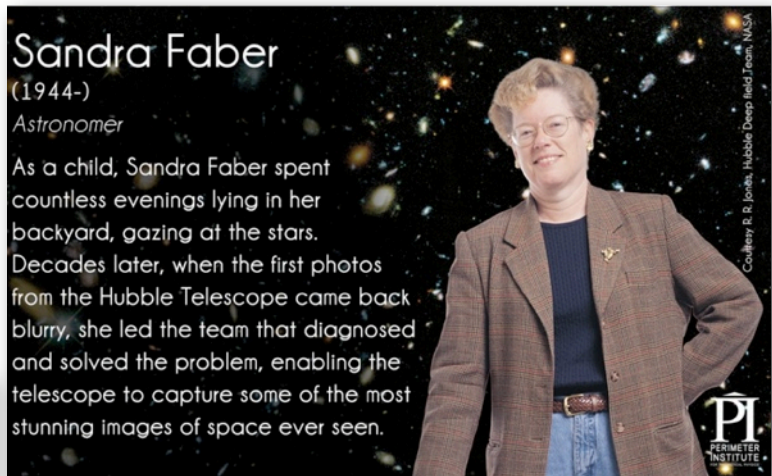




Astronomy News for Bluewater Stargazers
Vol 9 No. 7 July 2015



Perimeter Institute in Waterloo, ON, has issued a series of posters honouring Women in Physics. SGN 2015 issues will feature women who have made major contributions to astronomy and physics.

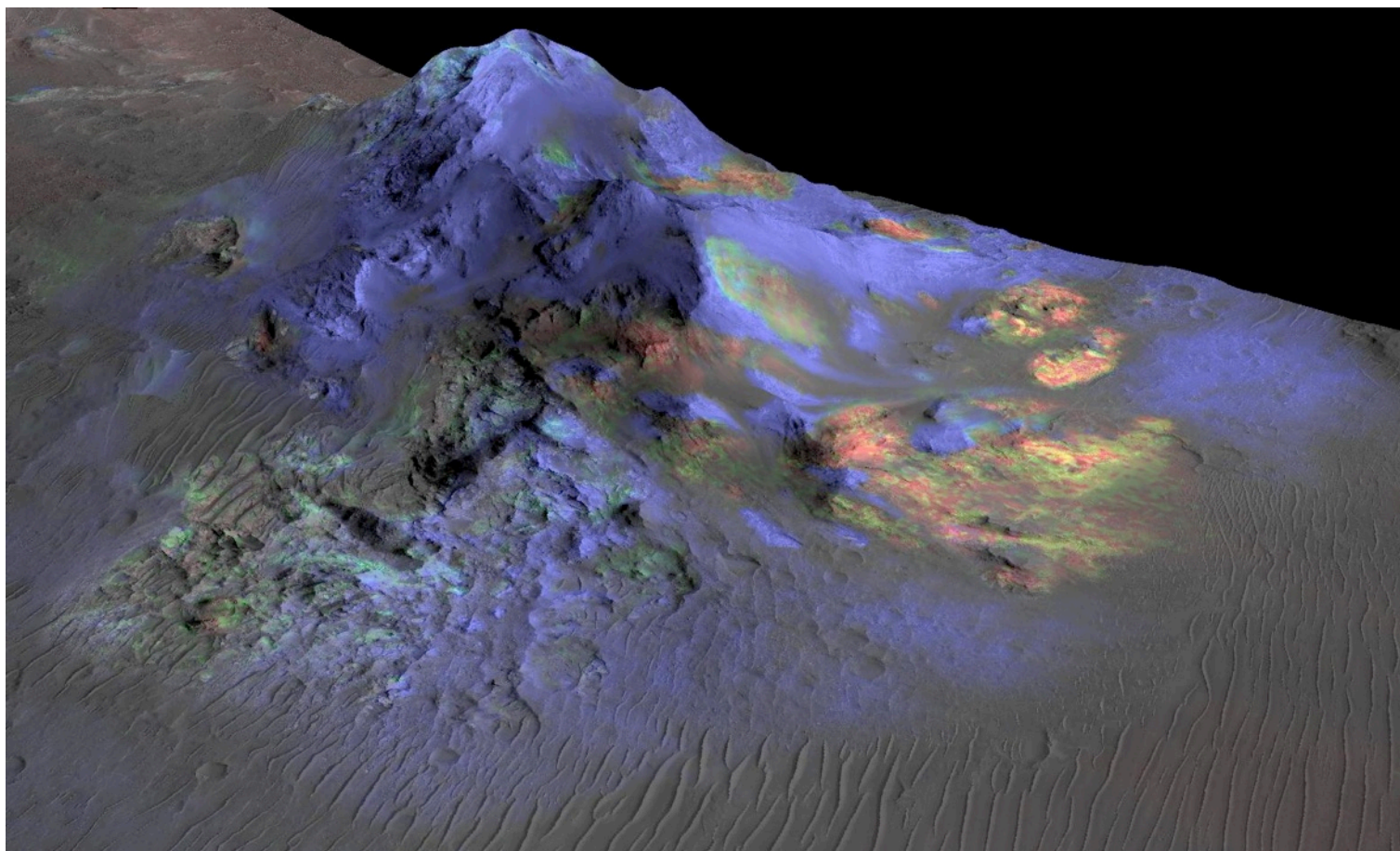
July 2015 Contents

- p 1: Life preserved in impact glass on Mars?
- p 2: BOEC Family Fun Day really takes off!
- p 3: Keppel Henge does weather magic
- p 4: Surprises from Comet 67/P; Philae wakes up!
- p 5: Ceres keeps astounding: Latest from Dawn
- p 6: Latest Update from Pluto
- p 7: View Ceres, 67/P and Pluto this summer: charts
- p 8: Quetican FoV: Sharing WOW Factor in Astronomy
- p 9: Quetican FoV: Sharing WOW: part 2
- p 10: Getting “the LEDs out” in Owen Sound
- p 11: Getting “the LEDs out” in Owen Sound pg2
- p 12: Teenager Discovers Exoplanet; Asteroid Nimoy
- p 13: Featured Constellation: Ophiuchus and Serpens
- p 14: July Sky Calendar: a quickie comet
- p 15: Classified; Miscellaneous Notices; Cartoon Corner
- p 16: Image of the Month: Stuart Heggie’s M92

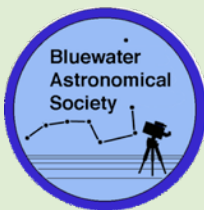
Impact Glass Found on Mars

Impact glass has been detected on Mars by the Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) on NASA's Mars Reconnaissance Orbiter. Image below.

Green indicates the presence of glass, blues are pyroxene; reds are olivine. Impact glass forms in the heat of a violent impact that excavates a crater and on Earth has preserved evidence about ancient life. A deposit of impact glass on Mars could be a good place to look for signs of past life on that planet. This view shows Alga Crater's central peak, a 5 km wide feature within the 19-km diameter crater in the southern hemisphere. The information from CRISM is shown over a terrain model and image, based on observations by the High Resolution Imaging Science Experiment (HiRISE) camera. The vertical dimension is exaggerated by a factor of two. The Mars Reconnaissance Orbiter has been using CRISM, HiRISE and four other instruments to investigate Mars since 2006.

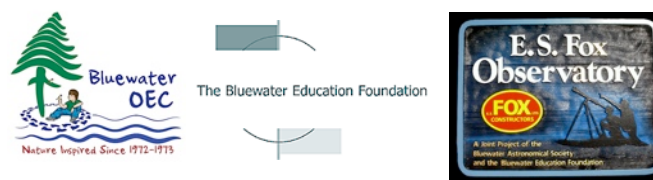


Disclaimer: StarGazer News reports on the activities of the Bluewater Astronomical Society (formerly Bruce County Astronomical Society) but any opinions presented herein are not necessarily endorsed by BAS. See the BAS website at www.bluewaterastronomy.info for up-to-date details relating to BAS events. The BAS weblog is back, with articles of immediate interest written by various BAS members.



StarGazer News is produced and edited by John Hlynialuk. I am solely responsible for its content. Your original articles, images, opinions, comments, observing reports, etc., are welcome. I reserve the right to edit for brevity or clarity. Errors or omissions are entirely mine although I strive for accuracy in star events, etc. I will not publish your emails or other materials without your specific permission to do so. No part of this publication shall be reproduced in any form whatsoever without the editor's consent. However, the Sky Calendar and Feature Constellation pages are free to copy. Feel free to forward this issue in its entirety to friends. Email comments and/or submissions to stargazerjohn@rogers.com

| BAS Executive 2015-2017 | | |
|--------------------------------|-----------------------------|---|
| Co-Presidents: | John Hlynialuk Aaron Top | stargazerjohn@rogers.com aaron_top@hotmail.com |
| Vice-President: | Zoë Kessler | zoe@zoekessler.com |
| Secretary: | Lorraine Rodgers | lrodgers@bmts.com |
| Treasurer: | Cheryl Dawson | cheryl.dawson@bell.net |
| Past-President: | Brett Tatton | brettatton@gmail.com |
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July 17-19 Dark Sky Weekend Venue Moved

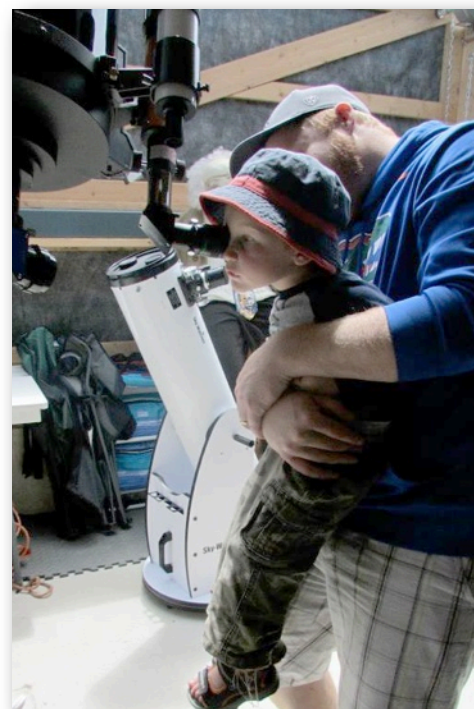
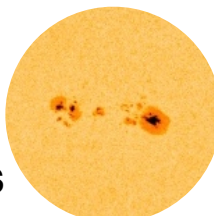
This year's Dark Sky Weekend has had a venue change. We will be gathering the weekend of July 18/19 at Whispering Pines Campground rather than at the national park near Tobermory. Our preferred group site at the BPNP was not available this year and the substitute sites offered had something to be desired, so we begged off for this year.

