PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR

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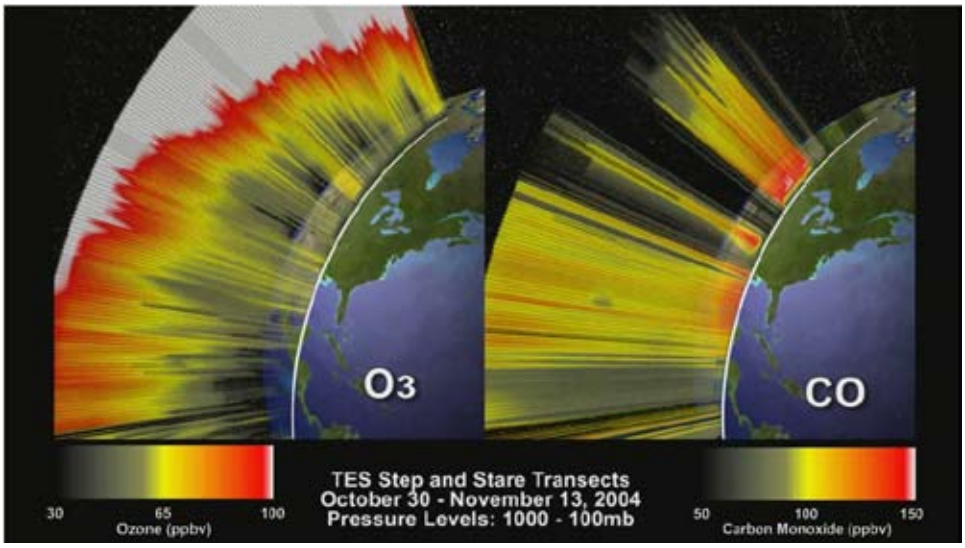
The Chemical Weather Report

"Sunny tomorrow with highs in the mid-70s. There's going to be some carbon monoxide blowing in from forest fires, and all that sunshine is predicted to bring a surge in ground-level ozone by afternoon. Old and young people and anyone with lung conditions are advised to stay indoors between 3 and 5 p.m."

Whoever heard of a weather report like that?

Get used to it. Weather reports of the future are going to tell you a lot more about the atmosphere than just how warm and rainy it is. In the same way that satellite observations of Earth revolutionized basic weather forecasting in the 1970s and 80s, satellite tracking of air pollution is about to revolutionize the forecasting of air quality. Such forecasts could help people plan around high levels of ground-level ozone—a dangerous lung irritant—just as they now plan around bad storms. "The phrase that people have used is chemical weather forecasting," says Kevin Bowman of NASA's Jet Propulsion Laboratory. Bowman is a senior member of the technical staff for the Tropospheric Emission Spectrometer, one of four scientific sensors on NASA's Aura satellite. Aura and other NASA satellites track pollution in the same way that astronomers know the chemical composition of stars and distant planetary atmospheres: using spectrometry. By breaking the light from a planet or star into its spectrum of colors, scientists can read off the atmosphere's gases by looking at the "fingerprint" of wavelengths absorbed or emitted by those chemicals. From Earth orbit, pollution-watching satellites use this trick to measure trace gases such as carbon monoxide, nitrogen oxide, and ozone. However, as Bowman explains, "Polar sun-synchronous satellites such as Aura are limited at best to two overpasses per day." A recent report by the National Research Council recommends putting a pollution-watching satellite into geosynchronous orbit—a special very high-altitude orbit above the equator in which satellites make only one orbit per day, thus seeming to hover over the same spot on the equator below. There, this new satellite, called GEOCAPE (Geostationary Coastal and Air Pollution Events), would give scientists a continuous eye in the sky, allowing them to predict daily pollution levels just as meteorologists predict storms. "NASA is beginning to investigate what it would take to build an instrument like this," Bowman says. Such a chemical weather satellite could be in orbit as soon as 2013, according to the NRC report. Weather forecasts might never be the same.



Example of visualization of data from the Tropospheric Emission Spectrometer. These frames are from an animation that steps through transects of the atmosphere profiling vertical ozone and carbon monoxide concentrations, combining all tracks of the Aura satellite during a given two week period.

Learn more about the Tropospheric Emission Spectrometer at tes.jpl.nasa.gov. Kids can learn some elementary smog chemistry while making "Gummy Greenhouse Gases" out of gumdrops at spaceplace.nasa.gov/en/kids/tes/gumdrops.

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

IYA 2009: Call for volunteers

President's Message

Another issue of the *Reflector* has landed on your screen or lap and a universe of information to read about. With the International Year of Astronomy (IYA) about to start and our new programming year about to commence in January, the PAA executive would like to hear from you as to what you would like to see and do next year. Do you have any ideas for speakers or projects? I know personally I would like to see more public viewing sessions and have us as a club (or as individuals) provide as many Galileo Moments as possible. This is the opportunity for the public to see the heavens through a telescope or binoculars (any optical aid), so they can experience the wonders of our solar system and universe, like Galileo did 400 years ago. Be sure to keep a record of these viewings all next year as we do this because we will be feeding into the much larger goal of providing 1 million Galileo Moments during IYA. We can do it and you can be part of the overall success of this venture. Just like you can help make this astronomy club the successful club it is. Volunteer to get a speaker/presenter for our monthly meeting or why not consider doing a presentation of your own? Let us know what you would like to see or do. We cannot promise it will all happen, but we sure can try, with your help.

