



*Astronomy News for Bluewater Stargazers  
Vol 7 No.10 Oct 2013*

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## Setting the Record Straight re: Normand Fulham 36 inch scope.

In the caption to the photo of the Fulham 36" in the last SGN issue, (pg. 8) it was stated that slight astigmatism was reported by one observer. (This came to my attention through a third party.) Anyway, the astigmatism was not in the mirror but was produced by one of the mirror supports and very quickly fixed by Normand.

Here is a portion of his reply to Doug about the problem.

*"Thank you for the up-dates and the Stargazer News! Yes it's too bad you couldn't stay longer on Saturday, we had some great views all night. And by the way, I had fixted the asgtig. on the 36" It was just a lateral support that was miss placed at the edge.*

*Doug, when do you plan to come up at the shop? I will have the 50" Folded Newtonien assembled in about 3 weeks !!!!*

*Have a nice day my friends*

*Normand"*

Those who attended Normand's talk quickly recognized that he is truly a Canadian treasure, witty, persistent and highly skilled at his trade. He is pretty much single-handedly revolutionizing the building of larger aperture telescope mirrors (by amateur standards) in Canada and providing us with well-made telescopes that speak to the artistic nature that resides in all of us. Well done, Normand!



## THANK YOU, Robert Williamson! and Happy 90th Birthday!

The BAS wishes to express our gratitude and thanks to the oldest current member of BAS, Robert Williamson. At 90 years "young", Robert has been a long-standing member of both BAS and BCAS. He has attended more meetings than I can count and contributed his knowledge and expertise in what has become an irregular column in SGN called "Robert's Gadgets". He donated his 12-inch Dobsonian telescope to the club telescope roster and it still gets comments and admiration for the many gadgets Robert provided along with it. Everything from a laser pointer holder to a unique counterbalance system Robert invented that provides balance without an obtrusive weight system. (It basically swings out of the way between the tube and mount.)

Robert has recently been unable to attend our meetings for health reasons and will be moving to Peterborough to be near his family.

I am sure everyone on the executive and the membership of the Bluewater Astronomical Society wishes you well and on their behalf, I extend our thanks and appreciation for what you have contributed to our club and to the enjoyment of our hobby.

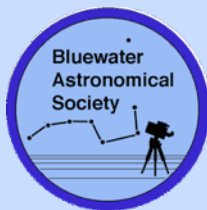
THANK YOU so much!



Sorry you could not join us to enjoy the birthday cake last meeting! It was delicious.

**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](http://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.

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### BAS Executive 2013-2015

<b>President:</b>	Aaron Top	aarontop@hotmail.com
<b>Vice-President:</b>	John Hlynialuk	stargazer@wightman.ca
<b>Secretary:</b>	Lorraine Rodgers	lrodgers@bmts.com
<b>Treasurer:</b>	Cheryl Dawson	cheryl.dawson@bell.net
<b>Past-President:</b>	Brett Tatton	bretttatton@gmail.com
<b>Membership:</b>	David Skelton	dskel@golden.net
<b>Public Outreach:</b>	TBA	



### BAS Events for September 2013

- Oct 2** **BAS meeting** Grey Roots Museum 7 pm  
Topic: "Never- before Seen Optics": John H.
- Oct 5 (NM)** **BAS viewing @Fox** ES Fox@dark, backup Oct 26 Sat (LQ)
- Oct 11/12 (FQ)** Triple shadow transit Jupiter (after midnight Oct 11  
12:32 am DST to 1:46 am DST (Oct12 am)
- Oct TBA** **BAS Astrophotography Workshop @Fox** Frank Williams and other BAS photographers on hand to give you pointers -a hands-on workshop. Bring you own equipment if you have it.
- Oct 26 (LQ)** **4th Annual Harv. Din.** BOEC Dining Hall starts 5:30 pm  
Speaker: Bob Henderson, silent auction, a licensed event. Tickets \$50/ea  
Available from Joan S. (519-376-9554), John H. (519-371-0670), Ross (519-389-3922) BOEC (519-534-2767)

### New BAS executive for 2013 to 2015 is:

- President:** Aaron Top
  - Vice-President:** John Hlynialuk
  - Secretary:** Lorraine Rodgers
  - Treasurer:** Cheryl Dawson
  - Past-President:** Brett Tatton
  - Past-Past President:** Dan Gieruszak
  - Membership Chair:** Dave Skelton
- Welcome to the new members on exec and  
**Thank You** to those who served in the past!

### From the "Top": by Aaron Top pres. BAS

Hi guys and gals, hope everyone is well. We are planning to do an astrophotography workshop weather-permitting on October 11, 2013 at the Fox Observatory. I along with Frank Williams, and Brett Tatton and anyone else who like to share their knowledge of photographing the night sky are welcome. We hope to reach out to both beginners and advanced astrophotographers. This will be a great opportunity for all of us to get together and share our ideas and skills and I very much look forward to it. Frank will be covering the deep sky photography using the 10" scope inside the observatory and I will be outside helping people with tripod photography. So again that is October 11, 2013 at the E.S. Fox Observatory at around 8 pm as the sun is setting earlier and earlier each night. Recently I took photographs of the Veil Nebula on the Meade 10-inch mounted on the AZ EQ 6. One was piggy-backed on the top of the mount (see pg 4) was 10 mins long in total with two 5min images stacked and with minor colour curve adjustments. The second was of NGC 6992 -a 41 minute image at prime focus through the 10" Meade. Both were taken using a Canon 60Da.

### How to destroy two 60Da's in one week:

by John H v-pres.

Aaron's note above requires an addendum. I was out on another evening imaging with the same setup as Aaron. Frank Williams was guiding us through the process of acquiring images through the 60Da. We were running Backyard EOS on the computer and controlling the 60Da with the software. Somehow we managed to fry the electronics of the camera! Our best guess after a lot of searching out posts about this very problem was that it probably happened when disconnecting the USB cable while the camera was connected to the computer and powered up. It also seems that the camera should be on AC adapter rather than running on battery. There is still a big question as to the real cause as Canon is not very forthcoming as to the reason. And now they have discontinued the 60Da -presumably to come out with a 70D and then a 70Da for astronomy. Just after Aaron's session, he also fried the electronics on his 60Da! TWO Da's fried within several days of each other!! Luckily both are still under warranty. Owners of 60Da's out there BEWARE!

### Bob Henderson: Harvest Dinner Speaker



Harvest Dinner Speaker: **Bob Henderson**  
Topic: **"Every Trail Has a Story: Following Blazed Heritage Trails"**.

Bob has been studying and traveling Canada for heritage stories and trails for over 40 years. He will criss cross Canada, Labrador to the Yukon, Lake Erie to Baffin Island with tales of significant places, people and practices, sharing the Canadian history that does NOT get told. Bob is author of Every Trail Has a Story (2005) and Pike Portage: Stories of a Distinguished Place (2010). He is working on a follow up to Every Trail now. Bob has taught Outdoor and Environmental Education at McMaster University, Brock and The University of Alberta. He is always on the prowl for a good story to share.

