

# Event Horizon



Volume 26, Number 3  
January 2019



## From The Editor

Another year is behind us, and a brand new one has begun! Man! Where does the time go?!

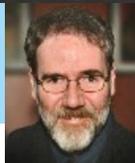
Ring in the New Year with the first edition of the E.H. of 2019.

Included this month are the H.A.A. Financial Statements for the 2017-2018 membership year.

Happy Reading!

*Bob Christmas,  
Editor*

*editor 'AT'  
amateurastronomy.org*



## Chair's Report by John Gauvreau

A very Happy New Year to all! Here's hoping the year brings health and happiness, clear skies and I wouldn't complain about another comet or two.

Not that the weather has improved greatly over the last month, but I did get one break. In this case, a break in the clouds.

On the night of December 16th we were visiting family in Angus, a small town of 18,000 people about 20 km southwest of Barrie. Knowing the skies there were much darker than at home I had taken a small scope, binoculars and some photographic gear in the hope of capturing Comet 46P Wirtanen. I did nothing to ingratiate myself to our hosts by constantly sticking my head out the back door to check on sky conditions. But Mother Nature did nothing to ingratiate herself to me by casting a light cloud over the sky that evening. The kind of cover that allows just the moon to shine through but would completely obscure the soft fuzz ball of a comet. Food was eaten, a good time was had and the day drew to a close. As I was carrying the last few items out to the car I glanced up one last time and was gifted a dazzlingly clear sky! Dark and rich and begging for observing eyes to take it in.

It was time to leave and the scope and gear were packed but I had access to my binoculars and I took 10 minutes to view. That night the comet was within a binocular field of the Pleiades. I had two pairs of binoculars with me and started with an 8x50 pair of Leicas that I found second hand at a star party (actually  
*(Continued on [page 2](#))*

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## Chair's Report (continued)

Matthew Mannering found them and knowing that I was shopping for a mid-size binocular brought them to my attention, saying "If you don't buy them I will!" I did.) The view through the 8x50s was rich and a quick sweep gathered up the comet. Large and diffuse, it made a beautiful sight along side the Pleiades. I then pulled out my 15x binoculars and the comet looked even better. The higher magnification darkened the sky background and the comet stood out clearly. I wanted to convince myself that I could see a hint of the green colour visible in the photos I had seen and as the eye is most sensitive to green it's possible, but it's also possible I was seeing what I wanted and expected to see. What I am sure of is that it was truly a lovely sight. Minutes later the sky conditions deteriorated and shortly after that a heavy fog rolled in and I could see nothing. I had my window of opportunity and I saw the comet. I hope you did too.

### January Meeting

Our next general meeting will be on Friday January 11th at 7:30pm. The guest speaker will be science writer Dan Falk. Dan is the author of 'In Search of Time' which he spoke eloquently about at his last visit to us, and of course "Universe on a T-Shirt", an excellent introduction to the history of cosmology. This time Dan will be talking on "Science and Shakespeare" and I can't wait to hear what he has to say this time.

As always, please be respectful of the speaker and your fellow audience members. We are fortunate to have a fine venue for our meetings, comfortable and acoustically excellent. Just as you can hear a speaker throughout the room, everyone else can hear you throughout the room too. And of course most speakers are happy to entertain questions at the end of their talk, so there is no need to interrupt them. We are an enthusiastic and engaging club and many a speaker has been thrilled to be so well received by such a large and pleasant group. Let's show off the HAA at its best.

Also, there are just a handful of our beautiful wall calendars left and this meeting will be your last chance to purchase one.

### Library

Keep an eye out for Denise White and the club's library at the back of the room. Each month Denise brings a collection of books available for members to borrow, take home and return at the next meeting. Denise knows the books well and will be happy to offer recommendations and guidance and for her efforts she deserves a big thank you! The library is a great resource so if you haven't seen it make sure you check out the books (see what I did there? Check out the books!)

### Scope Clinic

Our November Workshop, filled with excellent talks and enthusiastic guests, sent people home armed with a great deal of knowledge as they set out to consider buying telescope equipment. This month they are all invited back along with anyone else to bring their gear, new or old, in for help, instruction, tips and tricks. Our members will also have a wide assortment of astro-equipment on hand and will be happy (more than happy!) to tell you all about it. From telescopes to binoculars, eyepieces, star charts and books, meteorites and more, this is your chance to show off your favourite piece of astronomy gear. Or don't

*(Continued on [page 3](#))*

**Masthead Photo:** *Comet 46P Wirtanen on December 11, 2018, by Matthew Mannering.*

Stack of 29 frames, 5 seconds each, for a total of 145 seconds exposure time, with his Canon DSLR through his 200mm lens at f/2.8. Crop of original image.

## Chair's Report (continued)

just pick a favourite; bring it all! Everyone is welcome, members and guests, and everyone is encouraged to bring out your favourite show and tell item.

The HAA Telescope Clinic will be held Saturday January 19th, from 1pm to 5pm, at the Hamilton Spectator auditorium. Members can arrive any time after noon to set up. Hope to see you there!

## Lunar Eclipse

I won't step on our Observing Director's toes by delving in too deeply but one of the highlights of the observing year is this month's lunar eclipse. This will be the best one we have for a long time so here's hoping for one more thing this new year; clear skies on eclipse night!

As always, feel free to get in touch (council emails are on the last page of the newsletter) and see you out there.



## 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: *secretary 'AT' amateurastronomy.org*

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

## 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.





Three frogs were sitting on a tree limb, not far above a pond, and one of them decided to jump into the water.

