Event Horizon

Volume 28, Number 8
June 2021

From The Editor

The weather is warming up, the pandemic is on the wane, we hope, and there should be some good stargazing in the months ahead.

Have a good summer everyone, and stay safe!

Bob Christmas, Editor

editor 'AT' amateurastronomy.org

Chair's Report by John Gauvreau

Summer is here (some days anyways; it's still pretty cold some other days. That was actually snow a few days ago, right?) and it's so nice to see the constellations wheeling about in their familiar parade; the spring constellations of Leo and Bootes giving way as the night goes on to the summer favourites of Lyra and Hercules rising in the east. Warm evenings with the moon riding low through the trees (and clouds). The night sky still gives me that sense of calm and quiet even during these difficult days. For many that is why this is more than just a hobby; it is a salve that offers a moment of peace and comfort in their otherwise challenging days.

HAA Meetings

Kevin Salwach gave us such a great presentation last month. Taking us through an introduction to binocular observing, he gave us a talk that suited both the beginner and the experienced observer. Thanks Kevin for a stellar job!

(Continued on page 2)

IN THIS ISSUE:

Chair's Report (continued)

Traditionally our June meeting is the last before a summer break, but that may not be the case this year. Keep an eye out for an email announcing a special summer meeting. For now, I hope you will join in on Friday June 11th for our next regular member's meeting.

A friendly reminder that all our meetings are being held online through the Zoom platform for the foreseeable future. If you have had any hesitation 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' to get help joining the meeting, even once the meeting has started.

Also, since we are holding our meetings online there can be no collection for the foodbank, but don't let that stop you from contributing yourself. It doesn't matter if it comes from the club or straight from the club members; there are people in need and any donation is always welcome.

Club Activities

Last month I told you that a couple of members of council wanted to consider changing the club logo, but in the end, council decided that the logo we had was pretty good (I agree!) and although blessed with an abundance of good choices (the alternative being considered was also excellent) council decided to leave well enough alone and continue with the current logo.

This all came about when it was decided that a banner would be useful at club meetings, outreach events and other public outings, and although a design was crafted by council as a group it was suggested that a new logo be decided upon before having the banner printed (by the same good folk who print our calendar). Hopefully we will all see the new banner when we resume in-person meetings, whenever that may be.

Observing

As of this writing, the stay-at-home order is still in place, although we can see light at the end of the tunnel. As the summer progresses and circumstances allow, we will begin to reopen observing opportunities. They might be small at first, the same as last summer, but we will do all we can as we work together with the NPCA to get back out under the night sky. As soon as the restrictions are lifted and we get the all-clear from the NPCA, I will let you know and hopefully we will get back out observing soon.

Eclipse

The partial solar eclipse is coming up on the morning of Thursday June 10th, and the club hopes to distribute solar glasses to all members who are energetic enough to get up before sunrise for the early morning eclipse. Watch for an email announcing when and where to pick up your eclipse glasses.

Conclusion

This may be the last issue of the club newsletter this summer, but it isn't the end of club activities. Keep an eye out for a summer meeting, casual drop in (on-line) get-togethers and observing as soon as we are able. Of course I hope you enjoy your summer and I hope you stay in touch.

Masthead Photo: *Mercury Near Greatest Elongation East, May 16, 2021,* by *Bob Christmas.*

Taken with a Canon 40D through a 100mm lens at f/3.5 from Burlington, ON. Exposure: ½ second. Mercury was conveniently located in a gap between a pine tree and a basswood tree.

The Summer "Impromptu" Star Party

Here is the update for the Summer Impromptu Star Party. I spoke to Brandon Good this morning and he is asking attendees to the star party to e-mail him with the following information:

- Name of party
- number of people in the vehicle
- date of arrival
- date of departure

Brandon will create a list and no one will be charged until they arrive so that no issues will arise with refunds if the health restrictions are renewed or we have to cancel for any reason.

outdoored@lprca.on.ca - Please put Summer Impromptu Star Party Registration in the Subject Line.

The rental of the field is $50 / day for our impromptu gathering. If everyone were to attend for all five days, that means an extra $250. I will split that up based on the number of people / vehicles attending so it will be a small addition to the daily camping rate charged for each vehicle. If we have ten vehicles, that would add $25 for the duration of the stay. More people come and the cost drops substantially.

We will have access to the field from the rear of the park so we can avoid driving through the entire camping areas. The gate will be opened for our access during the day and closed but not locked at night.

Brandon will be opening up the washroom facilities in the building nearest the field for our use. So no porta-potties!!! Further, as long as the provincial guidelines do not restrict us, we will be able to use the shower facilities also available in the park!

As long as we "space ourselves" to meet public health guidelines and follow the requirements regarding the use of the field, we are going to have a great camping trip and star-gazing event!

There is sufficient room on the field for at least 60 vehicles and still provide sufficient spacing for scopes to be set up and so on.

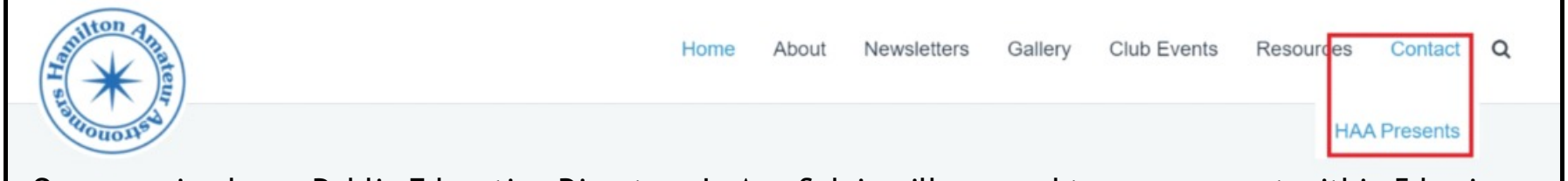
I will be bringing two generators to ensure we have the ability to charge power packs and electronic devices during the daylight hours.

— Dan Copeland, May 19, 2011 dan@dancopeland.ca

"HAA Presents"

Members of the public of any age in the GTHA can now request an in-person (once it is safe to do so) or virtual presentation from the HAA directly on our website.

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



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

HAA Explorers by Jo Ann Salci

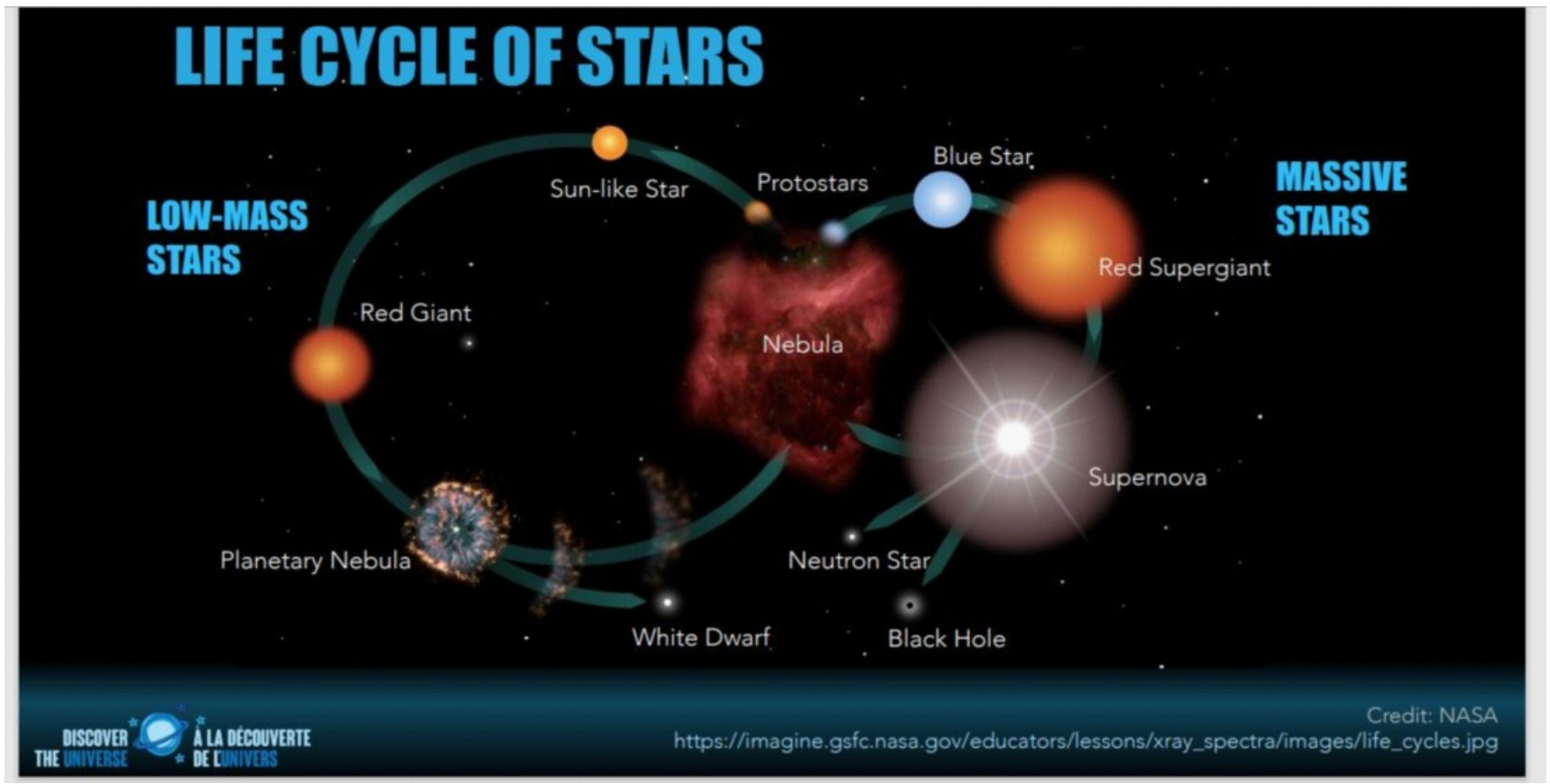
…A column for young astronomers - and those young at heart!

