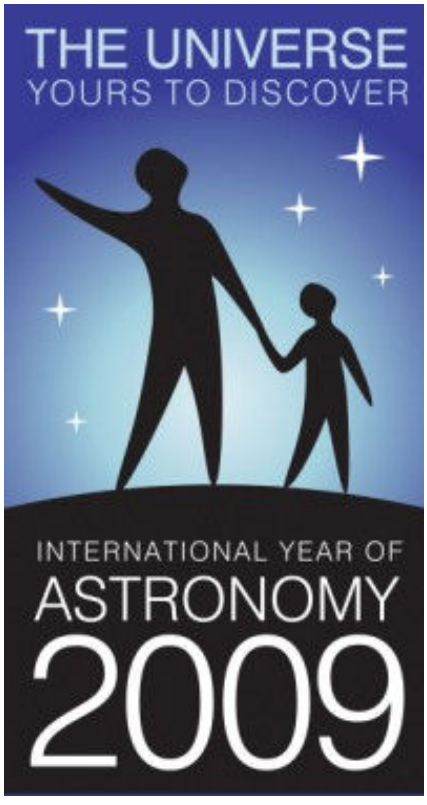

Orbit

The Official Publication of the Hamilton Centre of the Royal Astronomical Society of Canada

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January, 2009

Issue Number 3, January, 2009
Roger Hill, Editor

I hope everyone had a happy and healthy Sir Isaac Newton day on December 25th!

2009 is the International Year of Astronomy (more on this later), and I've been wracking my brain trying to figure out what do, personally, to celebrate it. Oh, I'll be involved in public outreach programs (like the upcoming one on January 16th), and other celebrations, but I wanted to mark it with something that I would remember. I wanted a project that I could sink my teeth into, that would be non-trivial, enjoyable, and would provide me with some satisfaction. I thought back on some of the things I've done in the past, astronomy-wise, that might fit the bill, but nothing seemed right.

And then, on Saturday night (Jan 4th), Les Nagy and I were at the observatory, using the 16" with my Canon XSi. Among other things, we took 30 images of M1 at prime focus. I did a little playing around using IRIS, Deep Sky Stacker and Images Plus (which provided the best results). The result is on the front cover this month.

It was after I'd finished when it occurred to me that I have the best times when I have a goal to accomplish. Like the night at StarFest over a decade ago when Les and I, along with a couple of others, observed all nine planets in less than 24 hours.

So what would be suitable for a year long project, involves imaging and using the Centre's observatory? How about photographing every Messier object? That seemed worthwhile. The only problem is, now I'm thinking about it, is I'm not sure if they're all visible from the site! I might have to use Manitoulin, Starfest, or Gary Colwells place to get the ones that aren't.

Anyway, I'll try to keep you up to date with the project as it goes along.

Anyone else care to join in with a project of their own? 100 solar system objects, perhaps? Actually, I like the sound of that one, too. Is it possible? 1 star, 8 planets, 2 dwarf planets, about a dozen moons, a couple of comets. Hmm...that's a lot of asteroids to hunt down. I might try that from my back yard observatory.

Anyway, in this issue you'll find the usual humour, images from members, and other things, besides.

I hope you enjoy it.

From the Keyboard of the President

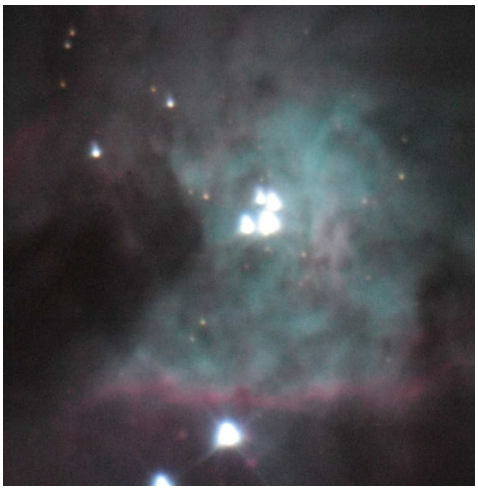
John Williamson continued his recovery, and was able to attend the Board meeting in December.

