camelopardalis

Big Bear

Cancer

Swan

Canes Venatici

Dolphin

Canis Major

Lion

Canis Minor

Eagle

Corvus

Hunting Dogs

Cygnus

Giraffe

Delphinus

Little Bear

Draco

Lesser Dog

Lacerta

Ram

Leo

Crab

Taurus

Dragon

Ursa Major

Lizard

Ursa Minor

Crow

Answers on page 17.

(Continued on [page 7](#))

## HAA Explorers (continued)

### Things to do until next time:

This month we are doing something a little different: Submit an entry for your chance to win a prize! Read on for the details:

#### ***Eligibility: Ages 5-12 years***

1. Sketch a picture of your favourite constellation.
2. Tell us why it's your favourite.
3. Tell us a story about it.
4. After looking at the night sky, create your own asterism, draw a sketch and tell us about it.

The winning entry will be selected by random draw and may be featured in an upcoming newsletter, plus, the winner will receive an astronomy-related prize!

***Submit your entry by March 26th*** to [education@amateurastronomy.org](mailto:education@amateurastronomy.org)

### During March, check out:

***1. On March 9th at about 7:30 p.m.*** facing south, you will see Orion, Taurus, Canis Major and Canis Minor along with the crescent Moon in Taurus. See if you can see the Winter Triangle:

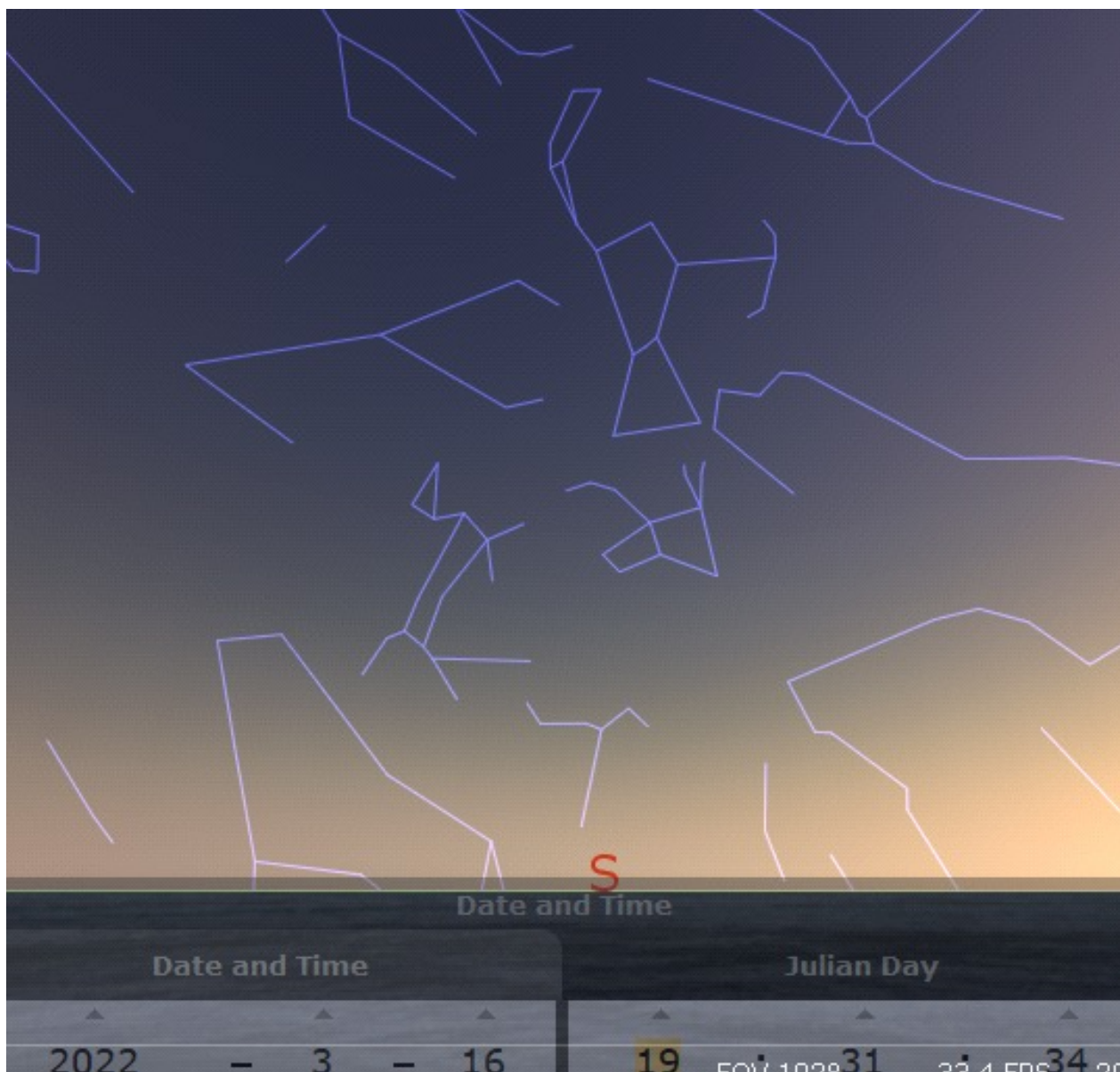


*Image generated using Stellarium*

*(Continued on [page 8](#))*

## HAA Explorers (continued)

2. On March 16th, just one week later, at the same time, see if you can still see the Winter Triangle. The clocks will have jumped ahead one hour to daylight savings time. Maybe it means that Spring is on its way if we can't see the Winter Triangle any more!



*Image generated using Stellarium*

### Finally:

Why didn't the Dog Star laugh at my jokes?

Answer: Because it was too Sirius!!

If you have a question you would like answered in the newsletter, please send it to [education@amateurastronomy.org](mailto:education@amateurastronomy.org).

Thank you to Mi and Ro for reviewing this article! 😊

### References:

Astronomy for Kids. 2019.

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

<https://www.constellation-guide.com/constellation-list/>





## The Sky This Month for March 2022 by Matthew Mannering

March is Messier Marathon month. The marathon is an attempt to observe as many Messier objects as possible in one night. This year, the best times in March to attempt the marathon are at the beginning and end of month around new Moon. Our club, the Hamilton Amateur Astronomers has its own special award for the marathon. If you are interested in participating in the award program, please contact Bernie at [eclipse@amateurastronomy.org](mailto:eclipse@amateurastronomy.org). However, should you prefer to go it alone, you can access the Messier Marathon list online from many sources. [Here's a link to a PDF](#) of a sample Messier Marathon list that can be printed out. Note that it is listed in the order to be observed based on when each object sets in the west, not by the Messier number.

Another way to acquire the list is to use Larry McNish's Messier marathon list on the Calgary RASC website: <https://calgary.rasc.ca/darksky/messierplanner.htm>

Here is a screen shot of the page with the info for Hamilton Ontario filled in.

Larry McNish's  
Messier Marathon Planner Version 1.52  
Copyright © 2003-2022 Larry McNish All rights reserved.

As of V1.51 Messier Planner now allows printing just the table.  
As of V1.50 Messier Planner now sets the Standard Time Zone Offset for any selected city.

Title: Hamilton Canada Ontario For: 2022 March 31

Longitude: Deg: 79 Min: 51 ☒ West ☐ East UTC Offset (Hrs): 5.00

Latitude: Deg: 43 Min: 15 ☒ North ☐ South

Or Choose a city then Verify your Standard Time UTC Offset, then click Submit.  
Hamilton Canada Ontario 1346 cities

☐ Remember title and location values.

Ensure your **Standard Time** offset is set in "UTC Offset (Hrs)" above.  
All times are displayed in **Standard Time**. If Daylight Saving time is in effect at the designated location, **add** one hour to all **event** times.

Horizon Limits: Deg: 10 Nautical 12°

Order table by: ☐ Messier # ☐ RA ☐ Dec ☐ m<sub>v</sub> ☒ Viewing sequence

Astronomy Magazine, March 2006

- Other Options -

☒ Include Images ☒ Show Max Altitude (+time +Azimuth) ☒ Include Remarks

☒ Include Times of Rising, Transiting, and Setting (takes longer to do)

NOTE: PRINT IN LANDSCAPE MODE WITH SMALL MARGINS

Thursday

After clicking on the 'Submit' button, scroll down to see the Messier list with comments and images.

When trying to complete the marathon, there are a couple of things to keep in mind.

- The Larry McNish list times are for Eastern Standard time. If Daylight Saving Time is in effect, add 1 hour to the times indicated in the list.
- Objects at dusk and dawn will be very difficult to capture.
- It will get very cold during the night. Bring lots of layers of clothes, hot drinks and snacks.
- Get to the site early and set up your equipment before dusk sets in.
- If the Messier award certificate isn't something you care about, then take a buddy along with you to share finding the Messier objects and increase your chances of seeing as many as possible. Note that this will disqualify you from any award/certificate.
- Be sure to have detailed charts and/or software to help you find your way.

March always has a couple of significant dates associated with it. On Sunday March 13th, Daylight saving time begins. Then on March 20th, the spring equinox arrives whether-or-not mother nature agrees.

