Event Horizon

Volume 27, Number 2
December 2019

From The Editor

Here's 2019's finale.

Included this month are the H.A.A. Financial Statements for the 2018-2019 membership year.

Happy Reading!

Bob Christmas, Editor

editor 'AT' amateurastronomy.org

Chair's Report by John Gauvreau

Over the past couple of months I have had opportunity to visit a couple of other astronomy clubs. Most interesting is seeing the differences between how they do things and how we meet the same goals. There are certainly lessons to be learned, but in the end I have to say that we have a great club; friendly, active, and large, and run in a very professional manner. The HAA has a lot to be proud of. Despite differences though, each other club was welcoming and friendly, full of good people. The amateur astronomy community is a good one, and I am happy to be a part of it. Jim Wamsley and I also visited the head office of the Royal Astronomical Society of Canada (to pick up planispheres and handbooks) and of course there was quite a bit of teasing going in both directions (since we are not an RASC centre, but are bigger and more active than most of them). Good natured teasing aside, the doors were opened to us in a most welcoming manner. They couldn't have been friendlier and we all had a great visit (and a long one!). Like I said, the amateur astronomy community in this country is a good one full of good people.

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IN THIS ISSUE:

Chair's Report (continued)

I am very pleased with how our first meeting at McMaster Innovation Park went. The facility proved to be very well suited for us, with great AV equipment. I heard lots of positive feedback and once we get the hang of a few things, it should be perfect. Special thanks for making it a great night go out to Les Webb and Michael Jefferson, who manned the welcome table in the foyer outside our room, and stayed there through the first half of the meeting to guide in latecomers. They sacrificed seeing our speaker to make sure other members didn't miss out. Thanks guys; that was above and beyond.

It sure didn't hurt our first meeting at MIP to have a wonderful presentation by Trevor Jones. He took a challenging topic and made it accessible to all. This was Trevor's first visit to us and I'm sure it won't be the last.

Only a week later we held our Scope Clinic and Workshop night at the Spectator building. There were a dozen members, and a couple of dozen members of the public came out. Thanks to all who brought equipment and set it up; there were quite a few good displays to fascinate visitors. And a big thank you to the three members who gave presentations. Sue McLaughlin started us off with a wonderful presentation on tips for the beginning astronomer. Sue's skill at speaking was evident and her material was very appropriate and well received. Then Brian Whitman took everyone through the use of a planisphere, with a planisphere for everyone to take home. Brian is a relatively new member of the club and yet performed like a pro! I look forward to more presentations from him. Finally, Barry Sherman spoke knowledgeably (of course!) about types of telescopes. He knows his stuff!

Upcoming Events

Our next meeting of the 2019/2020 season is coming up on Friday December 13th. Our guest speaker is Kevin Salwach with a seasonal topic. Kevin has been an HAA member for 10 years now and has been an invaluable part of the club. I always enjoy his presentations and I look forward to this one.

This month sees the return of Matthew Mannering to the role of Observing Director. You can read his article on 'The Sky This Month' here in the newsletter and his monthly presentation is always a treat. Matthew has an accessible and friendly manner to his talks that draw you in to his observing experience.

The December meeting is also our annual Christmas Social. We will have an extended break with treats and coffee. If you have anything you would like to contribute please feel free to bring it along.

Calendar

You have another opportunity this month to get the HAA 2020 calendar. Still just $15 each or 2 for $25, these high quality publications are full of great information and beautiful images, all taken by HAA members. They make great gifts! Thanks to Jim and Celia Wamsley for volunteering to sell the calendars. See them at the meeting to get yours!

2019/2020 Council

At the last council meeting, our first for the new club year, we appointed those people who volunteered to be councillors at large. These people pitch in where needed, bring new ideas to the club and of course have a vote in the club's official business (I would say that they have a say in the direction the club takes, and they do, but so do all of you; all members are welcome to attend council meetings, offer their views and have input).

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Masthead Photo: *Galaxy NGC 891* in Andromeda, *by Matthew Mannering.*

Chair's Report (continued)

I am happy to welcome back to council the following as councillors at large:

- Steve Germann
- Michael Jefferson
- Sue MacLachlan
- Dee Rowan
- Barry Sherman
- Gary Sutton
- Bernie Venasse

And a very special welcome to council to Melissa Whitman, who is joining for the first time. We are delighted to have your insights and company.

As is my custom in December, I will close with the words of Clement Moore, who wrote a most fitting wish for amateur astronomers: *'Merry Christmas to all, and to all a good night'.*

HAA Helps Hamilton

To support our community, we collect non-perishable food items and cash for local food banks at our general meetings. Please bring a non-perishable food item to the meeting or a donation of cash and help us help others.

Our donations go to Hamilton Food Share, which delivers them to various food banks around the Hamilton area.

If you would like to help or have any questions about this initiative, please contact the H.A.A.

Hamilton Food Share
Hunger. It's just unacceptable.

