

Event Horizon

Volume 19, Number 3
January 2012

From The Editor

This is the most challenging time of the year for our club newsletter. The holiday season is a very busy one for families and finding time to craft an article or write a report for the Event Horizon can be difficult. We owe a bigger than normal "thank you" to all of our contributors this month.

Mike Jefferson continues his comprehensive article about solar observing in this month's issue.

Greg Emery gets 2012 off to a great start with his take on the apocalyptic Mayan calendar prediction. And Alex has a bit of fun with the 2012 HAA calendar in her Cartoon Corner.

Keith Mann beautifully summarizes our December meeting for anyone who couldn't attend.

In short, there is plenty to read and do (don't forget Mario's Astronomy Crossword!) in this month's issue!

Ann Tekatch



Chair's Report by Bob Christmas

The past month and a half or so has been a very eventful and successful period for the HAA. Our telescope clinic was a huge hit, and we had our cosmology discussion in December, as well as a couple of outreach activities with local community groups such as the Cubs and Brownies. Our 2012 HAA calendar, like last year's, is selling like gangbusters, and there are only a few left! And the HAA keeps attracting enthusiastic new members all the time.

We had John Crowdis as our main speaker for the December meeting, which was a big draw, and John's talk did not disappoint. John gave his unique perspective of how events and discoveries in astronomy influenced the monotheistic religions of Judaism, Christianity and Islam over the last couple of thousand years. John's talk was warmly and enthusiastically received by the audience, and elicited many questions from the attendees. Thanks go to John for his fascinating and engaging presentation. The HAA's weekly telescope making workshops are taking off like a rocket, and I wish to thank Ann Tekatch and Everett Cairns for being the driving forces behind these sessions. *(Continued on [page 2](#))*

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Chair's Report (continued)

Well folks, it's now January, it's a brand new year, and there's lots of things happening in the upcoming year, the Venus Transit on June 5, 2012, and the Perseids meteor shower in August, just to name a couple.

The new council has been in place for a couple of months now, and we are actively pursuing new speakers for our monthly meetings for the upcoming year, as well as planning new activities.

One of these upcoming activities will be the return of a favourite from a couple of years ago, a special "live" presentation of The Sky This Season, which our Observing Director, John Gauvreau, will be presenting under the actual sky later this month. This will be open to all active HAA members.

Another activity being planned for our members will be an exclusive HAA trip to McMaster University's Origins Institute's McCallion Planetarium or 3D Theatre. We hope to have such a show some time in or around March.

If you are not a member of the HAA and you wish to partake in these and other member activities, you can become a member for as little as \$25 for the upcoming membership year. So don't miss out!

Also, this month, the HAA will begin taking orders from our members for special-edition HAA full-zip fleece sweaters. A couple of these fleeces were modeled at our December meeting, and they look snazzy and sharp!

In closing, I want to thank all of you who are members of the HAA, including all of you who volunteer, observe, educate, participate on council, and do what you do to make astronomy such a fabulous and rewarding hobby, and to make the HAA such a great astronomy club in the Hamilton area. Happy New Year, and may 2012 be a memorable one.

Clear Skies!

Bob Christmas



December Treasurer's Report by Steve Germann

(Unaudited)

Opening Balance:	\$6987.77
Expenses:	\$2559.41
Revenue:	\$2126.00

As of the end of 2011, our club account stands at \$6554.36

Notes

1. Major revenue for the month: Memberships \$365 , 50/50 \$41 , and Calendar Sales \$1720.
2. Major expenses for the month: Speaker dinner after meeting \$27.01, Council dinner meeting expenses \$75, Calendar printing, \$1695, Club annual Insurance cost, \$739.80, blank membership cards \$22.60
3. A correction of \$138.40 was applied compared to the previous published closing balance, due to a mis-transcription of the Nov 1 opening balance in November's Treasurer's Report, which should have been printed higher, as: Opening Balance \$5975.90 instead of \$5837.50, and Closing Balance \$6987.77 instead of \$6849.37

Masthead Photo Credit: The Tekatch backyard SkyShed observatory during the winter of 2011. Photo taken by Ann Tekatch with Canon T1i dslr and 8-16mm Sigma zoom lens. Photo was taken at f/11, 1/125 sec. at ISO 100. Let's hope this winter doesn't involve any shovelling!



Through The Looking Glass by Greg Emery

Happy New Year to all! Hopefully the holiday season passed by without too much turmoil or grief. It has been cloudy fairly steadily since the twentieth of December, which is a sure sign that there were more than a few astronomical gifts under the tree or around the Menorah. I had the option of ordering a couple of things for myself (gifts from the family to me) but as you will see below, I felt it best to go another year or two without the UHC filter and OIII filter.

In much of the world we celebrate the New Year around January 1. I am under the personal belief that the start of the year, corresponding to January 1st, is done solely to give people a reason to drink during the long, dark, cold winter night. The Chinese New Year is on January 23, 2012 this year. The upcoming New Year is the Year of the Dragon according to the Chinese cycle of years. I am a Dragon, being born in 1964. Anyone born in 1952, 1964, 1976, 1988, 2000 is also a Dragon.

The Mayan culture, most notably, developed a calendar system that predicts that the end of time is December 21, 2012. Wow, just think of it - you can run up the credit cards next fall and not worry about paying them off. Please remember though - spending money on Christmas gifts may not be a good investment, with the 25th of the month occurring after the 21st. It probably would be a good time for me to point out that I am being somewhat facetious, that while the Mayan calendar does predict that the Equinox in December 2012 is

the end of time, it does not predict that it is the end of all time. A new time or age will follow, so the credit card bills will get to you in the mail and the collection agencies will eventually find you.

The Mayan's devised a calendar that survives or exists for roughly 52 years. It is believed that the 52-year limit is done as this would have represented the typical life span of an individual. This has also been referred to as a generational calendar - each generation has their own calendar, and they most likely wouldn't need a second calendar. This 52-year calendar is referred to as the Calendar Round. It comprises 52 Haab (solar years) or about 73 Tzolk'in.

The Tzolk'in is a 260 day period that is derived from the combination of 13 days signs and a total of twenty named days. Each Tzolk'in has one of every possible combination of days signs and named days. There would be about 73 of these cycles in a 52-year period or Calendar Round. What is interesting is the reasoning for a 260 day time segment.