*(Continued on [page 10](#))*

## The Sky This Month for March 2022 (continued)

Last month I discussed the Zodiacal light which is sometimes visible in the west after evening twilight ends. The two-week span beginning March 20th is the best time period to see the Zodiacal light. You can find more information in the February Event Horizon.

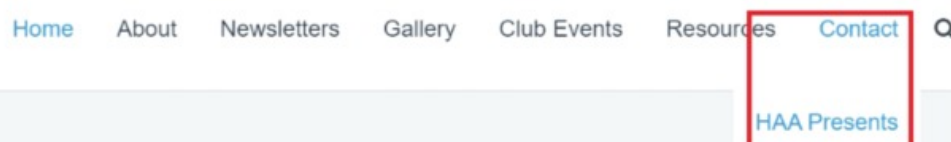
This month, all the planetary action occurs in the hour before dawn with the real show starting on the 26th. Venus, Saturn and Mars will form a very nice grouping low in the southeast through the end of the month. As a special bonus, the Moon joins the group on morning of the 28th.

Back on February 21st at about 4am, I happened to look out the window to the sky in the southeast. The third quarter Moon was very nicely placed above the tree line with a bright star about seven degrees to the right of it. My very sleepy brain wondered what star it might be, so I started to look for other bright stars near by to use as guides. Much to my surprise, the star in question turned out to be Spica in Virgo. As it turns out, every year at about this time, I get the same surprise! I always think of Spica as a springtime star and don't really expect to see it until then. It turns out that trying to identify stars two minutes after waking up at 4am can lead to some confusion. That's my excuse anyway. Come the latter part of April, Spica will be where it belongs, a prominent star in the eastern sky at about 10pm. In the meantime, enjoy the late winter constellations at a much more civilized time in the evening.

### "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](http://www.amateurastronomy.org) and select "Contact" from the top menu bar and then click on "HAA Presents" (see image below). You will be presented with a request form and once all required fields are entered, click on the "Submit" button and you will see a confirmation message that your request has been successfully submitted.



Once received, our Public Education Director, Jo Ann Salci, will respond to your request within 5 business days to discuss next steps. If you have any questions, feel free to send an email to [haapresents@amateurastronomy.org](mailto:haapresents@amateurastronomy.org).

### HAA Helps Hamilton

While during the pandemic, the H.A.A. hasn't been able to collect donations from our members and guests for local food banks at our general meetings, the H.A.A. has always valued its relationships with food banks in the community, particularly [Hamilton Food Share](#).

In that spirit, we encourage you to continue making donations directly to your local food banks.





## What's Up in Awards? March-April 2022 by Bernie Venasse

### Contents:

What's up in awards?

Pathways Observing Program targets... March, April

Rising Star Program: March, April

Messier Observing Program: March, April... Including target hints!!

Comets

Upcoming Meteor showers

### What's Up in Awards?

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

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

### HAA Rising Star Observing Award

#### ***March***

Constellations: Ursa Major

Stars: Regulus

Double stars: Tau Cancr

Object Pairs: M81/M82

Messier objects: M35, M42, M45

#### ***April***

Constellations: Virgo, Leo

Stars: Dubhe, Regulus

Double stars: 42 Leonis Minoris

Object Pairs: M65/M66

Messier objects: M96, M109

### Pathways Observing Program

Observable in March

Group D,

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.

Observable in April

Group A,

Spring Constellations: Find, observe, sketch: *Ursa Major, Bootes, Virgo.*

Stars: Find, observe, sketch: *Polaris, Arcturus, Spica.*

Asterisms: Find, observe, sketch: *Big Dipper, Virgo Diamond, Sickle.*

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

(Continued on [page 12](#))



### HAA Messier Objects Observing Award

#### *March Messier targets*

- M41** This cluster in Canis Major is visible as a hazy patch to the naked eye just below Sirius. M41 appears fairly loose in telescopes at low power.
- M93** This is a small fuzzy patch of light in Puppis. Use low power to examine this cluster and the surrounding richness in a telescope. Medium power provides a nice view of the cluster itself.
- M47** A bright cluster in Puppis, easily visible as a hazy patch to the naked eye. Telescopes show a fairly loose cluster with stars of wide variety of magnitudes.
- M46** This cluster is right next to M47 and is also visible to the naked eye. In telescopes at low powers this cluster evenly fills the eyepiece. While you are here go to medium or high power and look for the planetary nebula NGC 2438. It will appear as a faint uneven ring, with a blue/green color.
- M50** An open cluster in Monoceros. Like M93, the richness of the surrounding field is the only difficulty in finding this object. This is a fairly tight cluster at low power in a telescope.
- M48** M48 appears as a large fuzzy patch in binoculars, partially resolvable. Use low to medium power in your telescope for a spectacular view.
- M67** In the southeast portion of Cancer is another open cluster, barely visible as a fuzzy patch to the naked eye. Use low power to resolve this large, rich cluster in a telescope.
- M44** Known as the Praesepe or Beehive Cluster, this open cluster is easily visible to the naked eye as a large, fuzzy patch wider than the moon. Binoculars or wide field, low power telescopes provide the best views of M44.
- M81, M82** Both galaxies will fit into the same low power telescope field. M81 will appear as a large oval gray patch of light. M82 is a pencil like streak of light next to and perpendicular to the long axis of M81.

#### *April Messier targets*

- M40** This is a pair of faint stars located in Ursa Major. In telescopes, they appear to be an identical pair of stars and easy to split even at low power.
- M108** This galaxy will appear as a thin streak of light in telescopes, there is a definite brightening towards the middle. M108 is a very tough object for the largest binoculars.
- M97** This planetary nebula in Ursa Major, also called the Owl nebula, appears as a fairly large, round, hazy patch of light in a telescope. It is in the same field of view as M108 at low to medium powers.
- M109** This spiral galaxy in Ursa major appears as a small, oval patch of light. It can be found in the same field of view as Gamma UMa at low to medium power in a telescope.
- M106** This galaxy in Canes Venatici appears as an oval patch of light, larger than M109, with a fairly bright core.
- M95** This galaxy in Leo appears as a faint round patch of light with a bright nucleus.

(Continued on [page 13](#))

## What's Up in Awards? March-April 2022 (continued)

- M96** Look for M96 in the same low power telescope field as M95. Another round patch of light, slightly larger and brighter than M95, it too has a stellar core.
- M105** This is a small elliptical galaxy in Leo and can be found in the same low power field as M96. It looks like a small fuzzy star. M105 has a close companion galaxy, NGC 3384, which is only slightly smaller and fainter than M105. To prevent confusion, M105 is the closer of the pair to M96.
- M65** A small, but relatively bright galaxy in Leo. It is an elongated oval patch of light with a bright stellar core.
- M66** A close companion galaxy to M65, it can be seen in the same low to medium power field as M65. M66 is another oval patch of light, brighter and slightly wider than M65. While you are here be sure to look for a thin streak of light which is the galaxy NGC 3628. It can be found north of M66 in the same low power telescope field as both M65 and M66.

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

**Mercury:** Morning planet, poorly placed throughout the month.

**Venus:** Bright morning planet, 50% phase around 20 March. Near Mars and Saturn at end of March.

**Mars:** Morning object, slowly brightening. Sits close to Saturn and Venus at end of month.

**Jupiter:** Solar conjunction on 5 March; thereafter Jupiter not visible for the rest of the month.

**Saturn:** Poorly positioned morning planet. Near Venus and Mars at end of March. Crescent Moon nearby on 28 March.

**Uranus:** Best at the start of March. Currently in southern Aries, lost by end of the month.

**Neptune:** Neptune in conjunction with the Sun on 13 March and not visible this month.

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

**Mercury:** Impressive in evening, sets over 2 hours after sunset by end of April. Close brush with the Pleiades at month end (see chart next page).

**Venus:** Bright morning planet, low before sunrise. Near Mars and Saturn at start of month, close to Jupiter at end (see chart next page).

**Mars:** Morning planet. 19 arcminutes from Saturn on 5 April. Rises 90 minutes before sunrise at end of April.

**Jupiter:** On 30 April, morning planets Jupiter and Venus appear 40 arcminutes apart, rising one hour before sunrise (see chart next page).

