

AURORA



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The Royal Astronomical Society of Canada - Windsor Centre

September 2017

A Trio Travels to Hopkinsville, Kentucky by Tom Sobocan



Tom, Jeff and Dave Sobocan in "Eclipseville" Hopkinsville, Kentucky

"Silver towards the sun, black towards the back", I reminded my dad on Saturday evening August 19, 2017, regarding the use of his "Solar Viewer" eclipse glasses. I announced to him that my brothers Dave, Jeff and I were travelling to Hopkinsville, Kentucky, after studying weather forecasts for Monday, August 21, 2017, the date of "The Great American Solar Eclipse". My dad wished us luck and added: "You'll find some delicious chicken in Kentucky."

We travelled in Jeff's marine blue Ford 150, 4-door pickup truck with a full size cap. As Jeff drove

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Calendar of Events

Our next meeting...

Tuesday October 17, 2017
7:30 p.m.

at
Ojibway Park Nature Centre
5200 Matchette Road

Main Speaker...

Dale Partin
Warren Astronomical Society

Topic...

"Colonizing Mars"

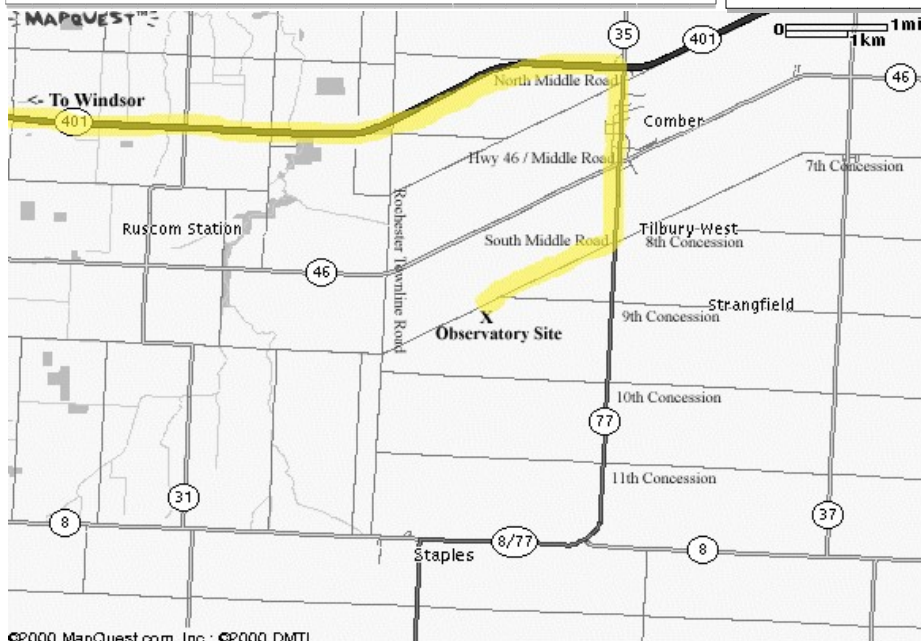
Activities...

Autumnal Equinox: The Sun will cross the Celestial Equator heading South on Friday September 22nd at 4:02 p.m. EDT.

Venus and Mars: Will be 1/4 degree apart in the morning sky on Thursday October 5. Use binoculars or a telescope for the best view.

Council Meeting: The next meeting of Council will take place on Tuesday October 10, 2017 starting at 7:30 p.m.. The meeting will be hosted by Melissa Martin at Skippy's Restaurant, 954 University Ave. West.

Regulus Occultation: The crescent Moon will occult Regulus in the dawn sky of Sunday October 15th. Disappearance occurs at 5:41:30 a.m. along the bright limb of the moon and reappearance occurs at 6:31:15 a.m. along the dark limb.



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 2017 Meeting Minutes by Dan Perissinotti

The monthly meeting of the Royal Astronomical Society of Canada - Windsor Center was held at the Ojibway Park Nature Centre on Tuesday June 20, 2017.

