



# Event Horizon



## From The Editor

Enjoy reading the December 2014 Event Horizon!

Once again, I want to thank all contributors. As HAA members, the E.H. Is your "speakers' corner" if you will. Please keep your articles & images coming.

Clear Skies!

*Bob Christmas,  
Editor*



## Chair's Report by Jim Wamsley

For my report this month, I first want to take a moment to apologise for our failure to have Peter Sutherland at the November meeting as our main speaker. I know many members were looking forward to hearing him speak. Peter had an emergency come up out of town at short notice, and was not able to be with us. I will be rescheduling Peter for a future meeting. At the same time I would like to thank Bill Tekatch for coming up with an absolutely terrific talk about his efforts to capture the great solar photos he has been able to get. These are now one of the features of the 2015 H.A.A. celestial events calendar. I know it isn't easy to put together a talk and rehearse it for presentation, but it is even harder to do this with such short notice. Well done Bill. I know the membership enjoyed your talk as much as I did. I would also like to once again thank Matthew Mannering for his extended Sky This Month talk. Matt, I know you put an incredible amount of effort into your presentations, and I have called on you to help me out many times. I will really try to take it easy on you in the future. It makes it a pleasure to chair a club with the talented and helpful people we have in the Hamilton Amateur Astronomers.

This time of year is a busy time for the club's council. There are a lot of things to get done to organize for the coming year. So far your new council has confirmed the appointment of the club's Councillors at Large. *(Continued on [page 2](#))*

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## Chair's Report (continued)

They are Harvey Garden, Brenda Frederick, Kevin Salwach, and Bernie Venasse. Harvey and Brenda are old hats in council. Thank you guys for your long time service. Kevin and Bernie, however, are the new kids on the block, and have stepped up from the ranks to help us out. Kevin has already taken on the job of making sure the food that is donated to the food bank program gets to the right place. Bernie has also taken on a task, with the blessing of council. Bernie will be a Key Holder for the Binbrook Conservation Area, and will be helping us out in our effort to get out to the park for observing sessions more often, if only we can count on some clear skies. I'm sure we will be seeing E-mails from Bernie soon, letting us know that the club's dark sky site is open for business. Thank you both for coming forward to help us out.

At the last meeting we set the club's budget for the year. As a not for profit charitable organization, we must, by law, disperse a set percentage of the club's income toward charitable purposes to maintain our charitable status. Council must determine the best way to do this. In the past we have supported many public service organizations that fit that mandate, as well as being a good fit with the club's mandate of furthering the knowledge and enjoyment of astronomy, physics, and the sciences. We will continue to support these causes, and this year we will expand our commitment of funds to the Bay Area Science and Engineering Fair, by donating an additional \$500.00 to become a bronze level sponsor to B.A.S.E.F as well as the \$200.00 we currently give as prize money for the best astronomy or physics related project. If you're not familiar with B.A.S.E.F. the Bay Area Science and Engineering Fair, is a competition to all grade seven through twelve students from Hamilton, Halton Region, Haldimand County, Norfolk County, Brant County and Six Nations. Students may attend any public, separate or private school, or be home schooled. Participants must be under the age of 21 before June of the BASEF year.

At our next council meeting, we will be setting out the schedule of club events for the upcoming year. Club council meetings are open to all club members. If you are interested in finding out what we are doing on your behalf, just ask at a general meeting and we will tell you the date and time of the next meeting.

In other news, I was privileged to attend a reception at the Balls Falls Conservation Area this past week, along with club members John Gauvreau, Kathy Smith, and my wife Celia. This reception was to recognise and honor the many people that have volunteered to help the Niagara Peninsula Conservation Authority over the past year. Mike Boyko, the Superintendent of the Binbrook Conservation area, spoke highly of the Hamilton Amateur Astronomers and the many club members that volunteer at the park.

That about covers everything I have to say, I'm sure you are anxious to get to the more interesting articles in the newsletter. Thanks for your indulgence and I'll talk to you again soon.



### 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 Jim Wamsley at 905-627-4323.

**Masthead Photo:** *The 2014 HAA Fall Telescope Clinic at the Hamilton Spectator Auditorium, by John Gauvreau.*

See more of John's photos from the Scope Clinic on Page 10.



## The Sky This Month for December 2014 by John Gauvreau

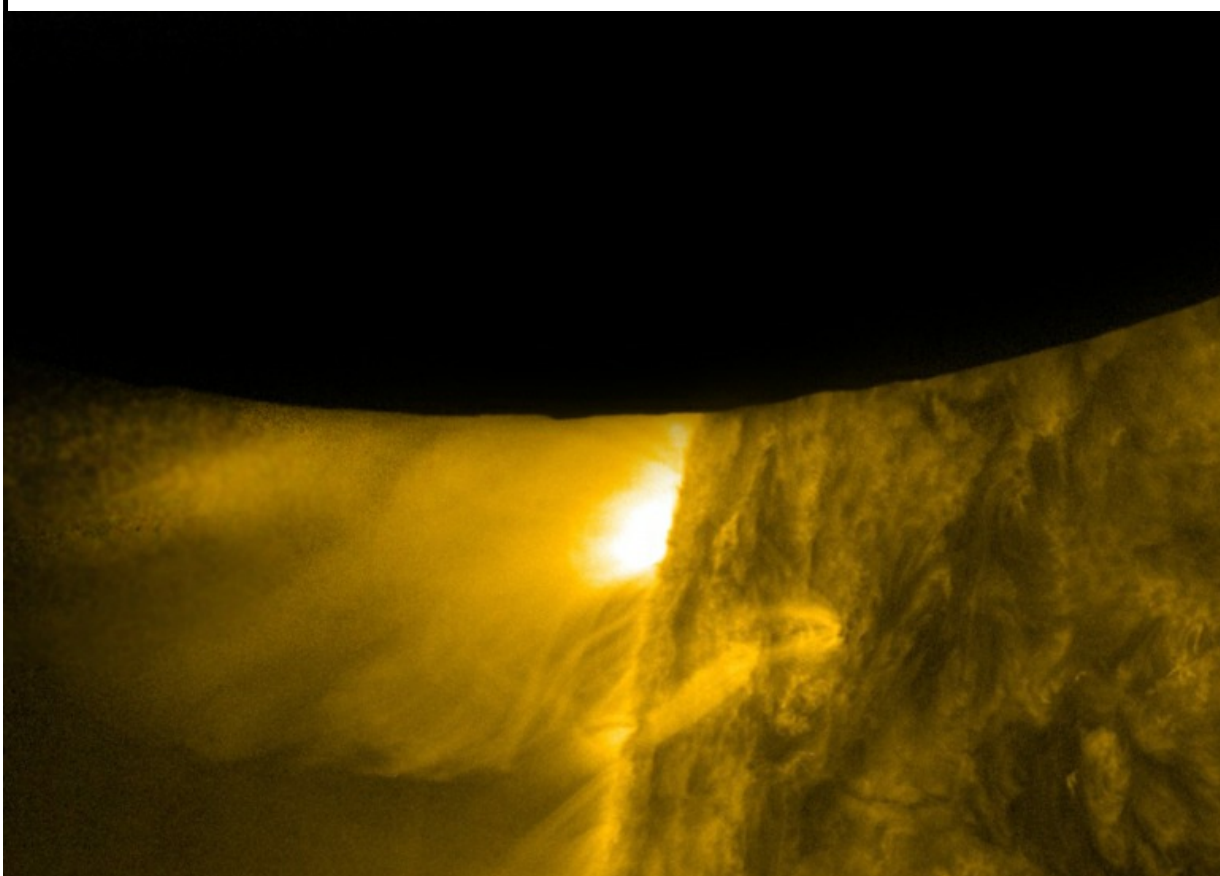
Although I have heard several other fine HAA members complain about the weather this year, saying that they have found few clear nights to get out and enjoy the sky, I must admit that as I look back over the past year, I experienced just the opposite. I got out in my very tree covered back yard quite a bit this year, and enjoyed many other observing opportunities from other locales as well. I think, overall, it has been a very fine year. That said, I will admit that over the last few weeks, indeed, most of the month of November, I have been frustrated by a lack of clear skies and chances to get my scope out. I admit, that there were a couple of fine clear days and night around mid-month, but it was during the cold spell we had and I just wasn't up to going out when it was 10 below. Sure, by January and February I expect that kind of temperature and am prepared for it, but not just yet! So I let those clear nights go by, and am now feeling the withdrawal of having had far too few observing nights recently.