Since there was a Webster visit to Whispering Pines slated for July 25, we have just moved that date to the preceding weekend to take advantage of the NM. Facilities at Whispering Pines are very suitable (even a swimming pool!) and BAS members have been offered free camping in return for some public stargazing with our telescopes as weather permits.

Contact Greg Rodgers grodgers@bmts.com who is coordinating the arrangements to reserve a site. More details will be available by email to BAS members and at the July 8 meeting.

BAS Events for July

- JULY** (July BAS Wed. meeting is **July 8, not July 1**)
 - Jul 8 Wed** **BAS regular Wed. meeting at ES Fox Observatory**
Topic: KW Webinar on Eyepieces -a live online event.
 - Jul 10 Fri** **Summer Stargazing public viewing #2 @Fox Planets, clusters, galaxies.** Starts at dusk.
 - Jul 11 Sat** **BAS viewing@Fox** member observing night
 - Jul 17-19** Webster visits Whispering Pines (see note right) for Dark Sky Weekend (note venue change)
 - Jul 24 Fri** Grey Roots Public viewing #1: Moon, planets, clusters and galaxies. Event starts at dusk.
- Note: Astronomy** Events for July are listed on pg. 14.



BOEC Family Fun Day Success



Solar viewing (right) and rocket launching were the highlights of BAS participation in a Family Fun Day at the Bluewater Outdoor Ed Centre June 13. An overcast morning changed into partly sunny skies for sunspot viewing.



Very light winds made rocket recovery easy as even the highest flying missiles came back under parachute to the vicinity of the launch pad. Launch director Scott H. ran an awesome show with only one slight mishap with R2D2. The second R2D2 launch (far left), was preceded by a proper countdown...

R2D2 takes off into the sky for his second flight (more like a short hop) into the vicinity of the spectators who were pleased(?) to see rocket motor activity from close-up.

Left: The rocket in the image with director Scott, was a welcome addition to the arsenal brought over by Ernie Abel, BOEC's neighbour to the north. Ernie turned out to be an avid rocketeer. That was, of course, the whole purpose of Fun Day -to bring out the kid in all of us. (Images from BOEC Facebook page)

Keppel Henge Does Weather Magic

In spite of a poor forecast for June 21, Summer Solstice Day, the magic atmosphere of Keppel Henge cleared the skies long enough to allow for sharp views of the Hydrogen-Alpha solar disk and prominences, -one huge tree-like fan in particular.

The morning overcast cleared by 11:30 am or so and the sky stayed crystal blue for several hours around the time of local noon. The shadow of the pointer stone was watched for the entire time it took to cross the base of the Summer Solstice Stone.

Henge co-designer, Bill Loney, talked about some of the interesting groups that have come to celebrate events at the Henge in the past, including a wiccan group from Orangeville. He admitted being slightly disappointed by the fact that they were just "ordinary-looking folks".

Ida Fisher, one of the original members of the Keppel Henge "club" that was organized to make the stone monument come to pass was also present to help "ring in" the new summer season. About 20-25 people visited over the noon hour and a small group even did some tai-chi to continue the tradition that has brought larger tai-chi groups to the summer celebration for many years in the past.

Below: Shadow of Pointer Stone falls exactly on the base of the Summer Solstice Stone at local high noon. Earth was at the summer solstice point in its orbit about an hour earlier.

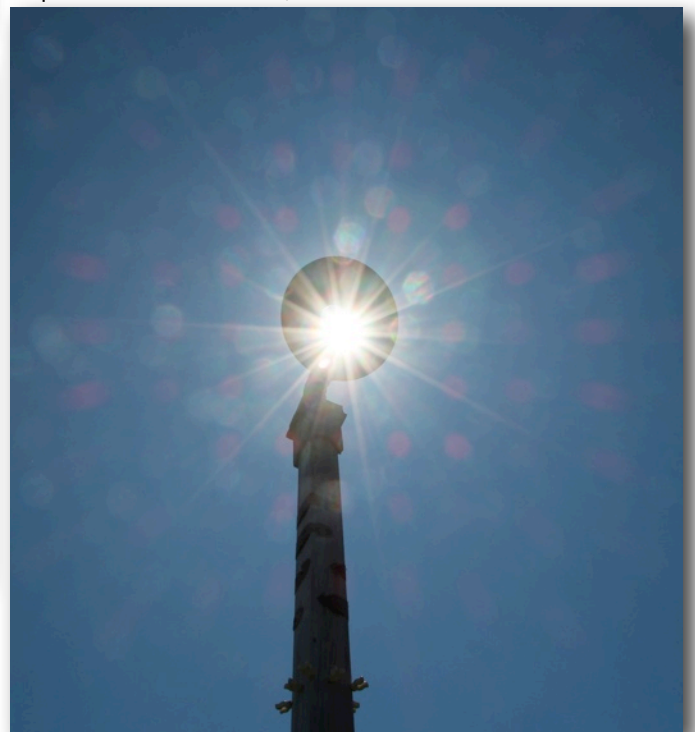


Above: Impromptu tai-chi "broke out" among the visitors around 1 pm. These folks were keen to keep up the tradition started around the International Year of Astronomy (2009) of doing their exercises among the monoliths on the first day of summer. **Right:** Sun streams through the analemma disk at solar noon. Time to clean the lens.



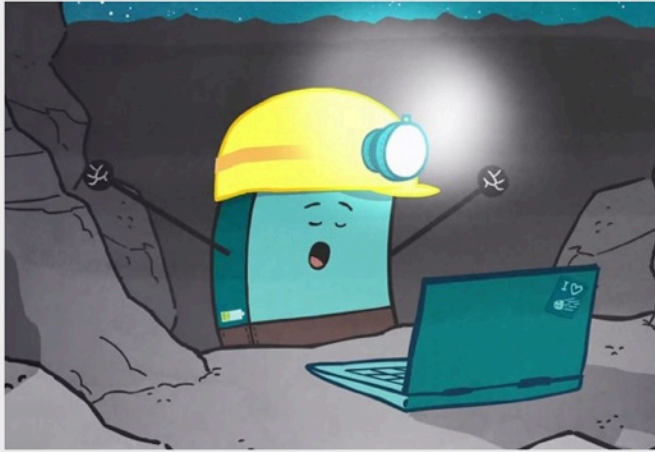
Steve G. demonstrates the perfect headgear for solar observing. His floppy hat is just right for blocking stray light from the eyepiece of the club's H-alpha scope.

There were more members of BAS present than were expected based on the poor forecast. In any case, five "die-hards" showed up, -a tribute to their interest in club activities or maybe just a lack of confidence in the Weather Network forecast. On the other hand, Clear Sky Clock for Keppel Henge was showing clear blue skies for the entire day after the showery weather passed through Saturday overnight into Sunday morning. Bottom line: it was a marvelous turnaround and BAS was there with H-alpha scopes to catch it! Thanks, Folks!



Surprise #1: Philae Wakes Up, Makes Contact!

by BOB KING on JUNE 14, 2015
Universe Today www.universetoday.com



The Philae lander "woke up" yesterday afternoon and contacted Earth for the first time since November. Credit: ESA

Fantastic news! Philae's alive and kicking. The lander "spoke" with its team on ground via Rosetta for 85 seconds — its first contact since going into hibernation in November.

Signals were received at ESA's European Space Operations Centre in Darmstadt at 4:28 p.m. EDT June 13. The lander sent more than 300 data packets reporting on its condition as well as information about the comet.

"Philae is doing very well. It has an operating temperature of -35°C (-31°F) and has 24 watts available," said DLR Philae Project Manager Dr. Stephan Ulamec. "The lander is ready for operations."

If coming out of hibernation isn't surprising enough, it appears [Philae](#) has been awake for a while because it included historical data along with its current status in those packets. There are still more than 8000 data packets in Philae's mass memory which will give the mission scientists information on what happened to the lander in the past few days on Comet 67P/C-G.

Philae shut down on November 15 after about 60 hours of operation on the comet after landing at the base of a steep cliff in a shaded area that prevented the solar panels from charging its batteries. Since March 12, the Rosetta lander has been "listening" for a signal from the lost lander.

Throughout, mission scientists remained hopeful that the comet's changing orientation and increase in the intensity of sunlight as it approached perihelion would eventually power up the little lander. Incredible that it really happened.

Yesterday, [in another Universe Today article] we looked at the many attempts to find Philae. A day later it's found us!

Surprise #2: Rosetta Discovers New Molecular Breakup in Coma

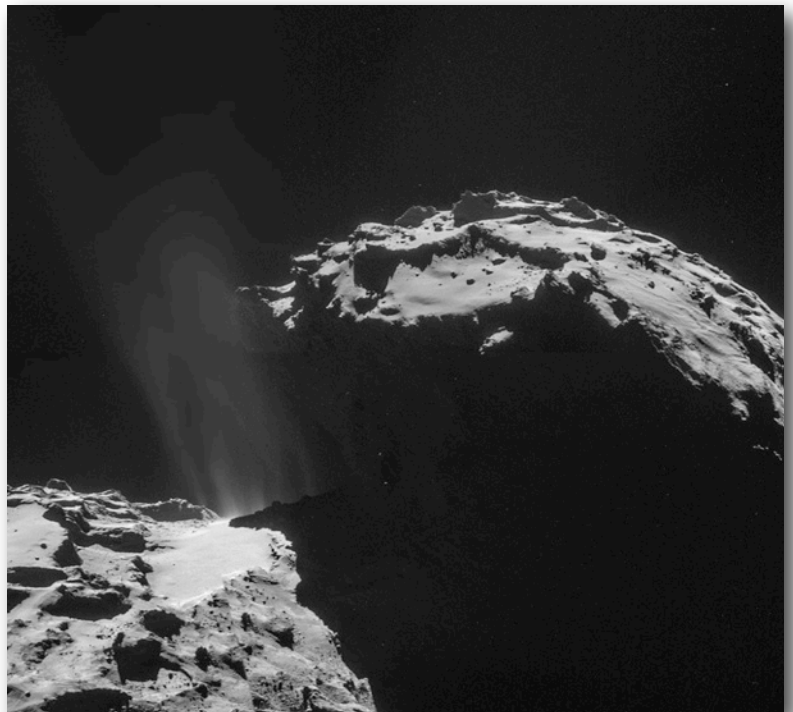
by KEN KREMER on JUNE 4, 2015
Universe Today (with editing by SGN)

A NASA science instrument flying aboard the European Space Agency's (ESA) Rosetta spacecraft has made a very surprising discovery — namely that the molecular breakup mechanism of "water and carbon dioxide molecules spewing from the comet's surface" into the atmosphere of comet 67P/Churyumov-Gerasimenko is caused by "electrons close to the surface." Until now it had been thought that photons from the sun were responsible for causing the molecular breakup. The carbon dioxide and water are being released from the nucleus and the excitation breakup occurs barely a kilometre above the comet's surface.