Welcome back! Last month we learned about our closest star, the Sun. This month we will explore how stars are made, and the fun we can have looking at them in the sky!

A Star is Born!

Last month we learned that stars spin and are made of very hot, burning gases. But how are they created? Let's explore!

Stars are made from clouds of dust and gas in space. These clouds are called Nebulae (one is called a Nebula). Imagine making a sand-castle. The sand is loose until you press it together to make your castle. The same happens with stars. Gravity is what presses everything together. When the pressure from the gravity is so high and the cloud becomes so tightly pressed together, the gases cause heat and light to be made, and a star is born!



Stars come in different sizes and colours. Imagine you are making 2 different sized sand-balls instead of a sand-castle. The smaller sand-ball would have less grains of sand in it than the larger sand-ball. The same is true for stars. Smaller stars (or low-mass stars) have less "stuff" in them than larger stars (massive stars). Smaller stars "live" longer, for billions of years, are cooler, and are usually yellow or red. Larger stars still "live" a long time, but less than the smaller stars, for millions of years. They are usually blue in colour and are very hot. The size of a star affects its temperature, brightness and life-span.

Stars start out as baby stars called Protostars. A smaller star like our Sun will "live" (burn gases) for billions of years before it gets bigger and becomes a Red Giant. After that, it explodes and becomes a cloud of dust and gas called a planetary nebula. What's left after all of this is a white dwarf. A larger star will "live" for millions of years before it gets bigger and become a Red Supergiant. After that, it will explode as a Supernova, which would be bright enough to see during daytime! The star Betelgeuse in the constellation Orion is an example of a Supergiant. We are all watching to see if it becomes a supernova!

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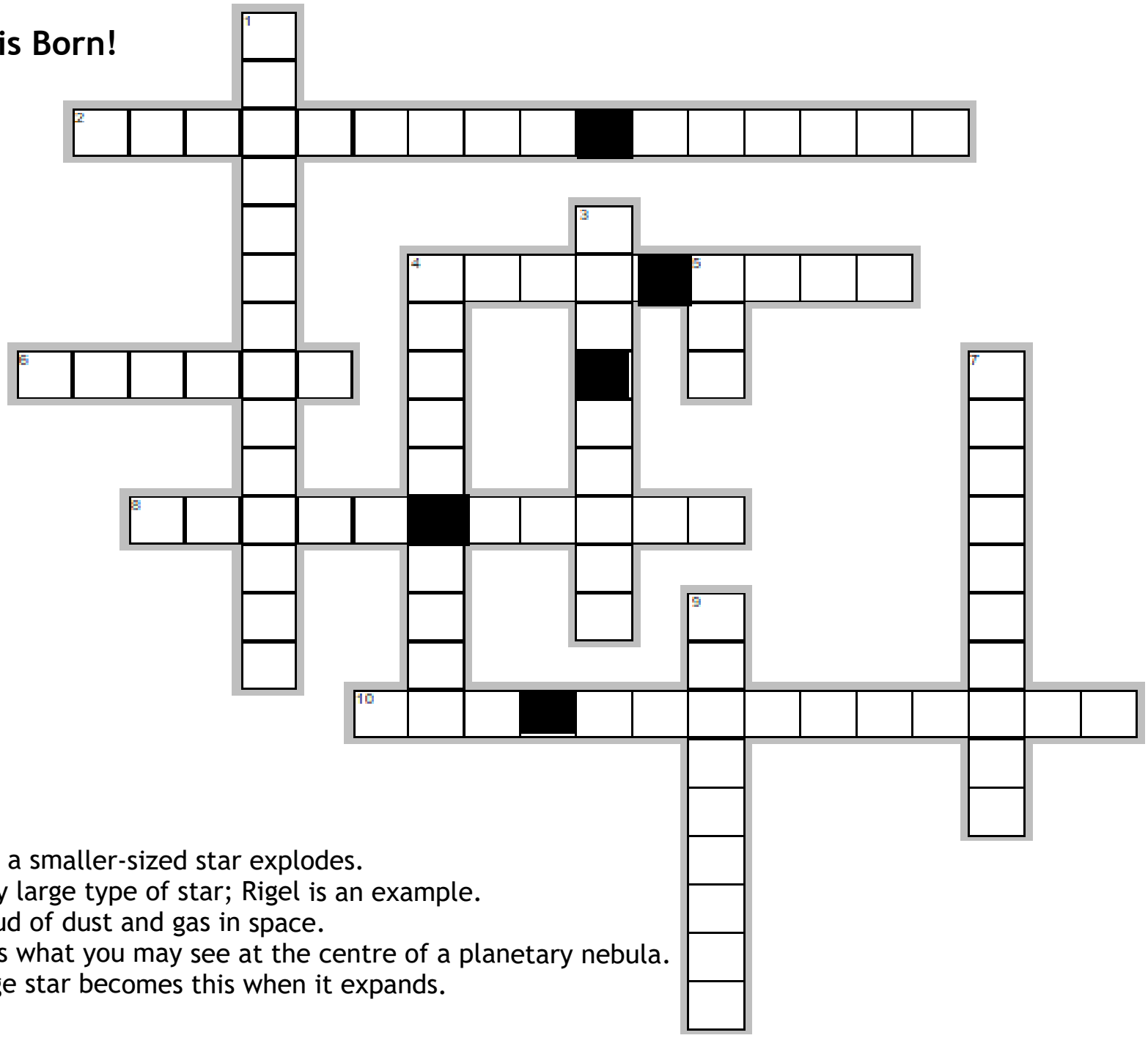
What's left after that will depend on how much stuff is leftover after the Supernova. Either a Neutron star or a black hole will form.

When you look up at the sky at night, you will see many stars. A long time ago, travelers used the stars to help them know where to go. They would connect the stars with imaginary lines… like a dot-to-dot puzzle… and create imaginary pictures of animals or people. These star pictures are called constellations. There are 88 constellations in the night sky.

A Star is Born!



Across

2. When a smaller-sized star explodes.
4. A very large type of star; Rigel is an example.
6. A cloud of dust and gas in space.
8. This is what you may see at the centre of a planetary nebula.
10. A large star becomes this when it expands.

Down

1. Imaginary pictures created by drawing imaginary lines between stars.
3. A smaller-sized star becomes this when it expands.
4. This could be left over after a supernova.
5. A medium-sized star close to Earth.
7. Baby stars.
9. When a large-sized star explodes.

Answers on page 9.

