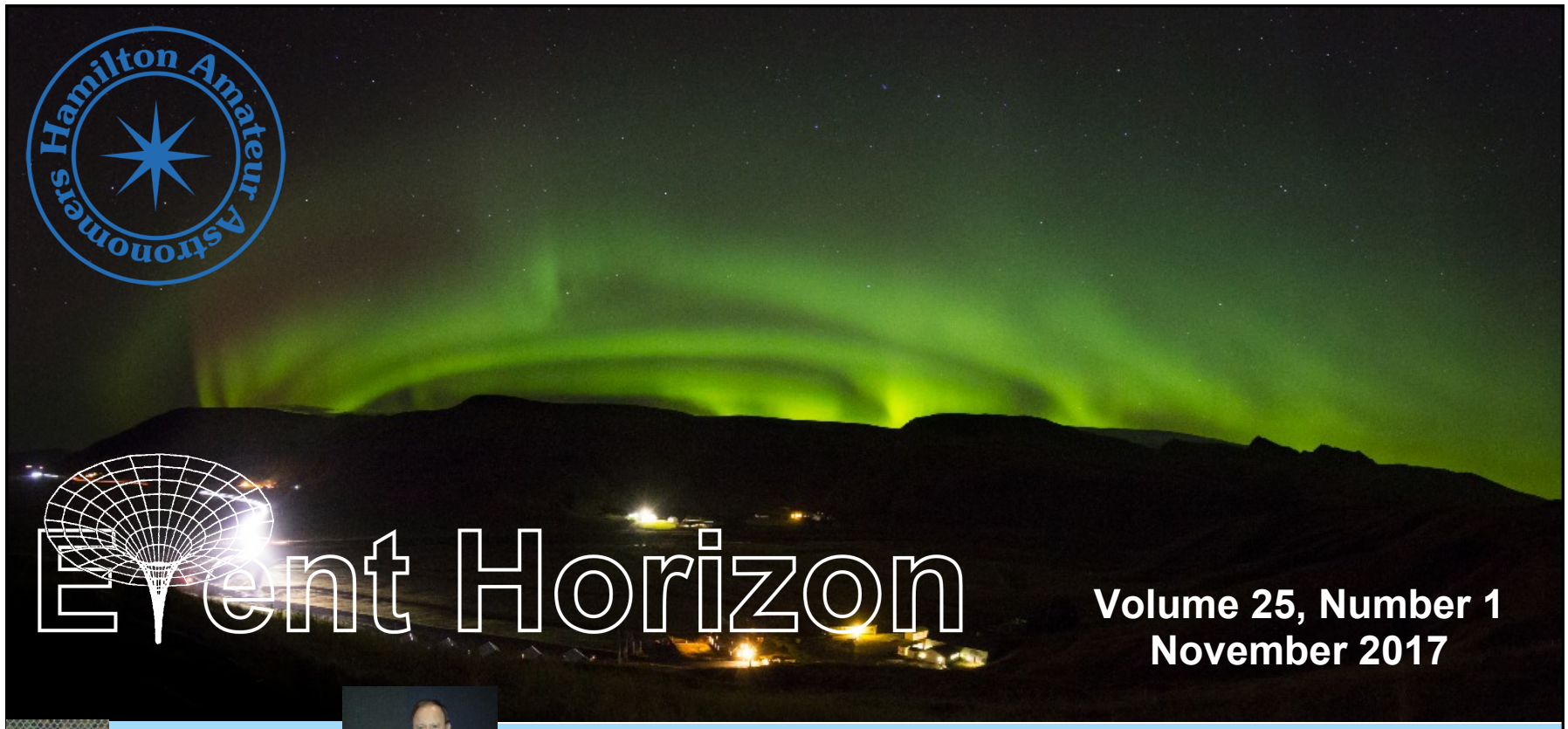


Event Horizon

Volume 25, Number 1
November 2017

From The Editor

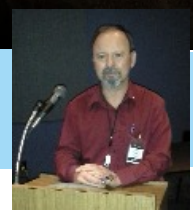
Happy New-H.A.A.-Membership-Year, everyone!

This means the 2018 H.A.A. Calendar will soon be available, so be sure to get your copy(ies)!

To whet your calendar whistle, this month's E.H. features an expanded Eye Candy gallery full of awesome astro-images by H.A.A. members!

Enjoy!

Bob Christmas, Editor
editor 'AT' amateurastronomy.org



Chair's Report by Bernie Venasse

We are finally heading into Autumn. It is time to start lining up your celestial targets for the coming season. Where will you go tonight? Messier objects 56, 57, 27, 30, 72, 73 are in prime positions. There are over 20 Caldwell objects that are in their best locations of the year for viewing. Have a great trip!

As a result of the Annual General Meeting held in October, we now have Kevin Salwach in the position of Secretary and Barry Sherman is now our Education Director.

Denise White, John Gauvreau and Jim Wamsley have stepped down from their respective positions in order to let 'new blood' come forward. It is my understanding that Jim will continue on with managing the Loaner Scope Program and the Foodbank Donation Program. Thank you, Jim for all the hard work and effort over the years.

Denise has offered to continue the new Portable Library and manage its content and operation. John Gauvreau has offered to aid Barry in his new position. I don't think that there are any of us who could not benefit from John's tutelage.

The Councillor-at-Large positions will be determined at this month's Council meeting. The fall version of the H.A.A. Scope clinic/ Open house is being offered on Friday, November 17th, open to the public from 7 to 10 pm in the auditorium of the Hamilton Spectator building, 77 Frid St., Hamilton, ON. Admission is free and as always we will accept Foodbank donations at the door. We look forward to seeing you there.