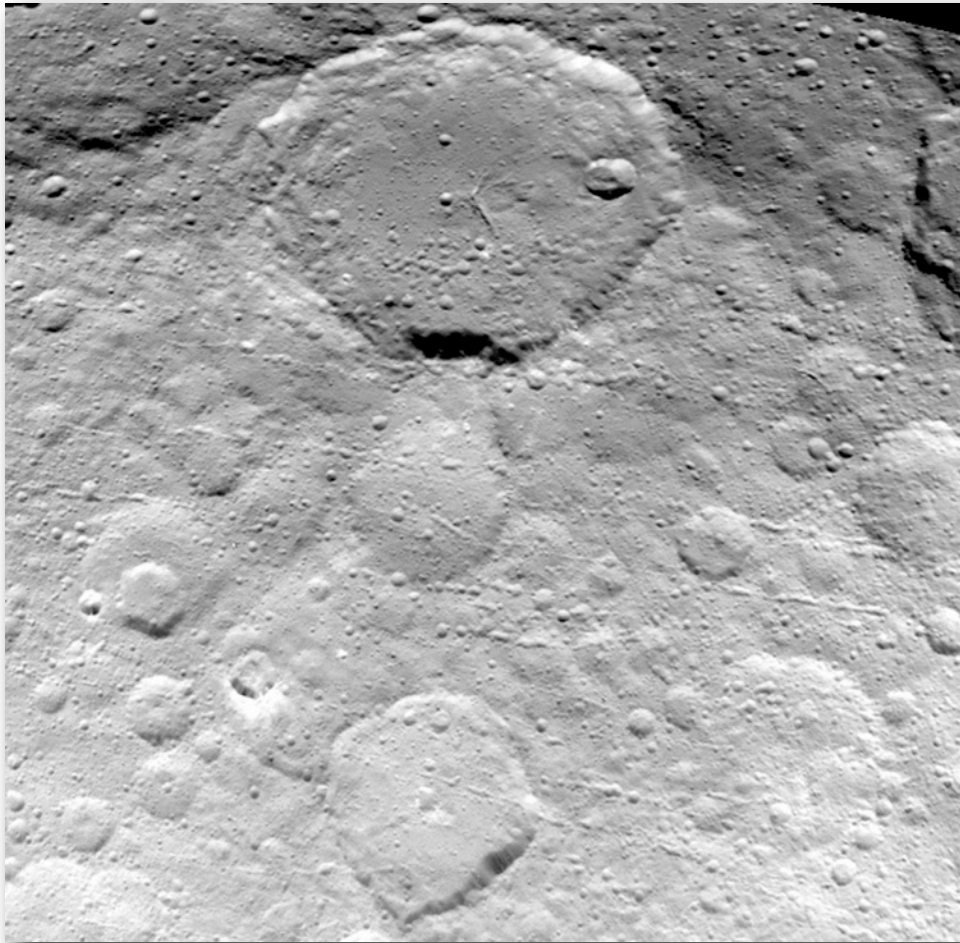
The instrument called Alice [not an acronym -ed], an Ultraviolet Imaging Spectrometer observed atomic emissions from molecules of water and carbon dioxide that were being broken up by electrons in the immediate vicinity of the comet's nucleus. According to the measurements, the water and carbon dioxide in the comet's atmospheric coma originate from plumes erupting from its surface.

"It is similar to those that the Hubble Space Telescope discovered on Jupiter's moon Europa, with the exception that the electrons at the comet are produced by solar radiation, while the electrons at Europa come from Jupiter's magnetosphere," said Paul Feldman, an Alice co-investigator from the Johns Hopkins University in Baltimore, Maryland, in a statement.

Comet 67P is still becoming more and more active as it orbits closer and closer to the sun over the next two months. The pair reach perihelion on August 13, 2015 at a distance of 186 million km from the Sun, between the orbits of Earth and Mars.



Jets of gas and dust are blasting from the active neck of Comet 67P/Churyumov-Gerasimenko in this photo mosaic assembled from four images taken on 26 September 2014 by the Rosetta spacecraft at a distance of 26.3 km from the center of the comet.
Credit: ESA/Rosetta/NAVCAM/Marco Di Lorenzo/Ken Kremer/kenkremer.com



Successful Dawn Mission Continues

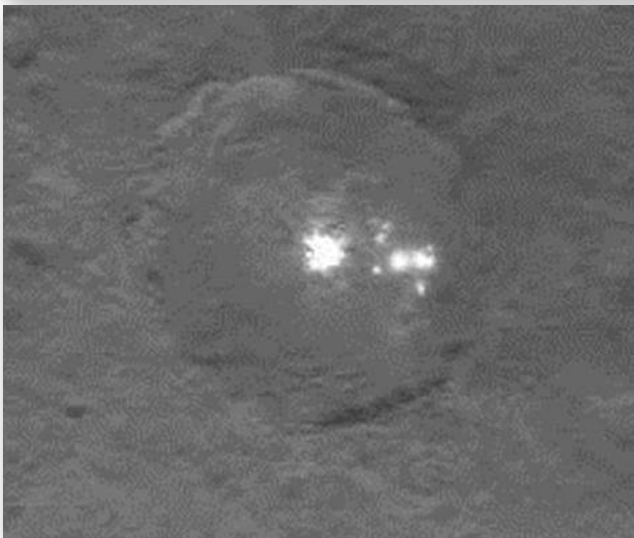
The Dawn spacecraft continues to orbit Ceres and send back stunning images of surface features -more than just white spots inside craters. Ceres is finally a real world that map makers can marvel over and we can enjoy. Hmm, seen stuff like this on the Moon?

This image of Ceres is part of a sequence taken by NASA's Dawn spacecraft on May 23, 2015, from a distance of 5,100 kilometers. Resolution in the image is about 480 m/pixel.

The view shows numerous secondary craters, formed by the re-impact of debris strewn from larger impact sites. Smaller surface details like this are becoming visible with increasing clarity as Dawn spirals lower in its campaign to map Ceres.

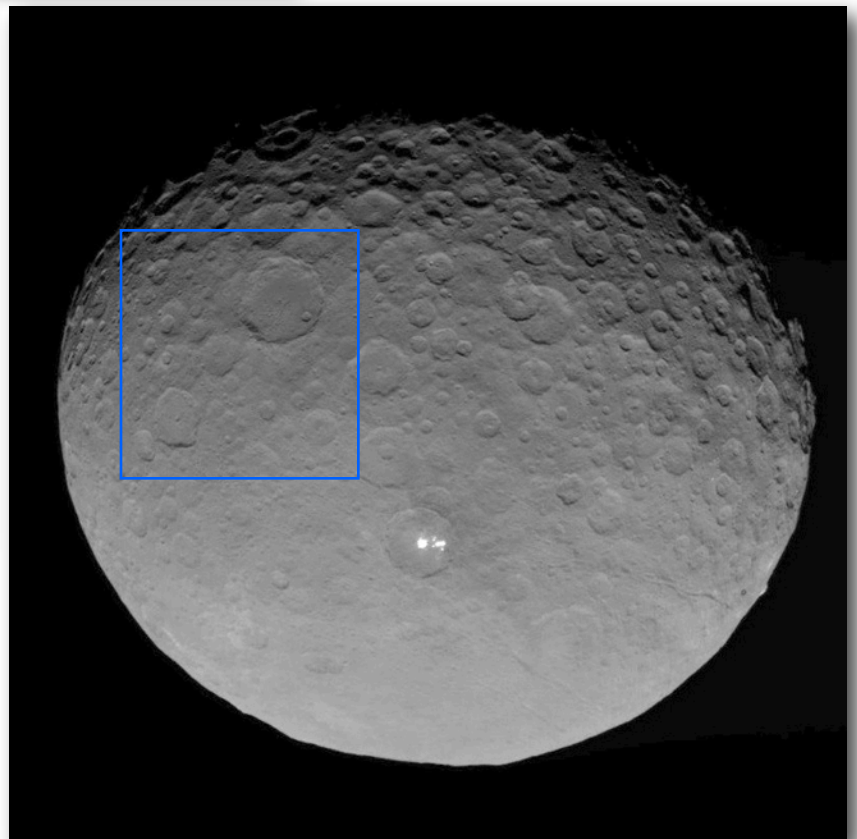
The region shown here is located between 13 degrees and 51 degrees north latitude and 182 degrees and 228 degrees east longitude. The image has been projected onto a globe of Ceres, which accounts for the small notch of black at upper right.

The crater trio is easy to find in the full face image below. The shadowed wall separating the large and small crater shows up clearly and the blue box below outlines the area. This full face image was taken May 4, 2015, from 13,600 km.



The origin of the white spots is still the subject of debate. The latest view May 16 from 7 200 km, shows the flashes of sunlight reflected by the spots inside a 90-km wide crater. There's one big spot with a smattering of smaller spots off to the right.

UCLA astronomer Christopher Russell, the Dawn mission's principal investigator says: "... we have these bright spots that have the reflectivity of ice, and whose spectrum of reflected light is similar to that expected from ice. So ice is a good bet." But Carol Raymond, a deputy PI at JPL, said there's still a chance that the reflective material is a type of salt, or perhaps a mixture of ice and salt. By December, when Dawn reaches its lowest 375 km orbit above the surface, the mystery should be solved.



For more information about the Dawn mission, visit <http://dawn.jpl.nasa.gov>.

827 km Closer Every Minute!

NASA's New Horizons spacecraft doesn't pass Pluto until July 14 – but the mission team is making new discoveries as the piano-sized probe bears down on the Pluto system.

In a long series of images obtained by New Horizons' telescopic Long Range Reconnaissance Imager (LORRI) May 29-June 19, Pluto and its largest moon, Charon, appear to more than double in size. From this rapidly improving imagery, scientists on the New Horizons team have found that the "close approach hemisphere" on Pluto that New Horizons will fly over has the greatest variety of terrain types seen on the planet so far. They have also discovered that Charon has a "dark pole" – a mysterious dark region that forms a kind of anti-polar cap.