# 4th Annual Fall Harvest Dinner Oct 26, 2013

an evening of great food  
and entertainment

in support of the ES Fox Observatory

Continuing Astronomy  
Education at the Bluewater  
Outdoor Education Centre

An official RASC Dark Sky Preserve  
#3092 Bruce County Rd 13  
near Oliphant

Menu catered by  
the award-winning:

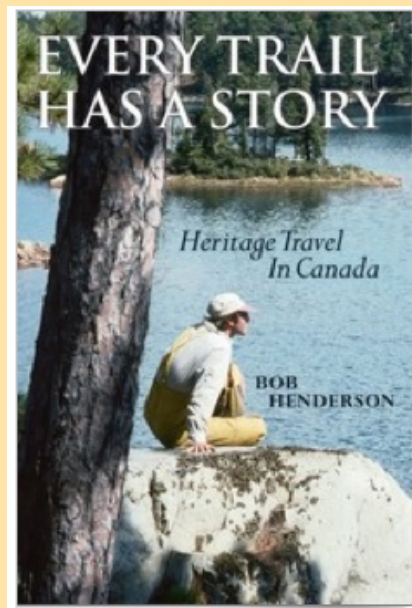


### Menu:

- Autumn green salad
- Bowtie pasta salad, feta, cherry tomato, bell pepper
- Basil, bean and feta rattatouille
- Sausage stuffed roast pork loin in apple cider jus
- Caramelized onion and cheddar scalloped potatoes
- Cream corn with local honey
- Dessert, coffee, tea.



Pelee Is. Wine & Local Beers (cash bar)



Speaker: Robert Henderson  
"Every Trail Has A Story:  
Following Blazed Heritage Trails"

Sponsored by the  
Bluewater Astronomical Society  
and the Bluewater Education  
Foundation

Tickets \$50.00 ea.

(Tax receipt will be issued for  
portion of ticket)

Doors open at 5:00 pm

Dinner at 6:30 pm

Limited Seating

Only 76 tickets will be sold

Call Now for Tickets

(519)376-9554 (Owen Sound)

(519)371-0670 (Owen Sound)

(519)389-3922 (Port Elgin)

Silent auction

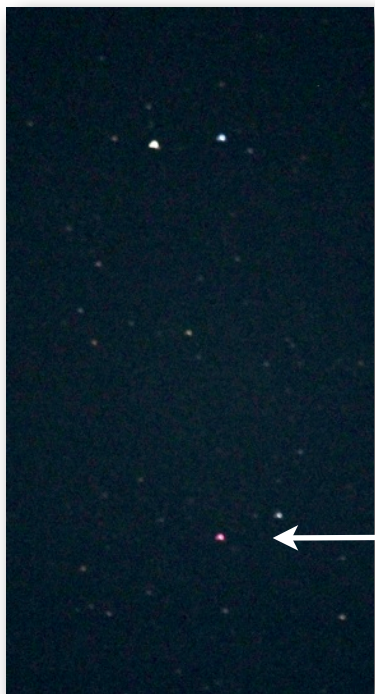
Live music

by Paul Williamson



**Above: Butterfly Nebula** by Paul Zelichowski. He writes: *My latest project (~3 yrs) was building a 12 inch hyperbolic newtonian astrograph using various components. Carbon fibre tube by Frank "Rocketman" Uroda, Van Slyke Instruments spider and mirror cell, 3.5 inch Starlight Feathertouch focuser w/ Robofocus and Hubble Optics f/4.27 mirror/corrector. The attached is first light....only one hour fifteen minutes through H alpha binned 2x2 using SBIG STL11000M camera. I couldn't be more pleased! :)*

Cheers,  
Ski



← Nova

**Nova Del 2013** was less than magnitude 6 Sep 19 when this image was taken. The star has experienced a remarkable colour change from a general white at maximum to a dull red, then deeper red and now a magenta tint. The colours may be a result of the 60Da camera used but the fact that colour has shifted is not disputable.



**Veil Nebula by Aaron Top** A wide shot of the three parts of the Veil Nebula. Exposure time total was 10 min (two stacked 5 min) ISO 2000, focal length 240 mm. Image taken Sep 3, 2013 before this 60Da electronics got fried. (The second camera in two weeks.) Read all about the double disaster on page 2 above.

Here are some photos received at SGN in the last month or so: Enjoy

**Right: Jim Chang's folded refractor at Starfest:**

Brett's candid assessment of a unique design for a refractor: "This is Jim Chang's folded 8' refractor. Robert [Atkinson?-ed] got around to look through it on Saturday night but Jim refused to look at anything other than a blurry Saturn. No optics can cure bad air! I am sure he could get fine images with it. Only technical issues would have to do with surface figure of the flats and some light loss from each reflective surface. Still any full sized tube would require a permanent installation probably...this unit is very portable.



**Left:** Sauble Beach has been the place to be to see nice crescent moons near Venus and Saturn. This Sep 8, 2013 image was enhanced by some nice clouds. Note Saturn in the upper right corner. The crescent and Venus appear near each other again Oct 7 & 8, Nov 6 and Dec 5 but not as close as in this image where the two were separated by less than two degrees.



**Above:** Iridescence in the clouds is caused by a light source shining through water droplets and is often visible in the summer when ice clouds are rarer. Photo above and upper left by John H.

**Left: Paul Zelichowsky -all sky image**

Paul writes: *I put together an all sky cam using an old Starlight Xpress colour one shot camera and a lens that Zbysek left for me from one of the UWO cameras. This was a one minute shot with the moon rising behind the trees at the top of the image. Caught my first meteor with it.*





*This 10-inch Meade SCT donated by Jim and Dora Bishop. On a new AZ-EQ6 mount it has become the workhorse scope at the Fox Observatory.*



*The first scope obtained by BCAS - a Meade 8-inch SCT. Dr. Herb Coleman also gave a 2-m dome and accessories. A additional rack focuser is attached to the diagonal holder to do the coarse focus, and then fine focus with the traditional focus knob.*



*Model 2044 Meade 4-inch SCT donated by E.M. Cressman (Priceville)*

Most of you have seen the 10-inch Meade SCT that is doing the majority of the service at the ES Fox Observatory lately. The image left shows yours truly observing (well, posing actually) with the 10-inch just after it arrived in April, 2012. The telescope was a generous donation from former BCAS members, Jim and Dora Bishop. This instrument in particular is very good optically with a focal ratio of f/10 (2500 mm). We have added a rich field adapter to reduce the f-ratio to f/6.3 making it a good wide field scope as well as a good high-power planetary instrument. With the RFA, both of the clusters of the Double Cluster fit into the FOV of a 25 mm Plossl.

Currently, of course, we have the optical tube mounted on our AZ-EQ6 Skywatcher mount and are having lots of fun slewing around the sky. All reports from those who have experience with GOTO mounts and auto-guiding indicate the mount is functioning extremely well. Images taken there by several of our members bears this out. These will be featured in future issues.

This 8-inch Meade SCT (left) has a much more interesting story behind it. It was received by the Bruce County School Board as part of the package from Herb Coleman which included the 2-m dome which is currently stored in the drive shed near the Fox Observatory. Dr Coleman's donation became the key components in the first observatory that our fledgeling astronomy club used for many years. The dome was installed on top of a 40 ft trailer with a spiral staircase leading up into the observing room. Eventually, the trailer developed a mold problem and had to be decommissioned, but the telescope and metal dome are still around. There has been some talk of re-incarnating the "Coleman Dome" as a solar observatory in a separate building to be built near the Fox Observatory. Stay tuned...