Windsor Centre **President, Randy Groundwater**, chaired the meeting and called the meeting to order at 7:36 p.m. and welcomed members and guests to the Ojibway Nature Centre.

Randy invited the members to review the minutes of the May 16, 2017 meeting which were printed in the June newsletter. A motion to accept the minutes was made and the **MOTION CARRIED**.

Randy provided an overview of the meeting and introduced Dr. Bill Baylis.

Main Presentation

Dr. Baylis' began his presentation "*Astronomy: Gateway to Science*" with the question: **Why is astronomy so fascinating to the public?** Beauty, Nature's art, places us in the universe, time and space, addresses curiosity about the origins of matter and life. It teaches us about science, math, particularly in large number, orders of magnitude geometry, physics and chemistry to name a few. Most importantly, it teaches how science works.

Today science literacy is needed for simple understandings of topics such as climate change, vaccinations, GM foods, drug relations, and pedagogy. Some of the recent astronomical endeavours include Mars and extra-terrestrial life.

Mars is the most earth like planet within our solar system. We know it hosts water, a thin atmosphere of mainly carbon dioxide, and the largest known mountain (Olympus Mons). Question: could meteorites that came from Mars have jump started life on Earth? Martian rovers such as Sojourner (1997), through to Curiosity (2012) are looking for signs of potential life giving building blocks and past life itself. Enceladus, a moon of Saturn, has been viewed having ice geysers from a possible sub-surface ocean. This moon is tidally locked to Saturn, and has a largely crater free surface. Titan is also a moon of Saturn, unlike Enceladus, this moon has methane lakes.

Jupiter, in the past year, has a new visitor, the Juno spacecraft. It orbits Jupiter in a highly elliptical orbit, 53 day period about 4000km above the planet. Multiple imaging swaths have created a combined image of the South Pole, seen for the first time. Exoplanets are the latest great contribution to science. Kepler Space Telescope has observed 4034 candidates (planetary bodies), 2335 confirmed, some around red dwarfs, 30 verified Earth-sized planets within its star's habitable zone. All the Kepler objects of interest (KOI) have been found in the constellation Cygnus.

Other notable technologies adding to scientific findings: Hubble and James Webb space telescopes. Construction of massive 30m land based telescope located in Hawaii. Miniature probes, shot into space using laser radiation. Neutron star detectors, SEX-TANT and NICER. Parker Solar probe, scheduled to be launched in 2018 hopes to "touch" the sun.

Prior to the coffee social break, Randy welcomed Steve Mastelotto to the floor to give a brief overview of the **2018 RASC Windsor Centre Astrophotography Calendar**.

After the **coffee break**, a **50/50 draw** was held, **Melissa Martin** won, and donated it back to the club.

Director of Observing Report

Randy welcomed **Brian Thomas** to give the **Director of Observing report** for the months of June, July, and August, as there are no membership meetings over the summer months.

Brian started with a question period on some **local observing** and members' photographs, including the **aurora display** on May 27, 2017. **Comet Johnson** reached perihelion a few days ago and is currently 8th mag. in Virgo and heading south.

Sun, moon and planets during the summer break:

- **Mercury** will be visible at dusk in July, with the greatest elongation on July 30th.
- **Venus** will be rising with the sun in the eastern sky, as the gibbous phase increases to -4 magnitude, it will be a very obvious sighting.
- **Jupiter** is in Virgo all summer, and will be losing some brightness as the season ends.
- **Saturn** will be in Ophiuchus all summer. The rings are at their maximum tilt at 26.7° adding to the overall magnitude.
- **New moons** this summer: June 24th, July 23rd, August 21st, and September 20th.

Upcoming events this summer: Saturn at its best, **Moon occults Gamma Virginis** on June 30th, **Perseid Meteor Shower** on August 12th (RASC hosted event at Point Pelee), **Crescent moon is 7° from Aldebaran** on August 16th, **Great American Total Solar Eclipse on August 21st**, Iridium-flare viewing (satellite design soon to be phased out), and star parties throughout Ontario.

