

ORBIT

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Roger Hill, Editor

I had to miss the January meeting, which was a shame because I heard that Mike Reid gave an excellent talk (again!).

One of the reasons was that I had to be up to get to work at 4:30 the following morning, but this happens fairly frequently, and it has rarely stopped me before. No...the problem this time was that my family and I were leaving on the Friday afternoon, after I got home from work, and driving to Buffalo for the first part of a cruise around the Caribbean.

Most of the problem was that I had not quite finished my packing. You see, this trip was not just my wife and I, but our two kids, too. My daughter heads off to Australia, leaving January 31 for L.A. and then taking another flight on February 2nd, bound for Sydney and Teachers College at the University of Wollongong (she has no intention of returning). We'd been looking to have one last great trip, just the four of us, and had decided that for what we liked to do, there was probably no better trip than a cruise around the Caribbean.

This involved four sets of luggage, various cameras, computers, clothes, masks, snorkels and fins (we all love snorkeling), and the like, and trying to distribute the non-clothes items in such a way as we could get it all down without weight penalties. By the time we got all this done, it was almost 8pm, and too late to go.

However, unless the weather is truly atrocious, I have no intention of missing the February meeting with Dr. John Percy!

As for the cruise itself, we had a marvellous time. My son and I went SCUBA diving, and my daughter was able to buy a used prescription diving mask at a very good price at the dive shop. She loved this, as it was the first time she'd been able to see clearly underwater. We did a lot of snorkelling together, the four of us, along with hiring a driver and car for the day on Dominica (highly recommended), went swimming with sea turtles and met some great people. And the food...can't forget the food...

I had hoped that I'd be able to find a quiet, dark, spot on the upper decks for some astronomy, but with the Moon just past Full, and mostly cloudy nights, I had no opportunities. This will change in March, when I head down to the Caribbean again, this time to spend 10 days with my wife, along with the Best Man at our wedding, and his wife on the island of St. Thomas (I'll be missing the March meeting as a result). We've rented a condo 50 feet from the edge of the sea on a dark, secluded bay.

Astronomy wise, I've not had any luck this month. The only evenings I've been available have been cloudy ones, but I'm looking forward to some great events this year like the Transit of Venus in June. I'm not sure where I'll be for that...I'm thinking that maybe the shore of Lake Huron would be good, and rather than watch the Sun rise with Venus already most of the way across, I'll watch it set.

There'll be the usual trips, too, to places like Manitoulin Island, or Gary's Geekend, for some observing. I'm hoping to get a Canon XSi modified, getting the original filter replaced by one that passes a lot more h-alpha. I might even then see about getting a narrow band filter and take some long exposure images from my backyard.

Most of all, though, I'm looking forward to the banquet and the swap meet in June...THAT should be one very special day!

Until next month,

Roger Hill

Presidents Message—Andy Blanchard

January started off with Andria and I hosting the third Hamilton Centre RASC Levee. There was, of course, lots of food, merriment and a master at arms, who collected fines for the club's coffers, from those who failed to keep the subject off topic. If that seems confusing, I guess you will have to attend next year's event.

Next, we took a 1st crack at Arm Chair Astronomy, in January, an event that was well attended. Ed Mizzi has an excellent post report so I will leave the details for you to read later in this Orbit. Gary Colwell and Ed Mizzi also hosted Public Night, and although not clear, they provided excellent advice to the young attendees on completing their telescope project (see a synopsis in the next Orbit).

At our January board meeting we approved the move to hosting our own server and email. Gary Bennett will tell you more about this but the advantages are many. Also, the June Banquet is now approved, with seats costing \$50 per person; this includes an all you can eat dinner, Terry Dickinson as our guest speaker, and entrance to our first Ontario Wide Swap Meet. On this last point I would like to hear your suggestions on a catchy name for this event, one that will be easy to remember and clearly identify with the Hamilton Centre. Please send me your suggestions ASAP. Once we pick a name we will launch our marketing campaign.