(Continued on page 2)

IN THIS ISSUE:

Chair's Report (continued)

The 2018 Hamilton Amateur Astronomers calendar will be available at the regular meeting on November 10th. They will be available at the door for $15 each or 2 for $25. Persons interested in obtaining calendars by mail (domestic or foreign) may contact me and we can arrange payment and shipment.
Chair 'at' amateurastronomy.org.

Membership renewals are due! Don't forget to forward your membership fees and help support this great club of yours.

Daylight Savings Time ends November 5th at 2AM. Don't forget to change your smoke detector batteries when you Fall back an hour. DST returns Sunday, March 11, 2018 at 2AM.

Check out the H.A.A.'s new 2024 Eclipse Countdown Page:
http://www.amateurastronomy.org/2024-solar-eclipse-countdown/

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.

Masthead Photo: *The Aurora, from Vik, Iceland, by David Tym.*

Taken October 25, 2017 during his trip to Iceland. See another Iceland aurora image by David in the *Eye Candy Gallery* on page 16.

The 2017 H.A.A. Annual General Meeting by Matthew Mannering

- The meeting was called to order at 7:30pm by *Bernie Venasse*.
- *Jim Wamsley* was not here to talk about the loaner scope programme.
- *Barry Sherman* brought in two tripods that needed a new home.

The Year-End Treasurer's Report by Ann Tekatch

- Year end will occur on October 31st.
- Revenue comes from memberships, the calendar, 50/50 draw and cash donations.
- Calendar net revenue was down from approximately $1,000 to about $500 this last year.
- There was an extra expense this year for the solar glasses that were given away to club members and the public.
- Expenses include; the room at the Spectator, insurance, web hosting, BASEF, the PO Box, public speaker allowances and the calendar.
- We now have the option of using PayPal to pay for memberships via our website.
- Our membership is roughly 200 at the moment and we are the 3rd largest independent club in North America. New York and Los Angeles are bigger.
- There are no plans at the moment for the surplus cash in our account.
- The financial statement will be presented in the next Event Horizon newsletter.

Election of Councilors

- *Kevin Salwach* asked if anyone can run for council? The Chair, 2nd Chair and Treasurer need to have been on council for one year. All other positions can be filled by any member.
- *Ed Smith* asked if there was a slate of officers listing the positions for which we already have volunteers? Bernie said there is not. He would like other people to step forward and volunteer.
- There were no nominations from the floor so Bernie asked for volunteers. Barry Sherman volunteered for the position of Education Director.
- Jim Wamsley stepped down as Secretary and Kevin Salwach volunteered to move from Councilor at Large to Secretary.
- All other positions were filled by members from the previous council who then volunteered to stay in their current roles.

Elected Council Members for 2017/2018:

Bernie Venasse, Chair
Mike Jefferson, Second Chair
Leslie Webb, Membership Director
Bob Christmas, Event Horizon Editor
Mario Carr, Publicity
Barry Sherman, Public Education
Steve Germann, Observing Director
Kevin Salwach, Secretary
Ann Tekatch, Treasurer
Matthew Mannering, Recorder
David Tym, Webmaster

- Councilors at Large will be chosen by council in November when the new council takes effect.
- *Dee Rowan* and *Christopher Strejch* expressed an interest in serving as Councilors at Large.
- *Denise White* talked briefly about her rewarding experience as a Councilor at Large.

(Continued on page 4)

The 2017 H.A.A. Annual General Meeting (continued)

- The elections were closed at 7:55pm. Moved by Bernie Venasse and seconded by Steve Germann. Passed.

Kevin Salwach Presented 'This Day in Astronomy'

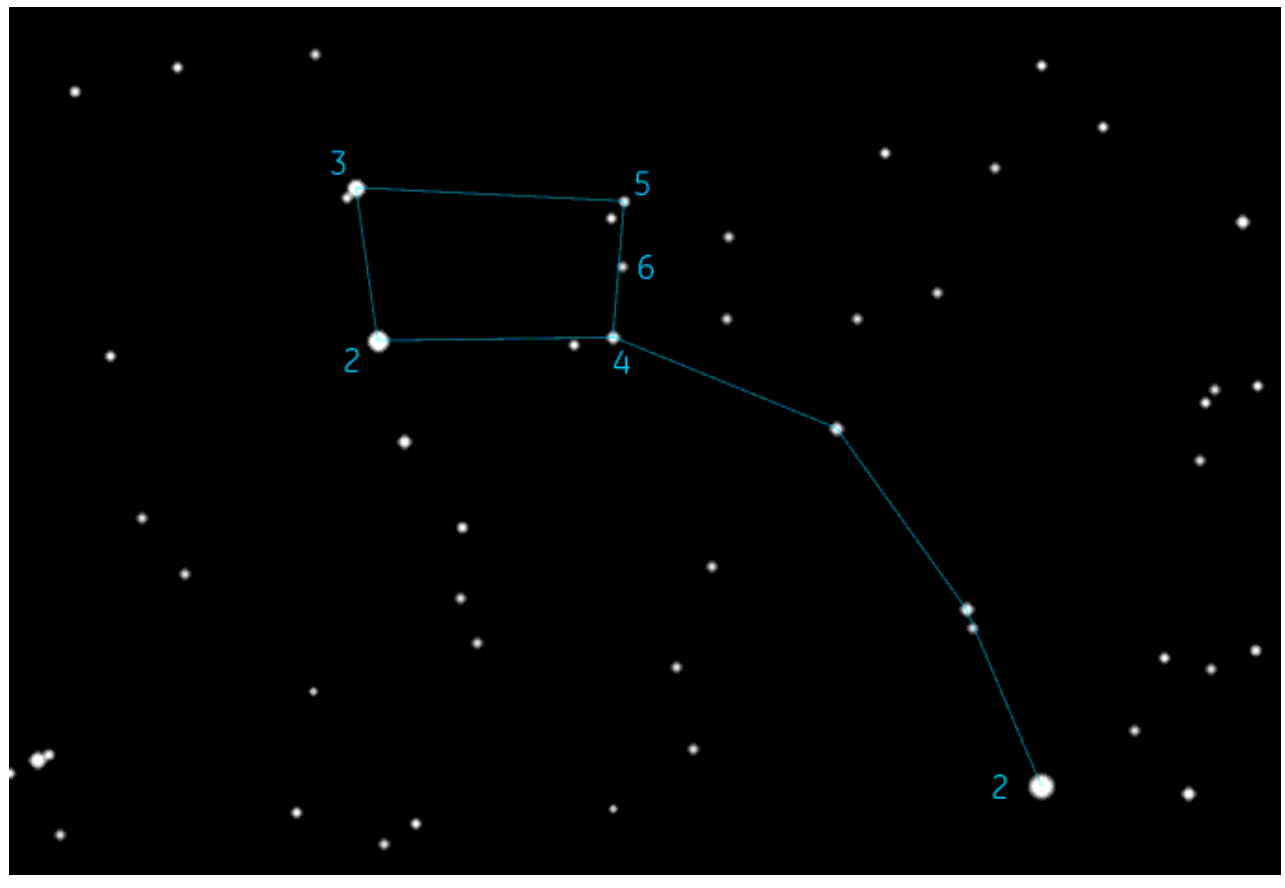
- *October 13, 1582* doesn't exist as the change was made from the Julian to Gregorian calendars. October 4 was followed by October 14.
- *1773* — *M51* was discovered by Charles Messier.
- *1884* — The Greenwich prime meridian was established.
- *1917* — The Miracle of the Sun. 100,000 people watched the sun dance in the sky in the town of Fatima, Portugal.

