Event Horizon

Hamilton Amateur Astronomers

Volume 28, Number 3
January 2021

From The Editor

Welcome to 2021!

There's lots of "Eye Candy" to close out that wild, wacky previous year, and I bid a huge Welcome to a brand new column, "HAA Explorers", brought to you by Jo Ann Salci!

Stay safe, and Clear Skies!

Bob Christmas, Editor
editor 'AT'
amateurastronomy.org

Chair's Report by John Gauvreau

Happy New Year everyone! 2021 is an exciting year for astronomy with some good sights and events coming up. I look forward to a great year in the club.

My astronomical library grew a little over the holiday. My lovely wife gave me some fascinating reading material for the holidays and one item was The Astrophotography Sky Atlas by Charles Bracken. It's a soft cover book with 70 star charts that have suitable astrophotography targets plotted in their correct size and orientation (rather than just a symbol). They are colour coded and include some faint (sometimes invisible) objects for the visual observer that would still make good photographic targets. Other targets that are good visually but not photographically are given reduced attention. There follows a 50 page table which includes all 2,000 objects plotted on the maps, with their location, brightness, how big a field you

(Continued on page 2)

IN THIS ISSUE:

Chair's Report (continued)

need to capture it, when it is best placed to observe and shoot, and info about how it will look and photograph. Yes, I have other star atlases, and love them all, but this is quite unique and it will travel with me to dark sites in the future. I am already planning my astrophotography targets for the year.

HAA Meetings

Last month Dr. Yanqin Wu gave a great presentation on searching for extrasolar planets. There were lots of questions and I heard lots of positive feedback from members. I also got some positive feedback from Dr. Wu who was very impressed with the caliber of members we have. Hooray for the HAA, making a good impression!

We also gave away some very special door prizes. A big thank you goes out to Swapna Shrivastava and her family for their generosity and helping make the season bright for the lucky winners. This month we have a great selection of books including a set of science books for youths that has been donated by Melissa Whitman and family. All you have to do is attend the Zoom meeting for your chance to win!

This month we will hear from our very own *Mario Carr*, who has become quite a celebrity (dare I say, he is our television star!). His television spots have become very popular and Mario will give us some behind the scenes stories about how he came to be the local astronomy authority. You've seen him on TV; now come talk to Mario.

A friendly reminder that all our meetings will be 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 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.

The January meeting begins at the usual time of 7:30pm on January 8th. Hope to see you there!

Membership

This is the time of year when we renew our memberships. We are still the least expensive and most active club in the area and members like you are what make the club so great. If you haven't already, you can join through our PayPal link on our website or even mail in a cheque (but doing it online is really easy!). If you have already renewed; thank you! If you are a new member who has just joined us recently, then welcome to the club! We are glad to have you here for the upcoming year. And if you are a member who still needs to renew then I hope you will do so. I always say that it is getting to know all the good people here that make membership in the club worthwhile.

Beginners Group

There have been many people sign up for the Beginners Group. If you are one of them you can look forward to an email arriving shortly with scheduling options. If you aren't one of the members who signed up for our 'Astro 101" course (as we call it) there is still time. Just contact me directly and I am happy to put you on the list.

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Masthead Photo: *The Flaming Star Nebula (IC 405), in Auriga,* by *Michel Audette*.

Taken on November 29, 2020 from Hamilton, ON.

Chair's Report (continued)

What's the Beginners Group all about? Each year the HAA offers a series of seminars for absolute beginners. Originally designed to familiarize newcomers to the club with the basic workings of telescopes so they could take advantage of the club's telescope loaner program (and when it is safe to do so we will revive the telescope loaner program), the Beginners Group (affectionately known around the club as Astro 101) has evolved to include not only telescope basics but also astronomical vernacular, a tour of what's up there in the sky to look at and available resources to help you move forward as you explore the hobby. And best of all, it's a chance to meet (online) other beginners and some experienced members. It's a great way to get familiar and comfortable with the club and the great hobby of astronomy.

This year, the Beginners Group meetings will be online. The group meetings are informal and interactive. It's a relaxed and fun environment. We will be beginning later this month but there is still time to join if you are interested.

HAA 2021 Calendar

In the end there were 200 copies of the calendar printed. All were sold or given to club supporters (like our media contacts). Well done everyone! We can now simply enjoy the finished product and begin to look forward to next year. Now open your 2021 calendar to January and enjoy that beautiful picture of Andromeda by Matthew Mannering!

Other Projects for 2021

Several other projects are in the works. First, you may recall back in 2017 we enjoyed a wonderful partial solar eclipse from here. At the time we had solar eclipse glasses for sale to anyone who needed them for safe viewing. There is another partial eclipse on the way this June and once again we intend to distribute solar glasses to make it safe to observe the sun. We will have one free pair for every member (and extras available if you want to buy more to give to friends). Look for more info as the time gets closer.

We are also working on a banner that will promote the club at public events and club venues. It will be an eye-catching display that will attract attention to our public observing events and direct members and visitors alike to our meeting rooms, once we get back to meeting in person. The plan is to have it ready in time for our return to in-person meetings.

We often distribute brochures advertising the club through libraries and public events. Once they run out we are also looking to replace our club brochures with a smaller and more economical business type card. These could be distributed to club members who want some, who could then distribute them as they please to members of the public who might ask about your fascinating hobby.

Finally, we are setting up chat forums on the website. Soon you will be able to pose and answer questions, share images and observations, or just keep in touch with your fellow members. Especially now during the distance and isolation of the pandemic this will be a great way to participate in the club from home.

Conclusion

We are already past the shortest day of the year (or as astronomers you may prefer to think of it as the longest night of the year) and more importantly we are surely all looking forward to warmer days and nights of observing. Best wishes for a safe and joyous year to you all.

