



Volume 21, Number 8 June 2014



From The Editor

It's June already, and this is the last edition of the Event Horizon.

...until September.

Thanks to everyone who contributed articles and images for this issue.

Have a great summer!

Bob Christmas, Editor

 $editor \ `at' \ amateur astronomy.org$

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Chair's Report by Jim Wamsley

This will be the last chair report for this season. We will be taking our summer break, and will not be having monthly meetings, or newsletters until September. This doesn't mean your club is doing nothing until then. Please be sure to watch your e-mail in-boxes for notices for club summer activities, such as member observing at Binbrook Conservation Area, our public observing at McQuesten Park July 5th, and most importantly, the club Picnic and Perseids Meteor shower public observing at Binbrook August 16th.

We finally have had some good observing weather! Our Astronomy Day public observing was a great success. The afternoon solar observing started off a little cloudy, but it soon cleared out, and we were able to share lots of great views of the sun with many people through the 4 P.S.T. Solar scopes, and 6 or more filtered scopes, brought by the club members. Visitors where able to have their first look at, and handle meteorites (*Continued on page 2*)

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Chair's Report (continued)

as I had my small collection of meteorites on display and John Gauvreau had his large Campo del Cielo meteorite on hand to show and impress young and old alike. The evening session was also extremely well attended by the membership and public alike. I'm sure there were more than two dozen member scopes there. Several people from the public, also brought in their scope to get us to help them with problems they were having. I had the clubs 8"Casagrain scope setup, with the T.V. and video camera. This enabled me to let groups of 10 to 15 people at a time, to view images of the Moon, Jupiter, and Saturn, with many ooh's and ah's from everyone. I think all had a great night. I know I did. [See images from Astronomy Day on Page 12]

The May meeting of the H.A.A. was very well attended, and the speakers didn't fail to entertain and impress us all. Rory Woods' talk on how we are using computers in astronomy was very interesting, and our own Matthew Mannering delivered another great Sky this Month talk. Notice was given the membership, of council's proposed changes to the club Bylaws and of the upcoming Vote on this change by the membership, at the June meeting.

Coming up this June 7th we will hold one of our best attended public events each year, at the Grimsby/ Niagara tourist information center. This event is always a great time. Not only do we get a good crowd out, but the center has a great food court with a Tim Horton's and most importantly a bathroom. I hope you can attend. The June meeting will be on the 13th this month. This will be a (don't miss) meeting. Not only will we have two great speakers, there will be a couple of surprises that I won't reveal here.

I hope you all have a great summer, and get out to a Star party or two, or at least come out to a club observing night with us at Binbrook. See you out there.



HAA Helps Hamilton

To support our community, we will be collecting nonperishable 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 in these tough economic times.

If you would like to help or have any questions about this initiative, please contact Jim Wamsley at 905-627-4323.

Masthead Photos:

<u>Left:</u> The First Quarter Moon, on May 6, 2014, by Ilya Inozemtsev. Post-processed using Adobe Lightroom to improve contrast and detailing.

<u>Right:</u> The Waxing Gibbous Moon, on April 9, 2014, by John Gauvreau. Taken through a 90mm refractor, 1140mm focal length (570mm prime focal length with 2x barlow) 1/100 second, ISO 200, contrast adjusted.

See more of Ilya's and John's images on Pages 15 and 16.

May 9th HAA Meeting Summary by Bob Christmas

HAA Chair Jim Wamsley got the May HAA meeting under way at 7:30 p.m. sharp by welcoming everyone in the audience to the meeting. He invited everyone to get out to some of McCallion Planetarium's shows at McMaster University, mentioned the proposed HAA bylaw change, and reminded HAA members to write articles for the E.H. Jim also reminded everyone about our Astronomy Day public viewing the following day (see gallery on Page 12), as well as a talk by 2nd Chair John Gauvreau at the Burlington Public Library that week.