- After the break, *Matthew Mannering* gave an update for the 2018 Calendar.
- *Steve Germann* mentioned that he was going to pick up copies of the RASC handbook and that anyone who was interested could request a copy at $20 each.

The Sky This Month by Steve Germann

Steve showed images taken by Denise, Janice, Matthew and Steve himself.
Steve then presented the Top Ten Things to See at Binbrook Conservation Area:

10: *M57* The Ring Nebula.
9: The stars of the *Little Dipper*. The range of magnitudes allows you to judge sky quality. *Image by Randy Culp (rocketmime.com)*
8: *The Sagittarius Star Cloud*.
7: *Milky Way* reflection on the lake.
6: The *Double Cluster*.
5: *Iridium flares*.
4: Other satellite trails. -6deg 36mins for geosynchronous satellites.
3: *M13* in Hercules.
2: Other peoples scopes etc.
1: Talking to other people out observing.



- The Astrophysics group will meet on the Friday following the general meeting. Send an email to Steve for the 'where and when' info.
- *Gary Sutton* was to present Theories of Gravity.
- Bernie mentioned the Scope Clinic will be on November 17 at 7pm for visitors, 6pm for those bringing in equipment.

October Astrophysics Group Meeting Summary by Mike Jefferson

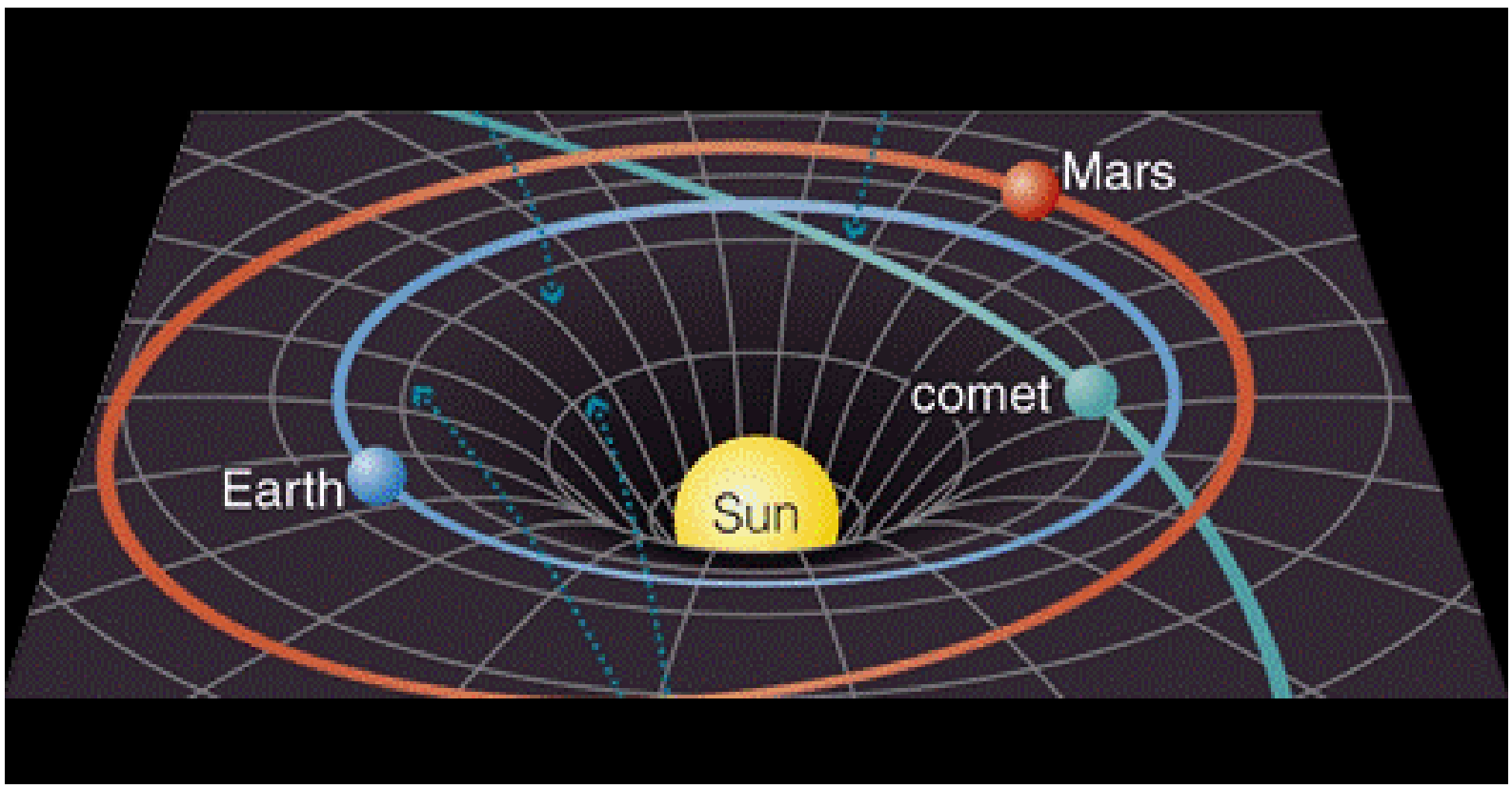
The Astrophysics Group met at Doug Black's home on this date and Gary Sutton was our presenter. Besides Gary, members present were as follows: Randy Weatherley, Doug Currie, Doug Black and Mike Jefferson. The topic under investigation was gravity, as seen by Newton and Einstein. It was demonstrated on the whiteboard as a comparison of Newton's static mechanics vs. relativity, curvature and the motion extant in Einstein's universe.