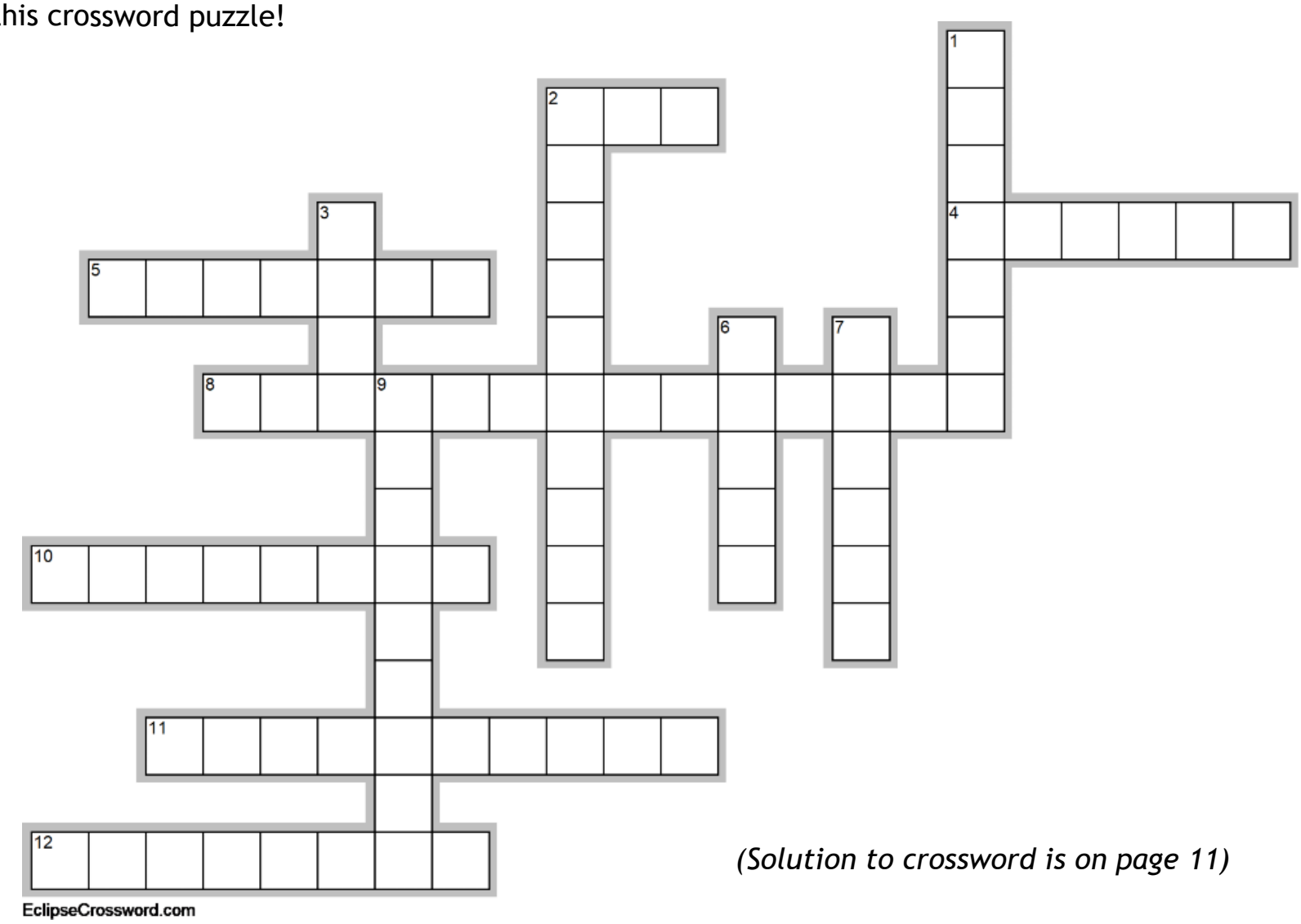
HAA Explorers by Jo Ann Salci

Welcome HAA Explorers!

This new monthly column is for our younger HAA astronomers. We will be exploring things in our sky. You will see pictures, quizzes, puzzles, jokes and more. We hope you like it!!

What's Up??

Let's start with what's up in the sky. So, what are some things that are up there?? Let's explore with the help of this crossword puzzle!



(Solution to crossword is on page 11)

Across

2. The closest star to Earth.
4. A cloud of dust and gas where new stars are born.
5. Rocks or metal chunks that burn as they get close to Earth.
8. Patterns that stars make in the sky.
10. Groups of stars, planets, dust, and gas. There are billions of these in the Universe!
11. Meteors that land on Earth.
12. The galaxy we live in.

Down

1. They go around the Sun in orbits.
2. The International Space Station is an example.
3. It takes 1 month to orbit around the Earth.
6. Balls of burning gas that come in different sizes and colours.
7. They are made of ice and dust and have tails.
9. An exploding star that is very bright.

