

Event Horizon



Volume 23, Number 2
December 2015



From The Editor

Another year is nearing a close, and it was packed with all kinds of sky events; planet conjunctions, comets, meteors, auroras, eclipses, you name it! But it's not quite over yet; there's still December!

Once again, thanks to everyone who has contributed to the E.H. Please keep your articles & images coming.

Clear Skies!

Bob Christmas, Editor

editor 'AT' amateurastronomy.org



Chair's Report by Bernie Venasse

Welcome to the December 2015 Chair Report and welcome to the long nights. These nights and cold, clear skies combine to give us some fabulous nights of viewing!

Our November meeting was incredible!! A full house, extra chairs used, and people standing. It was an absolutely terrifying setting for my premier as chair... but we all survived. Special thanks to our guest speaker, Prof. Peter Sutherland for his presentation. John Gauvreau evoked much laughter (and sales) when he stood in for David. Matthew Mannering gave us a very entertaining 'Sky this Month' as well. From the doors to the podium... a great job by everyone involved.

Our site at Binbrook Conservation Area was opened on the 14th at 16:30 even though the sky was very overcast and threatening. Mother Nature was in a good mood and delivered the forecast clear skies by 17:00. I was joined by 5 other members and we enjoyed the clear skies till about *(Continued on [page 2](#))*

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Chair's Report (continued)

22:00 when it became too cloudy to see even the Taurids. There is plenty of room for many more members and I invite all our Astronomy 101 alumni and our new members to take advantage of this fine site. Binbrook C.A. is set to be open again on December 12th and then on January 9th ... weather dependant, of course. Watch for the e-Mails to confirm the openings.

The November 20th Scope clinic was attended by several of our new members ... and so the journey begins.... Ann Tekatch shared some viewing time in the parking lot with a few lucky visitors. Our next Scope Clinic will be held on a SATURDAY ... April 23rd running from 13:00 to 18:00.

There still are several telescopes available for loan Contact Jim via Secretary 'at' AmateurAstronomy.org. Our Educational Outreach program was busy again this past month with presentations for the Saltfleet Library branch, the Queen's Rangers School in Copetown, and a group of Sparks in Ancaster. Great work John and Jim.

Volunteers Needed willing to set-up a scope or bino in the parking lot or other suitable location for guest viewing following our general meetings. This might take up a half hour or so of your time after the meeting. HAA Celestial Events Calendars are still available. \$15 each or 2 for \$25. (see next page)

Did you meet your goals for this year? See that comet? Photograph that conjunction?

Have you set your goals for next year?

Here are a few suggested targets to plan for:

Occultations of Aldebaran on January 20, April 10, October 19 and December 13th

Mercury transits the Sun on May 9th. This won't be seen again till 2039.

Meteor showers of note: May 5 eta Aquariids, August 12 Perseids, October 7 Draconids

Anticipated comets include 116P/Wild and 211P/Hill in January, 252P/LINEAR in March, 100p/Hartley in April, 77p/Longmore and 136p/Mueller in May, and P/2005 S3, P/2008 T1, P/2008 J3 all in November. Whatever you plan to see, I wish you luck and clear skies!!

Upcoming events:

December 7...	MONDAY... daytime occultation of Venus
December 11...	General meeting
December 12...	Binbrook Park opening... Geminid Meteor Shower
December 14...	Council meeting
January 8...	General meeting
January 9...	Binbrook Park opening
January 12...	Council meeting

Comments? Questions? Contact me via chair 'at' amateurastronomy.org.



HAA Helps Hamilton

To support our community, we will be collecting 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.

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

Masthead Photo: *The Pleiades (M45), by Janice Mannering.*

Taken with her Canon Rebel T5; ISO 1600 @85mm. Exposure: 20 minutes.

Hamilton Amateur Astronomers 2016 Celestial Events Calendar

The HAA once again offers its wall calendar for sale, while supplies last. This beautiful calendar features images exclusively by your fellow HAA members. It makes a wonderful gift and look great when displayed at home or office.

The price is \$15 each or two for \$25.

Any revenue generated from sales goes back into the club to help support club activities.





Bay Area Science and Engineering Fair

c/o Mohawk College, Room F175
135 Fennell Ave. West, Hamilton, ON L8N 3T2
✉ basef@basef.ca website: www.basef.ca
Registered Charity: BN 11895 1565 RR0001

November 9, 2015

Mr. Jim Wamsley
Hamilton Amateur Astronomers
PO Box 65578
Dundas, ON L9H 6Y6

Dear Jim

The 2015 Bay Area Science and Engineering Fair sponsored by ArcelorMittal Dofasco continued to be a tremendous success because of our many sponsors, volunteers, and Special Award donors like you who contribute your time and resources. The Organizing Committee and Volunteers thank you for supporting the 2015 Fair.