An interesting story about this scope involves a "forced collimation" and goes like this: The telescope was mounted and set up in one of the classrooms before the Fox Observatory was built. One day I happened to take off the lens cover while the scope was clamped in the downward-looking position. After the lens cover came away, I heard a "clunk!". The secondary mirror had fallen out onto the floor! Normally in a Schmidt-Cass this is secured in the corrector plate and does not dislodge easily. It appears a student had figured out a way to unscrew the secondary holder from the corrector plate and couldn't get it back together. So they just put it in loosely and attached the lens cap to hold everything in place.

Luckily there was no damage to the secondary mirror and I was able to reattach the holder using a long rod with a clothespin taped to the end to hold the collar that secured the secondary in place. Later, after reading up about SCT collimation, I was able to star collimate the telescope and it seems to be back providing decent views again. Word to the wise: When there are students in the building, don't let the little b\*\*\*gers out of your sight.

The final telescope of our Meade "Trio" is a 4-inch SCT that arrived as a surprise on my doorstep from the same gentleman in Priceville who sold me his C-8 in 1975. See the full story and moon pictures taken with the 4-inch in the Sep SGN pg 4.

Meade created its 8-inch SCT (centre) to compete with Celestron's venerable C-8. But to complete the lineup they later also introduced a smaller "travel" scope that started out as a single-arm model, the 2040, and then developed tabletop tripod legs as the 2044 to make it look like the much more pricey Questar telescope. Eventually it became a two fork model. Meade's ETX looks a bit like the 2044 but is actually a different style telescope that came on the market a dozen years later. The ETX90 is a Maksutov design and has about 10 mm less aperture (90 mm vs 100 mm). See [http://en.wikipedia.org/wiki/Maksutov\\_telescope](http://en.wikipedia.org/wiki/Maksutov_telescope) for more about Maksutov telescopes.

The model shown left is the 2044 and came with 5 eyepieces including a two-inch Meade 35 mm Wide Angle (an Erfle design) and a 45 mm Plossl in the 1.25-inch size - not many of these are out there. A 2-inch diagonal allows any DSLR camera to be mounted to the instrument and provides a 1000 mm focal length telephoto lens, - enough "power" to see the nostril hair in that eagle on the mesa! There is erecting diagonal too to allow terrestrial use -Mr. Cressman was after all a birder.

Images of the lunar craters on page 4 of the Sep SGN attest to the very good optics of this instrument. And more than one observer has said that it is such a "cute" telescope! -JH

# NASA's WISE telescope poised for second life as asteroid hunter

Aug 22, 2013

A dormant NASA space telescope is to be given a new lease of life – to sniff out near-Earth objects that could be on a collision course with our planet. Agency officials have decided to reactivate [WISE](#), the Wide-field Infrared Survey Explorer that was mothballed in 2011 after spending two years studying the universe.

Originally launched in late 2009, WISE's main aim was to perform an all-sky survey in the infrared using its 40 cm- diameter telescope to uncover newly born stars and brown dwarfs hidden outside our solar system. Before its hydrogen coolant began running low in late 2010, the telescope was also used for four months to search for comets and asteroids that could pose a threat to our planet (dubbed the NEOWISE project). During 2010 WISE observed about 158,000 rocky bodies out of approximately 600,000 known objects. Its discoveries included 21 comets, more than 34,000 asteroids in the main belt between Mars and Jupiter, and 135 near-Earth objects, some of which were potentially hazardous, before finally being put into hibernation in early 2011.

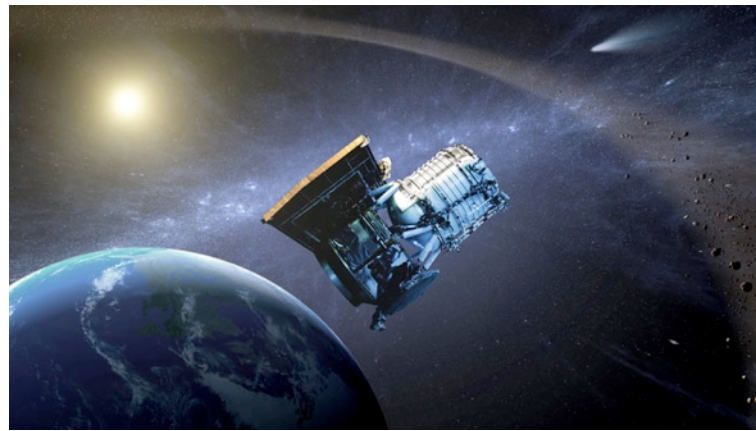
## Space rocks

Using WISE in this way was considered such a success that [Lindley Johnson](#), head of NASA's Near-Earth Objects Program, has decided to reboot the craft. The infrared telescope will be revived next month to discover and characterize NEOs that are orbiting within 45 million kilometres from Earth's path around the Sun. NASA anticipates WISE will use its telescope and infrared cameras to discover about 150 previously unknown NEOs and characterize the size, albedo and thermal properties of about 2000 others – including some that could be candidates for the agency's recently announced asteroid initiative. After it is reactivated, WISE it will only be used until 2017, when it will slip from its 500 km Sun-synchronous orbit.

## About the author

Gemma Lavender is a science writer based in the UK.

Article from Universe Today



*This artist's concept shows the Wide-field Infrared Survey Explorer spacecraft in orbit around Earth. In September, engineers will attempt to bring the mission out of hibernation to hunt for more asteroids*

## Telescopes, Telescopes, EVERYWHERE Telescopes!

Once the ES Fox Observatory was completed and the amount of publicity we received increased, the number of telescope donations started to go up. Earlier, most donations came from BAS members who had outgrown their scopes; more recently, we are getting some very nice instruments from folks that just call up and say: "I heard about you (on TV, in the Sun Times, in Sky News, on CBC Morning radio, in Explore Bruce, from my kids visiting the BOEC, -pick one) and I have a telescope that has been gathering dust. Would you like to have it for your observatory?"

I rarely ever turn down donations like this and even though BAS does not issue tax receipts, people are happy to drop them off hoping the telescope will get some use. Sadly, many donations come in because the owners tried the scope out a few times and found it non-user-friendly and/or stuff to look at just too difficult to locate. Often, people are surprised when I ask them if they lined up the finderscope first.

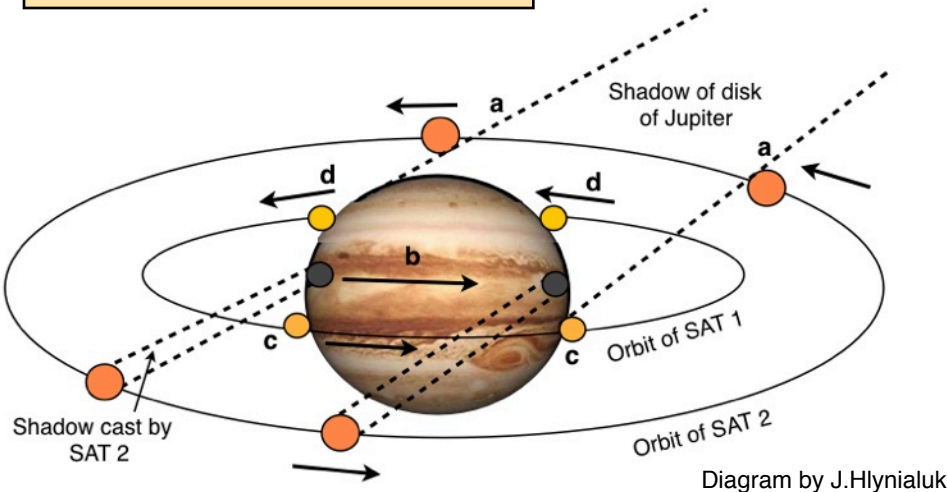
So here is the list of what has been DONATED to BAS/ES Fox over the last few years. By "donated" take it to mean that the telescope was given outright, purchased for a nominal amount or purchased with "other people's money" like the Trillium grant.

