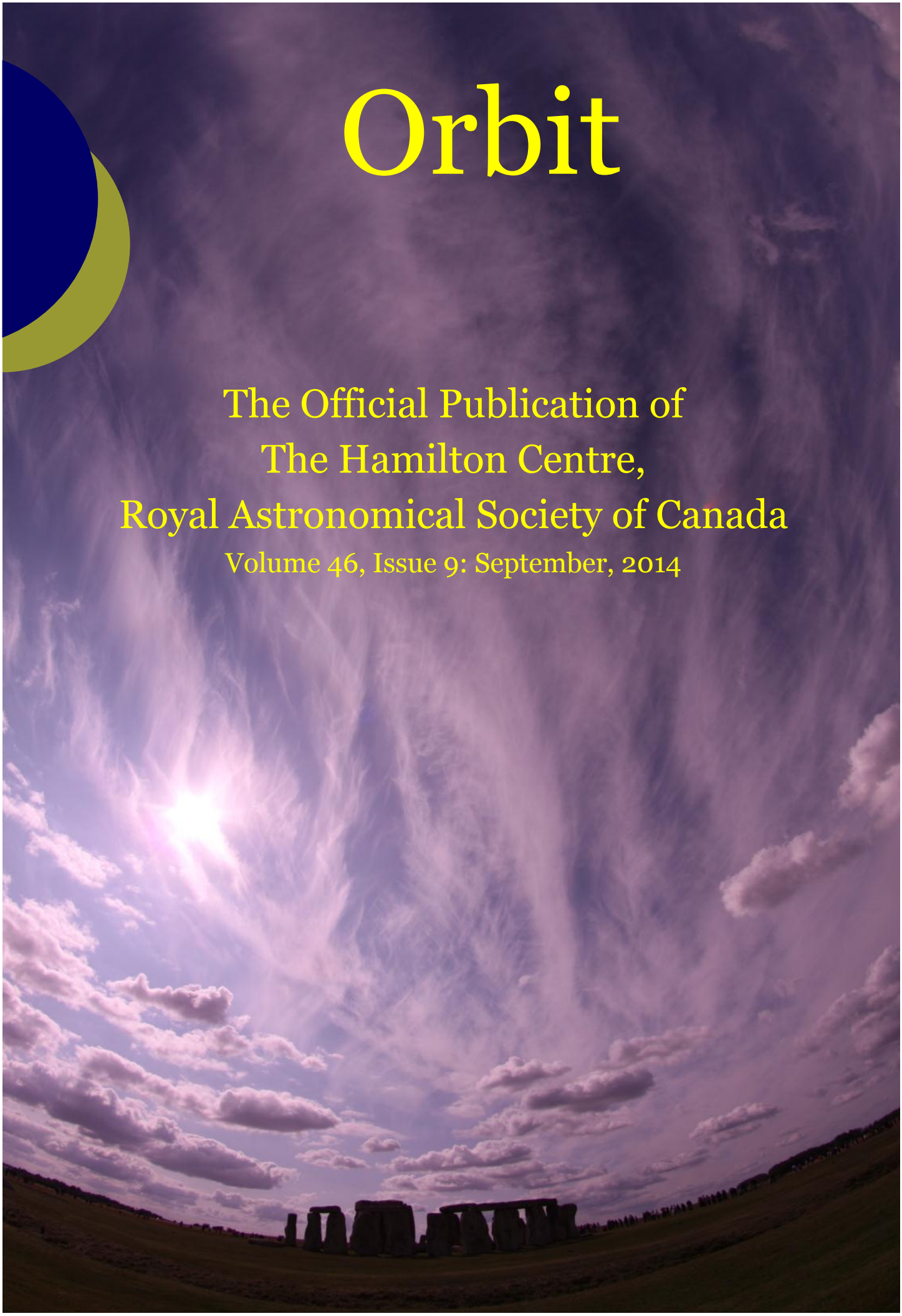
Orbit



The Official Publication of
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Royal Astronomical Society of Canada
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Issue Number 9, September, 2014
Roger Hill, Editor

Okay...welcome back, everyone. I trust that everyone had a great summer, despite the cooler temperatures that mostly prevailed. The coming months mean longer nights, with the constellations of summer giving way to those of winter. The Milky Way will stand out for those who go to darker skies, and staying up all night means Orion becomes available. It's my favourite time of year.

In the Hamilton Centre, October is a time of renewal as the outgoing Board of Directors reports to the membership and a new one is elected. Here's what I want you to do: Go to Page 13 and fill it in. Every person who would like to be on the Board of Directors needs to be nominated by a current member. If you've been on the NOVA course, for instance, I'd be happy to sign the nominator part of the form. Actually, I'd think that any current Board member would be happy to nominate you.

