Aurora
The Royal Astronomical Society of Canada - Windsor Centre
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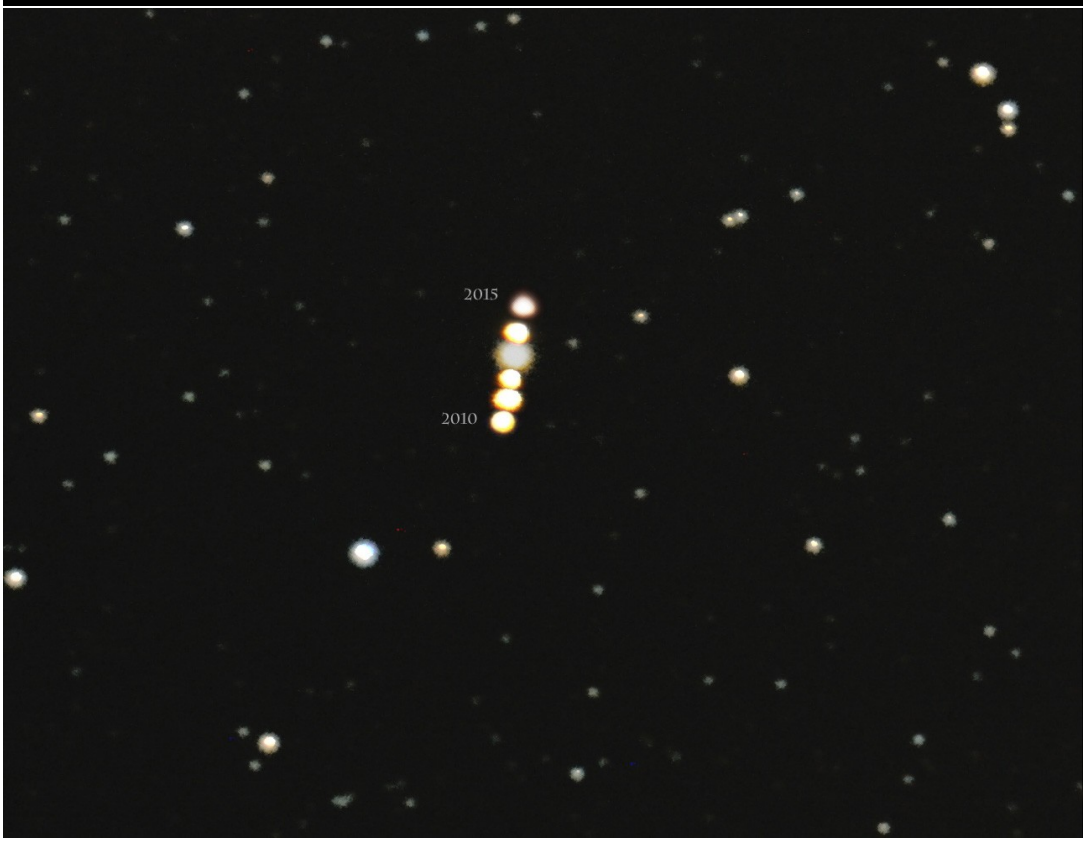
Barnard's Star



Barnard's Star is about six light-years away from Earth in the constellation of Ophiuchus which makes it the fourth-closest star to the Sun. The three components of the Alpha Centauri system are closer which makes Barnard's Star the closest star visible from the Northern Hemisphere. Barnard's Star is a low-mass red dwarf star which makes it dim at about 9th magnitude despite its close proximity. It is named for American astronomer E.E. Barnard. He was not the first to observe the star but in 1916 he measured its proper motion or movement against the background sky as 10.3 arc seconds per year. This is the largest-known proper motion of any star relative to the Solar System.

The image above or more correctly the 6 images above were captured by Dave Panton and Steve Mastellotto. Since 2010 Dave captured an image of the field that contains Barnard's Star and for 2015 Steve captured the image. 2010 was the first year of this personal project when Barnard's Star was in the lowest position in the above composite image created by Steve. In August Steve captured the 2015 image (top position) which now represents 51.5 arc seconds of movement over the intervening years.