BASEF is one of the oldest, continuously running regional science fairs in Canada. We are a registered charity, relying entirely on unpaid volunteers, sponsors, and donors. The overall mission of BASEF is to promote project based science and encourage youth to conduct research in science, engineering, technology and mathematics, using the scientific method or engineering design process. We believe all students should be given the opportunity to participate in science fairs. Students learn invaluable academic and life skills through researching, experimenting, displaying and presenting their projects. The judging process and public viewing components allow students to practice their people and communication skills, and gain self-confidence and a sense of accomplishment.

The 55th annual Fair, held at Mohawk College in Hamilton, awarded over \$204,000 in cash prizes, trips and scholarships to the 509 grades 7-12 participants from Hamilton, Halton, Brant, Haldimand, Norfolk and Six Nations, who presented 358 projects. All Special Award prize money and in-kind gifts went directly to the students. In addition, almost 83% of 2015 General Funding went to the students in the form of cash Merit Awards, Medals, participant keepsakes, and Trip Awards for 16 students to the Canada Wide Science Fair in Fredericton, New Brunswick and 3 students to the International Science Fair in Pittsburg, Pennsylvania.

A total of 172 Special Awards were presented to students, totalling \$24,680 in cash, \$9,500 in academic scholarships and one internship valued at \$2,200. Cash prizes were also awarded to two Champion Teachers, and two outstanding new schools.

This year, for the first time, 50% of all new Special Award donations were allocated to the administration of the Fair, and established donors were asked to make an allocation to general funding. To our delight many returning donors decided to increase their donation, rather than reduce the value of their student awards. As a result, Special Awards donors added more than \$2000 to General Funding this year.

Your 2015 BASEF receipt is enclosed, along with a copy of the 2015 Annual Report and photos of the students and projects that won your Special Award. A receipt for your Bronze level sponsorship will be forwarded under separate cover.

The 56th Fair will take place at Mohawk College from Wednesday March 30 to Saturday April 1, 2016, with the awards ceremony on Tuesday evening, April 5. We look forward to your continued generous participation and support in 2016.

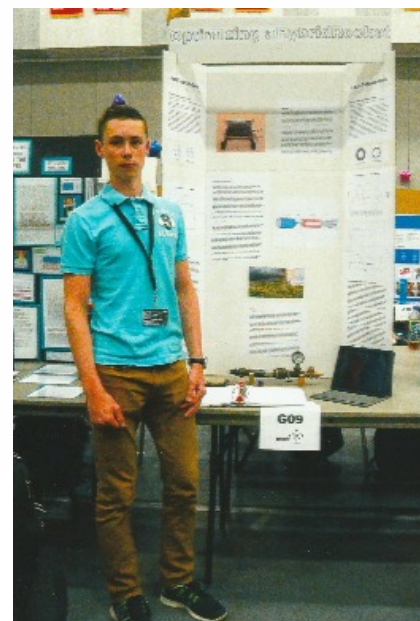
Sincerely,

V. J. Casey

Jim Casey
Special Awards Donor Liaison, BASEF 2016
905-575-5332

cc. Helen Barton and Eleanor O'Flynn, Special Awards Administrators

*Letter from B.A.S.E.F. to Past Chair & current Secretary, Jim Wamsley.
Insert Image: Matthew McGuire, 2015 Jim Winger prize winner.*





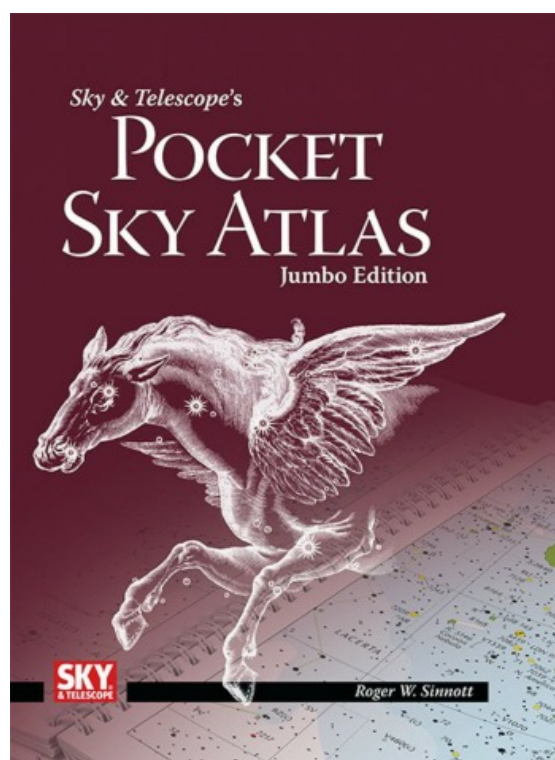
The Sky This Month for December 2015 by Matthew Mannering

Twice a year the club puts on a telescope clinic for our members and the public. The November clinic wasn't as busy as some others we have had in the past. But those who did turn up were full of questions and showed a lot of interest in our hobby. There was a good range of equipment on display which I'm sure will lead to a few Christmas wishes being made by those who attended.