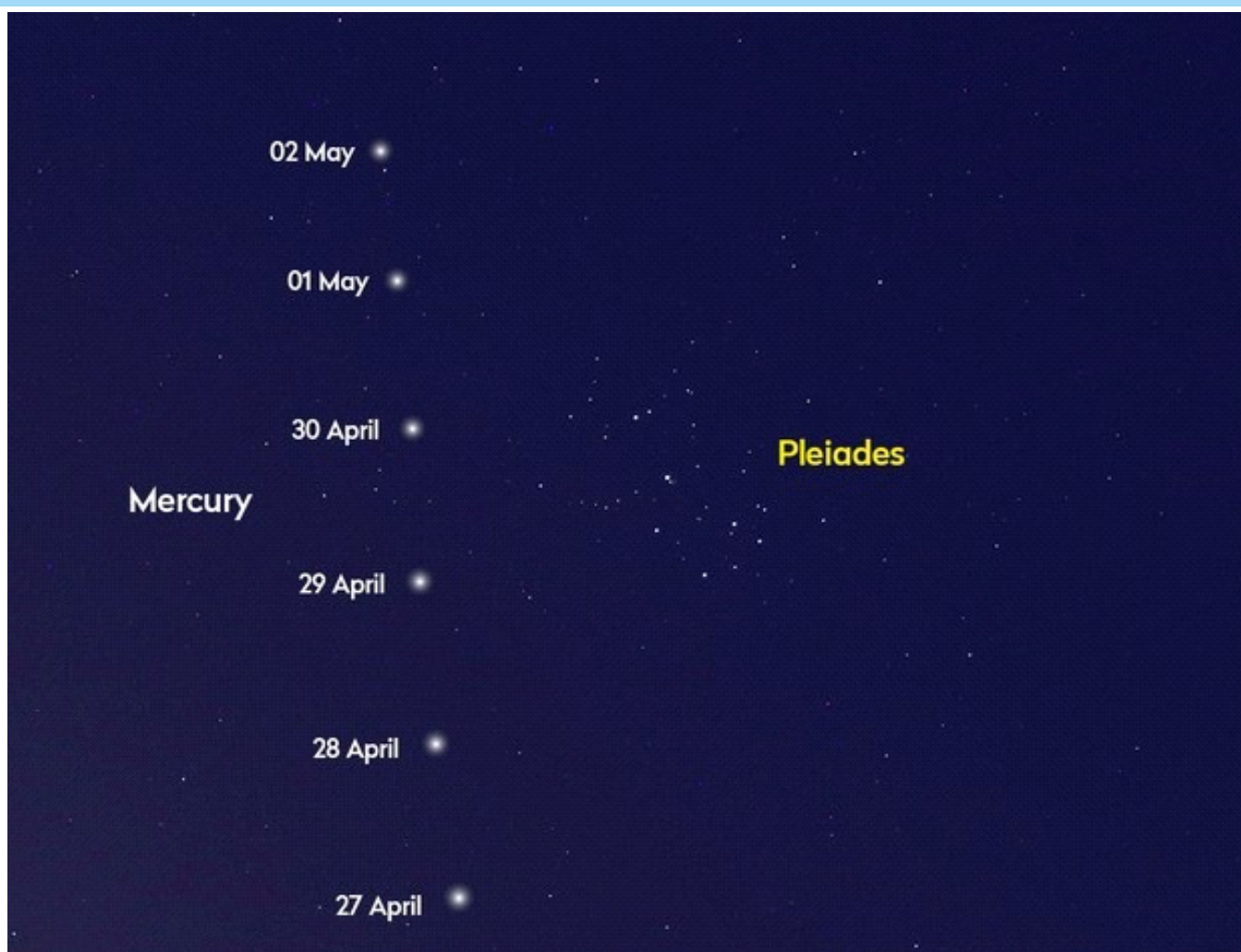
**Saturn:** Morning object, never gaining much height. Mars is 19 arcminutes away on morning of 5 April.

**Uranus:** Evening planet, just visible at start of April, then rapidly lost. Crescent Moon close on 3 April.

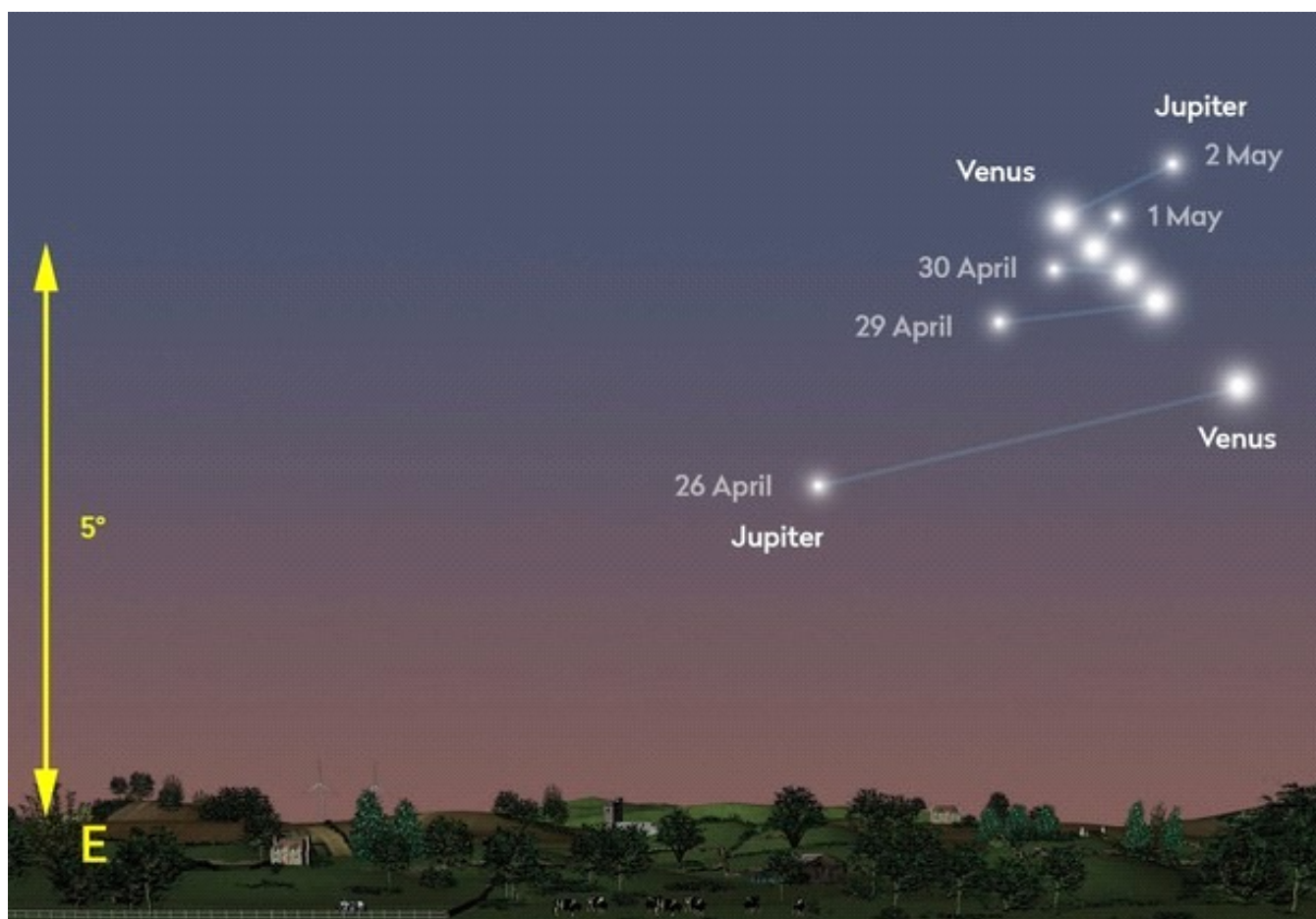
**Neptune:** Morning planet, but not viable for observation this month.

(Continued on [page 14](#))

## What's Up in Awards? March-April 2022 (continued)



*Mercury sets approximately two hours after the Sun at the end of April, a time when it will appear near to the Pleiades open cluster. Credit: Pete Lawrence*



*Venus has a spectacular morning conjunction with Jupiter at the end of April and into early May. Visible in the morning sky approximately 30-45 minutes before sunrise. Closest apparent separation of 22' 43" occurs on 1 May. Credit: Pete Lawrence* (Continued on [page 15](#))