Over the years Dave and Steve captured the images with slightly different set ups but in general the images are through the Celestron 14 inch scope at Hallam using Nikon and Canon digital cameras and about 2 minute exposures at ISO 800 or 1600. Focus is achieved using a Bahtinov mask.

In This Issue

Calendar of Events

Our next meeting…

Tuesday October 20, 2015
7:30 p.m.
at
Ojibway Park Nature Centre
5200 Matchette Road

Main Speaker…

Dale Partin

Topic…

The Grid: Is it Safe? Are You Safe?

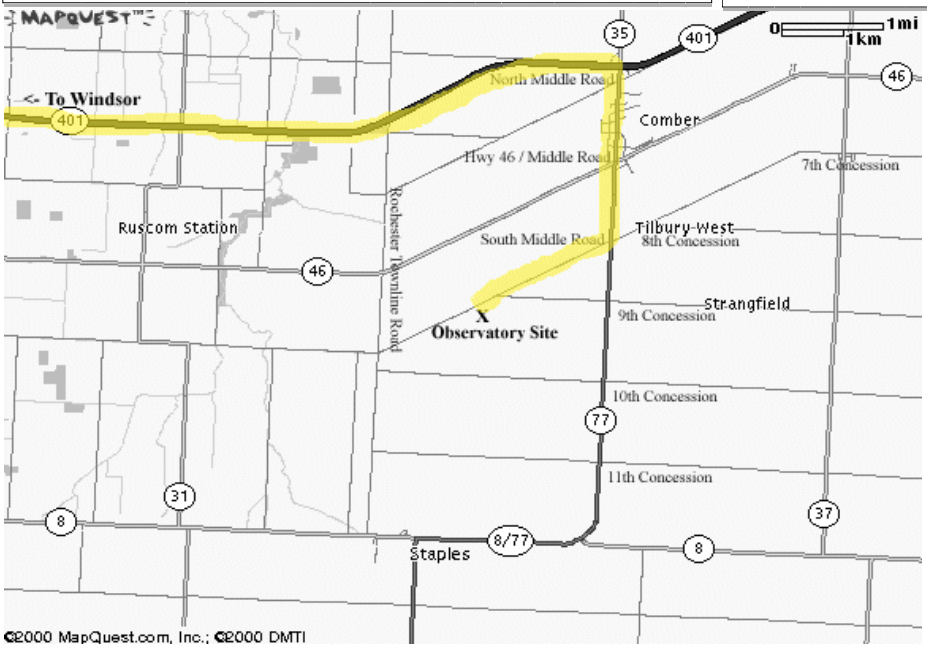
Activities...

Open House Night at Hallam: The next open house night at Hallam is on Saturday September 19th at 8:00 p.m..

Autumnal Equinox: The Sun will cross the Celestial Equator heading South on Wednesday September 23rd at 4:21 a.m. EDT.

Total Lunar Eclipse: On Sunday September 27th the Moon will begin entering the umbral shadow of the Earth at 9:07 p.m. marking the beginning of the partial phase of the eclipse. Totality begins at 10:11 p.m., mid-eclipse is 10:47 p.m. and totality ends at 11.23 p.m.. This will be the last total lunar eclipse visible from Windsor until 2017.

Council Meeting: The next meeting of Council will take place on Tuesday October 13, 2015 starting at 7:30 p.m.. The meeting will be at the home of Steve Pellarin.



Hallam Observatory Site

Directions: The map at left shows the Comber area and it includes the major highways (401, 77, 8 and 46) that are in the area of the observatory.

The most direct route from Windsor is "highlighted" on the map which is to take Highway 401 East to Highway 77 South to South Middle Road. Turn right onto South Middle Road and go about 1 kilometer and just after the point where Concession 9 joins it (it is hard to see this intersection) you will find the observatory site on the South side (left) of the road. 3989 South Middle Road.

If you hit the Rochester Townline Road (you come to a stop sign) you have gone too far.

Submissions

Aurora is published monthly except for July, August and December. The September, October, January, March and May issues are full newsletters (usually 6 pages) with a number of member submitted articles. The November, February, April and June issues are short flyers (2 pages).