At the same time, this past month offered celestial sights to all of us that were far beyond our imaginations and kept us captivated while watching our computer screens as close up images from a comet showed us sights we had never seen before. The Rosetta probe, launched over 10 years ago, finally arrived at Comet 67P/Churyumov-Gerasimenko and dropped the lander named Philae onto its surface. Although the mission was brief, this was the first time any probe has been landed on the surface of a comet, and it did not disappoint.

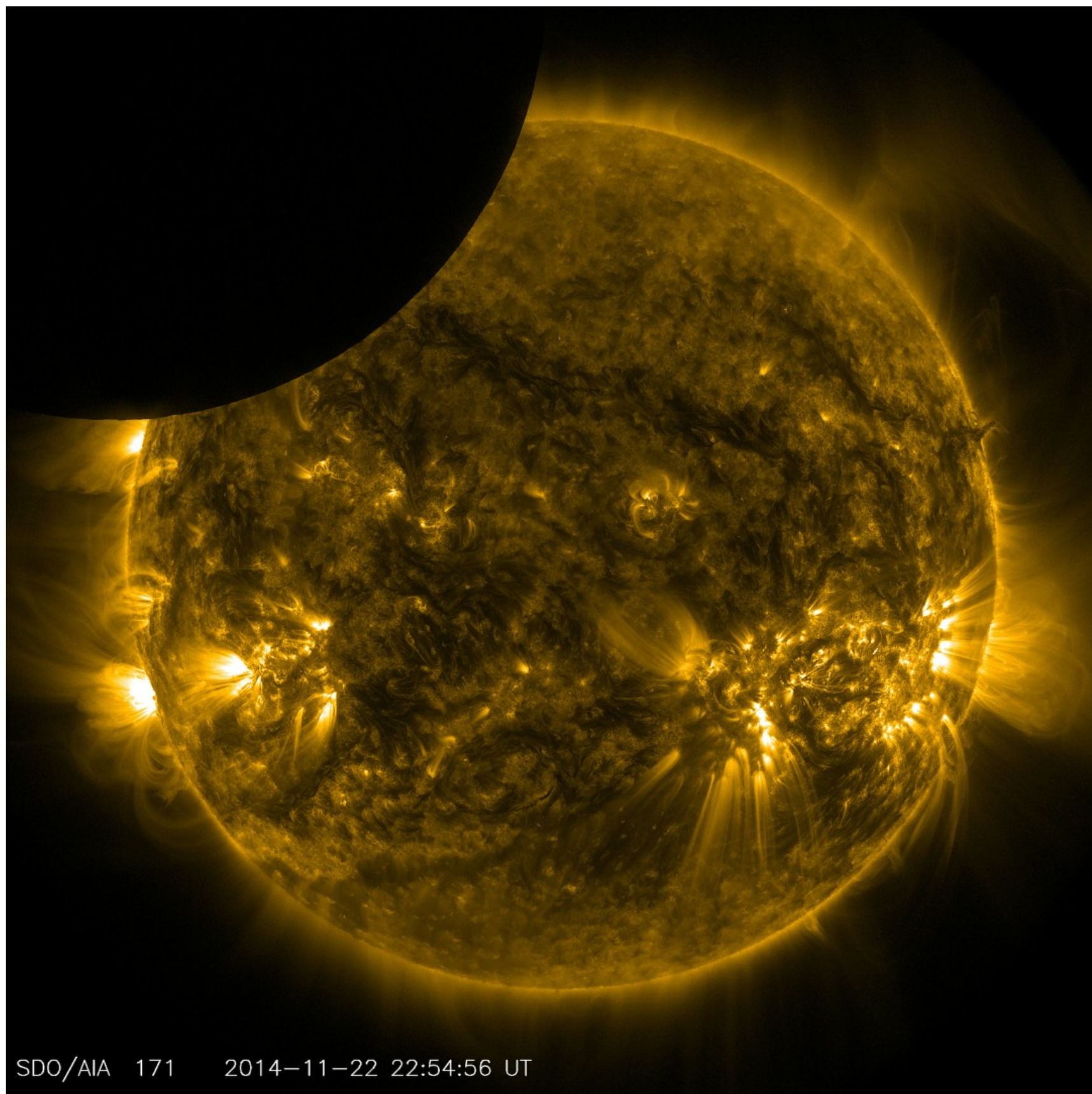
Another interesting sight this month also came from an off-world point of view. In October we experienced a total lunar eclipse and a partial solar eclipse, as highlighted in last month's article. A solar eclipse occurs when the moon passes in front of the sun, partially blocking our view of it. Many of our best views of the sun come from satellites like the SOHO (Solar and Heliospheric Observatory) and the SDO (Solar Dynamics Observatory). These spacecraft keep an eye on the sun at all times and provide nearly live continuous views in remarkable detail. Since they are not on Earth, they don't experience an eclipse when we do, but it can happen for them too. This past month, the SDO experienced its own partial solar eclipse, and the view was amazing. In the close up image below, you can see the uneven limb of the moon, as the surface rises and falls with mountains and valleys. A keen eyed observer with a good backyard telescope can also see that the limb (outer edge) of the moon is not smooth, as the terrain rises and falls.