1. Meade Lightbridge 12-inch dobsonian donated by Robert Williamson BAS member. Lots of gadgets & accessories.
2. Skywatcher 12-inch dobsonian on "permanent loan" from Brett Tatton BAS member.
3. Meade 10-inch SCT model 2120 donated by Jim and Dora Bishop former BCAS members. Mounted now on the AZ-EQ6.
4. Meade 8-inch SCT model 2080 and 2 m dome from Dr. Herb Coleman; the original donation that started it all.
5. Two 8-inch Skywatcher dobsonians purchased with Trillium funds 2011.

6. Meade 8-inch reflector model 856 f/7 donated by Georgian Bay SS Meaford.
7. Homemade 8-inch f/5 reflector (some Edmund Sci. parts) donated by OSCVI.
8. Homemade 6-inch f/8 reflector, one of 2 built by students at Warton District High School. Purchased optics and focusers.
9. Homemade 6-inch reflector -the other one built by students of WDHS. Both are dobsonian designs in plywood.
10. Meade 4-inch SCT model 2040 donated by Mark Cresswell of Priceville.
11. Coulter Odyssey 10-inch (blue dob circa 1980) donated by Bruce Peninsula District School.
12. Homemade 6-inch reflector (Edmund design) not operational, obtained from Bill Murphy.
13. Homemade 6-inch reflector obtained from Andy Dinsmore. (includes an unsilvered 12-inch mirror with other goodies like a complete mirror grinding kit).
14. Nexstar 4-inch GOTO reflector donated by Donna Geisler former BCAS member.
15. Several 4-inch reflectors (of "Tasco-style") donated by anonymous individuals including a Meade "Digital" motorized model which doesn't work very well.
16. Several 2-inch refractors from unknown sources. All non-functional but available for parts. Help yourselves.
17. Fischer-Price 2-inch refractor -the "joke scope" -but it does work.
18. At least three pairs of binoculars including a 25 X 70mm pair.

The BOEC has two telescopes, a Meade 6 and an 8-inch dobsonian that are kept at the Learning Centre and Elvira, our original 8-inch dobsonian loaner is under refurbishment in my garage. This collection of telescopes (and accessories that came with them) is now getting to the point of becoming a storage problem. The original plan was to have enough 6 and 8 inch dobs to provide pairs of students with a telescope to use for an evening at the observatory. There is no problem anymore accommodating a group of up to 30 or so students. JH

Circumstances of Jupiter's Moons



- a = beginning and end of an eclipse of (SAT 2 passes into Jupiter's shadow)
- b = transit of the shadow of SAT 2 (obvious black dot moving across disk)
- c = transit of SAT 1 on the disk of the planet (may be difficult to see against Jupiter clouds)
- d = occultation of SAT 1 (view of SAT 1 is blocked by Jupiter's disk)

From Astronomy magazine discussion forum:

Triple shadow events always involve the outermost Galilean satellite, Callisto (IV). For those who might be wondering, quadruple shadow events are impossible because the inner three Galilean satellites have a commensurability that prevents all three from lining up.

The inner three satellites have shadow transits every orbit. Callisto's shadow only transits when Jupiter's tilt relative to the Earth is small. Over Jupiter's nearly 12-year orbital period, there are alternating periods of about 3 years each in which Callisto's shadow can or cannot transit. In fact this is true for all of Callisto's dynamic events: Occultations, Eclipses, Transits and Shadow Transits.

The next period allowing for such Callisto events will be from 2008 JAN to 2010 SEP. However, no triple shadow transits will occur in that window. The following window will be from 2013 JUL to 2016 JUL. Triple shadow transits will occur three times during that period.

Below are given the mid-times of the next triple shadow events utilizing the International (Astronomical) Date Format and Universal Time. Also shown are the durations in minutes, the elongations from the Sun, and the three satellite shadows involved.

- 2013 OCT 12 05:04 UT 64 min W 90° I II IV
- 2014 JUN 03 18:56 UT 95 min E 38° II III IV [daylight for North America -ed]
- 2015 JAN 24 06:40 UT 25 min W 165° I II IV [a nighttime event but only 27 min! -ed]

Then not again until twice in 2032.

[edited by: Centaur at 12:52 PM (GMT -6) on Fri, Apr 13 2007]

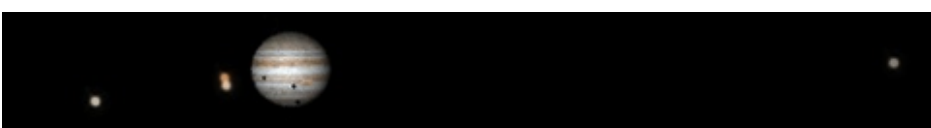
Jupiter's Moons: Transits, Occultations and Triple Shadow Crossings

Jupiter has always had a high approval rating with amateur astronomers. It has a lot going for it: the largest planet with much surface details visible, four large moons that shuttle around it and on top of that eclipses that are visible from a different perspective than the lunar variety seen here from Earth. Whenever it is in the night sky, it always is a crowd-pleaser.

Mark Oct 11 as a red-letter day for Jupiter. A relatively rare triple crossing of shadows takes place from 12:30 pm Oct 11/12 pm to about 1:20 am. There are two shadows until about 2 am and then the last shadow tracks off the disk around 2:45 am.

At first, I thought these were rather rare events, but triple crossings occur more often that I realized. The last one occurred in 2004 and there are three coming up in 2013 to 2015. See left for one explanation of these events. This was an item I got from the internet and I have not been able to identify "Centaur" as this piece is signed. It appeared in the Astronomy magazine Discussion Forum, but as for the accuracy of the information, Caveat Emptor.

If the information is accurate, make sure you observe the possible transits from 2013 to 2015 (Oct 11/2013, Jun 3/2014 and Jan 24/2015. There are no more until 2032 after that.



Graphic Above: Moon locations during the triple shadow transit on Jupiter around 1:am Oct 12. Io (red) and Europa are close to each other, Callisto is wide left and Ganymede is wide right. Diagram from Starry Night Pro.

Triple shadow transit on Jupiter occurs just after midnight Oct 11. Look for this "somewhat rare" three shadows crossing Jupiter from 12:32 am DST to 1:50 am DST (Oct 12 morning). Two shadows are rare enough, three are somewhat rarer, four are not possible (see item above for why). There are two more triple transits, one in 2014 and again in 2015. Then nothing until 2032! After 1:50 am, two shadows continue to be visible until 2:00 am and then one until 2:45 am. Jupiter is only 7 degrees up in the East at the start of the event for Owen Sound area. Telescopes larger than 4-inch aperture are required for good views. There may be observing at the Fox if it is clear, but Jupiter is low and may be below trees. Check BAS website for info about observing location.

