Orbit

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Issue Number 2, December, 2011
Roger Hill, Editor

The changes in the Hamilton Centre are coming thick and fast! The new Facebook page was well received, the web site re-organized, and the Yahoo! Group is getting used more and more.

There are more events being planned, and some old favourites being re-introduced.

Orbit, too, will see some new (ish) things inside its pages. Probably the biggest one is that each Board members is expected to contribute something every month...although I hope you'll forgive them if this deadline came a little too soon!

What I mean by new(ish), is that a précis of Board activity was once provided by the President in his report, but each Board member reported to the membership at the beginning of the monthly meeting, where questions could be asked, and answers received.

As I write this, I've already received Andy's report, and Ed Mizzi's has just arrived in my inbox.

So, what's been going on around the Centre? There was the visit to the David Dunlap Observatory, which was clouded out, but was still well attended. There was the astrophotography night on the 24th, which was also clouded out, but less well attended. Oh, and the keys to the Observatory have been changed...if you have a key, our esteemed treasurer, Will Gray, will happily relieve you of $25 for another year.

We have a Swap meet coming up at the December meeting, the return of the Discussion Group—now re-branded as Arm Chair Astronomy, a New Years Day Levee being hosted by Andy, Public nights at the Observatory being planned, Sidewalk Astronomy at the Westfield Pioneer Village in Rockton, and the return of the Annual Banquet is being discussed.

There's some initial planning that's been started for the opposition of Mars in March, to be called Mars Madness (appropriate, since Mars is French for March).

The Telescope Basics for Beginners night, on December 28th looks like a winner for all those people who got a Telescope for Christmas and would like to know how to use it.

There's some great speakers coming up, too, in the New Year, people like Mike Reid and Dr. John Percy.

And in a quite unexpected turn of events, someone dropped off a telescope in the driveway of the Observatory, with a sign on it that said "Free—Computer Not Working". Bert told me about it, so I went to pick it up. It's an 8" Meade LX200 and tripod, and it can now be found in the observatory. I didn't power it up, but even if the mount cannot be fixed, the scope can be dis-mounted and it can be put on to a EQ5 style German Equatorial to make a nice scope.

Not everything is sweetness and light, though. The boys are having trouble getting the robofocus to be repeatable, and they're not sure why. What **I'm** sure about, is that they'll soon have a fix for the problem, and the promise of automated focussing will be a reality. In the meantime, if you want to use the telescope, you'll have to be trained on it.

The major issue for me, though, was that I resigned from the Board of Directors. I will continue to do public outreach (under Mark Pickett), I will attend all the Board meetings I can, and I would like to continue as Editor of Orbit. Fortunately, the latter is not strictly a Board position.

Until next month,

Roger Hill

.Presidents Message—Andy Blanchard

Well Christmas is around the corner and we are about to enter into the new year. Our December meeting will have a completely different format. We will be hosting our first annual Swap Meet. Please come to the December 1st meeting ready to sell all of your items collecting dust and maybe pick up a few new items.

We will start the meeting with our speaker Brady Johnson, who will be discussing focusing. After the break we will then launch into our swap meet. Be sure to have some cash on hand, as I am sure there will be an item or two that will catch your eye. I have a couple of boxes to display and the prices will be hard to beat.

You will notice in this month's Orbit a completely different level of reporting from your board. All of the board members will be reporting on their respective committees. This level of accountability to the membership is, in my opinion, critical when we are attempting to grow our membership. Clarity in our mission will be demonstrated to you our members through our efforts, and hopefully we will continue to earn your trust. The Treasurer will be reporting monthly on our membership numbers. I will leave the good news for Will's report but just the same I am very proud of our board and their committee members and the work and time they are putting in.

The New Year promises to be a lot of fun as we have a busy list of monthly activities that we hope will stimulate your interest and help grow our club. See our calendar on Facebook and Yahoo for the exact times and dates. Starting in January you will notice a new item on the calendar called armchair astronomy. This will be a monthly event that involves discussion on astronomy topics. This will be an opportunity to jaw bone with friends and get a deeper understanding of topics like string theory, or how to calculate the orbits of Jupiter's main moons. The basic theme of the evening will be to go where the discussion takes us. Each event will have a moderator who will start the ball rolling.