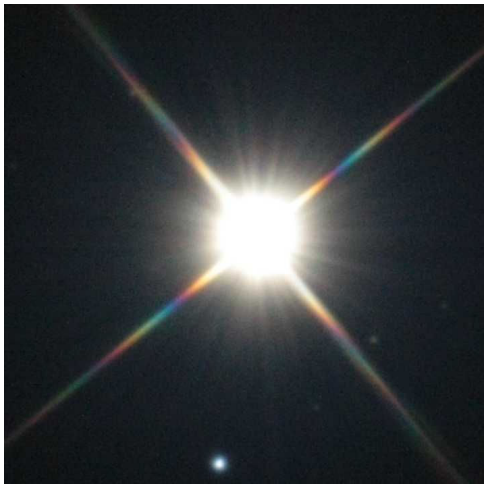
Of note in that meeting was that we have a new Board member—Mark Pickett. Mark wants to help out where he can, but mostly to help Gary Colwell with public outreach. If you've been out to meetings, you'll have seen Mark there, but being the quiet type, you may not know that much about him. Thankfully, he decided that now was the time to step forward, and I'm most grateful that he did. Pretty sharp guy he is, and well worth listening to. What I like is the fresh perspective that he brings. He forces me to question why we've always done things a certain way. Is it because that is the best way, or just the entrenched way? We could use a few more people like Mark.

One thing you should be aware of is that we're having a look at some fairly radical changes to the Observatory. Andy Blanchard was working away behind the scenes last year, and almost saw a really cool project come to fruition. With one thing, or another, this project was not possible without some major effort on the part of a lot of people, but not much stops Andy, once he gets the bit between his teeth. At first, I'd thought that his proposal was out in left field, but the more I've thought about it, the more I like it. If you want to find out more, come on out to a Board meeting.

Speaking of which, the next Board meeting will most likely be delayed by a week, or so. Unless I get a mass rebellion (a distinct possibility), we'll have it on Tuesday, January 20th.

One of the things that Les and I were doing was checking on the collimation of the 16", as we'd heard that it was out (again). We eyeballed it, and the star images inside and outside of focus looked like they came right out of a textbook on optics written by Ceravolo. However, when we took the first few images of M42, we that all of the star images were elongated. So, we took a picture almost straight up, of Capella, and it looked perfect.





So what was going on? Two possibilities. The first was that heat was to blame. Okay, it was about –15 or –20 that night, but the concrete floor could have had some heat coming off it. The other thing I think it may have been was that the shutter was causing a bit of vibration. Next time I'm there, I'll make sure I take a power supply for my laptop and set the mirror lock on. Then I'll try the same test, and see. What it meant though was that I changed my target for the night. Rather than going for M42, the Flame, or the Horsehead, we looked for an object that was high in the sky, and was a nebula. With the Moon also high in the sky, that didn't leave many alternatives. So we went with M1, the first in Messiers catalogue. It's not a large Hydrogen alpha cloud, so my unmodified XSi would be able to handle it with no problem.

Les and I like to shoot with the long exposure noise reduction mode turned on. A couple of conversations with Alan Dyer in Texas, and a look at some of his examples, went a long way toward convincing me that this was a good idea. I know there are a lot of people who would disagree, people I both respect and admire, but there is one very good reason why I like doing it this way: The dark frame you take with the camera is done for the exact time, temperature and ISO rating that the image was taken with. If one part of the camera is colder than another (perhaps because it's exposed to the sky), then there will be a temperature gradient across the chip. In camera dark subtraction solves all manner of problems. It also means that you don't worry about knowing what temperature it was that night so you know which dark frame to use.

I know that most of the experts say that you shouldn't waste clear skies, and that you should gather all the light that you can; that in camera noise reduction means that half the time your camera is in use, that it's not gathering photons. But I don't care...in camera noise reduction means that I'm using ***perfect*** dark frames...every time.

Recently in the Bulletin of the RASC, there was a call for participation in the IYA Sky Quality Meter Program by Dan Taylor. He wants as many Centres as possible to measure the skies and help understand how light pollution is affecting areas across Canada.

So, if you're looking for something meaningful to do for the International Year of Astronomy, this would be a worthwhile and appealing project. Enrolled Centres across the RASC can borrow an SQM unit for a period of time, and will be asked to do public outreach and take a multitude of measurements throughout their region. Ultimately, this data will help to expand awareness of light pollution levels in and around communities across Canada.

If there is someone who would like to take this on, come and see me, and we'll do what we can to get you set up. Please consider partaking in the program, your help is vital. Eight units are currently available, but we'll need to act quickly to secure an SQM. Email me to submit your Centre's reservation and make queries. Please note: shipping will be conducted via Centre officers.