So why should you do this? What's in it for you? First and foremost is the sense of accomplishment you get. The Board is also an amalgam of different personalities, attitudes, talents and personalities. Some of us have been on the Board for decades, while others have just finished their first year. Every single one of us has something to contribute. It's also a great way to make friends, too, and not just with the other Board members. You'd be astonished at the people who will introduce themselves to you once you've stood up at a meeting! You also get to find out about things in the Centre before anyone else. We have a new C14 that will complement the 16" OGS beautifully, for instance.

But the single biggest thing is that you get to help direct the future of the Centre. We've been granted the sort of opportunity that very few astronomical organizations ever get due to the belief by a few people that an astronomy trade show would be successful. The opportunity is to turn AstroCATS into the best of it's kind in the world. Concomitantly, we have an opportunity to make the Hamilton Centre one of the foremost organizations of it's kind anywhere. But to do it, we'll need as many good people on board, and on the Board as we can get.

Normally, the summer is a good time for observing. The nights are warm, albeit shorter and mosquito-ridden, and there's lots of great stuff to look at. There are also events like StarFest and the RASC's General Assembly to go to. You also have a chance to really use that nice equipment you picked up at AstroCATS. For me, though, my summer was dominated by the two weeks immediately prior to Labour Day. My wife, son and I went to England to visit my daughter, who now lives in the UK, just south of London.

It was a fantastic trip in many ways, but a vacation it was not. The list of places we went to in England is long and exhaustive (and exhausting!), but three things stood out, astronomically speaking. The first was Greenwich Observatory, the second was Stonehenge, and the third was a visit to a local astronomy club called the Orpington Astronomical Society (OAS).

Greenwich was both great and disappointing; Stonehenge was one of the most evocative and amazing places I've ever been; and I thoroughly enjoyed my visit with the OAS.

I've always liked visiting other astronomy organizations and this trip gave me an opportunity that seldom comes—to see one on another continent. Anyway, there'll be more inside Orbit about the trip...I hope you enjoy it!

So, as the nights get longer and cooler, as the summer constellations disappear into the west and the stars of Winter appear, enjoy the Fall.

Clear skies and happy observing!

President's Report—Gary Colwell

Well here it is…almost the end of the summer (as the EX goes)….and in just over a week (as of when I received it, Ed.) we will once again be starting our regular meetings…and we have some pretty great events and speakers lined up already!

Our first meeting is on Thursday September 4th at 8:00 pm at the Legion in Waterdown. Our first meeting has traditionally been a "catchup" on what members did over the summer. If there is something you would like to present, a tale of something astronomical that happened over the summer…any photographs you have taken, or anything you might think other members would be interested in hearing…drop me an email at the one below or… supergiant2003@hotmail.com and let me know what you would like to present and for how long..Lets get our first meeting off to a bang! (a Big Bang!)

Also, October will be election month and I would really like to encourage you to consider becoming a member of the board this year. We would like some fresh and new ideas…and there is always room for just one more on the board. If you would like to nominate someone for the board…please email me with your suggestion…and don't be shy… nominate yourself!!!

Also, a special announcement!
"Westfield Heritage Village is very excited to announce a brand new event – The Westfield Star Party. Presented in partnership with the Hamilton Centre of the Royal Astronomical Society of Canada, this event will be an exciting opportunity to discover the wonders of the night sky. Visitors will be able to learn about the history of astronomy at a period lecture, peer through a Victorian telescope and discover the world of modern astronomy".

The First Westfield Star Party will be held on Friday 26 September 2014, starting at 7pm (19:00 for those who like a 24 hour clock!) at Westfield Heritage Village.

If you can help out, bring a telescope or just make yourself available for this event….we need a lot of people to help make this new event a huge success. Let me know if you can come!!!

Really looking forward to connecting with everyone again this year!....and Oh Yes…Invite a friend!!!!

See you all soon!!!

Gary Colwell: President@hamiltonrasc.ca

Droughts, Floods and the Earth's Gravity, by the GRACE of NASA—By Dr. Ethan Siegel

When you think about gravitation here on Earth, you very likely think about how constant it is, at 9.8 m/s^2 (32 ft/s^2). Only, that's not quite right. Depending on how thick the Earth's crust is, whether you're slightly closer to or farther from the Earth's center, or what the density of the material beneath you is, you'll experience slight variations in Earth's gravity as large as 0.2%, something you'd need to account for if you were a pendulum-clock-maker.

But surprisingly, the amount of *water content* stored on land in the Earth actually changes the gravity field of where you are by a significant, measurable amount. Over land, water is stored in lakes, rivers, aquifers, soil moisture, snow and glaciers. Even a change of just a few centimeters in the water table of an area can be clearly discerned by our best space-borne mission: NASA's twin Gravity Recovery and Climate Experiment (GRACE) satellites.

Since its 2002 launch, GRACE has seen the water-table-equivalent of the United States (and the rest of the world) change significantly over that time. Groundwater supplies are vital for agriculture and provide half of the world's drinking water. Yet GRACE has seen California's central valley and the southern high plains rapidly deplete their groundwater reserves, endangering a significant portion of the nation's food supply. Meanwhile, the upper Missouri River Basin—recently home to severe flooding—continues to see its water table rise.