But before I go any further, I just want to mention that there is a really nice comet now appearing in the predawn eastern sky. I will talk more about it in the 'Targets for this Month' section of the newsletter.

So, in the spirit of Christmas, here are some suggestions that won't break the bank for the Astronomer(s) in your family. Let's start old school with a couple of Atlases.

There are two kinds of Atlases, ones used at home and those used in the field. The field Atlas that almost everyone uses is the Sky and Telescope Pocket Sky Atlas. Now for those of us with older eyes there is a new larger format version available called the Pocket Sky Atlas Jumbo Edition. The pages and the print are about 30% larger but the layout of the charts is the same. Six new close-up charts have been added, including a couple of the Sagittarius/Scorpius Milky Way.



If you are looking for a beautiful practical Atlas to use at home, it's hard to beat the Sky Atlas 2000.0 Deluxe in regular paper or laminated editions. It's composed of 26 very large charts showing stars down to magnitude 8.5. The advantage of the laminated edition is that you can use it in the field. You may however need a bigger table! Both Atlases are available at the 'Sky and Telescope' online shop.

For those of you who prefer to use your tablet or phone, the Atlas I recommend and use myself is 'Sky Safari'. I use the "Plus" version but you can also buy the Basic or Pro versions. The detail and clarity of this atlas makes it very easy to use. You can find out more at skysafariastromy.com.

Posters are another option that can be very useful. Posters can be found that show all of the Messier or Caldwell objects. These are really handy for confirming that the hazy smudge in your eyepiece is the object you are looking for. Posters are also available that serve as an all sky chart of the heavens showing the constellations and names of the brightest stars.

How about some astro toys for girls and boys? Camera tripods can be used to hold your binoculars steady. All that is needed is an adapter that secures the binoculars to the tripod. The adapters are made of plastic or metal. The plastic ones are perfectly fine for regular sized binoculars. The tripod itself should be strong enough to hold the binoculars steady in a light breeze.

(Continued on [page 6](#))



The Sky This Month (continued)

If you have large binoculars, you may have noticed it's not that easy to point them at a target. Assuming that is the case, you can mount a red dot finder or laser on the binoculars with another type of adapter. If you are going to use a laser be sensible when pointing it. You should know that lasers are not allowed at most star parties.

Filters make another great gift and there are many types available. A Moon filter will reduce the brightness and glare which will allow you to see more detail. A Nebula filter increases the contrast between the nebula and the blackness around it. Solar filters make it safe to look at the Sun. Just be sure to get advice on which solar filter is correct for your telescope and how to use it safely!

Some telescopes come with a very small, hard to use finder scope such as a 5x24 or 6x30. These can be replaced quite easily with a larger finder with much better optics such as a 7x50 (shown at left).



For those of you who don't have a GoTo telescope, a red dot finder (shown at bottom left) is another great addition. This allows you to easily point your telescope in the vicinity of your target. You can then use the optical finder scope (eg. a 7x50) to put the target right in the cross hairs. You may have noticed that I've mentioned a red dot finder twice in this article, once for binoculars and then for telescopes. Well it can also be used with a camera for astrophotography or birding. It is perhaps the most versatile finder you can own.

Storing and transporting your equipment is always an issue. Wait for a sale at your favorite hardware store and pick up a couple of aluminum or hard-shell plastic cases filled with pluck foam. Eyepieces, finder scopes, filters, flashlights, collimating tools and a myriad of other small expensive items can all be stored in these cases. The trick is to not over fill the case and leave two rows of pluck foam between items. This helps maintain the integrity of the foam so that it will last a long time. You can easily end up with four or five cases which may seem like over-kill. But once you have used them a few times you'll wonder how you ever went observing without them.

Last but not least would be a new eyepiece. Telescopes come with one or two eyepieces, a 25mm and sometimes a 10mm. The 10mm eyepiece usually has a tiny field of view and is of poor quality. Try looking through other 10mm eyepieces belonging to club members or at a store. You don't have to spend a lot of money to greatly improve your observing experience at that focal length.

Also anyone who has to wear their glasses while observing knows how hard it is to see anything at all through the tiny eye opening of the 10mm eyepiece that came with their scope. Look for an eyepiece with at least 17mm of eye relief. This is generally the minimum required by eyeglass wearers to see the whole field of view. In other words, you don't have to move your eye around to see the entire image in your eyepiece.