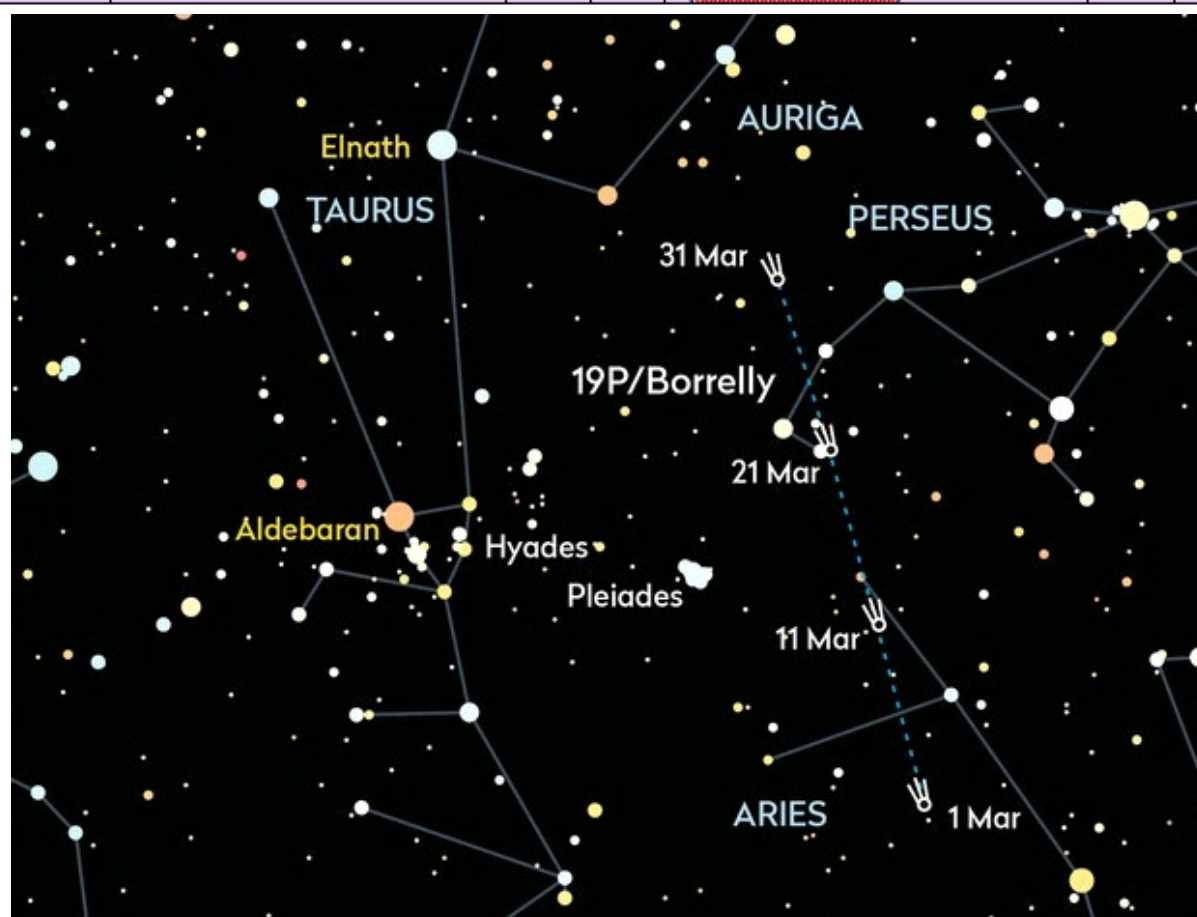


# What's Up in Awards? March-April 2022 (continued)

## Comets March-April 2022

Mg = Magnitude, h= height above horizon

	Evening			Midnight			Morning		
	Comet	Mg	h	Comet	Mg	h	Comet	Mg	h
2022 Mar	19P/Borrelly	9	46	C/2017 K2 (PanSTARRS)	9	1	C/2017 K2 (PanSTARRS)	9	54
	C/2019 L3 (ATLAS)	10	76	C/2019 L3 (ATLAS)	10	35	22P/Kopff	10	8
	C/2019 T4 (ATLAS)	11	13	C/2019 T4 (ATLAS)	11	33	C/2019 T4 (ATLAS)	11	9
	67P/Churyumov-Gerasimenko	12	81	67P/Churyumov-Gerasimenko	12	60	9P/Tempel 1	12	18
	C/2021 F1 (Lemmon-PanSTARRS)	12	12	104P/Kowal 2	12	14	C/2021 F1 (Lemmon-PanSTARRS)	12	13
	104P/Kowal 2	12	64	116P/Wild 4	13	74	C/2021 E3 (ZTF)	12	8
2022 Apr	C/2019 L3 (ATLAS)	10	60	C/2017 K2 (PanSTARRS)	8	26	C/2017 K2 (PanSTARRS)	8	64
	19P/Borrelly	10	42	C/2019 L3 (ATLAS)	10	10	22P/Kopff	10	10
	C/2019 T4 (ATLAS)	11	40	19P/Borrelly	11	3	C/2021 E3 (ZTF)	11	8
	C/2021 P4 (ATLAS)	13	20	C/2019 T4 (ATLAS)	11	37	9P/Tempel 1	12	15
	116P/Wild 4	13	74	C/2021 P4 (ATLAS)	13	5	C/2021 A1 (Leonard)	12	11
	C/2019 U5 (PanSTARRS)	13	36	116P/Wild 4	13	44	C/2021 P4 (ATLAS)	13	12
	C/2020 V2 (ZTF)	13	64	C/2019 U5 (PanSTARRS)	13	82	C/2019 U5 (PanSTARRS)	13	84



*Comet 19P/Borrelly is a viable target for small telescopes in March 2022, shining brighter than 10th magnitude.*

*Credit: Pete Lawrence*

*(Continued on [page 16](#))*

## What's Up in Awards? March-April 2022 (continued)

### Meteor Showers via American Meteor Society

There are no major meteor showers taking place in February or March.

#### Lyrids

**Period of activity:** April 15th, 2022 to April 29th, 2022

**Peak Night:** Apr 21-22, 2022

The Lyrids are a medium strength shower that usually produces good rates for three nights centered on the maximum. These meteors also usually lack persistent trains but can produce fireballs. These meteors are best seen from the northern hemisphere where the radiant is high in the sky at dawn. Activity from this shower can be seen from the southern hemisphere, but at a lower rate.

**Shower details - Radiant:** 18:04 +34° - **ZHR:** 18 - **Velocity:** 30 miles/sec (medium - 48.4km/sec) - **Parent Object:** C/1861 G1 (Thatcher)

**Next Peak** - The Lyrids will next peak on the Apr 21-22, 2022 night. On this night, the moon will be 67% full.

**However... If you happen to catch a meteor it may belong to one of these groups.** The meteor showers listed below rarely produce an average of more than two shower members per hour. In some cases, these showers have been recently discovered by video means, being too weak for visual observers to pick out from the sporadic background. This list is being provided for the experienced observer in order to follow the activity of these weak showers. Good luck with your observations

Shower	Activity Period	Maximum		Radiant		Velocity	Max.	Time	Moon
		Date	S. L.	R.A.	Dec.	km/s	ZHR		
<u>xi Herculids</u>	Mar 06-Mar 20	12-Mar	351.3°	16:58	+48.6°	35.4	<2	400	9
<u>delta Mensids</u>	Mar 02-Mar 26	12-Mar	352.0°	4:09	-74.4°	30.9	<2	500	9
<u>beta Tucanids</u>	Mar 02-Mar 26	13-Mar	352.33°	4:07	-77.0°	31	<2	500	10
<u>delta Pavonids</u>	Mar 11-Apr 16	31-Mar	010.0°	20:32	-63.0°	58	<2	500	0
April epsilon Delphinids	Mar 31-Apr 20	09-Apr	019.5°	20:30	+11.5°	60.5	<2	400	7
<u>kappa Serpentids</u>	Apr 11-Apr 22	16-Apr	026.0°	16:30	+17.9°	45.6	<2	400	15
<u>alpha Virginids</u>	Apr 06-May 01	18-Apr	028.0°	13:26	+03.9°	19.3	<2	100	17
<u>h-Virginids</u>	Apr 24-May 04	01-May	041.0°	13:35	-11.4°	17.6	<2	400	1

(Continued on [page 17](#))