One theory relates the importance of both the numbers 13 and 20 in the Mayan culture. The number 20, specifically, has a large role in the Mayan timekeeping structure. What seems more likely to me is the theory that the number 260 is related to the human gestation period. The typical average human gestation is 280 days (measured from the last menstrual period). If (Continued on [page 4](#)) this is measured from the first missed period we get a number closer to 252. Midwives may have contributed this knowledge to the founders of the calendar - or required the calendar to predict a date 260 days from any given time (birth date prediction).

A third hypothesis for this is astronomical in nature and therefore most interesting to us. The latitude of the Mayan Empire is of the order to 10 to 15 °N. The sun would pass through the Zenith twice a year, with roughly 260 days between passages. The Mayans would still need to measure longer time periods. By using a number system that is loosely based on the number 20 the 360 day year (*Haab* or *Tun*) consists of 18 months (*Uinals*) each of 20 days. A group of 20 *Tuns* is a *Katun*. A group of 20 *Katun* is a *Baktun*.



At last, the mystery of the Mayan calendar revealed.

Through The Looking Glass (continued)

Time Unit	Equivalence	Gregorian/Julian Days	Gregorian Years
Kin	1	1	0.00274
Uinal	20 kin	20	0.0548
Tun	18 Uinal	360	0.986
Katun	20 Tun	7200	19.71
Baktun	20 Katun	144 000	394.3
Long Count	13 Baktun	1 872 000	5125.3

To put this calendar in perspective, two or three long counts are enough to track back to the beginning of recorded history. From an astronomical point of view 5 long counts is essentially the time required for the earth's axis to complete one full precession. (Using my numbers above, we see that the total of 5 long counts + 1 baktun-1katun-1 tun is equal to 26000.1 years. The value for the precession of the earth's axis is 26000).

Regardless of the whys or wherefores, the ability and technical competence behind the Mayan Calendar is pretty cool. Your personal beliefs aside, the Mayans simply measured a set unit of time - they were not predicting a cataclysm or devastation. Planet X will not be making a near pass of the planet Earth causing irreparable damage to the environment. The Four Riders of the Apocalypse will not be charging through the sky. There will be a

December 22 in 2012; it will be in some respects, the first beautiful day of a new time.

I am not sure if I will be with you on that fateful day, however. I am in the process of applying for a sabbatical and am hoping that I will be gone for about 1 year. I can honestly say that the stars are aligning for me and that I feel everything is pointing in the right direction for me. If 2012 is the year of the Dragon, and December 21, 2012 is the start of a new time, then what better place for this Dragon to be than China! Although from the cities I will be living in, I don't think I will be doing too much observing.

And that is a very long-winded version of why I didn't buy myself the UHC and OIII filters.



FOR SALE

8 inch Meade SCT telescope has built in setting circles and clock drive, HD wooden tripod, red dot finder, choice of 8-12-15 inch dew shield, includes wooden storage/carrying box and dust cover.
\$ 600 --

**Please contact: Harvey Garden
 (905) 692-4595**

Club Asset Sale



TELESCOPE MIRROR SET FOR SALE

17.5" f/4.5 primary mirror and matching secondary mirror for sale by the club. Proceeds of this sale will be used to assist with the loaner scope program and other club activities.

Asking \$750. (Large mirror sets such as this routinely sell for \$900 and more - check out Canada Wide Buy and Sell or Astromart.)

Contact Jim Wamsley at 905-627-4323.



TRIPOD FOR SALE

This sturdy, aluminum telescope tripod was donated to the club and is being made available for the bargain price of \$60. The tripod could be used to support a binocular mount similar to the parallelogram mount built by Jim Wamsley.

Contact Jim Wamsley at 905-627-4323.

Proceeds from the sale will be used to support the club's loaner scope program.





Observing the Sun, Part Two by Mike Jefferson

SPECTROSCOPY

Another solar study that can be attempted, is spectroscopy of the sun's light. Here is also an area where one can get into trouble if the proper precautions are not taken! Like any other direct solar investigation, proper filtering would be a MUST. However, that would be counterproductive to the study of spectroscopy, where one does not wish to subtend the light available. For this is the study of the light itself! The fallback for this is, therefore, to carry it out indirectly. At a professional level, this recourse would be inadmissible. Yet, at the amateur level, it is really the only safe method. Reflected sunlight is the solution. So how is this done? One simply uses the planets that are available in the night sky at any given time. At amateur 'resolution' levels the contamination of planetary atmospheres and surface minerals is minuscule. It is possible to notice the minor differences from planet to planet, but for very basic solar study, it makes very little difference. The bigger differences between planets can be seen, but the absorption and emission lines of various elements in the sun's composition can also be noticed.

How is this carried out? One method is to mount a Rainbow Optics Star Spectroscope, Baader Planetarium or other similar instrument to the front of a suitable camera lens and let the target planet drift through the field of view of your tripod-mounted camera. Your shutter speed is going to be on 'B' so that there is time for a suitable spectral image to form on the film or the chip. This is the simplest and the most direct method for our purposes here. I will not try to explain all of the details of this activity because that is not my purpose in this essay. However, I can be contacted through HAA or approached at general meetings about the details of this kind of study, if it so interests the reader.

This kind of project can lead to books on the readings of spectral lines, Grotrian diagrams, their significance and some understanding of the atomic structure and abundances of the elements found in the sun. There are also many brighter stars in our night sky whose spectra can be taken if one wishes to expand this study into the stellar realms.

HYDROGEN ALPHA (Ha) AND CALCIUM K (CaK)

The next two areas of solar study, like white light, offer the attraction of providing visual images for the observer. Even given the fact that both of them are on the fringe of visual perception, their images can be seen with the naked eye, film or electronic cameras, using the appropriate telescope or filter.

CaK is the solar calcium line in the sun's spectrum and is getting very close to the ultraviolet. Consequently, this part of the sun's output, while quite easily seen by imaging cameras, will appear very dark to visual observers. Younger people, with their better eyesight, will have less difficulty than seniors will. CaK observing is available from most of the major manufacturers of solar equipment, but it has not yet proven as popular as Ha observing.