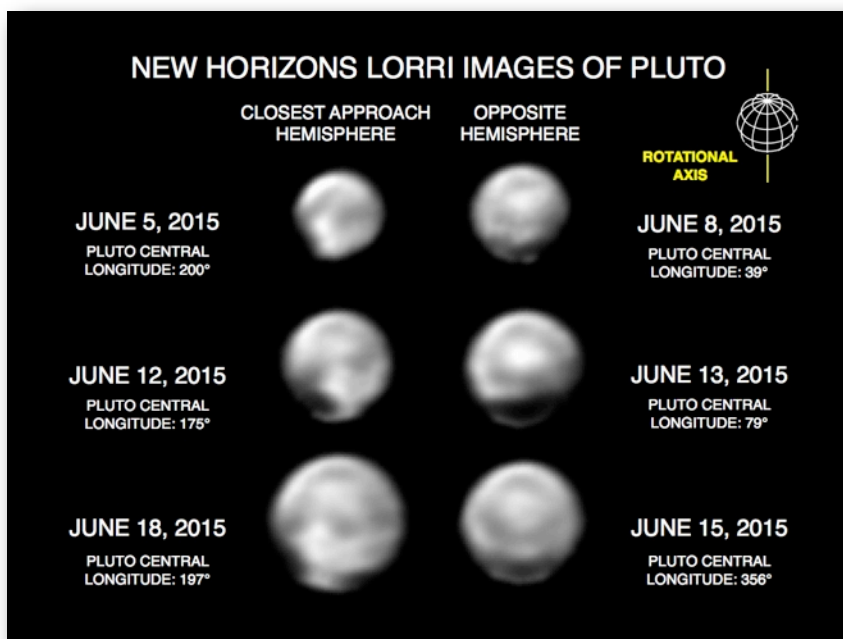
"This system is just amazing," said Alan Stern, New Horizons Principal Investigator, from the Southwest Research Institute, Boulder, Colorado. "The science team is just ecstatic with what we see on Pluto's close approach hemisphere: Every terrain type we see on the planet—including both the brightest and darkest surface areas – are represented there, it's a wonderland!

"And about Charon—wow—I don't think anyone expected Charon to reveal a mystery like dark terrains at its pole," he continued. "Who ordered that?"

New Horizons scientists use a technique called deconvolution to sharpen the raw, unprocessed pictures that the spacecraft beams back to Earth; the contrast in these latest images has also been stretched to bring out additional details. Deconvolution can occasionally produce artifacts, and Pluto's non-spherical appearance in these images is not real; it results from a combination of the image-processing technique and Pluto's large variations in surface brightness.

"The unambiguous detection of bright and dark terrain units on both Pluto and Charon indicates a wide range of diverse landscapes across the pair," said science team co-investigator and imaging lead Jeff Moore, of NASA Ames Research Center. "For example, the bright fringe we see on Pluto may represent frost deposited from an evaporating polar cap, which is now in summer sun."

[On June 22] New Horizons was approximately 4.7 billion kilometers from Earth and just 25 million kilometers from Pluto. The spacecraft and payload are in good health and operating normally.



A very well-done video of where we have been so far (and the possible view at Pluto) is available here:

http://earthsky.org/space/new-horizons-has-a-cool-teaser-trailer?utm_source=EarthSky+News&utm_campaign=8fc774cd02-EarthSky_News&utm_medium=email&utm_term=0_c643945d79-8fc774cd02-394151061

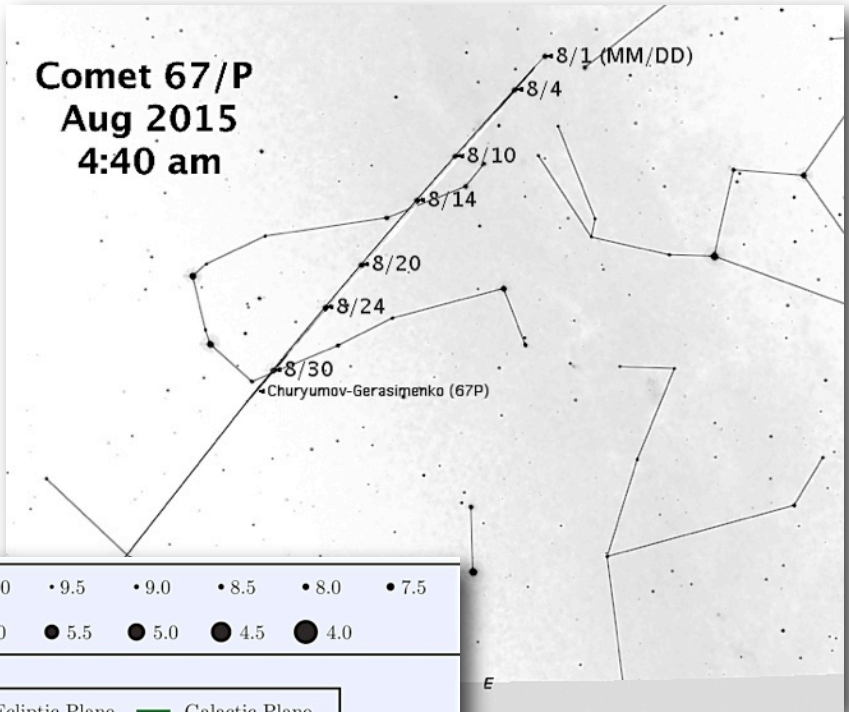
Below: A clip from Erik Wernquist produced video -artists conception of Pluto's surface



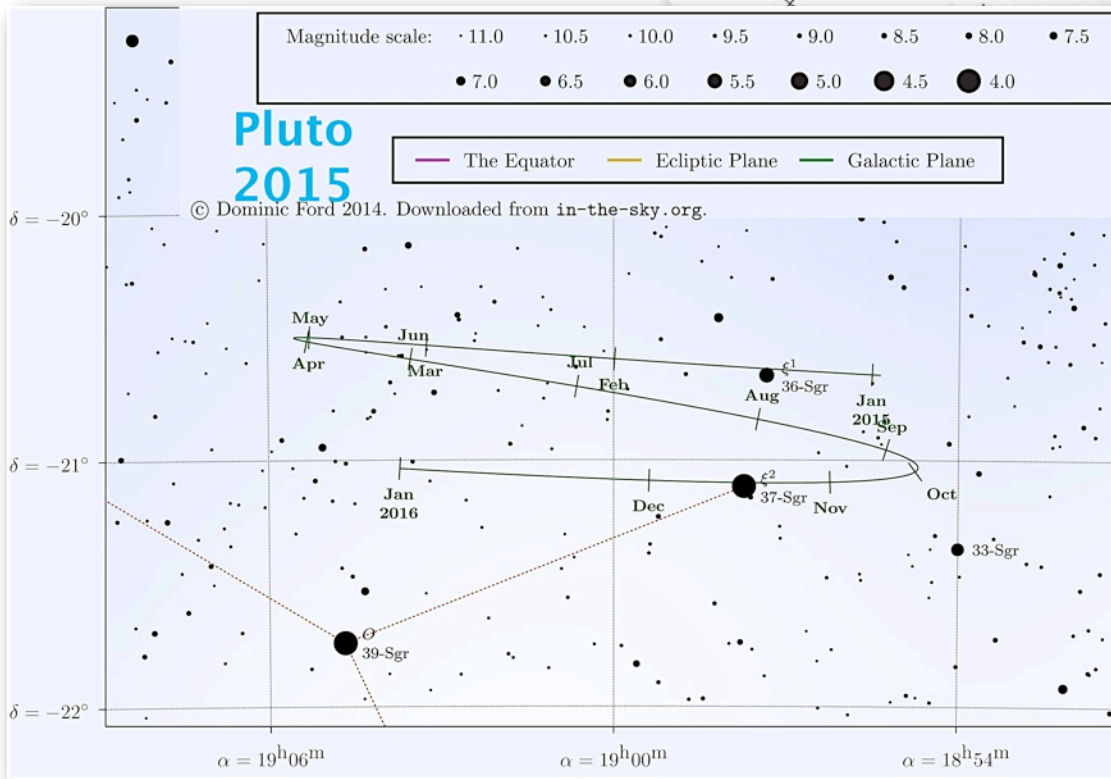
Two Challenges and One Slam-dunk!

Three interesting solar system objects are being visited by spacecraft this year and all three spacecraft are sending back amazing images and data. The close up views from Rosetta, Dawn and New Horizons are nothing short of spectacular.

But how about actually observing these objects with a telescope? It turns out that all three are not beyond the range of a medium-sized instrument and this summer is prime time to see them for yourself. The charts here are provided to guide you in your viewing. A warning, Pluto at magnitude 14.1 even at opposition in early July, will require a large telescope, probably 10 or maybe 12-inch. Comet 67/P brightens to 13.2 in August and similarly needs a medium-sized scope. Ceres is easiest at magnitude 7.5.



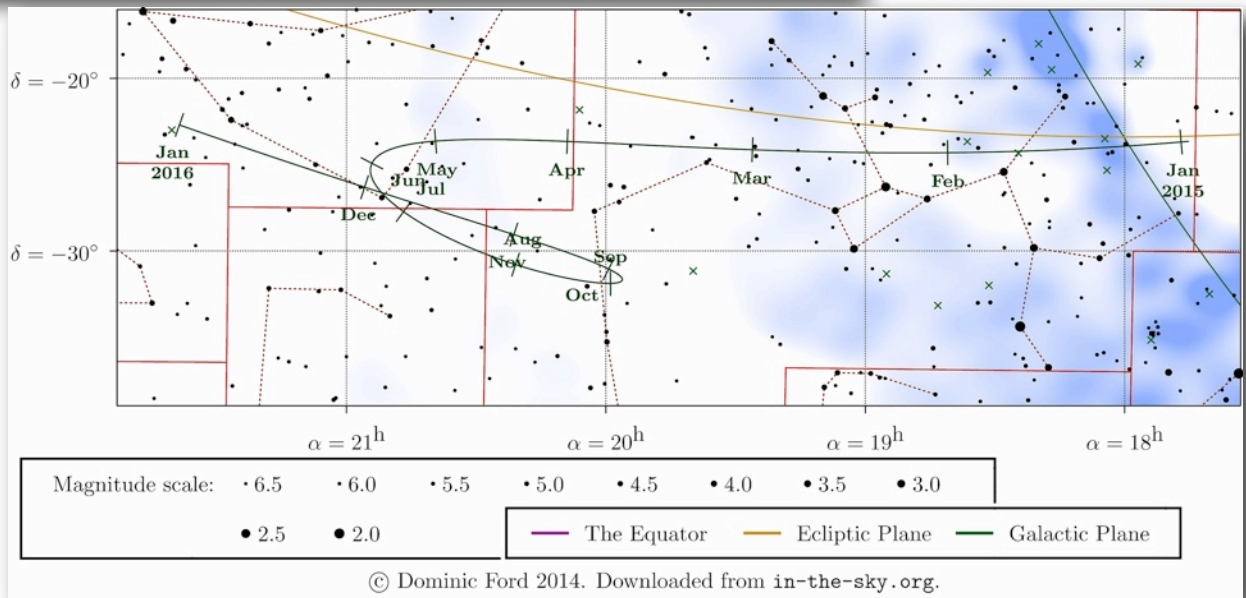
Comet 67/P: Chart above shows path of 67/P when it is brightest during 2015. Look just before dawn for the comet at magnitude 13.2 during the entire month of August. Best time is around new moon Aug 14 but even in Sep, 67/P is still close to 13.2 magnitude.