Hamilton Amateur Astronomers

Christmas Social

Friday December 13, 2019

McMaster Innovation Park

General Meeting 7:30 pm

Christmas Social 8:30 pm

Guest Speaker:
Kevin Salwach
Topic: A Christmas Story

Christmas Social

The regular meeting break will be extended to allow members and guests to mingle over coffee and treats. If you are able to contribute an item to the treat table such as Christmas baking/sweets, Timbits, a small tray of fruit or veggies, etc. please contact Sue MacLachlan at smaclach@teksavvy.com

Coffee and water will be provided.

HAMILTON Food Share

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

November Astrophysics Group Meeting Summary by Mike Jefferson

November 21/2019:

The Astrophysics Group met for the final time in the 2019 calendar year on the above date. Present were Doug Black, Doug Currie, Mike Jefferson and Gary Sutton. The topic under discussion this month was the viability and problems confronting human travel into the universal realms. Given that satellites, rovers, robots and telescopes (both ground and space-based) have made the biggest contributions to our understanding of the universe than any manned programmes to date, the question arises as to why we should even bother trying to send humans anywhere in the cosmic realms. "Fantastic Voyage" (the movie) notwithstanding, we realize the absurdity of shrinking vessels and people down to sizes small enough to put them into a human body for the purpose of exploring that realm. Likely, there are realms in the cosmic universe where people will never be able to tread.

Mike Jefferson was asked, the previous month, to come up with a topic that would be suitable for our study and would explore the activity of getting humans to investigate the cosmos. He found "A Journey to the End of The Universe" on YouTube. It deals with an imaginary rocket trip from the inner solar system to the limits of the cosmic background radiation and all of the trip-cords and pitfalls to be encountered on the way – as if it would always be just out of our reach. It seems as if humans are not designed to go that far into the universe. This programme is very well presented and explained and is about ½ hour in length.

Leading up to the above, *Doug Black* presented his part of "Barriers to Intergalactic, Interstellar and Interplanetary Travel" by showcasing a PowerPoint rendition of such. Barriers to interplanetary travel would be finding planetary and moon systems to explore, coping with the time this would take, dealing with radiation problems, food supplies and water availability. Interstellar flight would exact the tolls of time and distance even if such as *82 Eridani* did show some possibility of habitability. Much of this lends itself to engineering-daydreaming along the lines of 'the Isaac Arthur video presentations'.

Doug Currie then presented "A Summary of Human Spaceflight Options to the Moon and Mars". He covered the International Space Station, the Apollo Missions, space hazards, micro-gravity, radiation, bone mass loss, etc. He made reference to the Constellation and Orion projects and the Moon and Mars as destinations. Reference was made to Elon Musk's and the Chinese plans to colonize Mars and the Chinese rover on the far side of the Moon. Russia still endeavours to cooperate with the United States in much of this, including the "Deep Space Gateway" and lunar science that is relevant to human occupation. The United States is researching Gale crater on Mars as a possible human landing site for 'the Space Launch (Orion) System for Humans to the Moon and Mars'. The "Deep Space Gateway" is still currently developing components for this mission's success. Hopefully, there will be some progress here by 2024. Right now, Space X is having developmental problems. However, there are plans for nuclear rockets farther up the road.

Mike finished the meeting with YouTube's "A Journey to the End of the Universe". Doug Black ("Barriers to Intergalactic, Interstellar and Interplanetary Travel") and Doug Currie ("A Summary of Human Spaceflight Options to the Moon and Mars") have, as mentioned previously, developed PowerPoint presentations of both of these topics, suitable for small group showcasing.

This meeting was probably the longest in "Astrophysics'" history, due to some equipment delivery issues and the length of all three topics. We thank the Blacks and some of the membership for refreshments and hospitality – both being the touches that make a good seminar even better.

Our next session will NOT be in December, but in January 2020, on the 17th. Please refer to "Event Horizon" and the HAA website for any updates or changes.

The Sky This Month for December 2019 by Matthew Mannering

Last month featured the transit of Mercury across the face of the Sun. A lot of us were ready to observe this event early on November 11th, as it won't occur again until 2032. Unfortunately, the weather didn't cooperate and we were clouded out. On November 25th, Venus sped past Jupiter in the western sky at dusk. I also missed this event because of clouds low on the horizon. Some of the images I saw on the web are very pretty and worth a look.

Looking forward to this month, Jupiter is headed towards *superior conjunction* where its orbit takes it directly behind the Sun from our perspective.

Venus, on the other hand, will rise high in the evening sky and remain visible until spring. Venus is interesting to observe because it features phases just like the Moon. You can actually track its orbit by sketching the phase of Venus over a period of months. Take notice of the apparent size and visual magnitude as the phase changes. You may be surprised at the results of your observations. What you will see is Venus change from an almost full disc to a very slim crescent and the apparent size will grow from 12 to 54 arc seconds. When observing Venus as a thin crescent, it will be very close to the Sun so be sure not to aim your scope at the Sun!