## Kepler Data has clues to Surface Gravity

*Flicker, flicker little stars*

*Now we know what your surface gravities are*

*This update of a classic nursery rhyme was inspired by astronomers in the US, who by serendipity have found a new method of measuring the strength of gravity on the surface of a star. Surface gravity is a key stellar parameter and having a new way to determine its value could lead to further insights into extrasolar planets (exoplanets), which are planets that orbit stars other than the Sun.*

Surface gravity is important because it provides information about two fundamental properties of a star. These are its mass – which governs how the star behaves – and its diameter, which can affect estimates of the sizes of planets seen to be orbiting it.

Not surprisingly, the star with the most precisely known surface gravity is our own. The Sun is 109 times larger than the Earth and 332,946 times more massive, so simple calculations indicate you would weigh 28 times more there than here – if you could survive the heat. For more distant stars, surface gravity can be estimated using a spectroscopic technique, but only with an accuracy of 25–50%.

### Spotted by Kepler

Now, [Fabienne Bastien](#) and [Keivan Stassun](#) of Vanderbilt University in Nashville, Tennessee, and colleagues have chanced upon a new method that can deliver an accuracy of 15–25%. The story begins with Bastien examining data from the [Kepler space observatory](#), which makes very precise measurements of the brightness of stars. Kepler's primary goal is to find the tiny dips in brightness that occur when orbiting planets pass in front of their stars.

For some stars, Kepler has also detected internal oscillations in brightness and Bastien noticed that the more a star's light flickers during a period of eight hours, the lower its surface gravity. "It was an accident," says Bastien, a graduate student who is using Kepler data to study stellar magnetic fields. "I actually did not quite know what to make of it."

Stassun, her advisor, recalls what happened next. "She came into my office. 'Look at this pattern', she said. 'It's pretty dramatic. But what is it?'"

### Rising bubbles

Bastien and Stassun then hit upon the answer. Most stars, including the Sun, have surface temperatures of less than 6500 K. Such stars have outer layers that are convective: their surfaces boil like a pot of water on a hot stove. Hot bubbles of gas rise to the surface; cooler ones descend.

Following the Stefan–Boltzmann law, the hot bubbles are brighter, so the star's surface looks granulated, with dark areas surrounding bright ones. The granules, the astronomers think, cause the starlight to flicker. On a star with a high surface gravity, like the Sun, the granules are small,



*Artist's impression of Kepler spacecraft at work monitoring stars. Courtesy: NASA*

producing only tiny flickers. In contrast, a low-surface-gravity star, like a puffy red giant, has large granules and therefore larger flickers.

### "Surprisingly nice, tight correlation"

"It's an innovative technique to measure something interesting that will have impact on several different fields," says [Marc Pinsonneault](#), an astronomer at Ohio State University in Columbus who was not involved with the discovery. He calls the link between stellar flicker and surface gravity "a surprisingly nice, tight correlation".

"What the flicker method will do is to greatly improve the accuracy of planet diameters," Stassun says. Good estimates of planetary sizes help determine whether a far-off world is a gas giant like Jupiter, an ice giant like Neptune, or a rocky planet like Earth. Kepler scientists use the amount of starlight a planet blocks to estimate its size relative to its star. So determining the planet's absolute size requires knowing the star's diameter, which the flicker technique will provide via the surface gravity.

The flicker technique does have its limitations. It will not work on the hottest stars, which have outer layers that do not bubble. And the flickers are small, so the method requires a sensitive spacecraft such as Kepler. Kepler recently suffered a major malfunction, but NASA does plan to launch a successor, the Transiting Exoplanet Survey Spacecraft, later this decade.

Article reprinted from [Physicsworld.com](#) with permission

### Easier but less accurate than asteroseismology

The technique is also not as accurate as asteroseismology, which exploits a star's internal oscillations to derive its surface gravity. "Nothing compares to asteroseismology," says Stassun. "It really is

the gold standard." But flicker measurements are much easier to make than asteroseismic ones.

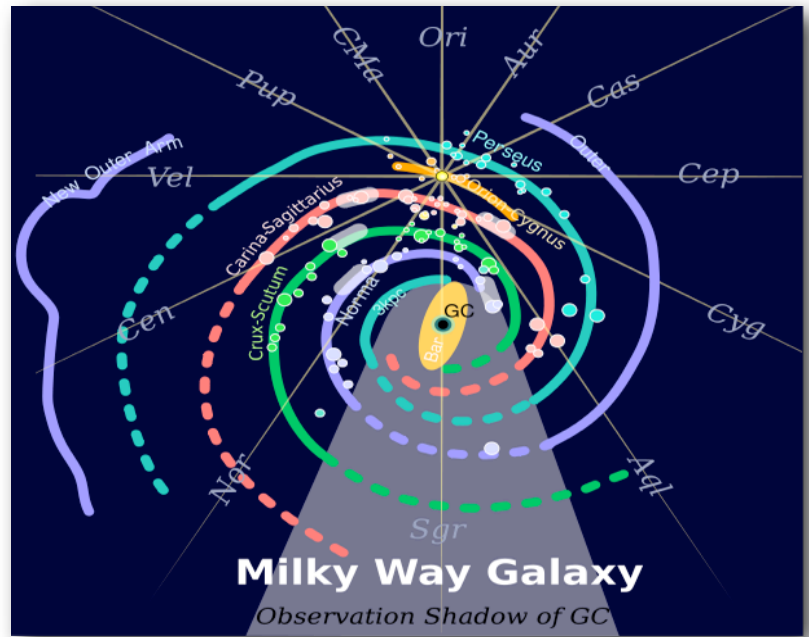
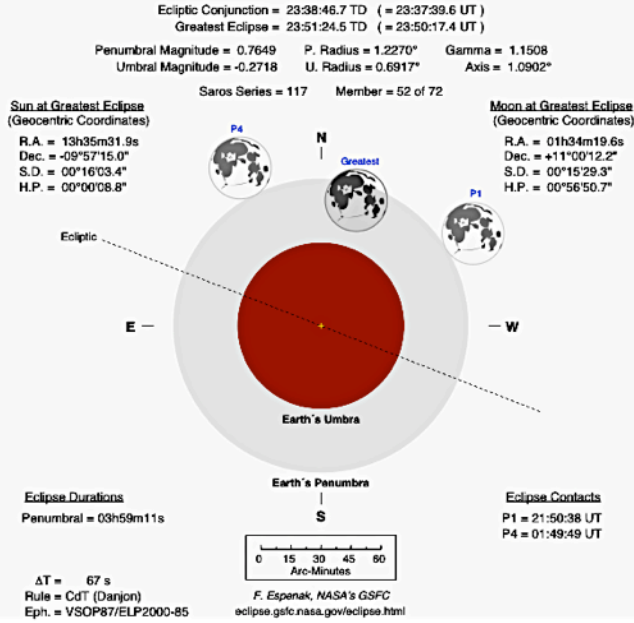
The new work also suggests that the Sun will someday lose its spots. Young sun-like stars have strong magnetic fields that pepper their surfaces with spots and flares, producing much larger stellar fluctuations than the flickers. But as stars age, their magnetic activity dwindles. Ultimately, they reach what Bastien and her colleagues call a "flicker floor": no spots besmirch their surfaces and all variability arises instead from the granules. At sunspot minimum, our star is already near this flicker floor. When will the Sun be completely spotless? "My guess is that we're probably talking something in the neighbourhood of a billion years," says Stassun.

The astronomers have published their discovery in [Nature](#).