Pluto: Chart left shows path of Pluto near the “Teaspoon” in Sagittarius. Note that the month labels are below the ticks for Jan to Apr and above for May to Sep. Pluto moves eastward from Jan 2015 then retrogrades west, then resumes eastward motion in Oct. Magnitude is 14.1 at opposition on July 6.

Ceres: Chart right shows path of Ceres (also at opposition in July) and a bright magnitude 7.5 for viewing (binos?). Note that Ceres and Pluto are in neighbouring constellations. Catching both in a single night would be a good night's work.

More detailed charts are required to confirm your sightings and Starry Night, Sky Safari or the RASC Handbook are recommended.



2015 Bayside Astronomy Program at Lion's Head POD: Sharing the "WOW" Factor in Astronomy

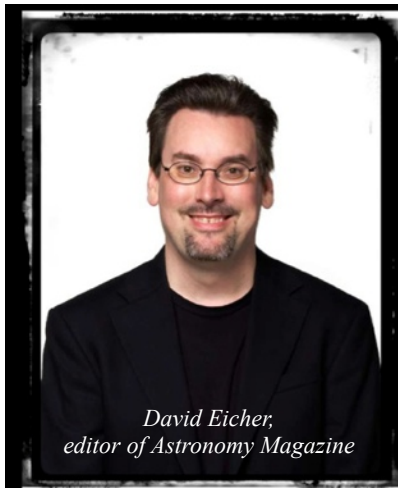
*"I'll chase the Sun from break of day
Till sunset's ruddy glow,
Then chase the stars till they away
At Twilight's soft hello ...
Of boundless seas and endless lands,
Of wonders great and small,
Then take my store of treasures all,
And share them all with you."*

"Song of the Adventurer" by Courtney Seligman

I remember the experience as if it occurred yesterday. It was the evening of November 7th, 2004. I was in our Quetican Observatory, processing the lunar video images that I had taken a number of days previously. My wife, Paula, opened the observatory door and said ***"Of all the times for you to be inside looking at a computer screen when the whole sky is ablaze with northern lights!"*** I went outside and looked up, .. and was simply stunned! Although my vision had not yet dark adapted, I was witnessing a spectacular auroral display (two images right). The universe was reaching out and touching us with her beauty. I continued to observe and image this magnificent auroral display until the early hours of the morning. To date, it was my best northern lights' experience and became another astronomical "WOW" experience. Although two-dimensional photos don't really do justice to my experience, I include two of them at right.

Robert Burnham, author of the classic, three volume "Celestial Handbook", really captured the essential attraction of amateur astronomy. Burnham wrote in his introduction:

"The appeal of astronomy is both intellectual and aesthetic; it combines the thrill of exploration and discovery, the fun of sight-seeing, and the sheer pleasure of first hand acquaintance with incredibly wonderful and beautiful things."



David Eicher,
editor of Astronomy Magazine

In a nutshell, those are the reasons why I have remained an avid amateur astronomer for over 46 years. I suspect that many of the readers of my column share these sentiments. I call it experiencing the celestial "WOW" factor.

This "WOW" factor is certainly no stranger to David Eicher, the editor of Astronomy Magazine. In his early years, David was the

editor of a specialty observer's magazine called "Deep Sky Monthly. It's no wonder that David is a knowledgeable and poetic interpreter of the night sky. Paula and I have experienced his magic



Great Aurorae of Nov 7th, 2004: Images above are 73 s and 36 s Canon Digital Rebel, 18 mm lens, ISO 800. Doug Cunningham photos

first hand as we have observed with him at Arizona Sky Village and New Mexico's Rancho Hildago. One night, using Gene Turner's 30 inch Dobsonian telescope, David shared with us his vast knowledge of the night sky. The "WOW" factor was readily on display as he moved the telescope to numerous celestial objects. We enjoyed premium views of Leo 1, Thor's Helmet, the Witch Head Nebula, and Hubble's Variable Nebula -- to name just 4 of them. The memories of those nights are still clear in my memory bank.

Eicher has described how, as a 14 year old teenager, he became hooked on astronomy. Someone shared the "WOW" factor with him by showing him the great Hercules Globular Cluster, M13. Eicher wrote later about how that experience changed him:

"I came away from that night reeling with excitement, as if I had been let in on a carefully guarded secret. The world around me hadn't changed. But, I felt profoundly different. I was keenly aware, as never before, that out beyond the blue sky lay vast numbers of stars and worlds, unseen. I couldn't help feeling differently. I had the whole Universe on my mind."



2014 Bayside Volunteers (L to R) - Brian Reis, Jeff Hatt, Reed Rodgers, Doug Cunningham, Paula Cunningham, John Rodgers, Graham Thomas, Griffin Thomas, Jim Kuellmer, Mike Warkentin, Christine Brown, Wendy Reis, Lee Brown (missing from photo Bill Hansen, Amanda Stanger, Darci Lombard, Lindsay Miller)

Our Northern Bruce Peninsula has the darkest night skies in SW Ontario. We think that the best way to protect our night skies from light pollution is through public education. Under the sponsorship of the Bruce Peninsula Biosphere Association, and with the very capable leadership of Elizabeth Thorne, we instituted, in the summer of 2012, our Bayside Astronomy Program and hired Amanda Stanger as our student manager.

By showcasing the poetic and intellectual aspects of astronomy and sharing the “WOW” factor with the public, we hope to build support for preserving our dark night skies. Our Program is offered at 4 venues; at the POD in Lion’s Head (the POD is an open air planetarium), at the beach at Summer House Park, at the beach at Miller’s Family Camp, and at the Bruce Peninsula National Park’s Singing Sands. The program is delivered by a group of 16 volunteers and one paid university student. Although the Biosphere Association has purchased three beautiful telescopes for us to use, most of our volunteers use their own telescopes. The Bayside Astronomy Program is free and it runs for 9 weeks throughout July and August. Over the past 3 summers we have shared our beautiful night skies with local residents and visiting tourists from all over the world .. around 6,000 people in all.

Lee and Christine Brown have been volunteers for our Bayside Astronomy program since it started three years ago. They are shown



at left, outside our 4-Elements Observatory, standing beside Christine’s new, 12-inch Orion GoTo Dobsonian telescope. Once Christine had mastered the GoTo functionality of her scope she spent the remainder of the night enjoying a Sky Tour. She and her husband then viewed many objects, but when they came to M11 in Scutum, an open cluster known by most amateurs as the “Wild Duck Cluster”, both of them exclaimed “WOW”! I smiled. The universe had touched their souls! I am quite sure that, during our Bayside Astronomy Program this summer, M11 will be a prominent feature of their own program of sharing.



From the editor:

M11, the “Wild Duck Cluster is one of my favourite open clusters and having seen it dozens of times through ever larger telescopes. it has taken on a new appearance to me. I started calling it the “Borg Cube” a few years back and now, I cannot get that image out of my head every time I look at it. I hope you will not be similarly affected. Let me know how you make out. Image above was taken in Sep 2008 with a Canon 20D at prime focus of TV NP101 540 mm focal length, f/5.4, ISO 800, 204 s exposure manually guided.-ed

Progress on the Light Pollution Front? -part 1



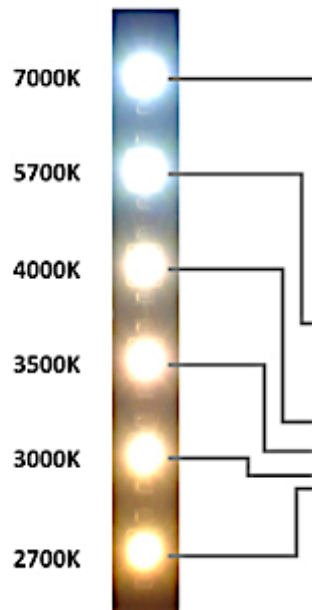
LEDs Taking Glow out of Owen Sound

The City of Owen Sound has completed a million dollar street light exchange program to convert most of its streetlights to newer, less-expensive-to-operate and more efficient LED (Light Emitting Diode) lights. Almost all of the old lights were the typical high pressure sodium lights (HPS) that cast that yellow-orange glow (some people called the colour "calming") over the streets and residential areas. The new lights are the more expensive LED lights that are a much whiter light than the HPS. As an amateur astronomer concerned about the spread of light pollution and having

heard of instances where the new lights caused citizen complaints, I was keen to learn what I could about the new lights and monitor the changes in light levels in the city. (Actual data will be presented in the Aug SGN).

The colour of lighting is described by temperature values and is illustrated in the diagram above. The closer the value to the 7000K end of the spectrum, the bluer the light. The eye sees 5700K light as pretty much white. This is related to the colour of stars in astronomy in that stars can be categorized by a colour-temperature as well: -Vega for ex. is a blue star with a surface temperature of 8900K and the red giant Garnet Star in Cepheus is 2200K. Each has a distinct colour as seen visually in a telescope. The new streetlights (and other light-emitting devices) use solid state LEDs to produce light (not a glowing gas as in stars) and the spectral colours are not related to temperature. However, the designation in °K remains to describe colour.

Basic LED Reference Example



LEDs appeared years ago (along with the first transistors) and are used in many electronic devices. They are familiar as POWER ON indicators in several colours, the glowing digits in clock radios and other displays. The very first LEDs were red only; -you may recall the red digits on wrist watches and calculators (I still have a working -more or less, red-display calculator). These were quickly supplanted by another device which did not actually emit light, the liquid crystal display (another topic for another day). The preferred colour for clock radios on bedside tables is still red and I would still like to get a hold of a red LED wrist watch for use in astronomy, now under \$10. The most recent batch of LEDs can put out light of all colours, red, green and blue and now white LED lights are fairly common. As for municipal lighting, in the last 4 or 5 years, the white LED has become the replacement of choice by cities all over the world as the old lights wear out and are scrapped.