How many frogs were there on the tree limb after that?

You might say 'two'. But I would say it's a trick question. Then you might say 'none, because if one frog thought it was worth jumping they all jumped'.

Well, the short answer is three. The frog only *decided* to jump. It did not jump (yet).

Will you *decide* to do some observing AND do it? Then this is your year. There's so much to see, that already in January 2019 you will be, like me, permanently delaying procrastination.

This January brings a few events that definitely are incompatible with procrastination. There's just no time for it.

### Solar Eclipse

There's a partial Solar Eclipse on January 6, visible from parts of the North Pacific Ocean. Unfortunately, the difference between a partial Solar Eclipse and a Total Solar eclipse is like night and day. Literally.

This one you can safely skip. The rest, not so much. Read on with me and start preparing!

### Lunar Eclipse

For starters, there's a *Total Lunar Eclipse* happening the evening of Sunday, January 20, 2019.

This rare case of a lunar eclipse coincides with a super moon, the largest full Moon of the year.

It's visible in its entirety from the Hamilton area, and by no coincidence, there's a full Super Moon rising that day too.

So if it is clear, check the Photographer's Ephemeris screenshot on the next page to see where the moon will rise...

Note that from our often-used Sydenham Road Lookout (clouded out last month, unfortunately) you will see the Moon rise over Lake Ontario beyond the Burlington skyline.

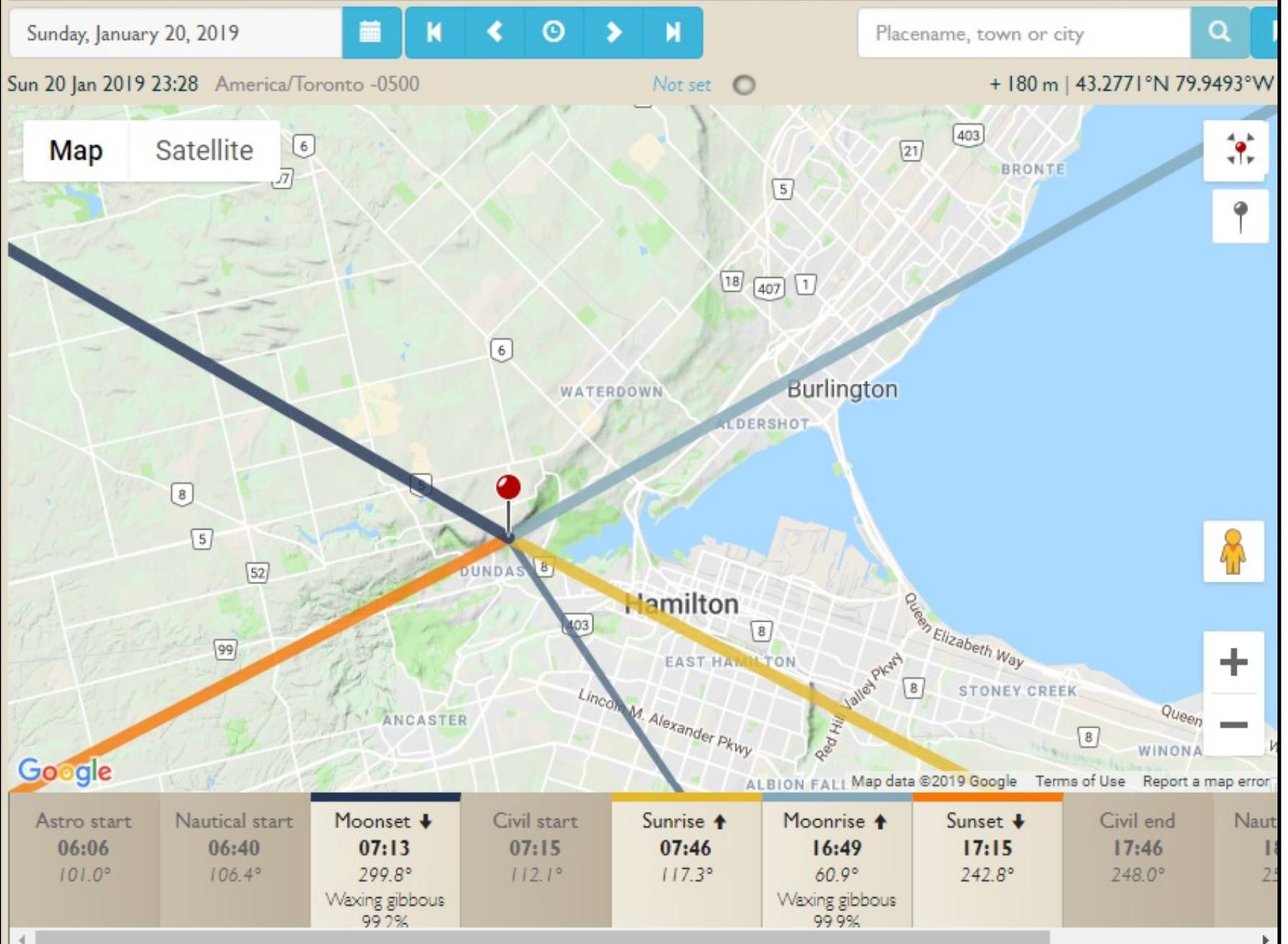
This gives you some advantages. For one thing you can use the app and the distant features of the skyline to calibrate your compass for an exact azimuth of Moonrise, and have your camera lined up to see it at the earliest time, when the moon is a deep deep red colour.