That's all for now. Roger Hill

Humour

Police Those Star Parties!
(Advice from another Club)

The star parties staged by our astronomy club were becoming unruly and chaotic. Perhaps you've noticed the same trend in your own club observing sessions. Do your typical group nights consist of telescopes careening rapidly from one bright object to another - a minute on M13, another minute for the Andromeda Galaxy, a brief glimpse at the Ring Nebula? Observing at excessive speeds is a common infraction. Another is the stunting that some observers revel in. They claim to see targets like Palomar 4, a magnitude 14 globular cluster, in a 4-inch telescope and then have the nerve to boast for all to hear, But it's real easy to see!

Another insidious practice that is becoming more widespread occurs when lazy observers rush over to see an object that a more disciplined amateur has found after spending half the night star-hopping to its obscure location. Such thievery of photons is unconscionable. What's more, these parasitic observers then glance through the victim's finder scope or Telrad finder so they can sight the location of the target and quickly sweep up the same object in their telescopes. They then add insult to injury by claiming to have found the object themselves. Such claims are illegitimate in our minds. Guilty parties should be stripped of their Messier badges.

The disorderly conduct was becoming to much to handle. The trend had to stop. To stem the tide of unruly observing, our club formed a much-feared but effective Observing Police. Their job: bring discipline and good observing skills to the uncontrolled nighttime mob. It was a tough job, but someone had to do it.

To enforce order, our Observing Police regularly patrol local star parties. Armed with red flashlights, they inspect observers and hand out citations for any observing they feel does not conform to the high standards we are attempting to instill. Citations that the Police have recently issued include:

1. OBSERVING TOO QUICKLY - A speed of 5 objects per hour is in force at our observing site. All objects must be sketched and sketches must be available for inspection during random spot checks. PENALTY: Confiscation of eyepieces.
2. OPERATING A TELESCOPE IN AN UNSAFE MANNER - Includes bonking people on the head with the tube of a long refractor or wiring a telescope tube to a high-voltage generator to create a giant 'dew-zapper' effect. PENALTY: Observing with said telescope.
3. STUNTING - Such as claiming to see invisible objects. PENALTY: Thirty days Solar observing. A further crime is claiming to actually see detail in invisible objects. PENALTY: Immediate promotion to club president.
4. RECKLESS OBSERVING - You're guilty if you think you see objects not actually being viewed. (such as exclaiming that the Cocoon Nebula is really bright! when the telescope is pointed at the Andromeda Galaxy). Also includes viewing objects with inappropriate filters and magnifications (such as scanning the Pleiades at 900X with an O III filter). PENALTY: One night in the Coma-Virgo galaxy cluster with a 60 mm telescope and an old Norton's Star Atlas as your only guide.
5. IMPAIRED OBSERVING - On one occasion an observer was caught trying to find an apparently interesting object called NGP. But it's marked right here on my atlas! he protested, not realizing the object was, in fact, the North Galactic Pole. Carefully searching for deep-sky objects with a sub-aperture planetary mask in place over a Dobsonian is also subject to ticketing. TYPICAL PENALTY: Tracking down all the Messier objects- in numerical order.
6. IMPERSONATING AN OBSERVER - Infractions include arriving at an observing site in July with a 20-inch telescope with the intention of observing the Orion Nebula. Or owning a 20-inch telescope with digital setting circles and never looking at anything except the brightest Messier objects. PENALTY: A mandatory one-night Messier Marathon- WITHOUT the digital circles.
7.

Our Observing Police have also found a lucrative method of raising money for Club activities - mostly to purchase Nagler eyepieces for all the club executives. We now require that all observers buy observing licenses. We set the highest fees for the brightest objects. This discourages people from partaking in the tiresome and unproductive practice of observing the same bright objects over and over again.

Our license fee structure is as follows:

Moon $1000.00
Planet $500.00
Galaxy $20.00
Planetary Nebula $10.00
Orion Nebula $1000.00
All other diffuse nebulae $2.50
M13 $1000.00
All other globulars $1.50
Open clusters and double stars FREE
Comets and Meteors 3 for $1.00
In addition, novice observers must obtain a learner's permit, at a cost of $50.00.

By enforcing these regulations we have found that our star parties are now much easier to manage. Gone is the boisterous, uncontrolled enthusiasm of the past. The chaos has been replaced by a quiet, disciplined observing that is a credit to amateur astronomy. Perhaps your club will follow our lead.