Come June next year, Venus will be directly between us and the Sun. This is called *inferior conjunction*. Once it moves beyond the disc of the Sun, it will begin to appear in the morning sky for a period of months. This cycle repeats over and over as Venus circles the Sun. It just depends where Venus is in its orbit relative to the Earth. This is why Venus goes by two names; the Morning star and the Evening star. We of course now know that Venus is a planet but the ancient names have stuck.

Uranus and Neptune are well placed for the next few months. Try and find both of these planets with a sky chart and binoculars. Look for a coloured 'star' that stands out from the others around it. Neptune will appear blue while Uranus will appear greenish depending on how you see colour. Neither is very exciting through a backyard scope but if you have a mount that tracks, you can take a 30 second image that will show some of their moons. Once you have an image, you can look up the names of the moons in apps like Stellarium or SkySafari. Take images over a period of days and watch the positions of the moons change as they orbit the planet. Here is an example image of Uranus and some of its moons that I took at Cherry Springs Star Party on September 27 this year. The number after the names of the moons represent their visual magnitude at that time.

Image Credit: Matthew Mannering

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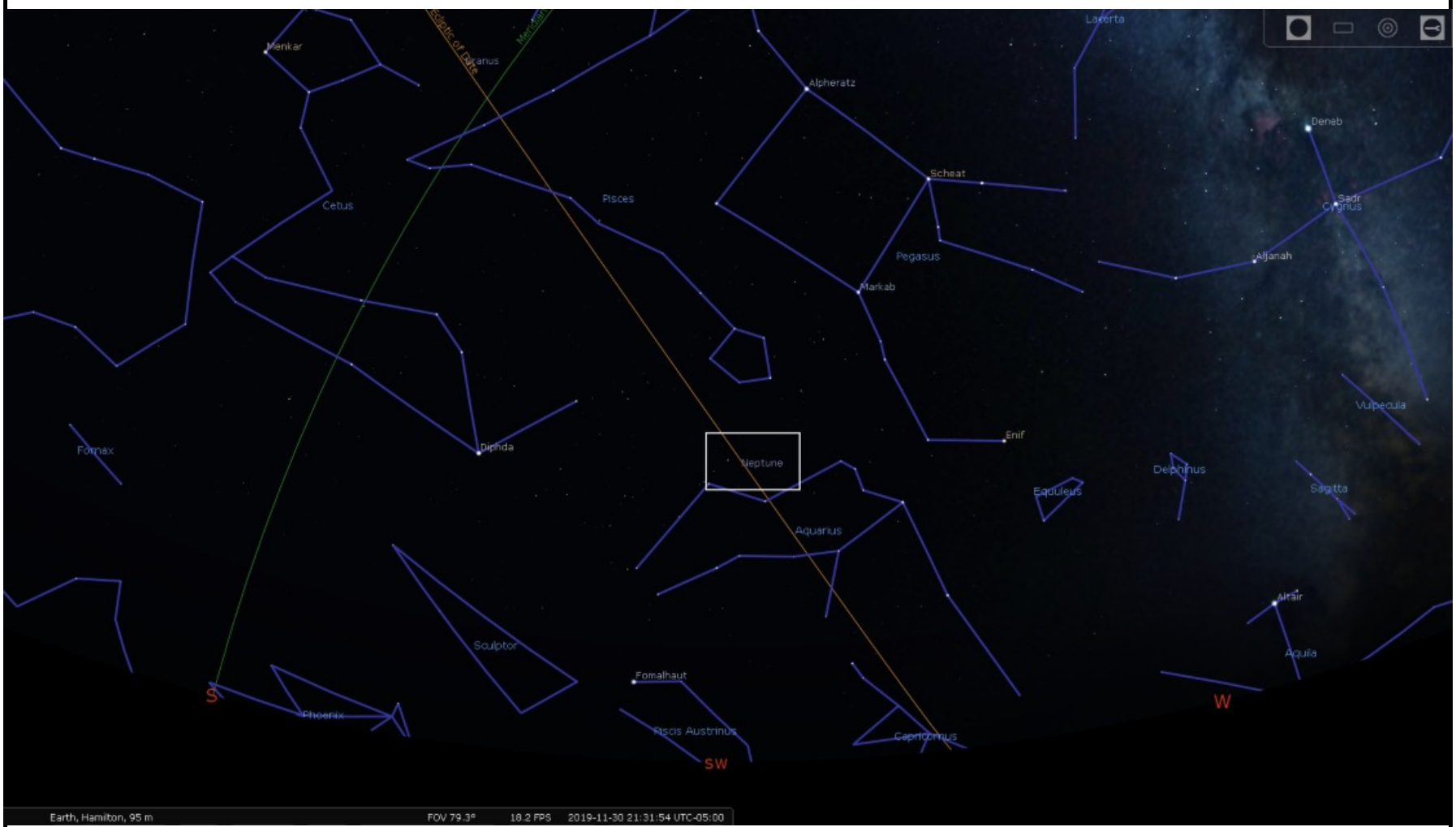
The Sky This Month for December 2019 (continued)