Also, the city of Burlington has made it clear to me that if we set up a scope on city property, including parks, we will be fined. I have taken this issue up with the Mayor's office and their position is clear; no permit, no public outreach on city property. I believe this position to be narrow minded and short sighted. Just the same, club members need to use caution in Burlington until the city changes its position. Should anyone want to address this issue directly, please contact me so I can provide you with more information?

February starts off with a great speaker, Dr. John Percy, from the University of Toronto. See you on February 2nd at the Waterdown Legion Hall.

I saved the best for last! We have secured two shows at the planetarium in Hamilton for the March Meeting. There will be one show at 7:00 pm and a second one at 8:30. The costs of the seats are \$15 per person and available, exclusively to Hamilton RASC members and their families, until the 31st of January. After that we will offer the remaining seats to our sister clubs and their families. So if you plan on attending the March meeting please visit our web site ASAP and purchase your tickets on line with our new PayPal service at

<http://www.hamiltonrasc.ca/McCallion-Planetarium.html>

I think that is more than enough for this month's report. A big thank-you to everyone who is helping out with new memberships. We had another great jump in our numbers this month. I am very hopeful that if we keep this great momentum going we could reach 100 members by September, a critical number that not only helps pay our bills but will fund many of our projects! Keep up the good work, come out to the meetings and bring a friend or two.

Andy Blanchard
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Report from the Board: Communications—Gary Bennett

As Communications Director, my job isn't usually interesting enough to be "Orbit news worthy", but this month is an exception.

At our last Board Meeting, the relocation of our web site hosting was approved in preparation for some new initiatives that I think most of you will find a lot of fun. Some of you may have noticed already that we now have a way for members and guests to book Special Event tickets and even pay for them on-line!

In the coming weeks we will be announcing a new Web Forum/Bulletin Board that does all the things that our Yahoo News Group does and a lot more. I will save the details for the formal "launch" but as a teaser, users will be able to post discussion topics under several topic categories. For example, some of the categories will include:

- Visual Observing
- Equipment Discussions
- DIY Projects
- Astrophotography
- And a lot more....

Membership in a "recreational club" is supposed to be fun and that is exactly what the new Forum will be. Think of it as Facebook for amateur astronomers!

I would also like to take this opportunity to say a special thank you to Les Nagy (our Atacama, Chile member). Les has been hosting our website for quite a few years now and has devoted considerable time and expense to keep us "on-line". Thank you Les!

Stay tuned for more developments!

January Board Meeting Synopsis—Ed Mizzi

Highlights include the following:

1. Mark Pickett reported that our "Westfield Pioneer Village" sidewalk astronomy nights were a grand success with hundreds of people experiencing a look through a telescope.
2. Andy Blanchard gave us the bad news that if we wish to continue our sidewalk astronomy at Spencer Smith Park we will have to purchase permits, one for each event. We will have to look for a new location.
3. Will Gray provided us with his treasurer's report, along with the good news that membership numbers are up.
4. Gary Bennett told us about his work in finalizing our website control, bulletin board and move to a virtual community. He will also be setting up a Pay pal link on our website to collect fees for things such as our Planetarium visit in March.
5. The observatory roof repair is underway and should be complete by the end of January.
6. Our Scouting Project is now in high gear and we're looking at a February start for this exciting program.
7. Planetarium ticket sales are going well and we're looking forward to this exciting event, taking place at McMaster University on March 1.
8. Special Guest Colin Haig, member and National Executive member, outlined a plan for our upcoming Swap Meet and year-end Banquet and we discussed how to proceed. The Board will be looking for volunteers over the next few weeks.
9. The Board noted that, since Sept., the club has witnessed new life and Board members are excited as we move into 2012.

The Nerdiest Video Game Ever—By Dr. Tony Phillips

NASA has a job opening. Wanted: People of all ages to sort, stack, and catalogue terabytes of simulated data from a satellite that launches in 2015. Agile thumbs required.

Sorting terabytes of data? It's more fun than it sounds.