International Year of Astronomy 2009

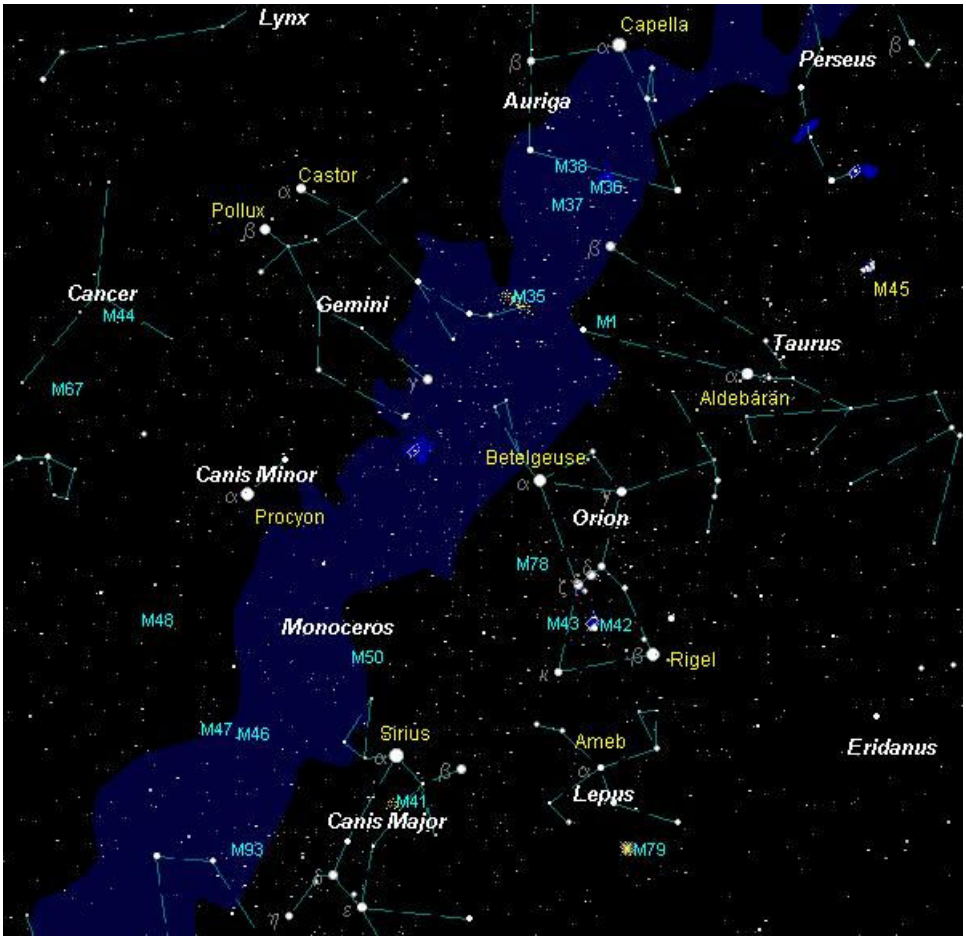
University of Toronto astronomers are giving the Sun, the Moon and the stars to riders of Toronto public transit (the TTC) this month with a series of high-impact ads that promote the celestial science as part of 2009's International Year of Astronomy.

The Sky This Month - January 2009 By Gary Boyle, Ottawa

More Than A Dozen Beacons

People often ask, “when is a good time to look at the stars”. Of course I jokingly answer with a grin, “when it’s clear”. After the chuckles subside, I continue to state, “anytime of year – even winter”. The fear in their eyes when I mention the ‘W’ word, but yes it can be a great time to observe.

Each month has their special perks, such as spring time is great for galaxies or the summer’s Milky Way in all its glory which extends into the fall. Canadian winters can be brutal at times and that is the main driving force that locks people indoors from November to April. However if you dress for outdoor temperatures, you can enjoy a couple of hours looking up.



Now that winter solstice has come and gone, our nights will gradually get longer. But you still have a wonderful opportunity to step outside with your binoculars or drag out the scope by 6 p.m. local time.

And the first familiar sight that awaits you is the mighty hunter – Orion. No matter what part of the world you find yourself in, part or all of the Hunter can be seen. City dwellers battling lights will have no problem seeing the familiar seven suns that silhouette the shoulders, belt and knees. Darker suburban skies are a must to spot the outline of his club to the upper left and shield found on the right. The mighty figure is in defensive mode while battling Taurus the Bull.

To say that Orion is bright would be an understatement – it is dazzling. The faintest star of this famous asterism is Mintaka (the right most star of his belt) at magnitude 2.5. One of, if not the most massive star in the sky is orange coloured Betelgeuse. Forming Orion’s left shoulder; Betelgeuse is in its last stages of life. When it decides to explode, it will be as bright as the crescent Moon and would be seen during the day. For now though it is intact. If we were to replace this aged sun with our own, it would be as large as Jupiter’s orbit.