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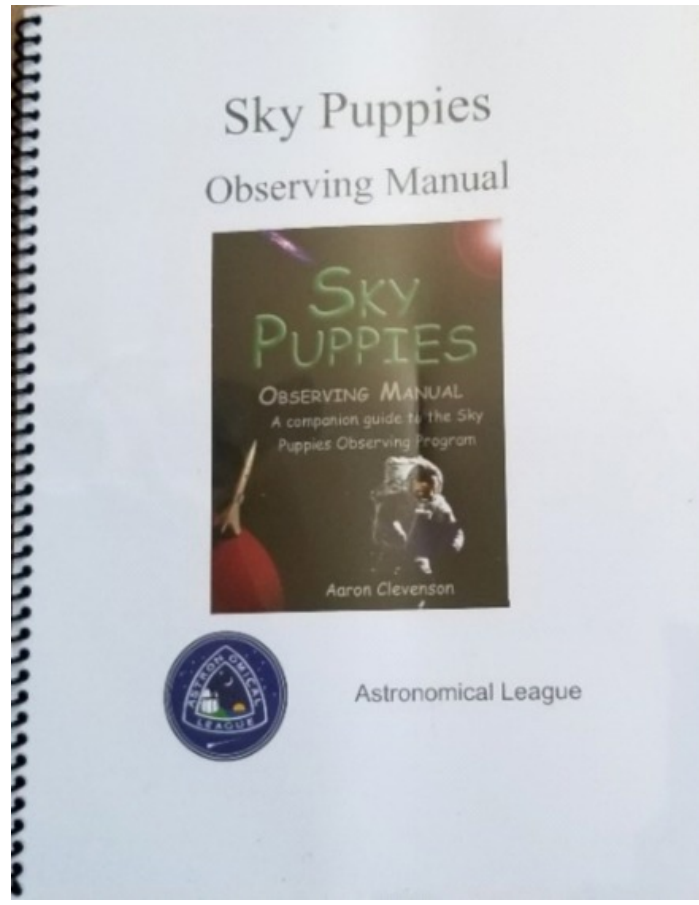
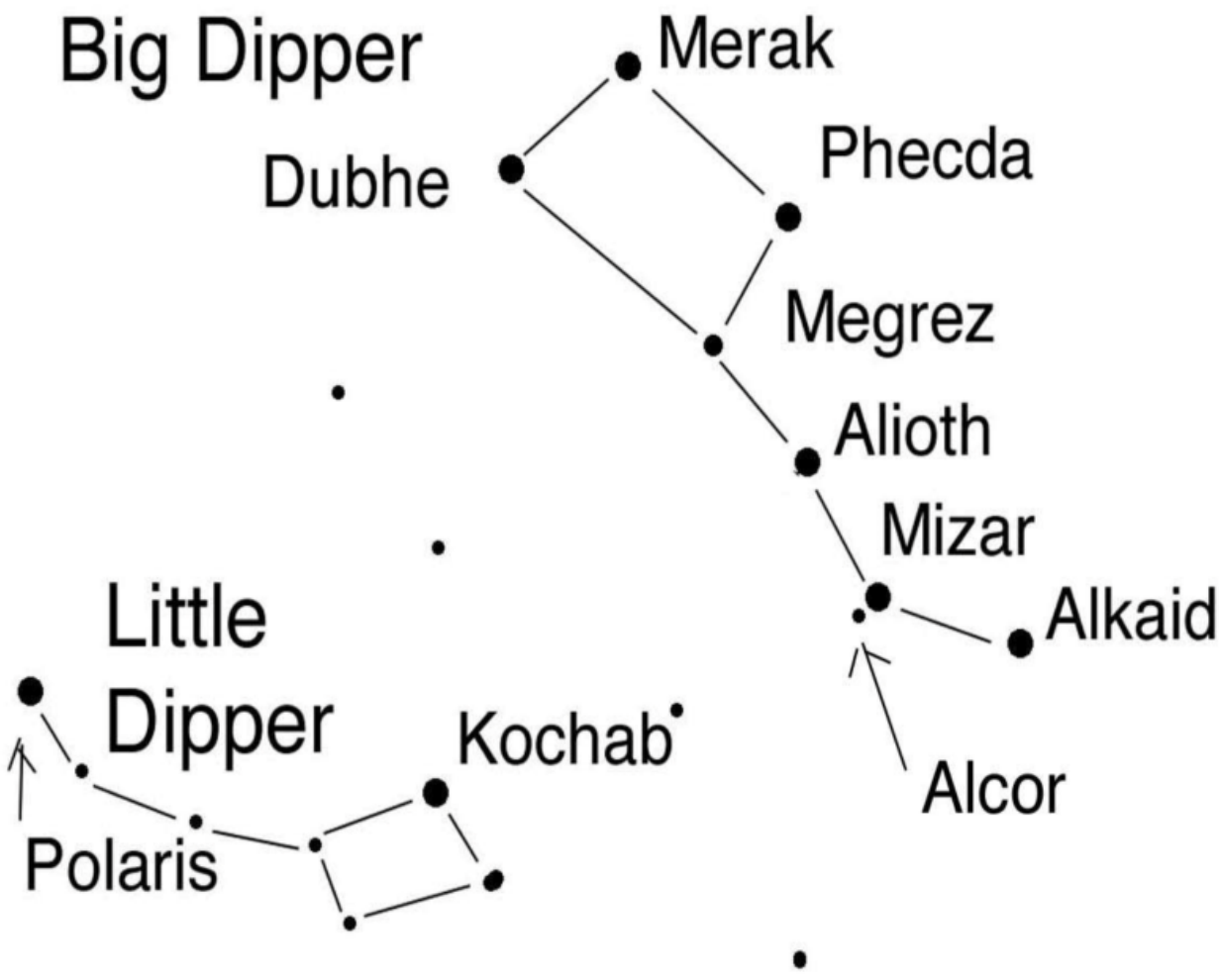
HAA Explorers (continued)

How many Constellations can you find? We can help get you started!! The HAA has a program called "Pathways" where you can get a certificate for finding things in the night sky! Please contact Bernie at eclipse@amateurastronomy.org to get a copy of the Pathways program. In the meantime, see below for two pages out of the program for you!

Another great award program is called Sky Puppies, from the Astronomical League. This program is available free for astronomers 10 years of age or younger. Please contact education@amateurastronomy.org for more information and to learn how to get your own free copy!



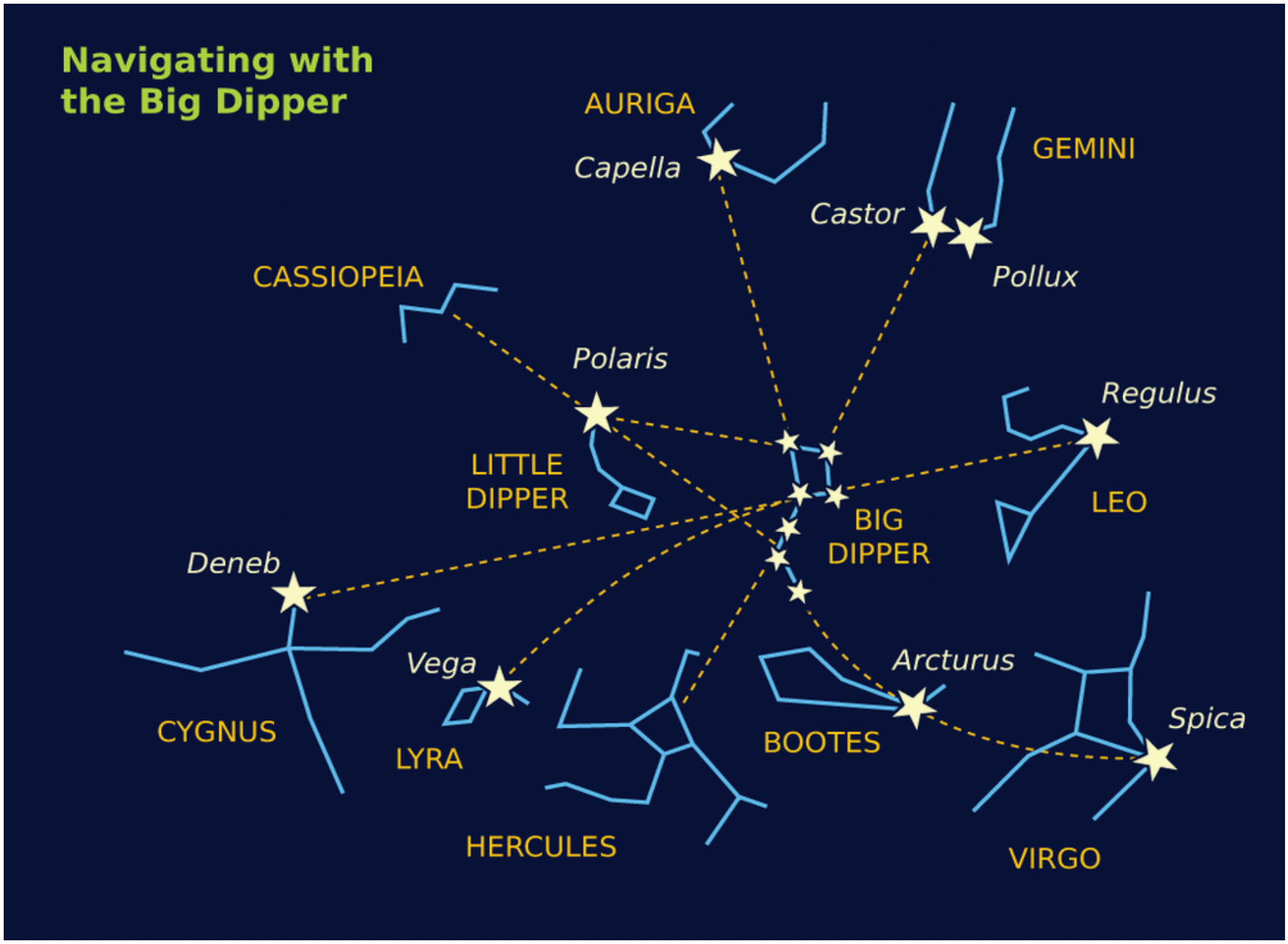
From the Astronomical League



From HAA Pathways

(Continued on page 7)

10 Steps to finding 10 constellations using the Big Dipper:



From HAA Pathways

1. Go from Merak to Dubhe (the pointers) and over to Polaris (the North Star) in the Little Dipper.
2. Go from Dubhe to Merak and you will reach the constellation Leo.
3. Alioth, Mizar, Alcor, Alkaid, Arcturus and Spica:
   a.) The stars Alioth, Mizar, Alcor, and Alkaid in the handle of the Big Dipper form an 'arc';
   b.) Follow this 'arc' to Arcturus, the bright star in the constellation Bootes.
   c.) Keep going until you 'Spike' down to shining Spica. Spica is that bright star in the constellation Virgo.
4. Megrez to Dubhe (top of the dipper bowl) points to bright Capella, in the constellation Auriga.
5. Megrez through Merak points to Castor in the constellation Gemini.
6. Start at Alioth and go through Polaris and you will arrive at the constellation Cassiopeia.
7. Start at Alioth, and go through the double stars Mizar and Alcor and you will arrive at the constellation Hercules.
8. Start at Megrez and go through Phecda and continue on to the bright star Regulus in the constellation Leo.
9. Go the other way from Phecda to Megrez and turn slightly left out to the bright star Vega in the constellation Lyra.
10. Go from Phecda to Megrez and out to the bright star Deneb in the constellation Cygnus the Swan.