Keep looking up,
Rick Stankiewicz, President PAA

They say November is the cruelest month...

As we come into cruel November we begin to pay more attention to the weather. Winter is around the corner and more often than not fewer clear nights are available for our astronomical viewing pleasure. So, this month holds two major meteor showers: the Taurids at the beginning of the month and the Leonids towards the latter half. Catch them if the weather cooperates.

Coincidently we have two weather-related astronomy articles for you to read if you can't go outside. Our cover has an interesting NASA/JPL story about the Aura satellites that will be used to provide weather reports with a chemical twist. John Crossen enlightens us with a description of the extreme weather in our solar system.

We have reviews this month. Three to be exact. John Galle provides a nice review of the SkyTools astronomy software. John Crossen gives some timely shopping advice for beginners' telescopes. And for a first for this publication, our own PAA president, Rick Stankiewicz reviews 3C84's CD 'b'. 3C84 is a collaborative music ensemble fronted by Peterborough's own Charlie Glasspool. It sounds intriguing and worth a listen. Sample tracks are available on the CD Baby website listed in Rick's review.

So, I hope you enjoy this issue of The Reflector and we'll see you again next month.

Phillip Chee
Editor, The Reflector

Peterborough Astronomical Association

The Reflector is a publication of the Peterborough Astronomical Association (PAA). Founded in 1970, the PAA is your local group for astronomy in Peterborough and the Kawarthas.

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Enjoy a midnight rendezvous with Orion the hunter

As November ends the constellations of autumn are swinging high overhead and winter's legendary hero, Orion is climbing up the eastern night sky. The Pleiades, Taurus, and Auriga, the charioteer are already well up by the time Orion makes the scene.

Orion is probably the best known constellation after Ursa Major (the Big Dipper). I suspect you can credit the movie Men in Black for the increased public awareness of the three stars in a straight line that make up Orion's belt. Unlike the movie, there are no mystical galaxies lurking in the belt — at least none that you could see with a backyard telescope. On the other hand, you can see a mammoth nebula in which baby planetary systems are organizing around their host stars. And best of all, you can spot it naked eye.

Step one is to locate Orion's belt with the three stars angled slightly upwards. Now look just below the belt where his sword would hang. The fuzzy patch of light is called the Orion Nebula. It's large enough that it would take the fastest rocket we have today over 1.5 million years to travel from one side of the nebula to the other. So despite the fact that it is over 1,400 light years away, it is easily visible to anyone outside a city's light pollution dome. If you have a pair of binoculars, give the nebula a look through them. Even at magnifications of 7 to 10 times you can appreciate its size and brightness.

What's keeping the lights on inside the Orion Nebula is a grouping of four bright stars called the trapezium. Their trapezoidal shape (like a squashed rectangular box) gives them their name. But it's the radiated energy from these young stars that is exciting the huge cloud of gas and dust that make up the nebula. The charged particles from the stars interact with the nearby hydrogen gas just like electricity reacts with neon in a light or sign. It excites the gas which then glows.

Orion rises in the east near midnight at the end of November. Those with droopy eyelids can wait until February, when it is well up by night fall.

Anyone with a backyard telescope can make out the sculptured dust and gas columns created by the radiating energy from the stars within the nebula. But it took the Hubble Space Telescope (HST) to pick out the newborn stars and the planetesimals just starting to coalesce from gas and dust into planets. Prior to the HST's revealing photograph, astronomers had merely theorized how stars, planets, and whole solar systems are born in the dense cloud of gas and dust that comprise a nebula. Hubble's picture turned the theory into fact.

What else is worth viewing in Orion's stars? The big bright orange one near Orion's shoulder is a red giant star named Betelgeuse. It is so large that were it to replace our Sun, you and I would be inside the giant ball of plasma.

see "Orion" on page 11

Will the lion roar with meteors on November 17?

Meteor shower from 39,000 ft. A NASA air-born meteor research crew took this photo at 39,000 feet during the 1999 Leonid Shower. The bright flashes are caused by pea-sized debris left from comet Tuttle Temple's crossing Earth's orbital path.

In the wee hours of the morning on November 17th the Leonid Meteor Show takes place. In the past it has been spectacular. Six years ago a group of us counted a total of 1,300 meteors in just one hour. It wasn't a shower, it was a storm! Will it happen again in 2008? No one can be sure. But if it does, you'll want to see it.

Barring any clouds, the observing conditions will be good, but not perfect. We'll be observing on the night of the Last Quarter Moon, so the sky won't be as dark during the early morning hours. On a positive note, the really cold weather won't be upon us yet, so you should be quite comfortable with a medium-weight jacket, warm pants and a cap. A jug of hot coffee wouldn't be a bad idea, either.

To watch the shower choose a site that is relatively tree-free to the horizon and as far away from city light pollution as you can get. Favourite spots include farmer's fields, cottages and, if you're still in the Halloween spirit, an old cemetery in the country. Stephen King would love it. The shower itself will peak in the hours after 2 am, so an afternoon or evening nap is recommended.

