Star Gazer News

Astronomy News for Bluewater Stargazers
Vol 6 No. 1 January 2012

Flammarion's "Stargazer" appeared in the masthead of the first issue of SGN (Jan 2007). This classic image is found in Camille Flammarion's book, *L'Atmosphere: Météorologie Populaire* (Paris, 1888), on p. 163 and apparently was commissioned by him for the book. The image has since appeared in many versions: B&W, coloured and stylized, but unfortunately, many bear erroneous captions. According to Kerry Magruder from the University of Oklahoma Science Library, the original Flammarion caption says (my rough translation from the French): "A Middle Age pilgrim tells (discovers?) that he has found the place where the earth and sky meet". The University of Oklahoma has an original copy of Flammarion's book and have kindly provided permission to use this image.

January 2012 Contents

2011: The "Miracle Year"

by John Hlynialuk

The year 2011 has been one to remember. Not only did the observatory that was the centerpiece of the Inspired By Astronomy project come into being, but a major grant was received from the Trillium Foundation to allow us to purchase some new telescopes and other equipment. In addition, after a rather slow start to the year, fundraising picked up considerably in the autumn and the construction costs of the building are close to being paid off. WELL DONE, BAS! and THANK YOU to our generous supporters.

The fundraising committee under the leadership of Ross Burkinshaw, should be especially commended for the hard work they put into the job. A lot of behind-the-scenes effort had to happen to convince potential donors that our cause was worthwhile. Furthermore, events like the Harvest Dinner and Summer Stargazing programs were not only planned but supported by committee members when it came time to doing the work to make the event happen. Besides those who contributed their time by serving on committees, there are many BAS members who donated directly to the project, some anonymously. Also, others contributed to the silent auctions, (always excellent items) or turned over fees for star talks/tours to the observatory fund. Even small amounts add up in the end and are definitely appreciated. Furthermore, many BAS members showed up for work parties at the observatory during the summer and spruced up the facility in many ways. Thank you!

Not only have the club's committees done a wonderful job as a group, there have been some individual accomplishments as well. One of our BAS astrophotographers, Paul Zelichowski and an "associate BAS member", Stuart Hegge, have their photographs featured in the 2012 RASC Calendar. See Paul's North America image (August) and Stuart's Andromeda Galaxy image in November. Furthermore, Steve Irvine's photos keep appearing in National Geographic, Astronomy magazine, Sky News and other national publications and Aaron Top is a regular contributor to the Weather Network and Spaceweather.com. You may remember seeing the work of these accomplished astrophotographers in the Cosmic Images photo show (another fundraising effort) which appeared at various locations in Bruce and Grey Counties during the IYA 2009.

After several years of planning, the actual observatory construction took less than a year. The ES Fox Observatory went from a hole in the ground to a working roll-off roof facility in 8 months. There have been about a dozen observing nights since then by OEC students and BAS members and the dark skies of the site have been appreciated by all. Even during this cloudy November and December, on a couple of occasions some die-hard BAS members took advantage of a rare clear night or two. There were even some guests that made it as well. Most recently, we showed off the sky to Tom Hakala, who is doing an article on the OEC for Escarpment magazine. Back in November, Chris Hlynialuk also visited the Fox. As an undergrad at Guelph he was the man on the spot when the Vernonscope came up for grabs. Chris and I spent my birthday night, Nov 25, observing. There was a nice two hour opening in the otherwise cloudy sky, and we revisited a few celestial favourites. It was a very special occasion for me to be with my son under the stars, -the nicest birthday present ever. -ed

BAS Executive 2011-2013

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BAS Events Calendar

No BAS events are scheduled in January and February.
Regular meetings start again on Mar 7,2012

Trillium Grant Approved

Ontario Trillium Foundation / Fondation Trillium de l'Ontario

Last July, BAS applied for a $36 000 grant towards the purchase of equipment and additional items for the ES Fox observatory. Late in October, the Ontario Trillium Foundation approved the grant and we arranged for a presentation ceremony on Dec 4 at the ES Fox Observatory. The grant is for three categories: new equipment, renovations and program support. The biggest part of the funds will involve the construction or purchase of a large (25-inch+) Dobsonian-style telescope that will be used by BAS members for viewing during our regular scheduled viewing nights. It will also give us bragging rights as the biggest telescope in an amateur observatory in Canada!.

Also included are improvements to the interior of the observatory with anti-fatigue flooring, folding work tables along some of the walls and construction materials to build several dobsonian mounts (student user-friendly) for our growing collection of telescopes. Additional equipment in our list includes a SolarMax H-Alpha telescope, MallinCam, eyepieces and filters, an LCD projector, computers and software as well as charts and posters. It also includes supplies for the Astronomy Kids program in the summer. The activities of BAS will be thoroughly transformed in 2012!

StarGazer starts its 6th year

They say that time flies when you are having fun. That's why it is hard for me to believe that this is the 61st issue of StarGazer News!

The first official issue of StarGazer News came out in Jan 2007 and was a 6 page publication. Vol 1, No.1 featured the first appearance of the Flammarion "Stargazer" and I have reproduced it in this issue. It remains one of my favourite images, along with the Leonid Meteors woodcut of 1833.

Articles that appeared in the 6 page January 2007 SGN included a report on the successful observation of a Mercury transit by 3 persistent BCAS members, first light for the U of G telescope, some astrophotographs, two book reviews and the Sky Calendar. That listing of astronomical events (originally called the Sky Almanac) appeared as a one page item in the previous BCAS newsletter called Sky Focus, edited by Charlie Szabototh. I have yet to duplicate Charlie's long run of Sky Focus astronomy news which he put together monthly from 1992. I think the last issue he worked on was Vol 12 #4 (April 2004). I took over intermittently at first as temporary editor and then the newsletter morphed into StarGazer News. I am proud of the fact that the Sky Calendar -the one-page listing of astronomical events, appeared in both Sky Focus and SGN as a continuing feature. Next year, 2012, will be Sky Calendar's 20th year!

The Trillium grant presentation ceremony was held at the ES Fox Observatory and was attended by our local MPP Bill Walker, Trillium rep Roger Cosgrove, representatives from BEF, IOEES and ten members of BAS. In spite of the happy occasion, it seemed almost impossible to get everyone smiling at the same time as their eyes were open. Many images were taken before we got one in which everyone had their eyes open and a smile simultaneously. Even Dr. Albert, our new night watchman at the Fox Observatory, had a bigger smile than usual on his face.