(Continued on page 5)

HAA Explorers (continued)

What is your favourite thing to explore in our sky? Over the coming months, you will read about the sun and planets, our moon, the constellations and much more! If you have a question you would like answered in the newsletter, please send it to: *education@amateurastronomy.org*

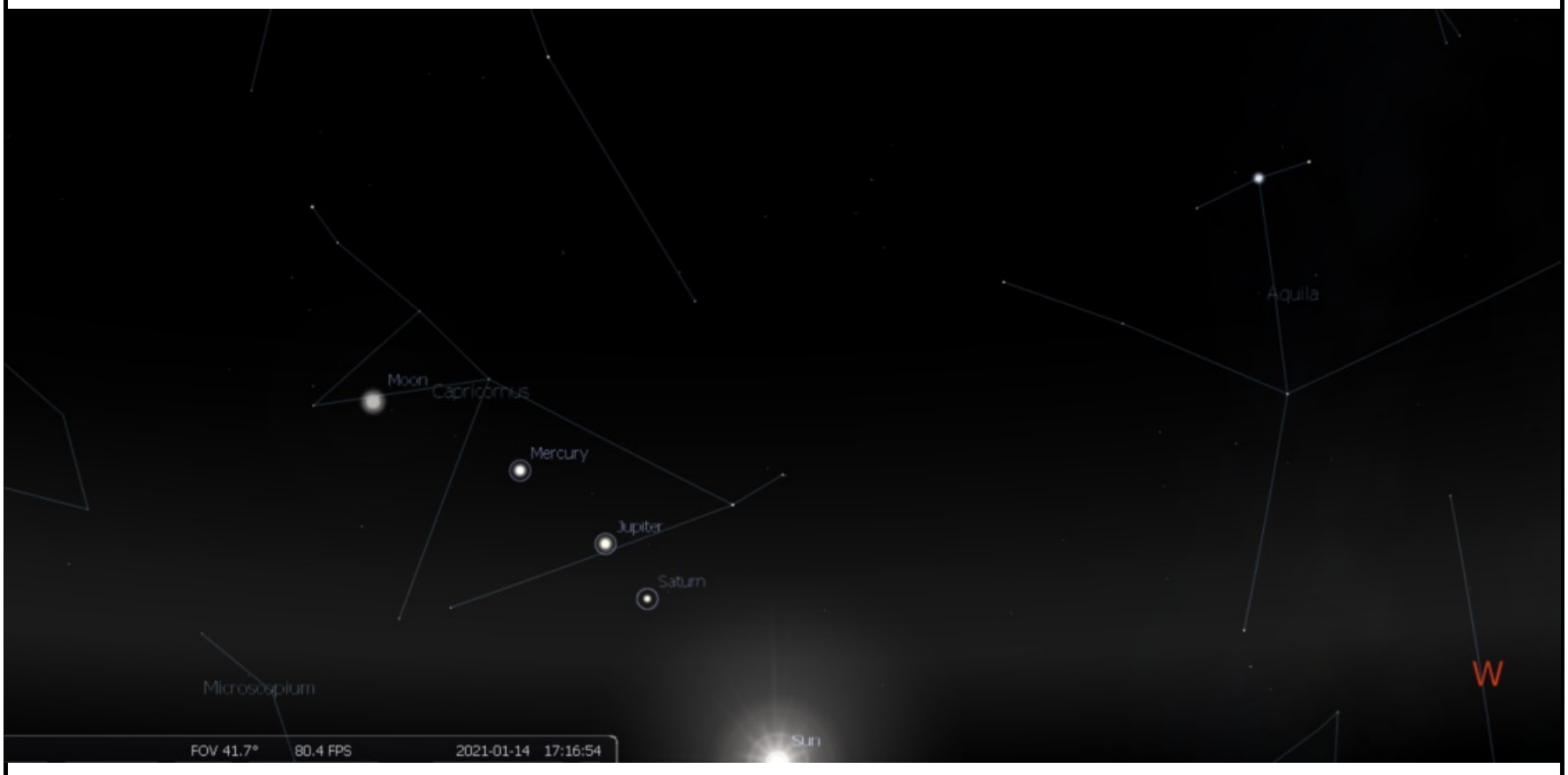
During January, see how many of these objects you can see in the sky:

Stars: Look at the sky on *any clear night* and you will see a lot of stars! Some are brighter than others. You may notice that they have different colours, too!

Photo credit
"Let's Look at the Planets":
Grosset & Dunlap

The Moon, Mercury, Jupiter and Saturn: *On January 14th at about 5:15 p.m.* in the southwest sky. This will be difficult to see because it is very low in the sky.
[Editor's note: Be careful; they're close to the Sun!]

(Continued on page 6)



The Moon, Mercury, Jupiter and Saturn on January 14, 2021. Image generated by Stellarium.

Moon: If the sky is clear on *January 28th after 5:30 p.m.*, you will see a Full Moon.

Photo Credit: Terence Dickinson.

Photo Credit: Jo Ann Salci.

Things to do until next time:

1. Visit NASA's Space Place, a great website for learning more about space. This month, you will learn more about the Universe, where you can even make your own Pinwheel Galaxy!! https://spaceplace.nasa.gov/menu/space/

2. Why do stars twinkle? [1]

A star gives off a _____ light. But we see it _____ because of _____ atmosphere. Each star is just one___ _ _____. When it passes through_____ (on its way to our eyes), layers of air __ __ ___ up and down and left and right, so the star seems to twinkle.

bend the light twinkling Earth's point of light air steady

(Answers on page 11)

3. Sign up for notifications of when the International Space Station (ISS) flies overhead at your location: https://spotthestation.nasa.gov/signup.cfm

Finally:

I'd tell you a joke about space, but it would be out of this world!

See you next month!

[1] Astronomy for KIDS, 2019, p.6.

The Sky This Month for January 2021 by Matthew Mannering

Welcome to 2021 and goodbye to what has to be the most horrible year in memory. Despite this I hope you all had a happy holiday season and please stay safe in the year to come.

The club has survived and adapted very well to the changing circumstances created by the virus. Zoom has enabled us to carry on with our meetings and attendance has been better than council hoped. Personally, I find that talking into a computer without seeing anyone in the audience is somewhat disconcerting. When I started presenting 'the Sky this Month' seven years ago I was very nervous facing the large sea of faces. Now I miss the interaction with the audience.