The meteors will appear to radiate from the direction of the constellation Leo. That's why they're called the Leonids. The mighty lion will be rising in the East and should just be peaking over the horizon while you're setting up for the observing run. If there are three or four of you, assign a slightly different viewing direction to each member of your party. The night we were caught in the Leonid storm the little streakers were coming in for all directions. For those of you who are novices at watching meteor showers, here's a little background on the Leonids.

A meteor show occurs when Earth passes through the debris trail left behind by a comet's tail. In the case of the Leonids, the comet guilty of celestial littering is Comet Temple Tuttle. Most of the debris left behind as the comet melts during its approach to and pass around the Sun are just tiny pebble-like bits, but when they strike our atmosphere, they make quite a spectacular flash. The friction created when these little bits of comet dirt strike our atmosphere causes them to burn up in a flash — literally.

Most of the action takes place in the upper atmosphere, 40km up and higher, so most of the meteors burn up before they even come close to hitting the ground. So the chance of you being bonked by one is virtually impossible. Higher up things are different in 2005 and the orbiting Chandra X-Ray Observatory recorded being hit by one on Nov 15, 2005.

That brings me to another point, meteor showers ramp up, peak, then ramp down over a one week period. So if you're an insomniac the week of November 16 to the 21st should be a real treat for you. The number of "incomings" should build up nightly until November 15, then trail off over the following few days.

Next week we'll dig a little deeper into Meteors, Meteoroids and Meteorites.

John Crossen

Star Gazing at PEI National Park

Every year we spend a week in PEI visiting old friends and relatives. We always stay at the Stanhope beach camping ground of the PEI National Park as the facilities are good, the beach is perfect, there are lots of paved bicycling trails, and the location is convenient to Charlottetown.

Last year, being my first year of star gazing, I was really looking forward to setting up my scope for some good viewing. Alas, the light pollution was intolerable. Just about anywhere that was suitable for setting up the scope, such as the parking lots or beach, were ruined by overhead lights scattered all over the place. Consequently, this year I was not expecting much. However, surprise, surprise, they have just removed all the lights; they were actually still lying on the ground nearby. Unfortunately, the local park personnel are just summer students and they had no knowledge as to why this had been done, but it sure made a difference. On returning home I checked on the National Park web site and, what do you know, they have an announcement from 2007 that they have joined the dark sky preserve network and are implementing various measures. Progress is being made !!!

There are a number of places where you can set up, including right at your campsite. The location I really liked was on the bluffs overlooking the beach. The sky view is all encompassing, plus you have the added bonus of viewing the reflection of the stars on the sea. And it's sooooooooooo dark.

So the great news is that, on top of all the other good reasons for visiting our National Parks, star gazing is being added to the list.

See you there !

John Galle

Moon Phases

First Quarter	11:03 pm	November 5
Full Moon	1:17 am	November 13
Last Quarter	4:31 pm	November 19
New Moon	11:55 am	November 27

The Sky this Month

Mercury is at superior conjunction on the 25th. Reached greatest elongation (18°) on October 22nd. Morning star in bright twilight during first days of the month.

Venus brightens to magnitude –4.2 and is prominent in the evening sky. On the 30th Venus passes 2° south of magnitude –1.5 Jupiter in a nice conjunction with a 3-day-old crescent Moon close by.

Mars is in conjunction with the sun on December 5th and is not visible while in the sun's glare.

Jupiter continues to display in the evening sky and will join Venus in a nice conjunction at month's end.

Saturn in Leo rises at 1:30 am by mid-month and will be high at 47° by civil twilight.

Moon at apogee on the 2nd. Jupiter 1.9° north of the Moon on the 3rd. It is 0.7° north of the Pleiades on the 13th. On the 18th it is 1.2° south of the Beehive cluster while on the 21st Saturn is 6° north of the Moon.

Meteor showers Southern Taurids peak on the 5th while the Northern Taurids peak on the 12th. Leonids peak on the 17th with unfavourable moon light.

Early to bed

"Oily to Bed, Oily to Rise" – attributed to Jerome "Curly Howard" Horowitz

By Mark Coady

The time honoured saying "Early to bed, early to rise, makes a man healthy, wealthy, and wise" has long been a guiding light for farmers, fishermen, and others whose occupation has them rising in the wee hours of the morning. Just like these stalwarts of society, my job with Bell Canada in Scarborough has me rising every weekday morning at 3:30 AM. Now many of you may be wondering why I even pursue this hobby considering that I have to be in bed so early that I miss out on many good evening observing sessions. After all, when the sun goes down the stars come out to play, don't they? Well, I'm not totally convinced that it always has to work that way – at least, not in my case. Quite often, early morning observing sessions can be far more enjoyable and far less stressful than evening ones. And there are several reasons for this.

1) Better Seeing: By 3 or 4 AM the atmosphere has usually settled down quite nicely and the skies, even during the humid months of the summer, are far clearer and crisper than during the evening. Also, during periods of a mix of sun and cloud, the early morning skies are usually the clearest.