Ha is in the red part of the spectrum, just below the infrared, and is much more visible than CaK. It has to be the last word in solar studies of all types. However, whether it be Ha, CaK or white light, these types of solar studies are traditionally more popular than other types of research (radio, spectral, internet, etc.) because most amateurs are typically visually-oriented. In other words, their work, whether visual or imaging, becomes a study in aesthetics rather than a research project, and this tends to disrupt the very valuable contributions that they could be making to professional data collection and analysis. (As a corollary, this author found it very interesting that our 2 BASEF Science Fair winners of the Jim Winger Prize for 2011 had done some excellent research on the internet using Sloan Digital Sky Survey data. Just for fun, I asked them if they set up and looked through any backyard equipment, knowing in advance what the answer was going to be! And they answered that that would not be appropriate to the kind of work they were involved in. Many of today's science-oriented kids really do take their astronomy very seriously, but they spend little time involved with aesthetic exercises - even though those exercises do have their own substantial benefits for us.)

(Continued on [page 7](#))

Observing the Sun, Part Two (continued)

Before one even begins Ha, CaK or white light observations, here are some very important rules from Lunt Solar Systems. I mentioned some of these in the section on white light solar observing. However, at the risk of sounding like a broken record, I will review them again, as stated by Lunt:

“There are inherent dangers when looking at the sun through any instrument, whether at the Ha-line, white light or the CaK line. Lunt Solar Systems has taken your safety very seriously in the design of their systems. With safety being the highest priority they ask that you read and understand the operation of your telescope of filter system prior to use. NEVER attempt to disassemble the system. Do NOT use your system

if it is in some way compromised due to mishandling or damage. Please contact the factory with ANY questions or concerns regarding the safe use of your instrument.

Never look at the sun with your naked eye or with a telescope that is not specifically designed to do so. Permanent and irreversible eye damage may result.

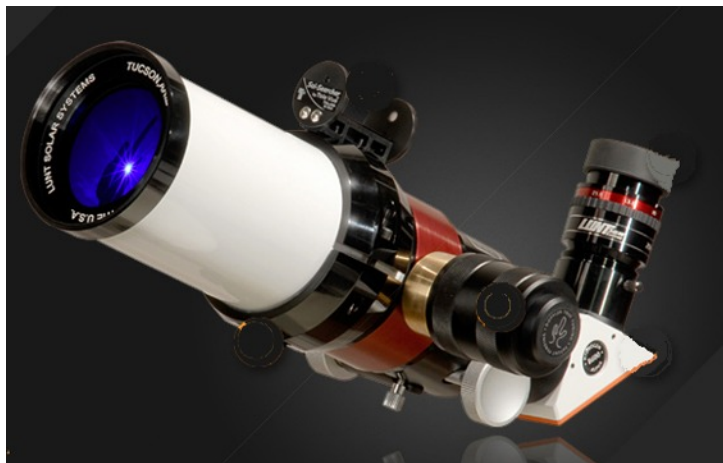
Check that all filters are installed correctly and are free of any surface contamination that may compromise performance and/or potentially damage the surface of the optic when exposed to the sun - ie. fingerprints. A dropped or damaged instrument should be immediately returned to the factory for tests and/or repairs. Perform a routine safety check before each observing session.

Never leave the solar telescope unsupervised while pointed at the sun. People who are not familiar with the correct operating procedures of the system may inadvertently replace the sun-block diagonal or remove the filter itself not being aware of the integrated safety

features of each.

The Lunt Solar (or any other manufacturer!) filter/telescopes (Ha or CaK) are NOT interchangeable with competitor products.

Always be aware that you are viewing in direct sunlight. Take the necessary precautions to protect yourself from sunburn and heat exposure.”



Lunt's new solar telescope. A superb instrument for observing the Sun.

Since we are now dealing with the area that most of us see as the pinnacle of 'solar observing', what do you get to accomplish it? While there are numerous models of Ha telescopes and filters available, this author will not be doing a presentation of all of them here. A good place to begin, if one does not want lay out a great

deal money is the Meade Coronado Personal Solar Telescope (or PST), either single or double-stacked (i.e. one or two etalons [filters]). These do very well for casual work or public presentations. He chose to go into this study at a level that was a few notches up from the PST and was advised that the best value for money spent would be the Lunt system of solar instruments. He wanted it small for transportation purposes but a little larger than the PST.

Lunt started the Coronado line some years ago, but sold it off to Meade recently and opened the new line produced under its own name.

You can get into this activity by using an Ha filter (etalon) on a standard white light telescope and many amateurs follow this path. It does quite well. However, the dedicated solar telescope is really the best - use each telescope in the area for which it was designed. The author's configuration is a Lunt Solar Systems Imaging Package or LS60T50FHaPT (Lunt Solar 60 Telescope, 50 Filter Hydrogen Alpha Pressure Tuned) - how is that for a mouthful? This name

(Continued on [page 8](#))

Observing the Sun, Part Two (continued)

simply means that it is a double-stacked etalon telescope for use on the sun only. Representing a fair amount of money, it is not everybody's solar telescope. That is why Coronado PST's are very popular.

A description of it would simply say that it is a 60-mm. telescope for visual work with a 50 mm. filter that can be screwed on the front end for imaging or visual endeavours. With either one or two filters, this is one amazing instrument! The 50 mm. front-end filter is tuned using its small brass wheel tuner. The main 60 mm. telescope can be had with a small brass wheel tuner, as well, if it is without the available 50 mm. front-end filter. However, when it is built as a dual filter system, the main telescope tuner is an air pressure, black cylinder on the side of the main optical tube. The pressure is only a few PSI and, as Lunt reassures, there is NO danger of explosion! Air pressure changes the refractive index inside the optical tube and this, along with the brass tuner on the front-end etalon allows for the viewing and imaging of the finest solar detail. With the 50 mm. on the main telescope the two etalons are capable of resolving <0.55 Angstroms - absolutely amazing for a 50-60 mm. backyard instrument! The safety figure in all of this comes in the diagonal - called a blocking filter (B) and it can be 600, 1200 or 1800. Lunt recommends a 600 or 1200 for the Solar Systems Package. A 600 is normally used for the 60 mm. single-stacked LS60THaPT for visual work and the 1200 is recommended for the double-stacked LS60T50FHaPT for both visual and photographic work. The 1800 is usually recommended for their larger 4" and bigger systems. The 1800 would probably allow in too little light for a 60 mm. instrument, because it is really intended for larger aperture equipment. Any advice or contact that the reader is seeking can be found on the Lunt website - www.luntsolarsystems.com.