Orion has a few good objects to view and photograph such as the Flame Nebula – NGC 2024 or IC 434 aka the Horsehead Nebula, but the showpiece of the entire sky is the Orion Nebula. Known by a couple of catalogue numbers M42 and NGC 1976, this 4th magnitude stellar nursery is a easy to spot with just your eyes. I do not know why Charles Messier did not make this object the top of his list.

When examining this fantastic nebula with a low power eyepiece, the challenge is how far can you follow the faint dust and gas as your eye move away from the bright Trapezium area? M42 measures some 45 light years (ly) wide and lays 1,500 ly from us. Kerry-Ann Lecky Hepburn has captured the delicate structure of the nebula from end to end, which are referred as the bat’s wings. (See Steve Barnes picture on the back page - RH)

Next we will take a look at Orion's combatant – Taurus the Bull. Aldebaran (known as the Follower in Arabic times) shines a little brighter than first magnitude and lies 65 ly away from us. Tipping the scales at 44 times the width of the Sun or 61 million kilometers wide, this orange star is huge. In mythological terms, Aldebaran is the eye of the bull but is not part of the familiar 'V' that outlines the head and horns. This starry asterism is actually an open cluster known as the Hyades, resting about 145 ly away. Taurus is also home to Messier's first entry M1 when he started comet hunting, the Crab Nebula. This is a super nova remnant that occurred in 1054 AD (See front cover picture—RH). The pulsar in the nebula is spinning at 30 times a second. Another famous Messier object - M45 the Pleiades forms the heart of the Bull.

Looking up from Orion and you will catch the bright star Capella (the She Goat from the Roman era) of the constellation Auriga the Charioteer. Capella is a yellow-white in colour and is ranked as one of the top brightest stars in the heavens. At only 42 light years (ly) away Capella consists of a very close double of yellow stars. Both are about the same temperature as our Sun (5,600°C) and are 80 and 50 times brighter. It will be a challenge to split these two as their true distance mimics the separation of the Sun and Venus. Last month we looked at the many open clusters that live here of which I must mention M37 again.

Moving east, the famous twins of the constellation Gemini is now showcased. The bright beacons are named Castor on the right and Pollux on the left. Mythology states these are warriors. And again as we have seen in a few other constellations, Castor is deemed the alpha star although it is fainter than Pollux by a full magnitude. Castor though is a complex system of four and two stars revolving around each other. Pollux is cooler than our Sun and is a K0 giant that plays parent to a planet.

Gemini has a few wonderful objects such as the gorgeous and large open cluster M35 at magnitude 5.1 and to its west we have the much fainter and smaller NGC 2158 at magnitude 8.8. A nice wide angle, low power eyepiece will probably squeeze these in the same view. Another gem with colour would be the Eskimo Nebula. Catalogued as NGC 2392, this planetary nebula shows well with medium to higher magnification.

Moving south of the famous twins, we find one of two stars that make up Canis Minor. Procyon, with an apparent magnitude of 0.34 is a subgiant star meaning it is now starving for fuel. Procyon, an F5 main sequence star has a white dwarf B component which is considerably fainter. Canis Minor is home to a handful of faint galaxy about the 14th magnitude range. Most of Procyon's brilliance comes from the fact is lies 11.4 ly away.

Curving down and to the left is the brightest star in the night sky. Sirius is his name and is the commonly known as the Dog Star. Mythology states Sirius is the eye of the constellation Canis Major. Both canines belong to Orion. A sharp contrast to the small dog, this constellation has a decent number of observable objects such as the dense open cluster NGC 2362. This cluster has some 60 stars along with the bright O8 star close to the center. A young cluster still sporting some nebulosity and is an estimated to only be 5 million years old. Located 4 degrees south of Sirius is M41. This is a nice peppering of stars and is best seen in binoculars.

And to end off our grand tour of the winter sky, we stop at Lepus the hare. Its alpha star is called Ameb and shines at magnitude 2.7. Only Messier object live here and that is the highly resolved cluster M79. At an estimated distance of 47,000 ly, this cluster is though to be home to some 90,000 stars. It glows at magnitude 7.7.

For meteor watchers, your turn is coming up on the morning of January 3rd when the Quandrantid meteor shower will be at its peak. This year's show is best seen in the western portion of North America with no moonlight to interfere. The parent comet associated with the shower is extinct 2003 EH1. Dozens to hundreds of meteor could be seen. A new service from Space Weather is a live radio echoes. So even if you are clouded out, you can still listen online.