Christmas Meeting Recap

The last BAS meeting of 2011 was a scene of celebration. The past year has been an incredible one for BAS -a “Miracle Year” in effect. The Fox Observatory was officially opened, the fundraisers reaped the rewards of their efforts receiving donations that have effectively paid off the construction costs of the building and a Trillium grant of $36 000 was awarded to BAS. This will allow BAS to provide new equipment for members to use and to enhance our public outreach activities.

Besides cake, coffee and cheese nibbles (thanks, Janet!) during the break, there were important issues discussed during the regular meeting. These included access to the ES Fox Observatory by BAS members, -see the details in the minutes that were mailed out (or contact Dave Green).

An outline of the Trillium grant budget was also provided to members. The largest single category is new equipment (86%) and includes a large dobsonian telescope (25 to 30 inch?), a solar telescope, Mallincam, and Nagler eyepieces among other items. BAS members with aperture fever will have their temperatures cooled with the new telescope for sure!

Some work benches are also planned along the walls of the observing room and so is some comfortable flooring. The summer astronomy programs also get a boost with a supply budget.

You might say that now all Ontario taxpayers are supporting astronomy in Bruce and Grey counties!

The draw for the BAS raffle was made at the end of the Dec 7 meeting and BAS is pleased to announce that Petal Furness is the winner of the first prize, the 8-inch telescope. Winner of the binoculars is Kevin Wain of Durham and the third prize, a framed photo by Paul Zelichowski went to John Hunt.

To All Stargazer News Readers: From the BAS Executive and Board...

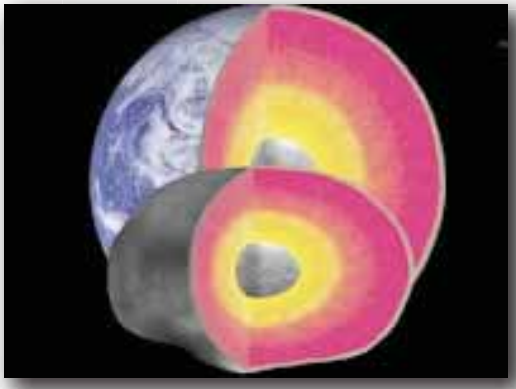
Is Vesta the "Smallest Terrestrial Planet?"

Dec 9, 2011: (Author: Dauna Coulter)

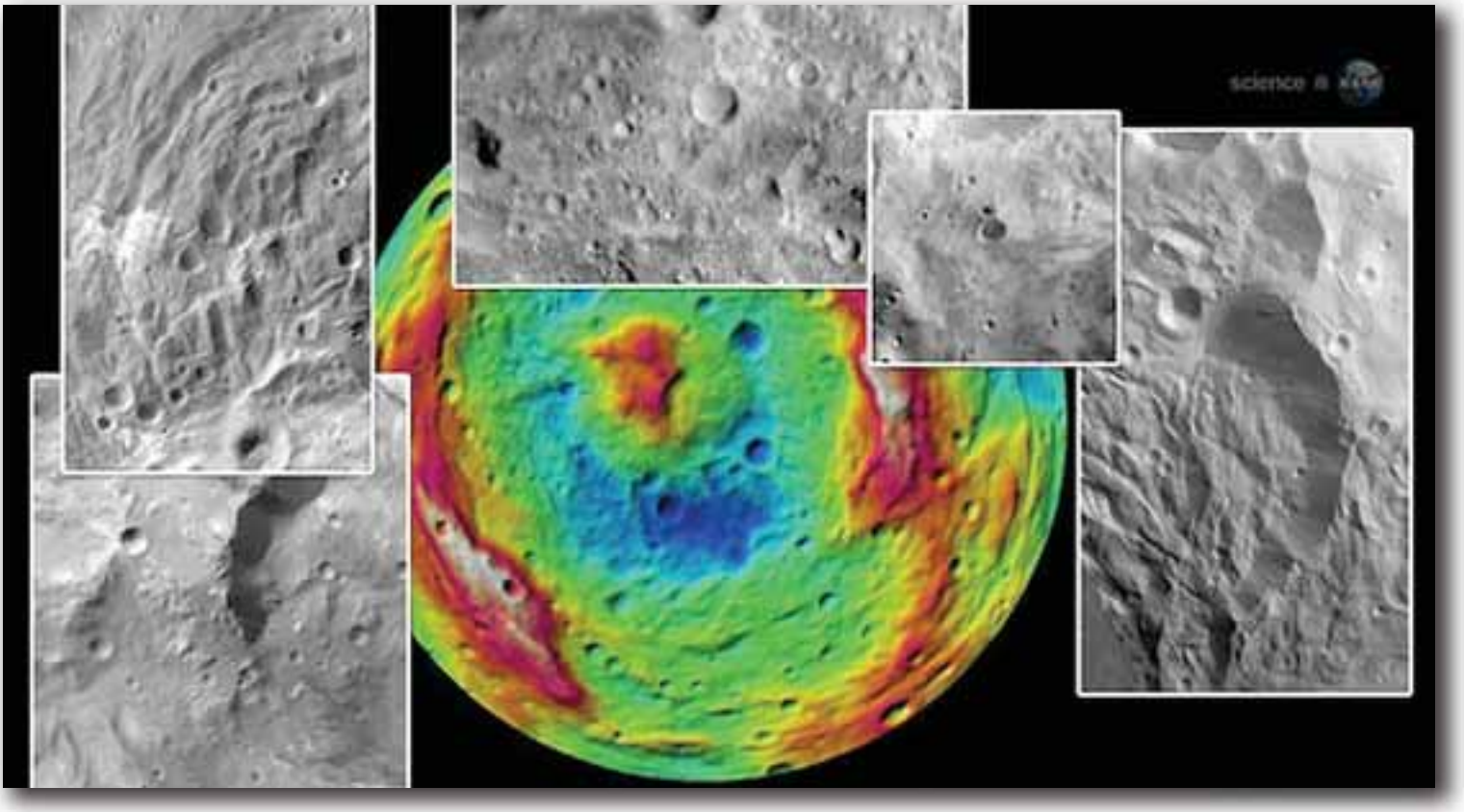
NASA's Dawn spacecraft spent the last four years voyaging to asteroid Vesta – and may have found a planet.

Vesta was discovered over two hundred years ago but, until Dawn, has been seen only as an indistinct blur and considered little more than a large, rocky body. Now the spacecraft is revealing the true complexity of this ancient world.