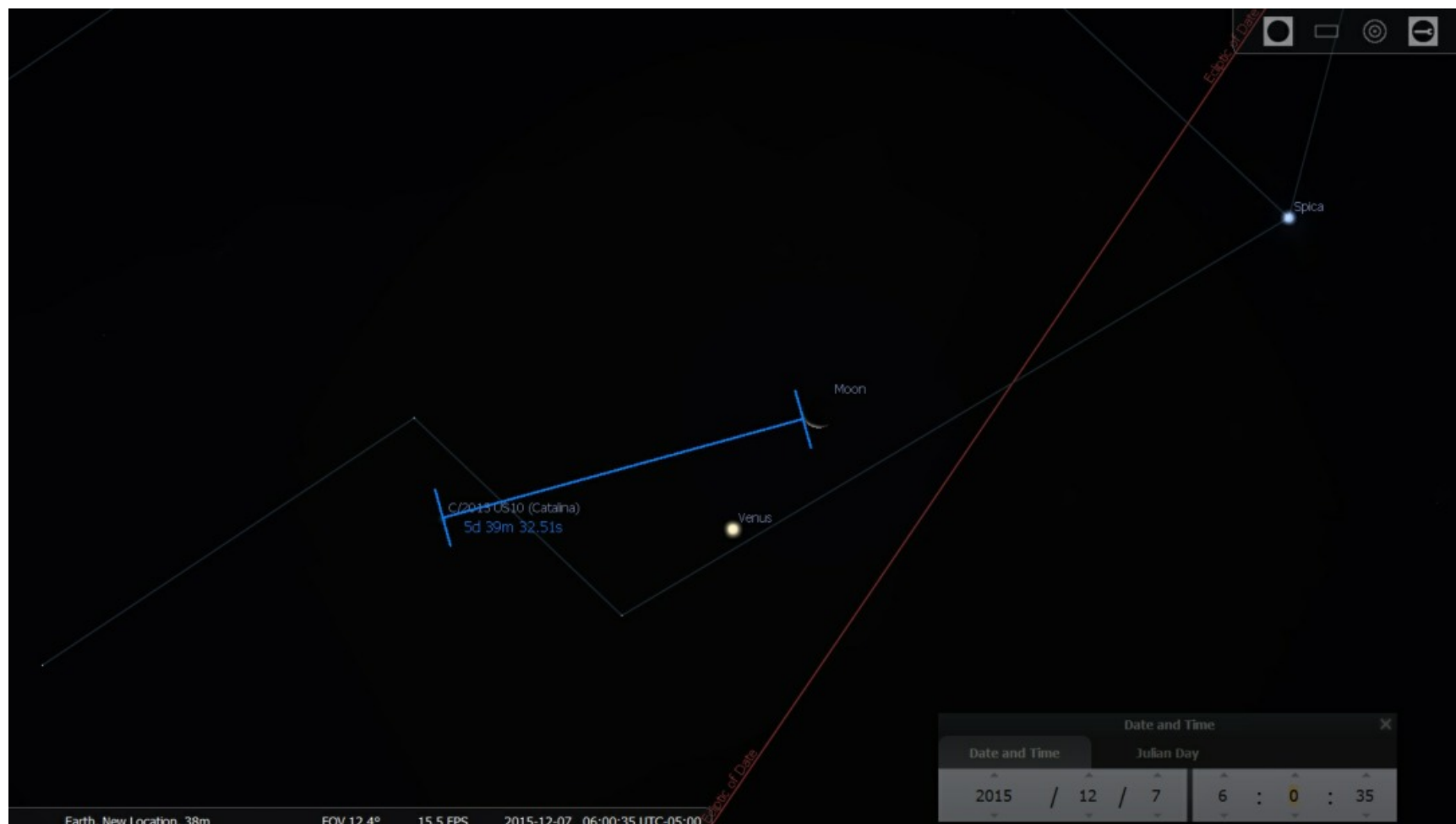


(Continued on [page 7](#))

The Sky This Month (continued)

Targets for December

Comet Catalina sporting at least 2 tails has appeared in the morning sky. You can look for it before dawn in the east. December 7th is a particularly good time to photograph the comet as it will be passing within 4.3 degrees of Venus and 5.6 degrees of the Moon.



Closeup Chart of Comet Catalina, Venus and Moon December 7, 2015

On the same day at 12:30pm the star **Aldebaran** will be occulted by the Moon. It will reappear just over an hour later. This event can be observed if you have a GoTo mount and leave it set up for the day. If you don't want to leave your telescope set up all day, try using binoculars and look midway between the Sun and the horizon due west at a height of about 20 degrees.

All through December and January, the comet will move higher into the sky. The magnitude probably won't exceed 4.0 but that is bright enough to make it visible to the naked eye. The chart at the top of the next page shows the position of the comet moving ever higher in the sky from December 1st to January 10th. If you want to look at the comet in the evening sky you'll have to wait until January 10th at about 11pm, low in the north east. Note that on January 1st, Catalina will pass very close to the star **Arcturus** providing another photo op.