Next, Observing Director Matthew Mannering gave his The Sky This Month talk, during which he mentioned Comet C/2012 K1 PanSTARRS, which is visible in the northern sky now, and the new Camelopardalids meteor shower. Matthew also mentioned the recent AstroCATS show in Hamilton and the visits & participation of various HAA members in it. Matthew's main theme this night was Retrograde Motion of the planets at and around opposition or inferior conjunction, whichever the case may be. He talked about how retrograde motion was first explained by ancient Greek astronomers including Ptolomy as the planets orbiting around the Earth in "epicycles", as illustrated in the classic "spirograph" diagram below. But of course we now know, the planets appear to shift back then forward again in our sky as Earth passes them (or as Venus or Mercury passes Earth) as all the planets orbit the Sun! Matthew talked about Jupiter, Mars and Saturn in the evening sky, Uranus, Neptune and Venus being in morning sky, the Spring constellations, DSO's such as M13 & M44, and the "double-double" star quartet in Lyra. He also showed neat pictures such as a face made up of eclipsed moons, the recent solar eclipse as imaged from Australia and Antarctica, and Comet PanSTARRS passing galaxy M51.

After Matthew's talk, we had our usual intermission, and then Les Webb & Alex Tekatch drew tickets for the door prizes and 50/50.

The second half of our May meeting featured main speaker Rory Woods of McMaster University, who gave his talk entitled "Welcoming Our Computer Overlords in Astronomy". Rory's talk was in 3 parts, the first of which was "A brief history of computing" starting with 1946's ENIAC, then 1951's UNI-VAC, 1976's Apple II, and 2013's Intel Cor i7, Apple iPhone & SciNet array, and how computer processing power has exponentially exploded over that time. Part two was "Astronomy and Computers". Rory talked about today's amateur telescopes being equipped with GPS, autoguiding ports and DSO databas-



Diagram of geocentric epicycles, courtesy of Wikipedia

es. He mentioned the 10 hours of super-computer processing time needed to produce the Planck Full Sky Dust Map, and the 12 *days* of supercomputing needed for the Herschel RGB composite of Perseus. Rory showed us a video of ESO's Atacama Large mm/ sub-mm Array and its supercomputing "correlator".

Thirdly, Rory talked about "Simulating Our Universe", and how, in 1941, Erik Holmberg used 74 light bulbs to simulate our galaxy! Nowadays, computers are used for simulating galaxy evolution, star-forming gas clouds and star cluster formation with radiation dynamics.

Thanks Rory for this very interesting and engaging talk!

Jim then closed the meeting by reminding the audience of the Astrophotography Group night, which took place on Sat. May 17th.

The Sky This Month for June 2014 by Matthew Mannering

Well it's here, sort of. Summer seems to be taking its time arriving but officially at least, it will arrive on June 21st . Meanwhile the seasonal motion of the stars carries on as usual. Vega is low in the East in the evening which means the constellations of summer and the Milky Way are starting their march across the sky. The summer Milky Way is much denser looking than its winter version. That's because in the summer we are looking towards the core of our galaxy whereas in the winter we are looking outwards to the galaxy's edge. At the end of June at 10:30pm look just east of south and just above the horizon you will find the constellation Sagittarius (the teapot). The Milky Way rises into the sky just to the west of the spout (it looks like steam rising out of a kettle). Next to the spout lies the core of our galaxy. You can spend hours at a time just scanning the Milky Way with binoculars. See how many Messier objects you can pick out while reclining comfortably in your chair. There are many clusters and nebulae to choose from throughout this section of the sky.

Summer is also the season of Globular Clusters. These make fine targets for anyone at any time, but they make especially good targets for beginners. When you first start looking at deep sky objects, it's much easier to start off by finding the bigger/brighter objects. Each Globular Cluster is unique. Look for differences in density, population, colour and distribution of the stars. Many exhibit strands of stars that meander their way through the Cluster. You will find yourself returning to them time after time. There is something visceral about seeing what appears to be a solid ball of stars just floating in space.

Easy Targets

So, let's start with some favourites within the summer triangle (the stars Vega, Deneb and Altair).



The **Ring** Nebula (M57) is a small but bright target in Lvra. In a small scope using low magnification - it will appear star-like. Boost the magnification and it becomes a smoke ring. Don't bother looking for the star at the center of the ring, it's too dim to see with most background scopes. While vou're in Lyra, check out the famous **Double** Double Star. (Continued on page 5)

The Sky This Month (continued)

It looks like one star to the eye, but add some magnification and it becomes two. Add more magnification and each of those splits again. So you get four stars for the price of one.