REMINDER: Astro Luncheon at SKIPPY'S RESTAURANT every second Wednesday of the month, at noon. Located at 954 University Ave West, Windsor.

Randy thanked everyone for coming out to the meeting and reminded everyone that the next regular membership meeting would take place on **September 19th, 2017** at 7:30 p.m.

Randy adjourned the meeting at 9:39 p.m..

Hallam Observatory Fee

A reminder that the Hallam Observatory annual access/key fee of \$60 is due October 1st. Please see our Treasurer Greg Mockler at the September meeting to pay for your key. If you no longer wish to have your own access to the observatory please turn in your key to Steve Mastelotto.

Key access to Hallam Observatory is available to all RASC Windsor Centre members in good standing who have been members for at least 1 year and complete a training session on the observatory equipment. Note that an additional \$10 key cutting fee applies.

At The Eyepiece: Scutum by Mike Ethier

During an in-depth study of the northern sky NGC catalogue (by constellation), I have only come across two areas that have no galaxies: Sagitta and Scutum. Even Sagittarius and Scorpius have a few of them. Of course both of these constellations cover small areas, and are immersed in the star clouds of the Milky Way, but galaxies abound just outside of their boundaries. When summer skies came around again and it was time to tackle Scutum, I knew that I would have a bit of a break from finding faint galaxies.

This month I will discuss three objects from Dreyer's catalogues in Scutum, two from the NGC and one from the IC. Since one of the NGC objects is also part of Messier's list, I will discuss it under my Messier of the Month heading, below. Next month I will continue by discussing some remaining gems in Scutum.

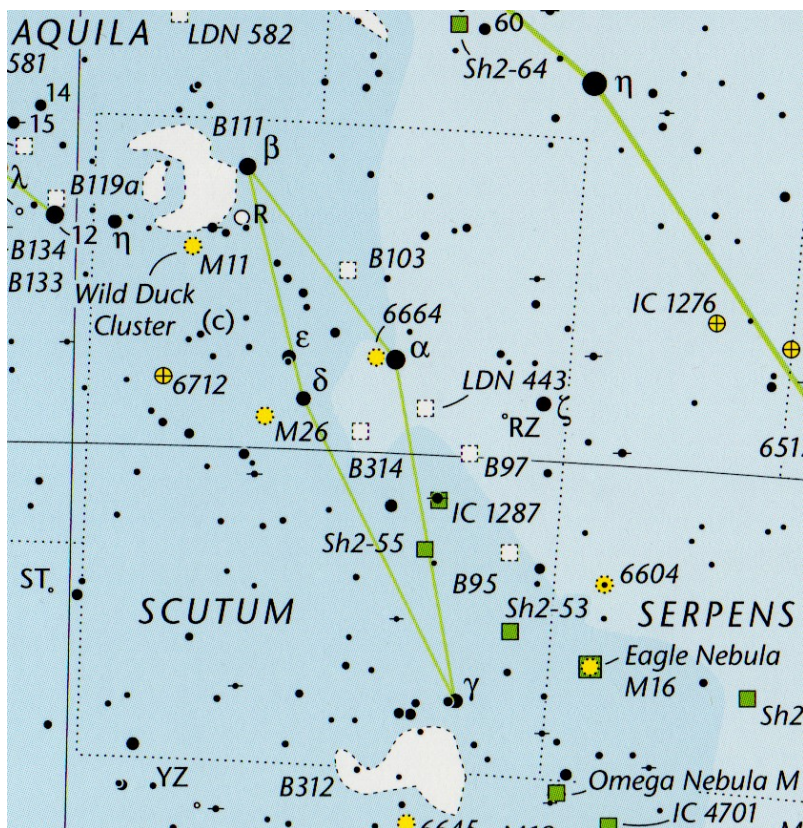
NGC 6712 is a vast and bright globular cluster, which I first observed in August of 1981 with my Edmund 8" scope. It was tough to resolve at that aperture, though at 169x the edges of the haze resolved easily enough. At 254x, a few stars winked in and out of view across the entire cluster.