I just acquired a 70-300 zoom lens which I plan to use for this occasion. I expect to make time exposures of a second or 2 and catch the entire emergence of the moon as it crests the horizon.

Will you join us (I won't be alone) for this? It's at about 4:30 to 5 PM on Sunday January 20th. There's safe legal parking and a great view. I am not saying we should remain there for the eclipse, but we could if there's enough people interested. Get some snacks and set up there. You will need lots of gas in your car

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

# The Sky This Month for January 2019 (continued)



*The Directions of Sunrise, Sunset, Moonrise and Moonset for January 20, 2019, from the Protographer's Ephemeris Website, for the night of the Total Lunar Eclipse*

(idling is not recommended) or (very) warm clothing, a thermos of hot drinks and a lawn chair... and of course your cameras and telescopes as you desire.

There's a space in front of where your car will be, for safe setup of a tripod, and a wall along the edge to prevent you tipping over the cliff in euphoria when you see the blue line at the edge of the Earth's umbral shadow cross the face of the Moon. And if it's cold, there's Dundas (aka civilization) only a few blocks away.

And at the top of page 6 is a map where to find the moon later in the evening during the eclipse.

I suggest that you take a look in the sky from your yard around midnight during the week before the 20th of January (or 11 pm now) and note the constellations you can easily see from your backyard. If you can see these, then you will be able to see the Lunar Eclipse from the comfort of your yard. If not, well, you need to make some lateral move. Basically, the Moon will be between Gemini and the bright star Procyon.

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

# The Sky This Month for January 2019 (continued)

## Moon

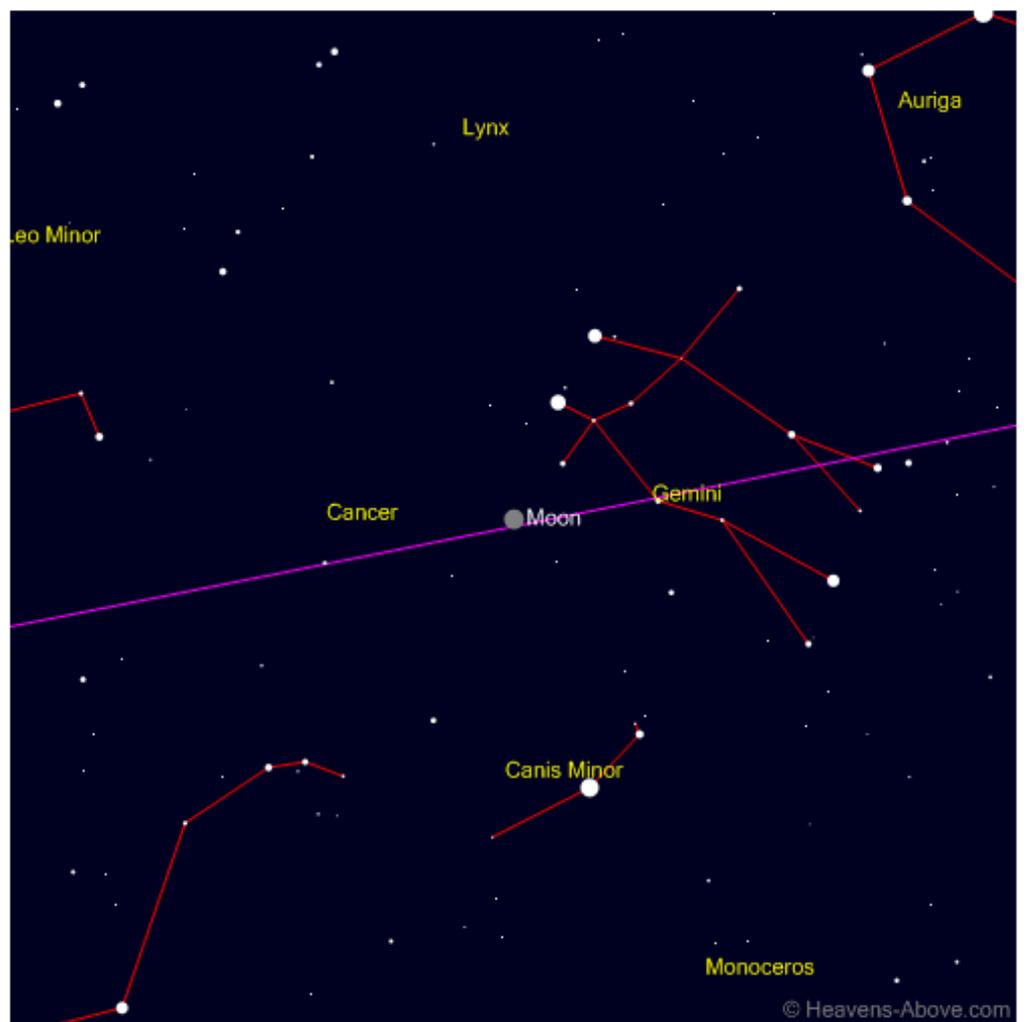
Year  Month  Day  Time

Position	
Altitude	66.1°
Azimuth	27.3° (NNE)
Right ascension	7 <sup>h</sup> 57 <sup>m</sup> 5 <sup>s</sup>
Declination	21° 8' 6"
Range	358,086 km
Constellation	Gemini

Appearance	
Diameter	33.37'
Illumination of disk	100%
Libration in longitude	-2.014°
Libration in latitude	-0.004°

Event	Time	Altitude	Azimuth
Sets	05:10	-0.8°	292°
Rises	17:43	-0.8°	69°
Maximum altitude	23:59	68.9°	360°

Monthly phases	
 New moon	06 January 2019 01:28
 First quarter	14 January 2019 06:46
 Full moon	21 January 2019 05:16
 Last quarter	27 January 2019 21:10
 New moon	04 February 2019 21:04



Position of the Moon

*The Location of the Moon in Gemini for the January 20, 2019 Total Solar Eclipse, from the Heaven's Above Website*

## Cheating on the Full Moon

A lunar eclipse offers you the rare opportunity to see the deep sky objects on the same evening as the Full Moon.