The great planetary conjunction of 2020 has come and gone. My wife and I along with Les and Ed were able to see it the evening of Friday December 18th. The sky was very clear that evening and the Moon was a waxing crescent about 20 degrees away. Jupiter and Saturn were only 20 arc minutes apart and easy to see together in the eyepiece. I had set up a 150mm Newtonian and an 80mm Refractor side by side on an alt/az mount. It was a wonderful sight in both telescopes! We stayed out for about an hour, but the cold got to us and we had to pack up. It was interesting to think that you could have visually hidden the two planets behind the Moon. That would have been an amazing double occultation to watch! The next evening we also had a chance to see it using binoculars. Just visible through the clouds, Jupiter and Saturn were only separated by 15 arc minutes. Since the 19th we have been clouded out every evening. Expressing my disappointment in a modern fashion would require a lot of sad and grumpy emojis ☹😤.

There is good and bad news for the coming weeks. First the bad news - January and February are the coldest months of the year. The good news is that the skies can be exceptionally clear with great transparency. If you are going to observe, make sure that you put your telescope out early so that it can cool down to ambient temperature. As a rule, the bigger the scope, the more time it takes to cool. In winter, my twelve inch Dob can take hours to settle, so I tend to go with smaller scopes. I find that a six inch Newtonian telescope will cool down in about a half hour. A problem does occur if the temperature keeps dropping as the evening progresses. At that point the optics are chasing the temperature downward and the view will never be crisp. Either way, unless you are chasing faint fuzzies, a small scope is a better choice. So, my choices for winter observing are a 5-8 inch Newtonian, an 80-100mm refractor or a set of binoculars.

There are three events in January that are definitely worth viewing and the best part is they all occur before 7pm.

The first event is visible from *January 9 to 11* (see top chart on page 8). For those three days, *Jupiter*, *Saturn* and *Mercury* form a nice tight grouping very low in the south-west sky. You need a good view of the horizon with nothing blocking it. The window for viewing the grouping is from 5:10pm to 5:25pm. Wait for the Sun to set at 5:05pm before you start looking. By 5:30pm the grouping will be at or below 5 degrees above the horizon.

The second and third events overlap quite nicely (see middle chart on page 8). Centred around the *21st of January*, *Mars* will be a couple of degrees above *Uranus*. In fact on the 21st they will be separated by just 1.7 degrees. Try using binoculars to view the pair. Place Mars at the top of the field of view and Uranus will be very close to the middle of the field.

The third event is also best seen with binoculars and involves *Mercury* (see bottom chart on page 8). It reaches greatest elongation east on the evening of the 23rd. That's a fancy way of saying that Mercury will appear to be at its greatest angular distance from the Sun. The date range for best viewing of this event is January 15th to 31st. From the 15th to the 25th look low in the south-west sky at 5:45pm. From the 26th to the 31st, start viewing at 6pm. The reason for this is that the days are slowly getting longer, and the Sun is setting later. Do not attempt this observation while the Sun is up as Mercury is a little too close to the Sun for safe viewing.