The **Geminid Meteor Shower** peaks on the night of the 13th and 14th. As a bonus the Moon will be new so it won't be a factor. You can expect to see 50 to 70 meteors per hour originating from the radiant located just above Castor and Pollux in Gemini in the east. See the chart at the bottom of the next page. Be sure to dress warmly for this event!

(Continued on [page 8](#))

The Sky This Month (continued)



Chart of Comet Calalina's Path through Virgo and Bootes

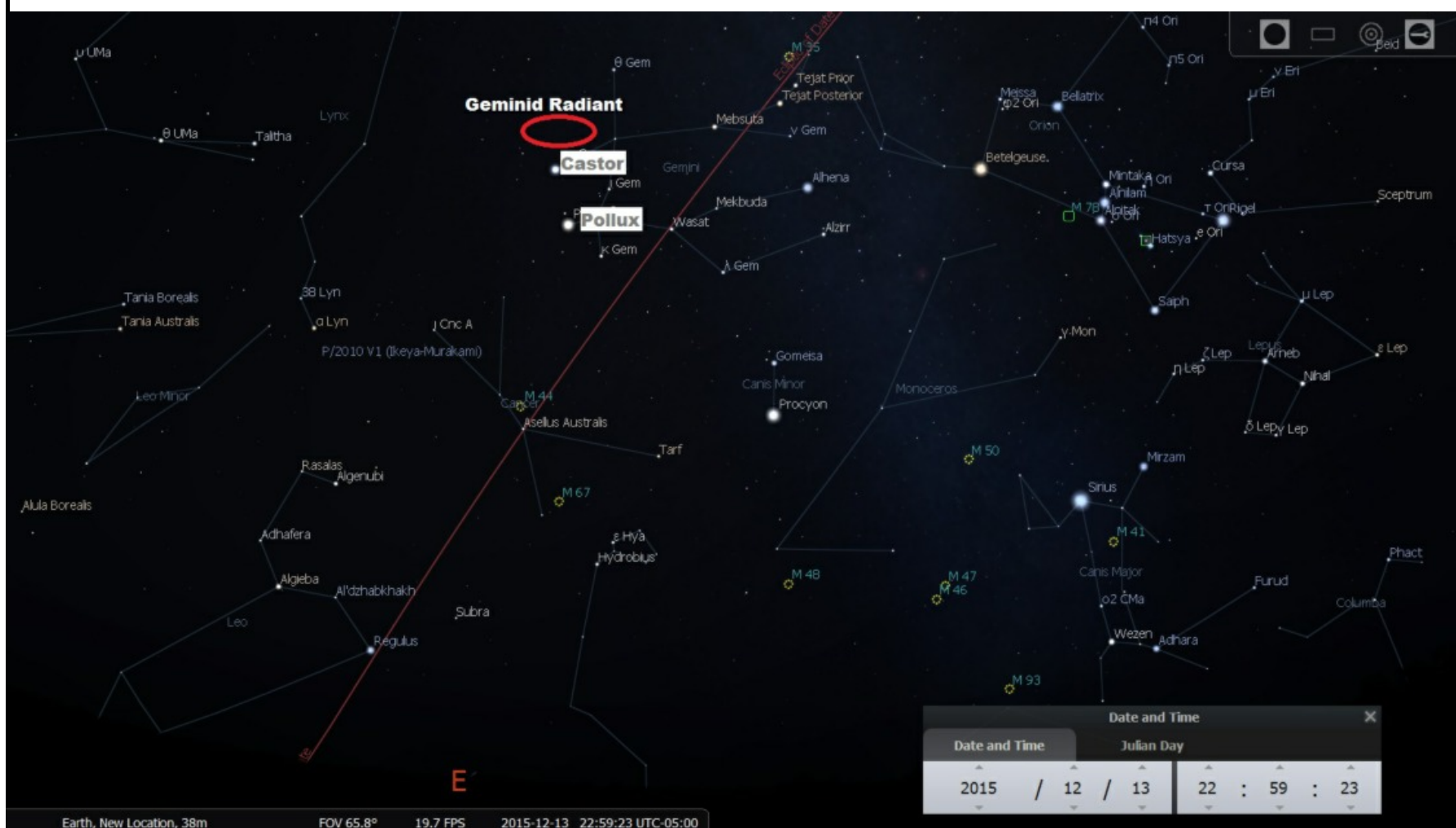


Chart of Radiant of Geminid Meteor Shower

(Continued on [page 9](#))

The Sky This Month (continued)

The Moon

Libration this month is as follows: The Northern limb will be most exposed on the 24th while the Southern limb will be most exposed on the 12th. The Eastern limb will be most exposed on the 27th and the Western limb on the 12th. Libration allows you to look at craters that are normally hidden on the far side of the Moon. Some Moon maps mark the areas visible with a favourable libration by shading them in a different colour.