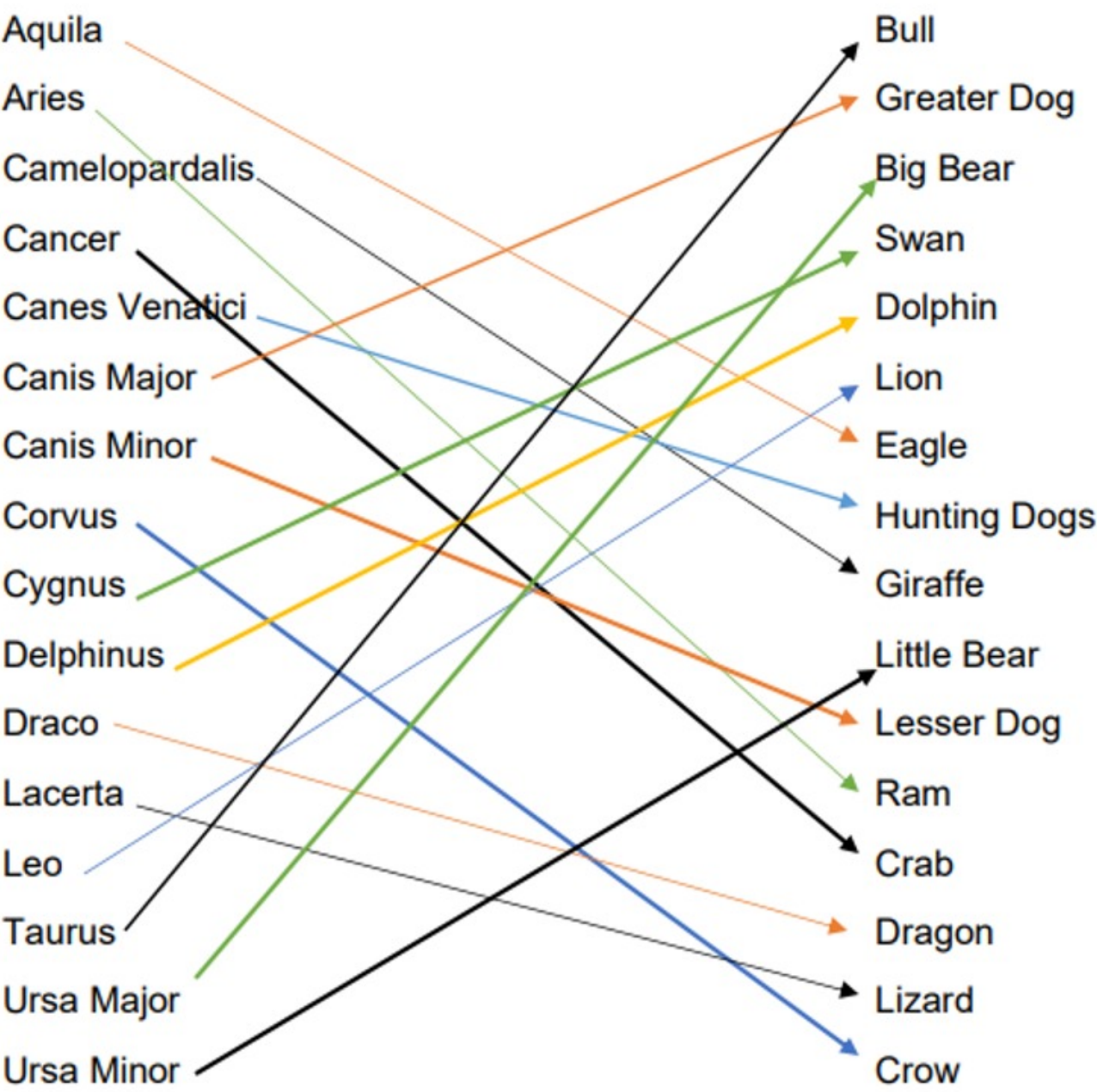
Observing Award Recipients

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:

<u>HAA</u>	<u>RASC</u>	<u>Astronomical League</u>
<u>Rising Star Awards</u>	Swapna Shrivastava	Bernie Venasse
001 Jean Jefferson	Explore the Moon	Binocular Double Star Observing Program 143
002 Kevin Salwach	Explore the Universe	Binocular Variable Star Observing Program 051
003 Jo Ann Salci (Nov 2021)	Jo Ann Salci	Binocular Solar System Observing Award 183-B
	Exploring Exoplanets (on-line course)	Sketching Observing Program 052
	Bernie Venasse	Meteor Observing Program 207 (new this month)
	Explore the Universe (new this month)	

Please feel free to contact me with any questions or comments at [chair@amateurastronomy.org](mailto:chair@amateurastronomy.org)  
— Bernie

Match Maker Answers:







## An Astronomical Romance by John Gauvreau

### The Story of Henry and Anna Palmer Draper

I was asked to talk about love of astronomy, but considering the group I am talking to, I figured there was little I could tell you about that that you didn't already know. So rather than talk about love of astronomy I decided to talk about love AND astronomy.

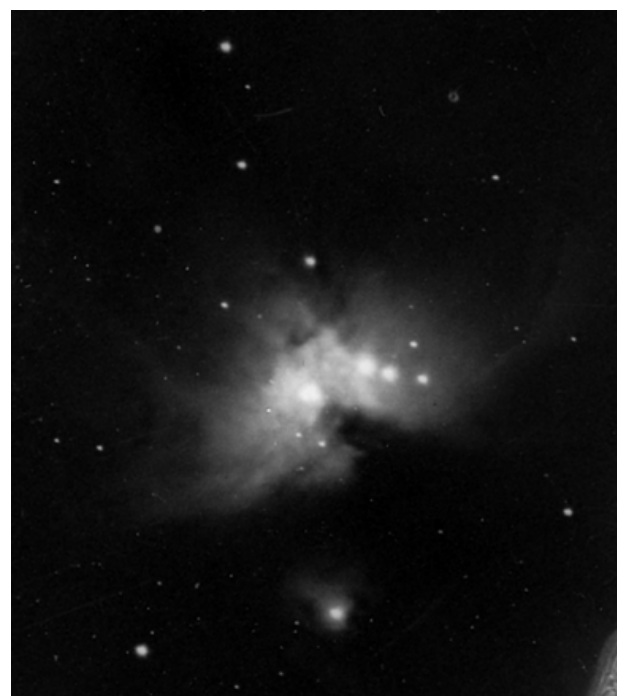
Henry Draper (below left) was a doctor who worked at Bellevue hospital in New York in the mid 1800's. Later he was a professor and dean of medicine at New York University, which is the school he graduated from years earlier. He was also an accomplished chemist and...he was an amateur astronomer.

In fact, his skill and passion for astronomy were so strong that he eventually quit his job to pursue that passion. In 1873 he observed and photographed the transit of Venus and in 1880 he became the first person to photograph the Orion Nebula (see at right).

How did he manage to not work and just pursue his hobby? Well, wouldn't we all like to know the secret to that? The answer lies in the fact that this isn't actually a story about Henry Draper. It is a story about love and astronomy, and in this case, it is all about Henry's wife.

Meet Mary Anna Palmer (below right). She was an American socialite and independently wealthy. Her father was a real estate and railroad investor and Anna never wanted for money, growing up in a mansion in New York. When her father died she became immensely wealthy. And she loved Henry. She married

*(Continued on [page 19](#))*



## An Astronomical Romance (continued)

him, dropped her first name but kept her last and became Anna Palmer Draper. They were crazy for each other, threw parties in their New York home and were happy.

Not only did she want to support his pursuit of astronomy, but she found she was passionate about it as well. Here's how much they were crazy for each other and their hobby; for their honeymoon they went all the way to lower Manhattan (a whole 20 something kilometers away) to purchase a 28" mirror blank. They ground it and polished it and silvered it and made a very impressive telescope.

The mansion became half home and meeting place for the academic society of the city, and half laboratory and workshop. They hosted dinner parties for the National Academy of Sciences, holding lectures and exhibits right in their home, and encouraged scientists to come and share their discoveries and explorations. And they exhibited their own astrophotography there.

They had 15 great years, working together and living together, and were truly partners. And then, just when they were set to begin a massive systematic survey of stellar spectra, Henry died of pneumonia at the age of 45. She was 43.

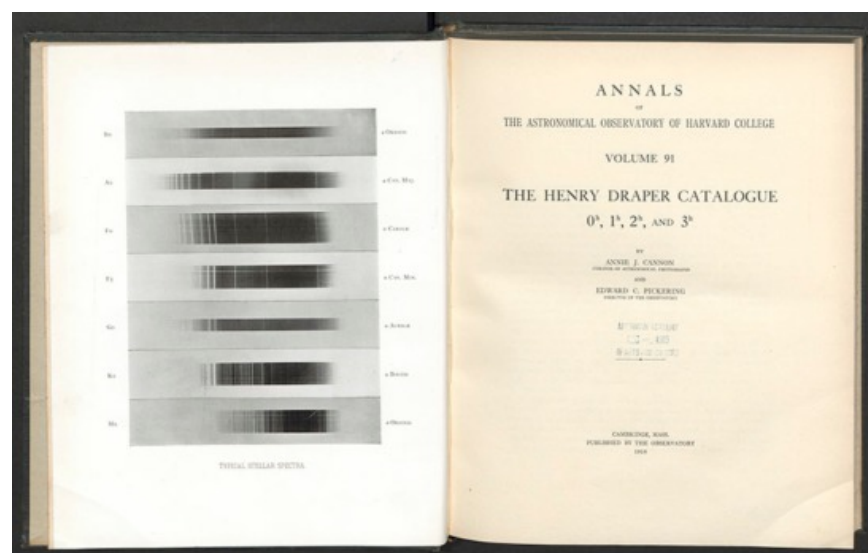
Anna was devastated and didn't want to do the work on her own. It just wasn't in her to continue without him. So she donated all the telescopes, all the research and a massive sum of money to the Harvard College Observatory. She arranged to have everything transported there, assembled and housed properly, all at her expense. She literally built building to house it all.



And it was there that Edward Pickering took up the task of classifying the stars according to their spectral signatures, the very work that the Drapers had been doing. He hired a staff to study the spectra. Draper was not among the staff she chose to remain the driving force behind the scenes, but she visited often. The staff were all women because they were paid less than men so Pickering could hire a larger staff. Make Draper's money go further. But among that staff were such luminaries as Annie Jump Cannon, Willamina Flemming and Henrietta Swan Leavitt, who discovered the means to measure intergalactic distances using Cepheid variable stars.