Now that Jupiter is low the western horizon and is lost in solar glare. It is in conjunction with the Sun on the 24th. Venus is now stealing the nightly sky show. Somehow cold winter nights make it appear brighter. Follow it from night to night till it reaches greatest elongation (highest in the sky) on January 14th when it will be 47 degrees from the Sun and then begins to slide westward. Now the sky begins as the more it sinks, its crescent phase grows and will be very dramatic in a telescope.

As January begins, Saturn is up in the east at midnight and two hours earlier at month's end. The rings are however getting thin as we get closer to the ring crossing event in September when the ring are directly line up to Earth. With the rings looking at us, it does make it easier to spot the Saturn's moons. Then they appear to begin to open over the months and years. This occurs roughly every 16 and 13 years in its 29.6 year orbit around the Sun.

Full (Wolf) Moon occurs on the 11th at 3:27 UT. However the day before the Moon is closest so this will be the largest moon for 2009 and or course very high tides. If you are in the South Pacific on January 26th, you will be treated to an annual solar eclipse. The sun will not be totally eclipsed due to the moon's distance from us as it swings around in its elliptical orbit.

Till next month, clear skies everyone.

Toronto Astronomy Festival

Kicking off the International Year of Astronomy in Toronto - Saturday, January 10, 2009, 10:00 am - 5:00 pm

FREE ADMISSION* - ALL WELCOME

*Applies to ASTRONOMY FESTIVAL events ONLY. A separate admission ticket is required to access Ontario Science Centre exhibit halls, Shoppers Drug Mart OMNINAX Theatre and Science Centre parking.

Exhibitors

Canadian Institute for Theoretical Astrophysics
Canadian Space Agency
Canadian Space Resource Centre
Department of Astronomy and Astrophysics, University of Toronto
Dunlap Institute for Astronomy and Astrophysics, University of Toronto
EfstonScience
Khan Scope Centre
Hamilton Amateur Astronomers
Humber College
MDA
North York Astronomical Association
Royal Astronomical Society of Canada, Toronto Centre
Royal Astronomical Society of Canada, Mississauga Centre
Science Teachers' Association of Ontario
SkyNews
Starry Night Education
York University Astronomical Observatory
University of Toronto Astronomy and Space Exploration Society (UTASX)
Cosmic Connections

Keynote Speakers

11:00 am - Superscope! The Future of Cosmic Exploration
Ivan Semeniuk, Science Journalist
1:00 pm - Worlds Beyond: The Diversity of Extra-Solar Planets Ray Jayawardhana, University of Toronto
2:00 pm - Canadarm's Role in Space Exploration
Michael Hiltz, MDA
3:00 pm - Canada's Star Stories: A guide to campsite astronomy in our nation's wild spaces
Peter McMahon, Discovery Channel

Programs (all day)

Solar Observing
Observing of the Sun's dynamic surface through safely-filtered solar telescopes *weather permitting

Ask an Astronomer!
Have a question about astronomy? Visit the Main Stage where astronomy and astrophysics students from the University of Toronto and York University will be equipped with space-themed props, eager to answer your questions.

3-D Astronomy
Explore the Universe through stunning 3-D images!

Images from the Canadian Astronomical Image Database
Images from Canadian astrophysicists, astronomers, and astrophotographers will explore themes ranging from the latest break-throughs in astronomical research to the individual-experience of the night sky.

Special Presentations

11:30 am - What's Up in 2009
Saturn loses its rings! Find out about the astronomical highlights for the coming year and how best to see them. Denis Grey, RASC Toronto Centre

12:30 pm - The Origin of the Universe
Neil Barnaby, Canadian Institute for Theoretical Astrophysics

1:00 pm - The Massive Black Hole in our Galaxy
Robyn Levine, Canadian Institute for Theoretical Astrophysics

2:00 pm - Bringing Stars to the City Sky
For city dwellers, light pollution has overwhelmed the wonders of the night sky. Find out how this happened and what you can do to bring back dark skies. Peter Hiscocks, RASC Toronto Centre Light Pollution Abatement Committee

3:00 pm - Apocalypse How: Countdown to the Great Collision between the Milky Way and Andromeda Galaxy
John Dubinsky, Department of Astronomy and Astrophysics, University of Toronto

3:30 pm - The Ultimate Whirlpool: when two black holes coalesce
Latham Boyle, Canadian Institute for Theoretical Astrophysics