Below are a couple of charts showing the general locations of Uranus and Neptune, as generated using Stellarium. This is the chart for Uranus:

This is the chart for Neptune:



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The Sky This Month for December 2019 (continued)

Other events for December are:

- At 5:25pm on the 4th, look to the south west. Jupiter will be very low in the sky (only 5 degrees above the horizon) with Venus and Saturn trailing higher in the sky.
- Venus will appear very close to Saturn on the evenings of the 10th and 11th. Start looking for them at 5:15pm low in the west. By 6:15pm the planets will have dropped to only five degrees above the horizon.
- The Geminid meteor shower should peak on the 14th. Unfortunately an almost full Moon will wash out the sky leaving only the very brightest meteors for you to view.
- The winter solstice comes on December 21st.
- At 6pm on the 28th, the Moon will appear as a very thin crescent just below Venus low in the south west.

Note: There is an error in the HAA calendar for December 2019. The event listed on the 24th does not occur at all.

The Moon

Libration this month is as follows: The Northern limb will be most exposed on the 5th and 30th. The Western limb will be most exposed on the 12th and 14th. Try taking a few images of the Moon at these times and look on a Moon map to identify craters that are normally hidden from Earth behind the curve of the Moon.

The phases of the Moon for December occur as follows: First Quarter Moon on the 4th, Full Moon on the 12th, Last Quarter on the 18th, New Moon on the 26th.

The Planets

- *Mercury* appears low in the eastern morning sky for the first half of the month.
- *Venus* shines brightly in the western evening sky all month.
- *Mars* sits about 20 degrees above horizon in the south east all month.
- *Jupiter* disappears below the western horizon at dusk by the 12th of the month.
- *Saturn* is low in the SW evening sky at dusk until late in the month.
- *Uranus* in Aries and *Neptune* in Aquarius are well placed in the evening sky all month.

On the next page are a couple of views of the Solar System for mid December. One shows the planets in the inner system and the other shows the planets in the outer system. I found these charts on the website www.in-the-sky.org. What I really like about these views is the colour scheme which shows clearly when the planets are visible. The planets move counter clockwise in these charts. The key in the bottom left corner is missing the light blue zone which represents planets that are visible in the evening.