From Hallam in 2017 with my 12" Dob, some outer resolution was apparent at 60x, where the object was very large and very bright. 100x gives some better resolution, including a bright star near the very center. At 136x the central core begins to show some detail, including a bit of clumping and a few bright and dense star groups. At 187x the core is breaking up and showing dark indentations. At 272x the globular cluster is still very bright, with very faint stars (mag. 15) continuing to resolve. At 375x stars are resolved all across the core. This is a great object for a 12" scope, and would look wonderful in the club's 14". Don't be afraid to use high power! Here are the official specs: gc 6712: Size 9.8"; Vis. mag. 8.1; Br. star mag. 13.

Two minutes of R.A. following NGC 6712, and just a tiny bit south, sits a very large and enticing planetary nebula. IC 1295 turned into a very pleasant surprise, easily swept up at 60x south-following the globular. The nebula immediately follows a star of mag. 11. At 136x and 187x not much of the haze can be seen, due to a star on its preceding rim, which dims it. However, with a Skyglow filter or an OIII filter (either will work fine), the nebula transforms into a very fine sight, large and dimly glowing at 120x and 136x. Although it can be viewed reasonably well as high as 272x, my best view was with the filter at 136x. Some detail in the way of brightness variations can be seen within the nebula. The central star, mag. 15.1, cannot be seen with the filter

on. However, at 272x and no filter, a tiny, glowing diamond chip can be seen steadily right in the center. At least two other faint stars are also seen involved with the haze, along with yet another faint star immediately following, and another one just south (remember we are in Scutum, a busy star cloud). Yet again this would be a nice object in Hallam's 14" scope. Here are the specs: pn I. 1295: 90"; Vis. mag. 11.9; Central star mag. 15.1.

And now it is time for Messier of the Month, a feature that began here last year and hopefully will continue until all of them have been discussed. I am not a fan of seeing 30 or 40 of them in a session, usually limiting myself to three or four near the end of a night's observing.



Open cluster Messier 26 is the underrated sibling to the much more popular and splendid cluster Messier 11 (discussed here next month). M 26 is an open cluster lying south-preceding NGC 6712, and is easily recognized at low power. I saw it for my first time back in 1981 (from Northern Ontario, where I grew up). At that time I observed it first with a 4" stop over my 8" mirror, and was not that impressed. It was much better with the 6" stop in place, however, and I seemed even more impressed at full aperture and 112x, where the cluster appeared kite-shaped, with a string of stars for a tail. At 169x I noted interesting patterns of intersecting stars.

This past summer I looked long and hard with the 12", writing half a page of notes, small writing. I'll give the

highlights only. 60x shows a rough diamond shaped group of 4 brighter stars near the center, with the brightest of them following behind the central diamond. 100x resolves all of the main cluster stars, including the fascinating string dangling north from the center. A larger and somewhat fan-shaped group follows behind the central diamond. That bright star at the following end of the diamond is yellow, and mag. 9. 136x shows about 40 stars within the main body of the cluster, with the north-curving star stream now resembling an elephant's trunk! At 187x and 250x, the center of the diamond shape is itself dark and surprisingly empty of stars, though some of the four diamond stars are now showing companions. I like how the cluster begins with a bright star followed by other bright ones, then gradually fades away, like a parade that quietly comes to an end. This is a pretty nice cluster in a 12". Take some time, and I recommend turning off the clock drive and allowing it to pass by a few times. Specs: M 26 (oc 6694): Size 10"; Vis. mag. 8; Br. star mag. 11; 120 stars (officially).

Until next month, clear skies!