The author's telescope came earlier this year but saw first light at Starfest 2011 in August. It was set up near the marquee of the company that procured his telescope for him. It was mounted on a Zeiss 1B equatorial mount (capable of supporting 35+ pounds of equipment, far more than adequate for this job and capable of carrying one of their heavier refractors - better

too much than too little!) and a heavy-duty Zeiss tripod. Everyone who took a look through it was thrilled with the details, resolution and sharpness in the prominences, filaments, spicules, plage, flares and chromosphere - all the features that are seen with a hydrogen alpha telescope or filter. In fact, he was able to secure 2 sales of this instrument for his procurer. Was he rewarded with one cent of commission? Not a chance! However, this is solar viewing at its finest. It does not get any better than this! So captivated were the Tekatches, at Starfest, with this Lunt instrument that they have gone to KW Telescope to purchase their own. I'm sure they will have more to say about it in the coming times. *(And we hope to have photos, too! - Ed.)*

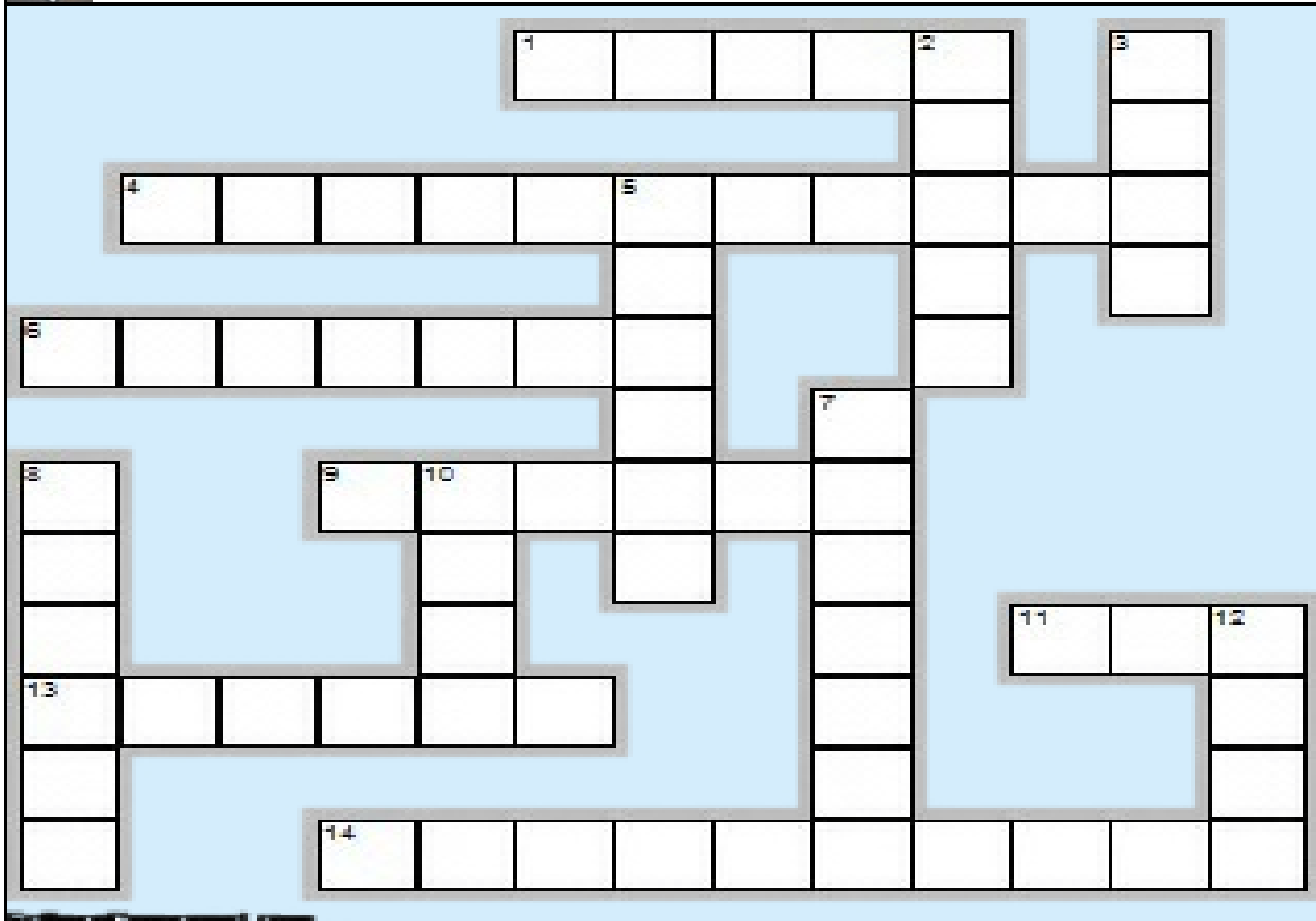
These instruments are quite expensive, but that should not deter you from acquiring an Ha instrument that is less costly. They are out there! But, if you do decide to purchase a Lunt, your best bet for sales and service would be KW Telescope in Kitchener, ON.

CONCLUSION

Before the author attempted this overview of solar study, he was told that this would be the first time that solar work had been covered in Event Horizon. However, it should be pointed out that he was given his inspiration to study the sun by our former Chair and Founder of HAA, Dr. Doug Welch. While Doug did not concentrate specifically on the sun as an object, as I, too, have not, he detailed in a number of Event Horizon articles of some years back how to construct a long wave radio apparatus for detecting sudden ionospheric disturbances. It was that project, as well as the work that he and Anthony Tekatch did in the development of the Sky Quality Meter that inspired his probings into this fascinating area of astronomy. And he hopes that he has provided you some encouragement to carry on in some part of the study of this most changing - as well as constant - celestial body - our star, the Sun.