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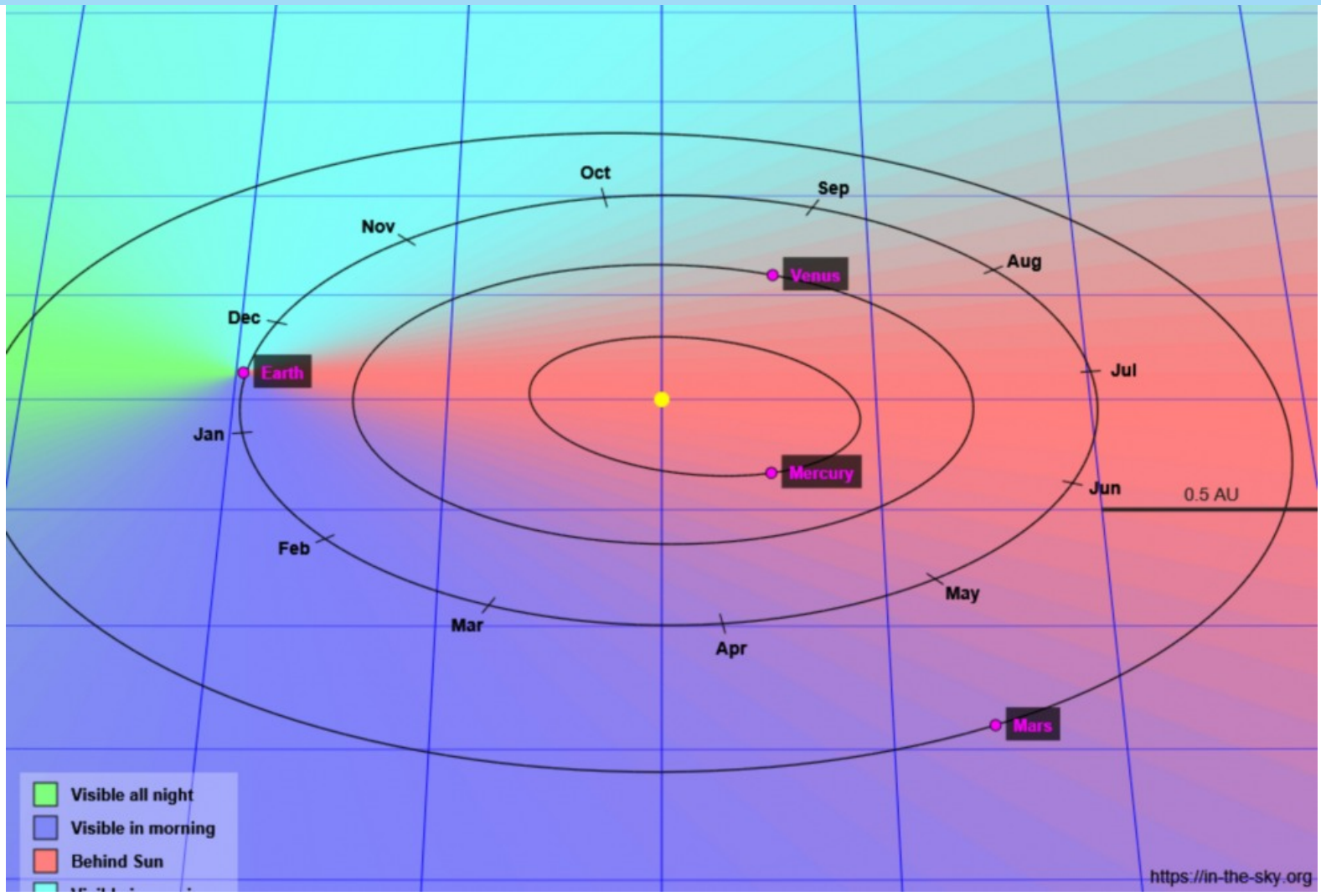
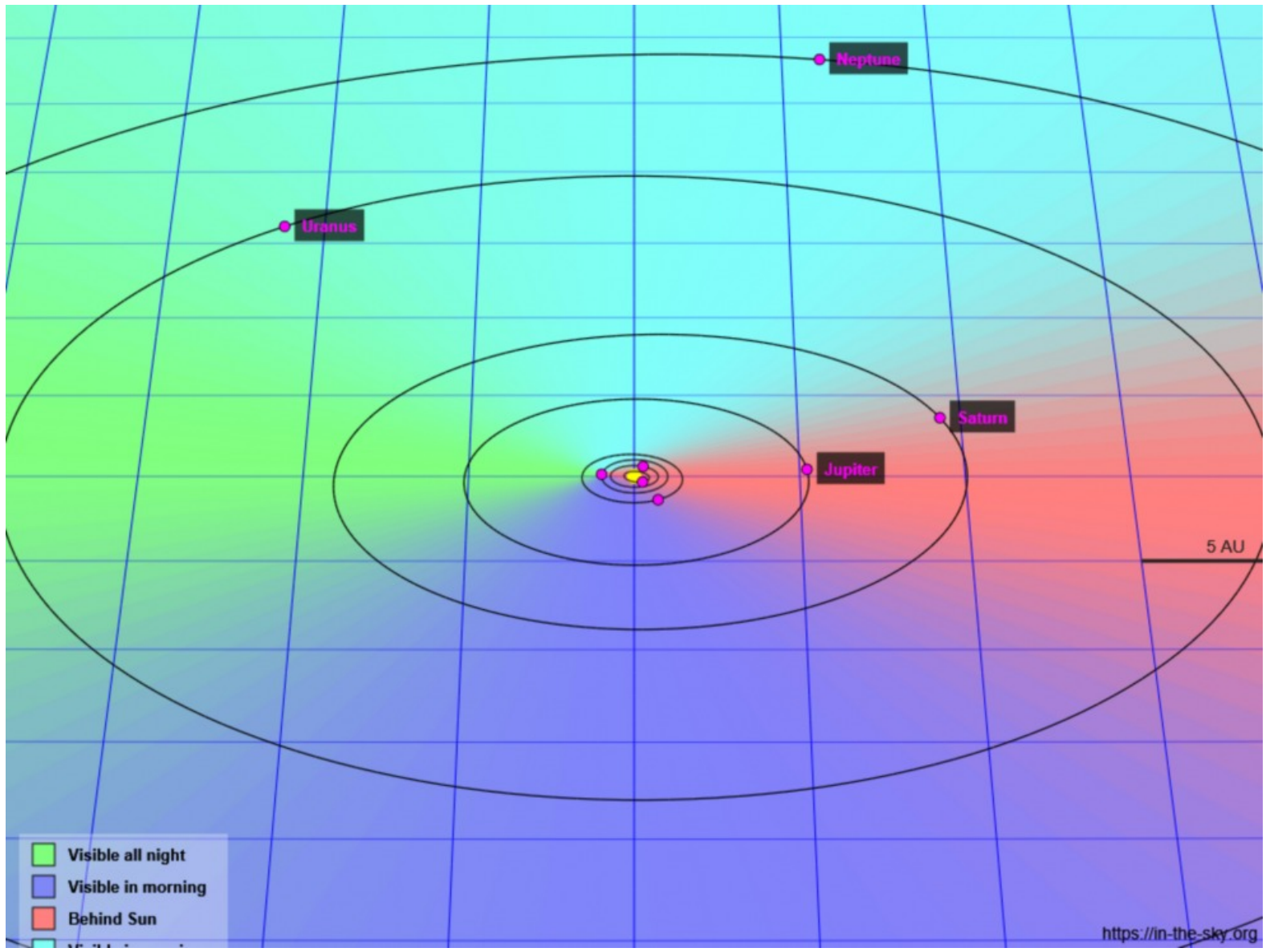
The Sky This Month for December 2019 (continued)





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.org to find local clubs, events, and more!