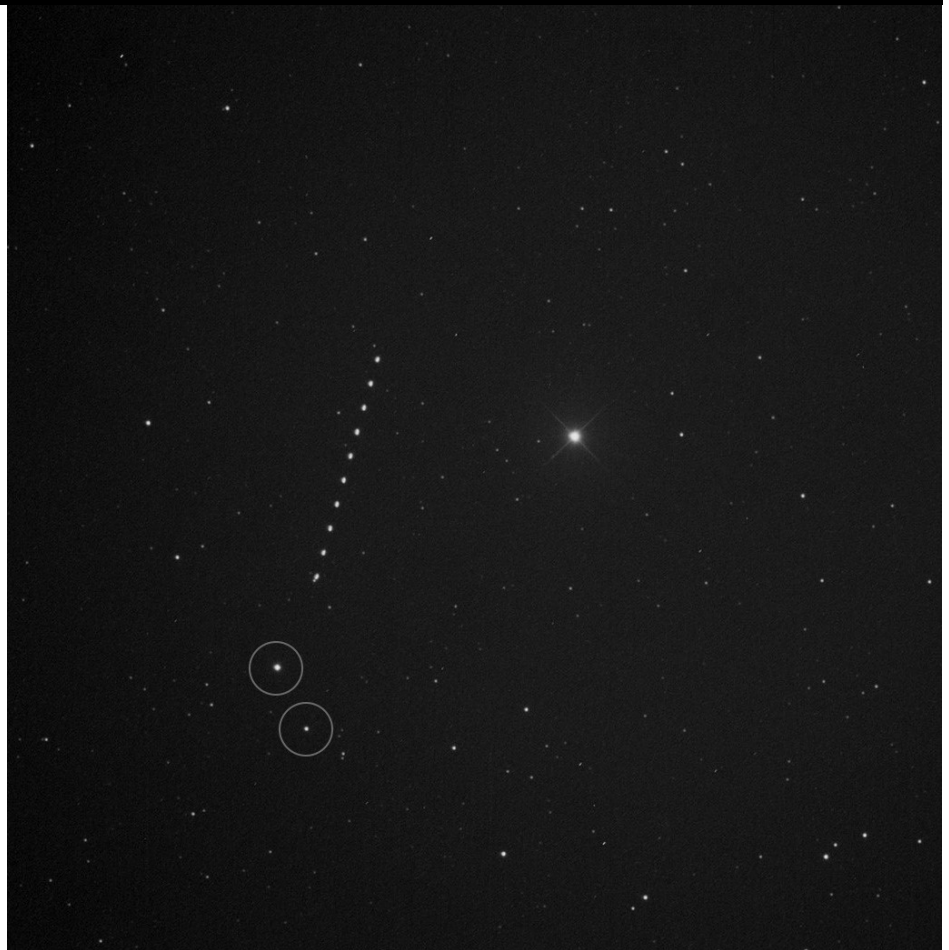
Asteroid 3122 Florence by Steve Mastellotto

Asteroid 3122 Florence, passed 7 million kilometers from Earth (that's about 18 times the distance from Earth to the Moon) on September 1st at 8:06 a.m. EDT. A 7 million kilometer pass, which is just under the criterion to make 3122 Florence a Near Earth Object is certainly no danger to the Earth this or any week in the near future. What makes this asteroid an attractive target is its size which is about 4.4 kilometers in diameter, a pretty good-sized chunk of rock as near Earth asteroids go.

At its' closest the asteroid crossed the border of the constellations Equuleus and Delphinus and was just under 10th magnitude and moved at 20' per hour (that's about 2/3rds the diameter of the Full Moon) which is fast enough to notice its motion against the background stars in a low power field of view after about 10 minutes or so.

For the photo at right starting at 4:43 UT on September 2, 2017 I managed to grab 10 quick 10 second frames about 80 seconds apart for a total elapsed time of about 12 minutes so the asteroid movement spans 4 minutes 49 arcseconds of the sky. The bright star in the field is SAO 126306 and is magnitude 6.8. The two dimmer stars (circled) are magnitude 10 and 12 so 3122 Florence was about 11th magnitude at the time.

The data was captured with a 16-inch f/8.9 RCOS on a Paramount ME, SBIG STL11000M CCD at the Sierra Remote Observatories outside of Fresno, California at 4600 feet elevation.