Now aim for the mid-point between M57 and the star **Albireo** in *Cygnus*. Here you'll find a small globular cluster M56. You'll need high magnification to see any detail.

Next move over to the star Albireo. This is one of the most beautiful double stars in the northern skies. It's also easy to split in the smallest scopes. Enjoy and record the rich colours of this double, that way you can compare the colours you saw with what others see.

So far we've been moving in a straight line across a small section of the sky and we're going to keep on going in a fairly straight line. **M27** the Dumbell nebula is a big bright nebula that is easy to find. Draw an imaginary line that extends from M57, through Albireo and keep going the same distance again. The Dumbell is right there. [See chart of Albireo, M27 and Brocchi's Cluster at the top of page 6.]

Now use your binoculars to find a nice little constellation just a couple of degrees away from the Dumbell. *Sagitta* is just a straight line of three stars with a fork on one end consisting of two stars. Between two of the straight line stars you'll find **M71**, a small globular that is similar to **M56**.

Next you'll want to look at the **Coat Hanger** also known as Brocchi's cluster. Use binoculars for this target as it's almost too big to fit into a view through the telescope. The Coat Hanger shape is far easier to see with a wide field and low magnification. To find it place the last two stars of Sagitta at the left edge of your field of view then move one binocular field up towards the milky way.

So far we've only covered a very small section of the sky. Here are a few more summer targets scattered around the sky that you can work on over the summer months. All are easy to see with binoculars or a small scope. You will need to use a Star Atlas to find the constellations and then figure out how to star hop to your targets. Don't be upset if you only find two or three in an evening. **M13, M3** and **M5** - Big Bright globular clusters.

M22 and M4 - Nice globular clusters low in the sky in Sagittarius and Scorpius.

M6 - The Butterfly open cluster in the Milky Way just a few degrees west of the spout of the Teapot.

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





M8 and M20 - The Lagoon and Trifid nebulae in the Milky Way. Look for the dark line running across the Lagoon and the open cluster in one half of the nebula. Look for the dark intersecting lines in the Trifid. M17 - The Omega nebula also known as the Swan. Really stands out with a nebula filter. Looks like a Loon to me.

M31 - The Andromeda galaxy. This galaxy is the most distant object that you can see with the naked eye, at 2.3 million light years away. Find it with binoculars first then see if you can spot it with just your eyes. Look for targets in Andromeda starting in August unless you like staying up really late. Almaak - a beautiful double in Andromeda.

(Continued on <u>page 7</u>)

The Sky This Month (continued)

The Moon

Libration favours the North limb on the 1st and 28th. The East limb is favoured on the 21st. The South limb is at its best on the 15th while the West limb is favoured on the 9th. Use the warm nights to learn the names of some of the more prominent craters and seas.

The Planets:

- *Mercury* is still visible low in the west for the first week of June. Make sure the Sun has set before you start looking. Mercury will only be 10 degrees above the horizon at 9:30pm on the 1st and 7 degrees on the 7th.
- *Venus* appears in the morning sky before dawn. It will be very low in the sky and the Sun will rise shortly after.
- *Mars* is still in Virgo and starts the month with a diameter of 11.7 arc seconds and ends the month at 9.4 arc seconds. It begins the month near the star Porrima and the moves east towards Spica. On the 7th the Moon passes a couple of degrees below Mars in the late evening hours. As our orbit takes us further from Mars, you will notice that Mars is no longer a full disk. In fact it will be around 90% illuminated.
- Jupiter is setting this month in the west. It's your last chance for an evening look until winter.
- **Saturn** starts the month about 25 degrees above the south eastern horizon at dusk and sets about 4:30 am. By months end it will be directly south at dusk at an elevation of 32 degrees and sets around 2:30am.
- **Uranus** rises around 3:15am at the beginning of the month and 1:15 by months end. On the 21st at 4:00am look for the Moon just a couple of degrees East of Uranus. By the beginning of August Uranus will rise at 11:15pm.
- *Neptune* is in Aquarius and will be 31 degrees above the horizon at mid-month at 4:30am. Look for the Moon to pass just above Neptune around 3:00am on the 18th. By the end of August Neptune will be visible all night and reaches opposition on the 29th.