Some of the topics that Gary highlighted in this topic were as follows:

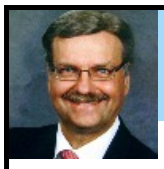
- density, pressure and energy density, which can be combined into 10 symmetric terms
- the curvature of space and time due to gravitational forces – Earth's gravity = 32 feet/sec^2
- gravity depreciates or appreciates as the square of the distance between two (or more) attracting bodies
- Einstein's work would say that Earth's gravity would attract a falling mass through a parabola just as a rocket taking off would describe a parabola – both would be parabolas, descending or ascending.
- gravitational collapse is theoretically impossible because it would lead to a repulsion or a rebound of the mass involved
- any scientific theory is a public challenge i.e. “...prove me wrong...”
- current books were presented and passed around for perusal, which focused on such topics as gravity, flat and curved space-time, inertia, mass, relativity, vectors and manifolds and their importance for our understanding of the universe.

Next month, on November 17/17, one week after the HAA November General Meeting, Doug Currie will discuss some of the latest findings on gravitational waves. It should make a nice follow-up to Gary's presentation.

Our sincere thanks go to the Blacks for their hospitality and refreshments.



Gravity Well of the Sun Diagram Credit: MickRed.com



The Sky This Month for November 2017 by Steve Germann

What is a supermoon?

I received an email from a citizen about the Supermoon expected on December 3 (20:47 PM EST to be exact). As an amateur photographer, he was interested in photographing it in all its special-ness, and willing to travel to get the best view. Being a Sunday a lot of people have the day off, too, so after answering his questions, I realized that this is something I can write about for all your benefit.

A Supermoon happens when the Full Moon occurs when the position of the Moon in its orbit is (relatively) closest to Earth (near perigee).

The moon's orbit varies in many ways during an 18.6 year cycle, and subtly between cycles. This moves the perigee vs full point around the sky and into different months.

http://www.moonconnection.com/apogee_perigee.phtml

Our computer programs are now up to the task. I remember studying celestial mechanics in the 1980's and it was pretty tedious to use a pocket calculator to do this math. I don't want to carry all those decimals...

We could again do that math... or let an excellent webpage do the math for us.

The Moon's diameter is about 3200 km, and it's about 356,000 km from Earth's center at perigee, so it subtends an angle of about .5548 degrees.

All the time, the Earth is rotating and the Moon is moving in its orbit.

So how long does a Full Moon last? An instant? No, longer than that. Although its maximum is at an instant in time, it's a wide peak, as we will see.

If we stand at the North Pole, greet Santa, and then watch the moon, we will see the moon circle the earth about once a month, against the background stars... or about once per 29.5 * 24 hours. Roughly 1.9 hours per degree, and 1.07 hours per .5548 degrees. You get the idea. As the Moon moves in its orbit, counterclockwise as viewed from above the north pole, it has to go a bit more than one orbit every month to end up full again, adding up to a whole extra orbit per year. Meanwhile the ascending node and perigee are chasing it, so it's not quite 27.5 extra days of orbiting in a year.

However everything is also changing, so it's not so simple. In the RASC observer's handbook (on sale at our December meeting), you can read all about the Moon's motions and surprising synchronizations.

If the earth was not orbiting the Sun, but somehow stationary, (but still lit by the Sun) then the Moon would be full more often.

Note that there is the difference between the Moon's synodic period, (new to new... 29.530 days), the Draconic period (ascending node to ascending node, 27.212 days) and the anomalistic period (perigee to perigee, 27.554 days).

There is about a half degree of Full Moon on the edges lit by the sun that we don't see. So the Full moon would appear to last about an hour, before you could start to perceive parts not lit anymore (with special equipment).

(Continued on page 7)

The Sky This Month for November 2017 (continued)

Similarly a New Moon cannot be seen until it's got more than grazing illumination from the sun and it's far enough from the sun to be seen against the sky-glow of twilight. Seeing young new Moons is another project entirely, and there's some interesting notes in the RASC handbook about that too.