NASA's GRACE satellites are the only pieces of equipment currently capable of making these global, precision measurements, providing our best knowledge for mitigating these terrestrial changes. Thanks to GRACE, we've been able to quantify the water loss of the Colorado River Basin (65 cubic kilometers), add months to the lead-time water managers have for flood prediction, and better predict the impacts of droughts worldwide. As NASA scientist Matthew Rodell says, "[without GRACE we would have no routine, global measurements of changes in groundwater availability. Other satellites can't do it, and ground-based monitoring is inadequate." Even though the GRACE satellites are nearing the end of their lives, the GRACE Follow-On satellites will be launched in 2017, providing us with this valuable data far into the future. Although the climate is surely changing, it's water availability, *not* sea level rise, that's the largest near-term danger, and the most important aspect we can work to understand!

Learn more about NASA's GRACE mission here: http://www.nasa.gov/mission_pages/Grace/

Kids can learn all about launching objects into Earth's orbit by shooting a (digital) cannonball on NASA's Space Place website. Check it out at: http://spaceplace.nasa.gov/how-orbits-work/

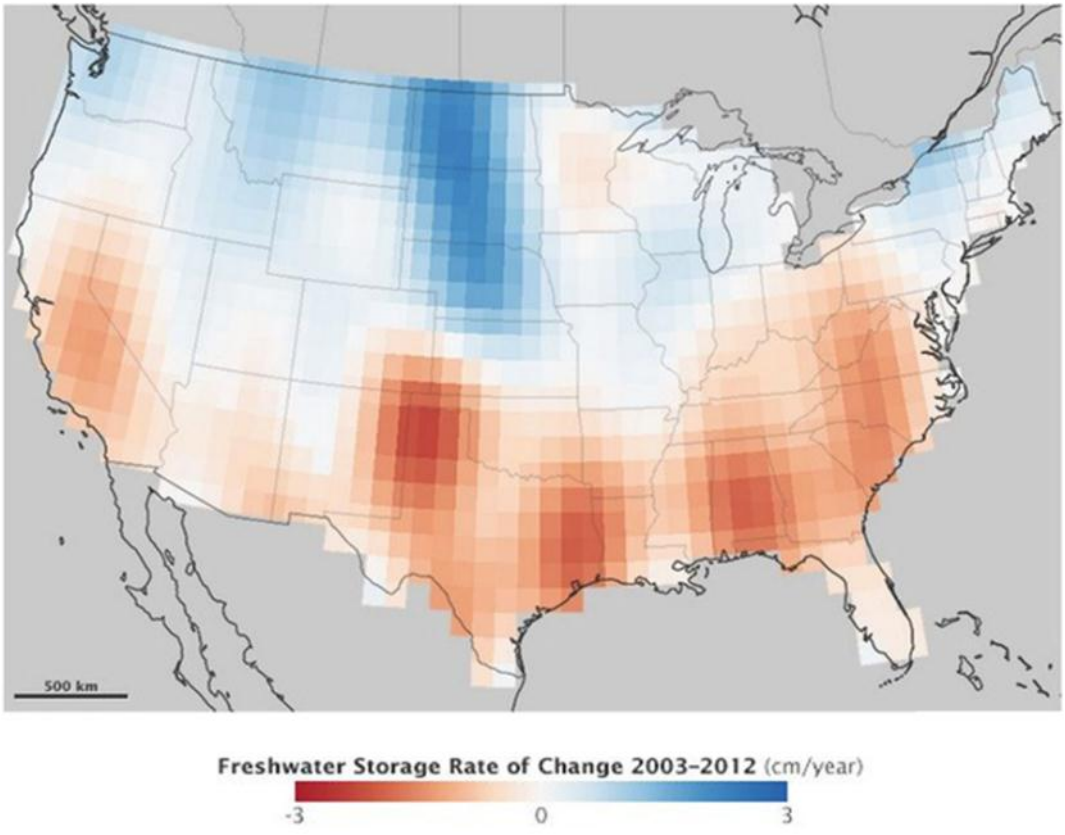


Image credit: NASA Earth Observatory image by Jesse Allen, using GRACE data provide courtesy of Jay Famigleitti, University of California Irvine and Matthew Rodell, NASA Goddard Space Flight Center. Caption by Holli Riebeek.

A (very) quick visit to the Orpington Astronomical Society—Roger Hill

Back in May, when my wife, son and I booked our tickets for a flight to the UK to visit my daughter, we started to put together a list of what we wanted to see and do in England.. The usual suspects appeared on the list: Buckingham Palace, the Tower of London, Trafalgar Square, and forth. We were going at the end of August, so a trip to Liverpool to see Liverpool Football Club play a game was near the top of things, too.

Soon, added to the list were things like: Stonehenge; the Roman ruins in Bath; Shakespeare's birthplace in Stratford on Avon; the White Cliffs of Dover from the sea; Greenwich; Harrods; the British Museum; Oxford; visits with relatives; a Beatles Tour; Abbey Road; a West End play or musical; and others.