Although staying connected from a distance, Anna Draper wrote to Pickering often. In fact, she and Pickering corresponded several times a week and got on very well as colleagues and friends, and that friendship extended to Pickering's wife Lizzie. Every letter Draper wrote began "My dear Professor Pickering" and every response that he wrote began "My dear Mrs. Draper". She insisted on being kept up to date on all the work that

(Continued on [page 20](#))





## An Astronomical Romance (continued)



*Anna's staff were all women.*



*Henry Draper's  
photograph of the  
Moon*

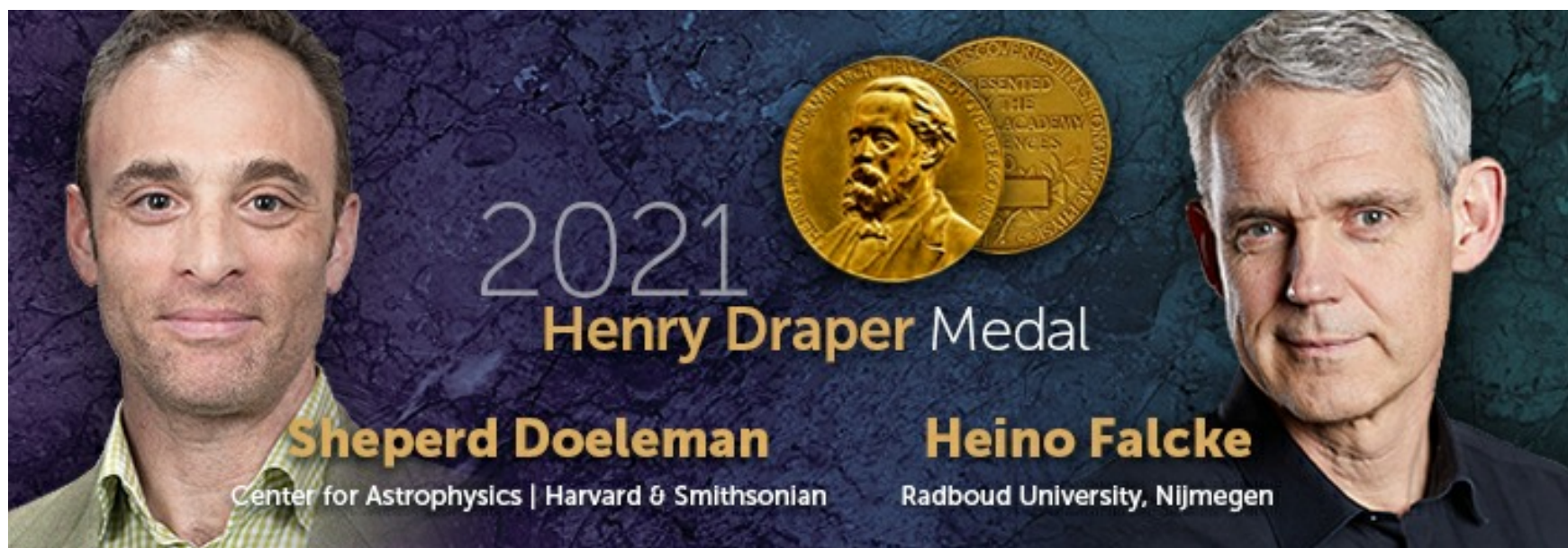
went on there. She may have been behind the scenes but she was very hands on, participating in choosing the direction of research and deployment of equipment. She knew her stuff! And of course, to her, this was her husband's work, or at least his legacy.

She also funded Pickering's expeditions to the American southwest in search of an observing site in a more suitable climate. Pickering found one and it is now the home of the Mount Wilson Observatory, where Edwin Hubble used Henrietta Swan Leavitt's Cepheid variables to measure the distance to the Andromeda Galaxy and prove that the universe was much more vast than previously imagined.

Anna lived to be 75 and never remarried. She was devoted to the memory of her husband and felt the best way to honour that memory was through the continuation of his work. By the time she died she had put the equivalent of millions and millions of dollars into the observatory and its operation, and in her will left millions more so they could continue the work into the future.

She also founded and funded the National Academy of Sciences Henry Draper Gold medal for contributions to astrophysics. The award is given every 4 years and continues to this day. Some past recipients were George Ellery Hale, Vesto Slipher, Harlow Shapley, Annie Jump Cannon, Martin Schwartzschild, Penzias and Wilson,

*(Continued on [page 21](#))*

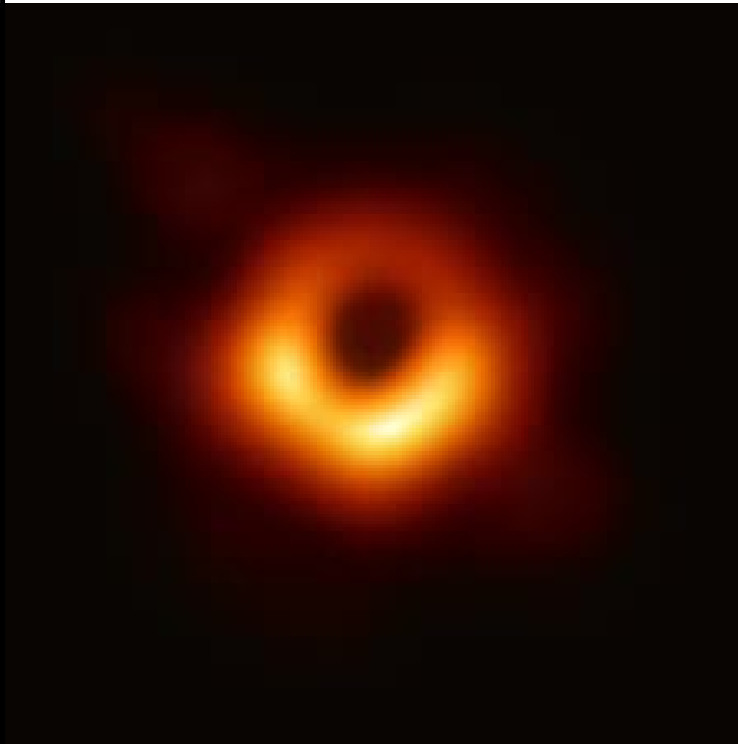




## An Astronomical Romance (continued)

Subrahmanyan Chandrasekhar and Lyman Spitzer (you recognize those names because they both have space telescope named after them). Most recently, in 2021, the award went to Sheperd Doeleman, and Heino Falcke for (and I'm reading the actual citation here) "their vision and their leadership within the Event Horizon Telescope collaboration, embracing theory, instrumentation, observation and analysis in combining radio telescopes around the world to image the shadow of the supermassive black hole in the nearby galaxy M87, thereby validating Einstein's general theory of relativity." Fittingly, Sheperd Doeleman is from the Harvard & Smithsonian Center for Astrophysics.

Henry and Anna's romance was brief but passionate, and in each other they found their biggest supporters and helpers. Together they were able to spread their passion to others and propel the sciences of stellar astrophysics, spectroscopy and astrophotography beyond what anyone else had dreamed at the time. And that is what you can do when bring together love and astronomy.



*(above)*  
*M87's Central Black Hole*

*Image Credit: Event Horizon Telescope collaboration et al.*



*Harvard College Observatory*



*(right)*  
*Henry Draper's and Mary  
Anna Palmer's grave stone*



# Earth Grazing Eclipses - I by Ray Badgerow

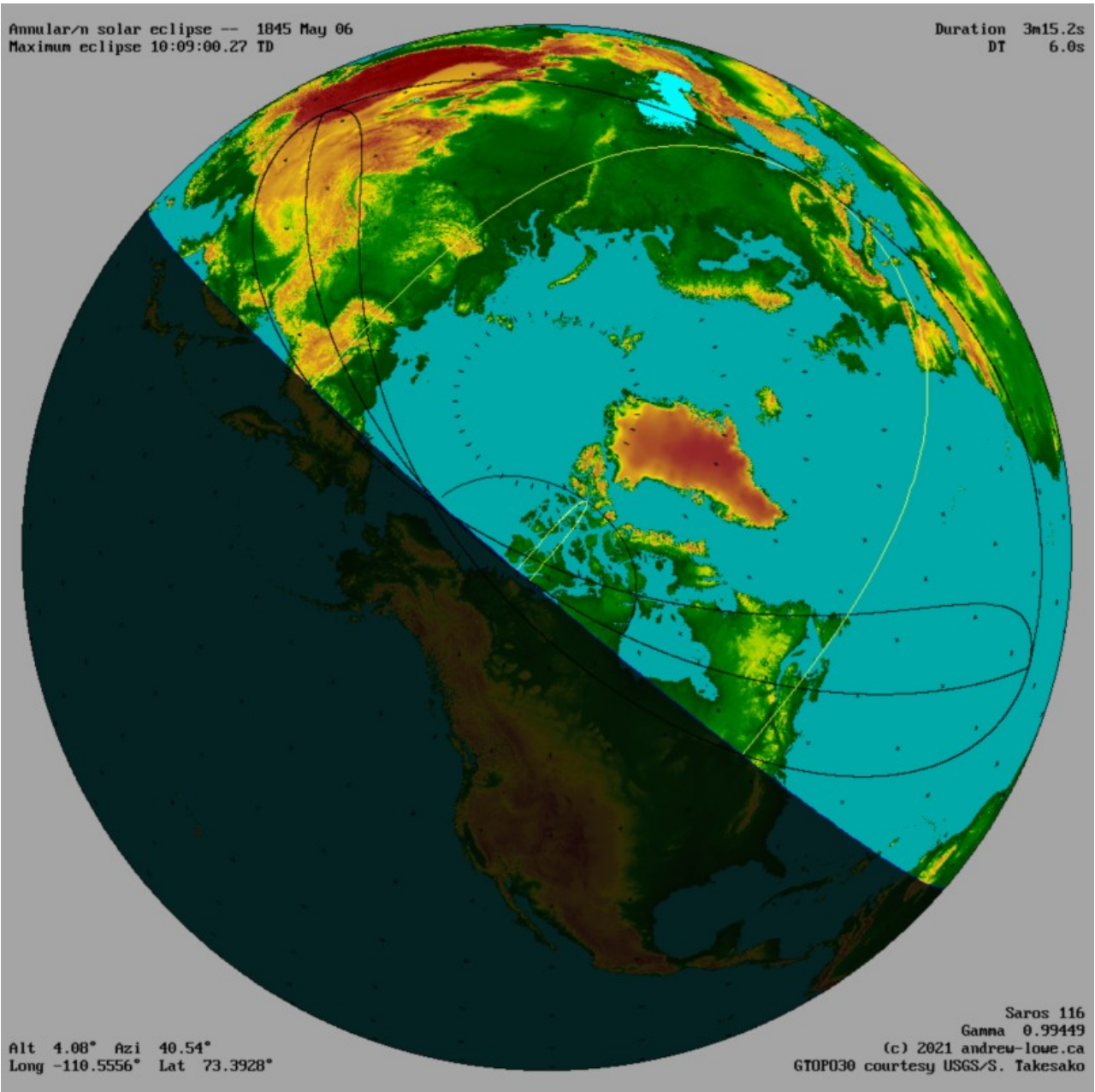
In most cases, the central core of the Moon’s shadow touches down on the Earth’s surface resulting in a total,annular, or hybrid solar eclipse with both a northern and southern limit. In a small number of cases, the moon’s (ant)umbral shadow grazes the Earth’s surface at an oblique angle at the sunrise or sunset terminator resulting in an eclipse without a northern or southern limit. These eclipses have a D-shaped path on the Earths’s surface. Depending upon the hemisphere these eclipses are designated as:

- An - annular with no northern limit
- Tn - total with no northern limit
- As - annular with no southern limit
- Ts - total with no southern limit.

My own experience with such an unusual eclipse occurred on May 31, 2003 from northern Iceland, as recounted in Event Horizon. That eclipse also had the oddity of moving backwards from East to West on the Earth’s surface since the moon’s shadow passed beyond the North Pole in late spring before the summer solstice.

Here is an image below of the 1845 Annular eclipse courtesy of [Andrew Lowe](#), [Andrew Lowe’s Minor Planet Home Page](#) ([andrew-lowec.ca](#))

Since Canada is a northern nation we get to experience events of this nature, listed below:



Credit: andrew-lowec.ca

Date	Type	Gamma	Duration	Path Width(km)
0123 Nov 08	An	0.9783	8m20s	1699
0246 Apr 03	Tn	0.9886	2m59s	1390
0267 Sep 06	Tn	0.9879	2m32s	1166
0361 Aug 17	An	0.9936	3m12s	2363
1494 Mar 07	Tn	0.9940	2m06s	1575
1523 Aug 11	Tn	0.9699	2m44s	5586
1845 May 06	An	0.9945	3m15s	2837
2449 Nov 15	An	0.9810	7m35s	1658
2680 Jan 23	An	0.9969	2m46s	4144
2716 Feb 15	An	0.9875	2m55s	945





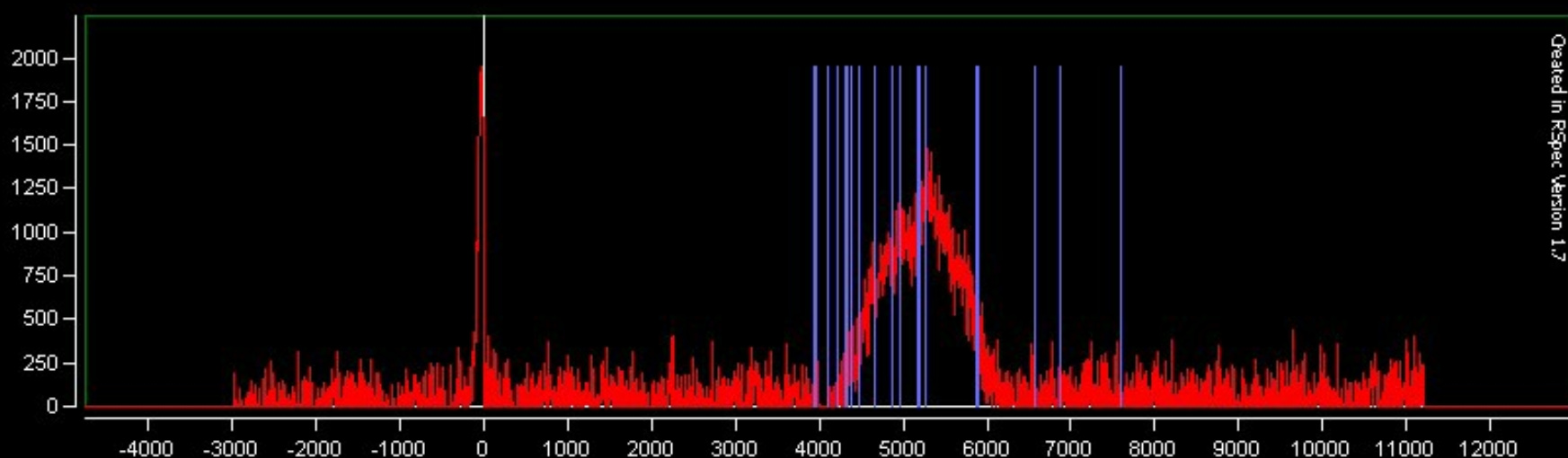
## Universal Complexity - Part 2 by Mike Jefferson

Last month I wrote an article on the complexity of a G2V (solar) spectrum reflected off the planet Mars. This month, I would like to take this a step further and compare a G2V spectrum to an A0V. The G2V spectrum (above) is the reflection of the sun off the planet Mars. The A0V spectrum (bottom) is Vega, a white main sequence star. The Vega spectrum is coloured for clarity and aesthetics. This is not really necessary, but it does make for a very colourful picture.

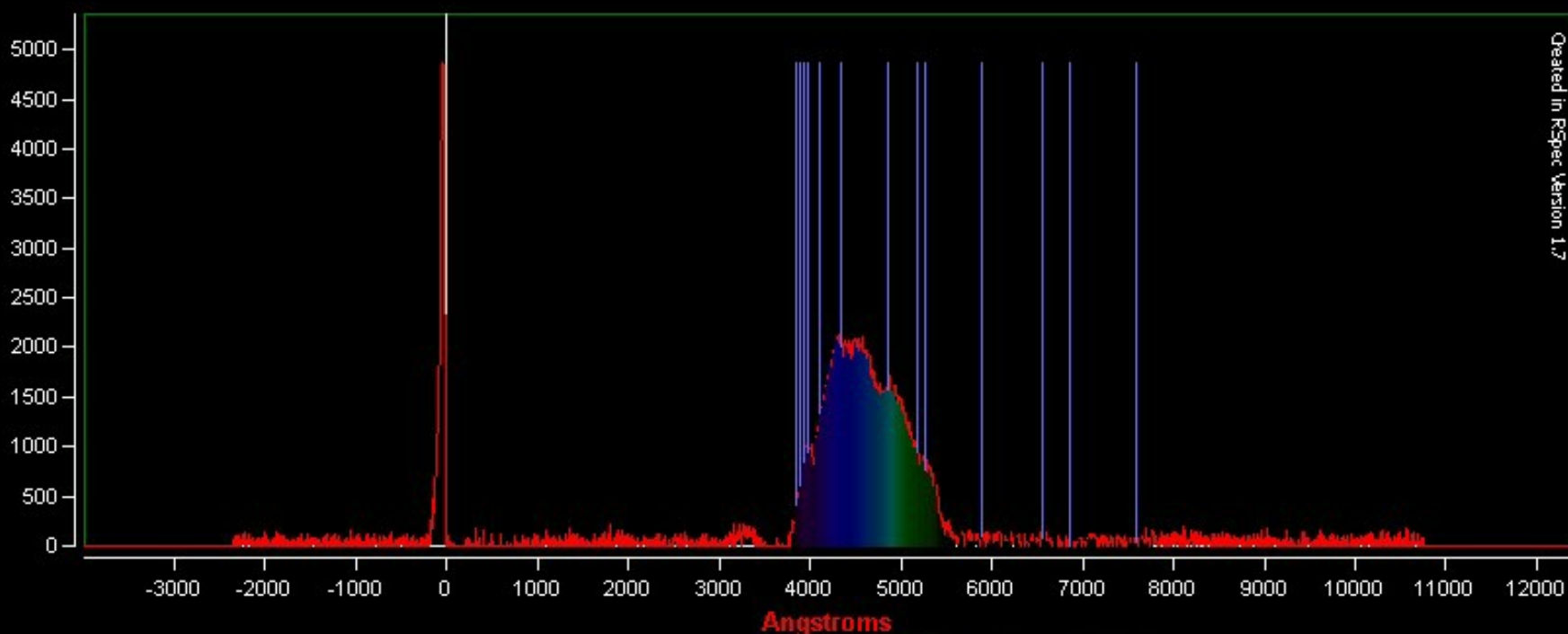
What I noticed recently was this; if you scan (or 'blink') from one image to another, you will get some very small movement. This 'blinking' was how Clyde Tombaugh discovered Pluto - flipping between images to see if anything moves - if it does it is a 'planet' (in this particular case). What I would encourage you to do with these spectra is to move between them and note the differences. You will see that the G2V is closer to the right hand side of the first 4 lefthand blue lines and the A0V skews closer to the left of these same lines. Use the 4th blue line from the right side as your measuring stick. An F star would fall between these two.