This link contains a fascinating account of the math and study of apparent moon size:

http://www.fourmilab.ch/earthview/moon_ap_per.html.

Why do people care?

The Supermoon always gets attention in the media, and this is no exception. By definition, there is one Supermoon per year… and some are more 'super' than others. The odds of the Full Moon happening within a certain percentage of the orbit time of the moon (29.5 days full to full) is roughly the same as the percentage.

The Moon passes perigee about once per month. Whether it is close to full or not depends on how close to full you want it to be.

December's Supermoon is full 16 hours before perigee. Technically about as mediocre as you can get for an annual Supermoon. Compare to January. Much more special.

Worth the trip? I think not.

What causes the perigee position to move?

The Earth's equatorial bulge tugs on the moon, as do the tidal bulges, which get ahead of the moon-earth line due to the earth's day being shorter than the Moon's orbital period.… and the shape of the Earth's orbit and Sun direction also combines to move the Moon's ascending node around the sky once per 18.6 years.

When will it happen again?

The Supermoon won't be this good again for .. um, 29 days. On January 1, 2018, there will be an even better Supermoon, with perigee at (Full - 4) hours. I played with this excellent calculator:

http://www.fourmilab.ch/earthview/pacalc.html

…and watched as I moved through next and previous years, for perigee to be at Full +/- small numbers. Each year has one under about +/-16 hours, (but the year 2034 has one at Full +/- 30 minutes).

So that will be when the Supermoon is super-est. There will be a spot on earth under the moon at that time (actually a stripe if you allow a few minutes of time relative to the point of fullness or the point of perigee, and that will be where we will see the super-est Supermoon for the next 30 years. The next time that happens (to the accuracy of this web page computer) is...

```
2034: Nov 25 22:08 356447 km ++ F-   0h   Dec  9 10:02 406606 km -  N-1d10h
2017: Dec  4  8:43 357495 km +  F+  16h   Dec 19  1:28 406604 km -- N+  18h
2018: Jan  1 21:56 356565 km ++ F-   4h   Jan 15  2:11 406459 km -- N-2d 0h
```

So the apogee on January 1 is the best. The time zone used for this chart is UTC so add 5 hours to get EST. 2.56 AM EST on January 2 is what it means.

(Continued on page 8)

The Sky This Month for November 2017 (continued)

Or boot up your time machine and head back to:

```
2014: Aug 10 17:44 356896 km ++ F-   0h   Aug 24  6:10 406522 km -  N-1d 8h
```

…Not as close, but just as full.

29.5 times 24 hours is roughly 708 hours. So for the Moon's perigee to happen in a particular hour takes about 708 (57 years) months to happen again.

That somewhat fits with the math seeing it to be about 20 years between events. (2014, 2034, 2054)

To have the Supermoon within 5 minutes of the perigee, and someone (not you) at the meridian (midnight) at the time, would have odds of 5/(29.5*1440)... roughly once per 708 years... but since the orbits are not locked (and definitely not random) it will eventually happen. A further 203,000 years before it happens in Hamilton.

That said, looking at the Moon, it looks just as 'full' for half an hour before and after the instance of maximum fullness.

Due to the Earth-Moon distance not being infinite, you cannot actually see right to the East and West terminators (day night transition) of the moon from one point on the Earth's surface, so there's actually a time interval where the entire part of the Moon you can actually see is totally sunlit from your point of view.

So we could relax those numbers probably to an hour, and compute about 708 orbits between perigee moons within +/-1/2 hour of full.

So, given the odds, just how 'super' is our Supermoon on December 3, and if we were to travel, what is the maximum 'specialness' available? If you are willing to travel you could be at the meridian, on the equator, under the Supermoon within 1/2 hour of its perigee and fullness, roughly once per 57 years.

But the local predictions seem to be only about 1/3 of that time. Perhaps the website has a different idea of what +0 or -0 hours to full moon really means.

After 2034, the next best time is in 2054:

```
2054: Jan 23 19:39 356511 km ++ F-   0h   Feb  6  6:10 406526 km -- N-1d12h
```

The Earth’s perihelion takes about 112,000 years to move once around the Sun compared to the fixed stars. So for the next few thousands of years, Earth's perihelion is in January, so Supermoons in January are extra bright.

And especially close.

The perigee in January is within 4 hours of the full moon. Do you want to see the Moon at perigee, or the moon at full? The full moon in December will be at 8:47 PM EST, and the full moon on January 2, 2018 will be at 7:24 am EST. Perigee for the Moon in December is at 13:43 EST. The Full Moon is on the other side of the Earth from us at that time.

Perigee for the Moon in January is at 2:45 AM EST. So the interval between 2:56 AM on January 2 and 7:24 AM EST on January 2 2018 goes from perigee to Full moon.

(Continued on page 9)

The Sky This Month for November 2017 (continued)

To be there at midnight, to have the Moon on the meridian, even closer, you would have to travel eastwards over the Atlantic for perigee and Europe for Full Moon.

Now, a couple of other details. The perigee distance is different for different months… but due to the tidal effect of the Sun, perigees near Full Moon tend to be closer.

In 2034 the Supermoon is the closest perigee for any of the years I checked, but the one in 2018 is farther by only an imperceptible 118 km.

Notable supermoons

Well, besides 2014 and 2034, what else can be notable about a Supermoon?

Supermoons happening closest to 19h UTC will be nearest our meridian.

The next full Moon within an hour of our meridian will be in July 2018, but unfortunately, it's the smallest moon in 2018, so being on the meridian for it will make it less small. Hardly worth opening the champagne.