I also looked to see if there was an astronomy club that would be having a meeting while we were staying with my daughter, who lives in a town called Beckenham, south of London. As we firmed up our schedule, it worked out that we'd spend 5 days in London, rent a car, drive around England with the last stop in Liverpool before heading back to London to drop off the car on August 26th. The nearest club I could find was an organization called the Orpington Astronomical Society, about a 50 minute bus ride away. They have a forum (like the one we've tried for years to get going in Hamilton) which non-members could join, and so I did.

I had come across a website a few months earlier, written by a woman called Carole Pope (https://sites.google.com/site/caroleastroimaging/home), when I was doing some research into converting some stepper motors to use in an EQ5 mount. It turned out that Carole was a member of the OAS, and that she had been to the RGB in Burlington some years ago!

Their meeting start time was 7:30. so I tried to arrange to get there at 7:15, but the taxi picked me up earlier than necessary, and I arrived at a place called BEECHE (Bromley Environmental Education Centre at High Elms— http://www.bromley.gov.uk/info/469/countryside_-_visitor_centres/384/bromley_environmental_education_centre_at_high_elms_beeche) a couple of minutes after 7pm. There was nobody around, until about 7:15, when a gentleman arrived in the parking lot who looked like he knew what was going on, so I discreetly followed him into a great building. It's a straw bale building, which has a wood frame, straw bales for insulation, a porous inner layer to stop mould, sustainable heating and a green roof. It's really cool. I'm not sure if such a structure would work in Canada, but it seems to work well in Kent!

I took a seat near the front and politely waited. A sign in book was passed around and I signed in as Roger Hill—Guest, which caused their Chair a delightful woman called Miriam Harries, to drop by. When I told her I'd come a long way, from outside Toronto, Canada, that I wanted to attend an astronomy club meeting while I was in the UK, she asked if I minded if she introduced me. Hamilton Centre members know that I will rarely decline a chance to speak when asked to do so, and of course I said I wouldn't mind at all!

Like the Hamilton Centre, the OAS does some housekeeping first, announcements, members images, items of

Astronomical interest, and so forth. There is a break for tea and biscuits (provided by somebody different each meeting), and then the main speaker. When I went for tea, I was asked a lot of questions and had a chance for a quick chat about public outreach. Several people asked about Northern Lights, and how they wanted to come to Canada to see them. I mentioned that my although my latitude was about the same as the south of France, my magnetic latitude was about 53° North, about the same as northern Scotland due to the magnetic pole not being co-incident with the axis of rotation.

I was also able to have a quick chat with a very nice fellow called Hugh about public outreach. The OAS does a fair bit of this with local schools, taking their Coronado SolarMax 60 Hα and a white-light instrument with them. One day they'd shown about 250 kids the Sun through the Coronado, and the Moon through another scope in the daytime! They have a number of retired folk, and a few people from local schools that have been able to help them arrange such visits.

When the meeting re-convened, it was a Members night, but rather than a number of members giving short talks, there was one long one. On this occasion, it was given by a fellow called Tony Buick. His topic? Orreries!

Now, after being a Hamilton Centre member since 1970, having gone to Starfest a dozen times, been to meetings in three countries, and a couple of General Assemblies, I don't think I've ever seen a talk about Orreries before. Frankly, I'd have given you pretty good money that there were no topics that interested amateurs that I'd not seen, but I'd've been wrong. I've seen several talks on sundials, but never, in 45 years of attending meetings have I ever seen a talk about Orreries.

Tony's talk was great. He had some incredible slides, several models, and a gift for making the arcana of these devices come alive. He obviously knew his audience, too, as they did him. It's a shame that the Hamilton Centre won't get a chance to see Tony in action...he was very good and his topic was very interesting. It just proved to me that the best speakers are the ones that are passionate about their subject, as opposed to merely learned. Tony was both!

The meeting wrapped up shortly after 10pm, and I found out that I'd won the raffle prize: a good book about observing Herschel Objects, and I was asked if I would like to join them at their local called "Change of Horses". I most certainly did! I'd driven from Liverpool back to London earlier in the day, and while I was fairly comfortable driving on the left (my inner reptilian brain was no longer screaming at me that a crash was imminent), I'd also stopped at Down House (Darwin's residence) earlier in the day, and I could really use a pint of ale, or two. I only had a quick chat with Carole (who had decided not to go to the Pub) in the Beeche parking lot, which was a shame as I wanted to quiz her about EQMOD and how to use it, but that may have to wait until a visit in the future. I hope that if she visits her friend in Burlington, that she'll let us know and we can invite her out to see our facility.

I learned a lot more about the OAS in the pub, but due to British licensing laws, last call is 11pm. Only one pint was possible, which Miriam's husband bought, and I was unable to reciprocate in kind. Perhaps a good thing as Miriam and her husband offered to drive me to a nearby train station where I'd be able to catch a taxi to take me to my daughters place. That taxi ride cost me almost £30, about $60. I have no idea if I got taken, or not, but it does seem a tad expensive for a 6½ mile ride at 11 O'clock at night.