The older lights in Owen Sound had been a variety of styles but mostly HPS with 2000K colour temperature (off the bottom of the colour chart). The city had gradually been changing the "Cobra Head" type to the more squat "Flat Lens" (my name for them) fixture which threw out much less light horizontally and up -their first attempt at eco-friendly lighting. The city also had decorative lights which were spherical with frosted or clear glass (check out

Visible light is just the part of the electromagnetic spectrum that our eyes can see. That's what makes LED lights so efficient: unlike incandescent bulbs, LEDs only emit visible light. #IncandescentFail

PERIMETER INSTITUTE

pathways of Harrison Park. Images provided below.

Then there are the “tear-drop” shaped lights along the main street. Some of these have clear glass on the top that allows a blinding white light to stream skyward to illuminate the undersides of jet aircraft, apparently. I could see no other purpose for that particular design feature. Since the city is not replacing these, and, the businesses on both the east and west approaches to Owen Sound are still using excessive illumination, more can be done, I think, on the light pollution front.

Next Month in part 2: Data Tells the Story



Left: Original HPS (High Pressure Sodium) lights had a very yellow output (2000K)
Below: First round of replacements only changed to a full cutoff fixture.

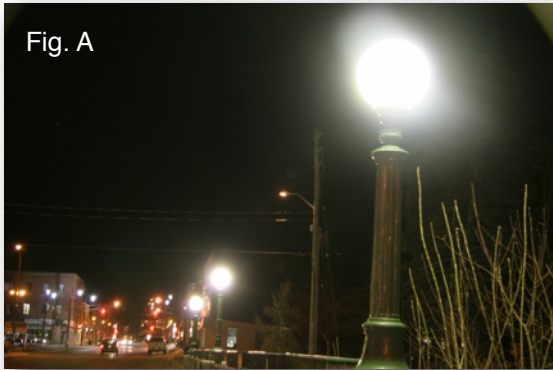
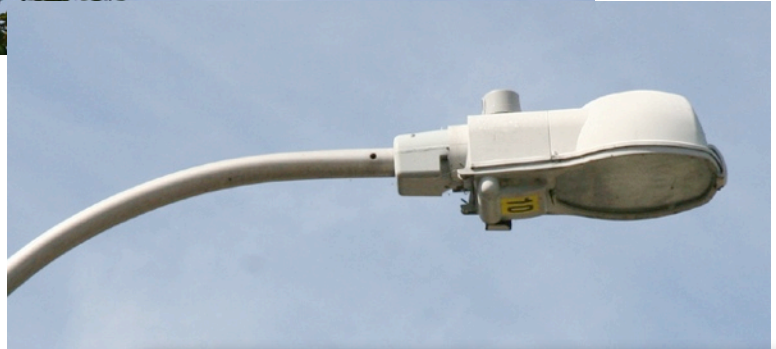


Fig. A



IN with the NEW



Fig. B



Fig. E

Worst Offenders Gallery

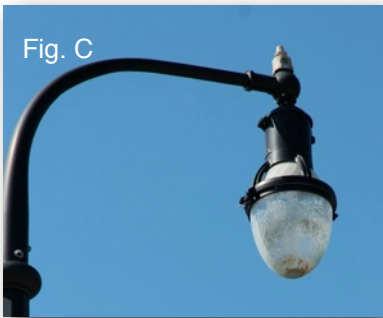


Fig. C



Fig. F

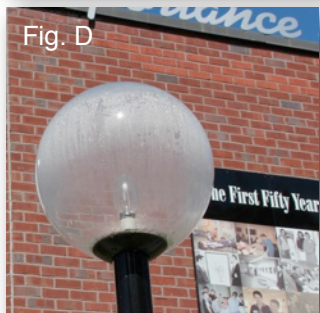
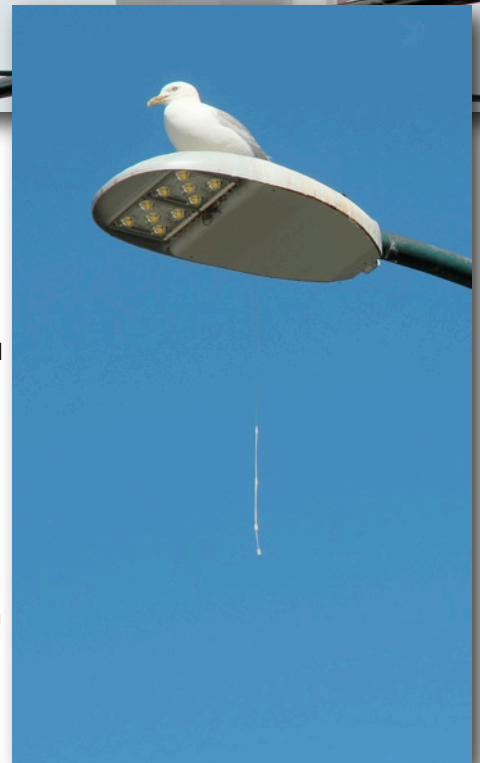


Fig. D

The “top hat” (Fig.F above) and “carriage lights” (Fig.E) at least shed less light skyward than the bulbs in Figs. A to D. The upper clear glass of the four bulbs on the left allows light upwards where it does no good whatsoever.

The new (LED) lights are much sleeker looking and conveniently fit right onto the same support pipe. **Image right:** new LED being christened by a seagull in the traditional way. Looks like seagull feces does not stick to the top surface of the lights very well, a positive design feature. [A note to other photographers: chances that you will catch a seagull in the act are about 1 in 3 but only if you stand within splatter distance of the streetlight. Wear a raincoat.]



New Exoplanet Discovered by 15-yr old

Keele University press release Jun 10, 2015

A 15-yr-old schoolboy has discovered a new planet orbiting a star 1000 light years away in our galaxy. Tom Wagg was doing work-experience at Keele University when he spotted the planet by finding a tiny dip in the light of a star as a planet passed in front of it.

"I'm hugely excited to have a found a new planet, and I'm very impressed that we can find them so far away", says Tom, now aged 17. It has taken two years of further observations to prove that Tom's discovery really is a planet.

Tom found the planet by looking at data collected by the WASP (Wide Angle Search for Planets) project, which surveys the night skies monitoring millions of stars to look for the tell-tale tiny dips (transits) caused by planets passing in front of their host star.

Tom's planet has been given the catalogue number WASP-142b, being the 142nd discovery by the WASP collaboration. It is in the southern constellation of Hydra. While astronomers worldwide have now found over 1000 extra-solar planets, Tom is possibly the youngest ever to have done so.

"The WASP software was impressive, enabling me to search through hundreds of different stars, looking for ones that have a planet", says Tom. The planet is the same size as Jupiter, but orbits its star in only two days. With such a short orbital period the transits occur frequently, making such planets much easier to find.

While the planet is much too far away to see directly, an artist's impression shows how it might look (image top right). The hemisphere facing the star is hot, blasted by the radiation from the star, while the other hemisphere is much cooler.

Tom, a pupil at Newcastle-under-Lyme School who has always been keen on science, asked for the work-experience week after learning that Keele University

had a research group studying extra-solar planets.

"Tom is keen to learn about science, so it was easy to train him to look for planets", says Professor Coel Hellier, who leads the WASP project at Keele. Tom has since achieved 12 GCSEs, all at A*, and wants to study physics at university.

The planet is one of a class of "hot Jupiter" planets, which -- unlike the planets in our own Solar System -- have very tight orbits close to their stars. They are thought to have migrated inwards through interactions with another planet. Thus it is likely that Tom's planet is not the only planet orbiting that star.

The planet does not yet have a name, though the International Astronomical Union has started a contest to name extra-solar planets. Tom is looking forward to making a suggestion for his planet.

The WASP collaboration (Wide Angle Search for Planets) is the UK's leading team discovering planets, having been recognized with a Group Achievement Award by the Royal Astronomical Society. Keele University operates WASP-South, an array of cameras which surveys the Southern Hemisphere sky each clear night. The WASP consortium also involves scientists from the Universities of Warwick, Cambridge and St. Andrews, and collaborates with scientists in Switzerland, France and Belgium. After Tom found the candidate planet, it was studied by astronomers at the University of Geneva and the University of Liege, to prove that it has the right size and mass to be a planet.

A paper reporting an analysis of WASP-142b is being prepared.



Keele University



Keele is in N. Staffordshire between Manchester and Birmingham.



Above: Artists impression of Wasp-142b, a "hot Jupiter" with a 48 hour orbit. The planet did not form there but probably migrated there as a result of an extreme gravitational encounter with another body in the system.



Above: Tom Wagg, youngest exoplanet discoverer **Keele University photo**

New Asteroid: (4864) Nimoy = 1988 RA5

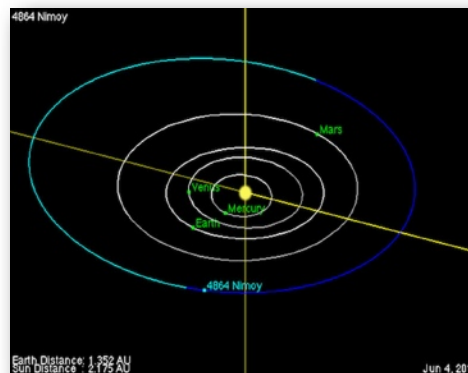
Discovered 1988 Sept. 2 by H. Debehogne at the European Southern Observatory.

Leonard Nimoy (1931–2015) was an American actor, film director and poet. Best known for his portrayal of the half-Vulcan/half-human science officer Spock in the original "Star Trek" TV series and subsequent movies, Nimoy wrote two autobiographies: I Am Not Spock (1975) and I Am Spock (1995). [M.P.C. 94384](http://www.imdb.com/name/nm0634241/)

4864Nimoy was discovered by Belgian astronomer Henri Debehogne on September 2, 1988 and given the provisional designation 1988 RA5. This month, Spock's "star" doesn't get any brighter than 16th magnitude as it slowly tracks from Capricornus into Sagittarius in the late night sky. Come mid-July, amateurs with 14-inch or larger telescopes might glimpse it when it brightens to magnitude 15.

Watch all the "Fascinating" clips in this video: (yes, every single one!)

<https://www.youtube.com/watch?v=cFods1KSWsQ>



Ophiuchus (OPH)

α-Ophiuchi - Ras Alhague β-Ophiuchi - Cheleb
 δ-Ophiuchi -Yed Prior ε-Ophiuchi-Yed Posterior
 ζ-Ophiuchi -Han η-Ophiuchi - Sabik λ-Ophiuchi - Marfic

Ophiuchus and Serpens, the Serpent, although considered to be two separate constellations, actually have several stars in common. On the chart Serpens is indicated by the broken line and Ophiuchus by the solid line, Serpens is further broken down into two parts; Serpens Caput, the Serpent's Head, and Serpens Cauda, the Serpent's Tail. It is counted as only one constellation. The Serpent forms a giant semicircle of stars in the sky; taken together, the two constellations seem to indicate the shape of a giant ostrich. The head of the Serpent is about 7° south of Corona Borealis. Ras Alhague, the brightest star in Ophiuchus, is at one corner of a huge isosceles triangle formed by itself, Altair in Aquila, and Vega in Lyra, Altair is at the apex of the triangle and lies to the east of the other two. Many clusters lie in the boundaries of these constellations, especially in the southern areas, which lie in the plane of the MW.