Other Events:

-June 5th:	First Quarter Moon.		
-June 12th - 13th:	Full Moon.		
-June 19th:	Last Quarter Moon.		
-June 21st:	Summer Solstice.		
-June 27th:	New Moon.		
-June – July:	Ceres and Vesta in Virgo appear to get closer and closer together until July 13th when they are only 2 arc minutes apart.		
-July 6th:	From 8:00pm to 10:00pm Mars and the First Quarter Moon are less than 0.4 degrees		
•	apart.		
	Spice		
-August 13th:	st 13th: Perseid meteor shower peaks.		
-August 18th:	5:45am Jupiter and Venus only 0.25 degrees apart.		



Across

- 1. The Full Moon in June is also known as this moon?
- 3. On June 7 the Moon will be close to this planet?
- 5. On June 21 this event officially starts summer?
- 8. On June 10 the Moon will be five degrees below this planet?
- 9. This star in Bootes is one of the brightest in the sky?
- 10. From the Churchill Northern Studies Centre in Manitoba there is a Plexiglas dome where visitors can view these?

Down

- 2. On June 3 Jupiter will have a triple shadow ...?
- 4. June 8 the Moon will be close to this star?
- 6. On June 24 the crescent Moon will be close to this planet?
- 7. This constellation is overhead?

Answers can be found on page 17. (No peeking!)

Through the Looking Glass by Greg Emery

I have been rambling for a few months now about things that come from outer space. In the news at the end of last month was the "new" meteor shower the Camelopardalids. The shower comes from the detrius of the comet 209P/LINEAR. I didn't look outdoors for the meteors, but a few things I read indicate a disappointment for many, mostly the media people telling everyone how they will see hundreds of bright meteors from the city. The sparks falling from the sky - that we didn't see - are perhaps one of the first things we think of when we consider something coming from outer space. There are others to consider, how about a radio message from space? Maybe from some aliens on some distant world, or maybe from a deep space object? The big question of course is how does the Camelopardalids meteor shower tie in to a radio and aliens? The answer to this is simple - AIR MILES.

One of the benefits of the travelling I have done over the pass two years is the large amount of reward and air miles that we have earned. We saved enough for a trip to New Mexico (I really like the southwest) and Colorado. We toured through most of New Mexico on a whirl wind driving tour that put just under 2000 miles (about 3250 km) and saw some interesting sites and museums. I was in New Mexico and Colorado for 10 days - my goal for the trip was to eat 20 burritos. I knew I was overly optimistic, but better to dream than to limit yourself I guess. I only managed to get 10 burritos (but that does not includes 3 tostados a couple of tacos and enchiladas as well as two chili rellenos and all the refried beans and rice I could get). I have a real weakness for good Mexican food (as my picture in profile at-ests) and New Mexico and Colorado have some great food!

In 2009 the National Museum of Nuclear Science and History opened in Albuquerque NM. The museum has a neat mix of Manhattan Project through the Hydrogen bomb displays and information up through the cold war to the fall of the Wall and collapse of the USSR. A section (*Continued on page 10*)



Yours truly with a mock up of Little Boy and Fat Man – the two weapons dropped on Japan in August 1945.

Through The Looking Glass (continued)

of the museum is also dedicated to medical applications. In the back lot of the museum bomber aircraft are being erected (plans for the coning tower of a nuclear sub are being carried out as well). It was fun for my son and I to go up to the BUFF (B-52) to poke around the bomb bays and the landing gear.

South of Albuquerque is the town of Socorro. Socorro is the home of the control center, called the Array Operation Center (AOC) for the Karl G. Jansky Very Large Array (VLA). The VLA itself is physically located about 50 miles west of Socorro (it is about the only thing west of Socorro besides desert scrub and cattle). The VLA is an easily recognizable set of 27 dishes used for radio astronomy. It has appeared in the movie "Contact" as well as 2010 and numerous documentaries and music videos.