In fact it's a game: *Satellite Insight*. The Space Place Team at the Jet Propulsion Laboratory created the entertaining app for iPhones to get the word out about GOES-R, an advanced Earth science satellite built by NOAA and NASA.

Described by the *Los Angeles Times* as possibly “the nerdiest game ever,” *Satellite Insight* may be downloaded for free from Apple's app store. Be careful, though, once you start playing it's hard to stop. Some reviewers have likened it to Tetris, one of the most popular video games of all time.

GOES, short for “Geostationary Operational Environmental Satellite,” is the workhorse spacecraft for weather forecasters. NOAA operates two (at a time) in geosynchronous orbit, one above the west coast of N. America and one above the east coast. They monitor clouds, wind, rain, hurricanes, tornadoes and even solar flares. The GOES program has been in action since 1975.

GOES-R is the next-generation satellite with advanced technologies far beyond those of the older GOES satellites. It has sensors for lightning detection, wildfire mapping, storm tracking, search and rescue, solar imaging, and more. Many of the sensors are trailblazers. For example, the Advanced Baseline Imager has 60 times the capability of the current imager—16 channels instead of 5. It has twice the spatial resolution and five times the temporal refresh rate, including the 30-second imaging of weather systems over a region of 1000 km x 1000 km. Also, the Geostationary Lightning Mapper can count and pinpoint lightning bolts over the Americas 24/7. It's the first such detector to fly on a geosynchronous satellite, and it could lead to transformative advances in severe storm warning capability.

All in all, GOES-R represents a “huge technological leap from the current GOES.” We know this because *Satellite Insight* tells us so. The app has an informative “Learn More” feature where players can find out about the satellite and the data they have been sorting.

Which brings us back to sorting data. It's a bit like eating Cheerios; just don't tell the kids it's nutritious, and they love it. Helping GOES-R gather and stash data from all those advanced sensors is just as satisfying, too—a dose of Earth science wrapped in thumb-flying fun.

More information about *Satellite Insight* may be found on the web at <http://itunes.apple.com/us/app/satellite-insight/id463588902?mt=8>. The game also available in web form (flying thumbs optional) at spaceplace.nasa.gov/satellite-insight.

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



9th Annual Expanding Canada's Frontiers Symposium—Ed Mizzi

On January 20 I made a trip to the University of Toronto, along with Dana Barton and Boris Hofman, to take part in “Space 2.0:”What’s Next”, a symposium organized by the ASX (Astronomy and Space Exploration Society), a volunteer group of U of T students whose mandate is to educate, excite and inspire students, professionals and the general public about astronomy and space. I must say that, in my view, they fulfilled their mandate as I was educated and inspired by the 3 guest speakers and it was an exciting event.



The MC for this event was a member of the new Dunlap Institute for Astronomy and Astrophysics at the U of T, Mr. Johannes Hirn. The first speaker was Marc G. Millis, the former Head of NASA Breakthrough Propulsion Physics, who discussed the topic of “Emerging Spacecraft Technologies”. He got us excited about the prospects of light speed (and faster) travel but brought us back down to Earth by pointing out the very long road ahead of us.