DOUBLE STARS [Note: Bold numbers = negative Dec]

| | Mag. | Sep (s) | Location | Remarks |
|-------|---------|---------|----------|-------------------------------|
| η | 3.0-3.4 | 1 | 170716 | |
| ο | 5.4-6.9 | 11 | 171524 | Yellow-Blue. |
| ρ | 5.2-5.9 | 3 | 162223 | Yellow-Blue. |
| 19 | 6.0-9.0 | 23 | 164502 | |
| 36 | 5.3-5.3 | 4 | 171226 | Yellow-Red. |
| 53 | 5.8-8.2 | 41 | 173210 | |
| 61 | 6.2-6.6 | 21 | 174203 | |
| 67 | 3.9-8.0 | 55 | 175803 | Yell-Purp; striking contrast. |
| 70 | 4.3-6.0 | 4 | 180303 | Yellow-Purple. |
| Σ2166 | 5.6-7.4 | 27 | 172612 | White-Pale Blue. |
| Σ2173 | 6.1-6.1 | 0.7 | 172801 | |
| P236 | 6.1-8.3 | 4 | 165419 | |

MESSIER OBJECTS (OPH)

| | Mag | Location | Remarks |
|-------|-----|----------|--|
| M 9 | 7.3 | 171618 | Globular Cl. Many minute stars. |
| M 10 | 6.7 | 165504 | Globular Cl. Rich in stars; easy to resolve. |
| M 12 | 6.6 | 164502 | Globular Cl. Very fine and bright, with condensed center. Easy to resolve. |
| M 14 | 5.7 | 173503 | Globular Cluster. Very large. |
| M 19 | 6.6 | 170026 | Globular Cluster. |
| M 62 | 6.6 | 165830 | Globular Cluster. |
| M 107 | 9.2 | 163013 | Globular Cluster. |

Other Objects of Interest in Ophiuchus

V-Ophiuchi -Long per (298 days) var. max. mag. 7.5. Location 162312

Serpens Caput & Cauda

DOUBLE STARS (SERPENS CAPUT)

| | Mag. | Sep (s) | Location | Remarks |
|-------|----------|---------|----------|---------------------------|
| β | 3.7-9.0 | 31 | 154416 | |
| δ | 4.2-5.2 | 4 | 153211 | Pale Yellow-Ashen; beaut. |
| ψ | 5.2-10.0 | 11 | 151702 | |
| Σ1931 | 6.2-7.6 | 13 | 151610 | |
| Σ2007 | 6.5-8.0 | 35 | 160313 | |

DOUBLE STARS (SERPENS CAUDA)

| | Mag. | Sep (s) | Location | Remarks |
|---|---------|---------|----------|------------------|
| θ | 4.5-5.4 | 22 | 185404 | Both Deep Yellow |
| ν | 5.0-9.0 | 47 | 171813 | Green-Lilac |

MESSIER OBJECTS (SERPENS CAPUT)

| | Mag | Location | Remarks |
|-----|-----|----------|---|
| M 5 | 6.2 | 151602 | Globular Cl. Called almost as good as the Hercules Cluster; a very beautiful object. [Yes, indeed! -ed] |

MESSIER OBJECTS (SERPENS CAUDA)

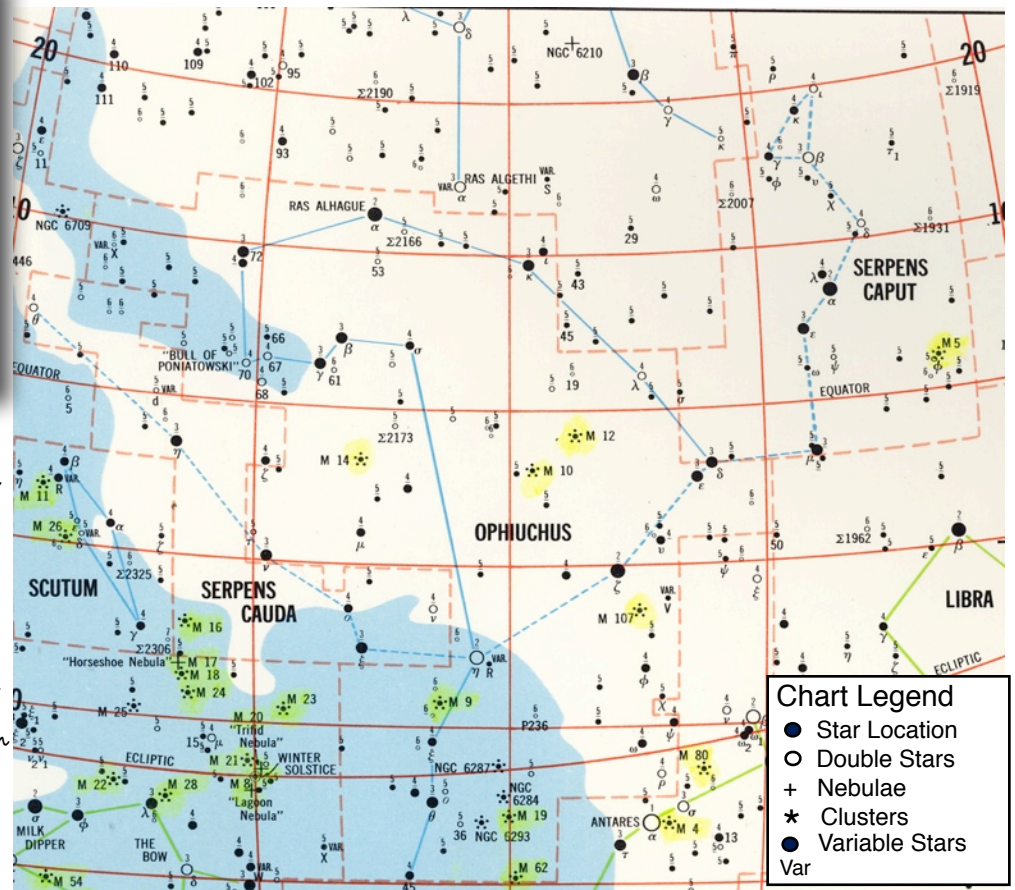
| | | | |
|------|-----|--------|---|
| M 16 | 6.4 | 181614 | Open Cl. [The Eagle or Star Queen Neb. surrounds this cluster. Many more Messiers to the south in Sag! -ed] |
|------|-----|--------|---|

M 5
Globular
Cluster
in Oph.



From Messier's notebook:

The night of May 23 to 24, 1764, I have discovered a beautiful nebula in the constellation of Serpens, near the star of sixth magnitude; the fifth according to the catalog of Flamsteed. That nebula doesn't contain any star; it is round, & could have a diameter of 3 arc minutes; one can see it very well, under a good sky, with an ordinary [non-achromatic] refractor of one foot [FL]. I have observed that nebula in the Meridian, & I have compared it to the star Alpha Serpentis. Its position was RA 226d 39' 4", & its declination 2d 57' 16" north. On March 11, 1769, at about 4:00 in the morning, I have reviewed that nebula with a good Gregorian telescope of 30 pouces [inches], which magnified 104 times, & I have ensured that it doesn't contain any star.



Date: (Time given on 24 h clock DST unless otherwise noted).

- Jul 01 22:20 **FM** rises locally at 8:38 pm EDT
- 05 14:54 Moon at perigee: 367 095 km
- 06 08:59 Earth at aphelion: 1.0167 au (farthest from Sun)
08:00 Pluto at opposition (mag. 14.1)
- 08 16:24 **LQ Moon** rises locally at 1:27 am EDT
23:00 Uranus 0.8° N of Moon. Occultation S. Indian O.
- 10 -- **Venus maximum brightness (-4.7)**
- 12 14:00 Aldebaran 0.9° S of Moon. Occultation Arctic region
- 14 17:15 Venus 1.5°S of Regulus
- 15 21:24 **NM** rises locally at 5:41 am EDT
- 18 13:34 Jupiter 4.1°N of Moon. Venus, Crescent Moon,
Jupiter Regulus group in W. Nice! Also July 19.
21:06 Venus 0.4°N of Moon: Occultation in S.Pacific
- 21 07:02 Moon at apogee: 404 837 km
- 23 15:00 Mercury at superior conjunction
- 24 00:04 **FQ Moon** rises locally at 2:29 pm EDT
- 25 04:00 **Ceres in opposition (mag. 7.5)**
- 26 04:43 Saturn 2.2°S of Moon
- 31 06:43 **FM** rises locally at 8:48 pm EDT (2nd FM in July!)

BAS Astronomy Events

JULY (note BAS meeting is July 8, NOT July 1 Canada Day)

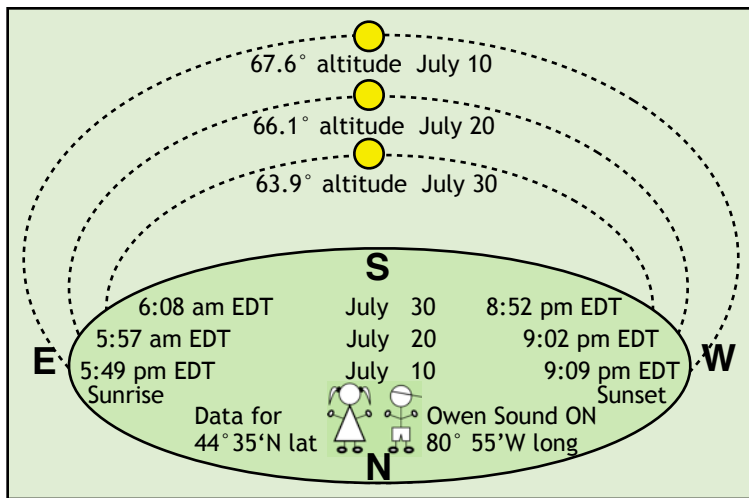
- Jul 1 Wed FM
Venus and Jupiter conjunction. Less than a half a degree apart.
- Jul 8 Wed LQ
BAS meets at ES Fox Observatory Topic: KW
Webinar on Eyepieces
- Jul 10 Fri Summer Stargazing public viewing #2
- Jul 11 Sat BAS viewing@Fox
- Jul 14 Tue **New Horizons flies past Pluto** (taking images and science data all the while!)
- Jul 15 Wed NM
- Jul 17-19 **Whispering Pines Dark Sky Weekend** c/ Webster.
- Jul 18 Sat **Venus less than 1° from Crescent Moon.** Jupiter about 6° away.
- Jul 23 Thu FQ
- Jul 24 Fri Grey Roots Public viewing #1
- Jul 25 Sat Whispering Pines star gazing moved to July 17-19
- Jul 29 Wed **δ-Aquariid meteors** peak at 11 am DST (daylight) Wednesday with a possible 20/h, but observe the night before or the night after. The **Moon is also near Full** (95%) -not great conditions for viewing.
- Jul 31 Fri FM **2nd FM of month** -incorrectly dubbed "Blue Moon"
Kind of rare: next Blue Moons in Jan & March 2018