Submitted articles can be of any length from a paragraph to multiple pages. I can scan pictures and/or diagrams (both prints and film) to support your article and the originals will be returned to you.

Submission deadline is the 1st of the month.

Editor: Steve Mastellotto Email: mmastellotto@cogeco.ca

Membership

The Windsor Centre of The Royal Astronomical Society of Canada meets on the 3rd Tuesday of every month (except July and August) at the Ojibway Park Nature Centre. In addition to regular meetings the centre hosts a number of observing nights, a picnic and a December social. Members receive a copy of the Observer's Handbook, a subscription to SkyNews magazine and access to the Centre's library and telescopes. Optionally the RASC Journal is available in print form—online version free.

Annual Membership Fees: Please see the RASC website at **www.rasc.ca** for current rates.

Contact Greg Mockler at (519) 326-7255 or visit our website at: http://www.rascwindsor.com for more information.

June 2015 Meeting Minutes by Steve Pellarin

The monthly meeting of the Royal Astronomical Society of Canada - Windsor Center was held at the Ojibway Park Nature Centre on Tuesday June 16, 2015.

Windsor Centre **President, Randy Groundwater**, chaired the meeting and called the meeting to order at 7:36 p.m. and welcomed members and guests. Randy invited the members to review the minutes of the May 19, 2015 meeting which were printed in the June newsletter.

A motion to accept the minutes of the May 19, 2015 membership meeting was made by Susan Sawyer-Beaulieu, seconded by Dave Panton. Tim Bennett made a correction that he had received the RASC National Award for viewing all the objects in the Society's "NGC Finest Objects" list last month, not the Herschel 400 list. Change was accepted. **MOTION CARRIED**.

The **main speaker, Juliana Grigoresceu** presented a talk on the topic of ***"Massive Stars"***. Juliana introduced Newton's universal law of gravitation as a means to calculate the mass of a star and showed how insignificant the mass of most planets are in comparison to that of the parent star that they circle. She then explained how scientists, through observation of the orbital motion of binary stars, were able to determine the actual masses of each component star in a system and thus discover a class of truly massive stars relative to our sun. She showed that the most massive stars in our universe are limited to a theoretical size of about 150 times the mass of our sun - however some newly discovered stars seem to go beyond this limit. It is not well understood how stars of this size can form, due to the fact that they should ignite with nuclear fusion reactions in their core at a much smaller size as they accrete material during the formation process.

As a star's mass becomes larger, the pressure on the core becomes greater creating increasingly higher temperatures and a more intense energy production through stronger nuclear reactions. Enormous stars burn through their fuel in only a couple of million years and during this time the incredibly intense radiation they release causes a gigantic "solar wind" to form in the star's outer layers of process elements. These super stellar winds cause the star to shed mass rapidly, sometimes forming expanding asymmetrical shells of gas around the stars. When this happens, the star is referred to as a 'Wolf-Rayet' type star. The intense radiation and stellar wind given off can also affect other stars and gas clouds for hundreds or even thousands of light years around them - either energizing them to glow hotter or eroding them away or both! Juliana went on to discuss several examples of super massive stars including Eta Carinae, the Pistol Star and some in the Arches and R136 clusters (which because of their apparent masses well above 200 sols, appear to break some of the laws of physics that we believe hold true). Scientists are busy studying these 'blue hypergiants' in an attempt to better understand the mechanisms at work within them. These odd stars are in some ways very similar to the hypothesized 'population 3' original stars that seeded our early universe with elements heavier than hydrogen and helium. By understanding the nature of blue hypergiants, scientist hope to come to understand the chemical and physical processes at work in when the universe was very young.

Randy then introduced **Susan Sawyer-Beaulieu** who came up to speak about two beautiful ***telescopes in miniature*** that were created by **Dave Panton and Susan**. These highly accurate and detailed models are 1/10 and 1/8 scale replicas of the Henry Lee Schmidt-Cassegrain telescope out at the Hallam Observatory and the 6" Newtonian telescope belonging to Susan. Through the aid of projected images, Susan shared with the audience the engineering process and difficulties through which she and Dave had to work to create these magnificent copies in miniature. As we have come to expect with any project from Dave, the attention to detail was staggering. Even the primary mirrors, made from polished aluminum, were made with precise curvatures to obtain the correct focal length! At the conclusion of the short presentation, the audience showed their admiration for Dave and Susan's fantastic work.