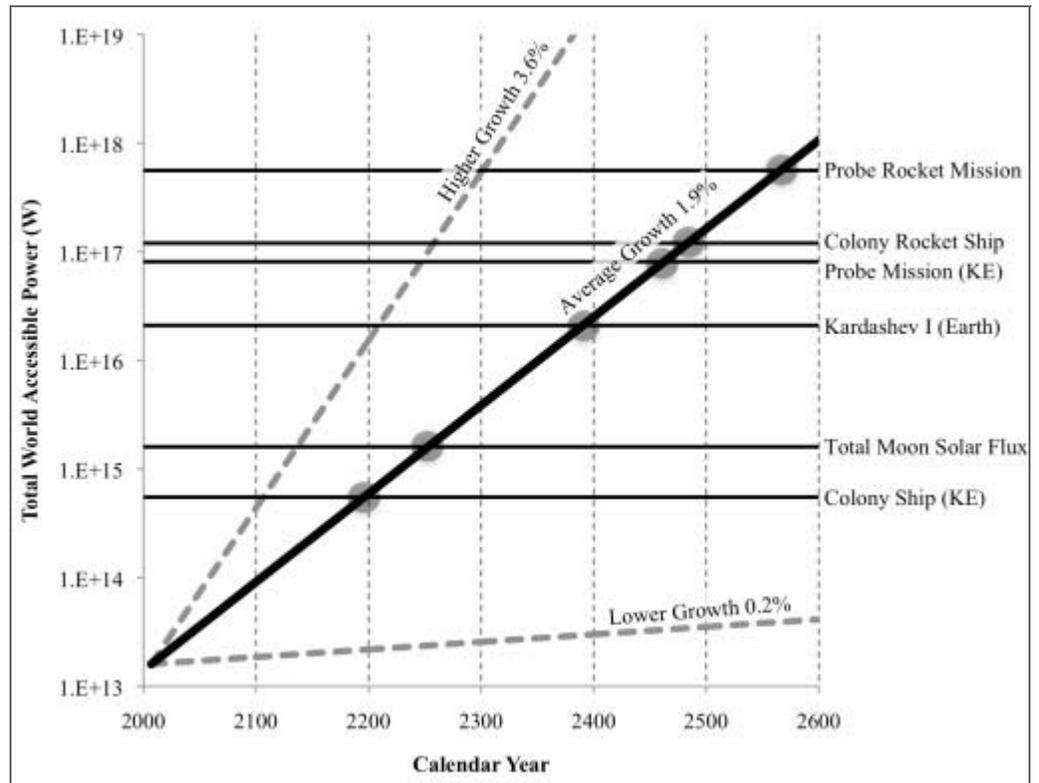
Next was Thomas Andrew Olson, Founding Partner, Exodus Consulting Group, whose topic was “Rise of Private Companies Changing Space Technology”. Mr. Olson discussed the fact that governments can no longer fund massive programs for space exploration and that private industry will have to carry the bulk of future advancements using their entrepreneurial skills and deep pockets.

The third speaker was Dr. Nicole Buckley, CSA Chief Scientist at the International Space Station (ISS) and Life Sciences at the Canadian Space Agency (CSA). Her topic was “Current and Near-Future Sciences Undertaken by the CSA”, and she spoke about some of the major challenges to space flight, especially long-term missions. She also described several ongoing projects and experiments developed by Canadians and tested on the ISS.

There was a panel discussion after the three speeches and audience members were encouraged to ask questions, some of which were quite intriguing, along with the answers given.

I applaud the ASX as I thought this was a very successful and enlightening event and I encourage RASC members to keep their eyes and ears open for future events run by the ASX.

They can be found at <http://asx.sa.utoronto.ca/>



New Star Discoveries Found in Antique Telescope Plates

A century's worth of astronomical photographic plates have revealed a slew of new variable stars, many of which alter on timescales and in ways never before seen.

The discoveries come from a new analysis of the 500,000 plates made by the Harvard College Observatory from the 1880s through the 1980s, covering the whole sky. The trove of old-school data has offered astronomers an unprecedented look at how stars change over long timescales.

"The Harvard College observatory has the most wonderful, best collection [of photographic plates] in the world," said Harvard graduate student Sumin Tang, who works on the plate analysis program. "It's a very unique resource because it's over 100 years. No other data set could do this."

The plates are relics from an earlier era, when researchers used glass surfaces coated with light-sensitive silver salts to record the visions seen by telescopes. The Harvard collection includes plates made with dozens of telescopes.

Starting in the 1990s, photographic plates were replaced with more sensitive CCDs (charge-coupled devices), which are digital light sensors. Smaller versions of these same devices power digital cameras.

Now scientists are trying to digitize the plate collection, basically using CCDs to image the plates, then applying an algorithm to quantify how bright stars appear and search for variations over time. The project, called Digital Access to a Sky Century@Harvard (Dasch), is headed by Harvard astronomer Jonathan Grindlay.