Looking forward to going back! Oh, and the raffle prize? I left it in Miriam's car!

Stonehenge

It's one of those places that everyone on the planet, with a decent education, knows about. It's a name to be conjured with, a place of mystery that can fire the imagination and yet beggar belief. In any list of ancient archeological sites, it name stands tall.

Stonehenge.

When we started planning our trip to the UK, and were putting out our wish list of places to go, Stonehenge was at the top of the list of places I wanted to go. The rest of the family agreed. The first destination after leaving London was to be this ancient stone circle.

There are many good references available that will tell you all we know about where the stones came from, how it was built, the alignment of the stones and it's relationship to the solstices.

What none of these sites do is prepare you for what you'll see.

It was only my second day wit the car, and we'd been stuck in bad traffic out of London. What should have been a 90 minute trip turned into 4.5 hours. My shoulders were aching and the muscles in my neck were all bunched up, my hands were tight from gripping the steering wheel. Every time I tried to relax, my subconscious took over, torn between fight and flight...unable to do either. My daughter was in the passenger seat reading the directions off GPS, and helping me to remember who has the right of way in a roundabout. My wife and my daughters boyfriend were chatting in the middle row of seats, and thus it was my son, in the third row of seats in our seven passenger Volkswagen Sharan who saw it first, notifying us with a "Holy Sh@%...there it is!"

Indeed!

You come over the crest of a hill, the GPS indicating that it's only a mile or so away, and suddenly there it is. I could only afford a quick glance, not the long look I so desperately wanted.

There is going to be very little that I can do to convey the impact Stonehenge had on me, and the rest of my family. Perhaps all I can say is that in a 16 day span where we saw the crown jewels, the white cliffs of Dover from the sea, went on the London Eye, went to Buckingham Palace, Shakespeare's birthplace, Oxford, Windsor Castle, Roman ruins and sang Beatles songs in the Cavern in Liverpool; the highlight for all of us was going to Stonehenge.

PST Eyepiece Shield by Rod Nabholz

I recently picked up a Coronado PST - what a great addition to my Astro Gear! Enjoying Astronomy during the day - effectively doubling my opportunity to observe - What's not to like? I have had a lot of fun watching the changes in prominences that happen in such a relatively short period of time. With the exception of Jupiter, we seldom get to see such dynamic changes happen so quickly.

While it is a very simple and easy to use instrument, there is one issue that I struggled with. In using the PST, I found that like others, I am bothered by the sun's glare entering the eyepiece, reducing the contrast. As a result, I spent most of the time observing with my hands cupped around the eyepiece and observing eye to get the best view. Not a particularly comfortable position for extended viewing.

I looked around at some of the commercial solutions offered like the shields that attach to the tube, or between the scope and mount. It seemed to me that they would address just part of the issue by shading the eyepiece. I was also experiencing intrusion of light from the periphery of my vision from the area beneath the scope.

I got to thinking that the best solution would be an extended eyecup - something on the order of a few inches across.

I was walking the aisle of the local GlobalDominationMart when I saw this in the auto section, made by Case Logic, the Catch-All it is a small soft bag made from a firm neoprene material that is intended to attach to the vent in your car and be a place to store your phone, pda, mp3 player, etc. In addition to local stores, It is widely available on the net, just Google "case logic catch-all" for a number of sources.

The top of the bag is held open by a hard ring covered by the neoprene. I took it off the shelf and held the ring up to my eye, and sure enough it was wide enough to block all extraneous light. I was thrilled, but the lady that saw me do that was wondering was so exciting....

I rushed home with it and got out the PST. I took a razor and cut about an inch or so of the bottom seam stitches. I then slipped the eyepiece holder of the PST through the slit.

Picked up the rig and headed out into the sun. It worked!! It blocked all of the extraneous light and the contrast was fantastic.

The bag was soft and comfortable against my face. I pulled it up so that its top was just slightly above the top of the eyepiece and compressed it slightly with my face as I moved into the eyepiece. Perfect!

Here are the advantages:
1. Cheap - just $3.88
2. Easy - just cut a few stitches with a razor knife, slide it on. Done.
3. Will not mark the scope - very soft.
4. Light - Will not throw off the balance of the scope.
5. Folds flat and stores easily in the PST case.

Now that it is fit properly, I will add a couple of stitches on each end of the slit to prevent the seam from opening further and making the hole any bigger. That should do it - total time invested, less than 10 minutes.

If you do any solar observing, or for that matter night observing in places where light intrudes, this is a good fix. It makes a huge difference with my PST, the additional detail visible with the eyepiece shielded is substantial.

In all, it is Simple, Inexpensive and Works Great - my kind of project.

Dark Sky Meter

Measuring Night Sky Brightness? There's an App for That

Astronomers and dark sky-advocates take note—you can now measure the brightness of the night sky using your smartphone. A new app for the iPhone called Dark Sky Meter uses the phone's camera to accurately measure the brightness of the night sky and deliver the results to a central database that will, in time, create a worldwide map of light pollution.