The dishes are located on one of three tracks which form a giant "Y" shape. The dishes can be moved to the work shed or to different points on the arms of the Y using a big tractor/transporter type device. The tracked transporter looks not too dissimilar from the transporter used by NASA for various missions and programs to take the launch vehicles from the assembly building to the pad. Why move the things at all you may ask? Well from my limited understanding there are two reasons. The first is maintenance. The dishes can be brought back to a central shed so they may be serviced/repaired indoors when more extensive repairs are required. Regular maintenance is done in the field (this is the desert - in the field means strong sun, wind and dust). The second reason - which much to my chagrin I had not considered when I went to the VLA - is to change the configuration. The dishes can be bunched tightly together or quite far apart. Far apart is called configuration A with a maximum dish separation. *(Continued on page 11)*



Standing in front of a dish by the side of the road. Four or five dishes are visible in the background. In D configuration about 18 dishes would have been visible from this vantage point.

Through The Looking Glass (continued)

The closer the dishes are to one another, the larger the value of the angular resolution with the difference between A and D configurations being of the order of a factor of 30.

The dishes are apparently moved or reconfigured on a four month cycle. Not knowing this valuable information - or having once known it and since forgotten - made driving up on the dishes much less impressive than you might imagine. We kept looking for all the dishes, expecting to see a tight clump of the darn things sitting in the middle of the desert. We visited during A configuration, so the density of dishes in any one of our pictures was necessarily low.

After visiting the VLA we had one more stop for the day - a mere 3 hour jaunt to Roswell New Mexico, home of everything alien. The UFO Museum is as much a tourist stop as it is a museum. The museum is interesting if you believe in aliens or life beyond the earth. If you do not believe, then there probably is not anything there to change your mind. I know some of you in the HAA believe in other life forms, UFOs, drones, crop circles and the like. Still others are staunch in their disbelief. I won't delve into the debate but suffice it to say that whether you believe or consider it a hoax, it still came from outer space!

So if you ever find yourself in New Mexico with a day or two of free time and a full tank of gas...



Joanna and I at the UFO Museum.

Another shot of the VLA dishes, here two and onehalf are visible – for scale the dishes are 25 m in diameter.





Photos by Lyle Jeakins.

NASA's Space Place



The Hottest Planet in the Solar System

By Dr. Ethan Siegel

When you think about the four rocky planets in our Solar System—Mercury, Venus, Earth and Mars—you probably think about them in that exact order: sorted by their distance from the Sun. It wouldn't surprise you all that much to learn that the surface of Mercury reaches daytime temperatures of up to 800 °F (430 °C), while the surface of Mars never gets hotter than 70 °F (20 °C) during summer at the equator. On both of these worlds, however, temperatures plummet rapidly during the night; Mercury reaches lows of -280 °F (-173 °C) while Mars, despite having a day comparable to Earth's in length, will have a summer's night at the equator freeze to temperatures of -100 °F (-73 °C).

Those temperature extremes from day-to-night don't happen so severely here on Earth, thanks to our atmosphere that's some 140 times thicker than that of Mars. Our average surface temperature is 57 °F (14 °C), and day-to-night temperature swings are only tens of degrees. But if our world were completely airless, like Mercury, we'd have day-to-night temperature swings that were *hundreds* of degrees. Additionally, our average surface temperature would be significantly colder, at around 0 °F (-18 °C), as our atmosphere functions like a blanket: trapping a portion of the heat radiated by our planet and making the entire atmosphere more uniform in temperature.

But it's the *second* planet from the Sun -- Venus -- that puts the rest of the rocky planets' atmospheres to shame. With an atmosphere **93 times as thick as Earth's**, made up almost entirely of carbon dioxide, Venus is the ultimate planetary greenhouse, letting sunlight in but hanging onto that heat with incredible effectiveness. Despite being nearly twice as far away from the Sun as Mercury, and hence only receiving 29% the sunlight-per-unit-area, the surface of Venus is a toasty 864 °F (462 °C), with *no difference* between day-and-night temperatures! Even though Venus takes hundreds of Earth days to rotate, its winds circumnavigate the entire planet every four days (with speeds of 220 mph / 360 kph), making day-and-night temperature differences irrelevant.