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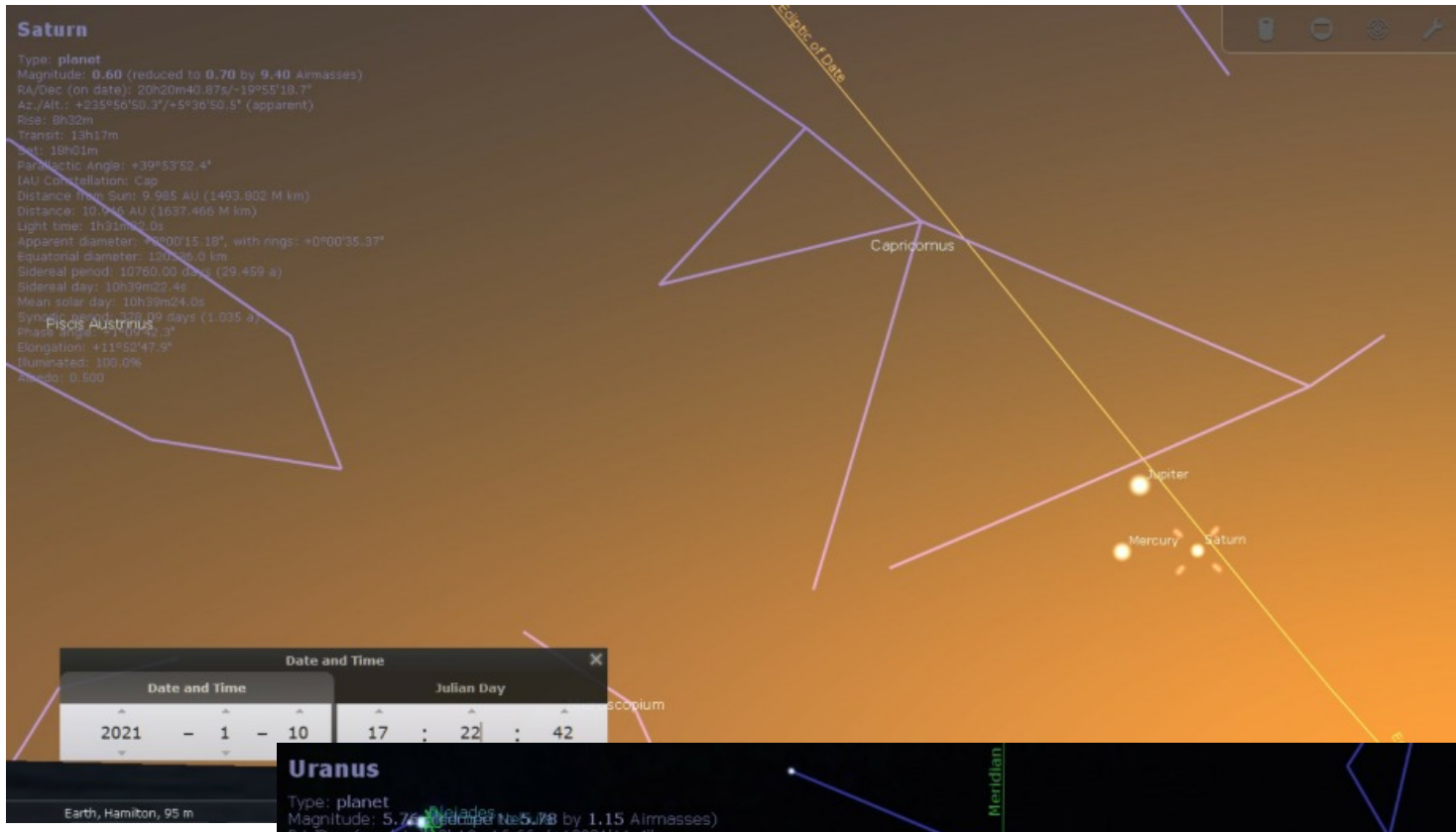
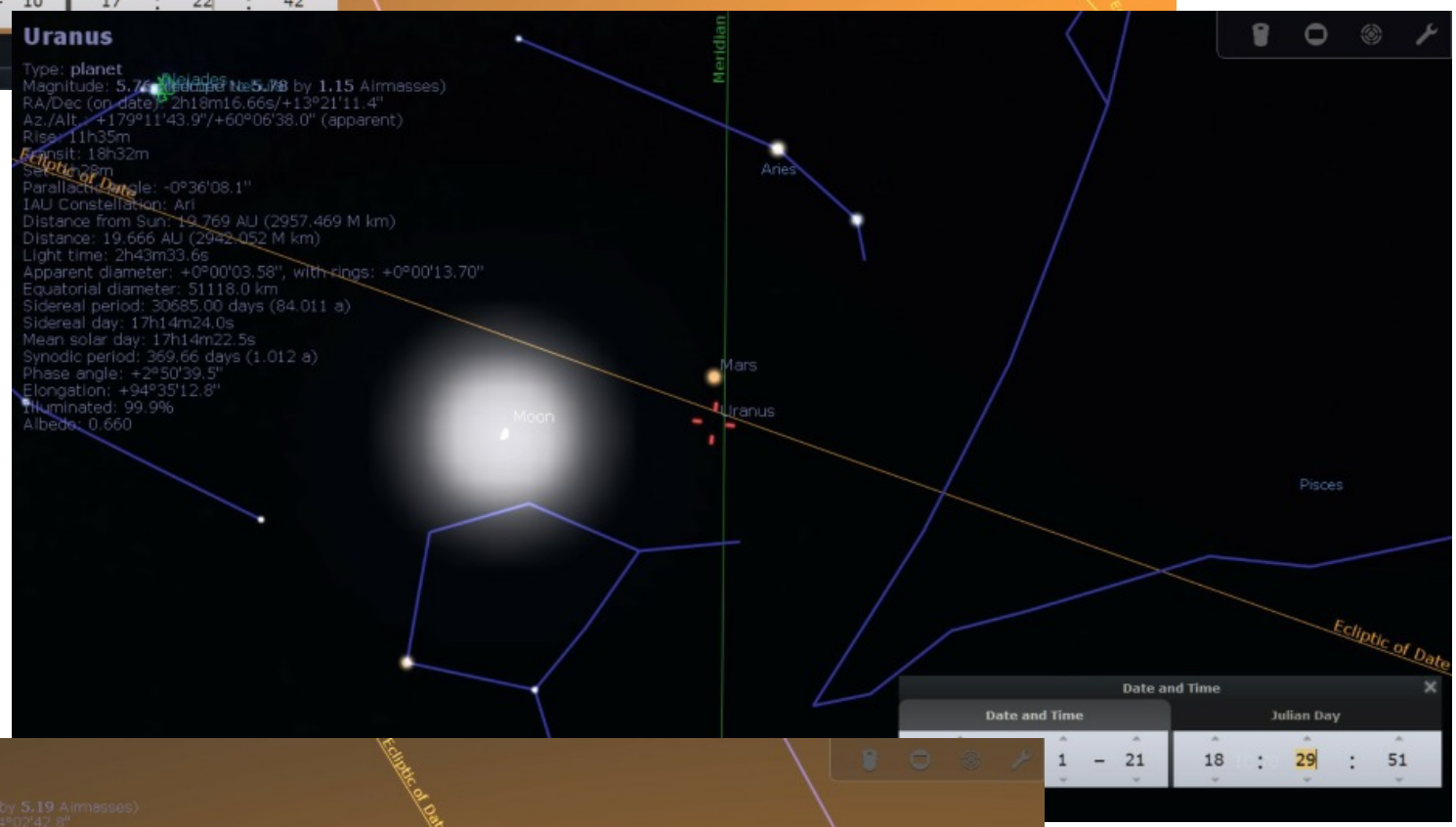
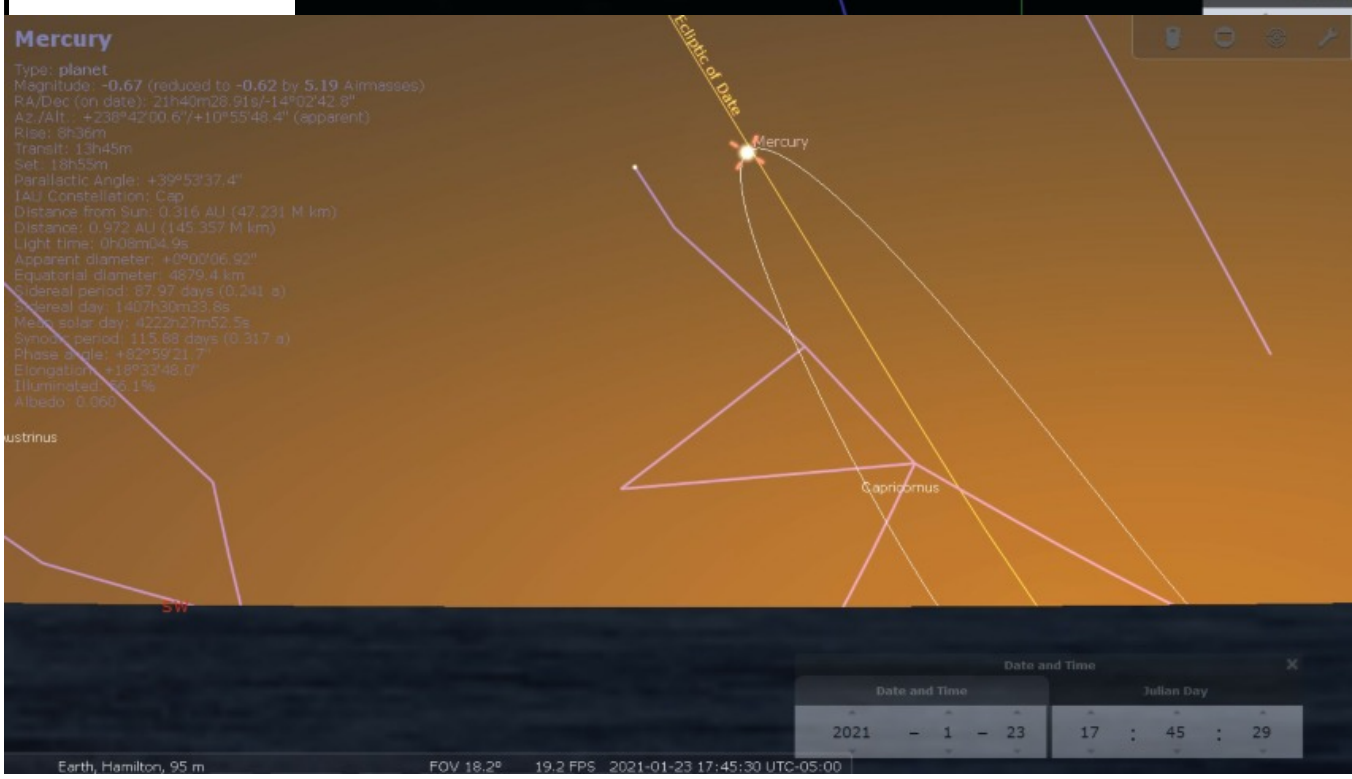
The Sky This Month for January 2021 (continued)