What's in the sky near the Moon that is worth a peek?

Well to start with, almost overhead now, is *Comet 46P Wirtanen*, not far from Gemini, and on the way towards the Big Dipper. This will be your best chance to see it during the Lunar Eclipse, when you are already out and in the company of telescope packing astronomers.

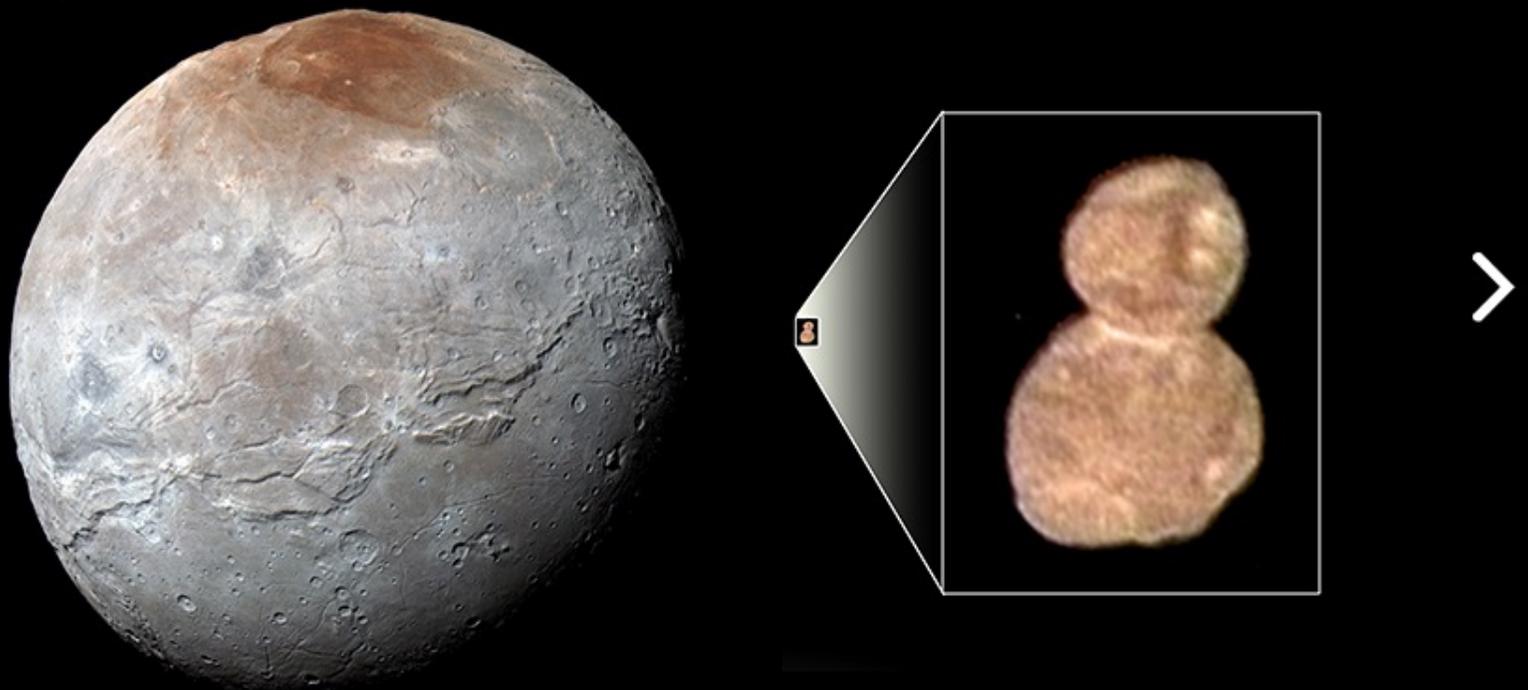
At the bottom of Page 9, at the end of this article, is a diagram from the Heavens Above website showing where 46P will be on January 20, the night of the eclipse.

It's going to fade soon, but 46P is still fifth magnitude, so this is your chance to get a glimpse of it for 5 years. Do you really want to wait 5 more years to see it?

I thought not.

*(Continued on [page 7](#))*

## Comparisons with the Pluto System



January 2, 2018

Press Conference

15

*Credit: NASA / JHU-APL / SWRI*

### Pluto and Ultima Thule

Pluto was the reason for the New Horizons probe, and Ultima Thule was a convenient object to visit along the same path.

This illustration shows how much smaller it is. Barely a crumb beside Pluto, but we can learn from it.

We have some fresh photos from 4 billion miles away, showing a contact binary planet. The first observed at close range. Probably weighs about 3 trillion tons.

This one had millions of years to eventually touch, and it's so cold out there, water ice is like rock so it did not crunch into a new snowball. Although it might have been liquid for a while early in its formation as objects were colliding with it.

