

ent Horizon

Volume 22, Number 10 October 2015

From The Editor

Chair's Report by Jim Wamsley

There's definitely a Lunar Eclipse theme to this month's Event Horizon.

Just look at Ann Tekatch's beautiful image above, Matthew Mannering's image on Page 3, the NASA Space Place article on lunar eclipses, and Alex Tekatch's cartoon this month! Also, on the next page, there's a link to Peter Wolsley's eclipse video.

Enjoy, and Clear Skies!

Bob Christmas, Editor

Where did the summer go? It's October and we will be having our Annual General Meeting on Oct. 2nd, one week earlier than normal, as the Spec had booked the hall on our normal night. We hold the club elections or confirm the volunteers for council at this meeting. At this time, I believe we have volunteers for all the council positions, but there is always room for more, and a need for new blood. I'm a firm believer that without change, things stagnate. New people bring new ideas. Partly for this reason and partly because I feel that my personal life will not allow me to give the job of Chair the time and effort it deserves I will be stepping down as Chair of the Hamilton Amateur Astronomers. I will still remain involved with the club's council, just in a less demanding position. I'm sure whoever replaces me will bring new and fresh ideas to the job and make the club even better.

Unfortunately, I will not be able to attend the Oct. meeting as I will be traveling to Las Vegas (*Continued on page 2*)

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Chair's Report (continued)

with my wife, who will be competing in the International Sweet Adeline singing competitions. John Gauvreau will be chairing the meeting in my absence. Steve Germann, our Treasurer, will give us his detailed report on the club's finances. Matthew Mannering will, of course, present his Sky this month.

On a personal note, I would like to thank Bernie Venasse for his opening the park for observing on many occasions over the course of the summer. Well done Bernie.

Thank you to everyone who has helped me out over the past 3 years. It has been a pleasure to be associated with the Hamilton Amateur Astronomers.



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.

Check out a cool video of the September 27, 2015 total Lunar Eclipse taken by H.A.A. Member Peter Wolsley from Mount Hope, ON on YouTube:

https://www.youtube.com/watch?v=vMcRvikV3y0&feature=youtu.be

Masthead Photo: *Total Lunar Eclipse of September 27, 2015, by Ann Tekatch.* Canon 6D DSLR, through a 7" f/9 apo refractor from the Tekatch's backyard observatory in Hamilton, ON. Exposure: 10 seconds at ISO 400.

The Sky This Month for October 2015 by Matthew Mannering

October would appear to be the month for those of us who are early birds. Mercury, Venus, Mars and Jupiter are all in the morning sky. Check under the **Other Events** section for some of their interactions.

This month we have two meteor showers. The **Draconids** peak right after dark on October 8th while the **Orionids** will peak after 2am on the 22nd. Both of these showers should produce meteors for a day or two either side of their respective peaks. The Orionids should produce around 20 meteors per hour while the Draconids are generally much more sparse. Interestingly the Draconids have produced meteor storms of thousands of counts per hour several times over the last century although a storm isn't expected this year.

The last of a tetrad (grouping of four) Lunar eclipses took place on September 27th. I hope you

had a chance to view it. We were outside for the whole event but cloud cover prevented us from seeing any of the shadow ingress phase leading to totality. Luckily the clouds parted for most of the duration of totality and we were able to get some pictures. The clouds rolled in again for a while but later we were able to get a few more pictures as the egress of the Earth's shadow took place. This is a picture I took at 12:19am just before the end of the eclipse.

Targets for October

Last month I discussed targets in Andromeda, Cassiopeia & Perseus. We are staying in this part of the sky for targets this

month. At the top of Page 4 is a view of the eastern evening sky to show the area. Perseus is just above the horizon below Cassiopeia.

Lets look at Algol, the Demon star in Perseus. Algol's <u>magnitude</u> is normally 2.1, but every 2 days, 20 hours and 49 minutes it dips to 3.4. This is because Algol is an *eclipsing binary* star system and the dimmer star passes in front of the primary once every 2.87 days. There is actually a third star associated with the system but is far too dim to see with back yard scopes. Another lesser known name for Algol is 'Gorgonea Prima'. The Gorgons were three sisters, one of whom was Medusa. She was famous for having snakes for hair and turning anyone who looked at her into stone. In Greek mythology Perseus is said to have slain Medusa by using a polished shield as a mirror to approach her and avoid a rather nasty death. So when you look up at the constellation Perseus you are seeing him holding the severed head of Medusa represented by Algol and three other stars.

Remember I mentioned that there are three sisters. If you look at the area of sky immediately around Algol those three stars are Gorgonea Secunda, Gorgonea Tertia and Gorgonea Quarta or in other words Gorgonea 2, 3 and 4. So according to the charts there are four stars named Gorgon. I'm not quite sure how this came to be when there were only three sisters.

On October 15th at 10pm Algol will be at its minimum brightness. Compare this with its normal brightness on other nights. You can find Algol's minima listed in the <u>RASC Observers Handbook</u> or in the October <u>Sky and Telescope</u> page 51. Just to be safe - make sure you use a (Continued on page 4)





as actually seen in the night sky. Algol is the right eye of Medusa.