### About the author

[Ken Crowell](#) is an astronomer and author of *The Lives of Stars*

**Penumbral Lunar Eclipse of 2013 Oct 18**



**The Puzzle of Spiral Arms**

How disk galaxies form their spiral arms has been puzzling astrophysicists for almost as long as they have been observing them. [Current models suggest] either this structure is caused by differences in gravity sculpting the gas, dust and stars into this familiar shape, or its just a random occurrence which comes and goes with time.

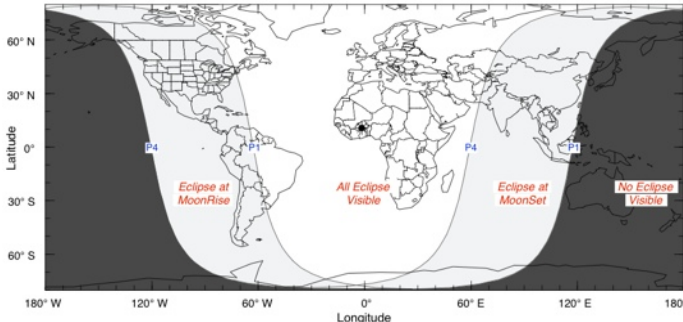
Now researchers are beginning to wrap their conclusions around findings based on new supercomputer simulations – simulations which involve the motion of up to 100 million “stellar particles” that mimic gravitational and astrophysical forces which shape them into natural spiral structure. The research team from the University of Wisconsin-Madison and the Harvard-Smithsonian Center for Astrophysics are excited about these conclusions and report the simulations may hold the essential clues of how spiral arms are formed.

“We show for the first time that stellar spiral arms are not transient features, as claimed for several decades,” says UW-Madison astrophysicist Elena D’Onghia, who led the new research along with Harvard colleagues Mark Vogelsberger and Lars Hernquist. “The spiral arms are self-perpetuating, persistent, and surprisingly long lived,” adds Vogelsberger.

When it comes to spiral structure, it’s probably the most widely occurring of universal shapes. Our own Milky Way galaxy is considered to be a spiral galaxy and around 70% of the galaxies near to us are also spiral structured. Many things take on this common formation: whisking up dust with a broom causes particles to swirl into a spiral shape... draining water invokes a swirling pattern... weather formations go spiral. It’s a universal happening and it happens for a reason. Apparently that reason is gravity and something to perturb it. In the case of a galaxy, it’s a giant molecular cloud – the star-forming regions. Introduced into the simulation, the clouds, says D’Onghia, act as “perturbers” and are enough to not only initiate the formation of spiral arms but to sustain them indefinitely. “We find they are forming spiral arms,” explains D’Onghia. “Past theory held the arms would go away with the perturbations removed, but we see that (once formed) the arms self-perpetuate, even when the perturbations are removed. It proves that once the arms are generated through these clouds, they can exist on their own through (the influence of) gravity, even in the extreme when the perturbations are no longer there.”

[So now] we know spiral structure isn’t just a chance happening and – to wrap things up – it’s probably the most common form of galaxy in our Universe. [This article from Universe Today written by Tammy Plotner, professional astronomy writer.]

Read more: <http://www.universetoday.com/101205/wrapping-around-the-mystery-of-spiral-galaxy-arms/#ixzz2eFadgTlz>



The last lunar eclipse of the year is a relatively deep penumbral eclipse with a magnitude of 0.7649. It should be easily visible to the naked eye as a dusky shading in the southern half of the Moon. The times are listed below.

- Penumbral Eclipse Begins: 21:50:38 UT (5:50:38 pm DST)
- Greatest Eclipse: 23:50:17 UT (7:50:17 pm DST)
- Penumbral Eclipse Ends: 01:49:49 UT (9:49:49 pm DST)

Note that the beginning and end of a penumbral eclipse are not visible to the eye. In fact, no shading can be detected until about 2/3 of the Moon’s disk is immersed in the penumbra. This would put the period of nominal eclipse visibility from about 23:30 UT (7:30 pm DST) to 00:10 UT 12:10 am DST. Keep in mind that this is only an estimate. Atmospheric conditions and the observer’s visual acuity are important factors to consider. An interesting exercise is to note when penumbral shading is first and last seen.

Figure 4 (above) shows the path of the Moon through the penumbra as well as a map of Earth showing the regions of eclipse visibility. Eastern Canada will see the entire event while the rest of Canada and the USA will see moonrise with the eclipse already in progress. Observers in Europe and Africa will also see the entire event, while eastern Asia misses the end because of moonset.

The October 18 penumbral lunar eclipse is the 52nd member of Saros 117 (Esenpak and Meeus, 2009). Complete details for the series can be found at: [eclipse.gsfc.nasa.gov/LEsaros/LEsaros117.html](http://eclipse.gsfc.nasa.gov/LEsaros/LEsaros117.html)

# Sagittarius (Sag)

α Sagittarii - Rukbat  
β Sagittarii - Arkab

γ Sagittarii - Al Nasl δ Sagittarii - Kaus Meridionalis  
ε Sagittarii - Kaus Australis ζ Sagittarii - Ascella  
σ Sagittarii - Nunki λ Sagittarii - Kaus Borealis π Sagittarii-Al Baldah

Sagittarius (the Archer) is the southernmost of the zodiacal constellations, lying between Capricornus to the east and Scorpius to the west. The central part of Sagittarius has a group of stars [an asterism] resembling in shape a giant teapot complete with spout and handle, an aid in identifying this constellation. The stars forming the handle and dome of the teapot comprise a group of stars known as the "Milk Dipper," another distinguishing feature. Sagittarius lies directly in the plane of the brightest part of the Milky Way; the Galactic Center is located in this constellation. The region is very rich in star clusters and nebulae. An enormous number of stars also lie in this region of the sky; it is a grand area for scanning with fieldglasses. Observe in binoculars the dark areas in the Milky Way around γ and δ Sagittarii; these are clouds of cosmic dust with no nearby stars to illuminate them. M 24 is an open cluster, impressive in binoculars, while M 8, the "Lagoon Nebula", is visible to the naked eye. M 22 is a magnificent globular cluster; its stars are of the 10th magnitude and fainter, but so compact they form an object barely visible to the naked eye.

### DOUBLE STARS

	Mag.	Sep'n (s)	Location	Remarks
ζ	3.3-3.5	1	190030	
η	3.2-10	4	181537	
μ	4.0-11.0-9.5-9.5	17-48-50	181021	Quadruple.
π	3.7-3.8-6.0	1	190721	Triple.
54	5.4-8.9	46	190381	Yellow-Blue.

### MESSIER OBJECTS

Mag	Location	Remarks
M 8	- 180124	Diffuse Neb. "Lagoon Nebula", visible to naked eye.
M 17	- 181816	Diffuse Neb. "Horseshoe Neb.", "Swan" or "Omega"
M 18	7.5 181717	Open Cl.
M 20	- 175923	Diffuse Neb. "Trifid Nebula"; very large, bright, has several doubles, multiple stars
M 21	6.5 180223	Open Cl.
M 22	5.9 183324	Globular Cl. Called the finest after M13, see above.
M 23	6.9 175419	Open Cl.
M 24	4.6 181618	Open Cl. Beautiful field.
M 25	- 182919	Open Cl.
M 28	7.3 182223	Globular Cl. Very condensed.
M 54	- 185231	Globular Cl.
M 55	- 193731	Globular Cl.
M 69	8.9 182832	Globular Cl.
M 70	9.6 184032	Globular Cl.
M 75	8.0 200322	Globular Cl. Most "open" of the large globulars.