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During the summer, check out:

1. July 12th: At 10:00 p.m., face west and you will see Mars, Venus, and the Moon:

Image generated by Stellarium.

2. August 12-13th: Perseid Meteor Shower: Look up in the night sky and you will see bright streaks of light. Earth is passing through space debris from the comet Swift-Tuttle.

Things to do until next time**:

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

1. What is a Star? https://www.youtube.com/watch?v=ZrS3Ye8p61Y

2. How Big is a Star? Check out this short video to see how our Earth and Sun compare to other planets and stars! https://www.youtube.com/watch?v=VKu1939d2vc

3. Make Colourful Star Cookies: https://spaceplace.nasa.gov/star-cookies/en/

4. Make your very own Starfinder and learn more about Constellations:
https://spaceplace.nasa.gov/starfinder/en/

Finally:

What star wears sunglasses?? Answer: ¡¡A Movie Star!!

Wishing you a fantastic summer under Clear Skies!! See you in September!

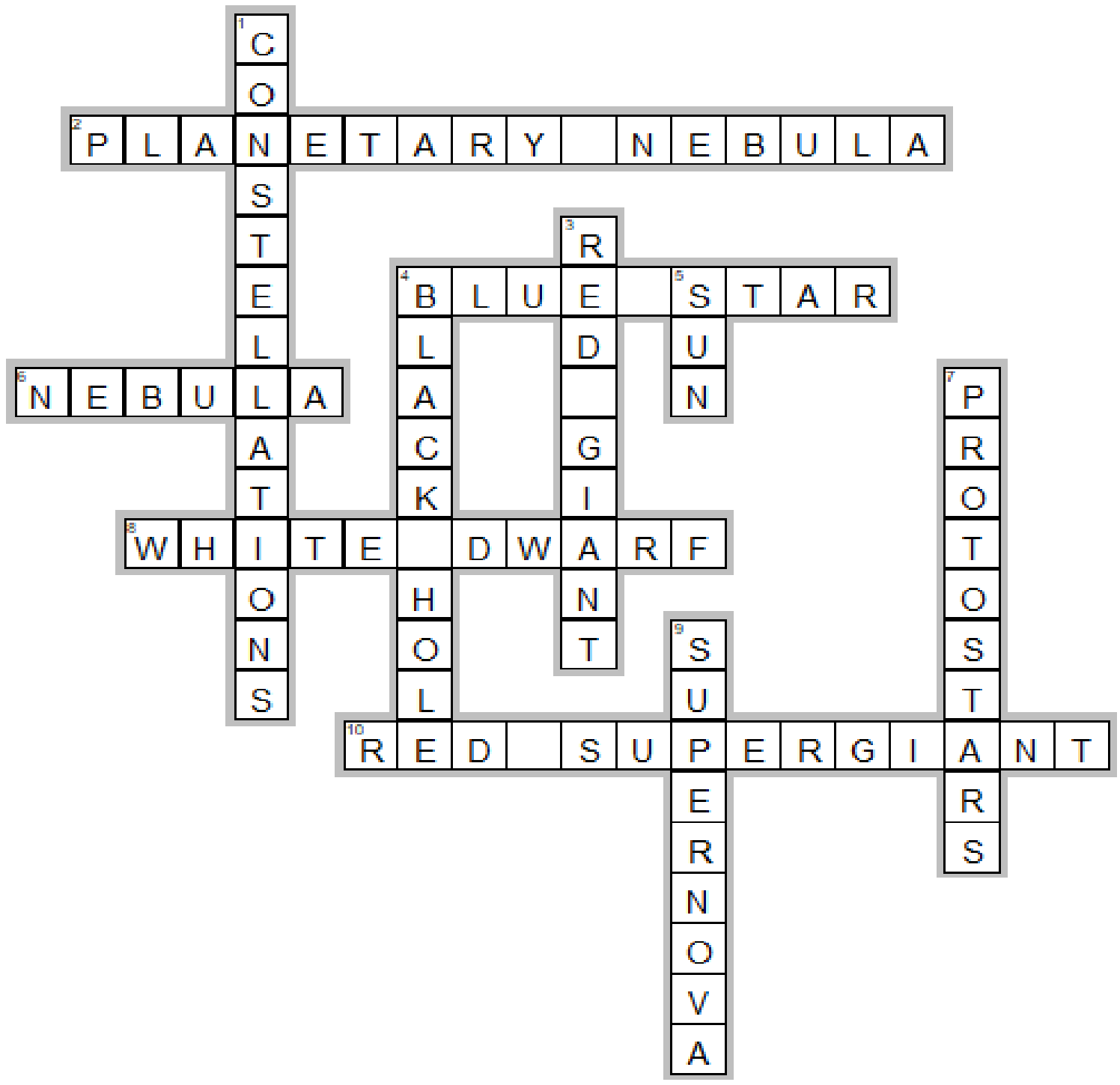
If you have a question you would like answered over the summer or in the newsletter, please send it to education@amateurastronomy.org. Thank you to Be, Br, and Mi for their review of this article! 😊

(Continued on page 9)

References:

Discover the Universe: https://www.discovertheuniverse.ca/resources
Let's Look at the Planets. Laura Driscoll. 1996.
National Geographic Kids: Ultimate Space Atlas. 2017.
The World Around Us: Space, Kingfisher Books, 1991.

Crossword Answers:



The Sky This Month for June 2021 by Matthew Mannering

Early yesterday morning on May 28th we had snow in southern Ontario. It stayed cloudy and rained all day. That wiped out any chance of seeing Venus and Mercury. They were only 20 arc minutes apart low in the west at dusk and it would have been a nice sight.

A few days before on May 23rd I was out at dusk (the sky was still quite bright) to try and see Venus and Mercury. Luckily I was on my own, otherwise it could have been quite embarrassing. According to Sky Safari, the two planets were only about 5° apart with Mercury appearing above Venus at the 11 o'clock position. Well after a few minutes I found them and was quite pleased. They were the correct relative brightness and position to each other but separated by about 7°. What the heck? Then I realized that the two objects were too high in the sky to be Mercury and Venus. What the heck??? Well it turns out that the two objects I was looking at were the stars Capella and Beta Auriga. Oops! It just goes to show that even after seventeen years of observing, a person (who shall remain nameless) can still be fooled. I'm pretty sure it won't be the last time either.

On June 10 at about 5:40am, an annular Solar Eclipse will reach its maximum at sunrise. Hamilton is not in the path of the annular eclipse. In fact, in Hamilton, the Sun will be about 72% eclipsed by the Moon. You will need solar glasses or a solar telescope to watch this event safely. If you are in any doubt about how to safely watch the eclipse, ***do not look at the Sun*** as you will damage your eyesight permanently. If you would like to see a map of the eclipse track, check last months' Event Horizon.

[*Editor's note: Ray Badgerow's article of the eclipse is being rerun this month (see pp. 16 and 17).*]

I thought for this edition of "The Sky This Month" I would talk about a summer constellation that doesn't seem to get a lot of attention. That constellation is *Ophiuchus* most of which is just north of the ecliptic. Ophiuchus is a large constellation situated between Serpens Cauda (the tail of the snake) to the east and Serpens Caput (the head) to the west. Hercules is north of Ophiuchus and Scorpius is to the south.

Ophiuchus is similar in shape to Cepheus. Both look like badly built houses. To find Ophiuchus, look above the head of the scorpion for 2 bright stars about one degree apart. Those stars are named *Yed Prior* and *Yed Posterior*. Shift your gaze to the east to find *Saik* and *Sabik*. These four stars form the floor of the house. From Saik (the middle star forming the floor) draw a very long sixty degree line in the sky to the constellation Lyra. Half way along that line you will find the bright star *Rasalhague* which forms the apex of the roof of the house. From there you should be able to find the two stars that form the corners of the roof line.

Now that you have identified Ophiuchus you can start looking for the myriad of targets in the area. They include many globular clusters, a few tiny planetary nebulae and some open clusters. Here is a list of targets, many of which will be visible in binoculars. Let's start at the bottom of the constellation and work our way up. (Please refer to the chart at the top of page 11.)

- *M9, NGC 6356 and 6342* – form a nice 2° triangle of globulars. M9 is the largest and brightest of the three.
- *M107 globular* – is about 3° below the star Saik. I have read that it contains dark lanes within the globular which is unusual. This is on my list of interesting targets for this year.
- *M10 and M12 globulars* – just 3.3° apart; you can see them both in the same field with binoculars. With a scope you will see that M10 is the slightly brighter of the two, with a more concentrated core.
- *NGC 6366 globular* – look for a mag. 4.5 star halfway between the stars Cebalrai and Sabik which form the eastern wall of the house. 6366 is only 1/4° east of that mag. 4.5 star. This is another target for me this summer.
- *M14 globular* – is a much brighter globular about 3° north-east of NGC 6366.