"In this way we can perform a systematic search for long-term variables," Tang told SPACE.com. "We don't need to use our eyes, because it would take forever."

Most of the stars in the plate collection were imaged between 500 and 1,500 times, providing ample evidence for some weird stellar behavior. So far, only 4 percent of the plates have been digitized, but that data set alone has turned up some new finds. The team hopes to digitize the whole collection over the next three to five years.

So far, though, the initial data yielded "wonderful results," Tang said. Some of the stars caught on the plates brighten and dim gradually for reasons unknown. "We've found several different new types of variables," she added.

For example, the astronomers discovered a group of stars that all vary in the same, weird way. These stars all happen to belong to a class called K giants, with temperatures of about 4,400 Kelvin (7,500 degrees Fahrenheit, or 4,100 degrees Celsius). Over decades they become brighter and dimmer by a factor of two.

"This kind of timescale is weird because it's just too long," Tang said.

The researchers think the stars can actually be divided into two classes: binary (double star) systems, and single stars, with two different mechanisms behind their variations.

The binary variables are possibly caused by strong magnetic activity stimulated by interactions between the two stars. "The other group, the single ones, are even more exotic," Tang said. "We guess it might be related to some gas processes. There must be something weird happening, but we don't know. That's the fun part."

Another weird set of variable stars discovered in the data are called symbiotic stars, which are pairs of stars where one is hot and the other cold — for example, a red giant and a white dwarf star orbiting each other. Some process is causing some of these star systems to alter in brightness over decades, but astronomers aren't sure what. They suspect the phenomenon might be related to nuclear burning of hydrogen on the surface of the white dwarf star, or accretion of mass onto one of the stars.

Ultimately, the researchers hope the project reveals much more about how stars evolve over time.

"Astronomy is driven by observation," Tang said. "If you have unique data, you will make unique discoveries, there's no doubt about that."

Tang presented some of the new findings earlier this month at the 219th meeting of the American Astronomical Society in Austin, Texas.

The project is supported by the National Science Foundation and the Cornel and Cynthia K. Sarosdy Fund for DASCH.

Is an American Moon Base Really a Lunatic Idea? COMMENTARY from Yahoo!

Presidential hopeful Newt Gingrich came under fire -- mostly for economic reasons -- when he proposed at the CNN Republican Presidential Debate in Jacksonville that he would like to have a permanent moon base on Earth's lone satellite by the end of his second term as president. But even if his ideas have some logistical hurdles to cross, there is ample reason to believe that an American moon base could be operational in a decade or two. Besides, the space race never really went into hiatus; the major players merely took a slower track, giving others a chance to enter the race.

A Moon Base By 2020?

There are several reasons to develop a moon base: military and strategic, scientific, economic, or simply territorial. But Gingrich's moon base ideation may have been spurred by the growing interest of other nations in reaching the moon. With a sort of Kennedy-esque vision of national direction, Gingrich revived the dream of not only reaching the moon, but obtaining a bit of it for the American people. A 2020 date might be somewhat optimistic, but he said he'd like to set up shop before China, which has plans to put a man on the moon by 2024.

The Obama administration has decided to forego the moon, concentrating on research and development, cooperating in international space endeavors, planning a future mission to an asteroid, and getting to Mars by 2035. But no moon mission. In fact, President Obama told his audience, which included moonwalking astronaut Buzz Aldrin, when he laid out his Space Policy at the John F. Kennedy Space Flight Center in Florida in April 2010, "We've been there before. Buzz has been there."

A Renewed Space Race?

The United States is the only country to have ever placed moonwalkers on the lunar surface. Twelve, in fact. However, with the development of several space agencies around the planet, that could soon change to simply being the first.

As mentioned, China has designs on getting to the moon. A Hong Kong newspaper reported in 2006 (recounted by Reuters) that a top Chinese space program official stated that China planned its first moonwalk for 2024. A moon base, territory grab, and mineral extractions will then begin, according to Robert Bigelow, founder of the private space company Bigelow Aerospace, who told Discovery News that the moon is the obvious next step in human exploration and development. And although there exists an international space treaty, the Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, that prohibits any one nation or organization from owning through claim, use, or other means any part or all of the moon, that will have little bearing on the situation at hand once a nation establishes an outpost of some kind on the lunar surface. History is littered with broken treaties.