Are you ready for a few more targets? **M27** (otherwise known as the Dumbbell) is a favourite target for amateurs. Situated just north of Sagitta it's an easy catch. If you haven't found it yet then search for it before you move on. Next, look for M27s much smaller cousin - **M76**, the Little Dumbbell. M76 just happens to be situated in the area between Cassiopeia, Andromeda and Perseus in the same neighbourhood as Algol. After you've looked for M76, try for **M103** and the **E.T. Cluster** in Cassiopeia.



The Moon

Libration this month is as follows: The Northern limb will be most exposed on the 4th and 31st while the Southern limb will be most exposed on the 18th. The Eastern limb will be most exposed on the 4th and the Western limb on the 19th.

Most of us seem to enjoy looking at the Moon when it is at first quarter (roughly 7 days old). The craters and mountain ranges in this area are particularly striking due to the topographic relief produced by shadow. So even though most of us would be hard pressed to be able to name many of the individual features, they become familiar to us over time. To view them in a different light wait until the two or three days leading up to last quarter. The shadows will originate from the opposite side of these features. You may be surprised at just how different this makes these features look. To see this difference open your lunar atlas to the page showing the first quarter moon and compare the view in your eyepiece just before the last quarter. Can you see details in the craters and mountains along the terminator that weren't obvious 2 weeks earlier?

This month the days leading up to third quarter are October 2nd - 4th. In November those days are the 1st - 3rd. Unfortunately you will have to stay up late to see this as the moon rises later every day by about 45 minutes. On October 2nd, moonrise is at 10:35pm. But by October 4th, moonrise is at midnight. Oh well, at least its over the weekend.

(*Continued on <u>page 6</u>*)

The Planets:

- *Mercury* is placed very nicely in the pre dawn sky from October 7 through to the end of the month.
- *Venus* shines like a search light rising in the east in the early morning hours. You really can't miss it!
- *Mars* also appears in the morning sky spending its time in Leo.
- Jupiter is grouped with Mars and Venus for most of the month.
- Saturn at the beginning of the month is very low in the south west in the evening sky.
- Uranus is at opposition on the 12th and is visible all night.
- Neptune is visible for most of the night all month long.

Use Stellarium on a PC or an app like Sky Safari on your tablet or phone to find Uranus and Neptune.

Other Events:

-October 1st into the 2nd:

- The Moon sits only $\frac{1}{2}$ degree (one Moon width) from Aldebaran in the Hyades of Taurus.

-October 4th:

- Last quarter Moon.

-October 8th:

- The waning crescent Moon, Venus and Regulus are in the eastern morning sky with Mars and Jupiter below (see chart below).
- The Draconid meteor shower peaks after dark.



Other Events (continued)

-October 11th:

- Zodiacal light visible in the East before morning twilight for the next two weeks.
- Uranus at opposition at midnight (Oct. 11th to 12th).

-October 12th:

 $-\operatorname{New}$ Moon.

-October 15th:

- Mercury at greatest elongation west.

-October 17th:

- Mars and Jupiter only $\frac{1}{2}$ degree apart in the morning sky:



Other Events (continued)

-October 20th:

- First quarter Moon.

-October 22nd:

- The Orionids peak in the early morning hours.

-October 23rd to 26th:

- In the morning sky Venus, Mars and Jupiter form a triangle with Mercury below.

-October 25th:

- Venus and Jupiter only one degree apart for the next two mornings.

-October 26th:

- Venus at greatest elongation west and only 1 degree south of Jupiter around 4am (see below).
- Uranus less than 1 degree north of the Moon at 6am (see chart at top of Page 9).

-October 27th:

- Full Moon.





Chart of Uranus / Moon conjunction of October 26.



Treasurer's Report by Steve Germann

Treasurer's report for September 2015 (unaudited)

\$8,529.22
\$592.00
\$1,560.28
\$7,560.94

Revenue consisted of Membership Renewals totalling \$540, and 50/50 of \$52.

Expenses were Hall Rental for 2015-2106 \$1130, Donation for the Clear Sky Chart \$50, Donation for the International Dark Sky Association \$68, and Donation to the Niagara Peninsula Conservation Authority \$100, prepayment for next year's Post Office Box \$176.28. We also spent \$20 for postage supplies. A correction of \$16 is included this month, found when I did the end of year reckoning.

This is the time of year when the club has major annual expenses to pay.

Next month we will pay the insurance, and also pay for the Calendar order. After that it will be mostly incoming until February when we make our budgeted donation to the Bay Area Science Fair.

Your club's finances are healthy, thanks to you, the members. We have the resources to cover our expenses and consider new activities and programs. One such change has been increase of \$500 in our annual donation to the Bay Area Science and Engineering Fair

This is almost the year end, and we are anticipating a charge for web hosting renewal early in the new fiscal year, as well as insurance and prepayment of the calendar order. After that, and with anticipated calendar revenue, our balance by the end of 2015 should be back

at about \$8500. A full financial report will be presented at the annual general meeting on October 2.