Calendars



RASC Windsor Centre - We will once again be producing a calendar featuring the astrophotography of Windsor Centre members. We are trying to estimate the interest level so please see our Treasurer, Greg Mockler at the September meeting if you are interested in purchasing the 2018 calendar. Steve Mastellotto will have a copy of the 2017 calendar available for you to review. The bulk order will be made in time for delivery at the October meeting. **Price will be \$20.00** (same as last year) which includes all postage, handling and taxes.



RASC National - Our Treasurer, Greg Mockler is taking orders for the 2018 RASC Calendar. **Price will be \$20.00** which includes all shipping, handling and taxes if he gets over 10 orders - this is a price increase from last year due to National Office pricing but is substantially less than the \$26.00 by ordering directly from the National Office. Please see Greg at the September meeting.

A Trio Travels to Hopkinsville, Kentucky (continued from page 1)

through Michigan towards Ohio we noticed the planet Jupiter, hoping to see it during totality. At exit 111, site of the Armstrong Air & Space Museum we toured the mock-ups of the Gemini and Apollo spacecraft. At a rest stop in Kentucky we slept outside under the stars. On Sunday morning August 20 we saw and photographed the last final ultra-thin lunar crescent and the planet Venus to its upper right.

The sky was partially cloudy as we drove towards Hopkinsville "Point of Greatest Eclipse", designated by NASA as the point where the moon's axis is closest to the earth or where the largest percentage of the photosphere of the sun would be covered at 102%. Totality would last 2 minutes and 40 seconds.

Hopkinsville was now "Eclipseville" where the atmosphere was both festive and commercial. I bought an eclipse t-shirt. They were also selling eclipse themed hats, glasses and fast food cups. Since all of the camping and eclipse viewing spots were full, Jeff, Dave & I spent the afternoon driving in search of one. We settled on the property of Mr. Pat O'Donnell's family - free of charge on a well groomed expanse of grass next to his house on Hopkinsville Rd., Princeton which was about 32 km from Hopkinsville itself but right on the centre line of the eclipse. With less than 20 hours before the start of the solar eclipse we had a full schedule:

- We drove to the Walmart in nearby Princeton for washrooms & supplies
- At Saints Peter & Paul Church I attended the fascinating talk entitled "Faith & Science" by Brother Guy Consolmagno a famous Jesuit astronomer from Detroit and the Director of the Vatican Observatory. He explained the contributions of many early astronomers and noted their prominent crater namesakes on the Moon such as (Nicolaus) Copernicus (heliocentric model) and Jesuit (Christopher) Clavius (the Gregorian calendar). He also emphasized that "science [is about] understanding the facts we have." Eclipse anecdotes and explanations were also prominent themes. He concluded by saying that "Astronomy puts everything else into perspective."
- My brothers Dave & Jeff explored Eclipseville. Every business & organization in town from Mayor Carter Hendricks on down was welcoming eclipse watchers.
- Night sky telescopic observing at the O'Donnell property with two campers Patrick & Michael Bellman. They marveled at seeing Saturn and its rings for the first time.
- A few hours of much needed sleep in our tent or in Jeff's truck
- 2 live Radio-Canada (CBC French) morning pre-eclipse interviews with Charles Levesque in Windsor and Marjorie Avril in Toronto. I enthusiastically explained the observing opportunity by the Detroit River with the University of Windsor Physics and Environment departments and RASC Windsor.
- Pre-eclipse setup - We attached a tarp to the back of Jeff's truck and prepared our viewing equipment: telescope, binoculars, cameras, solar filters and eclipse glasses, as well as a thermometer placed under the tarp in order to measure air temperature.
- Solar Eclipse Timer app. was readied for visual and auditory cues to the 4 moon-sun contact times during 3 hours and 5 minutes

11:56 a.m., Central Daylight time: 1st contact. Eclipse glasses on. Clear sky, hot, but not humid. **Thermometer temp. : 34.5°C.** People were lined up next to the telescope to view the advancing moon and several sunspots. Jeff methodically re-aligned the telescope on the sun, as the earth rotated. Dave used a tripod mounted camera to take photos of the partial phases. I was shooting hand held photos, at least at 1/1000 of a second with my 300mm lens. A drone, belonging to youths from Cleveland, would provide a bird's eye view during totality.