We will also continue to offer our Astrophotography program, and for non members we will be running a monthly Public Night, an event that you can invite friends and neighbours to. They can come out see the observatory, look through the big scope, or get lessons on how to use their new and old equipment.

We have also decided to reintroduce our annual year end banquet. Location and date to follow in a later Orbit.

The list of speakers booked so far include:

Brady Johnson, Focusing -December,
Dr. Mike Reid: The Big Controversy over the Big Bang -January,
Terrance Dickenson, topic to be determined -February,
Dr. John Percy, UofT -March,
Wayne Parker, "Launch of the 12' Sky Pod"-April,
Wayne Armstrong, "Space Weapons"-May and,

Our January meeting will be a Member's Night meeting when we will have an opportunity to show off our toys, photos and stories.

As always, if you have a suggestion, comment or idea, please drop me a note at atacamandy@hotmail.ca

Report from the Board: Program Director—Ed Mizzi

Our club got off to a tremendous start this year, beginning with the election of a new Board of Directors, several new members and a flood of volunteers ready to help out wherever and whenever needed.

Thus far this year we have had the Burlington Seminars, run by Roger Hill and when weather permitted, it was combined with Mark Pickett's Sidewalk Astronomy (always a big hit), with several members chipping in to assist.

We had a great showing for our visit to the DDO (David Dunlap Observatory) so thanks to Gary Bennett and Andy Blanchard for getting that off the ground.

Of, course, Gary Colwell is once again helping blooming astrophotographers hone their skills with his entertaining workshops.

Andy Blanchard is also presently working at setting up lessons for the Scouts and Guides in this area, giving our young people a chance to learn about this great hobby and science.

Right after Christmas we will be helping the general public and members with new equipment purchased and/or received as gifts during the holidays.

The New Year will prove to be even more exciting with Armchair Astronomy, Public Nights and more Astrophotography and Sidewalk Astronomy.

Please note that we are always looking for volunteers to help with our programs, and not only will you feel good about helping others, you will learn new things yourselves.

The more you get involved the more fun we'll all have.

Thanks to all who have assisted us so far this year!

Report from the Board: Outreach Director—Mark Pickett (submitted by Roger Hill)

The Outreach Committee was very busy in November, seeing the last of the seasons Burlington Seminars with a Telescope Night. There were a number of members who showed up to help out, including Ed Mizzi, Dana and Nancy Barton, Bert Rhebergen, and Gary Colwell. Thanks, one and all.

Coming up, we have three nights at Westfield Pioneer Village in Rockton. Again, we'd appreciate the help. See the Calendar at the back of Orbit, and keep an eye out on the website or Facebook page for details.

We'll be looking for a new Sidewalk Astronomy site next summer, as Burlington has re-organized a number of their programs, and we're no longer under the purview of the good folks at Discovery Landing.

And lastly, Mark met with a delightful woman called Cathy Brown twice on November 6th. Her sister gave her a telescope about 10 years ago (a Saturn brand, made in Taiwan, imported by Meade, 114 mm in diameter, f8, 0.965 eyepieces, really bad finder-scope, etc.). She did not use it because it was too complex. She had kept it for 10 years and never used it!

Cathy got the scope to Mark, and he had a look at it. In a few minutes, he had it balanced fore-and-aft, got the counterweight balanced, set in up with the mount pointing to Polaris, etc. He then showed her the moon - and she was really excited.

She had to go to a class, so he worked on the scope in the meantime. He washed it several times, worked on the collimation, fixed the finder scope, etc. When she got back from class, he showed her Jupiter and the Moon. In addition, I said she could invest in a new finder scope and a Plossl eyepiece. (he checked, and a 1.25" Plossl with tape around it would fit in the hole where 0.965 eyepieces were.

Mark told her to buy Night Watch - but she had this, so he encouraged her to read it, and she replied that she would..

Cathy and her husband are going to check the website for the Hamilton Centre and probably go to a meeting.

Mark finished his tale with the phrase "It was a good night, all in all! Cathy got the scope to me, and I had a look at it. In a few minutes, I balanced it for-and-aft, and got the counterweight balanced, set in up with the mount pointing to Polaris, etc. I showed her the Moon - and she was really excited.