"We're seeing enormous mountains, valleys, hills, cliffs, troughs, ridges, craters of all sizes, and plains," says Chris Russell, Dawn principal investigator from UCLA. " Vesta is not a simple ball of rock. This is a world with a rich geochemical history. It has quite a story to tell!"



Like Earth and other terrestrial planets, Vesta is differentiated into layers.



Like Earth and other terrestrial planets, Vesta has ancient basaltic lava flows on the surface and a large iron core. It also has tectonic features, troughs, ridges, cliffs, hills and a giant mountain. False colors in this montage represent different rock and mineral types.

In fact, the asteroid is so complex that Russell and members of his team are calling it the "smallest terrestrial planet."

Vesta has an iron core, notes Russell, and its surface features indicate that the asteroid is "differentiated" like the terrestrial planets Earth, Mercury, Mars, and Venus.

Differentiation is what happens when the interior of an active planet gets hot enough to melt, separating its materials into layers. The light material floats to the top while the heavy elements, such as iron and nickel, sink to the center of the planet.

The story begins about 4.57 billion years ago, when the planets of the Solar System started forming from the primordial solar nebula. As Jupiter gathered itself together, its powerful gravity stirred up the material in the asteroid belt so objects there could no longer coalesce. Vesta was in the process of growing into a full-fledged planet when Jupiter interrupted the process.

Although Vesta's growth was stunted, it is still differentiated like a true planet.

"We believe that the Solar System received an extra slug of radioactive aluminum and iron from a nearby supernova explosion at the time Vesta was forming," explains Russell. "These materials decay and give off heat. As the asteroid was gathering material up into a big ball of rock, it was also trapping the heat inside itself."

As Vesta's core melted, lighter materials rose to the surface, forming volcanoes and mountains and lava flows.
"We think Vesta had volcanoes and flowing lava at one time, although we've not yet found any ancient volcanoes there," says Russell. "We're still looking. Vesta's plains seem similar to Hawaii's surface, which is basaltic lava solidified after flowing onto the surface.

Vesta has so much in common with the terrestrial planets, should it be formally reclassified as "dwarf planet"?

"That's up to the International Astronomical Union, but at least on the inside, Vesta is doing all the things a planet does."

If anyone asks Russell, he knows how he would vote.

by Lyndsay Morrison,
staff writer The Weather Network

December 14, 2011 — Did you see a meteorite that tore across southern Ontario Monday night? It landed near Peterborough, and pieces of it could still be recovered.

"On Monday evening there was a very bright fireball that basically started over the central part of Lake Ontario and moved to the northeast and ended just to the north of Peterborough," says Peter Brown, Director of Western University's Centre of Planetary and Space exploration. "We think there's a very good chance that meteorites survived the fireball and have reached the ground." Brown says an event like this that produces a good chance of meteorites on the ground in southern Ontario happens maybe every one or two years.

"It's pretty rare, and it's also pretty rare to have it happen in a place where there's so much chance of recovery," he says. "Most of them end up in the Great Lakes or some place that's very inaccessible. This is not ideal territory but it's possible that someone might be able to recover something in this region."

As a result, the Royal Ontario Museum (ROM) and The University of Western Ontario (UWO) are looking for help from local residents who witnessed, or who may have found fragments, of the meteorite.

"We think there are meteorites down to the east side of the town of Selwyn. This is a region of upper Stoney Lake," explains Brown. "So residents in that area we're asking people to keep an eye out for possible meteorites on the ground."

Meteorites are dark in colour, heavy for their size, possibly magnetic and should stand out as being somewhat unusual compared to other rocks.

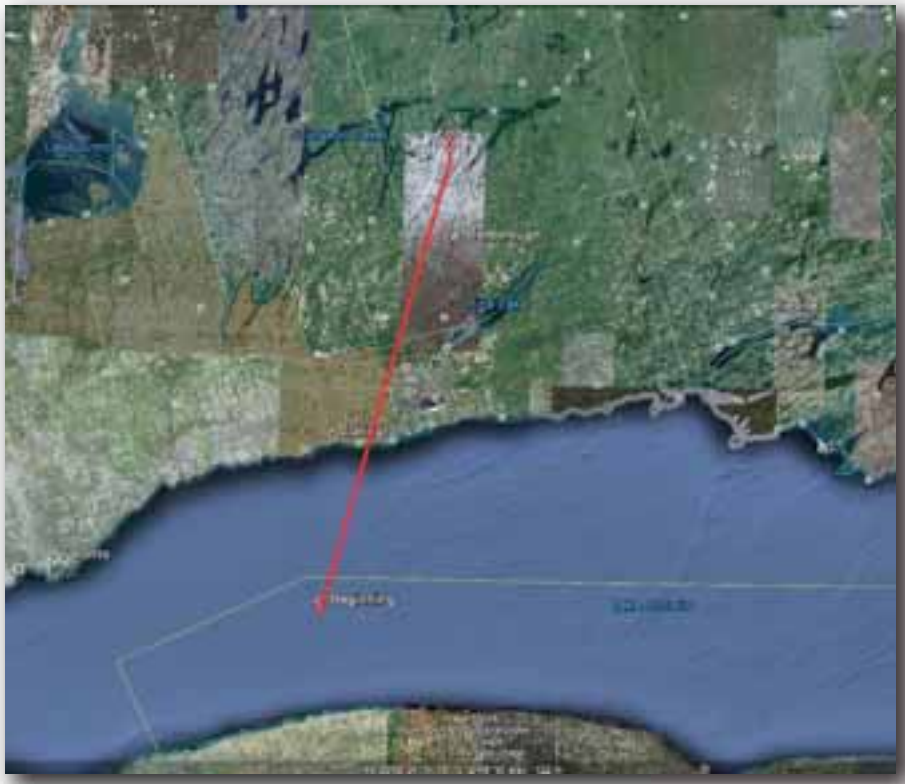
Brown is also hoping that anyone who saw the meteorite will contact him.

"If there are people in the general area of Stoney Lake who actually saw this fireball or heard the fireball, we'd be very interested in hearing from them. They can contact me by email at pbrown@uwo.ca."

Despite happening near the Geminid meteor shower, Brown says this incident is not connected. "It just by chance happened to occur the same time," he explains. "It's just a random piece of an asteroid that happened to enter the atmosphere Monday night."