Break and 50/50 Draw - Brian Thomas winner, donated back his $10 winnings to the club.

Announcements

- **Canada South Science City** presentation at 7:30 pm tomorrow night. Guest speaker, Dr. Barbara Zielinski, biologist from the University of Windsor, discusses Sea Lamprey - Vampires of the Great Lakes.
- **Rick Marion's video** capture from his drone or our annual **RASC Windsor Centre picnic** at the Hallam Observatory was shown. Weather conditions were better than predicted and attendees were able to spot Jupiter and Venus through tenuous holes in the semi-hazy skies. Randy went on to thank those who attended for providing the great variety of food for the pot luck at the picnic. **Melissa Martin** who was not able to attend the picnic, brought a fruit tray to the meeting - which members and guests were able to enjoy at the break (many thanks, Melissa!).
- **Mike Pataky** and his wife Michelle then came up to the front to **raffle off** the two beautiful **fully-framed poster images** that Mike had captured of **Jupiter and its Galilean moons**. The club was able to sell over 150 tickets and 100% of the profits went towards the Windsor Centre's general operating funds. Both images were won by Melissa Martin. Randy pointed out that the Centre Council thought it would be a good idea to make this sort of fundraising event an annual activity due to its apparent popularity and effectiveness in raising money.
- **AstroCats Astronomy Trade Show**: A number of members indicated an interest in going up for the day on Saturday, June 27th to the new location (Ontario Science Centre, Toronto). In addition to vendors, a slew of interesting speakers including Al Nagler will present talks. It was agreed that anyone interested in carpooling to the event would meet to organize the day right after this meeting.
- Susan Sawyer Beaulieu gave a brief update of the **CREW/ RASC Windsor Astronomy Night** fundraising event happening on Saturday, August 8th out at Colchester Ridge Estate Winery. She also invited any members interested to

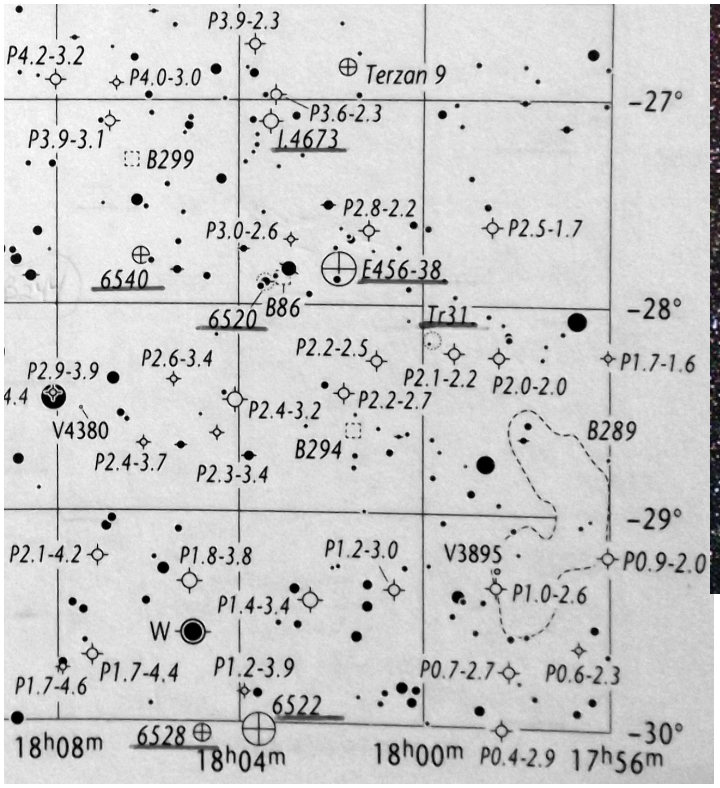
(Continued on page 3)

At The Eyepiece: Sagittarius - Wonders of the Smaller Variety by Mike Ethier

There are so many wonderful objects to view in Sagittarius that some observers can get overwhelmed. Where to begin? Well, the large number of showpiece Messier objects is the obvious place. However, many observers do not get beyond the obvious choices, and this constellation has so much more to offer. I offer one example of a small but interesting area of Sagittarius, lying just south of Messier 8. In an area of about two degrees (about four full moon widths) lie some lovely treasures that may be undiscovered by many regular observers.