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The Sky This Month for June 2021 (continued)

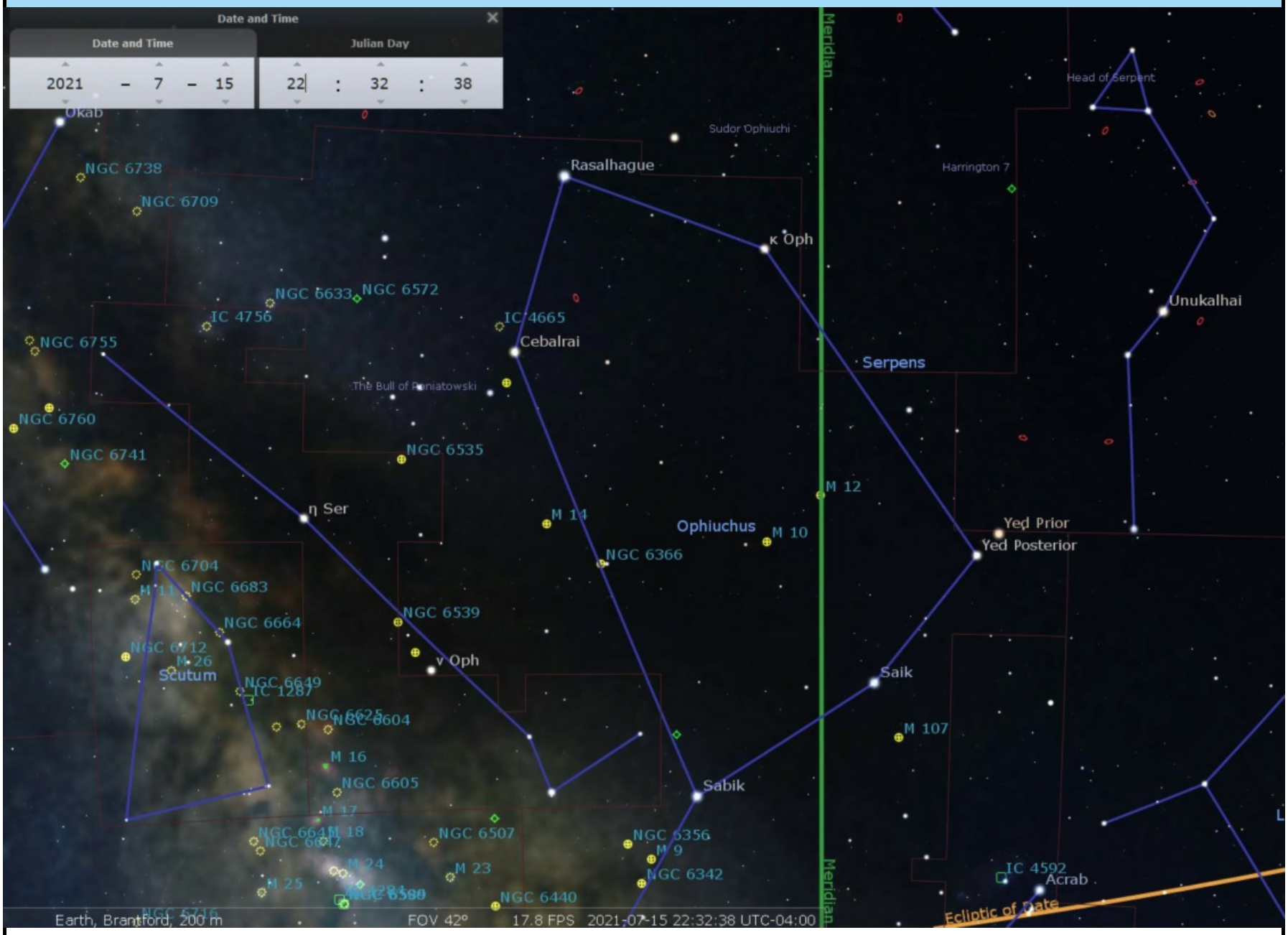

Chart of Ophiuchus generated using Stellarium

- *IC 4665 open cluster* - is about 1.25° north of the star Cebalrai. 4665 goes by many names. The Summer Beehive, the Trident of Poseidon and the Black Swallowtail Butterfly cluster. What outline do you see? I will have to find out for myself.
- *NGC 6633 (Tweedledum or Captain Hook cluster) and IC 4756 (Tweedledee) open clusters* – both are easy targets with 4756 being about twice the size of 6633.
- *NGC 6572 planetary nebula* – stands out against the starry background due to its colour. It is known as the Emerald, Blue Raquetball and Turquoise nebula. Don't expect to see any detail, just enjoy the colour.

That's a lot to see in a relatively small part of the summer sky. Of course the rest of the sky is filled with hundreds of targets for every observer. I look forward to seeing some of those targets with other club members later in the summer. Hopefully the COVID restrictions will start to relax and we can get together to observe.

Notes from My *Virtual* Table, June 2021 by Bernie Venasse

This month at the table…

What's Up?
Webcasts of interest.
From the Astronomical League.
AAVSO and British Astronomical Assn Webinars.
What's Up in Awards?
… Random Links
IDA's 'Capture the Dark' Photography Contest

What's Up? Webcast from Sky-Watcher at 1:00 PM Eastern

June 4, 2021… June Night Skies (2021 edition).
June 11, 2021… Evostar Overview.
June 18, 2021… Understanding Modified DSLR/Mirrorless Cameras.

From the British Astronomical Association

9th June 2021 - 19.00 UTC – Webinar:
Sketching Deep Sky Objects by Howard Banich. This and much more available on YouTube at:
https://www.youtube.com/user/britishastronomical

From the Astronomical League… https://www.astroleague.org/

Although these programs are offered by the Astronomical League, I encourage you to complete the observations and submit your results to me. You won't get a pin but you may receive a certificate from the HAA. Follow the rules set forth in the program and enjoy…

Lunar Observing and Binocular Lunar Observing Program:

https://www.astroleague.org/al/obsclubs/lunar/lunar1.html

The Lunar Program introduces amateur astronomers to that object in the sky that most of us take for granted, and which deep sky observers have come to loathe. But even though deep sky observers search for dark skies (when the moon is down), this program gives them something to do when the moon is up. In other words, it gives us something to observe the rest of the month, and we all know that the sky is always clear when the moon is up.

Looking for more Lunar Opportunities?

- There is a certificate available to those who have completed the Lunar Observing Program called the Lunar Evolution Certificate.
- There is also a Lunar-II Observing Program.

From the AAVSO…. https://www.aavso.org/2021-webinars-april-june

June 5, 2021… Your First Observatory: Keep It Simple!
June 12, 2021… Observing the Next Galactic Supernova.
June 26, 2021… A Romp With Betelgeuse.

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Notes from My *Virtual* Table, June 2021 (continued)

…and for the summer:
https://www.aavso.org/2021-webinars-july-september

July 3, 2021… A Quick Guide on VSX
July 10, 2021… Dr. Sanlyn Buxner, TBA
July 24, 2021… TBA
Aug. 7, 2021… Visual Observing, Title TBA
Aug. 14, 2021… Dr. Elmé Breedt, Title TBA
Aug. 28, 2021… Dr. Gibor Basri, Information and Illusions in Starspot Light Curves
Sept. 4, 2021… Gary Billings, Information from Periodic Star LCs

What's Up in Awards? June 2021

The Hamilton Amateur Astronomers Observing Programs are designed to provide direction for the 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 of 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. The information is based (excluding planets), on 10:00 PM Eastern Daylight Time on the night of the New Moon... in this case, June 10, 2021. **CAPITALIZED, BOLD objects are most prominent this month**.

HAA Rising Star Observing Award

Constellations (12 required)... Aquila, Auriga, **BOOTES**, Canis Major, Cassiopeia, Cepheus, **CORONA BOREALIS**, Cygnus, Gemini, **HERCULES**, Leo, Lyra, Ophiuchus, Orion, Pegasus, Perseus, Sagittarius, Scorpius, Taurus, Ursa Major, Ursa Minor, Virgo

Planetary Satellites (all required)… **EARTH'S MOON, JUPITER'S 4 GALILEAN MOONS** (It is important to note the date and time of the observations of Jupiter's moons)

*Stars (**POLARIS** + 5 others)*… Aldebaran, Altair, Antares, **ARCTURUS**, Betelgeuse, Capella, Deneb, Dubhe, Pollux, Regulus, Rigel, Sirius, Spica, Vega

Double Stars (2 required)… Albireo, Almach, Castor, Mizar, **ZUBENELGENUBI** (include observations about their colour if possible)

Galaxy pairs (1 pair required)… M31/M32, M65/M66, M81/M82

Messier objects (4 required)… M4, M6, M7, **M8**, M11, M13, M35, M42, M44, M45

Other (1 Required)… Aurora, an **ECLIPSE** (moon or sun, partial or full), **INTERNATIONAL SPACE STATION** (check heavens-above.com for ISS passes)

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Meteor Showers

June Epsilon Cygnids Meteor Shower
The June Epsilon Cygnids meteor shower is a minor shower which takes place within the boundaries of the constellation of Cygnus and peaks on June 14th every year.
The speed of the meteors is 53 km/s.
The source of the meteor shower is Asteroid 2013 KB and the closest star to the radiant point is Aljanah.