The Hamilton Centre goes to the DDO—Colin Haig

On November 19th, 2011, Hamilton and KW Centre members were treated to a bittersweet tour of the David Dunlap Observatory. The telescope, largest on Canadian soil, is now in the care of the RASC Toronto Centre. Our hosts including Ralph Chou, Eric Briggs, and several other fine folks (apologies for not getting names - Michelle ? Nicole? ???) started with a lecture on the history of how Jessie Dunlap presented the observatory to the University of Toronto as a memorial to her late husband. More recent events resulted in the UofT selling the property.

Sadly, most of the facility is in a sad state of repair, although the large telescope remains operable, it is clear that there has been a lack of attention to the site until Toronto Centre members started their efforts. Light pollution has made the location less than ideal.

Pictures provided by Colin Haig and Ed Mizzi

Report on Observatory & Ritchey-Chretien Training—Steve Kinsella

On Monday November 21, Andy Blanchard posted that he would be happy to perform some training on the16" Ritchey-Chretien, if there were at least a couple of interested parties. Lucky for me, Mike Ducak expressed an interest in learning the RC and so I joined them at the observatory.

The sky was mostly clear and calm and the temperature was not too cold to be uncomfortable.

Andy took the time to review the concerns with the buildings as well as the need to always have a buddy to observe with and then took us out to the observatory to show us the procedures for rolling back the roof and operating the RC. The instructions were well delivered and concise with lots of hands on practice. In a short time, Mike and I were feeling confident and could show Andy that we could operate the scope and roof and were left on our own to explore the sky.

I had brought a few cases of eyepieces and filters and we were quick to get them out as Mike and I were both mainly interested in using the RC as a visual instrument. We started our session looking at Jupiter and were impressed with the detail we could see. We moved on to Uranus which showed itself as a greenish disk.

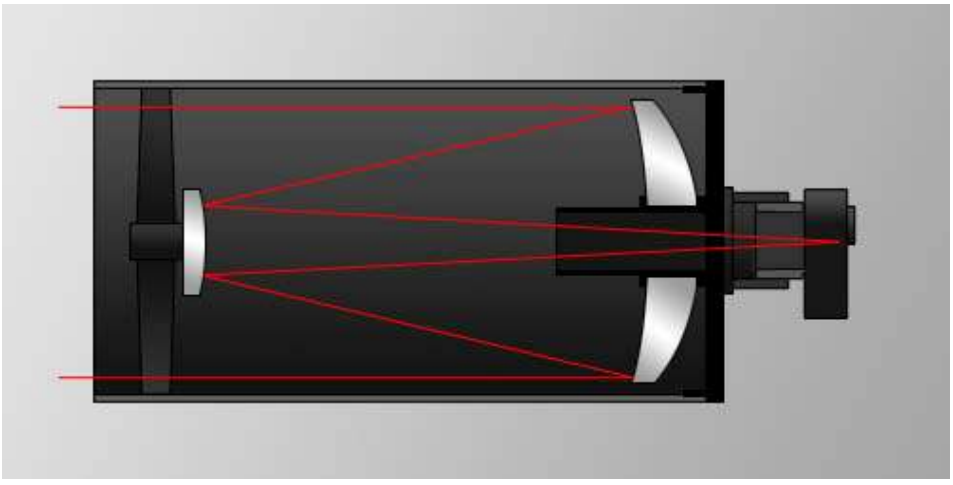
We then decided to move onto some Messier objects and had a look at the open cluster M37 in Auriga. The view was striking and rich using the 35 mm Panoptic. Mike suggested we turn our attention to a galaxy and we slewed to M31. We kept slewing to other objects with different objects with different eyepieces and even got the OIII filter out for M76 which really brought out some detail in the Little Dumbell.

We were both getting a little cold and had to get up early the next morning, so we decided to have one last look at Jupiter before we called it a night. As Mike moved to the eyepiece, he commented that there was a pimple on the southern equatorial belt. I reached for my Observer's Handbook and realized it was Ganymede starting to transit. That coupled with a transit of the Great Red Spot was a fitting end to our observing session.

Thanks go out to Andy for his time spent instructing us and to Mike for his company at the eyepiece.