As the year comes to a close, we look forward to 2015 and all it will bring. We get a fine lunar eclipse, a triple planet conjunction, the arrival of the Dawn spacecraft at minor planet Ceres and the much anticipated arrival of the New Horizons Spacecraft at Pluto in June. On top of all those celestial treats, I wish you all even more, a joyous holiday season and all the best in the new year.

*(Continued on [page 4](#))*



*Images at left and on next page courtesy of NASA's Solar Dynamics Observatory*



### What's in the Sky This Month?

This month begins in autumn and ends in winter, and the sky reflects that, with plenty of familiar fall and winter constellations well placed for us to see. The Great Square of **Pegasus** is prominent in the southwest in the evening, with **Andromeda** extending away from '3rd base' of the diamond that is Pegasus, and leading us to **Perseus** in the southeast, with its wonderful star clusters. If we then look to the east, we see **Orion** and **Gemini** rising, with **Taurus** high above. Truly, this season brings an abundance of rich constellations for us to observe.

Now though, let us turn our attention to a pair of smaller and often overlooked constellations that are nestled in the very midst of these other celestial giants. The first one, **Aries**, is well known as one of the zodiac constellations, and indeed, is the very first on that list. Aries is *(Continued on [page 5](#))*

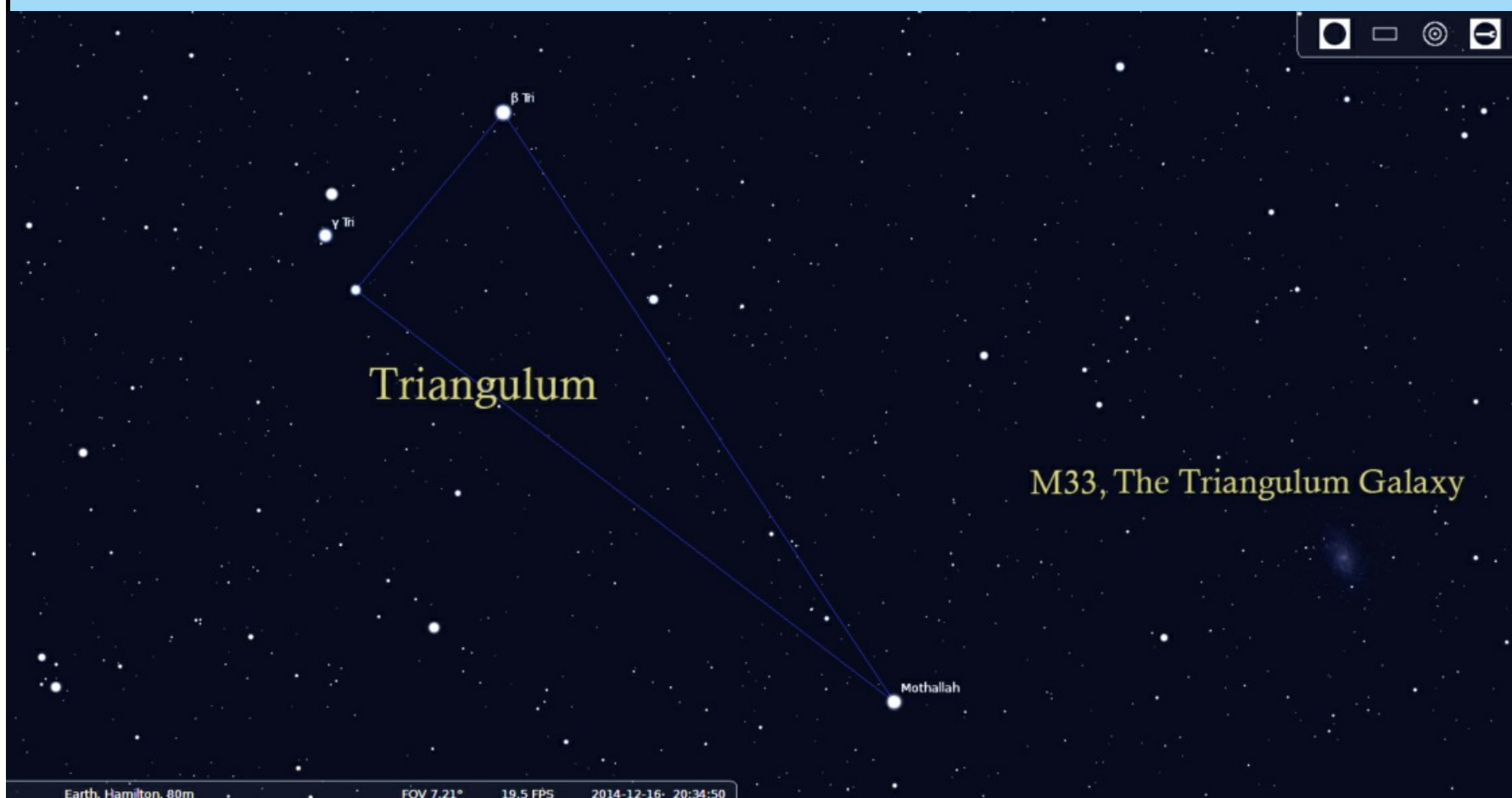
## The Sky This Month (continued)



the ram, and in fact is the ram that bore the Golden Fleece. Sadly, such a luminous coat does not translate into the sky, and the constellation has no stars brighter than 2nd magnitude. That dim honour goes to Alpha Arietis, known as Hamal, which simply and unsurprisingly, means 'head of the ram' in Arabic. This star is not very interesting, but is known to be about 65 light years distant and is the home to a possible extra-solar planet. Of more interest is Gamma Arietis, which is a fine double star. It was discovered to be a binary by Robert Hooke, the English astronomer who was the nemesis of Isaac Newton. When he found them in 1664, they became one of the first doubles to be discovered by telescope, a device which was still in its infancy. The two companions are the same magnitude 4.6 in brightness, and both appear white. The star itself is visible to the unaided eye, but a small telescope is needed to split the double. They are like a pair of car headlights looking back at you, or a pair of eyes in the night, for the more imaginative.