Astronomy Crossword by Mario Carr



Across

1. January's brightest planet
4. January's meteor shower
6. January's second brightest planet
9. On January 2, the moon is at
11. On January 31, 1961 this chimp blasted into space
13. Rises in the east after midnight.
14. On January 4 the Earth is at

Down

2. On January 16 the last quarter moon and Saturn form a triangle in the predawn sky with
3. During this month in the early evening Venus can be seen in the
5. This constellation is high in the sky this month
7. On January 17, the moon is at
8. As the month ends Venus and Jupiter move
10. On January 26 the crescent moon and Jupiter
12. On January 2, Jupiter pairs with the



December 2011 Meeting Summary by Keith Mann

- HAA Chair **Bob Christmas** welcomed members and guests to the meeting at 7:30PM and presented some recent news highlights and announcements:
 - The confirmation that Kepler 22-B is a potentially habitable planet.
 - The launch of the Mars Curiosity rover
 - The upcoming (December 10th) meeting of the Cosmology Group
 - Polar Fleece jackets embroidered with the HAA logo will be available for purchase in January
- Event Horizon editor **Ann Tekatch** updated the club on the progress of the Telescope-Making Group
- Secretary **Jim Wamsley** thanked the membership for its continued, generous, and much-appreciated donations to the food bank; Jim also announced that a pair of 10x50 binoculars had been donated to the club by Les Webb and are now available as part of the Loaner 'Scope program.
- The main speaker for the evening, **John Crowdis**, discussed "The Influence of Astronomy on Ancient Religious Development."
- Observing Director **John Gauvreau** detailed upcoming celestial events, including the Geminids and a great series of Jovian moon transits, then told us about several great clusters to observe this time of year, including the double cluster in Perseus, the Pleiades, the Hyades, and the Alpha Persei Association.

Snow dusted the ground as HAA members arrived for the final meeting of 2011. Inside, in the minutes before the meeting got underway, the crowd buzzed with friendly chatter. As the last few calendar sales and membership renewals were completed, our Chair, Bob Christmas, opened the meeting. Bob began the evening with mention of two exciting items of astronomy news: the confirmation that the orbit of Kepler 22-B was indeed within the habitable zone of its star, and the launch of NASA's next Mars rover, Curiosity.

Other HAA council members had news of their own. Event Horizon editor Ann Tekatch told us that the Telescope-Making Group was making great progress and eagerly discussing their designs. Secretary Jim Wamsley passed along the sincere thanks of the food bank for the generous contributions of our members, and announced that an excellent pair of Pentax 10x50 binoculars had been kindly donated to the club by Les Webb and are now available under our Loaner 'Scope program.

Bob then introduced the evening's main speaker, John Crowdis. John provided an interesting historical lesson on "The Influence of Astronomy on Ancient Religious Development." John detailed the interplay of religious thought and astronomical discovery in the Fertile Crescent from the time of the earliest Mesopotamian civilizations through the rise of Islam.



John Crowdis at the December general meeting. Photo courtesy of Joe McArdle.

After the break, and following the drawing of the door prizes and the 50/50 by Membership Director Matthew Mannering and Alex Tekatch, Observing Director John Gauvreau launched into the December edition of "The Sky This Month".

John led off by sharing with the club the first astrophotographs from one of our newer club members, including a couple of the Moon and a remarkable Solar shot containing fifteen sunspots. On a related note, Kevin Salwach responded to John's call for observing notes from the membership at large by reporting his viewing of a naked eye sunspot.

John echoed Bob's earlier remarks about Kepler 22-B and the Curiosity (Continued on [page 11](#))

December 2011 Meeting Summary (continued)

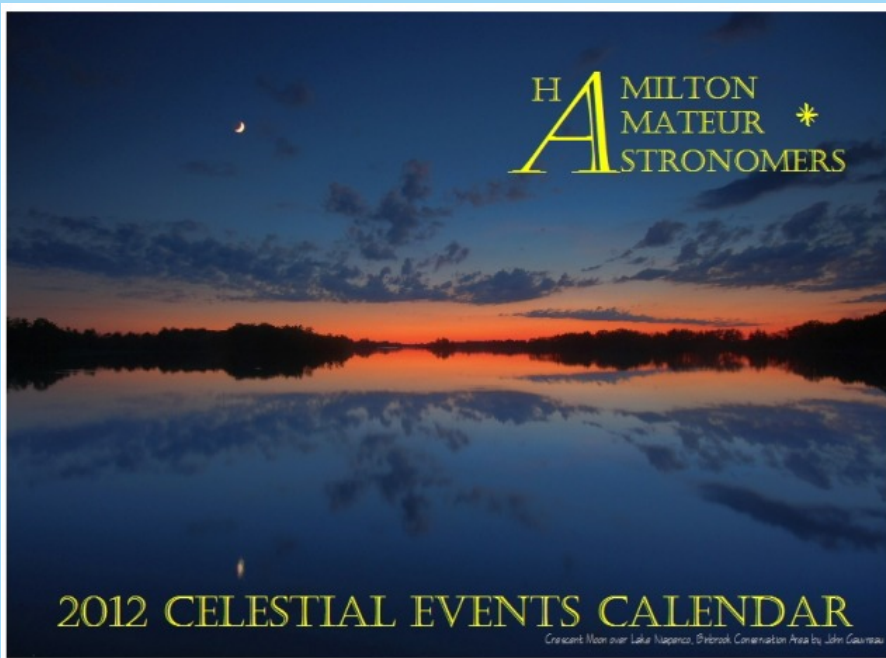
launch, noting that the Mars rovers keep getting bigger and more complex. John went on to discuss the Geminids, describing them as “the best or second-best of the year,” but remarking that, unfortunately, their peak this year, on the early morning of December 14th, is coincident with a bright moon (although, he pointed out that there would still be lots of meteors -- and no moon -- that evening). Other events John described included a great series of moon and shadow transits of Jupiter coming up on December 27th, a conjunction of the Moon and Jupiter on January 2nd, and the ongoing appearance of Venus low in the west at sunset. John proceeded to discuss some famous clusters, including the Alpha Persei Association, the Hyades, the Pleiades, and the double cluster in Perseus - with instructions on finding the last of these by using Cassiopeia as a guide. He wrapped up his talk with the story of NGC 1514, telling us how Herschel concluded that this planetary nebula is result of gas around the central star, and is not actually composed of stars.

Bob briefly retook the podium to close the meeting and invite all present to the customary post-meeting chat at Crabby Joe's, and we all headed out back into the snow.



Our observing director, John Gauvreau, employing his modelling abilities to show off the new Hamilton Amateur Astronomer Arctic fleece jacket. Photo courtesy of Joe McArdle.

2012 HAA Calendars For Sale



We still have a few 2012 calendars remaining. These beautiful calendars make great Christmas gifts!!