### Other Objects of Interest (Sag)

NGC 6723 - Globular Cl. Loc'n. 185637  
 NGC 6822 - Irr. Gal. mag. 11. 194315.  
 R Sagittarii - Long per. (269 d) var. max mag 7.3. Location 191319  
 T Sagittarii - Long per. (392 d) var. max mag 8.0. Location 191317  
 W Sagittarii - Cepheid var., mag range 4.3-5.1. per. 7 d15h55 min. 180230

# Scutum (Scu)

Scutum (Scu) is a small, faint constellation lying between the three great constellations of Aquila, Ophiuchus and Sagittarius. Its four brightest stars are in the shape of a great elongated diamond. The two brightest stars, α and β Scuti, have magnitudes of 4.1 and 4.5 respectively. It lies in the Milky Way and therefore does not stand out very well. M 11, a "semi-globular" open cluster, is visible to the naked eye. [a favourite open cluster for many observers -ed]

### DOUBLE STARS

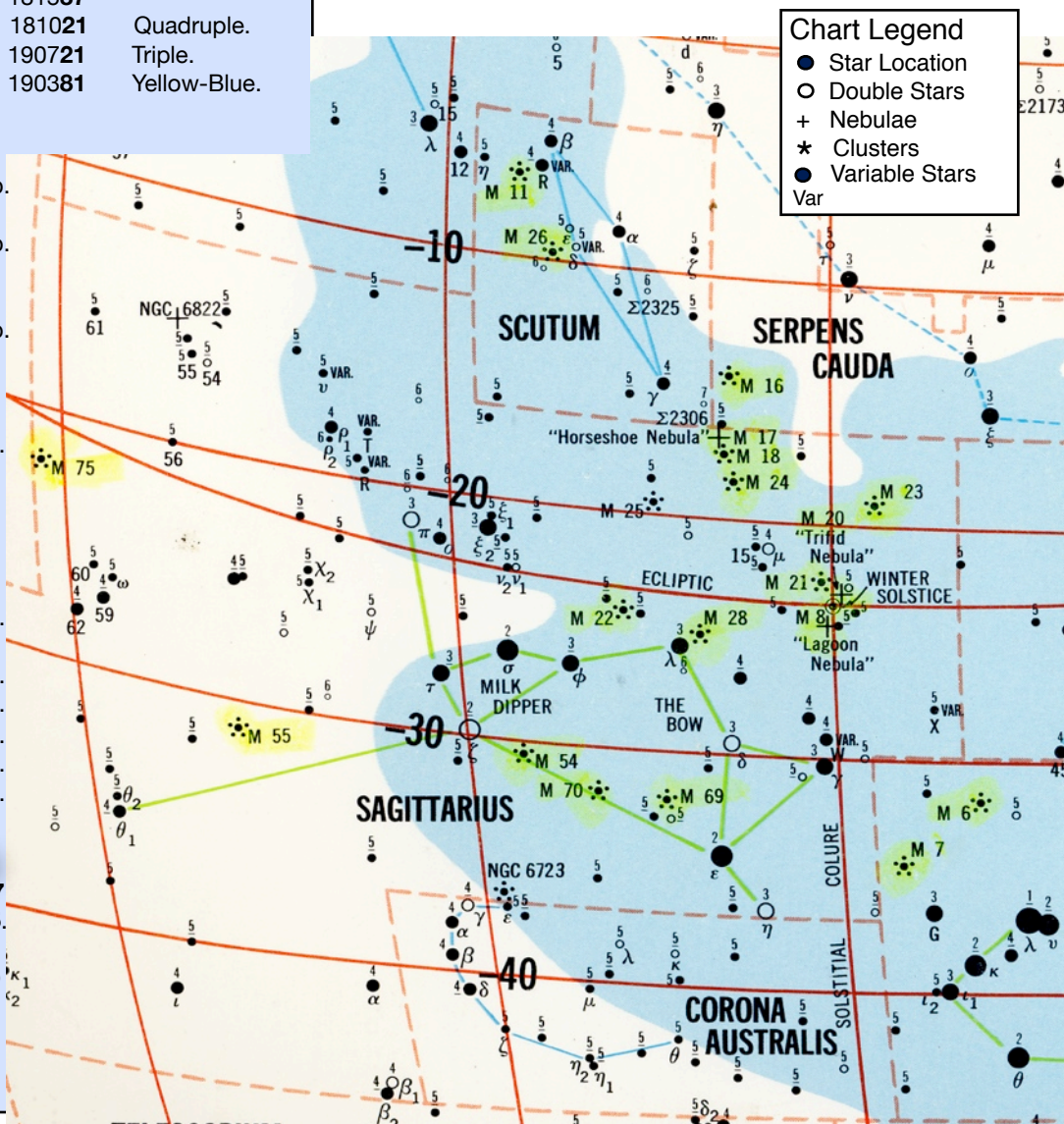
	Mag.	Sep'n (s)	Location	Remarks
Σ2306	7.2-7.9	12	181915	Yellow-Deep Blue; very beautiful.
Σ2325	6.0-9.3	12	182810	

### MESSIER OBJECTS

Mag	Location	Remarks
M 11	6.3 184806	Open Cluster. Called semi-globular. Known as the "Wild Duck" cluster. [or the "Borg Cube" -ed]
M 26	9.3 184309	Open Cluster. Coarse.

### Other Objects of Interest in Scutum

R Scuti Long period (145 days) variable, magnitude range 4.9-9.0. Location 184506.



- Oct 1 Mars 7° N of Moon
- Oct 3 Zodiacal light before dawn twilight in East for next two wk.  
**Uranus (5.7) at opposition (50 high°) at midnight**
- Oct 4 New Moon** rises locally at 5:54 am DST
- Oct 6 Mercury 3° S of Moon,  
Saturn 1.9° N of Moon (difficult observation)
- Oct 8 Venus 5° S of Moon
- Oct 9 Mercury greatest elongation from sun (25° E)
- Oct 10 Mercury 5° S of Saturn  
Moon at perigee (369 813 km)
- Oct 11 First Quarter Moon** rises at 2:22 pm DST
- Oct 14 Mars 1° N of Regulus**
- Oct 16 Venus 1.6° N of Antares**
- Oct 18 Full Moon** rises at 7:20 pm DST  
**Penumbral Lunar Eclipse** max eclipse 7:53 DST, difficult observation, moon sets at mid-eclipse locally.
- Oct 21** Orionid meteor peak (20/h) moon 3 days past full
- Oct 25 Moon at apogee (404557 km)  
Jupiter 5° N of Moon.
- Oct 26 Last Quarter** rises at 12:35 am EDT
- Oct 29 Mars 6° N of Moon

## Planets

**MERCURY**, stays near the western horizon and the setting sun all month and is difficult to see in twilight all Oct.

**VENUS**, (-4.2), is the bright Evening Star low above the western horizon all month. The crescent moon is nearby on Oct 7 and 8.

**MARS** (1.5) is a dawn planet in Leo rising about 3 am. It is less than a degree from Regulus on Oct 15. **JUPITER**, (-2.2) starts rising before midnight by Oct 8. By month end it is 70° high by the start of dawn twilight. Three moon shadows cross its surface on Oct 11/12. See pg 8 and Special Events below for details.