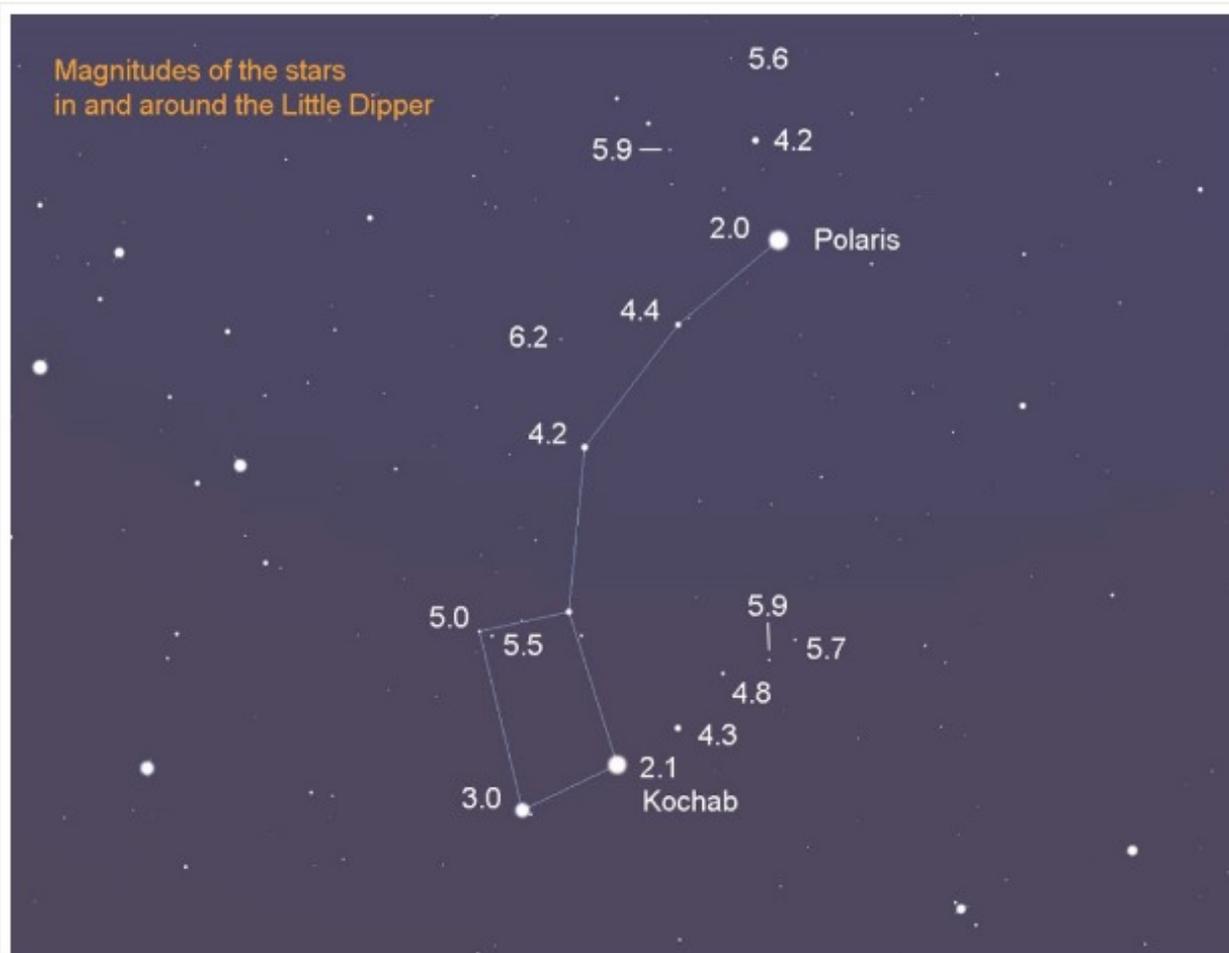
Over the next few months we will learn more about its density and possible clues about how it formed, and where.

If you started out 100 km away, not orbiting, it would take you 3 months to fall inwards and land on the surface, and by then you would be falling at about 2 cm a second. More of a touchdown than a thud.

It probably had a measurable effect on New Horizons' orbit, and we will find out how much it weighs in due course.

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

## Uranus bright enough to see



The Little Dipper with magnitudes (to the tenth) shown for each of its stars. Since it has only three stars of third magnitude or brighter, it's no wonder most people have never seen the constellation. From a truly dark sky, you can around 2000-2500 stars on any particular night compared to only a couple hundred or fewer near a city.

Of the interesting planets, only *Uranus* gives us an attractive chance for observing this month.

It can be seen with unaided (human) vision from a dark sky this month at magnitude 5.8. That is a little dimmer than the dimmest bowl star in the Little Dipper. If you are planning to look for Uranus, then start by looking towards the Little Dipper. If you can see both magnitude 5 stars, then it's time to look southward towards Uranus. If you cannot see them, it might be time to head to Binbrook.

This diagram comes from a great website about measuring your dark sky, here.

<https://astrobob.areavoices.com/2010/12/06/how-dark-is-your-sky/>



As always, heavens-above.com is your good helper. Here's an example of what you can see without a login.

Uranus is following Mars about 2 hours behind. You won't be able to wait for the Lunar eclipse for this. You need to get looking before about Jan 9 when the Moon will be up and interfering.

In this diagram, it's at the left edge of Pisces right now. You can use  
(Continued on [page 9](#))

## The Sky This Month for January 2019 (continued)

the great square of Pegasus to help find your way to Pisces and Uranus.

You will need really dark skies without binoculars, or basically anyplace with binoculars, to see it.

### Coming eclipses

The January issue is when I take the time to anticipate the major astronomical events of the coming year(s).

For starters, we expect a total eclipse of the Sun in Chile on July 2, 2019. If you are planning to see it in person, you need to be seriously considering transportation and lodging, although it will pass through some reasonably large towns on its way through Chile.