Price is \$15 each with volume discounts available to members. See Steve Germann (treasurer@amateurastronomy.org) or Jim Wamsley (secretary@amateurastronomy.org) to get your copies soon.



Sky Calendar

January 1 - First Quarter Moon

January 2 - Moon 4 degrees above Jupiter

January 3 - Europa transits Jupiter from 10:50pm to 1:15am

Ganymede's shadow on Jupiter from 1:00am (Jan. 4) to Jupiter set (low in west)

January 4 - Earth at Perihelion (closest to Sun) 147 million kilometers

January 9 - Full Wolf Moon

January 13 - See the brightest and the dimmest planet; Venus and Neptune only 1 degree apart

January 14 - Use Jupiter to find Comet Levy, which is only 6 degrees above the comet

January 20 - Comet Levy closest to Earth

January 23 - New Moon

January 25 and 26 - Moon and Venus paired in western sky

January 29 and 30 - First Quarter Moon only 7 degrees from Jupiter

Triangulum

Triangulum is one of the smallest and least conspicuous constellations in the sky, but don't let that stop you from adding it to your observing list. If for no other reason, it's very easy to find. As I write in the early in the evening of one of the final days of 2011, Triangulum is almost directly overhead. Wedged (appropriately for a triangle) in between the constellations of Andromeda and Perseus, it seems a mere footnote beneath these greater apparitions in the sky. It contains no first or second magnitude stars, and occupies a mere 132 square degrees (together, Andromeda and Perseus cover 1,337 square degrees) and yet it holds one of the most alluring Messier objects, a stunning double star and a handful of other deep sky objects.

Triangulum is one of those constellations that shares part of its name with a southern counterpart. Triangulum Australe is a relatively new constellation, first mentioned in the early 16th century and appearing in maps about a hundred years later. Our northern Triangulum is the original though, and in fact is one of Ptolemy's original set of 48 constellations that we still use today (although we have added others (mostly in the southern hemi-

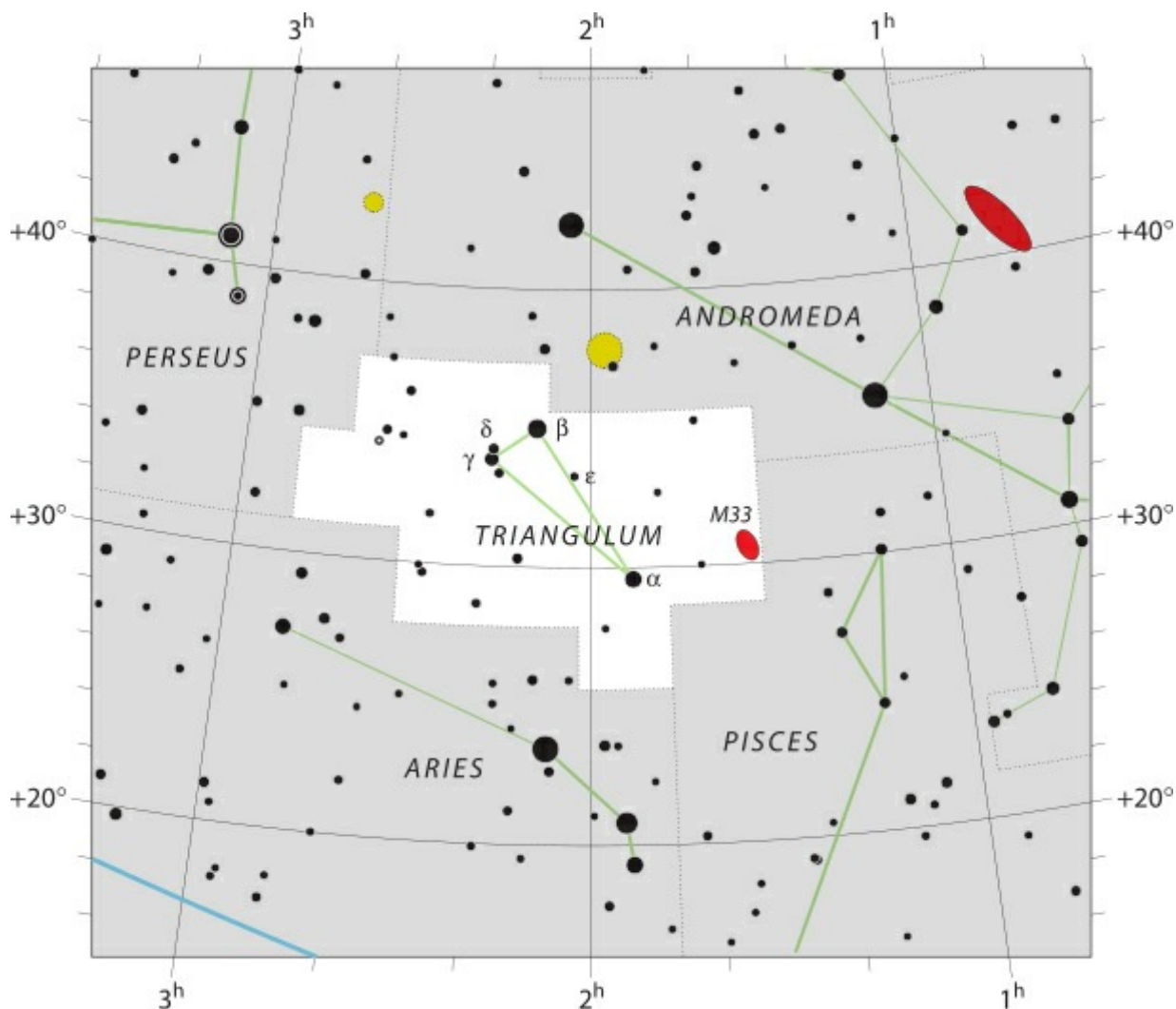
sphere) to bring the total number of recognized modern constellations to 88). Although today we look to Ptolemy as a great cataloguer of stars, much of what he recorded was ancient in his time. Triangulum is one of the constellations recorded by the Babylonians over 1000 years before Ptolemy (about 1000BC). The constellation's triangular shape gives it its name to and represented the letter 'delta' to the Greeks, as well as a river delta which is the shape of, well, the letter 'delta' which is the shape of a triangle. The constellations became associated with the Nile delta to the Egyptians who called it Nili Domus. To the Romans the constellation was Sicilia, named for the island of Sicily, largest island in the Mediterranean and if you look at a map you will see why this island just off the coast of Italy has ties to the constellation Triangulum. Finally, the name of the brightest star in the constellation, Beta Triangulum is Metallah, which is Arabic for 'triangle'.