Bucket list

Your bucket list probably does not contain many annual events, but this one is at least the best for the next 16 years? Does it rate?

Depending on who you are with, it could be notable. I plan to put in the effort to see the four double blue Moonrises too!

Where to see it

Well, any place with an unobstructed view of the sky will be good. If you only care about the Moon and its apparent size, literally a lit up parking lot will do. If you also want to acquire a photo of the star field, you will have to take 2 shots. One vastly over-exposing the Moon (with very clean lenses to avoid washing out the contrast) and one with daylight settings showing no stars, to properly see the Moon.

Then a little photoshop magic will be your helper.

Rising

The Moon's rise is properly predicted by the photographer's Ephemeris website which I use each month. (See top of next page.)

From near here, I thought, what better backdrop for a super Moonrise photo than the skyline of Toronto (or Hamilton, which is even closer)

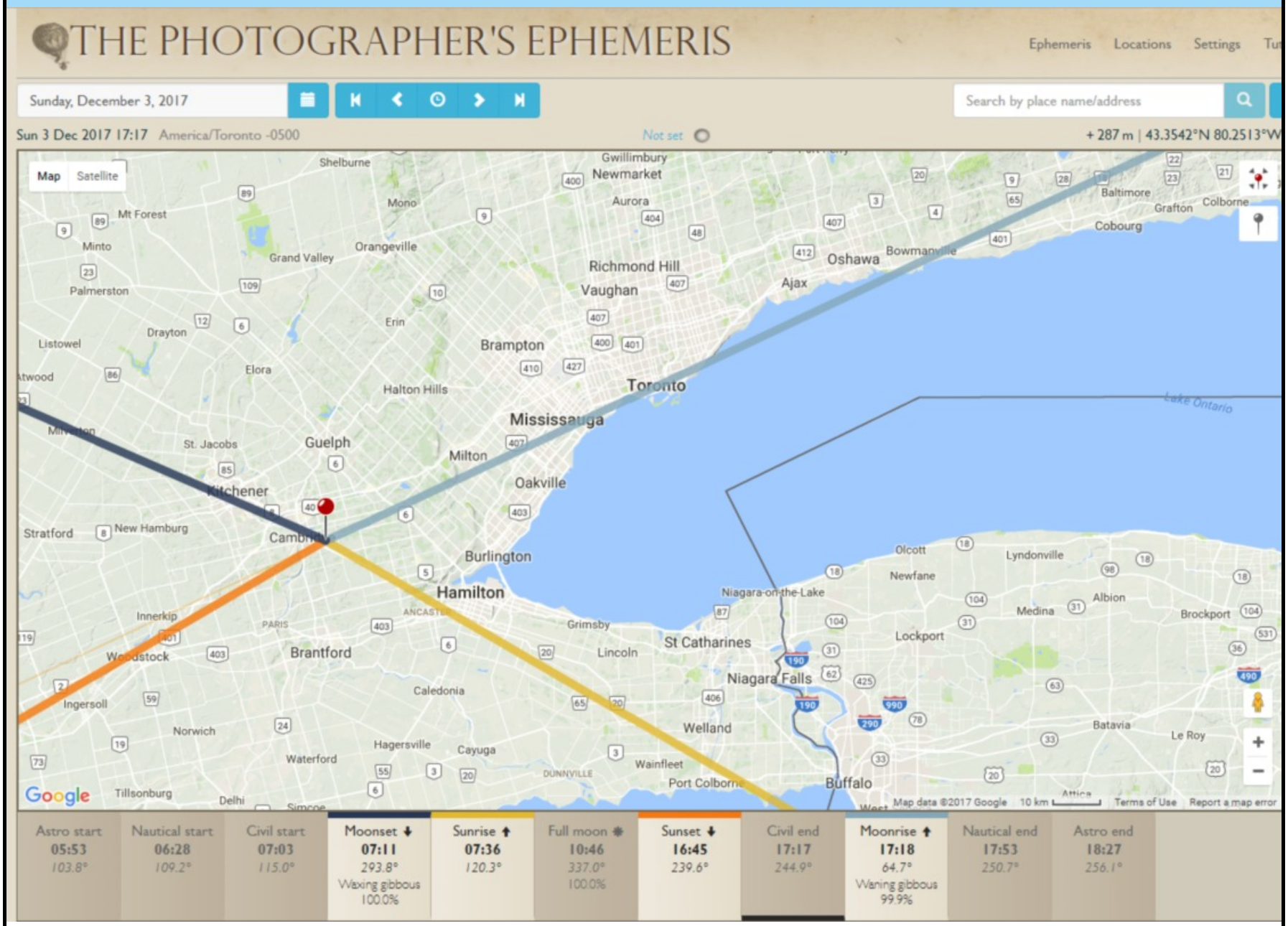
You can use the website to take the location of a known landmark and determine where you need to be so that it's many miles away and smaller than the Moon.

As a point of reference, the CN tower is about 1860 feet tall. So to have it subtend less than 0.55 degrees you will have to recede 37 miles from it (and still be able to see it)

That's a tall order, but not impossible.

(Continued on page 10)

The Sky This Month for November 2017 (continued)



Here's the map...

http://app.photoephemeris.com/?ll=43.277655,-79.948207&center=43.2493,-79.8462&dt=20171029223500-0400

…or more specifically, a bird's eye view of it...

Scout a point on that line far enough away. Make sure the background is visible and you can park and set up safely there.

You might want to have a copy of this article handy to give to the policeman who asks you why you are stopped there at 5:17 in the evening. …I only really need 5 minutes, officer...

In the sky

This is even easier. (See above for star field considerations though)

There might not be landmarks in the distance, but you can still catch it through trees, among buildings downtown, near an elevated landmark, reflected in the glass of office towers, or off the surface of the lake.