Skewing to the right (red) would mean a cooler star and skewing to the left (violet) would mean a hotter star. You don't even have to look at the colour of their images in an astrophoto and make a guess. The spectral proof of their temperatures is incontrovertible. A G2V star is 5,200-6,000 K and an A0V is 7,500-10,000 K and they are an F star apart. This is science and it is complex. It is also 'bullet proof'.

Profile



Profile







**This article is distributed by NASA Night Sky Network.**

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### Embracing the Equinox

David Prosper

Depending on your locale, equinoxes can be seen as harbingers of longer nights and gloomy weather, or promising beacons of nicer temperatures and more sunlight. Observing and predicting equinoxes is one of the earliest skills in humanity's astronomical toolkit. Many ancient observatories around the world observed equinoxes along with the more pronounced solstices. These days, you don't need your own observatory to know when an equinox occurs, since you'll see it marked on your calendar twice a year! The word "equinox" originates from Latin, and translates to *equal* (equi-) *night* (-nox). But what exactly is an equinox?

An *equinox* occurs twice every year, in March and September. In 2022, the equinoxes will occur on March 20, at exactly 15:33 UTC (or 11:33 am EDT), and again on September 23, at 01:04 UTC (or September 22 at 9:04 pm EDT). The equinox marks the exact moment when the center of the Sun crosses the plane of our planet's equator. The day of an equinox, observers at the equator will see the Sun directly overhead at noon. After the March equinox, observers anywhere on Earth will see the Sun's path in the sky continue its movement further north every day until the June solstice, after which it begins traveling south. The Sun crosses the equatorial plane again during the September equinox, and continues traveling south until the December solstice, when it heads back north once again. This movement is why some refer to the March equinox as the *northward equinox*, and the September equinox as the *southward equinox*.

Our Sun shines equally on both the Northern and Southern Hemispheres during equinoxes, which is why they are the only times of the year when the Earth's North and South Poles are simultaneously lit by sunlight. Notably, the length of day and night on the equinox aren't precisely equal; the date for that split depends on your latitude, and may occur a few days earlier or later than the equinox itself. The complicating factors? Our Sun and atmosphere! The Sun itself is a sphere and not a point light source, so its edge is refracted by our atmosphere as it rises and sets, which adds several minutes of light to every day. The Sun doesn't neatly wink on and off at sunrise and sunset like a light bulb, and so there isn't a perfect split of day and night on the equinox - but it's very close.

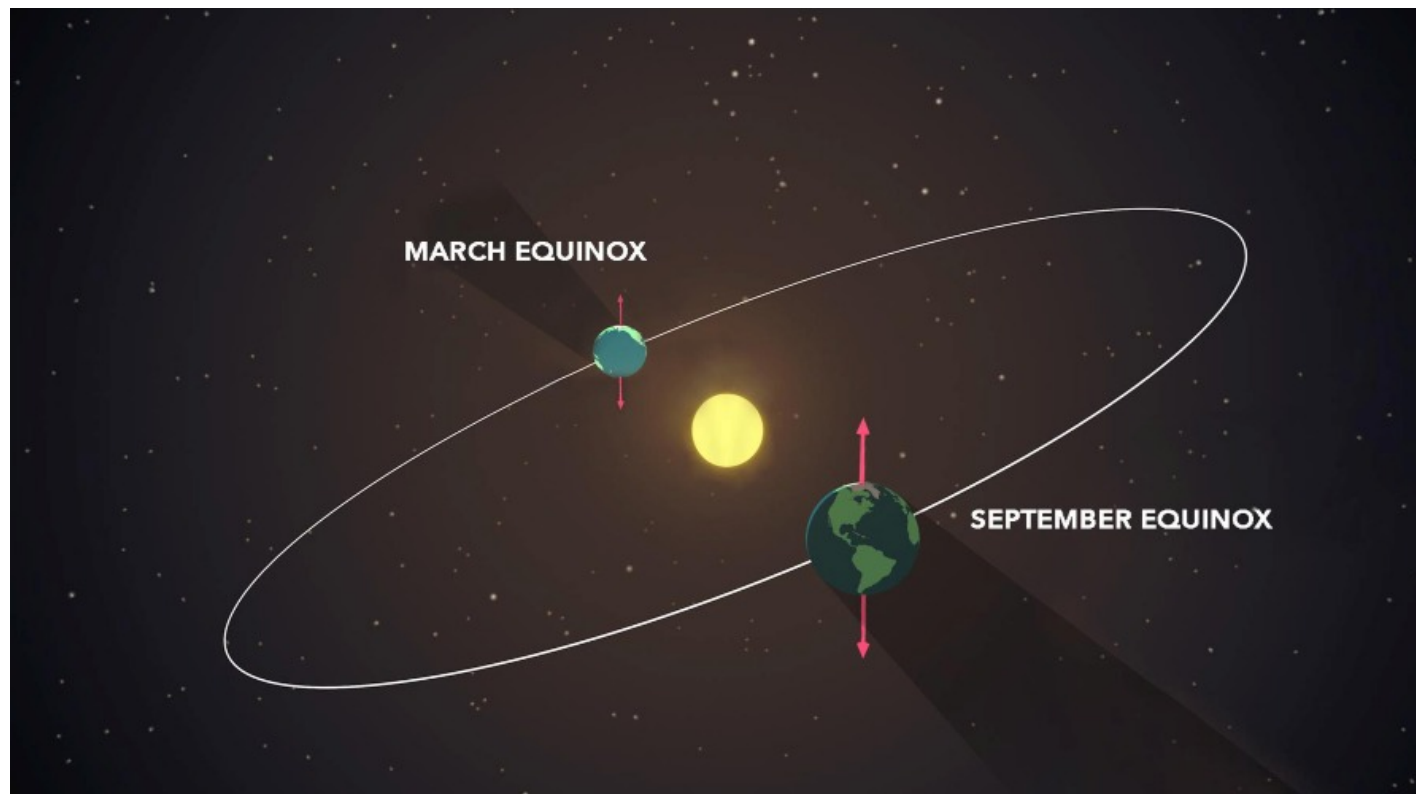
Equinoxes are associated with the changing seasons. In March, Northern Hemisphere observers welcome the longer, warmer days heralded by their *vernal*, or spring, equinox, but Southern Hemisphere observers  
(Continued on [page 25](#))

## NASA Night Sky Notes (continued)

note the shorter days – and longer, cooler nights - signaled by their *autumnal*, or fall, equinox. Come September, the reverse is true. Discover the reasons for the seasons, and much more, with NASA at [nasa.gov](http://nasa.gov).

*This (not to scale) image shows how our planet receives equal amounts of sunlight during equinoxes.*

*Credit:  
NASA/GSFC/  
Genna Duberstein*



### Solstice

December 21,  
2010



### Equinox

March 20,  
2011



### Solstice

June 21,  
2011



### Equinox

September 20,  
2011\*



*\*Image taken a few days  
early; equinox took place  
on Sept. 23, 2011*

*Scenes of Earth from orbit from season to season, as viewed by EUMETSAT. Notice how the terminator - the line between day and night - touches both the North and South Poles in the equinox images. See how the shadow is lopsided for each solstice, too: sunlight pours over the Northern Hemisphere for the June solstice, while the sunlight dramatically favors the Southern Hemisphere for the December solstice.*

*Source:  
[bit.ly/earthequinox](http://bit.ly/earthequinox)*

*Images: NASA/Robert  
Simmon*





**NGC 2244, the Rosette Nebula, by Pavle Culum**

Taken through Skywatcher 80ED scope with modded Canon 600D on HEQ5 Pro mount.  
Exposures: 120 x 90seconds; 3 hours total.



**The Heart Nebula, by Rich and Rosemary Kelsch**

Taken through a 105mm Astro-Physics Traveler scope with modded Canon 6D on Losmandy G-11 mount.  
Total exposure time: 5 hours & 45 minutes worth of 5-minute subs.



## UPCOMING EVENTS

March 11, 2022 - 7:30 pm – Virtual Online H.A.A. Meeting. Our main speaker will be *John Read*, and the topic will be *Goal Oriented Observing*.

Due to the COVID-19 Coronavirus pandemic, the meeting will be conducted on the platform Zoom. Be on the lookout for an invitation e-mail with a meeting link. You may download the Zoom app for various platforms from Zoom's [Download Center](#).

We hope to return to in-person meetings very soon!

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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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