Ritchey-Chretien Telescope optics

Recently, Gary Bennet and I were having a discussion (it actually got quite heated...sorry Gary) about the optics of the 16" scope. The major difficulty in our discussion was that the definitions of the words I was using were different that what Gary understood, and vice versa. So...I did some digging into telescopes, and Ritchey-Chretiens in particular. I found a great explanation at Starizona's web site, and I reproduce it here. Because, if a couple of guys like Gary and I can have a discussion devolve due to misunderstanding, then it can happen to anybody.

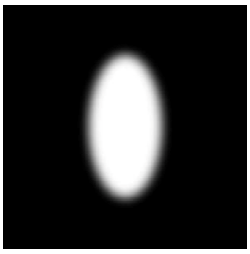


How Ritchey-Chrétiens Work

RCs are a type of Cassegrain telescope, meaning they use a folded optical design like the more familiar Schmidt-Cassegrain telescopes (SCTs). However, they are an all-reflective system, using only mirrors and no lenses. Instead of the mirror being supported on the corrector lens as it is in a catadioptric design like an SCT, the mirror is supported by a spider consisting of four metal vanes. These produce the common diffraction spikes seen as crosses on bright stars in many astrophotos. Because of the folded optical design, RCs provide a long focal length in a short package. This high magnification makes them ideal for imaging small targets.

Aberrations in a Ritchey-Chretien

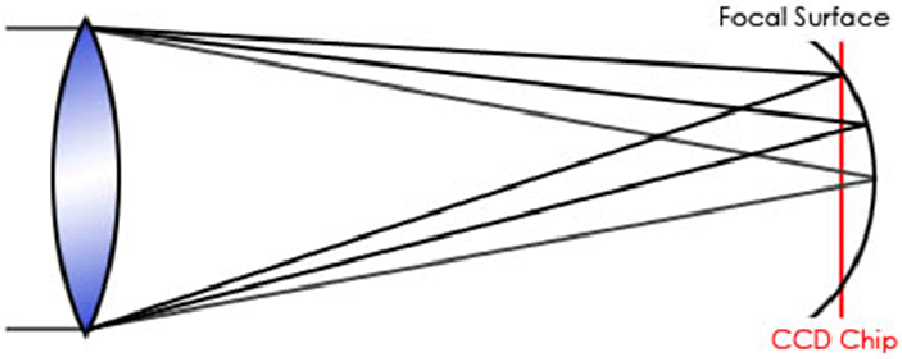
In a classical Cassegrain telescope (another all-reflective design like the RC), the primary mirror at the back of the telescope has a parabolic shape, just like the primary mirror in a Newtonian. And like a Newtonian, classical Cassegrains suffer from off-axis coma (see image, right), which prevents the stars at the edge of the field from being sharp.



For professional astronomers, this is a problem because they need to be able to accurately measure the position of stars across the entire field of view. Coma is an asymmetrical aberration, and displaces the star images from their actual positions. The RC design trades off coma for astigmatism. The RC uses hyperbolic primary and secondary mirrors to eliminate coma and spherical aberration. However, the stars are still elongated at the edge of the field, but they are no longer asymmetrical as they would be with coma (see image, right). This is critical for making astrometric measurements, and many professional telescopes, from Hubble to Keck, are Ritchey-Chrétiens. It is also the reason why so many people thought that the Hamilton Centre's RC was out of collimation, when in fact it was in perfect shape.

For amateur astronomers who are interested only in pretty pictures, whether the telescope suffers from coma or astigmatism is less important. For advanced amateurs engaged in scientific study such as searching for or studying asteroids, an RC would be preferable. But for imaging deep-sky objects, coma versus astigmatism is more of a toss-up. A classical Cassegrain gives star images only about 10% larger than those of an RC at the edge of the field. So why are RCs so popular while classical Cassegrains tend to be rarer? One reason is that these are expensive telescopes, normally used by advanced amateurs, many of whom *are* doing scientific studies with them. But more often, the users are astrophotographers who are taking beautiful images of the night sky. Most commercial classical Cassegrains are designed as planetary telescopes and have very slow focal ratios (around f/15 or f/20). This makes them poorly suited to deep-sky imaging because of the longer time required to capture the light from a faint object. RCs on the other hand, have focal ratios in the range of f/7 to f/9, making them preferable for deep-sky photography. There is no reason an f/7 classical Cassegrain could not be built (and certainly some have been), but very few such commercial models exist, so RCs have become more popular.