Brown insists that a meteor like this would not have been considered dangerous.

The event as seen from Orangeville, ON. One of the All Sky cameras near Orangeville captured the fireball as it streaked across the sky. This still image was made on Dec 12 at 23:04:43 UTC or 7:04 pm EST.



The flight path of the meteor.Peter Brown determined that the meteor started over the middle of Lake Ontario south of Peterborough and passed to the west of that city. Any fragments would have come down in the Stoney Lake area (east of the town of Selwyn) north of Peterborough.

"It's not moving particularly fast when it hits. It's not hot, it's actually quite cool to the touch," he says. "It can only be dangerous if you are hit by the meteorite, which would be pretty incredibly bad luck."

[Brown mentioned that the object might have been the size of a basketball and reached 30 mile altitude before it was extinguished. -ed]

Comet Lovejoy Plunges Into the Sun and Survives

Dec. 16, 2011: This morning, an armada of spacecraft witnessed something that many experts thought impossible. Comet Lovejoy (C/2011 W3) flew through the hot atmosphere of the sun and emerged intact.

"It's absolutely astounding," says Karl Battams of the Naval Research Lab in Washington DC. "I did not think the comet's icy core was big enough to survive plunging through the several million degree solar corona for close to an hour, but Comet Lovejoy is still with us."

The comet's close encounter was recorded by at least five spacecraft: NASA's Solar Dynamics Observatory and twin STEREO probes, Europe's Proba2 microsatellite, and the ESA/NASA Solar and Heliospheric Observatory. The most dramatic footage so far comes from SDO, which saw the comet go in (top link under image above) and then come back out again (bottom link).

In the SDO movies, the comet's tail wriggles wildly as the comet plunges through the sun's hot atmosphere only 120,000 km above the stellar surface. This could be a sign that the comet was buffeted by plasma waves coursing through the corona. Or perhaps the tail was bouncing back and forth off great magnetic loops known to permeate the sun's atmosphere. No one knows.

"This is all new," says Battams. "SDO is giving us our first look at comets travelling through the sun's atmosphere. How the two interact is cutting-edge research."

Astronaut Dan Burbank captured Comet Lovejoy from the International Space Station on December 21, 2011. Despite setting his Nikon D3S to an ISO of 12800, he still needed a steady hand for this 0.8-second exposure through an f/2.8 lens. The greenish ribbon, above the blue twilight band hugging Earth's limb, is airglow from oxygen atoms about 60 miles (100 km) up. NASA / D. Burbank

Try these sites for Solar Dynamics Orbiter movies of Lovejoy rounding the sun:

http://science.nasa.gov/media/medialibrary/2011/12/16/comet_whoosh.mov

http://science.nasa.gov/media/medialibrary/2011/12/16/phoenix_comet_emerges.mov

Comet Lovejoy has now become a lovely southern sky Christmas Comet. More Images will appear in the Feb issue of SGN.

"The motions of the comet material in the sun's magnetic field are just fascinating," adds SDO project scientist Dean Pesnell of the Goddard Space Flight Center. "The abrupt changes in direction reminded me of how the solar wind affected the tail of Comet Encke in 2007)."

Comet Lovejoy was discovered on Dec. 2, 2011, by amateur astronomer Terry Lovejoy of Australia. Researchers quickly realized that the new find was a member of the Kreutz family of sungrazing comets. Named after the German astronomer Heinrich Kreutz, who first studied them, Kreutz sungrazers are fragments of a single giant comet that broke apart back in the 12th century (probably the Great Comet of 1106). Kreutz sungrazers are typically small (~10 meters wide) and numerous. The Solar and Heliospheric Observatory sees one falling into the sun every few days.

At discovery, Comet Lovejoy appeared to be at least ten times larger than the usual Kreutz sungrazer, somewhere in the in the 100 to 200 m range. In light of today's events, researchers are re-thinking those numbers.

"I'd guess the comet's core must have been at least 500 m in diameter; otherwise it couldn't have survived so much solar heating," says Matthew Knight. "A significant fraction of that mass would have been lost during the encounter. The remains are probably much smaller."

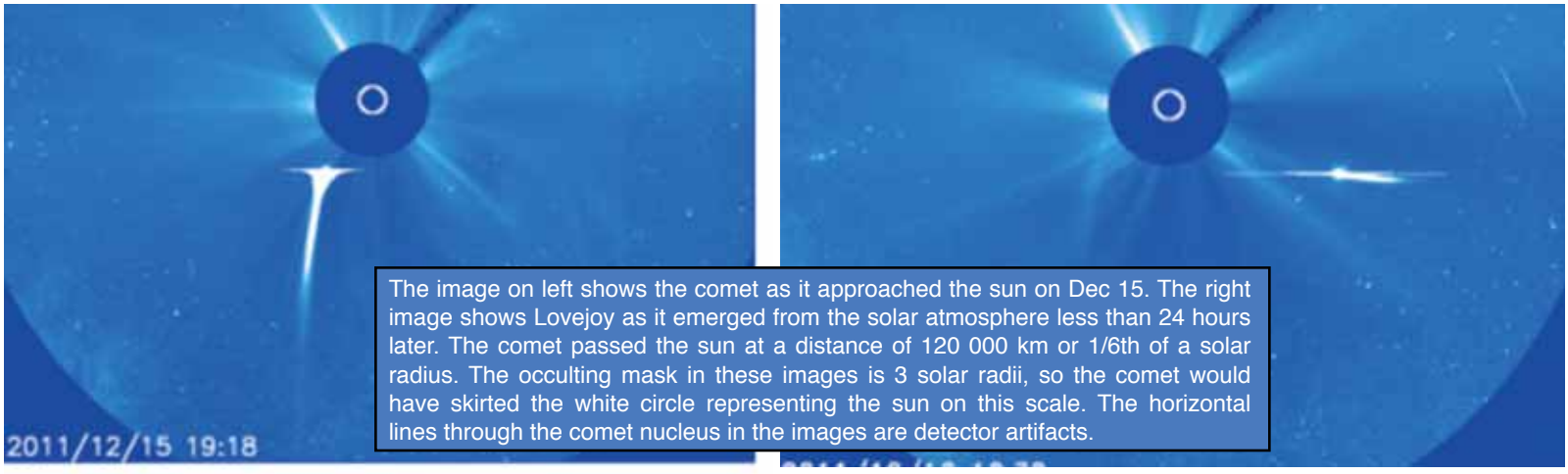
SOHO and NASA's twin STEREO probes are monitoring the comet as it recedes from the sun. It is still very bright and should remain in range of the spacecrafts' cameras for several days to come.