The International Dark-Sky Association (IDA), a non-profit group that has long been working to help raise awareness of the problems of light pollution, has worked closely with the app developers and hails the new app as an affordable way to measure the night sky from anywhere. Bob Parks IDA's Executive Director says, "The Dark Sky Meter is an easy, inexpensive way to monitor light pollution. I helped to test the app and was impressed by its accuracy."

The "pro" version of the app sells currently for $3.99 and compares favorably to a handheld device that retails for $130. Results can be viewed on a map that allows users to compare their results with users from around the globe. The "Lite" version of the app is free for download allowing a greater number of users to contribute data. It provides a more simplified version of the results, showing how many times brighter a sky is as compared to a natural night sky.

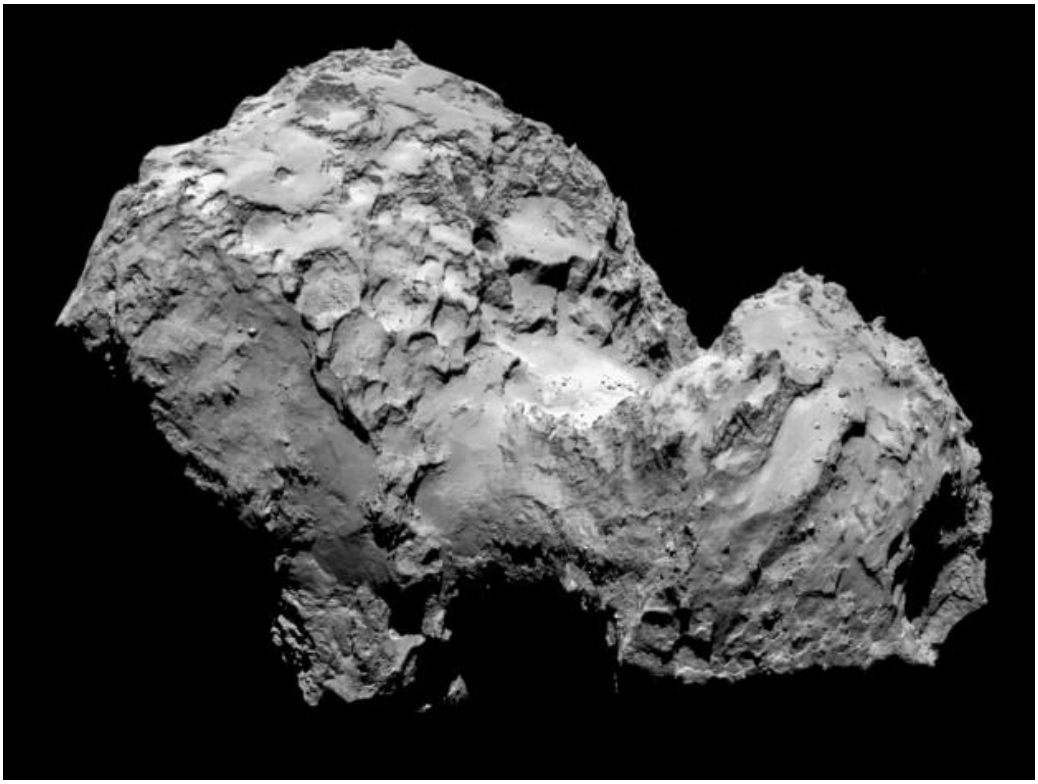
The ease of making the measurements with the app makes it a great tool for public outreach. Crowd sourcing the measurements at events like star parties and night sky outreach events improves the accuracy of the measurements, increases the public's awareness of light pollution, and contributes to our understanding of the problem.

App developer Norbert Schmidt and engineer Harro Treur developed the Dark Sky Meter. Schmidt explains, "During the development process we took 5000 measurements by hand and filled in 120 Excel spreadsheets with measurements before releasing the app. Each new measurement collected improves the app's algorithms making the data more accurate." Their company DDQ has developed other smartphone science apps, such as one to make fine dust measurements and one for last year's transit of Venus. More information and download links for Dark Sky Meter is available at www.darkskymeter.com. Currently the most accurate results come from those using the iPhone 4S and 5, but work continues on improving results for more devices.

Android users that are also interested in monitoring the night sky shouldn't worry as there is a new app called "Loss of the Night" that they can download for free in English and German at the Google Play Store.