1:00 p.m., 24 minutes before totality. I was taking pictures of people watching the eclipse and of the banana shaped partial eclipse reflection off of the water of a swimming pool as well as the hundreds of crescent shaped suns projected onto the grass through the trees.

10 minutes until totality. The sun was more than 90% eclipsed. I removed the solar filters from my telephoto lens and my binoculars. Excitement and anticipation filled all of us as we saw the clear sky because we knew that we were going to see totality!

1:19 p.m., 5 minutes before totality. Who turned down the dimmer switch on the sun? An eerie blue-grey light surrounded us. The sun was nearly eclipsed as the moon's umbral shadow rushed towards us at more than 2300 km/h.

1:22 p.m., 2 minutes before totality. Thermometer temperature: 25.5°C, a drop of 9°C in 1 hour and 26 minutes. The Solar Eclipse Timer and I started counting aloud for the beginning of **2nd contact or totality at 1:23,52 p.m.** from 20 seconds as the remaining candle-like flame was slowly extinguishing itself: "...5, 4, 3, 2, 1, Glasses off." I hesitated, then lowered my eclipse glasses and stared upwards in awe. How can such a dark black hole be surrounded by such a well-defined circle of pure white light? No picture, no video, no written description can replace the surreal sensation of being there!

I saw Jupiter distinctly, far to the left of the eclipsed sun and Venus closer to the upper right lined up along the ecliptic surrounded by a navy blue sky. We had some cloud cover behind us but none near the mesmerizing coronal glow. I switched to my 10 X 50 binoculars where the outer corona, the sun's invisible atmosphere most of the time, filled my field of view with distinct filaments. Then I snapped a few quick photos still hand held starting at ISO 500, f 5.6 @ 1/1000 second and increasing the exposure.

Jeff, who had only removed the solar filter on the telescope after the beginning of totality for safety reasons called Dave & I over to look at the magnified eclipse. We could see the solar prominences (red, pink, orange, yellow & white) dancing on the edge of the black lunar disk while the corona radiated outward to the edges of our field of view at 40X magnification!

The Solar Eclipse Timer was warning us of **3rd contact at 1:25,12 p.m.,** in 20 seconds: "Glasses on!" I shouted in unison. I hesitated, as the diamond ring or giant Bailey's bead dazzled blindingly growing exponentially in fractions of a second while the sun rose rapidly above the lunar valleys and mountains. I jammed the eclipse viewer back in front of my eyes. In a few seconds, I could clearly see the back of my eclipse viewer. A few minutes later it seemed that the afternoon sunlight was back.

The temperature at mid-totality was **25.0°C;** it dropped to a low of **24.5°C** ten minutes after totality for a total drop of **10°C in 103 minutes.** By **2:22 p.m.** about 48 minutes after the end of totality the temperature had risen to **31.0°C** half a degree higher than before the eclipse began.

We watched the moon uncover the sunspots which it had progressively covered during the 1st half of the eclipse. Patrick O'Donnell and his family came out to see us with cold refreshments and chocolate brownies. His son & grandchildren peered through the telescope as the new moon continued to disappear. We shared our experiences of totality and thanked our generous hosts.

After **4th contact at 2:51 p.m.** we packed our gear and visited the towering Jefferson Davis Monument in Fairview, Kentucky. A group of Mennonite youth were selling spray painted pictures of the solar eclipse on a sheet metal backing. It was a very tangible memory of our eclipse experience.

Our dad's parting words came true: "You'll find some delicious chicken in Kentucky." We did, at O'Charley's restaurant in Hopkinsville. He told us by phone that he had observed with fascination the partial solar eclipse in Windsor. At Customs, we declared that we had seen "The Great American Solar Eclipse"!