The Planets

- **Mercury** appears low in the west immediately after the sun sets. However it will be very low above the horizon. The best chance to get a good view of it is to wait until the last 11 or so days of the month.
- **Venus** still shines in the south east at mag -4.1 for the month in the hours before sunrise.
- **Mars** appears in the morning sky at 3am in Virgo at the beginning of the month. By months end it will rise at about 2am.
- **Jupiter** rises at about 1am at the beginning of the month and at 11:30pm by months end.
- **Saturn** reappears low in the east at dawn at the end of the month.
- **Uranus** is south east in Pisces at 6pm at the beginning of the month moving to due south at the same time at months end.
- **Neptune** in Aquarius is visible in the evening sky in the south west till 11pm at the beginning of the month and 9pm by months end.

Other Events

- December 3rd*: — Last quarter Moon.
- December 4th*: — Jupiter 1.8 degrees from the Moon at 1am just after moon rise.
- December 6th*: — Mars 2.9 degrees from the Moon at 3am just after moon rise.
- December 7th*: — **Comet Catelina passes within 6 degrees of Venus and the Moon at 6am.**
— **Venus is occulted by the Moon at 12:31pm and reappears at 1:37pm.**
Use planetarium software to get the times for your exact observing location.
- December 11th*: — New Moon.
- December 13th/ 14th*: — Geminid meteors peak.
- December 17th*: — First Quarter Moon.
- December 19th*: — **Uranus 1.3 degrees from the Moon at 8pm.**
- December 21st*: — Winter Solstice.
- December 23rd*: — Moon 2.4 degrees from Aldebaran at 6pm.
- December 25th*: — Full Moon.
- December 28th*: — Mercury at greatest elongation east.
- December 31st*: — Jupiter 3 degrees from the Moon at 7am.



Eyepiece Review by Bruce Pawlett

In last month's HAA newsletter article "It's not over until it's over" describing my experience observing the lunar eclipse in September I mentioned how I enjoyed the view with my new low magnification wide field of view eyepiece. That eyepiece is the argon purged Explore Scientific 34mm x 68deg field of view (FOV). I absolutely love it! I really enjoy the sense of immersion that it generates with the extended field of view around the primary target.

I was so enthralled I was inspired to treat myself to yet another new eyepiece. I wanted higher magnification and yet still maintain a large FOV so I finally decided on the Tele Vue Ethos 10mm x 100deg FOV. It definitely provides a phenomenal field of view; in fact the FOV is much greater than the peripheral vision of my eye.

The disadvantage I found for this eyepiece compared to the Explore Scientific is that with the narrower diameter and shorter eye relief that I cannot wear my eyeglasses when using it. I have some astigmatism so I now have on order Tele Vue's DioptRx lens for astigmatism correction (view is still pretty clear without the correction). This may well turn out to be an advantage since there are many disadvantages for wearing eyeglasses while viewing. I am looking forward to an optimized viewing experience.

Due to weather and other priorities I haven't had much opportunity to put them to use and my trials have been under so-so conditions. So far I have only viewed the waxing crescent moon and the double cluster in Perseus. I love viewing crescent moons since the shadows provide greater depth perception and improved crater detail. The whole moon filled the eyepiece with just the crescent illuminated. I was quite impressed with the clarity of the details (even with my astigmatism).

The double cluster of Perseus easily fit into the field of view of the 34mm Explore Scientific along with the surrounding stars, a very nice view indeed. With the 10mm Tele Vue I could see most of both clusters but with opposite edges clipped. Since the entire view was comprised of the double cluster and the image was beyond the range of my peripheral vision the visual definition of what I was looking at was reduced (double cluster not well defined). However, with the higher magnification the star intensity was much more dramatic, so the view was also quite nice.