What happens next is anyone's guess.

"There is still a possibility that Comet Lovejoy will start to fragment," continues Battams. "It's been through a tremendously traumatic event; structurally, it could be extremely weak. On the other hand, it could hold itself together and disappear back into the recesses of the solar system."

"It's hard to say," agrees Knight. "There has been so little work on what happens to sungrazing comets after perihelion (closest approach). This continues to be fascinating."

Author: Dr. Tony Phillips Science@NASA



The image on left shows the comet as it approached the sun on Dec 15. The right image shows Lovejoy as it emerged from the solar atmosphere less than 24 hours later. The comet passed the sun at a distance of 120 000 km or 1/6th of a solar radius. The occulting mask in these images is 3 solar radii, so the comet would have skirted the white circle representing the sun on this scale. The horizontal lines through the comet nucleus in the images are detector artifacts.

The Herschel 400 - a 2012 Observing Adventure

" Who would believe that so small a space
could contain all the images of the Universe"
-Leonardo da Vinci " On the Eye"

The thrill of the hunt, combined with the poetry of the night sky, are certain emotional rewards awaiting the dedicated deep sky observer. I know this resonance intimately! I remember the sense of satisfaction I felt when I completed observing all 110 objects of the modern Messier Catalogue. I kept a Journal of all my observations and fully intended to submit them and receive my Messier Certificate. But, really, the observing journey was my reward, and, to this day, my certificate application remains unsent. And no sense of loss! I was amply rewarded because I found my way around the celestial sphere, had a wonderful observing adventure, and was motivated to learn some fascinating astrophysics. But, is there life after Messier? Well, for those of you who wish another observing challenge, there is the Herschel 400 list. This observing project can be accomplished using telescopes of 6 inch aperture. Indeed, the renowned observer, Stephen James O'Meara, observed all the Herschel 400 objects with a 4 inch f/5 Genesis refractor from his dark Hawaiian skies.

The Herschel 400 list was compiled by members of the Ancient City Astronomy Club (ACAC) of St. Augustine, Florida, in response to a letter written by James Mullaney, which was published in the April 1976 issue of Sky and Telescope. Mullaney suggested that amateurs compile a list of about 615 deep sky objects culled from the 2,500 celestial objects that were discovered and catalogued by William Herschel and his sister, Caroline. Consequently, the ACAC members came up with a list of 400 Herschel objects that would challenge observers with telescopes of 6 inch or larger apertures.

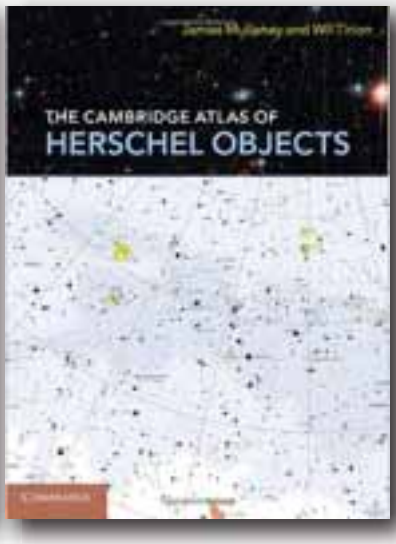
The Herschel 400 includes 231 galaxies, 107 open clusters, 33 globular clusters, 20 planetary nebulae, 2 halves of a single planetary nebula, and 7 bright nebula. The list was designed to hone the observing skills of the amateur astronomer. The Astronomical League is comprised of 240 astronomy clubs across the US and they award a Herschel 400 Certificate to members who complete the list. Observers, who are awarded this Certificate, take great pride in their accomplishment for it recognizes a particular level of observing skill. According to veteran observer, Stephen James O'Meara, four things are required of the successful observer. Specifically, a general knowledge of the night sky, skill at using both binoculars and a telescope, a strong sense of commitment, and a will to succeed. If observing the Herschel 400 objects interests you, then there are two wonderful resources to guide your journey. One is a book written by O'Meara and entitled "Herschel 400 Observing Guide" and the other is "The Cambridge Atlas of Herschel Objects" by James Mullaney and Will Tirion.

O'Meara's Guide is a "must have" and takes the observer through the Herschel 400 list, season by season, and month by month, until all objects are observed in one calendar year. He divides each month into 7 observing nights and he varies the number of objects for each night, depending on how challenging they are to find. He provides Star Charts for each night, and, for each object he provides technical information; i.e. (Object Type, Constellation, RA, DEC, Magnitude, Diameter, and a Difficulty Rating); a Photograph, a General Description, Finder Directions, and, what he calls the Quick View, which is his view at the eyepiece. A wonderful complement to this Herschel 400 Project is Mullaney's and Tirion's Atlas of Herschel Objects. This Celestial Atlas displays over 2500 of the most visually attractive star clusters, nebulae, and galaxies that were discovered by Herschel, Caroline, and William's son, John. The atlas covers the entire sky from North to South Celestial Pole. It shows all 88 constellations, and it is spiral bound and printed in red-light friendly colors for use at the telescope. The Atlas also includes a detailed Appendix at the back, providing technical information on all of the 2500 objects mapped and catalogued by the Herschels.

Astronomy involves observing with both the mind and the eye. Mullaney talks about the "photon connection" which occurs when ancient starlight excites our retina. Our minds provide the "interpretative scientific framework" to render meaning and wonder.

The Herschel 400 observing list provides another excuse, in 2012, to get "out there under the stars" and experience the poetry of amateur astronomy. Hey, if its important to you, maybe even get the Certificate!

"Herschel 400 Observing Guide" published by Cambridge University Press in 2007, ISBN 978-0-921-85893-9



"The Cambridge Atlas of Herschel Objects" by Mullaney and Tirion, Cambridge University Press 2011, ISBN 978-0-521-13817-8.

A Home-Built 6-inch Telescope

article by John Hlynialuk

The image above shows several home-made components including a hose clamp and v-block finderscope mount. No finder or eyepieces came with the telescope but there were a lot of other nice surprises.

Recently, I was lucky to acquire an inventory of telescope components owned by an enthusiastic amateur telescope-builder. For $100, I got a completed 6-inch reflector, all the mirror-grinding supplies, a library of telescope making books and an unfinished additional mirror that I will describe later in this article.