June Lyrids Meteor Shower
The June Lyrids meteor shower takes place within the boundaries of the constellation of Lyra and peaks every year on June 15th/16th.
The speed/velocity of the Meteor Shower particles is 33 km/s.

Corvids Meteor Shower
The Corvids meteor shower takes place within the boundaries of the constellation of Corvus and peaks on June 17th every year.
The velocity of the Meteor Shower particles is 9 km/s.
The source of the meteor shower is Asteroid 2004 HW.

Sagittariids Meteor Shower
The Sagittariids meteor shower takes place within the boundaries of the constellation of Sagittarius. The meteor shower lights up the sky between June 1st and July 15th, peaking on June 19th every year.
The Meteor Shower originates near the Scorpius constellation.
The number of meteor at peak is normally around 5/hour. The speed of the Meteor Shower particles is 23 km/s. Bright meteors are frequent.

Delta Piscids Meteor Shower
The Delta Piscids meteor shower takes place within the boundaries of the constellation of Pisces between June 20th and June 26th with a peak on June 23rd every years.
The velocity of the Meteor Shower particles is 69 km/s.
The closest star to the radiant point of the meteor shower is Linteum

Pi Cetids Meteor Shower
The Pi Cetids meteor shower (June 16th-July 4th) originates from the boundaries of the constellation of Cetus and peaks occur on June 26th every year.
The number of meteor is 4/hour and their speed is 67 km/s.
The source of the meteor shower is C/1874 G1 (Winnecke) and the closest star to the radiant point of the meteor shower is Pi Ceti.

Scutids Meteor Shower

The Scutids meteor shower takes place within the boundaries of the constellation of Scutum and peaks on June 26th every year.
The speed of the Meteor Shower particles is 19 km/s.
The source of the meteor shower is believed to be Asteroid 2004 CL.

Eta Serpentids Meteor Shower

The June Scutids (Eta Serpentids; June 2nd to July 29th) meteor shower takes place within the boundaries of the constellation of Scutum and peaks on June 27th.
Expect to see 2-4 meteors / hour.
The closest star to the radiant point of the meteor shower is Eta Serpentis.

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June Bootids Meteor Shower
The June Bootids meteor shower (June 27th – July 5th) takes place within the boundaries of the constellation of Bootes and peaks on June 28th/29th every year.
Expect to see several meteors (population index 2) per hour with a low speed/velocity of 14 km/s.
The source of the meteor shower is Comet 7P/Pons-Winnecke and the closest star to the radiant point is Nekkar.

Daytime Beta Taurids Meteor Shower
The Daytime Beta Taurids meteor shower (June 5th-July 17th) takes place within the boundaries of the constellation of Taurus and peaks every year on June 28th.
Expect to see up to 10 big meteors per hour flying at a speed of 27 km/s through the atmosphere.
The source of the meteor shower is Comet 2P/Encke and its closest star to the radiant point is Elnath

Tau Aquariids Meteor Shower
The Tau Aquariids meteor shower (June 27th-July 6th) takes place within the boundaries of the constellation of Aquarius and peaks on June 28th every year.
Up to 7 meteors per hour will strike the sky at a speed of 64 km/s.
The closest star to the radiant point of the meteor shower is Tau1 Aquarii.

Pathways Observing Award

The Pathways Observing Program is a unique program designed specifically for the beginning observer either young or not-so-young. It is designed to help the new observer learn his or her way around the sky and to teach some of the basics of the night sky WITHOUT binoculars or a telescope!

Planets to be observed (In any order, reporting one per Group): Venus, Mars, Saturn, Jupiter.

Group A:	
Spring Constellations:	Find, observe, sketch or diagram: Ursa Major, Bootes, Virgo
Stars:	Find, observe, sketch or illustrate: Polaris, Arcturus, Spica
Asterisms:	Find, observe, sketch or illustrate: Big Dipper (Tail of Ursa Major) Virgo Gt. Diamond, (Cor Caroli, Arcturus, Spica, Denobola) Sickle (Head of Leo)
Planet:	Find observe and sketch or diagram: Any one planet that is remaining in the list.
Activity:	Use the pointer stars to find Polaris.
Group B:	
Summer Constellations:	Find, observe, sketch: Cepheus, Hercules, Scorpius
Stars:	Find, observe, sketch: Altair, Vega, Antares
Asterisms:	Find, observe, sketch: Dragon Head (Draco), Hercules Keystone (Hercules), Summer Triangle (Vega, Altair, Deneb)
Planet:	Any one planet that is remaining in the list.

Random Links…. Explore….

http://skymaps.com/downloads.htm
https://telescopius.com/
http://www.virtualcolony.com/sac/index.html
https://transit-finder.com/

Enter IDA's 'Capture the Dark' Photography Contest (details on their website)

https://www.darksky.org/capturethedark/

A photographer captures the dark, Utah, May 2019.

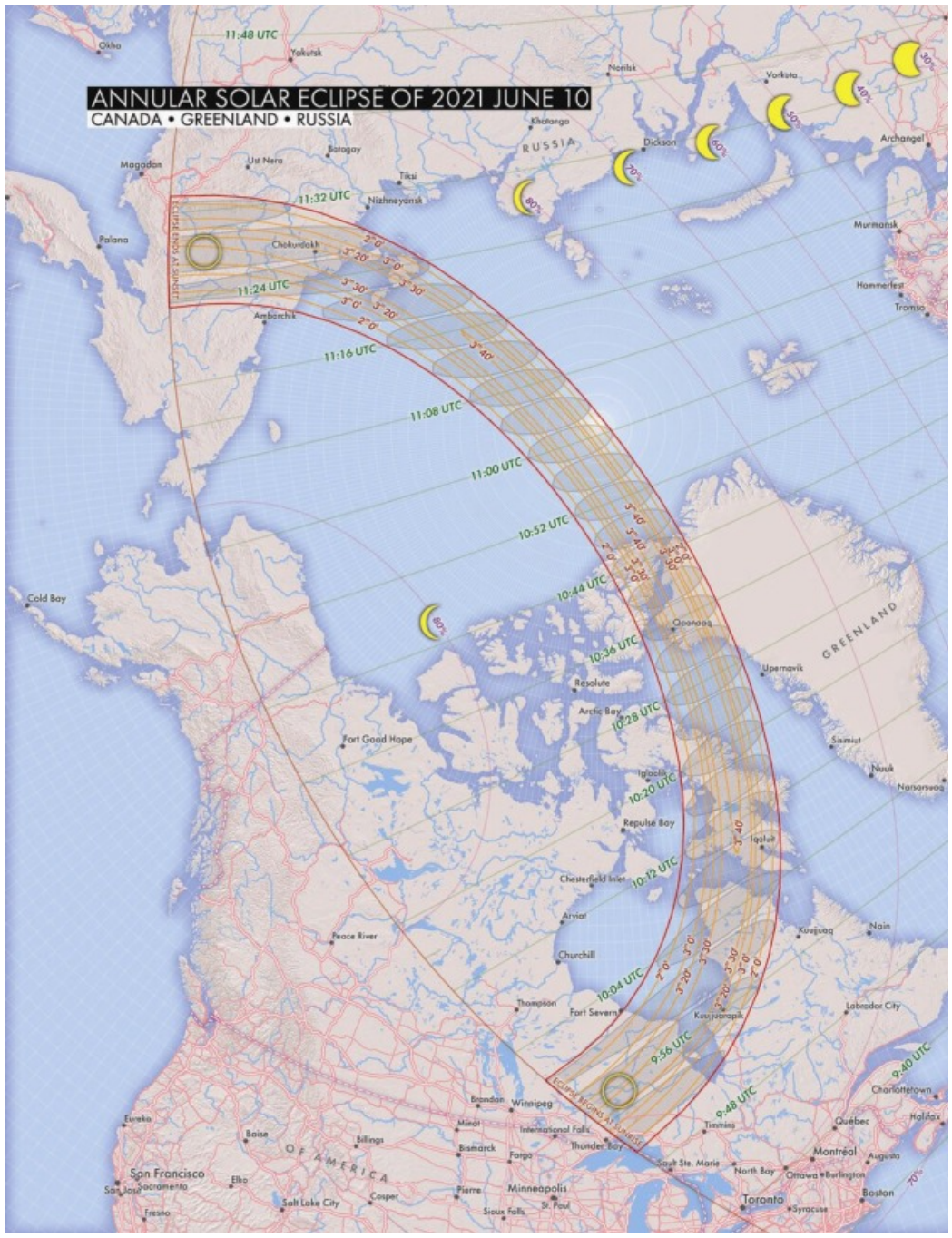
Photo Credit: Bettymaya Foott

The Annular Solar Eclipse of June 10, 2021 by Ray Badgerow

On the morning of Thursday, June 10th, Canada will experience a celestial event, an annular solar eclipse that will occur shortly after sunrise for residents of Ontario.

The antiumbra touches down on the Earth's surface north of Thunder Bay at 9:49:43 UTC and moves rapidly northward across Hudson Bay into Nunavut where it reaches the point of greatest eclipse at 10:41:51 UTC off the coast of Ellesmere Island (3m51s) before going over the North Pole and ending at sunset in Eastern Russia at 11:33:45 UTC. Due the the circumpolar nature of the track, the moon's shadow stays on the Earth's surface for 1h47m and has a total path length of 7,775 km.