67P—Stuart Atkinson

We always thought of your kind as icily beautiful.
Pale princesses wistfully wandering the heavens,
Long veils flowing behind you as you smiled down
At the bewitched mortals sighing far, far below.
Or you were ghost ships, silently sailing through the stars,
Blown on the solar winds, sighing softly
As you passed Earth for the thousandth time
Since you first tacked in towards the Sun.
But while some of you grew to greatness,
Unfurling bright, twisted ribbon tails across the lavender twilight,
Fluttering like pennants flying from Camelot's tallest towers
Most of you were never seen by eye alone;
Even gazing at you through telescopes
Only ever showed you as out of focus stars,
A gritty chalk dust speck rubbed with a fingertip
Onto the blackboard of the sky…
But now, with your concealing veil pulled away by ROSETTA
You are revealed, we see you as you really are.
You are a bizarre, gnarled, chewed-on… thing;
Two twisted, ancient masses of ice and dust,
Thrust together who knows how many millennia ago,
A scarred neck left connecting your cratered lobes.
Princess? No; more a coal-black Quasimodo,
Hunchbacked after merciless torture on Time's rack
Left you mutated, misshapen, like some nightmarish creation
Dali and Giger drew on a beer mat as they sat, drunk,
In the corner of Heaven's gloomiest bar,
Now spinning slowly, slowly in the Great Dark…
Looking at your pixelated portrait I wonder
"How can anything which shines so beautifully in the sky
Be so ugly?" How can such a black,
Maggot-gnawed apple core grow such a glorious tail?
How can something like… that…
Hypnotise even
But if I look closely…
There is a barren beauty about you,
In the way shark tooth shadows are cast behind
Your twisted towers and spires of filthy ice;
In the way aeons of dust – grey as cremation ash
Spilling from a loved one's shattered urn –
Has buried your craters, smothering them
Until only ghostly smoke rings remain…
Soon you will awake.
As the nearing Sun's warmth begins to bake you
Comet quakes will shake boulders
From your crumbling cliffs, sending stones
Bouncing and rolling down your snowy slopes,
Ploughing furrows through the dust
For OSIRIS' eagle eyes to harvest from above,
And then, finally, after centuries of wondering what you are,
After ten thousand lifetimes of fearing
Your fleeting appearances in our skies
We will look straight into your eyes
And know you.
With your glacial breath on our faces
We will stare into your ancient soul
And Know You.
Comet: plague-carrier! Harbinger of doom!
Destroyer of Empires! Murderer of Kings and Queens -
No. No more; now we know you as an icy orca,
Prowling the deep sea between Sol's worlds,
Surfacing briefly to sing and shine before diving
Down into the cold, ebony dark halfway to the nearest star
To sleep, and dream of thawing, golden sunbeams
Once more…



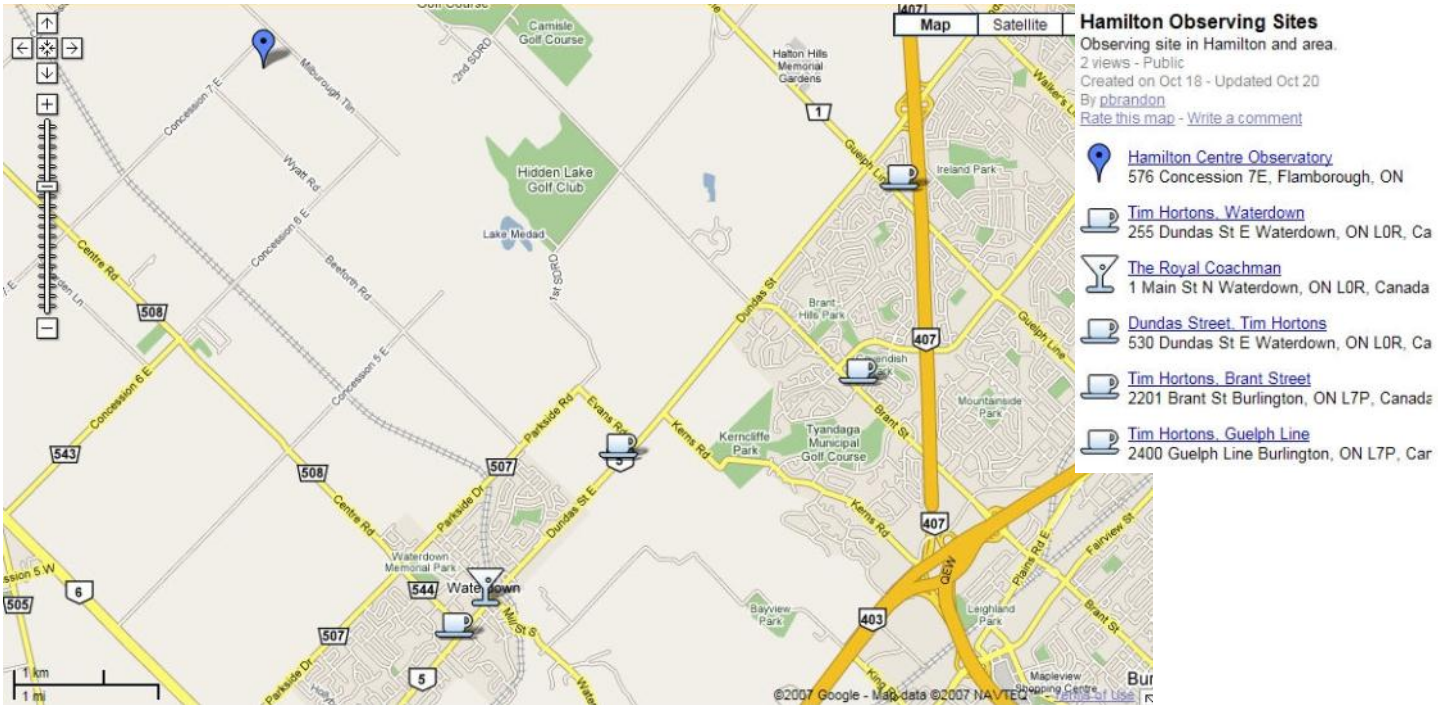
What you missed last meeting—The June, 2014 meeting:

Our guest speaker was Haroon Oqab of the Canadian Space Society. He told us all about how the Canadian Space Society was organized and its constitution. Hamilton Centre members who have been around for the last 20 years or so may remember a meeting we had at the Hamilton Spectator building, where we were similarly entertained by a fellow from the Hamilton Shipbuilders.

A number of the raffle prize winners from AstroCATS who were unable to be there when their names were drawn dropped by to pick up their prizes.

Afterwards, there was the usual gastronomy at the Royal Coachman: great wings, excellent fish and chips, and if you like a good curry then the Curry and Chips is not to be missed!

You may also have missed the Banquet, which was moved from the Legion to become a picnic at Andy Blanchard's. Dave McCarter, though, remained as the speaker, and did an excellent job! Dave is an excellent speaker, and he did his usual superlative job. He was entertaining and informative, engaging and educational. I, for one, hope he visits the Hamilton Centre more frequently, and when he does, you should attend!



576 Concession 7 East, Flamborough ON
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Gary Colwell, President
Gary Bennett, Membership Director / AstroCATS Chairman
Jason Blane, Observatory Director
Roger Hill, Orbit Editor
Bill Legitt, Treasurer
Mark Pickett, Outreach Director / National Council
Shawn Preston, IT Director
Dave Surette, Secretary
Andy Blanchard, Past President / AstroCATS Co-Chairman

Calendar for September, 2014

Mon	Tue	Wed	Thu	Fri	Sat	Sun
01	02	03	04 • 8pm» Public Monthly Meeting	05	06 • Family BBQ at the Observatory	07
08	09	10 • 7:30pm» Star Gazing at the Observatory	11 • 8pm» RASC Board Meeting	12	13	14
15	16	17 • CANCELLED - Scouts Night at the Observatory	18	19	20	21
22	23	24	25 • 8pm» Henry's Astrophotography Night	26	27	28
29	30					

NOMINATION FORM for the Board of Directors - October, 2014.
I, _____ , being a member in good standing of the Royal Astronomical Society of Canada 1968, Hamilton Centre, do hereby nominate _____ for election at the Annual Meeting.

_____ _____
Signature of nominator and Date - 2014/MM/DD

I, _____, being a member in good standing of the Royal Astronomical Society of Canada 1968, Hamilton Centre and being at least 18 years of age, do hereby accept my nomination to the Board of Directors of the Royal Astronomical Society of Canada 1968, Hamilton Centre.

_____ _____
Signature of nominee Date and 2014/MM/DD

NOMINATION FORM for National Council Representative - October, 2014.
I, _____, being a member in good standing of the Royal Astronomical Society of Canada, and of the Hamilton Centre, and being at least 21 years of age, do hereby accept my nomination for National Council Representative for the Royal Astronomical Society of Canada 1968, Hamilton Centre. (Two year term)

_____ _____
Signature of nominee and Date—2014/MM/DD

Bylaw Number One of The Royal Astronomical Society of Canada 1968, Hamilton Centre (September 13, 2005)
5.04 NOMINATIONS
Any member of the Centre may make nominations to the Board. Such nominations shall be submitted by the member to the Secretary of the Centre in writing at least ten (10) days before the annual meeting, and shall contain the name of the nominator and the written consent to the nomination by the nominee.

Bylaw Number One of The Royal Astronomical Society of Canada (February 2006)
4.07 CENTRE COUNCILS AND OFFICERS
(2) (2) Every member of the Centre Council shall be elected by the members of the Centre, for such term and in accordance with such procedure as is established by the Centre by-laws, at the Centre's annual meeting or at such other meeting as is duly called for that purpose.

4.08 NATIONAL COUNCIL REPRESENTATIVES
(2) Subject to Article 4.08(4), the National Council Representatives of a Centre shall be elected by the members of the Centre in accordance with the procedure established in Article 4.07(2) for the election of Centre Council members.
(4) If for any reason a National Council Representative of a Centre is unable to attend a meeting of the National Council, then the Council of the Centre may appoint another member of the Centre as an alternate for that National Council Representative. The alternate will be entitled to exercise all the rights of the National Council Representative for whom he or she is the alternate only upon presentation to the National Council of proof in writing from the President or Secretary of the Centre as to the due appointment of the alternate.