Jupiter, Saturn and Mercury in the Evening Sky on January 10, 2021.



Mars, Uranus and the Moon on January 21, 2021.



Mercury in the Evening Sky on January 23, 2021.

Images generated by Stellarium.

Benefits of Spectroscopy to the Study of Astronomy by Mike Jefferson

Up until the latter years of the 1800's most astronomical activity consisted of making notes of observations, logging the brightnesses of variable stars and working to achieve meaningful results in the very new field of astrophotography.

The latter years of the 1800's and the early years of the 1900's brought knowledge of the existence of helium on the sun and other physical properties of stars and other objects out in the universe. From this time, up until the opening years of the Second World War have been referred to as The Golden Years of Physics. Without getting into the details of the spectacular discoveries made by the likes of Roentgen, Planck, Einstein, Rutherford, Dirac and many others, these years provided some of the most powerful and numerous discoveries of universal laws in history.

Consequently, it was no fluke that astronomers began applying these earthbound discoveries to the structure of the universe. The thinking was (correctly) that any law that was extant for a terrestrial environment also applied to the universe as well. If helium could be made on the sun, it could be made here as well - and it was - leading to a much safer airship than had been used in the previous years of the Zeppelin Era. Now, stars are a long way away. You cannot take samples of them and analyze these materials in a physics or chemistry laboratory. So, what can you do? You can make use of the energy they radiate and analyze that instead. Newton (1642-1727) had already done this after pondering the existence of rainbows. He passed some light through a slit and a glass prism to reveal a colourful spectral continuum. Then, he passed that back through another glass prism to draw all of the colours back to white light. The basic colour structure of light was revealed.

So, what can spectroscopy do for you or any other astronomer? Lots! The object of this investigation is to produce a wavelength calibrated line profile of the spectrum of an astronomical object. The line profile will enable you to produce a synthesised rectangular spectrum ('rainbow') either in colour or higher resolution black-and-white, and measure wavelengths and equivalent widths, classify stars and supernovae, measure doppler shifts, elemental lines and radial velocities. A single image done in fractions of a second or several seconds is a plethora of information. A hand-held image of Mars will produce all the raw data needed for a finished product. Rsec or V Spec programmes will let you produce a finished product. You can even leave it as a raw image and compare it to textbook images - keeping an observing log.

Because it is so powerful, spectroscopy does not need pristine skies or perfect observing conditions. You do not get into light frames, dark frames, multi exposures or any of the other things used in conventional astrophotography. It can be point-and-shoot. Most of your time will be spent on your computer, processing spectra.

The HAA is, apparently, having a speaker in the upcoming months (Tom Field) who can get more into the in's-and-out's of this fascinating aspect of astronomy.

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!