And in 2024, stay put to see the total Solar Eclipse pass over Hamilton.

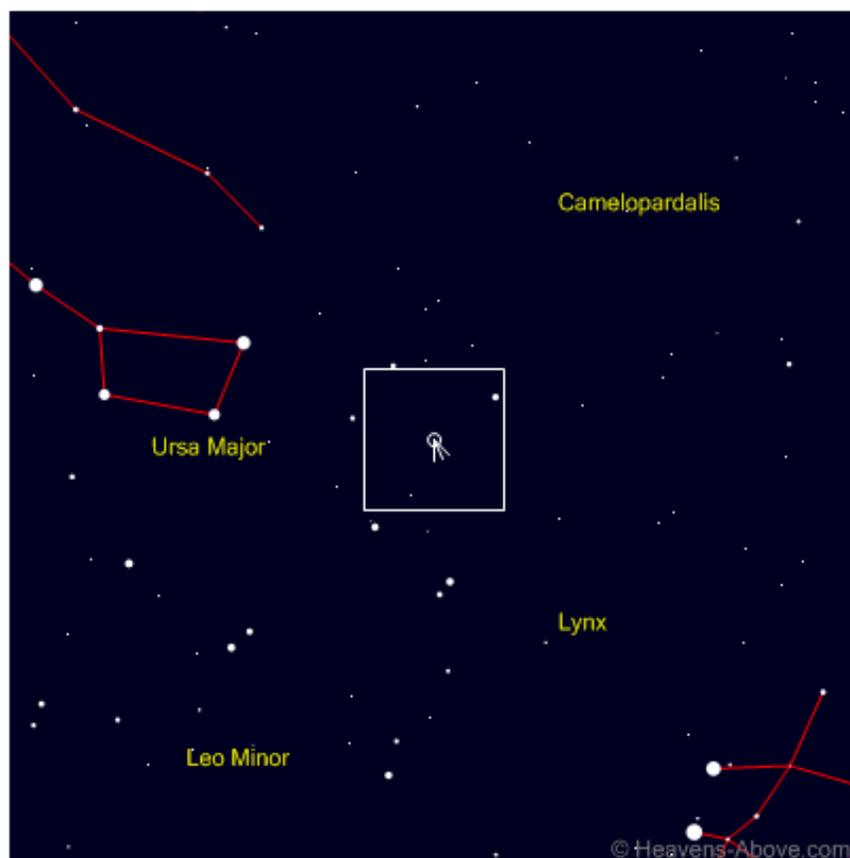
There is some allure to seeing it in your own backyard, but a hero camera can do that for you, while you head for Binbrook for a longer time of totality and more friends in attendance (depending on the size of your yard and refreshments budget, I guess). Our club is making plans to do something big for that eclipse, and Bernie is in the special projects department now, and keen to chat with you about ideas, at every meeting. Let him know you are interested and share your ideas with him.

As usual, I will be showing your recent Moonrise and astronomical or sky photos at our meeting. Please send them along with a description to 'observing "AT" amateurastronomy.org'

I wish you "Clear Skies!"

### Comet 46P Wirtanen

Year  Month  Day  Time



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



Fine finder chart  
(Field of view: 10°, Max. star mag.: 8)



**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](https://nightsky.jpl.nasa.org) to find local clubs, events, and more!

### January's Evening Eclipse and Morning Conjunctions

By David Prosper

Observers in the Americas are treated to an evening **total lunar eclipse** this month. Early risers can spot some striking morning conjunctions between **Venus**, **Jupiter**, and the **Moon** late in January.

A **total lunar eclipse** will occur on **January 20th** and be visible from start to finish for observers located in North and South America. This eclipse might be a treat for folks with early bedtimes; western observers can even watch the whole event before midnight. Lunar eclipses takes several hours to complete and are at their most impressive during total eclipse, or totality, when the Moon is completely enveloped by the umbra, the darkest part of Earth's shadow. During totality the color of the Moon can change to a bright orange or red thanks to the sunlight bending through the Earth's atmosphere - the same reason we see pink sunsets. The eclipse begins at 10:34 pm Eastern Standard Time, with totality beginning at 11:41 pm. The total eclipse lasts for slightly over an hour, ending at 12:43 am. The eclipse finishes when the Moon fully emerges from Earth's shadow by 1:51 am. Convert these times to your own time zone to plan your own eclipse watching; for example, observers under Pacific Standard Time will see the eclipse start at 7:34 pm and end by 10:51 pm.

Lunar eclipses offer observers a unique opportunity to judge how much the Moon's glare can interfere with stargazing. On eclipse night the Moon will be in **Cancer**, a constellation made up of dim stars. How many stars you can see near the full Moon before or after the eclipse? How many stars can you see during the total eclipse? The difference may surprise you. During these observations, you may spot a fuzzy cloud of stars relatively close to the Moon; this is known as the "**Beehive Cluster**," **M44**, or **Praesepe**. It's an open cluster of stars thought to be about 600 million year old and a little under 600 light years distant. Praesepe looks fantastic through binoculars.

**Mars** is visible in the evening and sets before midnight. It is still bright but has faded considerably since its closest approach to Earth last summer. Watch the red planet travel through the constellation Pisces throughout January.