Ritchey-Chrétiens also suffer from field curvature. Field curvature distorts the star images across the field of view. This is because field curvature produces a curved focal plane. The outer parts of the focal plane are focused closer to the telescope than the inner parts (in an RC or other Cassegrain). But the detector used for imaging (whether a CCD or film) is flat, meaning the entire field cannot be in focus at once. RCs and classical Cassegrains have very comparable amounts of field curvature. But the curvature is almost 7 times greater than in a comparable Newtonian and about twice that of a comparable SCT. To use a very large imaging detector such as a 35mm format CCD, a field flattener lens is required. This lens provides a flatter field and can also minimize astigmatism to produce excellent star images across the entire field of view. These are common accessories for RCs.



Re-thinking an Alien World: The Strange Case of 55 Cancri e

Forty light years from Earth, a rocky world named "55 Cancri e" circles perilously close to a stellar inferno. Completing one orbit in only 18 hours, the alien planet is 26 times closer to its parent star than Mercury is to the Sun. If Earth were in the same position, the soil beneath our feet would heat up to about 3200 F. Researchers have long thought that 55 Cancri e must be a wasteland of parched rock.

Now they're thinking again. New observations by NASA's Spitzer Space Telescope suggest that 55 Cancri e may be wetter and weirder than anyone imagined.

Spitzer recently measured the extraordinarily small amount of light 55 Cancri e blocks when it crosses in front of its star. These transits occur every 18 hours, giving researchers repeated opportunities to gather the data they need to estimate the width, volume and density of the planet.

According to the new observations, 55 Cancri e has a mass 7.8 times and a radius just over twice that of Earth. Those properties place 55 Cancri e in the "super-Earth" class of exoplanets, a few dozen of which have been found. Only a handful of known super-Earths, however, cross the face of their stars as viewed from our vantage point in the cosmos, so 55 Cancri e is better understood than most.

When 55 Cancri e was discovered in 2004, initial estimates of its size and mass were consistent with a dense planet of solid rock. Spitzer data suggest otherwise: About a fifth of the planet's mass must be made of light elements and compounds—including water. Given the intense heat and high pressure these materials likely experience, researchers think the compounds likely exist in a "supercritical" fluid state.

A supercritical fluid is a high-pressure, high-temperature state of matter best described as a liquid-like gas, and a marvelous solvent. Water becomes supercritical in some steam turbines—and it tends to dissolve the tips of the turbine blades. Supercritical carbon dioxide is used to remove caffeine from coffee beans, and sometimes to dry-clean clothes. Liquid-fueled rocket propellant is also supercritical when it emerges from the tail of a spaceship.

On 55 Cancri e, this stuff may be literally oozing—or is it steaming? —out of the rocks.