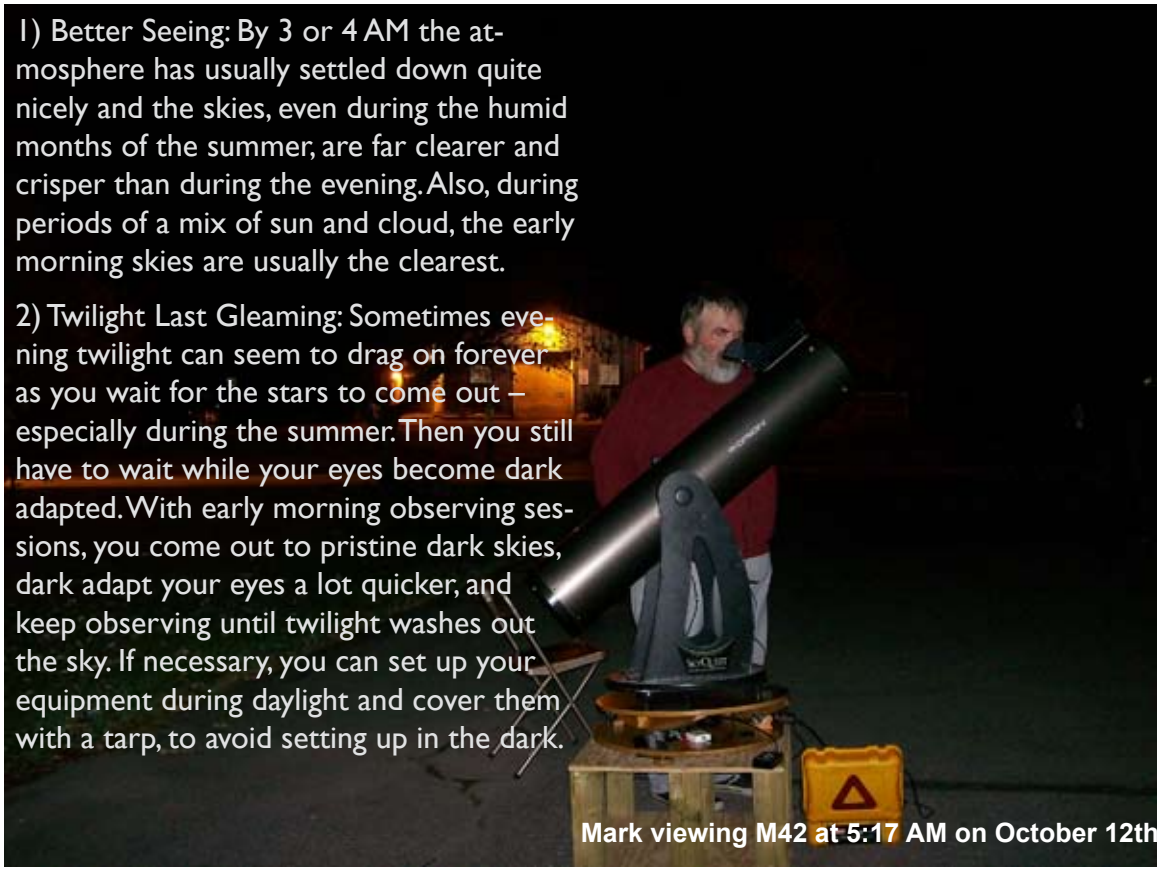
2) Twilight Last Gleaming: Sometimes evening twilight can seem to drag on forever as you wait for the stars to come out – especially during the summer. Then you still have to wait while your eyes become dark adapted. With early morning observing sessions, you come out to pristine dark skies, dark adapt your eyes a lot quicker, and keep observing until twilight washes out the sky. If necessary, you can set up your equipment during daylight and cover them with a tarp, to avoid setting up in the dark.

3) Meteor Showers: Most meteor showers, especially the Perseids, peak after 2 AM. This past August I only had to get up an hour early to view them in a well rested state rather than waiting all evening for the peak and barely being able to keep awake.

4) Seasonal Treats: Depending on the season, you can also view some parts of the heavens in far more comfortable conditions than with evening observing sessions. This past September I was viewing M42, the Great Nebula in Orion, in shorts and a tee shirt and also in October by only adding a sweater and track pants. Try doing that in the dead of winter when this celestial sight is high in the evening sky and you're laden down with a toque, mittens, boots, and a heavy parka.

5) Peace and Quiet: When you are out observing in the wee hours of the morning you are quite often alone with the heavens as your only companion. This can add to your enjoyment of astronomy as you have