I was impressed by the first look at the 6-inch because I recognized a lot of the designs from 2 ATM "bibles". One is a book called "All About Telescopes" by Sam Brown originally published by Edmund Scientific Co. in 1967. It cost $3.25. The other ATM book (which also came with my purchase) are a series of three telescope making books that first appeared around 1930 and which were edited by Albert G. Ingalls, -a Scientific American columnist who wrote the Backyard Astronomer column for that magazine. Ingalls continued with Scientific American until he retired in 1955. The 3-volume ATM books have remained in print ever since.

The images on this page tell the story of the work of this dedicated amateur and provide a hint of his plans for a larger telescope. He definitely had aperture fever. Tucked away in a custom-built oak box was a nearly completed 12-inch full-thickness mirror! Judging by the partially cut out hole in the back of the mirror it would have been the heart of a 12-inch Cassegrain telescope. If we are lucky, this mirror may be ready to be aluminized and, if someone can be talked into building a dobsonian mount for it, we can add it to our collection of BAS telescopes. The 6-inch will be mounted on a dobsonian mount and made available for OEC classes to use.

The six-inch scope construction details are remarkably ingenious in many respects. Not so in others. On the plus side is the tripod which is as stable as the best wood tripods I have seen. The split leg design and the spreader bar makes it a solid unit that does not wobble or twist. On the other hand, the latitude adjustment bar (the aluminum bar in the "v" between the two square wood pieces) tends to loosen easily. The door hinge between the two plates is also a source of looseness.

The plumbing components of the focuser (top right image) are non-standard. Note that focusing requires turning the entire eyepiece holder and would produce much vibration in use. However, the home-made focuser mount hints at the fact that the fibreglass tube was entirely hand made. I have compared it side by side to a factory-made tube and in some respects this home-made tube is much better, much smoother inside.

The two sets of pillow block bearings give the scope a nice smooth action in both RA and Dec, but the clutch on the Dec axis (a wooden block clamped to the 1-inch shaft) did not work because it appeared to be missing a piece. The RA clamp just above the pillow block in centre of the mount seemed OK.

The tube straps were made of leather and I was sorry to have to cut them to get the tube off the cradle. I know that Dr. Ricardo Olivarez, who was the builder, was interrupted before he had a chance to put the finishing touches on this telescope and it probably was not actually used. But don't worry, the Olivarez scope will be remounted on a simpler dobsonian mount and it we will be stargazing with it before long. Anyone have a use for a nice wooden tripod? And, you will have to wait for the Feb issue of SGN to see the most unique feature of this telescope.

Lunar Eclipse for Western Canada

A total lunar eclipse occurred on Dec 10, 2011 and if you happened to be in the western half of North America, you had a ring-side seat. This lunar eclipse was not visible from Ontario because the moon set in the west about the time of the first contact of the umbra 7:45 am or so. There might have been some shading a few minutes beforehand but the sky was brightening and the turbulent air near the horizon would have made this a difficult observation. Best to wait until the two eclipses in 2014.

Alan Dyer has posted images of this eclipse on his website: http://amazingsky.net. Alan is an expert astrophotographer and associate editor of Sky News magazine and had a perfect view from Rothney Observatory outside of Calgary Alberta. Dyer was joined by a 100 other observers for an eclipse viewing breakfast. He has kindly granted permission for StarGazer News to use his eclipse images.

Dyer writes: "This is my favourite shot from the December 10 dawn eclipse. It's the one I was after, with the red Moon in a blue sky over the snow-covered Rockies." Image (c) Alan Dyer 2011. Canon EOS 5D MkII, 200 mm lens, f/4, ISO 800, exposure = 1/10 s.

He continues: "Lunar eclipses don't have the dramatic and sudden effects of a total eclipse of the Sun. But neither do they have the anxiety and sometimes sheer panic! Lunar eclipses are more stately affairs as they play out in relaxed manner over 2 to 3 hours. But they are beautiful nonetheless, especially when the Moon is low in the sky and set above a scenic landscape at moonrise or, as it was with this eclipse, at moonset. The red colouration of the Moon makes the scene, as the Moon, embedded in Earth's shadow, becomes lit by the light of all the sunsets and sunrises going on around the world at once. If Earth had no atmosphere the Moon would go totally black during a total eclipse. But besides making life on Earth possible (no small thing!), our atmosphere also provides us the wonderful sight of a red Moon during a total eclipse. Take a deep breath and enjoy!"

Details of the April 15, 2014 total lunar eclipse. *Mid eclipse is at 3:46 EDT and the start of totality happens 40 minutes earlier at 3:06 EDT. Totality is over at 4:24 EDT giving a duration of 1 h 18 minutes of totality.*

Mark your Calendar:

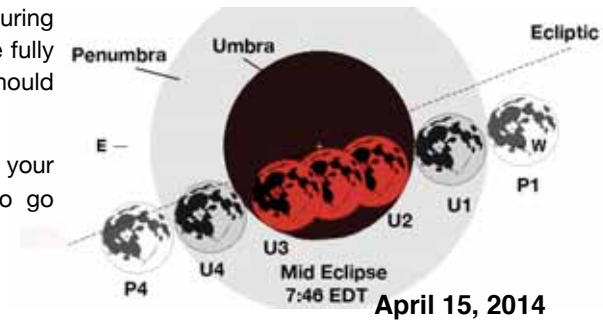
Apr 15, 2014 and Oct 8, 2014

All the lunar eclipses in 2012 and 2013 are penumbral or partial at best. The only one that comes close is a partial in the morning of June 4, 2012 but none of the deep red colour of the umbral stage is evident in this type of eclipse. The June 4 partial will be about the same as the past December eclipse,-the moon setting just as the first umbral contact occurs. Don't lose any sleep for this one. But, if there are no lunar highlights in 2013, then mark 2014 as a prime year for lunar eclipses in North America.

Apr 15, 2014: The first of the two is on Apr 15, 2014 and is about as centrally located over this part of Canada as it can get. We see the entire eclipse from the first to the last penumbra contact. The umbral phase when the entire moon is covered by shadow starts at 2 am EDT and ends by 4:30 am EDT. The moon doesn't set until 6:45 am so even the partial phases will be visible.

Oct 8, 2014: This total lunar eclipse is not quite as well centered for Ontario since the moon sets during the partial phase just after totality is over. The fully eclipsed Moon low on the western horizon should make for some good photographs, however.