The Orion Nebula: Window Into a Stellar Nursery

By David Prosper

Winter begins in December for observers in the Northern Hemisphere, bringing cold nights and the return of one of the most famous constellations to our early evening skies: Orion the Hunter!

Orion is a striking pattern of stars and is one of the few constellations whose pattern is repeated almost unchanged in the star stories of cultures around the world. Below the three bright stars of Orion's Belt lies his sword, where you can find the famous Orion Nebula, also known as M42. The nebula is visible to our unaided eyes in even moderately light-polluted skies as a fuzzy "star" in the middle of Orion's Sword. M42 is about 20 light years across, which helps with its visibility since it's roughly 1,344 light years away! Baby stars, including the famous "Trapezium" cluster, are found inside the nebula's whirling gas clouds. These gas clouds also hide "protostars" from view: objects in the process of becoming stars, but that have not yet achieved fusion at their core.

The Orion Nebula is a small window into a vastly larger area of star formation centered around the constellation of Orion itself. NASA's Great Observatories, space telescopes like Hubble, Spitzer, Compton, and Chandra, studied this area in wavelengths we can't see with our earthbound eyes, revealing the entire constellation alight with star birth, not just the comparatively tiny area of the nebula. Why then can we only see the nebula? M42 contains hot young stars whose stellar winds blew away their cocoons of gas after their "birth," the moment when they begin to fuse hydrogen into helium. Those gas clouds, which block visible light, were cleared away just enough to give us a peek inside at these young stars. The rest of the complex remains hidden to human eyes, but not to advanced space-based telescopes.

We put telescopes in orbit to get above the interference of our atmosphere, which absorbs many wavelengths of light. Infrared space telescopes, such as Spitzer and the upcoming James Webb Space Telescope, detect longer wavelengths of light that allow them to see through the dust clouds in Orion, revealing hidden stars and cloud structures. It's similar to the infrared goggles firefighters wear to see through smoke from burning buildings and wildfires.

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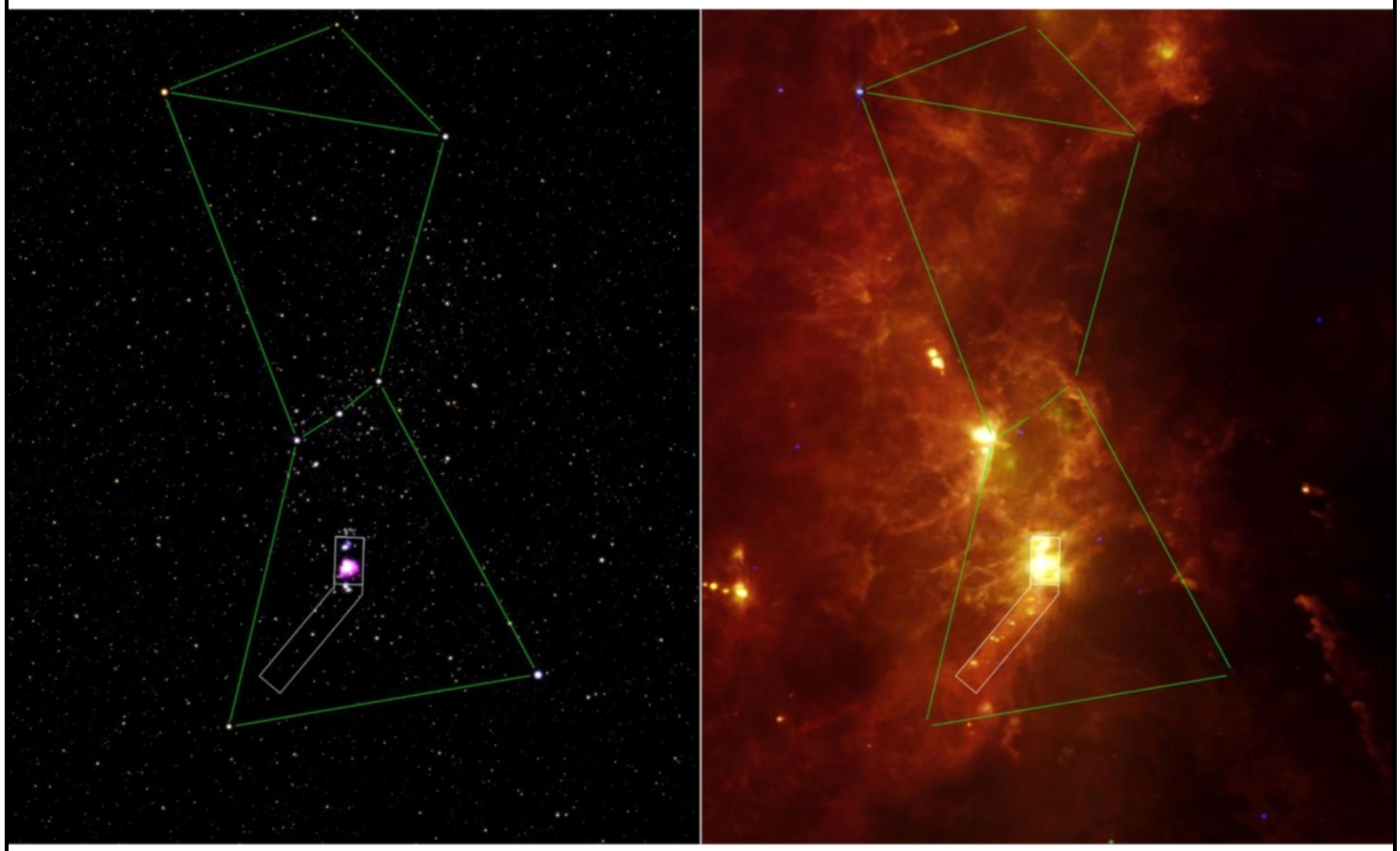
NASA Night Sky Notes (continued)