Check Your Sky's Quality with Orion!

David Prosper

Have you ever wondered how many stars you can see at night? From a perfect dark sky location, free from any light pollution, a person with excellent vision may observe a few thousand stars in the sky at one time! Sadly, most people don't enjoy pristine dark skies – and knowing your sky's brightness will help you navigate the night sky.

The brightness of planets and stars is measured in terms of apparent magnitude, or how bright they appear from Earth. Most visible stars range in brightness from 1st to 6th magnitude, with the lower number being brighter. A star at magnitude 1 appears 100 times brighter than a star at magnitude 6. A few stars and planets shine even brighter than first magnitude, like brilliant Sirius at -1.46 magnitude, or Venus, which can shine brighter than -4 magnitude! Very bright planets and stars can still be seen from bright cities with lots of light pollution. Given perfect skies, an observer may be able to see stars as dim as 6.5 magnitude, but such fantastic conditions are very rare; in much of the world, human-made light pollution drastically limits what people can see at night.

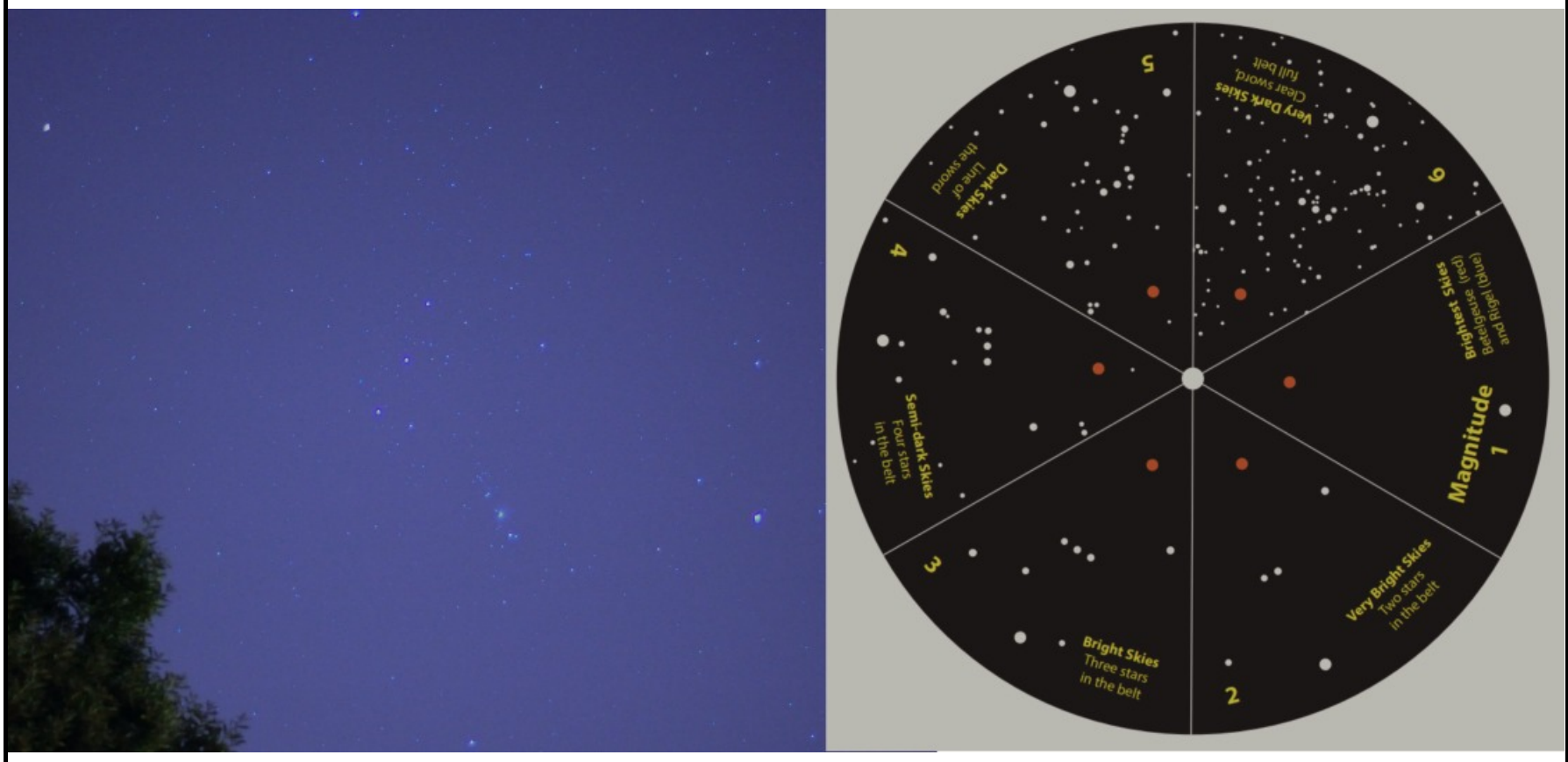
Your sky's **limiting magnitude** is, simply enough, the measure of the dimmest stars you can see when looking straight up. So, if the dimmest star you can see from your backyard is magnitude 5, then your limiting magnitude is 5. Easy, right? But why would you want to know your limiting magnitude? It can help you plan your observing! For example, if you have a bright sky and your limiting magnitude is at 3, watching a meteor shower or looking for dimmer stars and objects may be a wasted effort. But if your sky is dark and the limit is 5, you should be able to see meteors and the Milky Way. Knowing this figure can help you measure light pollution in your area and determine if it's getting better or worse over time. And regardless of location, be it backyard, balcony, or dark sky park, light pollution is a concern to all stargazers!