It is not this brightest star that draws our attention though. Just behind the base of the triangle, on the way to Perseus, lies Iota Triangulum, a 5th magnitude star that is worth a look through the telescope. This true binary contains two stars separated by only 4" (arc seconds), meaning that it won't be an easy split, but (Continued on [page 13](#))

The Sky This Month (continued)

it shouldn't be impossible for even a small scope. One star is a nice warm yellow and the second is blue, green or gray, depending on whose observation you trust. The Great double star observer William H. Smyth called them "topaz yellow and green". Judge for yourself and let me know what colours they look to you.

But now we come to that for which this constellation is best known. There lies just one Messier object in this diminutive constellation, but oh what an object! M33 is the great Triangulum Galaxy, also known as the Pinwheel, and is one of the closest to the Milky Way and one of the largest in the sky. At over a



full degree wide it is best seen through binoculars or a wide field eyepiece, but it is still a challenge to see, because this galaxy is almost face-on to us. This means that, although large, its light is spread out and thin. It takes a very clear night and a dark sky to get the most out of this spiral galaxy, but under good conditions you can see it with the unaided eye. I've done it on more than one occasion and if you can do it too, you will be looking out 3 million light years into space, making it perhaps the most distant object you can see with just your eye (next time some unknowing person admires your telescope and asks "How far can it see?" feel free to boast a little and tell them that it can see distant galaxies that are hundreds of millions of light years away, but maybe best not to deflate their bubble by telling them that they can still see 3 million light years all on their own!). M33 is less than 15 degrees away from M31, the Andromeda Galaxy, and the make a fine pair to contrast. M33 lacks the bright core that Andromeda has and is so much more tenuous, but under sparkling clear and dark skies can still (Continued on [page 14](#))

The Sky This Month (continued)



*M33 -The Triangulum or Pinwheel Galaxy.
Photo courtesy of Bob Christmas.*

show mottling and knots of nebulosity in its spiral arms. Some carry their own designation, and NGC 604 is the most conspicuous. It may look like a small star in front of the galaxy, but keep increasing magnification until it shows itself as the soft patch of nebulosity that it is. The two galaxies, M33 and M31, are indeed close to each other in space, and at less than half a million light years apart, each must have a spectacular view of the other.

For a challenging deep sky object in Triangulum, try the edge-on galaxy NGC 672. It is 10th magnitude and only 6 arc minutes across, so medium to large aperture and high magnification is called for. The successful observer though is rewarded with an elongated diffusion of light that at 26 million light years is almost 10 times more distant than the Pinwheel.

For such a small constellation, Triangulum is rich in history, star-lore and observing targets. Don't overlook it next time you're out observing.

Under the Stars

The New Year is upon us and 2012 promises to be a very exciting year for the astronomical observer. As the year opens we have the two brightest objects in the sky, Venus and Jupiter, prominent in the evening (okay, the two brightest objects in the sky are the sun and the moon, but I mean other than that!). Jupiter has been wonderful for many months now and we still have a couple more months to enjoy this giant planet (it's grand finale comes in March with a close conjunction with Venus). And Venus is just beginning its show for this year. Many of you have undoubtedly spotted this brilliant evening star low in the west after sunset. I already find it eye-catching and unmistakable. But of course, the best is yet to come. Venus will climb higher and higher in the sky over the next few months, peaking in altitude in April (when it passes directly through the Pleiades!) before plummeting into the western horizon for its greatly anticipated transit of the sun. In June we will have a chance to experience one of the rarest of astronomical observations as Venus passes directly in front of the Sun. There won't be another chance in our lifetimes to see this, so start planning now!

Mars will also be coming to opposition this spring and the few months of late spring and early summer will provide the best views of Mars that we've had for years.

As summer comes upon us we can truly look forward to the Perseid Meteor Shower this year. If you attended the HAA public Perseid Night at Binbrook Conservation Area last summer, then you know that even though there was a bright and nearly full moon, there were still about 800 people that came out to look for meteors. This year though, is the one we've been waiting for; the moon will be almost new and we will have a dark sky for the meteor shower. Throw in a daylight occultation of Venus by the Moon (in August) and a couple of wonderful planetary conjunctions and you've got a year of great observing.

For now though, we have the January sky above us. Certainly in my mind, January seems the coldest month, promising those bitter winds, crunchy snows and thoughts that no matter how warm you dress, it's never enough when you're out at the telescope (I used to tell my college students, before heading off on a winter observing field trip, to wear everything you own; you can always

(Continued on [page 15](#))

The Sky This Month (continued)

take layers off if you're too warm. They never did.). And that, of course, is the key to enjoyable winter observing; be prepared! Wear many layers, with a variety of fabrics that will handle both moisture and cold. It's a good idea to apply this thinking to your hands and feet as well. Multiple layers of socks inside your boots can do wonders, and wearing both a light glove (that can manipulate telescope focusers and hand controllers) and a heavier outer mitt over top of the lighter glove (for extra warmth) is certainly better than just one layer of mitt or glove. Chemical hand warmers are popular (and can be used to heat optics if they frost over, but they can get very hot, so use carefully). And of course remember that being comfortable means not just fighting the cold, but hunger and fatigue as well, so bring a snack (something dry; you don't want to handle eyepieces with sticky fingers) and a thermos of your favourite hot beverage (coffee is the best friend of many an observer, but I'm a hot chocolate guy myself) and bring something comfortable to sit on and a blanket to snuggle in. The nights get dark early and it's easy to spend quite a bit of time out there, and a nice comfy seat sure helps when you need to step away from the eyepiece to recharge with that coffee and hand warmer.

So why go through all this? Why dress up and brave the cold at all? Here's a few reasons that come to mind; the Orion Nebula; supernova remnant M1, the Crab Nebula; the great string of open clusters in Gemini and Auriga, M35, M36, M37 and M38; Castor, one of the finest double stars in the sky (can you see the third star?); the Pleiades; the Hyades; Sirius and the Pup (a white dwarf star to challenge your telescope); the Rosette Nebula, and the greatest selection of bright stars of any season, from red giants Antares and Betelgeuse, to supergiant Rigel, Castor, Pollux, Capella and Procyon, spanning the winter sky through six of the sky's finest constellations and shining through the crisp, cold air to give a bright and snowy winter landscape a look that simply can't be rivalled at any other time of year. That's why you dress up and brave the cold.