Learn more about how astronomers combine observations made at different wavelengths with the Night Sky Network activity, 'The Universe in a Different Light," downloadable from bit.ly/different-light-nsn. You can find more stunning science and images from NASA's Great Observatories at nasa.gov



This image from NASA's Spitzer missions shows Orion in a different light – quite literally! Note the small outline of the Orion Nebula region in the visible light image on the left, versus the massive amount of activity shown in the infrared image of the same region on the right.

Image Credit: NASA/JPL-Caltech/IRAS /H. McCallon. From bit.ly/SpitzerOrion

H.A.A.'s Loaner Scope Program

We at the HAA are proud of our Loaner Scope Program.

If you don't have a telescope of your own and want to make use of one for a month or so, you can borrow one of our fine loaner scopes.

Please contact Jim Wamsley, at: 905-627-4323
or e-mail Jim at: *secondchair 'AT' amateurastronomy.org*

and we'll gladly get one signed out for you.

Eye Candy the Members' Image Gallery

The Waxing Gibbous Moon November 8, 2019, by **Sylvie Gionet**
Taken with Canon Rebel T6i & EF-S55-250mm lens. 1/125 second exposure at f/5.6 & ISO 200

The Crescent Moon and Venus, November 28, 2019, by **Bob Christmas**
Taken from Burlington, ON, with Canon 40D & 50mm lens. 1 second exposure at f/2.8 & ISO 200.

2018-2019 Financial Statements by Ann Tekatch

CASH FLOW

Income	**31-Oct 2019**	**31-Oct 2018**
Memberships	$3,135.00	$3,995.00
HAA Calendars	$3,140.00	$3,072.00
RASC Handbooks	$0.00	$0.00
Clothing Sales	$1,245.00	$0.00
50/50	$672.50	$485.25
Coffee Fund	$0.00	$0.00
Advertising Revenue	$0.00	$0.00
Cash Donations	$190.00	$80.00
Messier Marathon	$0.00	$0.00
Banquet Revenue	$0.00	$1,260.00
Miscellaneous	$0.00	$0.00
Prepaid Postage	$0.00	$0.00
Total Income	**$8,382.50**	**$8,892.25**

Expenses	**31-Oct 2019**	**31-Oct 2018**
Insurance	$1,083.24	$914.76
EH Newsletter	$0.00	$0.00
Brochures/Promotion	$0.00	$24.86
HAA Calendars	$2,340.54	$2,367.46
RASC Handbooks	$0.00	$0.00
Clothing Sales	$1,473.53	$0.00
Donations Outgoing	$700.00	$950.00
Depreciation Expense	$344.15	$420.81
PO Box Rental	$187.58	$183.06
Speakers Allowance	$350.00	$196.06
Office Supplies	$165.21	$28.69
Postage	$0.00	$0.00
Banquet Costs	$0.00	$1,186.31
Public Education	$41.03	$0.00
Kids Outreach Kit	$0.00	$0.00
Hall Rental	$1,290.00	$1,130.00
Prepaid Hall Rental	$0.00	$1,290.00
Miscellaneous	$517.84	$209.42
Equipment Repairs	$0.00	$0.00
Website	$130.97	$492.78
Total Expenses	**$8,624.09**	**$8,104.21**
Surplus/Deficit	**-$241.59**	**$788.04**