Across

- 1. On October 11 the thin crescent Moon is extremely close to this object in the morning sky.
- 5. This type of light can be seen for two weeks starting October 12.
- 7. The tight grouping of Venus, Jupiter and this planet are in the eastern morning sky at the end of October.
- 8. October meteor shower
- 9. This object is low in the south western evening twilight sky this month.

Down

- 2. On October 8 the crescent Moon will be close to Venus and this object in the morning sky.
- 3. The Full Moon in this month is called the Hunter's Moon.
- 4. This planet is at opposition in October.
- 6. This object shines brightly in the eastern morning sky.
- 7. On October 9 this object will be close to Mars and Jupiter in the morning sky.

Answers can be found on page 14. (No peeking!)

NASA's Space Place



Measure the moon's size and distance during the next lunar eclipse

By Ethan Siegel

The moon represents perhaps the first great paradox of the night sky in all of human history. While its angular size is easy to measure with the unaided eye from any location on Earth, ranging from 29.38 arc-minutes (0.4897°) to 33.53 arc-minutes (0.5588°) as it orbits our world in an ellipse, that doesn't tell us its physical size. From its angular size alone, the moon could just as easily be close and small as it could be distant and enormous.

But we know a few other things, even relying only on naked-eye observations. We know its phases are caused by its geometric configuration with the sun and Earth. We know that the sun must be farther away (and hence, larger) than the moon from the phenomenon of solar eclipses, where the moon passes in front of the sun, blocking its disk as seen from Earth. And we know it undergoes lunar eclipses, where the sun's light is blocked from the moon by Earth.

(Continued on <u>page 12</u>)



Image credit: Daniel Munizaga (NOAO South/CTIO EPO), using the Cerro Tololo Inter-American Observatory, of an eight-image sequence of the partial phase of a total lunar eclipse.

NASA's Space Place (continued)

Lunar eclipses provided the first evidence that Earth was round; the shape of the portion of the shadow that falls on the moon during its partial phase is an arc of a circle. In fact, once we measured the radius of Earth (first accomplished in the 3rd century B.C.E.), now known to be 6,371 km, all it takes is one assumption—that the physical size of Earth's shadow as it falls on the moon is approximately the physical size of Earth—and we can use lunar eclipses to measure both the size of and the distance to the moon!

Simply by knowing Earth's physical size and measuring the ratios of the angular size of its shadow and the angular size of the moon, we can determine the moon's physical size relative to Earth. During a lunar eclipse, Earth's shadow is about 3.5 times larger than the moon, with some slight variations dependent on the moon's point in its orbit. Simply divide Earth's radius by your measurement to figure out the moon's radius!

Even with this primitive method, it's straightforward to get a measurement for the moon's radius that's accurate to within 15% of the actual value: 1,738 km. Now that you've determined its physical size and its angular size, geometry alone enables you to determine how far away it is from Earth. A lunar eclipse is coming up on September 28th, and this supermoon eclipse will last for hours. Use the partial phases to measure the size of and distance to the moon, and see how close you can get!



Editor's Note: We'll get another chance during our next lunar eclipse on January 31, 2018.

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:
 - Oct 7: Introductory Astronomy for Kids (1st Wed of every month)
 - Oct 14: Moons of the Solar System
 - Oct 21: Cosmic Footprints
 - Oct 28: Cosmology
- For more details, visit <u>www.physics.mcmaster.ca/planetarium</u>

Answers to Astronomy Crossword on Page 10



The Scope Store at Camtech

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Proud supporter of the HAA

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UPCOMING EVENTS

October 2, 2015 - 7:30 pm — Annual General Meeting at the Hamilton Spectator Auditorium. NOTE that this will be the 1st Friday in October.

October 17, 2015 - 7:30 pm to 11 pm — *Public Stargazing Night* at the Niagara Gateway Tourism Centre in Grimsby.

November 13, 2015 - 7:30 pm – *HAA Meeting* at the Hamilton Spectator Auditorium.

2014-2015 Council		
Chair	Jim Wamsley	Check out the Hamilton Amateur Astronomers Website
Treasurer	Steve Germann	www.amateurastronomy.org
Webmaster	David Tym	<u>Contact Us</u>
Membership Director	Leslie Webb	Hamilton Amateur Astronomers PO Box 65578 Dundas, ON
Observing Director	Matthew Mannering	L9H 6Y6 www.amateurastronomy.org
Education Director	John Gauvreau	General Inquiries: secretary@amateurastronomy.org
Event Horizon Editor	Bob Christmas	Membership: membership@amateurastronomy.org
Recorder	Ann Tekatch	Meeting Inquiries: chair@amateurastronomy.org
Secretary	Mike Jefferson	Public Events: publicity@amateurastronomy.org
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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. <u>http://www.npca.ca/conservation-areas/binbrook/</u> 905-692-3228		Webmaster: webmaster@amateurastronomy.org
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