(Continued on page 11)

The Sky This Month for November 2017 (continued)

…with the space station doing a transit across the Moon

This is very rare. (for any given location). There's a website http://calsky.com/ that can notify you of the likely times of space station crossing the face of the moon from points within driving distance of a place you specify.

Almost half the time, (when the station is on the same side of the Earth as the moon is), there will be a (penumbral) shadow cast by the space station on the earth, and it's technically transiting the Moon as viewed from there. That point moves very quickly and scribes a line on the earth.

When the Sun is up there's a similar line for the ISS crossing the disk of the Sun.

calsky.com can be configured to send you emails a few days in advance letting you know when these events will happen in your area… or when for instance, the scribbled line will cross itself hours later, at a place you can get to.

Be warned however, that the ISS is not well-behaved, and might not be where the computer expects it to be, due to expending rocket fuel to lift its orbit, or due to orbital decay, which also happens continuously, but not predictably.

How to photograph the Supermoon

Use a telephoto lens. 300 mm if you have one. If hoping for stars, make sure your lens is clean. Use fixed focus. If you have a tracking mount for your camera, use it. Otherwise keep your exposure times short.

The Moon moves its own width in the sky (due to Earth's rotation) in 2 minutes... 120 seconds. So if your zoomed in view of the Moon is, say, 500 pixels wide, then you need to have an exposure significantly shorter than 120/500 seconds... about a quarter second. If the Moon is almost filling the frame, it's probably 3000 pixels wide, and you have 1/25 of a second to snap a clear photo.

Definitely snap as many as you can, and some will have clearer 'seeing' due to the atmospheric turbulence temporarily relenting.

Daytime photography settings would be best. Fortunately the Full Moon rises in twilight, so you will still get a decent shot of the background along with the moon.

I recommend taking several shots with slightly different settings, and save Raw + Large photos so you can see what you got right away, and process them later if you are motivated to do so.

Upcoming events

Well, besides the Supermoon, there's more in store for November...

Daylight Saving Time ends on November 5th at 2 am. You will get an extra hour of sleep. Handy.

Or a chance to observe the sky an extra hour and still get your full sleep. Handier.

(Continued on page 12)

The Sky This Month for November 2017 (continued)

The Leonid Meteors peak in the night of November 17-18th

On the evening of Friday November 17th, after our excellent Telescope Clinic, is the peak of the Leonid meteor shower.

Don't miss it! It's new moon, and these meteors are FAST… the fastest shower of the year.

Energy scales with the square of speed, so a little faster is a lot brighter. Try to see a couple of Leonids to compare to Geminids in December. I am rooting for you!

Planets

The Moon will be near Mars on the 15th.

I wish I could find you a case where Jupiter, Venus or Saturn is near the Moon in daytime, because then with binoculars (being careful to stand in the shadow of a structure or building where you can see the Moon but NOT the Sun) you could then explore the sky and see the planets against the daytime sky. You will be impressed. I will continue to watch for opportunities to do this.

Out General Meeting

I hope to see you at the HAA meeting on November 10th for more upcoming and past astronomical highlights!

Treasurer's Report by Ann Tekatch

Treasurer's Report for October 2017 (Unaudited)

Opening balance:	$8,578.47
<u>Revenue:</u>	
50/50 Draw:	$30.00
Memberships:	$680.00
Memberships via PayPal:	$250.00
Donation:	$35.93
<u>Expenses:</u>	
2017 Webhosting	$192.86
Donation to NPCA	$100.00
Donation to Clear Sky Chart	$50.00
Donation to International Dark-Sky Association	$62.82
PayPal Fees	$9.97
Postage	$9.61
2018 Insurance (prepaid)	$914.76
2018 Calendars (prepaid)	$2,273.59
Closing Balance:	$5,960.79

Editor's note: The 2017 Year-End Treasurer's Report will appear next month, in the December 2017 edition of the Event Horizon.

Eye Candy the Members' Image Gallery

The North America and Pelican Nebulas in Cygnus, by **Janice Mannering**
Taken July, 2017 from Mikisew Provincial Park, near South River, Ontario

Eye Candy the Members' Image Gallery

Saturn and a Meteor (below in Ophiuchus), and M8, M20, M21, M23 & M24 (at top in Sagittarius)
by **Bob Christmas**
Taken on September 20, 2017 from Spectacle Lake, near Barry's Bay, Ontario
North is to the right.

Eye Candy the Members' Image Gallery

The Pleiades (M45) in Taurus, by **Janice Mannering**
Taken on September 26, 2017 from Cherry Springs State Park in Pennsylvania

Eye Candy the Members' Image Gallery

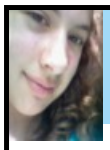
The Pleiades and Hyades with two distinctly different sky phenomena