Just above Aries is the constellation **Triangulum** (*see chart next page*). Also a small constellation, it should be no surprise that it is shaped like a long triangle. Oddly, it is one of the few constellations whose brightest star is not labeled alpha. Beta Triangulum is the brightest star in this constellation at magnitude 3, while alpha is slightly dimmer at 3.4. If there is little else of interest among these stars, Triangulum is home to one of the finest galaxies in the sky. **M33, The Triangulum Galaxy**, is actually visible to the unaided eye under a very dark sky, but binoculars are useful in spotting it. It is the third largest member of our local group of galaxies, after the Andromeda Galaxy and our own Milky Way Galaxy. It is about the same distance as M31, the Andromeda Galaxy, but appears more face on. Because of this, it appears large and dim in the sky. It spans a distance wider than two full moons, so is easily overlooked in a telescope because of its great size. Binoculars are really much better for such a distended object. When under a dark sky, a wide field telescopic view shows detail among the spiral arms, and although it can be dull and difficult in a light polluted sky, in a dark sky it really comes alive. Although it can be located by jumping off the triangular constellation from which it takes its name (some people call it the Pinwheel, but that name usually applies to M101), another way of locating it is by using M31, the Andromeda Galaxy. From the arms of the constellation Andromeda, one travels up to the galaxy, but from the same starting location travel down the same distance, and you are in the ballpark of M33. They appear so close together in our sky because they are close together in space. The two galaxies lie only about 700,000 light years apart. As we enjoy a view of M31, imagine how it must look from a planet in M33, which is less than a third the distance that we are from it. Spectacular!

(Continued on [page 6](#))



### The Planets:

- **Mercury** is at superior conjunction with the sun on December 8, meaning it is on the opposite side of the Sun from us, so is invisible for most of the month. For the dedicated observer, it appears very low in the west after sunset during the last few days of the year. Use brighter Venus as a guide, and look for Mercury just below and to the right.
- **Venus** appears low in the west after sunset, but like Mercury, you will have to peer through the illumination of dusk to see it. Visible from mid-month on, this is the beginning of a long apparition for Venus, and we can look forward to many more favourable months of observing the Evening Star in the new year. If you can wait that long, the Moon joins Venus on the evening of December 22, and they make a nice binocular sight.
- **Mars** continues to be low in the west this month, just like last month, as the sky darkens earlier and Mars continues to move eastward, keeping it above the horizon for a little while longer. As mentioned in last month's 'The Sky This Month', on December 3rd, Mars will pass  $1/5$  of a degree from M75, a dim globular cluster, but it will be tough to see this deep-sky object in the twilight glow. On December 24th the Moon joins Mars in a wide pairing, but if you can pick them out of the sunset glow, you have a chance to see all three rocky planets, Mercury, Venus and Mars, in the western sky in the last few days of the month. If you manage to see these three, be sure to look down at your feet to see the Earth, and complete your observation of all four terrestrial planets.
- **Jupiter** rises between 9 and 10 pm this month, bringing it high enough for observing by midnight. Jupiter season is finally beginning. At magnitude -2, it is easily the brightest object in the sky, even with all the bright stars of winter up ahead of this giant planet. Located in Leo, it is just west (meaning it appears above, as it rises in the east) the bright star Regulus. They make a lovely pair and are joined by the Moon on the night of the 11th and into the morning of the 12th. All three objects, Jupiter, Regulus and the Moon, are visible in binoculars at the same time.
- **Saturn** emerges from its conjunction with the Sun last month, and appears very low in the eastern sky at morning. In the pre-dawn sky of December 19th, Saturn and the Moon make a nice pair only 2 degrees apart.

(Continued on [page 7](#))

## The Sky This Month (continued)

- **Uranus** is still well placed for observing, high in the south in the early evening, and setting after midnight. This is a fine time to see this blue ice giant. As mentioned in last month's newsletter, look for it less than one degree below the Moon about an hour after sunset on December 1st.
- **Neptune** is the most distant planet, and so creeps slowly across the sky. It remains in Aquarius in the southwest at dusk and is well placed through the evening. Watch it as it draws closer to Mars throughout the month, in anticipation of a very close conjunction in mid-January.

### Other Events:

- December 5: The nearly full moon is nestled in the Hyades Cluster in Taurus, and is only one half degree from Aldebaran, the bright red star that is the eye of the bull.
- December 6: Full Moon.
- December 11: The Moon, Jupiter and Regulus form a triangle about 5 degrees on a side.
- December 13: Geminid Meteor Shower is at its peak. One of the years best, but still best observed away from city lights that will drown out many of the fainter meteors.
- December 14: Last quarter Moon.
- December 21: Winter Solstice. Winter begins at about 6pm our time, and the days begin to get longer.
- December 21: New Moon.
- December 28: First Quarter Moon.

## Hamilton Amateur Astronomers 2015 Celestial Events Calendar

The HAA once again offers its wall calendar available for sale starting in November. This beautiful calendar features images exclusively by your fellow HAA members. They make wonderful gifts 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.





## Interstellar (Movie Review) by Mike Jefferson

Movie-makers must really wrack their brains trying to consistently devise themes that will appeal to the general viewing audiences on a continual basis. One of the worst themes explored has to be that of science fiction. Fictional movies, short stories and novels all rely on telling a story in an environment rich in intrigue, plot, crises and climax. Outer space is not such an environment. It is huge beyond belief, riddled with numerous types of deadly radiation and encumbered with sweaty spacesuits, oxygen tanks, special toilets and other life-support systems - not the kind of stuff that makes for a good whodunnit, love triangle, adventure story or murder mystery.

As a species, we cannot travel into the micro-world. We leave that to fibre optics and nanobots. This is for reasons that I will not elaborate here, but they are founded on very good natural conditions and physical laws. In a similar way, the cosmos may be too big and too dangerous for us to travel in. None of our own planets appears to lend us a cozy home-away-from-home and anything beyond that is unknown in the extreme. Dangers to our continued survival out there abound. Do our robots and telescopes not do a great enough job for us as we stay safe on our own planet?