*(Continued on [page 11](#))*

## NASA Night Sky Notes (continued)

**Venus** makes notable early morning appearances beside both **Jupiter** and the **Moon** later this month; make sure to get up about an hour before sunrise for the best views of these events. First, Venus and Jupiter approach each other during the third full week of January. Watch their conjunction on the 22nd, when the planets appear to pass just under 2 ½ degrees of each other. The next week, observe Venus in a close conjunction with a crescent Moon the morning of the 31st. For many observers their closest pass - just over half a degree apart, or less than a thumb's width held at arm's length - will occur after sunrise. Since Venus and the Moon are so bright you may still be able to spot them, even after sunrise. Have you ever seen Venus in the daytime?

If you have missed **Saturn** this winter, watch for the ringed planet's return by the end of the month, when it rises right before sunrise in Sagittarius. See if you can spot it after observing Venus' conjunctions!

You can catch up on all of NASA's past, current, and future missions at [nasa.gov](https://www.nasa.gov)



*Have you ever wondered how eclipses occur? You can model the Earth-Moon system using just a couple of small balls and a measuring stick to find out! The “**yardstick eclipse**” model shown here is set up to demonstrate a lunar eclipse. The “Earth” ball (front, right) casts its shadow on the smaller “Moon” ball (rear, left). You can also simulate a solar eclipse just by flipping this model around. You can even use the Sun as your light source! Find more details on this simple eclipse model at [bit.ly/yardstickeclipse](https://bit.ly/yardstickeclipse)*



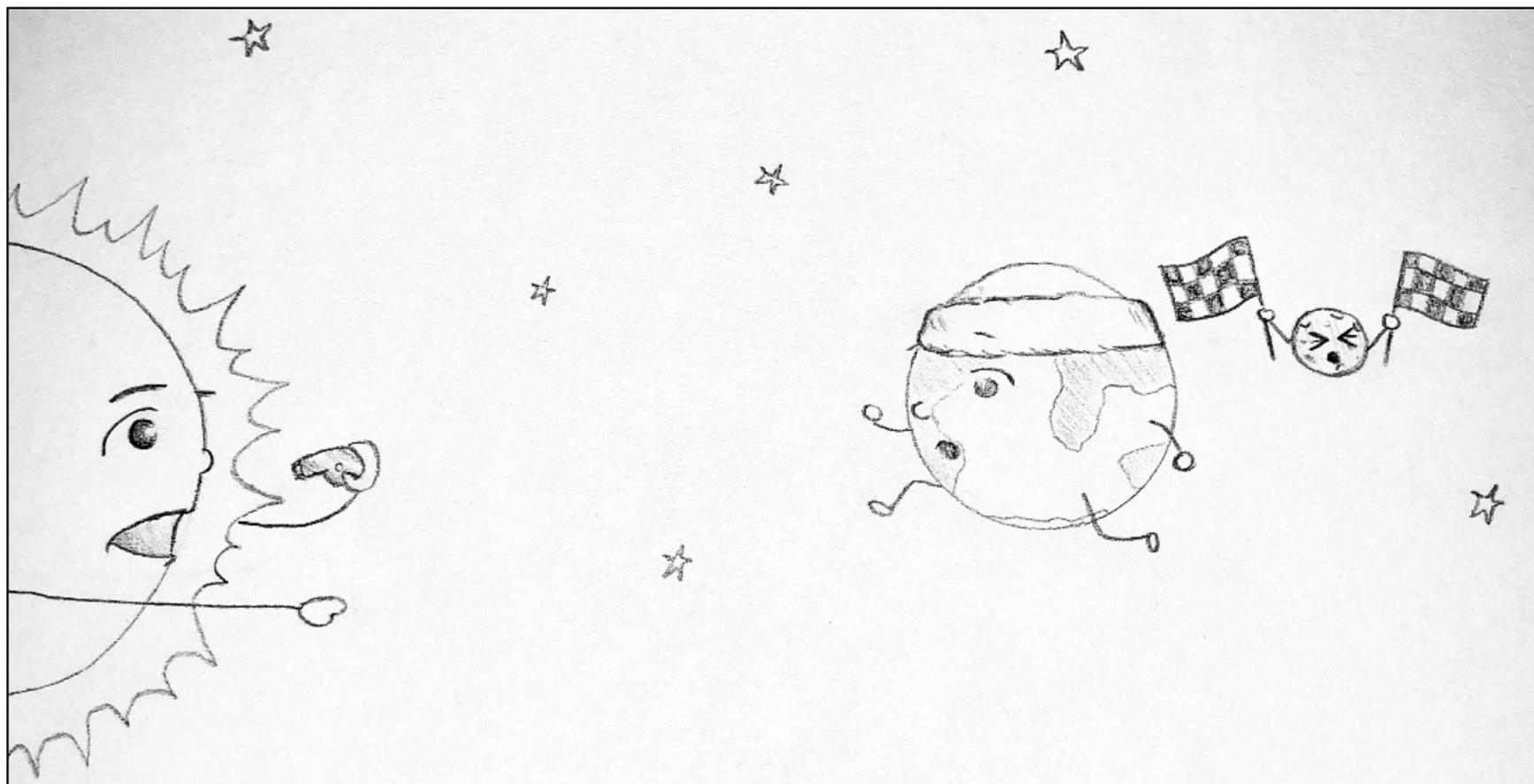
**Comet 46P Wirtanen in Cetus, December 12, 2018, by Matthew Mannering**  
Taken from Brantford, ON, with Canon DSLR & 50mm lens. 20 exposures 3 & 5 secs each.



**Comet 46P Wirtanen and the Pleiades, December 18, 2018, by Bob Christmas**  
Taken from Burlington, ON, with Canon 40D & 50mm lens. 12 x 10 secs (2 mins total) at f/3.5 & ISO 800.