JAXA (Japan Aerospace Exploration Agency) also revealed in 2006 in an AFP report its long-range plans for putting a man on the moon by 2030. Spokesman Satoki Kurokawa stated that Japan hoped to get a man on the moon by 2020.

India, which has sent unmanned orbiters to the moon, has also expressed an interest in a moon base.

What About Russia?

Gingrich's moon base could also see realization in renewed efforts by the Russians to reach the moon. A Cold War competitor as part of the Soviet Union, the Russian Space Agency Roscosmos announced Jan. 19 (per BDK) that they had enjoined talks with European and American space partners about a possible base or manned orbiter.

So was Gingrich's idea a lunatic's dream? Hardly. And with all the attention his moon base comments have received, they could very well spark renewed interest in America's manned space program, which ended with the touchdown of the shuttle Atlantis in July.

From **Night Thoughts on Life, Death and Immortality**

By Edward Young, (1742-1745)

... 'Tis thus the skies
Inform us of superiors numberless,
As much, in excellence, above mankind,
As above earth, in magnitude, the spheres.
.....
The soul of man was made to walk the skies;
Delightful outlet of her prison here!
There, disincumber'd from her chains, the ties
Of toys terrestrial, she can rove at large;
There, freely can respire, dilate, extend,
In full proportion let loose all her pow'rs;
And, undeluded, grasp at something great.
.....
How distant some of these nocturnal suns!
So distant, (says the sage) 'twere not absurd
To doubt, if beams set out at nature's birth,
Are not yet arrived at this so foreign world;
Though nothing half so rapid as their flight.
.....
Is this the sole exploit, the single birth,
The solitary son, of Power Divine?
Or has th' Almighty Father, with a breath,
Impregnated the womb of distant space?
Has He not bid, in various provinces,
Brother-creations the dark bowels burst
Of night primeval; barren, now, no more?
.....
Is not this home creation, in the map
Of universal nature, as a speck,
Like fair Britannia in our little ball;
Exceeding fair, and glorious for its size,
But, elsewhere, far outmeasured, far outshone?
In fancy (for the fact beyond us lies,)
Canst thou not figure it an isle, almost
Too small for notice, in the vast of being;
Sever'd by mighty seas of unbuilt space
From other realms; from ample continents
Of higher life, where nobler natives dwell.
.....

... On nature's Alps I stand,
And see a thousand firmaments beneath!
A thousand systems, as thousand grains!
So much a stranger, and so late arriv'd,
How can man's curious spirit not inquire,
What are the natives of this world sublime,
Of this so foreign, unterrestrial sphere,
Where mortal, untranslated, never stray'd?
"O ye, as distant from my little home,
As swiftest sun-beams in an age can fly!
Far from my native element I roam,
In quest of new, and wonderful, to man.
What province this, of His immense domain,
Whom all obey? Or mortals here, or gods?
Ye bord'ers on the coast of bliss! what are you?
A colony from heav'n? Or, only raised,
By frequent visit from heav'n's neighboring realms
To secondary gods, and half divine?--
Whate'er your nature, this is past dispute,
Far other life you live, far other tongue
You talk, far other thought, perhaps, you think,
Than man. How various are the works of God!
But say, What thought? Is reason here enthroned,
And absolute? or sense in arms against her?
.....
... Know you disease
Or horrid war? With war, this fatal hour
Europa groans (so call we a small field,
Where kings run mad.)
.....
With you, can rage for plunder make a god?
And bloodshed wash out ev'ry other stain?
But you, perhaps, can't bleed: from matter gross
Your spirits clean, are delicately clad
In fine-spun ether, privileged to soar,
Unloaded, uninfected; how unlike
The lot of man! How few of human race
By their own mud unmurder'd! How we wage
Self-war eternal! Is your painful day
Of hardy conflict o'er? or, are you still
Raw candidates at school? And have you those
Who disaffect reversions, as with us?
But what are we? You never heard of man;
Or earth; the bedlam of the universe!