So where does that leave INTERSTELLAR? Not very well-off thank you. My wife Jean and I went out for dinner at Kelsey's (very enjoyable) and to see this show on Friday, November 21/14 at Silver City, Ancaster. We opted for the IMAX version because the start time was more convenient for us - big mistake! The sound track is overwhelming in the extreme! You are assigned seats at IMAX and we were down near the front on the right-hand side - they were not bad. From the time the 70 mm. film began to roll I had that 'deja-vu all over again' feeling that I got from GRAVITY and other sci-fi 'horrors' from the last 30 years. It really is so hard to make a compelling, believable drama about life in the cosmos simply because living out there is not really believable - that simple.

The theme of the picture has Matthew McConaughey as a former, world-class pilot-turned-corn-farmer in a world riddled with drought and dust storms (because of our damaging the environment. Yes, even environmentalism makes a guest appearance in this flick.) stumbling upon Michael Caine's (the senior scientist in this adventure) project to launch a rocket to find a suitable exo-planet and to hunt for the existence of a previous colonial effort to do just the same. The whole thing is blatant confusion for nearly 3 hours. My backside cheeks were numb, we were bored, confused and shell-shocked by the entire experience.

The director likely took advice from some astrophysicists and then concocted his own version of time-dilation, red-shifting, the role of gravity in a 5-dimensional universe and using worm-holes and black holes to shorten interstellar trip times. Wowee! The audio levels were pumped by thousands of watts of sonic power so that every seat and building block in the entire theatre shook. This was not the ear-buzzing stuff that you get at rock concerts (the really dangerous levels), but it just kept hitting you from the beginning of the picture to the end, with no real respite in between. The actors' voices were overwhelmed by the noise (It was not music!). The sound-track was unintelligible at most times. It was confusion and chaos as we stumbled from crisis to crisis in this doom-and-gloom scenario. And yet, in the final analysis, our hero pilot returns home safely to an L5 space colony around Saturn, named after his daughter (now an old woman and he's still the same age - time dilation, remember?). The family is all gathered around her bedside because she's heading off to the heavenly realms - and they all live happily ever after...and it's over, thank goodness!!

To be fair, I have to say that there were a few good parts to be noted. The trip from Earth to Saturn showed space in a very realistic way. During an explosion, when the air rushed out of part of the mother ship, the sound-track went dead (mercifully!) because of the vacuum of space. The wormhole and black hole portrayals were very imaginative. Realistic? I don't know. I've never been there.

As I said above, science fiction is not a good medium for a really engaging storyline. In book form you can let your imagination wander and that is its saving grace. Motion pictures are another issue altogether. Today's audience knows far more about the cosmos than people of 60 years ago. COMMANDER COREY, FLASH GORDON, BARZOOM and TOM CORBETT - SPACE CADET just do not cut it in today's literary and movie world. Those adventures sought to portray earthly human experiences out in a cosmos, little different than life right here. They were naïve in the extreme, but they were fun and we loved them for their simplicity and their stupidity. The worst of their breed is FIRE MAIDENS OF OUTER SPACE. This one

*(Continued on [page 9](#))*

## Interstellar (Movie Review) (continued)

is a must-see because it will provide hilarity like you've never experienced elsewhere. It is found on YouTube and the best version is the 1990's Mystery Science Theatre 3k one, where the characters on that show sit in front of the screen, as if at a real movie theatre and pan the daylights out of it. In any of the 5 YouTube versions this 1956 'thriller' is well worth a watch to show how bad movie making can really get. MST3k also shows other 1950's sci-fi bloopers. Unfortunately, MST3k is no longer on mainstream television.

My strongest advice is that you give INTERSTELLAR a wide miss. GRAVITY was not that great either, but this one is far worse. Much better for you to spend a nice night under the real universe or to go to a camera-telescope store and shop for that small piece of equipment you need to round out your observing experiences.



### Harvey Garden's Binocular Box



The beauty about a binocular box is all that is necessary to be an amateur astronomer is hidden in the protective box including the binocular. All that is needed to get started is to set the box on the ground, unhook both spring loaded hooks, pull up on the handle, unscrew the three legs from inside, screw the three legs into the three leg bases around the handle, set the legs on the ground, lift up the part that was left on the ground and put it on top of the empty box, hook the spring loaded hooks into the eye screws, set the binocular on its rest and you're ready to go. I installed a lazy susan type bearing between the box and the disk that the handle and the three legs bases are fastened to for ease of operation. I have viewed Saturn, Jupiter, Mars and a Solar Eclipse with this very box, it's easy to build and easy to use.

— H. G.