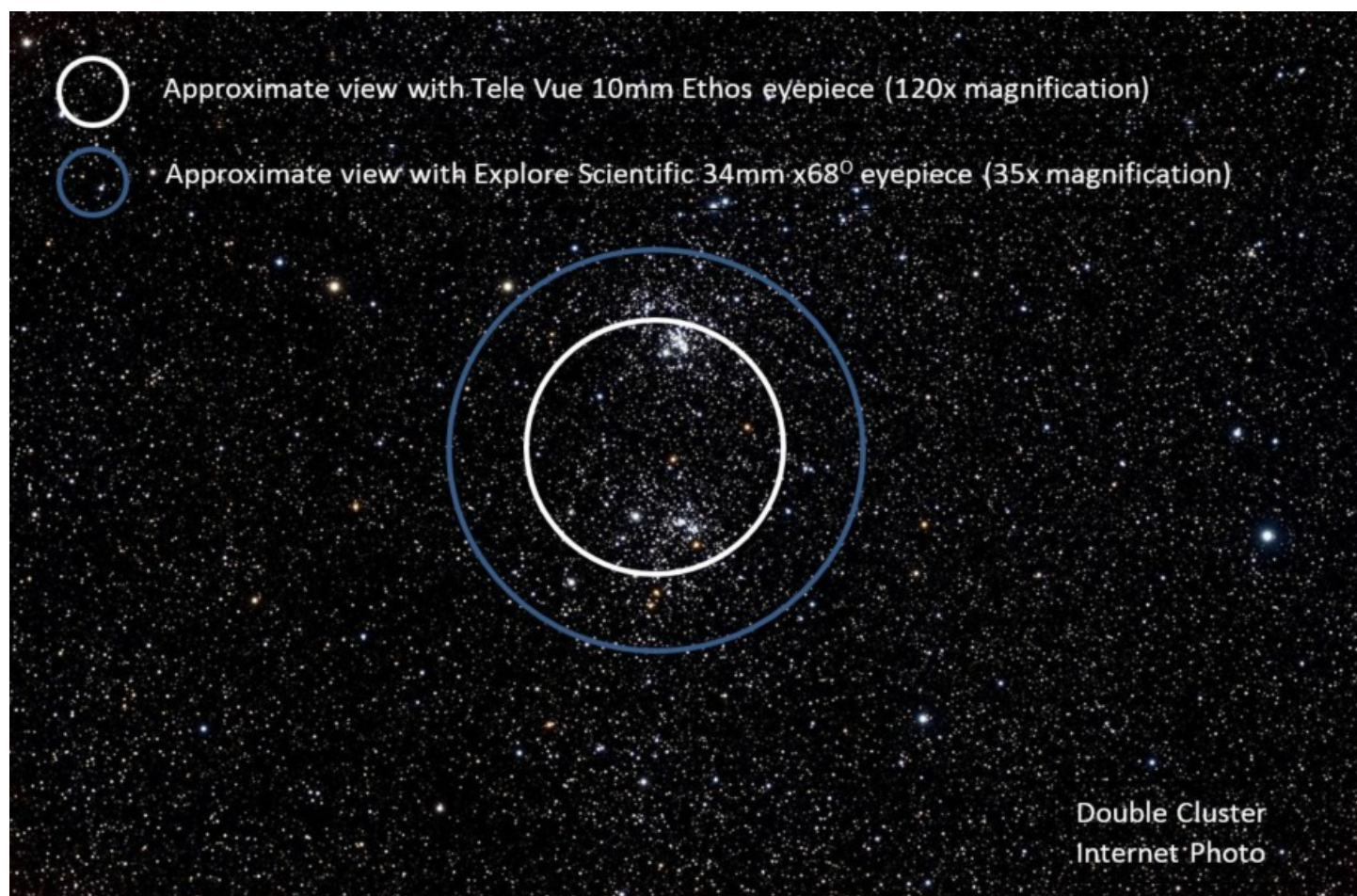
I am quite sure I will get much enjoyment from both eyepieces. The sense of immersion accomplished with the perspective offered by the inclusion of the spacescape surrounding the object of interest is awesome. Both eyepieces provide this and utilization of both of them offer complimentary perspectives to provide a fully enriched experience.



*Tele Vue Ethos
10mm X 100deg.*



*Explore Scientific
34mm X 68 deg.*





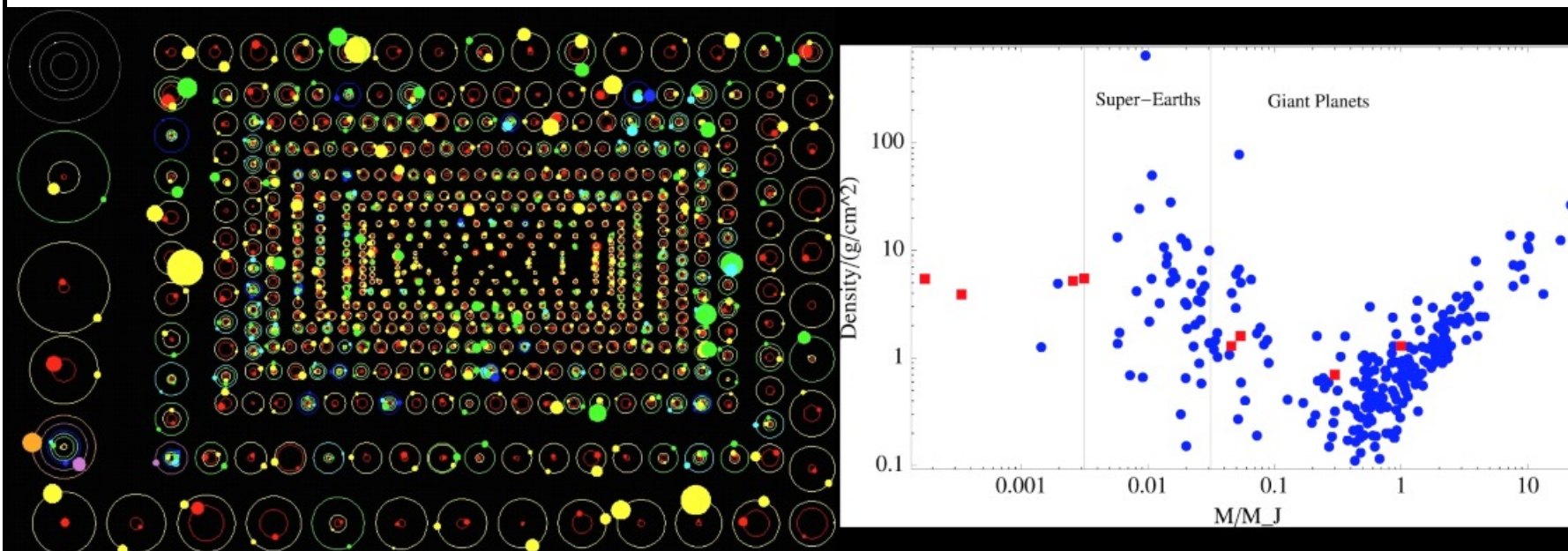
Our Solar System Is *Almost* Normal, But Not Quite