You have been alerted. Mark this down on your observing calendar. Only about 835 days to go until the April 2014 eclipse!



April 15, 2014
Total Lunar Eclipse

SGN Featured Constellations: **Cassiopeia and Cepheus**

Cassiopeia

α Cassiopeiae - Shedar β Cassiopeiae - Caph
γ Cassiopeiae-Tsih δ Cassiopeiae - Ruchbah

Cassiopeia is an easily recognized constellation; its five 2nd and 3rd magnitude stars form a widespread W or M, depending on its position in the sky. It is the same distance from the pole as Ursa Major. A line connecting α-Andromedae, γ-Pegasi and β-Cassiopeiae marks the equinoctial colure; where this line, extended to the south, crosses the equator (and the ecliptic) marks the vernal equinox, the point in the heavens from which all right ascension coordinates are measured. Cassiopeia is rich in star fields and clusters; scan carefully with fieldglasses, especially around the area of γ Cassiopeiae.

For the Telescope

Double Stars	Mag.	Separation (s)	Location	Remarks
α	2.5-9.0	64	003856	Yellow-Blue
η	3.5-7.3	11	004758	Yellow-Purple; easy for small scope
ι	4.7-7.0-8.2	2-7	022567	Yellow-Blue-Blue; very fine; triple
σ	5.4-7.5	3	235755	Green-Blue; fine field
φ	4.5-8.9	25	012268	
Σ163	6.2-8.2 -9.7	35-115	014864	Gold-Blue
Σ191	6.2-8.5	5	015974	

Messier Objects

	Mag	Location	Remarks
M 52	7.3	232261	Open Cluster. Very fine.
M103	7.4	013060	Open Cluster

Other Objects of Interest

NGC 103 - Open Cluster. Loc'n 002161.
NGC 663 - A beautiful open cluster with many stars. Location 014161.
NGC 7789 -Beautiful open cluster; large cloud small stars. Loc'n 235456.
γ-Cassiopeiae -Irregular variable, magnitude range 1.6-2.3.
R Cassiopeiae -Long period (431 days) variable, max. mag. 7.0. Loc'n 235351.
T Cassiopeiae -Long period (445 days) variable, max. mag. 7.8. Loc'n 002155.
V Cassiopeiae -Long period (228 days) variable, max. mag. 7.9. Loc'n 231059.
[**φ Cassiopeiae** is the guide star to locating the "ET Cluster" aka NGC 457 -it really does look like ET with φ Cas as one of his eyes (image below) .-ed]

Cepheus

α-Cephei - Alderamin β-Cephei - Alfirk
γ-Cephei - Er Rai

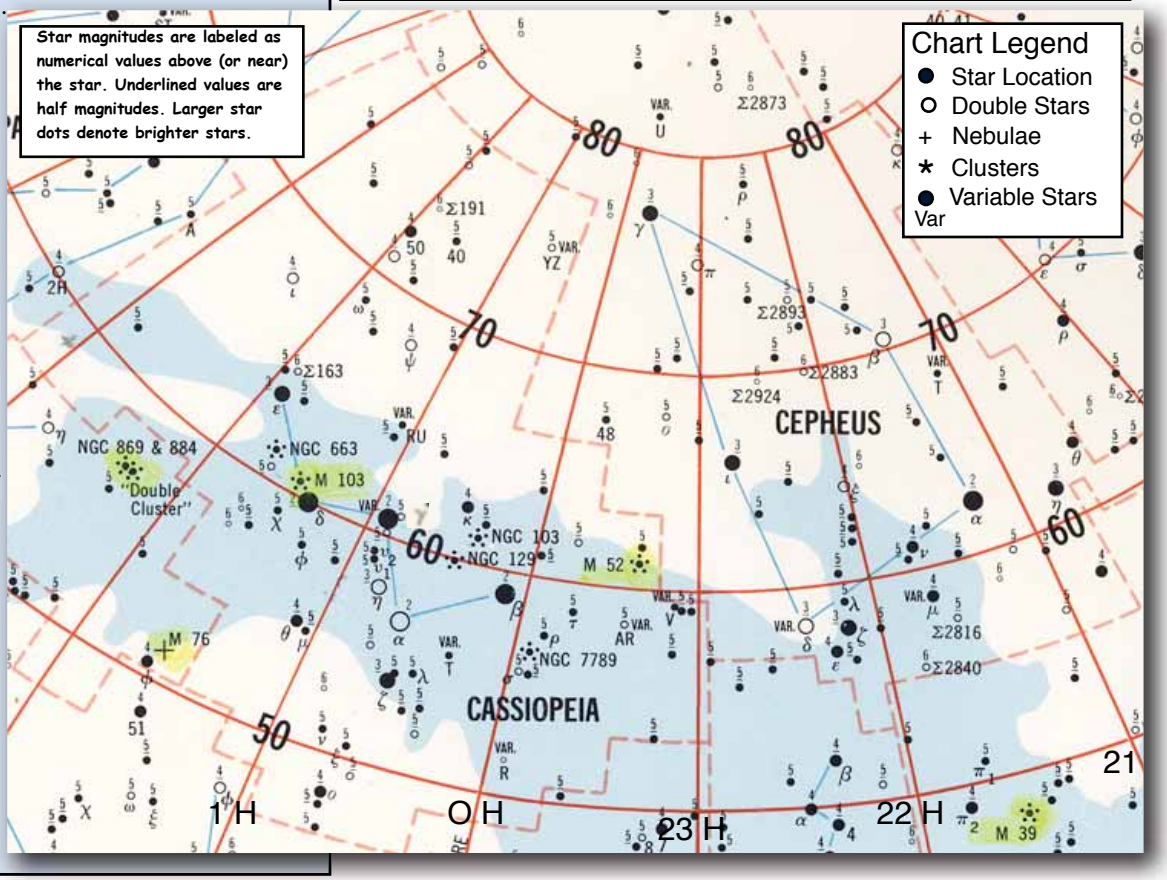
Cepheus is a circumpolar constellation; its five rather faint stars form a rough peak-roofed house-shaped figure, like a small child's drawing. It and Ursa Major are in exactly opposite directions from the Pole Star. δ Cephei, the prototype of the so-called "Cepheid Variable" type of star; derives its name from the constellation. A Cepheid variable is a short period variable having a definite relationship between its apparent magnitude and its period of variation. This "period-luminosity" relationship has been invaluable in determining the distance of faraway objects in the universe. δ-Cephei is also a beautiful field glass double. μ-Cephei is the "Garnet Star": compare its color with α-Cephei, a white star.