see "Early bird" on page 11



Mark viewing M42 at 5:17 AM on October 12th

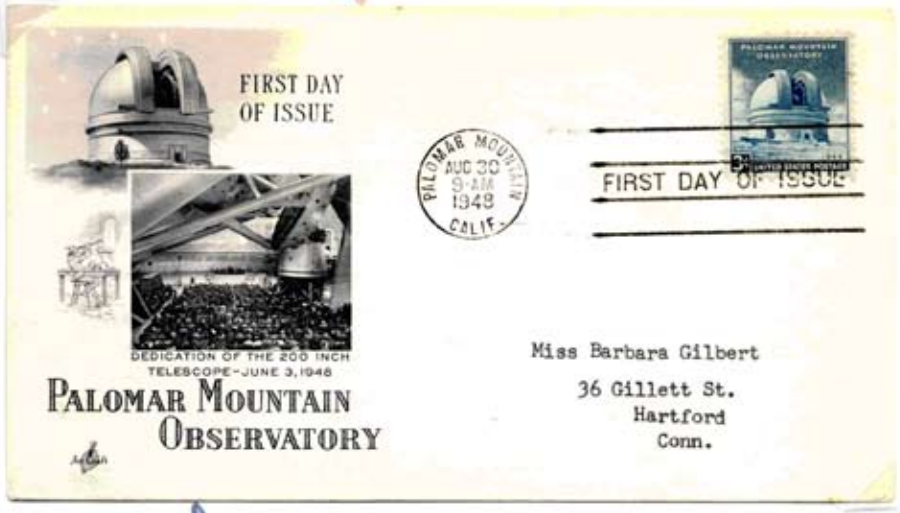
Astronomy in Philately

The attached page is a "shining" sample of what is called a "One-Page Exhibit" in the stamp world. There have to be at least 3 different philatelic elements, with appropriate text. This was my entry in this year's Peterborough-KAPEX 2008 (March/08). It was also used at another stamp show this fall in Cobourg.

Your Astronomical Philatelist,
Rick Stankiewicz, President, PAA

The Evolution of the Observatory

The astronomical observatory (structures for making observations) has been around for thousands of years in one form another. The telescope as we know it, has only been around since about 1608, so Nicholas Copernicus was using anything but a telescope when he made his famous observations between 1522 and 1543, from a tower in the Baltic town of Frombork, Poland. The "tower" observatory shown on this 1962 Polish stamp, is part of the fortress cathedral complex where Copernicus did much of his astronomical studies about the solar system before his death in 1543.



This First Day of Issue Cover cachet from 1948, depicts the dedication of the Palomar Observatory 17 foot (5 metre) telescope on a mountaintop in California. This was the largest telescope in the world at the time. A "domed" structure such as this is what we have come to expect of an astronomical observatory, as it allows rotation for the telescope within.

This official postcard issued by the United States Postal Service in 2000 shows the twin W.M. Keck Observatory domes a top Hawaii's volcano, Mauna Kea. They each house a 33 foot (10 metre) telescope. These two domes were constructed between 1992 and 1996 to house the largest telescopes of the day. These domes work in tandem, but are remote controlled from a facility over 22 miles (35 km) away in Kamuela.

Crescent Moon and Jupiter Conjunction of November 1

This evening was a nice night to be out in southern Ontario. At about 7:30 p.m. the twilight was a nice orange colour and a perfect setting for the crescent moon with earthshine and Venus just parallel to it low in the horizon. Jupiter is not taking a backseat to Venus in the evening twilight. The photos below were all taken with a tripod mounted Canon 400D and Sigma 17-70mm lens from my backyard south of Peterborough, Ontario, Canada.

Earthshine Moon and Venus (200 ISO: *ƒ*/4.5; 4 sec. @ 70mm)

Jupiter in the upper left and the Moon and Venus in the lower right (200 ISO: *ƒ*/3.5; 1/6 sec. @ 30mm)

Text and photos by Rick Stankiewicz

PHOTO GALLERY

***Subaru*. On October 28 I took advantage of the clear night to take a portrait of the Pleiades star cluster, aka M45. This was made by stacking four 2-minute photos using DeepSkyStacker. I then opened the file in Photoshop CS3 and applied Noel Carboni's Astronomy Tools, a collection of Photoshop actions that do things like remove light pollution and colour gradients. I used the AstroTrac tracking platform with a Nikon D200 and Nikkor 135mm *ƒ*/3.5 AI lens, ISO 400. Photo by Phillip Chee**

***The Nebulae of Orion*. On November 6 I set my camera to the belt and sword region of Orion to see how well I could pickup the various nebulous regions. I attached a 1.6X teleconverter to the lens and took this 14 minute (7 x two-minutes) exposure and stacked the resulting files in DeepSkyStacker. Same camera setup above with a Nikkor 200mm *ƒ*/4 AI lens, ISO 400. Photo by Phillip Chee**

SkyTools Software

Having been in the racket for many years I'm still, in retirement, a bit of a software junky. Consequently, as soon as I got involved in star gazing I started looking at astronomy software. There are an awful lot of packages to choose from, and I've tried quite a few (being a junky!). I found that much of it is of poor quality or unbelievable complexity or simply useless.

Most would not come close to satisfying my needs, which I identified as being:

- Star charting in various styles & formats.
- Plotting of current phenomenon such as comets, minor planets, etc.
- Data base of information on stars and deep sky objects.
- Field of view identification for my own telescopes, finders and eye pieces.
- Suggested observing lists e.g. Burnham's, RASC, Levy's, etc.
- Customized observing list i.e. my own planned viewing list(s).
- Logging of my own observations, with easy retrieval of the information.
- Controlling my GoTo scope from my laptop computer.

One package seems to stand out from the rest (in my not so humble view), and that is SkyTools 2 from an outfit called Skyhound in New Mexico (www.skyhound.com).

I have now used this software for over a year and it serves me well. My routine for an evenings viewing is, typically, selecting what I'm going to view that night, determining if it's visible at the right time, printing the charts for each item (including the finder and eyepiece views), waiting for dark, praying for the clouds to disappear, cursing the guy with the bright light, doing the viewing, logging the observations in a note book, and going home and entering the information into the computer. SkyTools fits into this routine very well. In fact, recently, if it's not too dewy, I been taking the laptop along with me and referring to it directly. SkyTools, as with many other packages, has a night vision mode, but it can still be fairly bright, although, dimming the video display using the "Function-Arrow" keys is a great help.