What you missed in January...!

On Jan. 5, we held our first monthly meeting of 2012 and it was a memorable one that saw the announcements of several new initiatives and activities as well as a super guest speaker. Our president, Andy Blanchard, began with a warm welcome to everyone, including our speaker and 6 new members. He gave a short review of our activities in the latter part of 2011, including the 3rd annual New Year's Levee (that Andy and his wife hosted), the Dec. 28 night out for those who received astronomical Christmas gifts and a reminder to visit our website, our Yahoo Group and to regularly click on "Like" on our Facebook page. Andy then gave a run-down of up and coming monthly meetings, including exciting guest speakers, a visit to the McMaster Planetarium and a banquet in June that would include an all-you-can-eat buffet, the first Ontario Golden Horseshoe Astronomy Swap Meet and Terence Dickinson (world renowned astronomer) as the guest speaker. Andy also encouraged members to attend our new Arm Chair Astronomy meetings, our Sidewalk Astronomy nights and the ASX's 9th Annual 'Expanding Canada's Frontiers' Symposium at U of T on Jan. 20.

Colin Haig brought greetings from RASC National and did a quick "what's your opinion on the updated RASC website?" discussion. Colin also entertained us with some local/global astronomy trivia.

Will Gray, our treasurer, orchestrated another raffle and trivia question contest. The winner of the raffle, Jeff Lillycrop, received a RASC thermos and the winner of the trivia (Gary Bennett) won a Mars Bar! Both prizes were graciously presented by Will's assistant, his beautiful daughter Michelle.

Andy then did a demonstration of his newest toy, a Sky Window, a device that allows the user to sit comfortably while he/she views the night sky with a pair of binoculars.

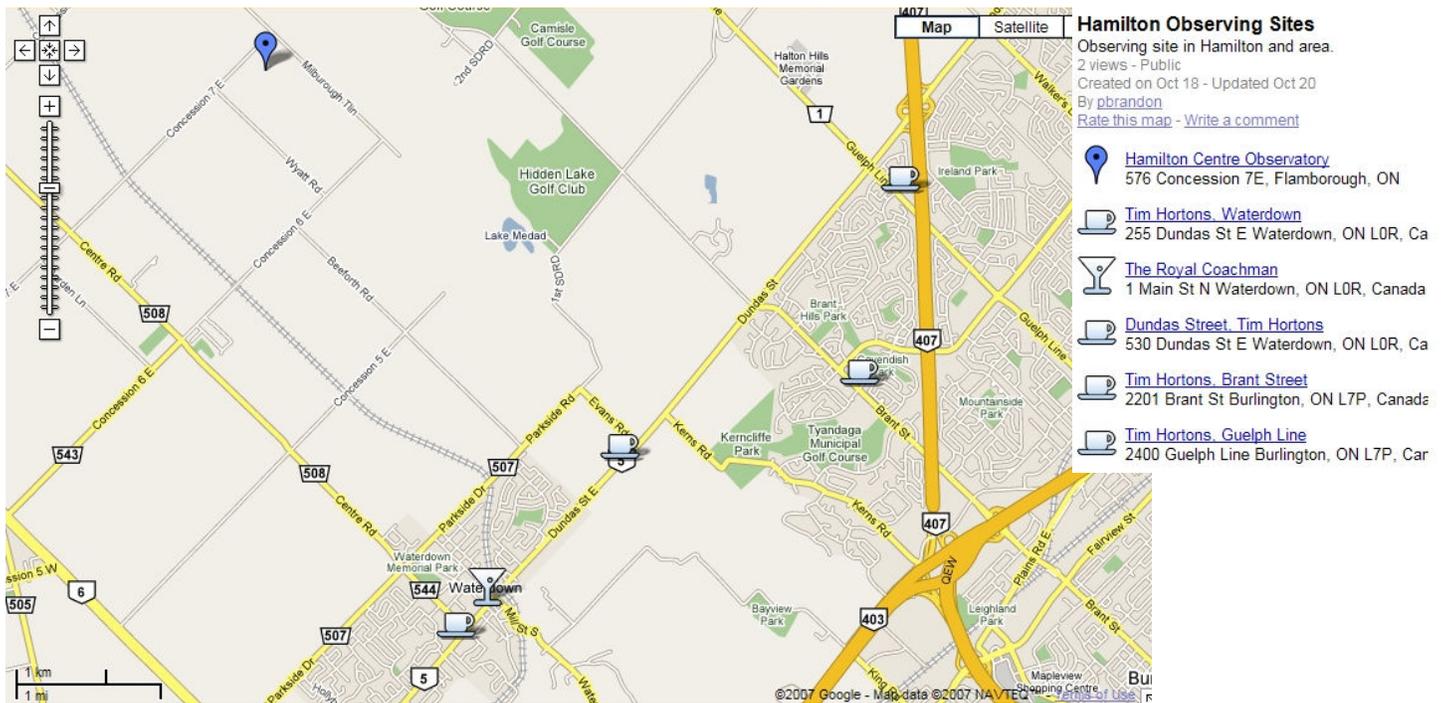
Of course, the highlight of the evening was our speaker, Dr. Michael Reid, a professor from the U of T. His topic was "The Big Controversy over the Big Bang" and, not only did he present us with some fascinating facts and history but he kept the entire audience engaged in the discussion. In fact, we were all so engrossed in the debate that Andy suggested that it also be the topic of our first Arm Chair Astronomy night on Jan. 10.