Near the center of this area (see detailed map below) is open cluster NGC 6520. The cluster and surrounding area are well placed for early evening viewing in September, so if you have not had many opportunities over the summer to observe that season's constellations, there is still time. The cluster is rather compact, at 5' in size. Visual magnitude for the entire object is 7.6 mag., though the brightest star is mag. 9. A full count on professional photo plates show about 60 members. In Deb's 6" scope it is already a minor gem, with about 15 stars resolved at 94x, but still some haze in the background. Back in the day with my Edmund 8" reflector, despite enjoyable views at all magnifications, there was still some unresolved haze. The central bright star is golden orange. In my Orion 12" reflector the cluster is lovely and intense at 60x. There are nine relatively bright stars in the group, including the leading star, gold in colour. Resolution is good at 100x. At 200x, 20 faint stars immediately circle the central star, and about 30 others surround this inner group in a tight area. There is no more unresolved haze.

Back at lower powers, 1' preceding this fine cluster is Barnard 86, the "Inkspot Nebula." A 7th mag. star sits on its north-preceding edge. When dark nebulae were first discovered it was assumed that they were simply starless areas. This idea was held by the American astronomer E. E. Barnard, who compiled an extensive catalogue of the objects in 1927. He was eventually convinced by other astronomers that they were, in fact, dark obscuring dust clouds. To see these objects really well they must be highlighted against a rich background of stars. Barnard 86 is small (5' x 5'), but on a scale of 1 to 6, where 6 is essentially as black as black can be, it rates a 5 for opacity. This means that viewers that scan back and forth between open cluster NGC 6520 and next door neighbour Barnard 86 are in for a visual treat. If you have never thought that seeing *nothing* was worthwhile, this could change your mind. The contrast between the rich milky way stellar background and the inky blackness of B 86 is truly remarkable. In the 12" mirror a very few faint stars overlay the nebula, obviously foreground objects. Though many dark nebulae are often better suited to binoculars and naked eye viewing, this is an easy and worthwhile exception for telescope users.



Left: Uranometria 2000: All-Sky Edition, Chart 145. Note that the underlined objects can be seen in a 12" scope.
Above: Open Cluster NGC 6520 and Barnard 86
http://stardustobservatory.org

A final challenge awaits adventurous viewers with larger telescopes. Globular cluster E456-38 sits just 2' preceding the dark nebula, and is just north of an 8.5 mag. star. Its visual mag. is 9.9, but don't let that fool you into thinking it will be easy to find. Its official size is an enormous 9'.9, though little of that can be seen in the 12". To me it resembled a faint, round planetary nebula or even a galaxy, as it was observed at 125x amidst a triangle of somewhat bright stars. I viewed it up to 200x, mostly using averted vision, where its size appeared to be only about 2'.

As can be surmised from the detailed map, there are a few more treasures awaiting the intrepid observer/explorer in this part of Sagittarius. Rather than tell you about them, why not go looking on your own? This is a very rich area for casual sweeping, as well as a harbour for some beautiful deep sky objects.

June Meeting Minutes (continued)

(Continued from page 3)

come out and support the event either by bringing a cash donation and/or by bringing out their telescope or binoculars to share with other visitors that evening. 100% of the profits will come back to the Windsor Centre. No advertising flyer is yet available. Steve Mastellotto indicated that he would be updating information about the event as well as other club activities for the summer on the club's website, so members could look there for more details.