This screen print shows a typical star chart (not in night vision mode):

This screen print shows, at top, the main SkyTools screen; left bottom is a log report for 61Cygni, and right bottom is the data base information on 61Cygni:

One capability I really like is that, as I read articles in astronomy magazines about interesting viewing objects to observe this month I can easily set them up in SkyTools in my own "Hit Lists":

As I'm still focusing on learning the sky I don't use the GoTo scope capabilities too much. But I have easily hooked up SkyTools

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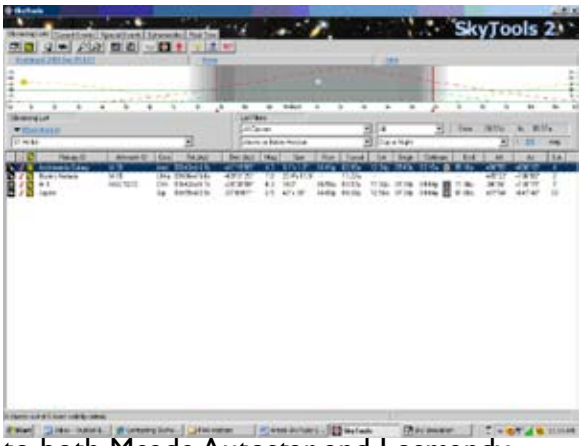
SkyTools



to both Meade Autostar and Losmandy Gemini operated mounts and it works really well.

Price for the package is about $100 plus $40 extra for the GoTo controller add-on.

Give it a try

John Galle

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Early bird

the time to contemplate the grandeur of what you are observing without the distractions of everyday life.

6) Most Important Reason: Your mind and body are much better suited to early morning sessions. Being well rested and a lot warmer, you are more apt to spend more time at the eyepiece – even during the winter months – as your body is better able to deal with night time weather and temperatures. You end up spending less time in a warming room just so you can handle a little more observing.

Now I never rule out evening observing sessions but, with my schedule and the fact that I have a dog and cat that act as weekend morning alarm clocks, I have become a huge fan of observing during the wee hours of the morning. And early morning observing sessions may be just the ticket for some of you. Why not try them out?

Music Review: 3C84's "b"

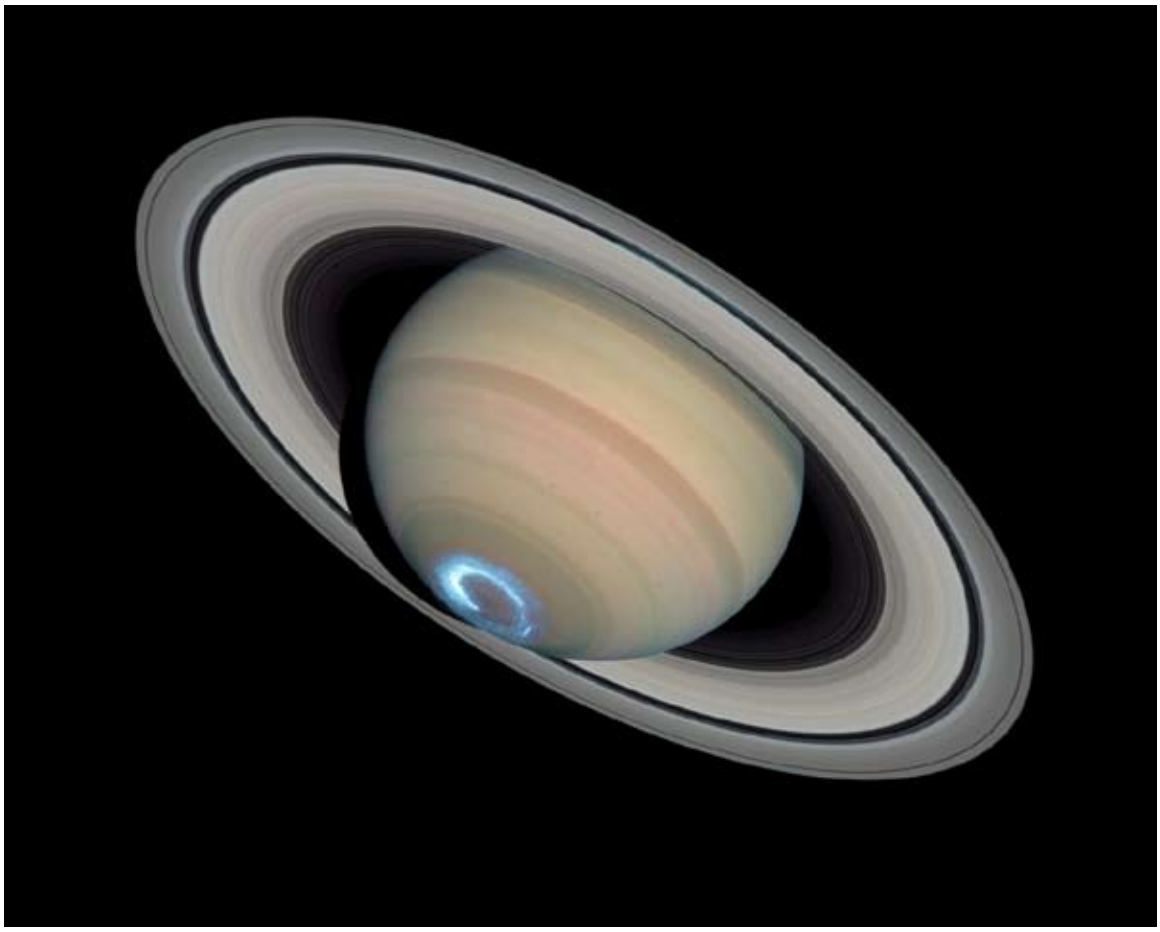
Charles Glasspool should ring a bell with some of you PAA members? He rings more than bells with me. He and some of his group of musicians (3C84) played for us on Armour Hill a couple years ago during our Astronomy Day evening observing session. I had the opportunity to listen to a copy of his very first CD project that is "hot off the presses" from Toronto and hot it is! The eleven track CD is a unique musical compilation by twelve talented individuals.