## Scenes From The Fall 2014 Telescope Clinic

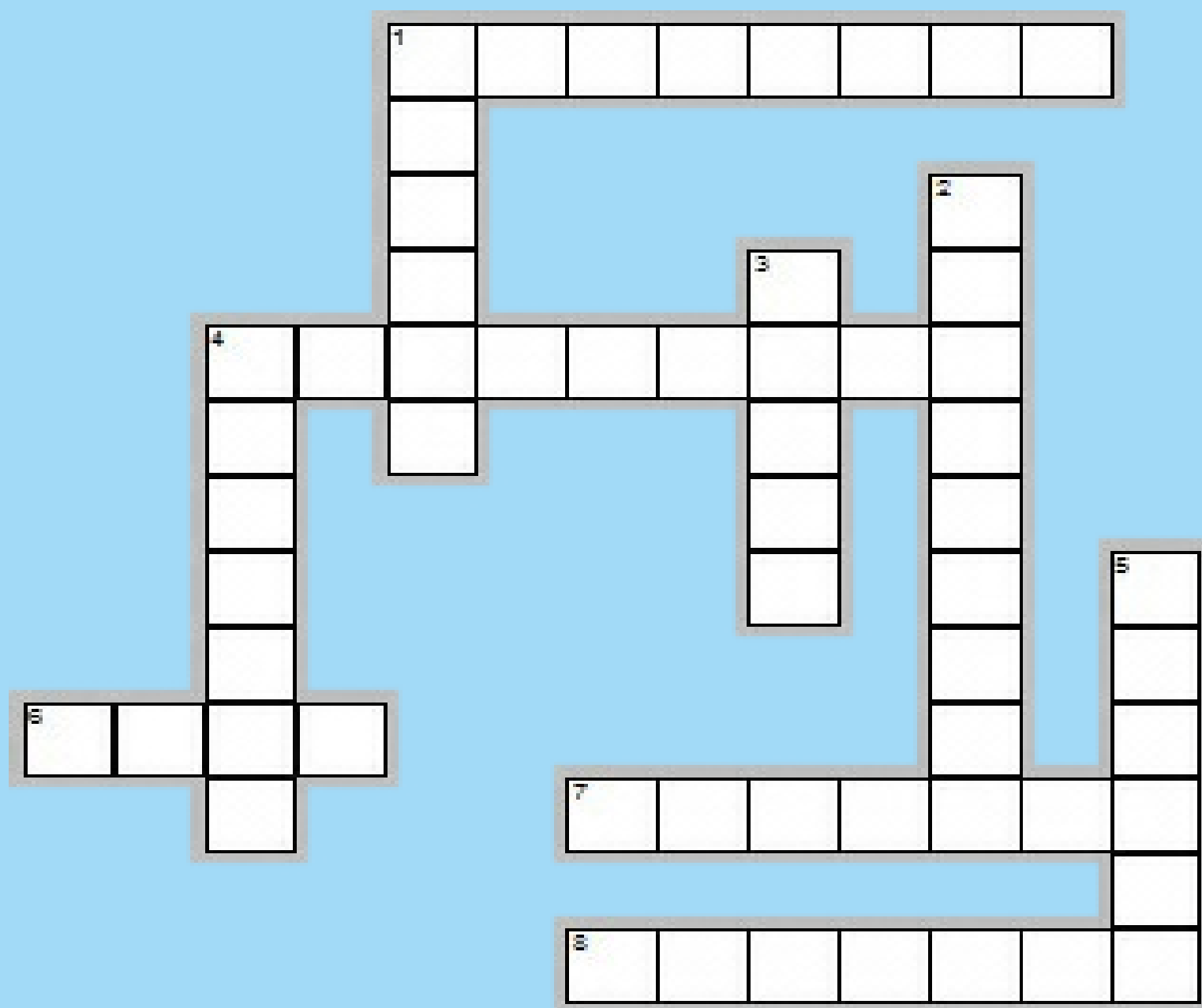


The H.A.A.'s Fall Telescope Clinic took place on November 7, 2014 at the Hamilton Spectator Auditorium.

*All photos by  
John Gauvreau*



# Astronomy Crossword by Mario Carr



## Across

1. On Dec. 21 this event occurs?
4. December's HAA speaker
6. On Christmas Eve, the Moon is above this planet in the evening sky.
7. On Dec. 13, this Meteor Shower peaks and should be a good one.
8. On Dec. 11, the Moon, Jupiter and this star form a half degree triangle.

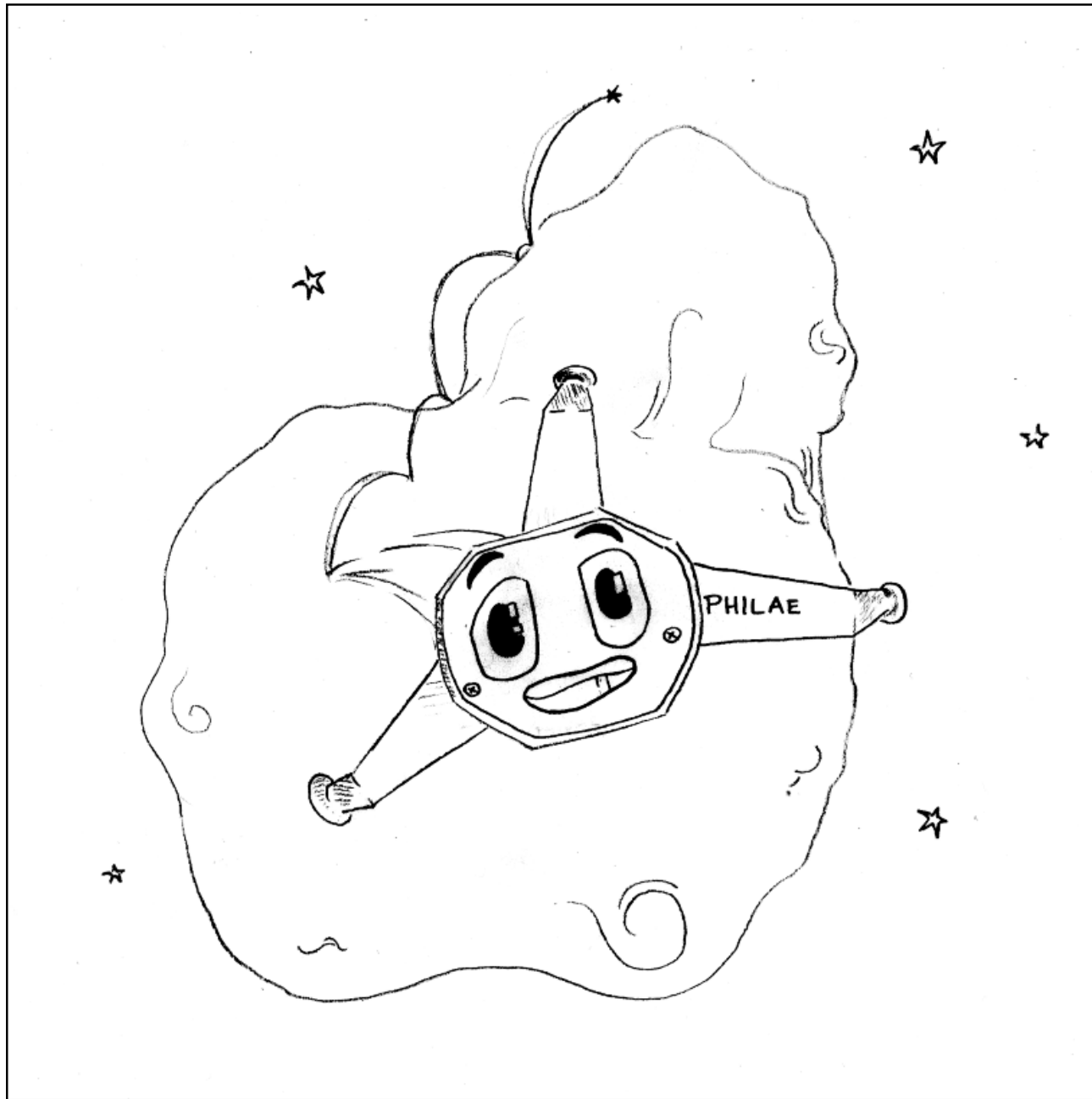
## Down

1. On Dec. 19, the Moon is two degrees from this planet low in the dawn sky.
2. On Dec. 5, the Moon is a half degree from this star in the evening sky.
3. On Dec. 22, the thin crescent Moon is near this planet low in the evening sky.
4. This planet won't appear until the end of the month below Venus.
5. This star cluster is located in Taurus?