How do you figure out the limiting magnitude in your area? While you can use smartphone apps or dedicated devices like a Sky Quality Meter, you can also use your own eyes and charts of bright constellations! The Night Sky Network offers a free printable Dark Sky Wheel, featuring the stars of Orion on one side and Scorpius on the other, here: bit.ly/darkskywheel. Each wheel contains six "wedges"

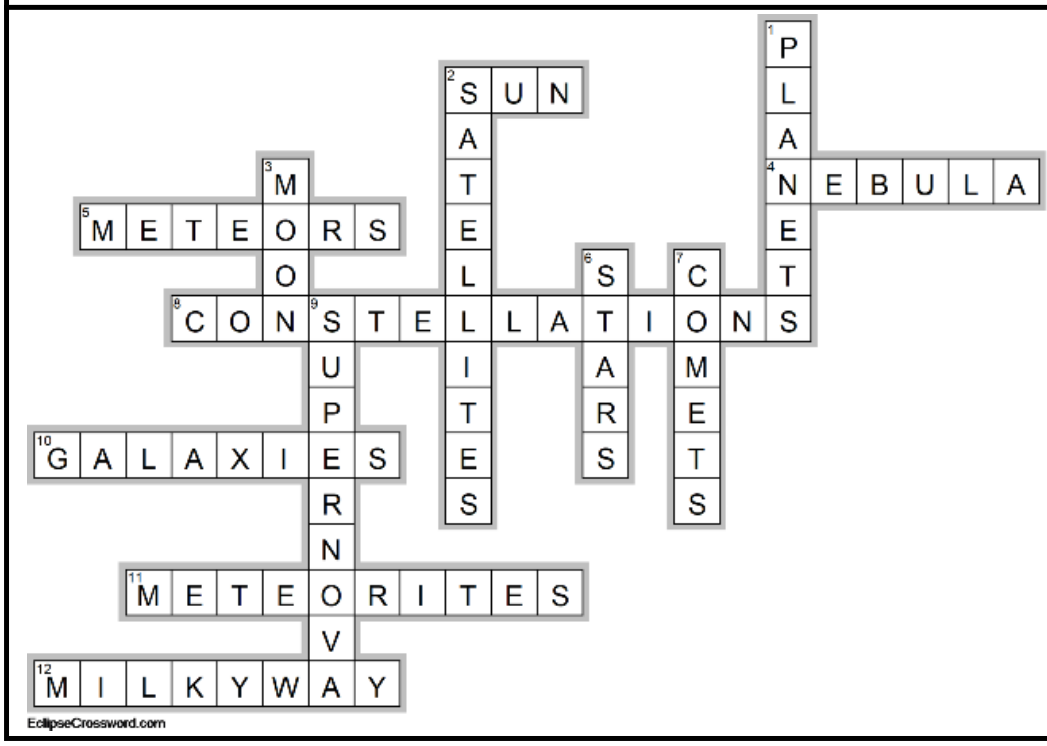
(Continued on page 11)

showing the stars of the constellation, limited from 1-6 magnitude. Find the wedge containing the faintest stars you can see from your area; you now know your limiting magnitude! For maximum accuracy, use the wheel when the constellation is high in the sky well after sunset. Compare the difference when the Moon is at full phase, versus new. Before you start, let your eyes adjust for twenty minutes to ensure your night vision is at its best. A red light can help preserve your night vision while comparing stars in the printout.

Did you have fun? Contribute to science with monthly observing programs from Globe at Night's website (globeatnight.org), and check out the latest NASA's science on the stars you can - and can't - see, at nasa.gov.



The Dark Sky Wheel, showing the constellation Orion at six different limiting magnitudes (right), and a photo of Orion (left). What is the limiting magnitude of the photo? For most observing locations, the Orion side works best on evenings from January-March, and the Scorpius side from June-August.



Solution to HAA Explorers Crossword

Answers to "Why do stars twinkle?":

A star gives off a ***steady*** light. But we see it ***twinkling*** because of ***Earth's*** atmosphere. Each star is just one ***point of light***. When it passes through ***air*** (on its way to our eyes), layers of air ***bend the light*** up and down and left and right, so the star seems to twinkle.

The Jupiter-Saturn Conjunction of December 2020

December 18, 2020, through William Optics Megrez 90mm refractor,

by **John Gauvreau**

December 18, 2020, through Canon 100mm lens, by **Bob Christmas**

Eye Candy the Members' Image Gallery

The Crescent Moon
December 18, 2020,
through William Optics Megrez 90mm refractor,

By
John Gauvreau

Spectacular Hamilton Sunset on December 10, 2020, taken with an iPhone 7
by **Brian Whitman**

Eye Candy the Members' Image Gallery

top:

Full Moon in Norfolk County
December 29, 2020.
Taken with an iPhone

by **Swapna Shrivastava**

right:

Another telescopic image of the **Jupiter-Saturn Conjunction** from December 18, 2020.
Taken with a cell phone through 5" Schmidt-Cassagrain & 25mm eyepiece.

by **Jo Ann Salci**

Eye Candy the Members' Image Gallery

top:
Orion over a Norfolk County Farm
December 31, 2020.
Taken with an iPhone

by **Swapna Shrivastava**

right:
The Leo Trio of Galaxies
M66 (top left), M65 (bottom left) and NGC 3628 is faintly visible at far right.

by **Andrew Brenyo**

UPCOMING EVENTS

January 8, 2021 - 7:30 pm — Virtual Online H.A.A. Meeting for members. The meeting will be conducted on the platform Zoom. Our main speaker will be H.A.A. Publicity Director Mario Carr. Be on the lookout for an invitation e-mail with a meeting link.
You may download the Zoom app for various platforms from Zoom's Download Center

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

2020-2021 Council

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

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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