Director of Observing Report

Steve Mastellotto began his report by speaking briefly about what's been going on in the sky since our last meeting, including:

1. **Venus' greatest eastward elongation -** June 6th
2. The **double shadow transits** of some of Jupiter's Galilean moons - May 27th and June 3rd
3. **Saturn reaching opposition** in the sky - May 23rd
4. Interesting **solar filaments** and activity on the sun's disk
5. **Comet Lovejoy** still relatively bright in the sky

After Steve inquired about member's observations over the last month, Randy noted that many must be watching **Jupiter and Venus** converging in the western sky with an expected spectacular conjunction coming up in the next week or so. Steve went on to discuss in detail the upcoming close approach of Jupiter and Venus as they come within just 20 arc minutes of one another on June 30th. He also noted that although the planets are at very different distances from us, in a telescope, their disks will appear about the same size (~40 arc seconds across). Steve also gave a few tips for those wishing to take pictures of the event.

Using Stellarium software, Steve demonstrated the shadow transits of Jupiter's moons that just occurred, what viewers can expect telescopically as Jupiter and Venus pass one another and the phase changes that Venus will undergo over the rest of this particular apparition in the western sky. Steve also gave highlights of what to expect when observing both Saturn and Jupiter over the summer months.

A photo of a beautiful **solar halo** take by Donna Ronconi was shown and discussed. Steve also highlighted an image of **Markarian's Chain** - a long string of galaxies at the core of the Coma-Virgo galaxy cluster that was the topic of an observing article in the May Aurora newsletter. Steve also showed some images from the Centre's **annual picnic** taken by Tom Sobocan and Rick Marion.

Steve went on to discuss the upcoming summer **Open House** nights out at Hallam Observatory, the summer solstice, the **Perseid meteor shower** and an overview of what constellations are visible both in the evening and early morning skies of our area at this time. He noted that because of the shallow angle at which the sun is setting and the shorter night-time period, solar rays are able to illuminate many satellites above us pretty much all night long through the early summer, so observers should keep an eye out for numerous satellite passes during their observing sessions. Members were also informed about a great **ISS pass** happening right after the end of this meeting (10:12 PM) high overhead (see photo below of attendees enjoying the pass).

Steve also gave updates on what the **Dawn** and **New Horizons** spacecraft were up to in their encounters with dwarf planets **Ceres and Pluto** respectively. New information about the Philae lander reawakening on the surface of comet **C-G 67P** was also discussed. Apparently there are still some challenges for engineers trying to communicate with the little lander.

Steve went on to talk about several star parties that are happening relatively nearby this summer that members might be interested in attending. To conclude his talk, Steve did a tour of the summer constellations and some of the more interesting deep-sky objects that can be seen in small telescopes or binocular - objects such as the **Dumbbell Nebula** (M27), the **Wild Duck Cluster** (M11), the **Coat Hanger** cluster, the **Veil Nebula** (a supernova remnant), the beautiful double star **Alberio**, the **Ring Nebula** (M57) and **M71**, a neat globular cluster in Sagitta.

Randy thanked Steve for his D of O report.

Steve Pellarin then announced that he will be teaching a **new astronomy course** at **St. Clair College** on Monday nights this fall **starting in September** and that the course is open to the public for registration. The cost of the course is about $200 and will run for 10 weeks. It will include several observing sessions both at the college and out at Hallam Observatory. No previous knowledge is required to join this course.

Randy thanked the members for attending and adjourned the m**eeting** at 10:08 p.m..

ISS Pass following the June membership meeting.
Photo by: Randy Groundwater

Calendars

Our Treasurer, Greg Mockler is taking orders for the 2016 RASC Calendar. Price will be $17.50 including S&H and HST if he gets over 10 orders - this is the same price as last year and is substantially less than ordering directly from National. Please see Greg at the September meeting.

Event Photos

The RASC Windsor Centre held our annual picnic on Saturday June 13th at Hallam Observatory. In addition to our regular BBQ, socializing and daytime astronomy Rick Marion had his drone. In addition to some great video posted on our Facebook page Rick captured this group photo.

On Saturday August 8th the RASC Windsor Centre and the Colchester Ridge Estate Winery (CREW) hosted an astronomy night at the winery. The shot above by Steve Mastellotto shows the telescope field to the East of the winery where Mike Mastronardi provided an introductory presentation on astronomy. As you can see by the clouds no observing took place.