Workshops (Note this schedule is tentative and subject to change)

11:00 am & 2:00 pm - Cosmic Classrooms: Astronomy for teachers*
Explore the Universe with the Ontario Science Centre! Visit the CA Planetarium (Toronto's only planetarium) at the Ontario Science Centre and get a preview of the curriculum-linked programs available to you and your students. Travel through time and space as you visit planets and moons of the solar system, find worlds orbiting other stars, float above the Milky Way galaxy and see what you can spot in the sky tonight.
*This program is restricted to teachers. Phil Mozel, Science Educator, Ontario Science Centre

12:00 pm - Solar observing in Galileo's footsteps
Four hundred years after Galileo first turned his telescope on the Sun, amateur astronomers can observe it in ways he could never have imagined. Techniques of solar observing, and what we can learn about the nearest star, are discussed. Dr. Ralph Chou, Royal Astronomical Society of Canada, Toronto Centre

12:00 pm - Astronomy for the Whole Family - How can the whole family get involved with discovering the universe? This presentation will look at astronomy activities for young and old: using binoculars and telescopes, using star charts and tools of the new astronomer, making the astronomical fashion statement and information for Cubs, Brownies, Guides and Scouts who are working on their astronomy badges. Randy Attwood, Royal Astronomical Society of Canada, Mississauga Centre

1:00 pm - "Stargazing 101" - Learn How to Use your Telescope
Do you have or are you getting a telescope over the holidays? Experts from Khan Scope Centre will explain how to get the most out of your telescope! Learn some of the tips and tricks that make using an astronomical telescope easy. Alex Castillos, Khan Scope Centre

2:00 pm - Observing the Night Sky WITHOUT a Telescope
Find out what you can see in the universe through binoculars with members of the Royal Astronomical Society of Canada

3:00 pm - Using a DSLR for Astrophotos
Today's DSLRs can take amazing astrophotos. Learn the basics of how you can use your camera for astronomy photography.

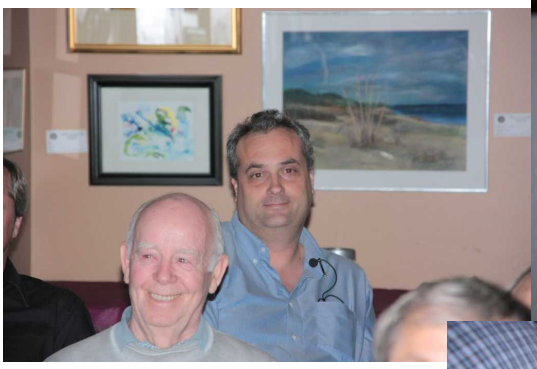
Visit the Ontario Science Centre web site for more details.