**SATURN**, (mag 0.6) is low in the western sky and sets in dark sky only at the start of Oct. One last hurray occurs on Oct 6 when the crescent moon and Mercury appear below it -a challenging observation. Both **URANUS**, (5.7) and **NEPTUNE**, (7.8) are above the horizon by 11 pm in Aug. They straddle the meridian by 1 am at the end of the month. Both **asteroids, Vesta (7.8)** and dwarf planet, **Ceres (8.1)** are now too close to the sun to observe. **PLUTO** (mag. 14) is in dark sky for much of the night and well-placed for viewing in Aug. The September BAS@Fox viewing night will target Pluto.

Diagram below gives the sunrise/sunset times and sun's altitude on three dates this month. The sun is at equinox on Oct 22. The Oct moon phase graphic below shows lunar phases for each night of the month. Times of moonrise for NM, FQ, FM and LQ are given in the Calendar listing at left.

## BAS Events

- Oct 2 BAS meeting** Grey Roots Museum 7 pm  
Topic: "Never- before Seen Optics": John H.
- Oct 5 (NM) BAS viewing @Fox** ES Fox@dark, backup Oct 26 Sat (LQ)
- Oct 11/12 (FQ) Triple shadow transit** Jupiter (after midnight Oct 11 12:32 am DST to 1:46 am DST (Oct 12 am))
- Oct TBA BAS Astrophotography Workshop @Fox**  
Frank Williams and others will give pointers -a hands-on event. Bring you own equipment if you have it.
- Oct 26 (LQ) 4th Annual Harvest Dinner** BOEC Dining Hall starts 5:30 pm Speaker: Bob Henderson, silent auction, a licensed event. Tickets \$50/ea. Available from Joan S. (519-376-9554), John H. (519-371-0670), Ross (519-389-3922) BOEC (519-534-2767)

## Special Events

### Triple Shadow Transit

A rare triple shadow transit will be visible on Jupiter around midnight on Oct 11. The planet is only 7° above the eastern horizon when (12:32 pm) the third moon shadow, Io, starts crossing the disk. Both Europa and Callisto shadows are on the planet from the rising of Jupiter (11:46 pm at Owen Sound) until well into the wee hours. Io's dot finally leaves the disc around 2:45 am Oct 12. The table below gives the approximate times for shadow ingress/egress for the three moons. Note also that Io and Europa are **very** close to each other to the left of Jupiter during the first hour or so. They are only 3.6 seconds of arc apart at the closest. Compare this to the separation of Mizar and its tiny companion (not Alcor). Mizar A and B are 14 seconds apart. This is 4 to 5 times the separation of Io and Europa at the closest time, 1:05 am! It may be tough to split these two moons considering that Jupiter is not higher than 20° at about this time. Give it a shot. See pg 8 above for complete details.

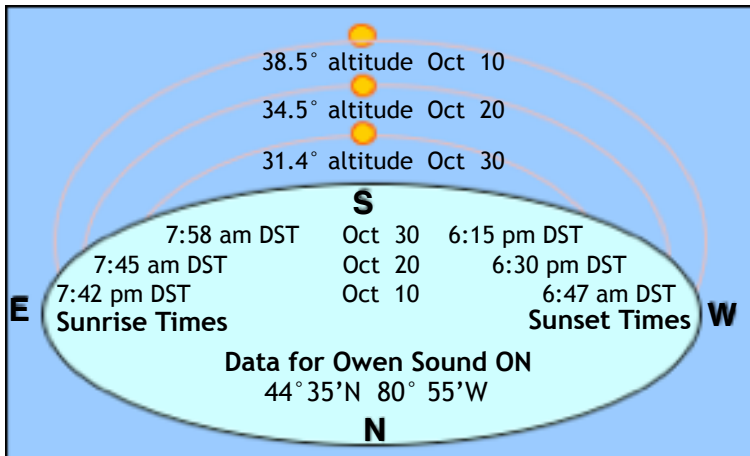
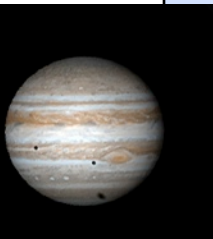
**Venus and Crescent Moon Oct 8** The thin crescent moon and Venus are about 5 degrees apart in the head of Scorpius this evening in the West -a repeat of the close pass last month (image pg 4). Antares is nearby as well making a triangle of bright objects. Photo op!

Moon	App.	Disapp.
Callisto	11:08 pm	1:46 am
Europa	11:23 pm	2:20 am
Io	12:30 am	2:45 am

**Note:** Jupiter rises at 11:46 pm and is 30° high by 2:45 am at Owen Sound latitude. Times estimated (+/- 1 min) from Starry Night Pro.

Several double shadow transits occur on Jupiter in October as well. See the 2013 Observer's Handbook pg 117 for dates and times.

The view at 1:05 am EDT Oct 12, c/o Starry Night. Callisto, Io (above) and Europa (L to R) and the three shadows on Jupiter's disc (Io,



## Oct 2013

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

**BAS Member Loaner Scopes**

**Solar H-alpha scope now out on loan.**

Our Lunt solar scope can be borrowed by BAS members but there is a waiting list! Contact Aaron to get your name on it. We now have a suitable mount for it as well. A short training session will be provided on pickup.

**One 12-inch Dob still available.**

One 12-inch telescopes has been spoken for but the other is still available for the summer. Our two **8-inch dobsonians** are presently out on loan. Contact Brett T. or Aaron T. to check on availability. Scopes come in and out periodically so keep checking with Brett or Aaron if you are interested in a loaner.



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Information about the 50D can be found here:

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and here: <http://www.imaging-resource.com/PRODS/E50D/E50DA.HTM>

**FOR SALE: Meade LX75 **SOLD !** telescope mount**

Meade LX75 with the 497 AutoStar hand controller (GOTO system). It comes with two balance weights and 12 V power supply. This mount is a medium-duty mount that will support 30 pounds. Vixen-style dovetail mount suitable for up to 5 or 6-inch refractors or up to 9.25-inch SCT. ASKING \$350.00

See <http://www.cloudynights.com/documents/lxd75.pdf> or [http://www.cloudynights.com/item.php?item\\_id=2014](http://www.cloudynights.com/item.php?item_id=2014) for more information.

Contact Brett Tatton ([brettatton@gmail.com](mailto:brettatton@gmail.com))

**FOR SALE: Televue Pronto**

2 element E.D. Refractor, 2.7" / 70mm diameter. f.l. 480mm, f/6.8. with 1-1/4" Star Diagonal, with 45 degree Prism diagonal (for terrestrial viewing), with Televue Red dot finder, complete with Televue Soft Case. Asking \$ 700.-- Firm Anton VanDijk 519 376-9912 [ravand@rogers.com](mailto:ravand@rogers.com)



**SOLD !**

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If you have a suitable (new or hand-made item) that you would like to donate to the Harvest Dinner silent auction, please contact Cheryl D. ([cheryl.dawson@bell.net](mailto:cheryl.dawson@bell.net)) ph:519-371-4129 or John H. ([stargazer@wightman.ca](mailto:stargazer@wightman.ca)) ph: 519-371-0670. There is a tax-receipt available for the retail value of the donation. Items are requested by the week prior to the event or make arrangements with John or Cheryl for pickup/delivery at a convenient time. Thank You!