## Cartoon Corner by Alexandra Tekatch



**Sun:**  
"Come on, let's go! Another lap! Happy 2019!"



## Treasurer's Report by Ann Tekatch

### Treasurer's Report for December 2018 (Unaudited)

Opening balance:	\$8,103.24
<u>Revenue:</u>	
50/50 Draw:	\$62.00
Memberships:	\$485.00
Calendar sales:	\$1,185.00
<u>Expenses:</u>	
Speaker Honorarium:	\$50.00
PayPal Fees:	\$6.29
Cheques:	\$147.14
Closing Balance:	\$9,631.81



## 2017-2018 Financial Statements (continued)

### BALANCE STATEMENT

<b>Assets</b>	<b>31-Oct 2018</b>	<b>31-Oct 2017</b>
Bank	\$7,128.27	\$6,802.02
Cash	\$0.00	\$0.00
Inventory	\$0.00	\$0.00
Prepaid PO Box Rental	\$187.58	\$183.06
Prepaid Mailing Expense	\$0.00	\$0.00
Prepaid Liability Insurance	\$0.00	\$0.00
Prepaid Hall Rental	\$1,290.00	\$1,130.00
Accounts Receivable	\$0.00	\$0.00
Prepaid Banquet Expenses	\$0.00	\$0.00
Prepaid Calendars	\$2,340.54	\$2,367.46
<b>Total Current Assets</b>	<b>\$10,946.39</b>	<b>\$10,482.54</b>
<b>Fixed Assets</b>		
Equipment	\$1,683.23	\$2,104.03
<b>Total Fixed Assets</b>	<b>\$1,683.23</b>	<b>\$2,104.03</b>
<b>Total Assets</b>	<b>\$12,629.62</b>	<b>\$12,586.57</b>
<b>Liabilities</b>	<b>31-Oct 2018</b>	<b>31-Oct 2017</b>
Deferred Membership Revenue	\$1,575.00	\$2,320.00
Banquet Tickets sold	\$0.00	\$0.00
Accounts Payable	\$0.00	\$0.00
<b>Total Liabilities</b>	<b>\$1,575.00</b>	<b>\$2,320.00</b>
<b>Equity</b>		
Opening Balance	\$10,266.57	\$10,607.19
Adjustments	\$0.00	\$0.00
Donated Equipment (Book Value)	\$0.00	\$0.00
Current Year	\$788.04	-\$340.62
Closing Balance	\$11,054.61	\$10,266.57
<b>Total Liabilities and Equity</b>	<b>\$12,629.61</b>	<b>\$12,586.57</b>
Balance Sheet Difference	\$0.00	\$0.00
Prepaid Expenses EOY	\$3,818.12	\$3,680.52
In bank owed to next year	\$1,575.00	\$2,320.00

## 2017-2018 Financial Statements (continued)

### REVENUE & DEPRECIATION TABLE

<b>HAA 2018 Revenue (Net)</b>	<b>31-Oct 2018</b>	<b>31-Oct 2017</b>
Membership	\$2,755.00	\$3,140.00
Calendars	\$953.25	\$394.64
Cash Donations	\$80.00	\$55.93
50/50 Draw	\$485.25	\$456.10
Planetarium Trip	\$0.00	\$0.00
Donations in Kind	\$0.00	\$0.00
Intangible Donations	\$0.00	\$0.00
Banquet	\$0.00	\$0.00
<b>Net Revenue</b>	<b>\$4,273.50</b>	<b>\$4,046.67</b>

Food Bank Estimate	\$2,000.00	\$2,000.00
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<b>Depreciation Table</b>	<b>31-Oct 2018</b>	<b>31-Oct 2017</b>
Opening Balance	\$2,104.03	\$2,630.04
Depreciation Full Year	\$420.81	\$526.01
Donated Equipment	\$0.00	\$0.00
Additions	\$0.00	\$0.00
Sales	\$0.00	\$0.00
Net	\$0.00	\$0.00
Depreciation Part Year	\$0.00	\$0.00
<b>Total Depreciation</b>	<b>\$420.81</b>	<b>\$526.01</b>
<b>Closing Balance</b>	<b>\$1,683.22</b>	<b>\$2,104.03</b>



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:
  - **Jan 9: Introductory Astronomy for Kids — Solar System**
  - **Jan 16: Astronomy Through the Ages**
  - **Jan 23: Moons**
  - **Jan 30: The Scales of the Universe**
- For more details, visit  
[www.physics.mcmaster.ca/planetarium](http://www.physics.mcmaster.ca/planetarium)

## UPCOMING EVENTS

**January 11, 2019** - 7:30 pm – *HAA Meeting* at the Hamilton Spectator Auditorium. Our featured speaker will be **Dan Falk**. He will talk about his book “*The Science of Shakespeare*”.

**January 19, 2019** - 1:00 pm - 5:00 pm – *Telescope Clinic* at the Hamilton Spectator Auditorium.

**February 8, 2019** - 7:30 pm – *HAA Meeting* at the Hamilton Spectator Auditorium.

### 2018-2019 Council

Check out the H.A.A. Website  
[www.amateurastronomy.org](http://www.amateurastronomy.org)

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

#### Contact Us

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Dundas, ON  
L9H 6Y6

[www.amateurastronomy.org](http://www.amateurastronomy.org)

#### **General Inquiries:**

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

#### **Membership:**

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

#### **Meeting Inquiries:**

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

#### **Public Events:**

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

#### **Observing Inquiries:**

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

#### **Education:**

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

#### **Newsletter:**

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#### **Digital Platforms Director:**

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