Catch the hottest planet in our Solar System all spring-and-summer long in the pre-dawn skies, as it waxes towards its full phase, moving away from the Earth and towards the opposite side of the Sun, which it will finally slip behind in November. A little atmospheric greenhouse effect seems to be exactly what we need here on Earth, but as much as Venus? No thanks!

(Continued on <u>page 14</u>)

NASA's Space Place (continued)

Check out these "10 Need-to-Know Things About Venus": http://solarsystem.nasa.gov/planets/profile.cfm?Object=Venus.

Kids can learn more about the crazy weather on Venus and other places in the Solar System at NASA's Space Place: <u>http://spaceplace.nasa.gov/planet-weather</u>.



Image credit: NASA's Pioneer Venus Orbiter image of Venus's upperatmosphere clouds as seen in the ultraviolet, 1979.



Treasurer's Report by Steve Germann

Treasurer's report for May 2014 (unaudited)

Opening balance:	\$8,143.35
Revenue:	\$143.00
Expenses:	\$421.97
Closing Balance:	\$7,864.38

Revenue consisted of memberships, \$30; 50/50, \$63; sale of assets, \$50. Expenses consisted of pins, \$381.97 and shipping, \$40.

Eye Candy



Top left: Airplane passing through Hercules, as imaged from Binbrook Conservation Area.

Top right: Orion setting, and a meteor, on April 19, 2014, from Binbrook C.A.

Bottom right: The Big Dipper, composite of 27 camera-ontripod images for 50 sec total imaging time, plus darks.

All 3 of these images were taken by **Ilya Inozemtsev** with his Nikon D7000 digital SLR camera with a normal 35mm lens.



Eye Candy (continued)



Top:

John Gauvreau managed to image the Hubble Space Telescope as it passed just 11 degrees above the horizon on April 19, 2014 at Binbrook Conservation Area. The insert in the image is an enlarged and contrast stretched version of what's in the box of the larger image. That streak is the HST.

Bottom left:

Ilya Inozemtsev imaged an Iridium satellite flair in Lyra, about half-way through the pass, at 9:58pm April 19, 2014 from Binbrook C.A., with his Nikon D7000 digital SLR with a normal 35mm lens.



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Answers to Astronomy Crossword on Page 8





William J. McCallion Planetarium

McMASTER UNIVERSITY, HAMILTON, ONTARIO

- Public shows every Wednesday (7:00pm)
- Public transit available directly to McMaster campus
- Tickets \$5 per person; private group bookings \$100
- Different shows every week
- Upcoming shows include:
 - Jun 4: Introductory Astronomy for Kids (1st Wed of every month)
 - Jun 11: Eclipses
 - Jun 18: Astronomy for Kids
 - Jun 25: 101 Fuzzy Observations
- For more details, visit www.physics.mcmaster.ca/planetarium



UPCOMING EVENTS

June 7, 2014 - Public Stargazing night at Niagara Gateway Tourism Centre, Grimsby, ON. June 13, 2014 - 7:30 pm — *General Meeting* at the Hamilton Spectator Auditorium. Our main speaker will be former HAA Chair & Observing Director **Mike Spicer**, whose talk will be "Sir William Herschel, A Model for Amateur Astronomy".

June 21, 2014 - Cosmology Discussion Group meeting.

July 5, 2014 - Public Stargazing night at McQuesten Park, Hamilton, ON.

August 16, 2014 - HAA member picnic at Binbrook Conservation Area followed by public *Perseid Meteor Watch*.

August 30, 2014 - Public Stargazing night at Niagara Gateway Tourism Centre, Grimsby, ON.

2013-2014 Council		Domain and webhosting for the
Chair	Jim Wamsley	Hamilton Amateur Astronomers generously supplied by Limelyte Technology Group, Inc Business hosting, email and network security. <u>www.limelyte.com</u> info@limelyte.com
Second Chair Treasurer	John Gauvreau Steve Germann	
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