With song titles like "Alien", "Lights Down Low", "Let's See What My Telescope Says", "Somewhere Off The Coast Of NGC 1275", "Lunatic" and "Yuri Gagarin's Lullaby", it is not hard to figure out where this music is going to take you. Charles has done all the song writing and it is varied. The more you listen to the music, the more it draws you in. You have to give this CD some time to grow on you. I liked the variety of style and tempo. The use of flute and the haunting sounds of the theremin make this a unique musical experience.

The inside liner states, "A humble tribute to a distant music-making friend. A collection of songs about space, time, memory and the universe of the body and the mind." The explanation of the origins of the musical concept is further explained with the following: "Seems like a black

see "CD Baby" on page 13

The really wild weather is out of this world



Space weather even includes aurora like these photographed on Saturn. Courtesy NASA Cassini Mission.

The really wild weather is out of this world.

As November's chilly breath blows across the stubble fields of the Kawarthas, tales of -20°C nights, mountains of snow and ice take over the conversations around the wood stove. But what's coming our way is a piece of cake compared to a typical day on the outer planets of our solar system.

Right next door, just one planet out from Earth, Mars had its first snowfall in early October. The Canadian-built weather station on NASA's Phoenix Lander detected the first Mars flakes over a month ago. The Lander is on the northern latitudes of Mars and the days are already becoming short. Soon darkness will rule and the Lander's solar panels will no longer experience warmth and energy from the Sun. The Lander will then become another lifeless monument to our exploration of the red planet. Temperatures will drop to -120°C during the winter months. Even in the more temperate zones further south it seldom warms to over 17°C during the Martian summer. That's the price of being 227.9 million kilometers away from the Sun. But Mars is still in the celestial tropics compared to the next planet out, Jupiter.

At 778.3 million kilometers from the Sun, the gas giant Jupiter is down right nippy. Plus the winds would shred Mary Poppins' um-

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Stormy weather

brella in a nanosecond. Because Jupiter has no hard surface, it has no land features to drag on the atmosphere and slow it down. Even the thin atmosphere of Mars has mountains and valleys to contend with. But on Jupiter there's nothing to get in the wind's way. So the cloud tops that comprise Jupiter's visible surface blast along at a chipper 550 km/h. Hop into the famous Red Spot (a centuries-old cyclone) and the pace picks up to 700 km/h. Batten down the hatches! Oh, and the temperature in the cloud tops is -150°C. Send more mittens, please Granny.

What could have worse weather than Jupiter? Well, Saturn is even further away from our Sun…1.43 billion kilometers to be exact. Quiet and peaceful though Saturn may appear in photographs, it has a very violent personality. Electrical storms are a regular event in its cloud tops where a typical lightening bolt is 1,000 times more powerful than those on Earth. Had Ben Franklin tried his electrical experiment with a kite and a key on Saturn, it would have curled his hair. Then again, with a wind speed of 1,800 km/h at its equator, dear old Ben would have had a kite ride that would put a breeze up his bloomers. Plus Saturn's upper cloud temperature is about -180°C. Gotta Franklin stove, anyone?

Things only get worse as we move further out to the other two gas giants Uranus and Neptune. And when we get to distant dwarf planet Pluto (5,955 billion km from the Sun) the winter can be so cold that the planet's thin atmosphere freezes and drops to its surface - clunk. Yup, that's nippy cold — about -230°C. We'll know more about the popsicle planet in 2015 when NASA's New Horizons Space Mission reaches it.

Until we meet again by the backyard telescope, keep those yard lights pointed down and dim. You'll save energy and you won't be polluting our dark Kawartha night skies. Visit www.darksky.org to learn more about light pollution and how to curb it.

John Crossen

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CD Baby

hole in an extraordinary distant galaxy called NGC 1275 has been making quite a racket for a very, very long time. A few years ago, researchers at the Chandra X-ray Observatory discovered that this noise was a single note – a subsonic B flat, 57 octaves below Middle C on a piano. An alien transmission. How interesting that it should be a B flat. A tuning note. Music is truly the universal language." Thus, the title "b" for this CD. If you listen to this music it will all start to make sense.