A big thank you goes out to member Dana Barton and her Mom for providing a plate of delicious cookies, something they have been doing at every meeting since this past September. Also, thanks to the 25+ members and guests who attended and helped make the evening the success that it was.

Submitted by Ed Mizzi

The January, 2012 Public Astronomy Night

On January 18, residents from the Golden Horseshoe area were invited to attend our January Public Night and a great night was had by all. Gary Colwell and Ed Mizzi hosted close to 15 people from Hamilton and Burlington, including three young and inquisitive boys looking for help with their school telescope project. Gary began with a slide show that discussed some of the history of the telescope as well as the several different types that exist. He then amazed them with some of the photographs he has taken with his own telescopes and talked about how new-age technology has now put this hobby in reach of everyone who is interested. The guests were then given a tour of the observatory and the many different scopes on display. We then returned to the meeting room for a short video describing the Winter Sky and what can be observed at this time of year. Unfortunately, the sky did not cooperate and clouded over so that actual observing was not possible. However, the visitors were encouraged to come out next month and to other events put on for the club and the general public, such as our monthly meetings and our trip to the McMaster Planetarium in March. Ed gave them a short run down of these future events as well as a brief description of being a RASC Hamilton Centre Club Member. All in all, and despite the cloudy skies, the January Public Night was enjoyed by everyone and we look forward to the next one.



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Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
30	31	1	2 7:30p Monthly Meeting - Guest Speaker John Percy Professor Emeritus: U of T	3	4	5
6	7	8	9 8p Board of Directors Meeting	10	11	12
13	14 7:30p Armchair Astronomy	15 7:30p Public Night	16	17	18	19
20	21	22	23	24	25	26 6p Orbit Deadline 6p Orbit Deadline
27	28	29	1 7p Monthly Meeting - McCallion Planetarium	2 6:30p Sidewalk Astronomy	3 6:30p Mars Madness	4

Here is the Astronomy Problem of the Month from the January meeting:

Radio broadcasts from Virgin Radio produce light waves with frequency 99.9 MHz ("mega"Hz, or "millions of Hz"). Calculate the wavelength of these waves. (Beware! Radio waves are light waves and do not travel at the speed of sound.)

wavelength = wave speed / frequency

- a) 3 miles
- b) 3 metres
- c) 30 metres
- d) 30 miles