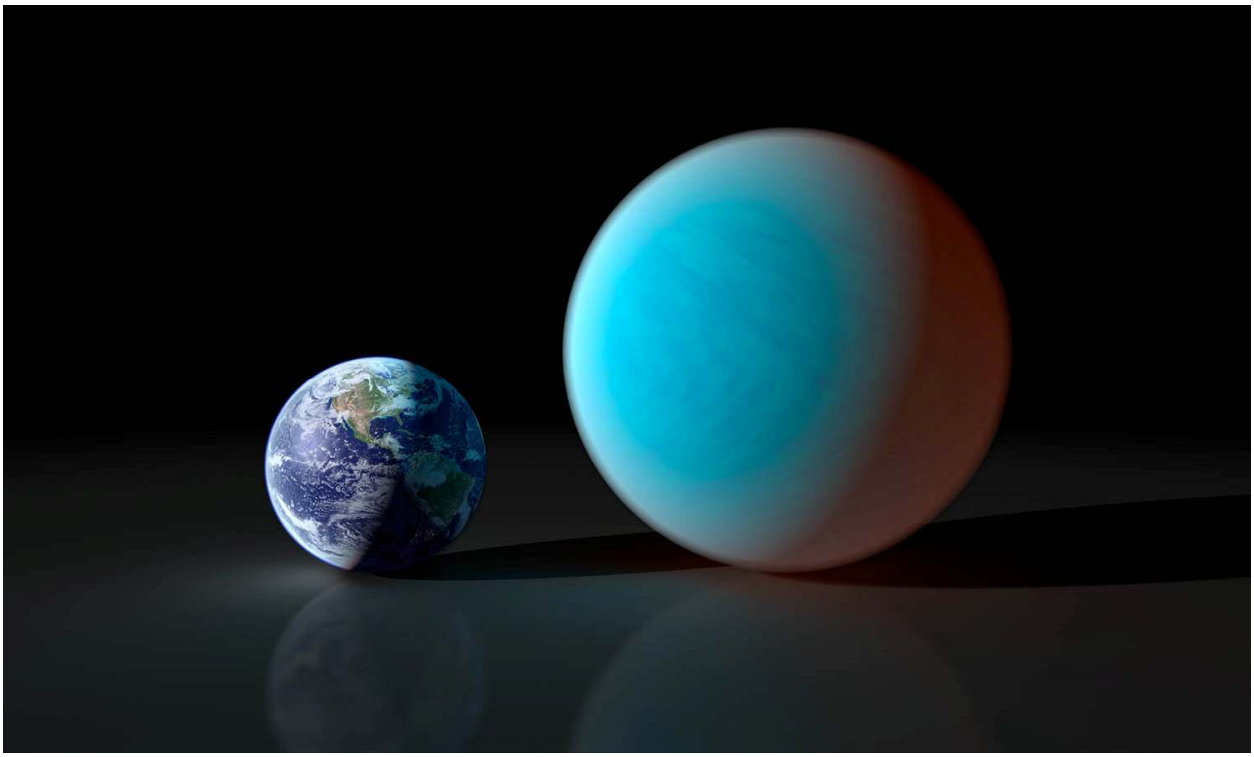
With supercritical solvents rising from the planet's surface, a star of terrifying proportions filling much of the daytime sky, and whole years rushing past in a matter of hours, 55 Cancri e teaches a valuable lesson: Just because a planet is similar in size to Earth does not mean the planet is like Earth.

It's something to *re*-think about.

Get a kid thinking about extrasolar planets by pointing him or her to "Lucy's Planet Hunt," a story in rhyme about a girl who wanted nothing more than to look for Earth-like planets when she grew up. Go to http://spaceplace.nasa.gov/story-lucy.

The original research reported in this story has been accepted for publication in *Astronomy and Astrophysics*. The lead author is Brice-Olivier Demory, a post-doctoral associate in Professor Sara Seager's group at MIT.

Artist's rendering compares the size Earth with the rocky "super-Earth" 55 Cancri e. Its year is only about 18 hours long!



This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

BLUE

Ignoring the tsunami of technology humming behind her,
The chaos of cameras, computers and calculators
Covering the walls, she shuts her eyes and smiles.
This isn't what she imagined as a girl.
In all those classroom daydreams she always saw herself
Looking down – or up – at the world from high above - or below –
Beside a plate-sized portal, straining to glimpse
Some small portion of the planet spinning silently beyond
The scratched and fingerprint-smeared glass, unable to see
More than mere hints of the colours, shadows and shapes
Shown in all the books and magazines...

But *this*...