above:
The Aurora, the Northern Lights,
by **David Tym**

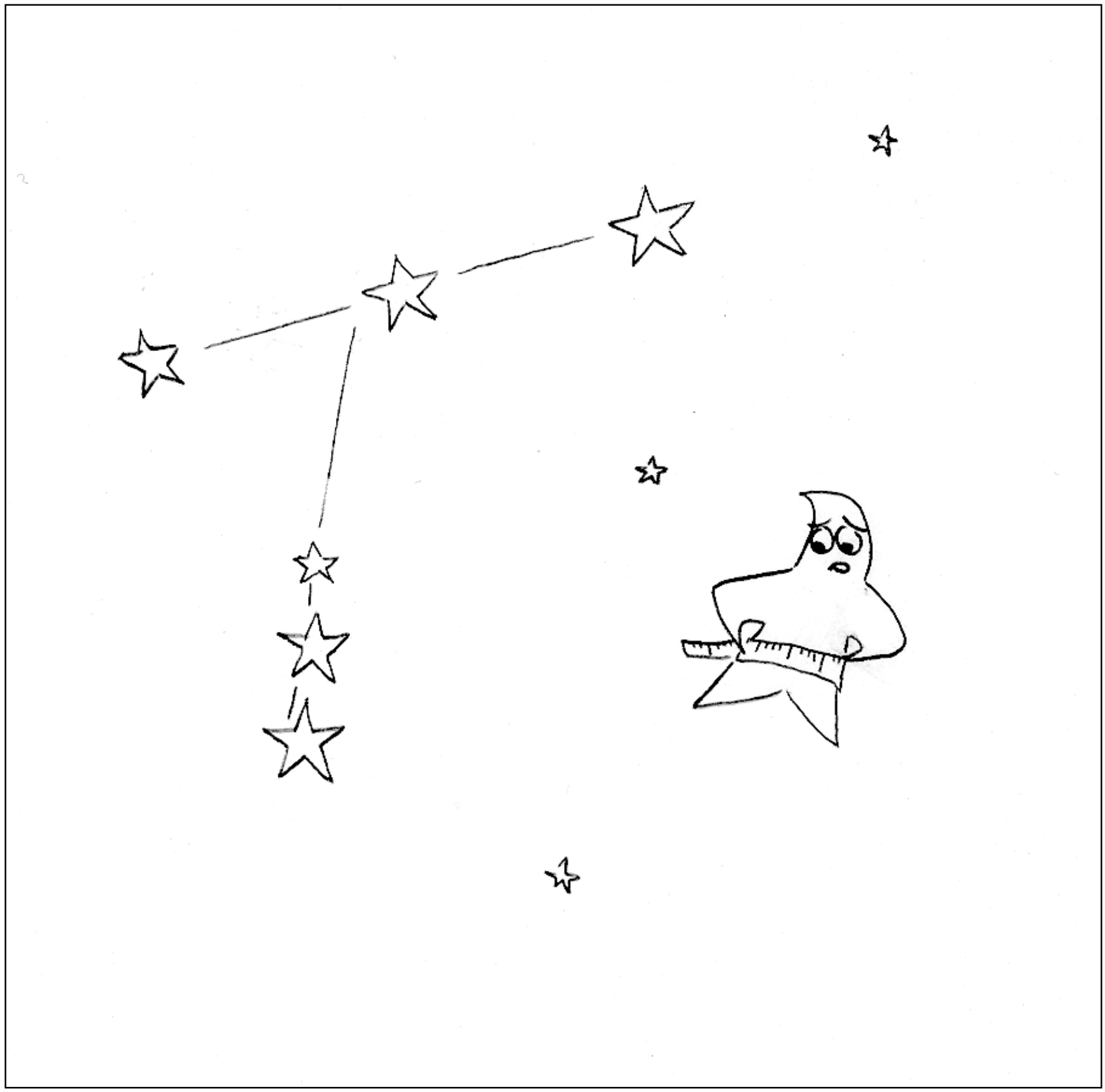
Taken October 25, 2017
from
Kirkjubæjarklaustur,
Iceland

left:
Thin clouds and Taurus rising,
by **Everett Cairns**

Taken October 2, 2017
from Dyer's Bay, Ontario



Cartoon Corner by Alexandra Tekatch



Orion is the biggest waist of space

For Sale

For Sale: Custom Built 10” F6 Newtonian Telescope. Asking $700 or best offer.

Contact Moe at:

905-379-1055

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:
  - Nov 1: Introductory Astronomy for Kids — Solar System
  - Nov 8: Asteroids: Vermin of the Sky
  - Nov 15: A Quarter Century of the Hubble Space Telescope and Beyond
  - Nov 22: Distant Worlds in the Solar System
  - Nov 29: Introductory Astronomy for Kids — Galaxies
- For more details, visit www.physics.mcmaster.ca/planetarium

UPCOMING EVENTS

November 10, 2017 - 7:30 pm — *HAA Meeting* at the Hamilton Spectator Auditorium.

November 17, 2017 - 7:00 pm - 10:00 pm — *Fall Telescope Clinic* at the Hamilton Spectator Auditorium.
Many types of telescopes will be on display, and experts will be on hand to answer questions. You can also bring your own telescope and get tips and pointers about its use. Whether you have a telescope, are thinking of getting one, looking for advice on a unique Christmas gift, or just want to learn more about exploring our amazing universe.

December 8, 2017 - 7:30 pm — *HAA Meeting* at the Hamilton Spectator Auditorium.

2017-2018 Council

Chair	Bernie Venasse
Second Chair	Mike Jefferson
Treasurer	Ann Tekatch
Webmaster	David Tym
Membership Director	Leslie Webb
Observing Director	Steve Germann
Education Director	Barry Sherman
Event Horizon Editor	Bob Christmas
Recorder	Matthew Mannering
Secretary	Kevin Salwach
Publicity Director	Mario Carr
Councillors at Large	To be confirmed by the new council

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

Contact Us
Hamilton Amateur Astronomers
PO Box 65578
Dundas, ON
L9H 6Y6

www.amateurastronomy.org

General Inquiries:
secretary@amateurastronomy.org

Membership:
membership@amateurastronomy.org

Meeting Inquiries:
chair@amateurastronomy.org

Public Events:
publicity@amateurastronomy.org

Observing Inquiries:
observing@amateurastronomy.org

Education:
education@amateurastronomy.org

Newsletter:
editor@amateurastronomy.org

Webmaster:
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 out-door 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

HAMILTON AMATEUR ASTRONOMERS