Based upon my analysis, the average duration of annular eclipses (n=276) is 3m36.9s at an average altitude of 25.5 degrees.



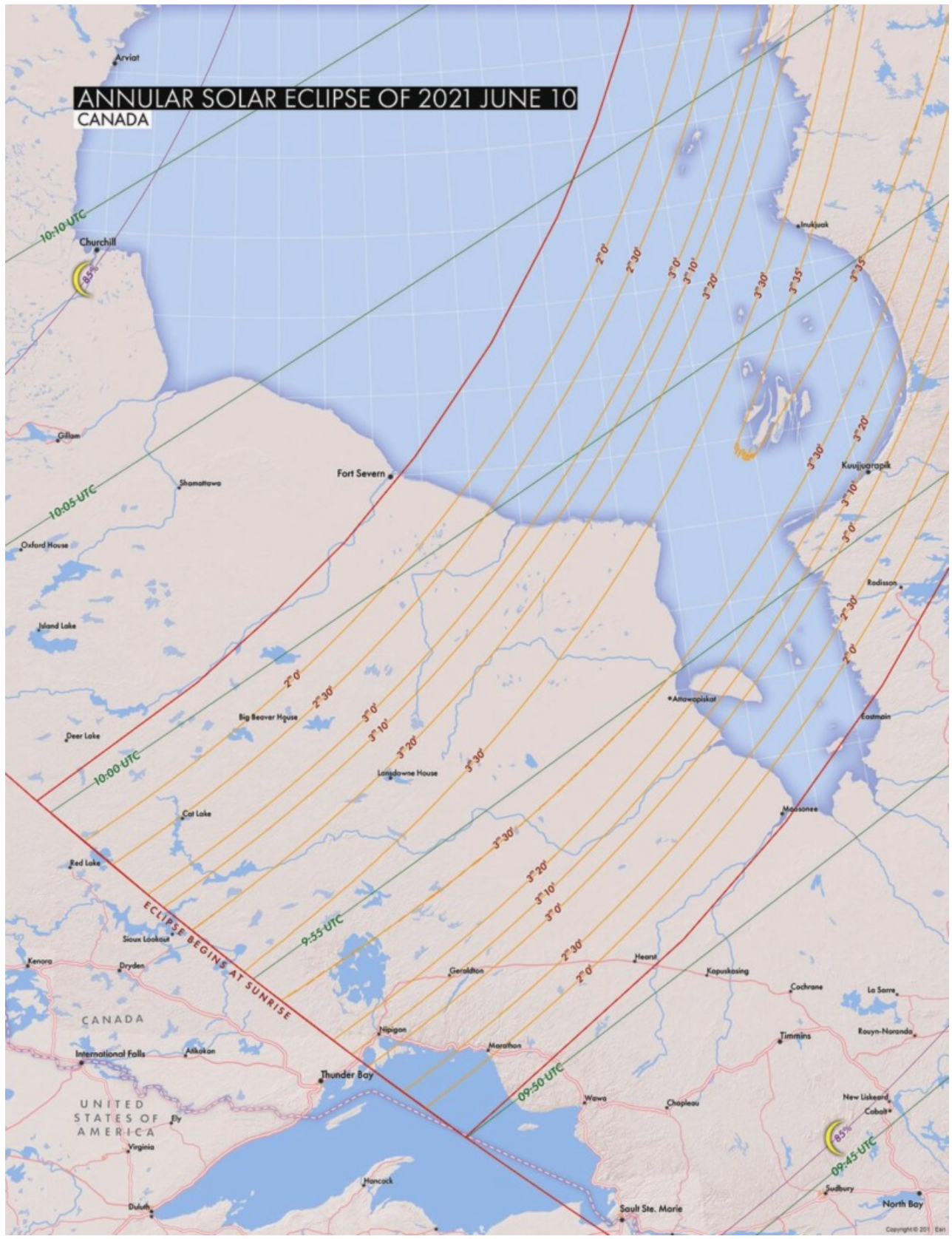
Images on pp. 16 and 17 courtesy of Michael Zeiler, GreatAmericanEclipse.com

The weather prospects for this eclipse are marginal at best, with Northern Ontario having a 55% chance of cloud cover and 85% chance further north in Nunavut. The best weather circumstances can be found in Western Greenland at Qaanaaq which has a 38% chance of cloud on eclipse day.
[Annular Solar Eclipse – June 10, 2021 | Eclipsophile]

This eclipse is the second annular for Saros series 147 that I had previously viewed from Northern Iceland on May 31,2003 (refer to the June 2003 Event Horizon), and my tour group got lucky when the Sun emerged from the clouds minutes before annularity started. Will my luck hold up again?

(Continued on page 17)

The Annular Solar Eclipse of June 10, 2021 (continued)



Due to a combination of remote viewing areas, poor weather prospects and pandemic induced travel restrictions the number of people viewing this event will be very small. There are 2 expeditions planned to Baffin Island and Greenland. They will likely be cancelled due to lack of access before June 10th. Sky and Telescope magazine is sponsoring a flight, E219, which was recently approved, that will fly into the zone of annularity from Minneapolis, Minnesota on the morning of the eclipse. What are my plans for the eclipse? I traveled up to Northern Ontario last August and carried out an initial survey and found several potential observing sites along Highway 11. If all goes well, I will head back to do a more detailed survey, find the best location with a prime site in Hearst and backup sites further west toward Geraldton. As a backup plan, dependant upon weather, I may charter a bush plane from Hearst Air (Carey Lake) to increase my chances of seeing the eclipse. Since this eclipse occurs shortly after sunrise there is very little margin for error, since it will be rising in the ENE (Az=54) in the boreal forests of NW Ontario. My final decision will not be made until several days before in early June based upon weather forecasts and COVID restrictions.

So...you really think you're going to Mars? by Mike Jefferson

In recent times there has been a great deal said about the possibility of human travel to the red planet, Mars. From the days of Disneyland television (in the 1950's), the writings of Wernher von Braun and Colliers Magazine articles, the possibility of human travel to that destination has been foremost in the minds of many people. This quest has been driven by the desire to be the first to get there in the same way that Apollo became the endeavour to beat the Russians to the Moon. Apollo 11, in 1969, was the American success story that became the symbol for American engineering prowess and ingenuity. It was the flagship for a whole line of craft which all played some part in making "Apollo" a success. It took a great amount of money and research to bring a series of 250,000 mile trips to a a successful conclusion. On the way, only Apollo 13 was nearly lost. The rest seemed to go off like clockwork and only 3 astronauts were lost – Grissom, White and Chafee. And that was due to suffocation on the ground, before lift-off could occur. So, what about Mars and the plans and efforts to get there?

Within the last several years, Bill Maher, the American comedian, has spent parts of several shows panning the whole idea of going there in the first place. Going back yet much farther in time to the late 1800's and early 1900's, Alfred Russell Wallace, arguably the greatest biogeographer ever and co-discoverer of evolution, proved, with the help of a number of scientific colleagues, that there could not even be any life on Mars, given the ability of scientific sophistication of the time to discover. Colder than Antarctica, an atmosphere of C02, an overburden of ferric oxide dust, windstorms lasting for long periods of time, dust devils, and not 250,000 but 35,000,000 miles away. Why would anyone want to go there for any length of time, let alone live there?

From the time of Percival Lowell, Antoniadi and other astronomers near the beginning of the 20th Century, there has been much talk of intelligent civilizations occupying the Martian planet. By the late 1940's Wernher von Braun was writing books about the steps to be taken if we wanted to send human expeditions there. More recently, our rovers, landers and orbiters, and most recently, a helicopter, have been very successful explorers for us. If we had followed von Braun, by now we would have sent many shuttle missions to the ISS station to build fleets of deep space ships and their accompanying landers for expeditions to our Moon, Mars, Venus and other points of interest in the inner solar system. However, the only manned shuttle we have devised to date has now been grounded due to massive unreliability and lack-of-convenience issues. Our only manned lander was taken out of service after Apollo was ended and the only manned 'deep space' craft still in use is the International Space Station, forever condemned to explore Earth and the near 'deep space' around it – confident in the knowledge that it is well protected from cosmic radiation from the Sun and true deep space by the Van Allen belts.

Where does all of this leave us at the present time? Basically stuck in low-Earth orbit if we are referring to manned exploration. However, we have sent every kind of robot craft to Mars since the time of the 2 Viking landers. And most recently, Perseverance and Ingenuity (rover and helicopter). What about all of the Martian craft and the 'explorers' of other regions of the solar system and the cosmos at large? They have done fabulously well! Of that there can be no argument. They have done far more and done it much more cheaply than any human expeditions to the Moon or to low Earth orbit.