Let me know of any observations you would like to share with the club, and I'll see you out there!
observing@amateurastronomy.org



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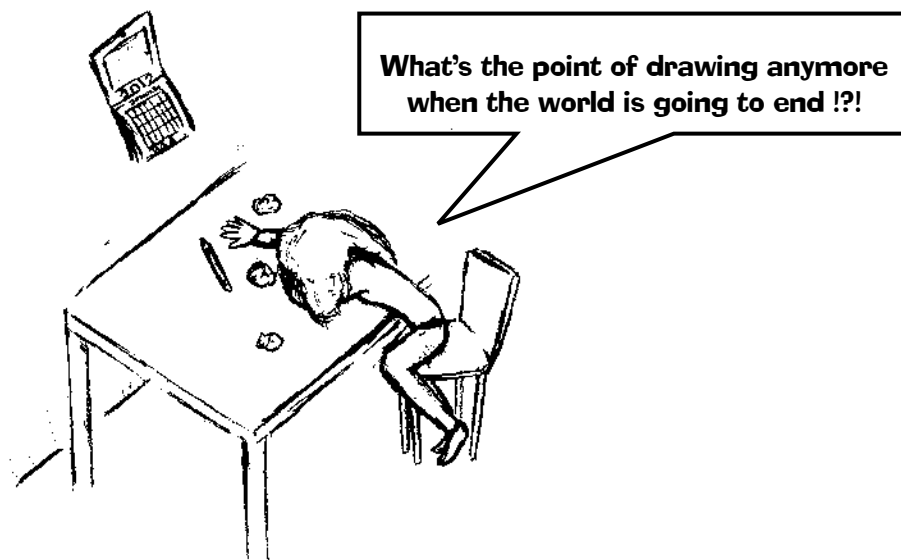
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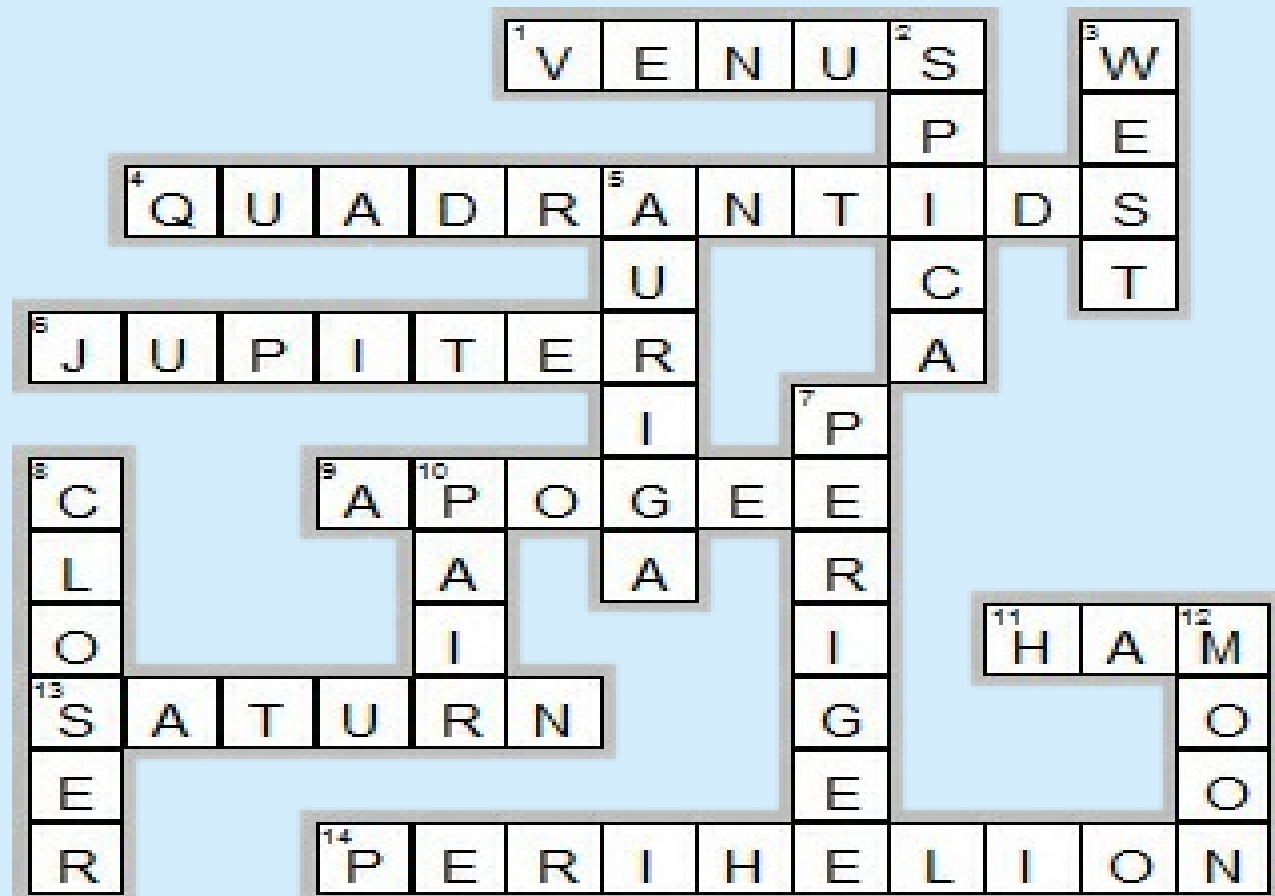


Cartoon Corner by Alexandra Tekatch

Our fearless cartoonist discovers that the 2012 HAA Celestial Calendar ends in December 2012



Answers to Astronomy Crossword on Page 9



UPCOMING EVENTS

January 13, 2012 - 7:30 pm General Meeting at the Hamilton Spectator Building. Speakers are Brady Johnson and Brian Dernes of KW Telescope.

January 28, 2012 - The Sky This Season, live from Binbrook Conservation Area. John Gauvreau will present a tour of the winter sky.

February 4, 2012 - 7:30 pm, HAA astronomy book club meeting. Contact Mario Carr mariocarr@cogeco.ca for directions, etc..

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