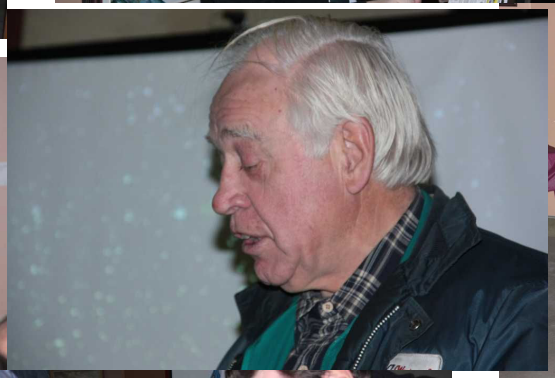
What you missed last Month

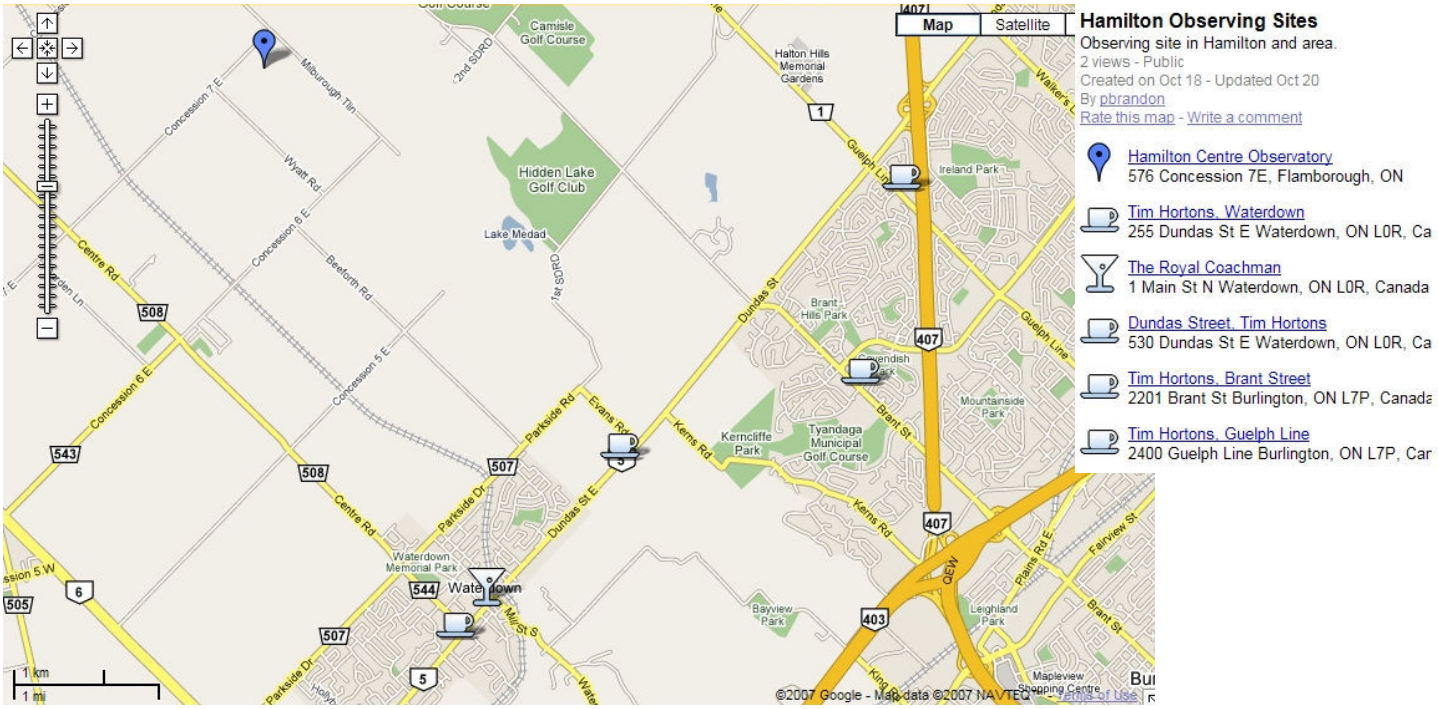
Steve Barnes was our featured speaker in December. He presented an updated version of the talk he gave at Starfest this year: “Searching for planets in the Atacama Desert” . One of the highlights was the carbon fibre tube, and a number of fittings, that will be used in a number of telescopes in the next enlargement of the observatory he, with the help of a number of other members of the Hamilton Centre, has built in Chile.

The meeting was also videotaped by Les Nagy, who may offer his services to other RASC Centres, to try to preserve meetings for posterity.

What are you going to miss in the coming months? Nothing, I hope. If everything works out, we’ve got some great speakers coming, and a diverse range of topics, too! The International Year of Astronomy is looking really good to be part of the Hamilton Centre.







Website:	**http://www.hamiltonrasc.ca/**	Observatory Phone: (905) 689-0266
E-Mails:		576 Concession 7 East, Flamborough ON
General Inquiries:	hamiltonrasc@hamiltonrasc.ca	N43° 23’ 27” W79° 55’ 20”
President:	president@hamiltonrasc.ca	
Secretary:	secretary@hamiltonrasc.ca	Mailing Address:
Treasurer:	treasurer@hamiltonrasc.ca	Hamilton Centre, RASC
Orbit Editor:	orbit@hamiltonrasc.ca	Box 1223 Waterdown, Ontario
Web master:	webmaster@hamiltonrasc.ca	L0R 2H0

Comet C/2007 N3 (Lulin)

Discovered in July 2007, should be the highlight comet of this season. It's predicted to reach about 5th magnitude in late February, so it should be easily seen in binoculars. It may even become detectable with the unaided eye in a dark, moonless sky.

This image, taken by Steve Barnes and Alain Maury, is copyright of Searchlight Observatories.

Click below to download a printable finder chart in PDF format for the appropriate date range, courtesy of Sky and Telescope:
Jan. 1 – Feb. 14
Feb. 13 – Mar. 2
Mar. 1 – Mar. 20
Mar. 14 – May 1

Above, is an incredible image of M42 from Steve Barnes. Below, find four very nice pictures from the rapidly improving Gary Colwell. Included below in clockwise order are the Horsehead in Orion, IC443 in Auriga, M45 in Taurus, and finally, M37 in Auriga.