BALANCE SHEET

Assets	**31-Oct 2019**	**31-Oct 2018**
Bank	$9,454.08	$7,128.27
Cash	$0.00	$0.00
Inventory	$0.00	$0.00
Prepaid PO Box Rental	$190.97	$187.58
Prepaid Mailing Expense	$0.00	$0.00
Prepaid Liability Insurance	$0.00	$0.00
Prepaid Hall Rental	$0.00	$1,290.00
Accounts Receivable	$0.00	$0.00
Prepaid Banquet Expenses	$0.00	$0.00
Prepaid Calendars	$2,293.90	$2,340.54
Total Current Assets	**$11,938.95**	**$10,946.39**
Fixed Assets		
Equipment	$1,414.08	$1,683.23
Total Fixed Assets	**$1,414.08**	**$1,683.23**
Total Assets	**$13,353.03**	**$12,629.62**
Liabilities	**31-Oct 2019**	**31-Oct 2018**
Deferred Membership Revenue	$2,540.00	$1,575.00
Banquet Tickets sold	$0.00	$0.00
Accounts Payable	$0.00	$0.00
Total Liabilities	**$2,540.00**	**$1,575.00**
Equity		
Opening Balance	$11,054.61	$10,266.57
Adjustments	$0.00	$0.00
Donated Equipment (Book Value)	$0.00	$0.00
Current Year	-$241.59	$788.04
Closing Balance	$10,813.03	$11,054.61
Total Liabilities and Equity	**$13,353.03**	**$12,629.61**

PROFIT & LOSS

Revenue (Net)	31-Oct 2019	31-Oct 2018
Membership	$2,640.00	$2,755.00
Calendars	$1,021.25	$953.25
Cash Donations	$190.00	$80.00
50/50 Draw	$0.00	$0.00
Planetarium Trip	$0.00	$0.00
Donations in Kind	$0.00	$0.00
Intangible Donations	$0.00	$0.00
Banquet	$0.00	$0.00
Clothing Sales	-$228.53	$0.00
Net Revenue	**$3,622.72**	**$3,788.25**

Depreciation Table	31-Oct 2019	31-Oct 2018
Opening Balance	$1,683.23	$2,104.03
Depreciation Full Year	$336.65	$420.81
Donated Equipment	$0.00	$0.00
Additions	$75.00	$0.00
Sales	$0.00	$0.00
Net	$75.00	$0.00
Depreciation Part Year	$7.50	$0.00
Total Depreciation	**$344.15**	**$420.81**
Closing Balance	**$1,414.08**	**$1,683.23**

William J. McCallion Planetarium

McMASTER UNIVERSITY, HAMILTON, ONTARIO

- **Public shows every Wednesday (7:00pm)**
- **Public transit available directly to McMaster campus**
- **Tickets $7 per person; private group bookings $150**
- **Different shows every week**
- **Upcoming shows include:**
  - **Dec 4: Introductory Astronomy for Kids — Galaxies**
  - **Dec 11: Oumuamua and Other Eccentric Objects**
- **For more details, visit www.physics.mcmaster.ca/planetarium**

UPCOMING EVENTS

December 13, 2019 - 7:30 pm — *HAA Meeting* at McMaster Innovation Park, 175 Longwood Road South, Hamilton, ON. Our featured speaker is HAA member *Kevin Salwach*, whose talk is entitled "An Astronomical Christmas Tale: The Star of Bethlehem". Kevin will outline some of the theories pertaining to the mystery of the Star of Bethlehem. Everyone welcome.

January 10, 2020 - 7:30 pm — *HAA Meeting* at McMaster Innovation Park. Everyone welcome.

2019-2020 Council

Chair	John Gauvreau
Second Chair	Jim Wamsley
Treasurer	Ann Tekatch
Digital Platforms Director	Christopher Strejch
Membership Director	Leslie Webb
Observing Director	Matthew Mannering
Education Director	Jo Ann Salci
Event Horizon Editor	Bob Christmas
Recorder	Brenda Frederick
Secretary	Denise White
Publicity Director	Mario Carr
Councillors at Large	Barry Sherman Bernie Venasse Dee Rowan Gary Sutton Melissa Whitman Mike Jefferson Steve Germann Sue MacLachlan

Check out the H.A.A. **Website**

www.amateurastronomy.org

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Observing Inquiries:
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Newsletter:
editor@amateurastronomy.org

Digital Platforms Director:
webmaster@amateurastronomy.org

Observing site for the HAA provided with the generous support of the
Binbrook Conservation Area
Come observing with the HAA and see what a great location this is for stargazing, a family day or an outdoor function.
Please consider purchasing a season's pass for $79 to help support the park.
http://www.npca.ca/conservation-areas/binbrook/
905-692-3228

The Harvey Garden HAA Portable Library

Contact Information

E-mail: library@amateurastronomy.org