Where does this leave my place in the studies of Mars? Probably in the spectroscopic realms. When we were enduring continuous nights of poor skies this past winter, I kept monitoring the conditions on a nightly basis hoping for a clearing, possibly a 'sucker hole' – playing dodge ball with the clouds. Near the beginning of February we got a good night and I decided to 'go for it'. I set up the DSLR with a 200 lp\mm diffraction grating and a 55X55 mm lens and went outside on a whim. It stayed clear! No tripod or EQ drive was necessary. Hand held, I knocked off around a dozen exposures of about 1 second each. Back inside the house after 15 minutes and glad the skies held up, I checked my quarry. Some of what I got was pretty miserable stuff and will be relegated to the scrap heap of digital images. Much of it, however, was very acceptable. I took one of my raw data images and processed it with Tom Field's Rspec software. The raw data gave me a very clear, bright, first-order spectrum and a nice, sharp 0-order spectrum (or, the planet, Mars, itself). From this, I was able to construct a G2V (or solar) line profile, for the Martian reflection.

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So...you really think you're going to Mars? (continued)

Calibration converted the line profile from pixels to angstroms (my favourite wavelength! - certainly not nanometers!) and from this I could 'draw' a synthesized spectrum, which is an artificial replica of the kind that was derived in the days of film. (The days of film were not that long ago. I started in spectroscopy about 2003 when Mars was making one of its famous close passes to Earth and I was using celluloid. We all were in those days.).

Today, the line profile is the most important thing about any spectrum. It is a 2-D pyramid-shaped construction which shows the peak intensity of a body's radiations, what those wavelengths are, its temperature and where it is absorbing or emitting photons, thus betraying the orbitals of the electrons in the elements or compounds contained therein. This is what we refer to as diffraction and it is the highest resolution you will ever get from any astronomical body. You are literally looking at the 'fingerprints' of stars and planets, etc. It invites experimentation and plays with your imagination. Saying that diffraction is a higher order than either reflection or refraction is not about equipment bragging rights. It is more about looking at nature through a 'microscope' as opposed to a telescope.

So, what did I get from my spectrum of Mars? First of all, it was not truly a spectrum of Mars, per se. My equipment is not that sensitive and Mars is not a radiating body as such. It was a solar (or G2V) spectrum reflected off Mars. It showed all the characteristics of any G2V spectrum, i.e. told me exactly what it was – a G-class object reflected off a planet. I did not get any hints of Martian CO2 which you would say that I should have captured. But it did tell me that the Martian atmosphere is intrinsically thin. There were no murky gases or dust storms that would leave their tell-tale traces on the spectrogram. Back in about 2005, I imaged Saturn and Jupiter and their opaque atmospheres did leave traces of themselves. I think my point is that there is always some information that can be had from spectrograms that are done with even the most basic equipment. My work is not carried out with a 20” telescope inside an Ash dome. I guess that I like to think of my equipment as somewhat tele-robotic, guided by a human hand.

Do I want to be a human astronaut? Definitely not. Humans are the weakest link in any space programme and require more care and nurturing than anything else on the mission.

That is why I have a t-shirt that goes to Starfest and other star parties which says:

“The future is not in spacesuits. It is in robots.”

P.S. If you were thinking of following Elon Musk to Mars with a million other people, I hope my little dissertation has changed your mind! (M.J.)

HAA Helps Hamilton

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

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

This article is distributed by NASA Night Sky Network.

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach.

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

Astrophotography With Your Smartphone

David Prosper

Have you ever wanted to take night time photos like you've seen online, with the Milky Way stretched across the sky, a blood-red Moon during a total eclipse, or a colorful nebula? Many astrophotos take hours of time, expensive equipment, and travel, which can intimidate beginners to astrophotography. However, anyone with a camera can take astrophotos; even if you have just a smartphone, you can do astrophotography. Seriously!

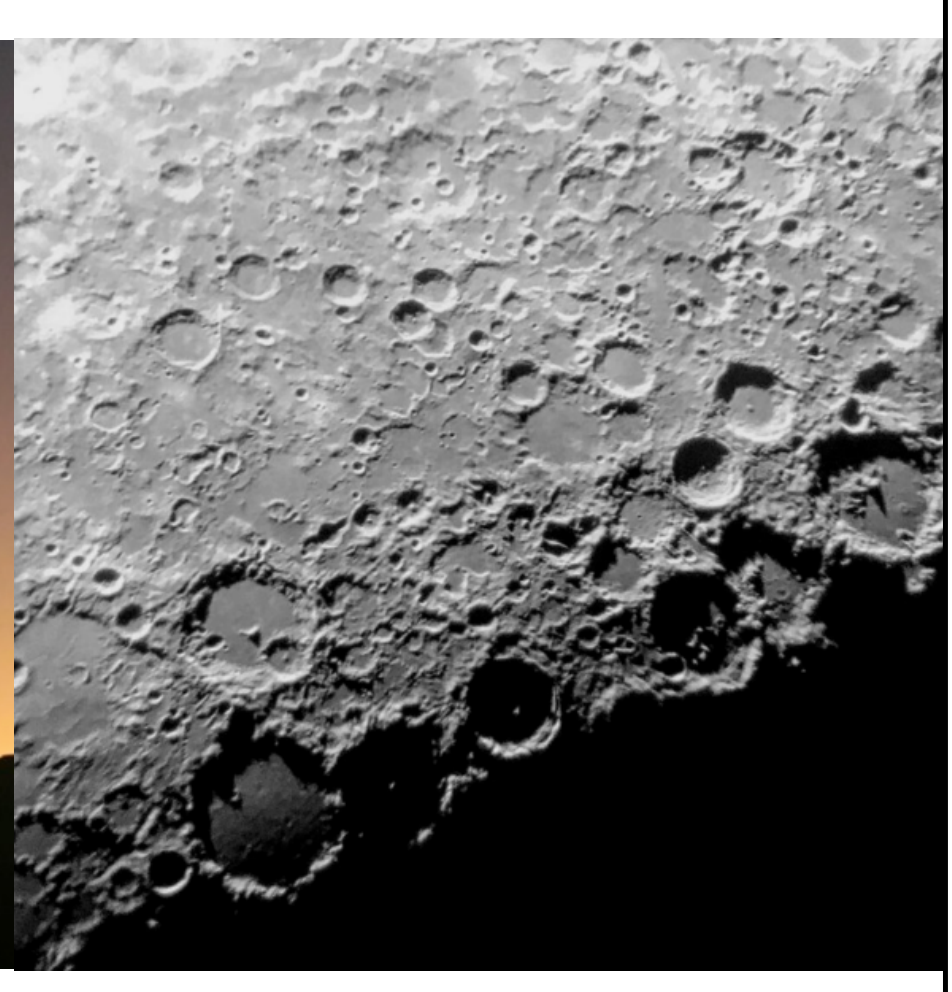
A small tripod for a smartphone. They are relatively inexpensive – the author found this at a local dollar store!

Don't expect Hubble-level images starting out! However, you can take surprisingly impressive shots by practicing several basic techniques: steadiness, locked focus, long exposure, and processing. First, steady your smartphone to keep your subjects sharp. This is especially important in low light conditions. A small tripod is ideal, but an improvised stand, like a rock or block of wood, works in a pinch. Most camera apps offer timer

(Continued on page 21)

options to delay taking a photo by a few seconds, which reduces the vibration of your fingers when taking a shot. Next, lock your focus. Smartphones use autofocus, which is not ideal for low-light photos, especially if the camera readjusts focus mid-session. Tap the phone's screen to focus on a distant bright star or streetlight, then check for options to fine-tune and lock it. Adjusting your camera's exposure time is also essential. The longer your camera is open, the more light it gathers - essential for low-light astrophotography. Start by setting your exposure time to a few seconds. With those options set, take a test photo of your target! If your phone's camera app doesn't offer these options, you can download apps that do. While some phones offer an "astrophotography" setting, this is still rare as of 2021. Finally, process your photos using an app on your phone or computer to bring out additional detail! Post-processing is the secret of all astrophotography.

You now have your own first astrophotos! Wondering what you can do next? Practice: take lots of photos using different settings, especially before deciding on any equipment upgrades. Luckily, there are many amazing resources for budding astrophotographers. NASA has a free eBook with extensive tips for smartphone astrophotography at bit.ly/smartastrophoto, and you can also join the Smartphone Astrophotography project at bit.ly/smartphoneastroproject. Members of astronomy clubs often offer tips or even lessons on astrophotography; you can find a club near you by searching the "Clubs and Events" map on the Night Sky Network's website at nightsky.jpl.nasa.gov. May you have clear skies!



The Moon is large and bright, making it a great target for beginners.
The author took both of these photos using an iPhone 6s. The crescent moon at sunset (left) was taken with a phone propped on the roof rack of a car; the closeup shot of lunar craters (right) was taken through the eyepiece of a friend's Celestron C8 telescope.

Eye Candy the Members' Image Gallery

The Waxing Gibbous Moon — This stunning, crisp image was taken on May 20, 2021.
by **John Gauvreau**

UPCOMING EVENTS

June 11, 2021 - 7:30 pm — Virtual Online H.A.A. Meeting for members. The meeting will be conducted on the platform Zoom. June main speaker: T.B.A. Be on the lookout for an invitation e-mail with a meeting link. *Possible July* online meeting T.B.A.
You may download the Zoom app for various platforms from Zoom's Download Center

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

2020-2021 Council

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Second Chair	Jim Wamsley
Treasurer	Ann Tekatch
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All active HAA members have the privilege of access to an exclusive HAA members only dark sky location.

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

The Harvey Garden HAA Portable Library

Contact Information

E-mail: library@amateurastronomy.org