Planets

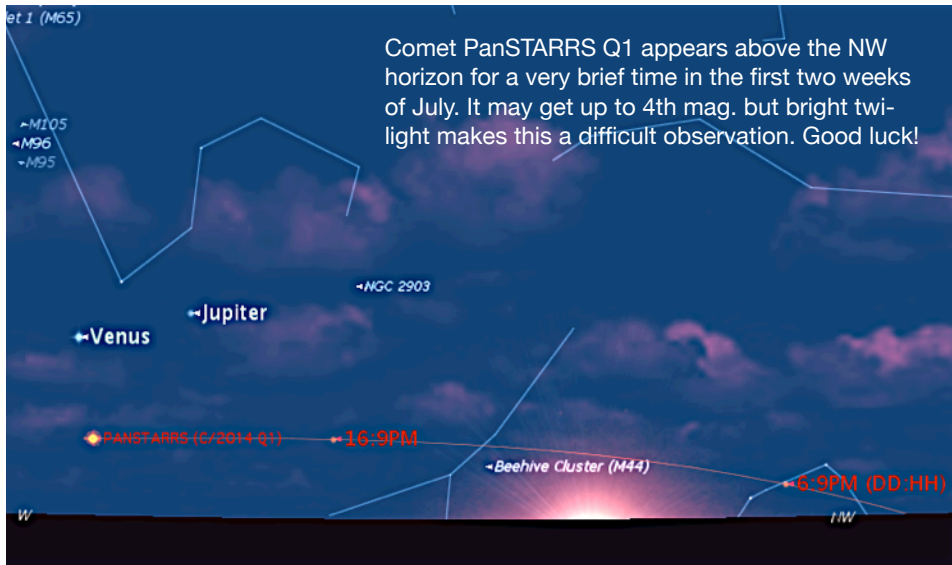
MERCURY, is a morning star and is best in the first week of July. After that it is too close to the Sun for easy viewing. It will not be in good view until August as an evening star and even then it hugs the western horizon. **VENUS**, (-4.7 on July 10) is well up in the sky, slips past Jupiter on June 30/July 1, Regulus July 14 and then drops towards the horizon. It finishes July setting about 9:20 pm EDT. **MARS** is a morning object but still too close to the Sun for viewing. **JUPITER**, (-1.8) is low above the western horizon now and like Venus is setting in twilight. Jupiter viewing is drawing to a close but **SATURN**, (mag. 0.1) is still well placed all night long even though it has passed the meridian by sunset. Ring tilt is 24.0° but increases slightly later this year. **URANUS**, (5.8) and **NEPTUNE**, (7.8) rise before midnight by month-end and are visible in dark sky most of the night. **Dwarf planet, Ceres (7.5)** is brightest at opposition this month on July 25 and visible all night long. **Asteroid, Vesta (6.5)** follows Ceres in the sky and is now located in Pisces just under Uranus (11° away). **PLUTO** (mag. 14) leads the asteroids and outer gas giants into the dawn sky and will be best placed in the summer MW in Sagittarius. Asteroid Vesta, Ceres and Pluto charts are on the BAS website.

The diagram below gives the sunrise/sunset times and the Sun's altitude for July. The Sun has started southward again.

The moon phase graphic at the bottom of this page shows the lunar phase for each night of the month. Times of moonrise for NM, FQ, FM and LQ for Owen Sound are in the Sky Calendar listing at left.



July 2015



| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|-----|-----|-----|----------|-----|----------|-----|
| | | | 1 FM | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 LQ | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 NM | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 FQ | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 FM | |

By permission Univ. of Texas McDonald Obs.

BAS Member Loaner Scopes

Solar H-alpha scope now available.

Our Lunt solar scope can be borrowed by BAS members and it is waiting at the Fox! Contact John to get your hands on it. We now have a suitable mount for it as well. A short training session will be provided on pickup.

Several Dobs available.

One 12-inch dobsonian loaner telescope is available for free loan by members. Smaller 8-inchers are also available. Contact John H. or Brett T. for availability. Scopes come in and out so keep checking with John or Brett if you are interested in a loaner.



SGN Classified Ads Section

(Now also on our website)

FOR SALE: Meade Lightbridge 16" Dobsonian

Azimuth bearing upgraded to Teflon and textured Formica bearing. Includes AstroZap shroud and Telrad unit finder. The truss tubes and castings were originally bright white! I recoated them in flat black header paint after a light sandblasting. I have also modified the Rocker/Base Assembly using "knock down" fasteners. This bulky assembly can be assembled or disassembled in about five minutes with one Allen key for flat storage in a car trunk. The Lower Optical Assembly will fit into the backseat of my Corolla. This is a relatively transportable "Light Bucket" priced at \$1300. Make me an offer! Brett Tatton ph: (519) 389-6010 or: brettatton@gmail.com



Note: Actual scope does not have a handle under focuser or reinforced base (near eyepiece rack) as shown in image above.

FOR SALE:

Canon EF 20 mm f/2.8 USM lens

Field of view = 94° (along diagonal) filter size = 72 mm (Skylight 1B filter included) lens caps included. Asking \$400. Call 519-371-0670 or contact stargazerjohn@rogers.com. Review at: <http://www.photozone.de/Reviews/151-canon-ef-20mm-f28-usm-lab-test-report-review>



FOR SALE:

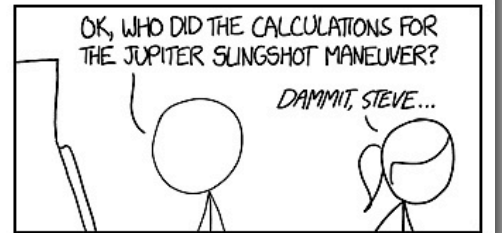
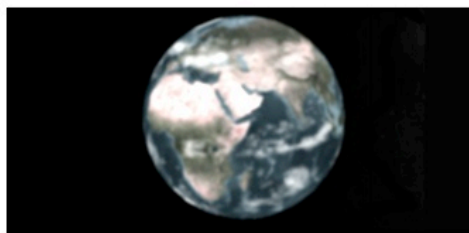
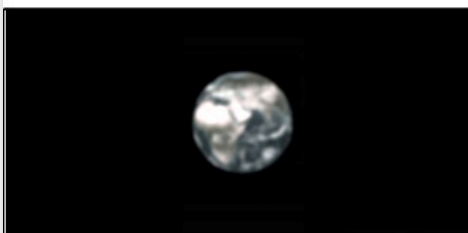
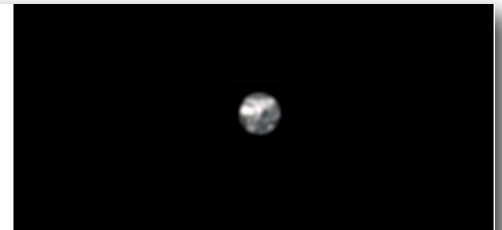
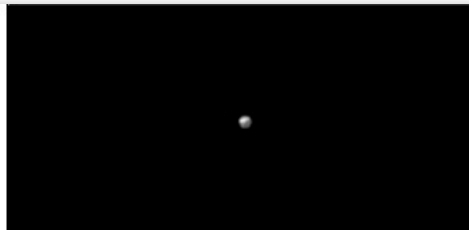
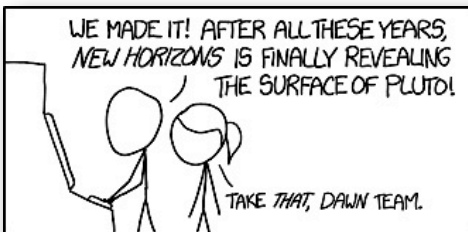
Canon EOS T-adapter

Connect your Canon camera to other components with a T-adapter. Bayonet mount connects directly to camera body. Other end has a removable threaded section that can be replaced with a 2-inch barrel for a 2-inch eyepiece holder. Contact John at 519-371-0670 or at stargazerjohn@rogers.com. I can do some machining to customize this item to your telescope as well (for a small fee/materials cost).



The Cartoon Corner

<http://xkcd.com>



M92 - The 2nd Great Globular Cluster in HerculesImage by
Stuart Heggie

This from **SEDS.ORG**: (with editing)

Globular cluster Messier 92 (NGC 6341) is one of the more conspicuous globular clusters. Situated in Hercules, it is second only to bright M13, the Great Hercules Cluster. M92 is one of the original discoveries of Johann Elert Bode, who found it on December 27, 1777. Charles Messier independently rediscovered it and cataloged it on March 18, 1781, but it was William Herschel who first resolved it into stars in 1783. M92 is about 26,000 light years distant, only a little more than its neighbor M13. A recent estimate of M92's age has given a value of more than 14 billion years. However, the results of ESA's astrometrical satellite Hipparcos may require a re-estimate to about 12-14 billion years. M92 is a splendid object (mag. 6.4) and visible to the naked eye under very good conditions and a showpiece in any telescope. It is only slightly less bright but about 1/3 less extended than M13: its 14.0' angular extension corresponds to a true diameter of 109 light years, and may have a mass of up to 330,000 suns. M92 is approaching us at 112 km/s.

Image Details:

Camera: Apogee U16M w Astrodon Gen II LRGB Filters
Telescope: Planewave 12.5 CDK at F/8 on Paramount ME
Guiding: Astrodon MMOAG w SBIG ST-402ME guide camera
Luminance 14 x 10 min RG 9 x 10 min, B 5 x 10 min
Acquired using CCD-Commander, CCDSoft5 and TheSky6 Pro
Images aligned and combined in Maxim. Processed in PS CC
(Levels and Curves, some sharpening and Reduce Noise on background)

[Check out Stuart's webpage for more amazing images:
<http://www.astrofoto.ca/stuarthebbie/>

Flesherton, Ontario
June 2014