By Ethan Siegel

It was just over 20 years ago that the very first exoplanet was found and confirmed to be orbiting a star not so different from our own sun. Fast forward to the present day, and the stellar wobble method, wherein the gravitational tug of a planet perturbs a star's motion, has been surpassed in success by the transit method, wherein a planet transits across the disk of its parent star, blocking a portion of its light in a periodic fashion. Thanks to these methods and NASA's Kepler spacecraft, we've identified many thousands of candidate planets, with nearly 2,000 of them having been confirmed, and their masses and densities measured.

The gas giants found in our solar system actually turn out to be remarkably typical: Jupiter-mass planets are very common, with less-massive and more-massive giants both extremely common. Saturn—the least dense world in our solar system—is actually of a fairly typical density for a gas giant world. It turns out that there are many planets out there with Saturn's density or less. The rocky worlds are a little harder to quantify, because our methods and missions are much better at finding higher-mass planets than low-mass ones. Nevertheless, the lowest mass planets found

(Continued on [page 12](#))



Images credit: NASA / Kepler Dan Fabricky (L), of a selection of the known Kepler exoplanets; Rebecca G. Martin and Mario Livio (2015) ApJ 810, 105 (R), of 287 confirmed exoplanets relative to our eight solar system planets.

NASA's Space Place (continued)

are comparable to Earth and Venus, and range from just as dense to slightly less dense. We also find that we fall right into the middle of the "bell curve" for how old planetary systems are: we're definitely typical in that regard.

But there are a few big surprises, which is to say there are three major ways our solar system is an outlier among the planets we've observed:

- All our solar system's planets are significantly farther out than the average distance for exoplanets around their stars. More than half of the planets we've discovered are closer to their star than Mercury is to ours, which might be a selection effect (closer planets are easier to find), but it might indicate a way our star is unusual: being devoid of very close-in planets.
- All eight of our solar system's planets' orbits are highly circular, with even the eccentric Mars and Mercury only having a few percent deviation from a perfect circle. But most exoplanets have significant eccentricities, which could indicate something unusual about us.
- And finally, one of the most common classes of exoplanet—a super-Earth or mini-Neptune, with 1.5-to-10 times the mass of Earth—is completely missing from our solar system.

Until we develop the technology to probe for lower-mass planets at even greater distances around other star systems, we won't truly know for certain how unusual we really are!



Treasurer's Report by Steve Germann

Treasurer's report for November 2015 (unaudited)

Opening balance:	\$5,743.81
Revenue:	\$2,368.00
Expenses:	\$1,018.54
Closing Balance:	\$7,093.27

Revenue included Memberships, \$860; 50/50 \$78; and Calendar Sales \$1,430.

Expenses included \$854.28 for our insurance coverage; \$150 speakers allowance and gas cards; and \$14.26 for another receipt book.



"I hate aperture fever!"

The Scope Store at Camtech

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- 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 2: Introductory Astronomy for Kids**
 - **Jan 27, 2016: Death from the Skies!**
- For more details, visit
www.physics.mcmaster.ca/planetarium

UPCOMING EVENTS

December 11, 2015 - 7:30 pm – *HAA Meeting* at the Hamilton Spectator Auditorium.

January 8, 2016 - 7:30 pm – *HAA Meeting* at the Hamilton Spectator Auditorium.

2015-2016 Council

Chair	Bernie Venasse
Second Chair	Mike Jefferson
Treasurer	Steve Germann
Webmaster	David Tym
Membership Director	Leslie Webb
Observing Director	Matthew Mannering
Education Director	John Gauvreau
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Check out the Hamilton Amateur Astronomers
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