For the Telescope

Double Stars	Mag.	Separation (s)	Location	Remarks
β	3.3-8.0	14	212870	White-Blue.
δ	3.7 to 4.4-7.5	41	222858	Yellow-Blue; beautiful.
κ	4.4-8.0	7	201377	White-Blue.
o	5.2-7.8	3	231768	Yellow-Blue.
ξ	4.6-6.5	7	220264	Both Bluish White.
Σ2816	6.0-7.9-8.0	12-20	213658	Triple.
Σ2840	6.0-7.0	20	215056	Pale Grn-Pale Blue; beautiful
Σ2873	6.2-7.0	14	220083	
Σ2883	6.2-8.2	15	221070	White-Blue.
Σ2893	5.5-7.6	29	221273	Yellow-White.
Σ2924	6.8-7.3	0.7	223270	

Other Objects of Interest

μ-Cephei - Irregular variable, magnitude range 3.6-5.1. A beautiful deep red in color; view with low power. Location 214159.
T Cephei - Long period (390 days) variable, maximum magnitude 6.0. Location 210868
U Cephei - Eclipsing variable, period 2.49295 days, magnitude range 6.7-9.8. Location 005882.



Sky Calendar — January 2011

compiled by John Hlynialuk (**stargazer@wightman.ca**) using the Observer's Handbook 2012(RASC), Sky and Telescope and Sky News magazines. Please contact the editor if you notice any errors.

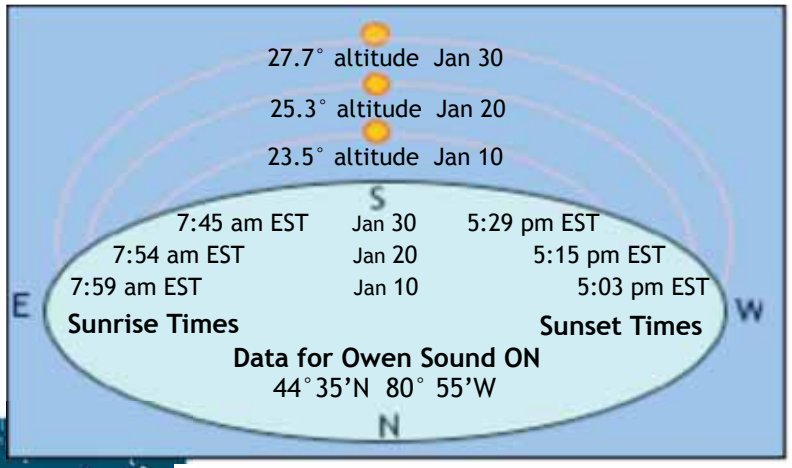
Jan 1 **First Quarter Moon rises at 11:50 pm EST**
Jan 2 Jupiter 5° S of Moon
Jan 4 **Quadrantid meteors peak (120/h) Moon 77%**
Double shadow transit Ganymede 1:00 am, Europa 1:26 am start
Jan 9 **Full Moon (Moon After Yule) rises at 4:43 pm EST**
Jan 13 Venus 1.2° S of Neptune
Jan 14 Mars 9° N of Moon
Jan 16 Spica 2° N of Moon
Last Quarter Moon rises at 12:58 am EST
Saturn 6° N of Moon
Jan 23 New Moon rises at 7:43 am EST
Jan 26 Venus 7° S of Moon
Jan 30 Jupiter 5° S of Moon
Jan 31 First Quarter Moon rises at 11;18 am EST
(Second FQ moon of the month -not a Blue Moon)

BAS Events

No BAS events are scheduled in January and February.
Regular meetings start again in on Mar 7,2012

Planets

MERCURY, in the morning sky is visible with difficulty only in the first week of Jan. For the rest of the month, it is too close to the sun. **VENUS**, (-3.9) is back as the Evening Star above the western horizon. It passes 1.2 ° S of Neptune on Jan 13 and there is a thin crescent moon above Venus on Jan 25 and 26. **MARS** brightens to mag -0.3 by month end (brighter than Vega). It rises under Leo around 11 pm and appears 2 hours earlier by month end. **JUPITER**, (mag -2.5) still remains bright, large and well-placed in the sky. Double transits of moons become a regular occurrence in Jan but most occur when Jupiter is below the horizon for Ontario. See Jan 4 at left. **SATURN**, (0.7), rises near midnight by month end and hangs around near Spica all month. **URANUS**, (5.8) is higher at sunset than **NEPTUNE**, (7.9) and they set by 11 pm EST and 9 pm respectively. Jupiter is nearby and Venus is between Uranus and Neptune for the latter half of January. Three gas giants plus Venus and the moon (Jan 25/26) are visible in one part of the sky. **PLUTO** rises in the East just before sunrise and is too faint to observe. Ceres is still visible near Venus all month (chart on pg 5 of the Sep issue). The diagram below gives the sunrise/sunset times and the sun's altitude on three dates this month. The calendar below the sun chart shows the moon phases for the month. Times of moonrise for NM, FQ, FM and LQ are in the Sky Calendar listing at left.



Special Events

C.Garradd in Hercules

January is the month that Comet Garradd becomes better placed for viewing in the morning sky. Look just to the left of the Keystone in Hercules as the comet starts to rapidly climb through that constellation this month. It's brightness has not changed as quickly as other comets have and at last report it was hanging in at about 6.5 magnitude. It may even brighten a half magnitude more as it approaches perihelion in early February. Even at 3 am, the comet is 15 degrees above the eastern horizon in a dark sky. By 6 am, the Keystone is 45 degrees up and the comet is still in dark sky. It is winter after all, and dark hours outnumber the bright ones. That started to change at the winter solstice in December, but there are lots of dark hours yet.

A Christmas Comet!

A sun-grazing comet discovered in November 2011 turned out to be the comet of the year! One of the Kreutz group of comets which come very close to the sun on their swing by at perihelion, many never survive the encounter. Lovejoy is a rare exception. It emerged its very close solar passage, about 1/6th of a solar radius! and appeared on the other side basically intact. Then it developed a tail that southern observers say is second only to Comet McNaught back in 2001. There are many postings of images on the internet and you can be sure images of Lovejoy will be featured in the Feb issue of SGN. Too bad it is only visible in the southern hemisphere!