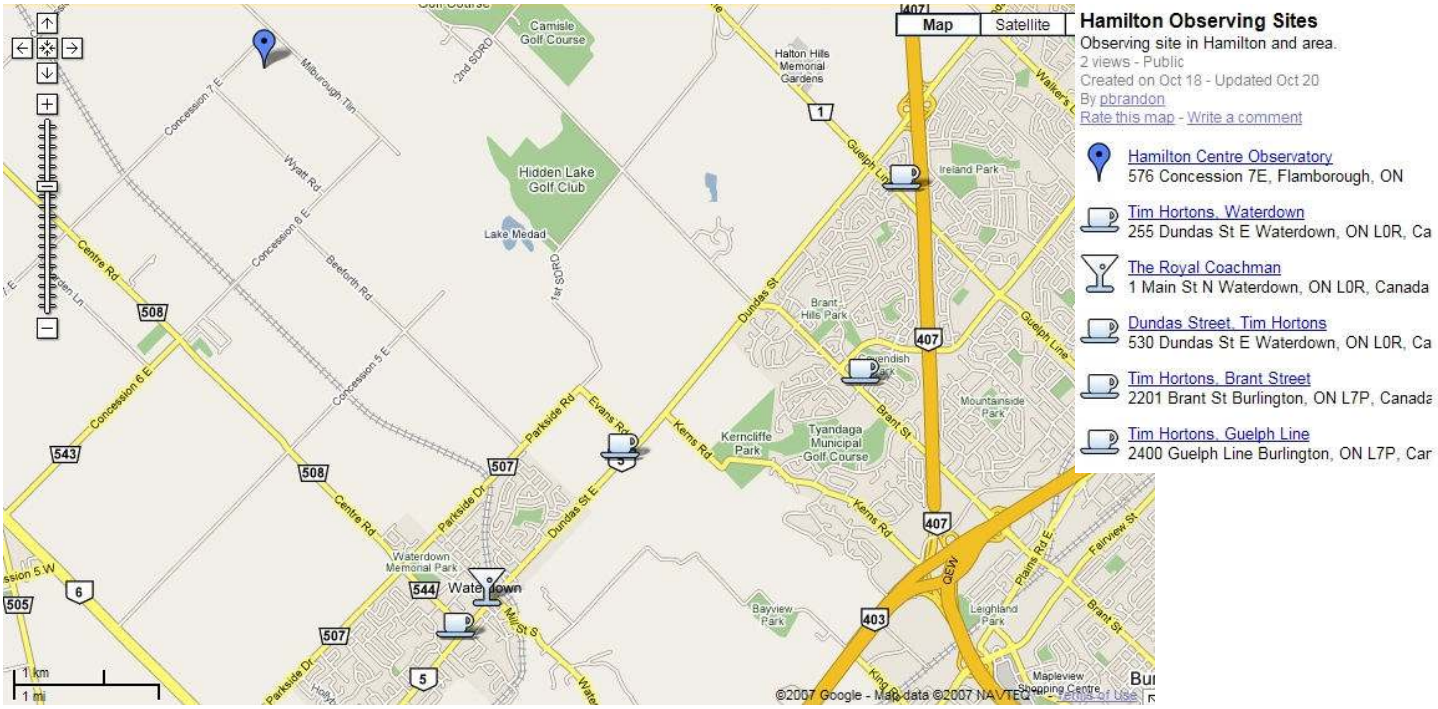
Earth is *there... everywhere...*
A ball of burning blue close enough to touch.
Painted on the heavens in all its Van Gogh glory
It fills the sky, overflows her sight,
A startling Stargate of colour in an ocean of emptiness.
Even with her eyes closed she still sees its azure glow,
Feels its sapphire shades blazing in the ink-black night.
In the work-day-over darkness, Earthlight
Washes her face like cool rain as painfully beautiful
Whirls and whorls of milk-white cloud swirl
O'er the world below and she knows, in her aching
Heart, that long after she has returned to Terra,
To walk barefoot on its dew-drenched grass and
Splash in its ocean's surging surf a part of her
Will always be here, at this window, gazing down
Upon the Earth.

What you missed in November...!

The November meeting saw the invasion of some guys from the London Centre. It was all good, though, as one of them was Peter Jedicke, who spoke about Neptunes Birthday. Andy had seen Peter give this talk in London a few months back, and he was right….it was engrossing!

There was also discussion of the results from the Survey that was done in September, a prize for answering an astronomy question (won by Dana Barton, who's name was drawn from amongst all the people who answered correctly), there was coffee and baked goodies from Nancy and Dana Barton, and a good chance to chat with good friends—old and new!

Oh...and not to forget the post meeting meeting at the Royal Coachman...just watch out for those RIDE Patrols, though!



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Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
28	29	30	1 7:30p Hamilton Centre Monthly Meeting & Swap Meet	2	3 6p Westfield Christmas Nights	4
5	6	7	8 8p Board of Directors Meeting	9	10 6p Westfield Christmas Nights	11
12	13	14	15	16	17 6p Westfield Christmas Nights	18
19	20	21	22 7:30p Astrophotography Night - Beyond The Basics	23	24	25
26	27	28 4a Telescope Basics for Beginners	29	30	31	1 12p New Years Levy