*Answers can be found on page 16. (No peeking!)*



Philae makes the first successful landing on a comet, and the second, and the ?



"Weeeeeeeeeeeeeeeeeee!"

### **The Scope Store at Camtech**

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### Where the Heavenliest of Showers Come From

By Dr. Ethan Siegel

You might think that, so long as Earth can successfully dodge the paths of rogue asteroids and comets that hurtle our way, it's going to be smooth, unimpeded sailing in our annual orbit around the sun. But the meteor showers that illuminate the night sky periodically throughout the year not only put on spectacular shows for us, they're direct evidence that interplanetary space isn't so empty after all!

When comets (or even asteroids) enter the inner solar system, they heat up, develop tails, and experience much larger tidal forces than they usually experience. Small pieces of the original object—often multiple kilometers in diameter—break off with each pass near the sun, continuing in an *almost* identical orbit, either slightly ahead-or-behind the object's main nucleus. While both the dust and ion tails are blown well off of the main orbit, the small pieces that break off are stretched, over time, into a diffuse ellipse following the same orbit as the comet or asteroid it arose from. And each time the Earth crosses the path of that orbit, the potential for a meteor shower is there, *even after* the parent comet or asteroid is completely gone!

This relationship was first uncovered by the British astronomer John Couch Adams, who found that the Leonid dust trail must have an orbital period of 33.25 years, and that the contemporaneously discovered comet Tempel-Tuttle shared its orbit. The most famous meteor showers in the night sky all have parent bodies identified with them, including the Lyrids (comet Thatcher), the Perseids (comet Swift-Tuttle), and what promises to be the best meteor shower of 2014: the Geminids (asteroid 3200 Phaethon). With an orbit of *only* 1.4 years, the Geminids have increased in strength since they first appeared in the mid-1800s, from only 10-to-20 meteors per hour up to *more than 100* per hour at their peak today! Your best bet to catch the most is the night of December 13th, when they ought to be at maximum, before the Moon rises at about midnight.

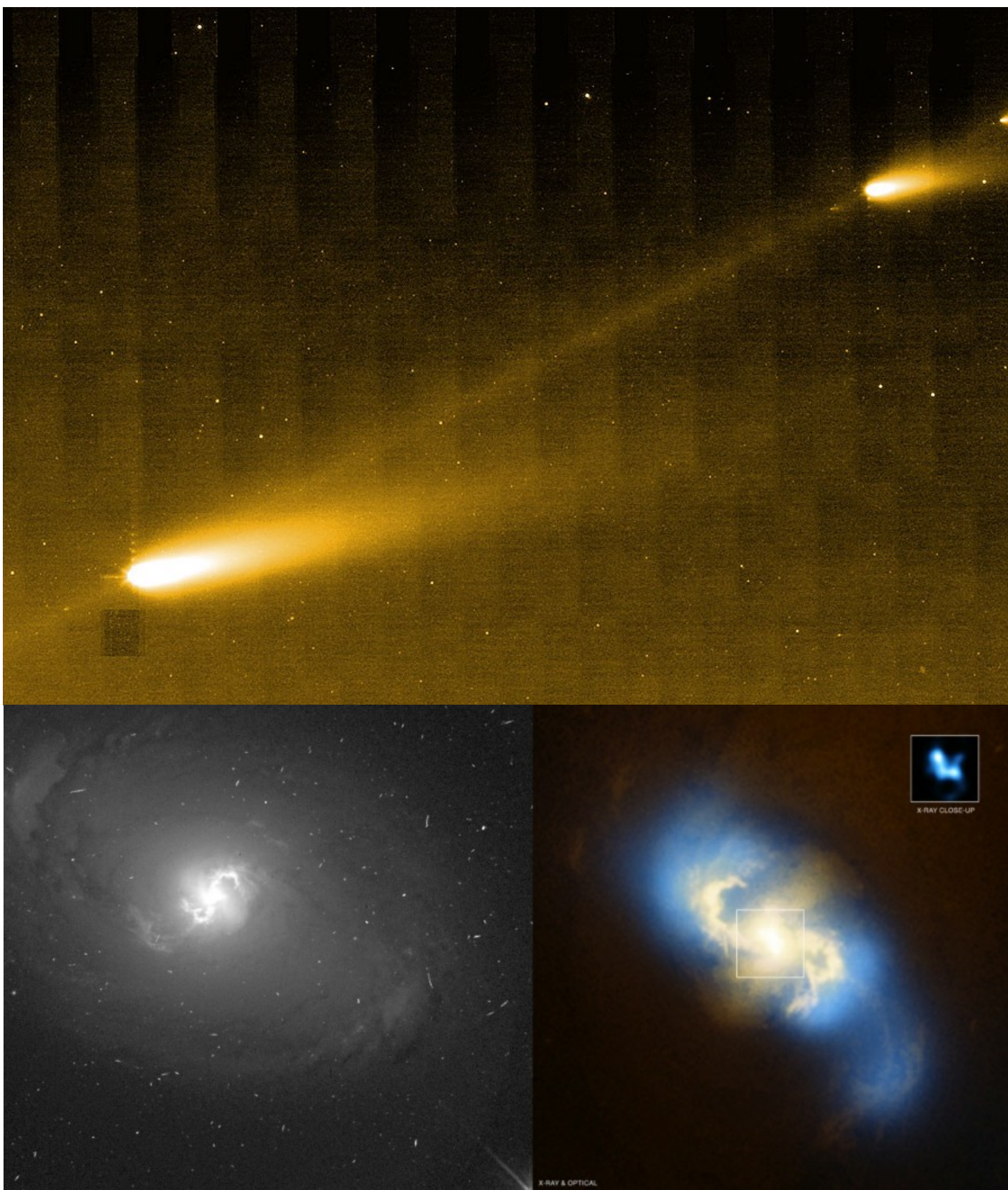
The cometary (or asteroidal) dust density is always greatest around the parent body itself, so whenever it enters the inner solar system and the Earth passes near to it, there's a chance for a **meteor storm**, where observers at dark sky sites might see *thousands* of meteors an hour! The Leonids are well known for this, having presented spectacular shows in 1833, 1866, 1966 and a longer-period storm in the years 1998-2002. No meteor storms are anticipated for the immediate future, but the heavenliest of showers will continue to delight skywatchers for all the foreseeable years to come!

(Continued on [page 14](#))

## NASA's Space Place (continued)

*What's the best way to see a meteor shower? Check out this article to find out:*  
<http://www.nasa.gov/jpl/asteroids/best-meteor-showers>.

*Kids can learn all about meteor showers at NASA's Space Place:*  
<http://spaceplace.nasa.gov/meteor-shower>.



*Image credit: NASA / JPL-Caltech / W. Reach (SSC/Caltech), of Comet 73P/Schwassman-Wachmann 3, via NASA's Spitzer Space Telescope, 2006.*



# 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 3: **Introductory Astronomy for Kids**  
(1<sup>st</sup> Wed of every month)
  - Dec 10: **Festive Skies**
  - Dec 17: **Festive Skies**

For more details, visit

[www.physics.mcmaster.ca/planetarium](http://www.physics.mcmaster.ca/planetarium)



## Treasurer's Report by Steve Germann

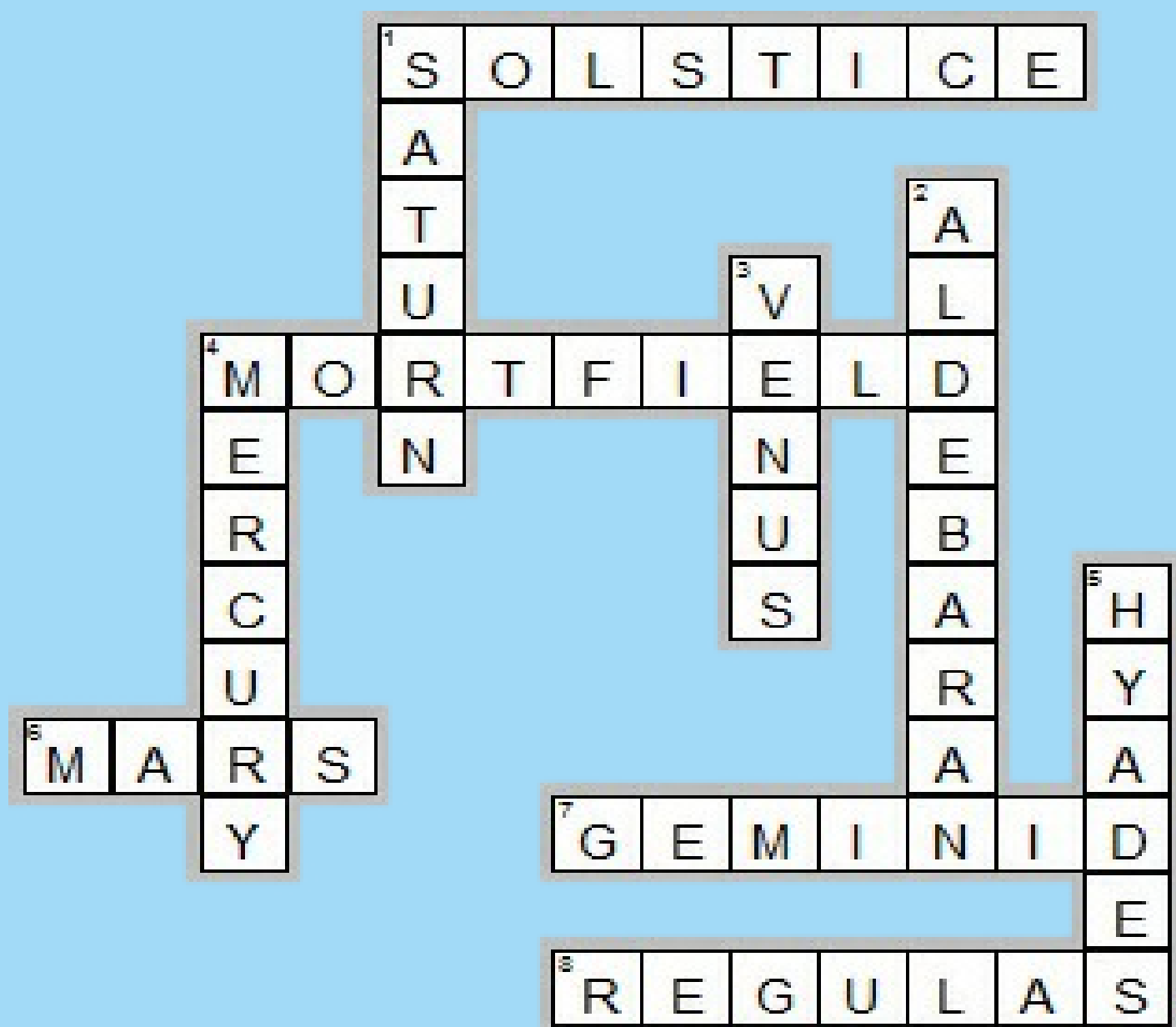
### Treasurer's report for November 2014

Opening balance:	\$5,483.04
Revenue:	\$1,774.50
Expenses:	\$829.44
Closing Balance:	\$6,428.10

Revenue included sales of calendars \$1,025, new memberships \$680, and 50/50 proceeds \$69.50.

Expenses consisted of Insurance, \$829.44.

### Answers to Astronomy Crossword on Page 11



## UPCOMING EVENTS

**December 6, 2014 - 7:30 pm** – *Cosmology Discussion Group Meeting*. Contact H.A.A. Chair for location.

**December 12, 2014 - 7:30 pm** – *General Meeting* at the Hamilton Spectator Auditorium. Our main speaker will be **Paul Mortfield**. Paul is Chair of the David Dunlap Observatory in Richmond Hill, ON, and a member of the RASC Toronto Centre. His talk will be “40 Years of Astrophotography - the Good, the Bad and the Ugly”.

**January 9, 2015 - 7:30 pm** – *General Meeting* at the Hamilton Spectator Auditorium.

### 2014-2015 Council

Chair	Jim Wamsley
Second Chair	Joe McArdle
Treasurer	Steve Germann
Webmaster	David Tym
Membership Director	Leslie Webb
Observing Director	Matthew Mannering
Education Director	John Gauvreau
Event Horizon Editor	Bob Christmas
Recorder	Ann Tekatch
Secretary	Mike Jefferson
Publicity Director	Mario Carr
Councillors at Large	Brenda Frederick Harvey Garden Kevin Salwach Bernie Venasse

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**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:**  
[editor@amateurastronomy.org](mailto:editor@amateurastronomy.org)

**Webmaster:**  
[webmaster@amateurastronomy.org](mailto:webmaster@amateurastronomy.org)

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