The album can be purchased online and rather cheaply too, at CD Baby as an mp3 download the entire album is appropriately, $3.84 US, or a complete CD for $9.99. This reviewer says it is worth it at any price. Check out the music sampler at: http://cdbaby.com/cd/3c84

And order one while you are at it. Maybe we will be fortunate enough to have 3C84 play for us again during next years Astronomy Day or IYA event? Here hoping!

Rick Stankiewicz
PAA Music Reviewer

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Orion

And so would Mercury, Venus and Mars — all the inner planets. By the way, Betelgeuse means armpit of the warrior in Arabic — yet another reason you might not want to get too close to it.

According to mythology, mighty Orion was slain by a tiny scorpion. One sting and the king of hunters bit the dust. That's why Orion is only visible in the winter sky, and Scorpius can only be seen during the summer. If good fences make good neighbours, one six months wide should keep the hunter and the scorpion safely separated.

John Crossen

BHO goes BOO at Discovery Day in Peterborough

KIDS AT THE GOODY TABLE. Student's stuffed their minds with knowledge and their bags with all kinds of astro-paraphernalia during the Discovery Day show. Its part of the annual Halloween celebration put on by Sean Gillespie's Scream Works.

Buckhorn Observatory's active public outreach program is one of the reasons we earned a spotlight on NASA's SOHO website. But the positive reaction of the kids is the key reason we spend so much time presenting the stars to youth groups. The reward factor is amazing. And such was the case on October 24th when BHO was asked to present our planetarium show at the Scream Works annual Discovery Day/Halloween show in Peterborough.

The event attracted about 250 kids from schools in the Peterborough area to the Marrow Building for a delightful mix of fun and facts. One of the presentations focused on medieval armor, complete with a staged battle of the knights. Another show brought a reptile zoo to the kids along with some fascinating facts about the critters on display. There was another show on environmental issues and a roaring 3-D simulation that took the kids on a roller coaster ride. Only the screams were real, so the 3-D effect must have been very well done.

BHO brought the planetarium along and during the course of the day gave 4 shows to the students. With the kids ranging from grade 4 up to grade 8 the question sessions were lively and had me sprinting to keep ahead of the kids with my answers.

Equally lively were the freebie sessions at the big table out front of the planetarium's dome. A seemingly endless line of kids grabbed bags and stuffed them full of posters, stickers, magazines and more from the generous people at the NASA SOHO website and SkyNews Magazine. We thank them again for contributing so much to the show and the kids. It was an astronomical success – literally.

For the Grade 4 students the planetarium

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Trash telescopes don't make a Christmas Merry

It's Christmas again and just like last year, thousands of retail big box stores will be unloading millions of junk telescopes on unsuspecting gift givers around the world. That's a shame, because these junky scopes will do more to put someone off astronomy than encourage their interest. After 20 years scoping things out, here's what I know.

To get out of the junk telescope range you have to spend a fair chunk of change. For instance around $200 will get you a decent beginner's telescope from reputable manufacturers such as Celestron, Meade, Vixen, NewStar, Orion, Antares and SkyWatcher. Don't look for a lot of bells and whistles, just decent optics and a reasonably stable tripod and mount. Here are a couple recommendations.

The Orion StarBlast Astro 4.5 starts at just $199.00. It's portable, very stable and nicely made. It's perfect for little astronomers as well as adults.

The SkyWatcher 705 AZ3 is a well made short tube refractor that delivers excellent wide-field views of star clusters. It's easy to use and the price is $199.95.

Also on my recommended list is the Celestron AstroMaster 70AZ. This scope has a longer focal length and should deliver good lunar and planetary images. Like the other two telescopes on my recommended list the mount is a simple alt/azimuth design.

There are many more good telescopes available, but a word of advice. Avoid any beginner's scope with a German Equatorial Mount (GEM – sometimes called an EQ mount). These tend to be awkward for the novice to use and require a lot of time to set up and polar align. Also, if you want a computerized telescope, stick with the same manufacturers I've mentioned, but up your budget to around $600.

If that has you going "ouch" don't give up, there are plenty of non-telescope astro-options available for beginners. We'll talk about them next week, but in the mean time, here

Orion's StarBlast Astro 4.5 is great first scope for a child or adult. Avoid the EQ version. It has a complicated equatorial mount and a poor tripod.

are some telescope retailers in the southern Ontario area who sell the good stuff and have knowledgeable staff. Tell them your budget and ask what they sell that's simple and easy for a novice to use.

In Toronto EfstonScience has a knowledgeable staff and a wide selection of telescopes. Visit them online at www.escience.ca or call 1-888-777-5255 toll free.

Just north of Toronto you'll find a nifty little shop called Perceptor. Run by Lauri Kangas, you can visit them at www.perceptor.com or call toll free at 1-877-452-110.

Jump a little further north and you come to Astromechanics in Barrie. You'll find them online at www.astromechanics.com or give a call at 1-705-725-0625.

Also in the neighbourhood is KW Telescopes of Kitchener/Waterloo. Their website is www.kwtelescope.com and the phone number is 1-519-745-5757.

If a good telescope is too expensive, don't give up. Next week we'll look at some non-telescope alternatives for gifting the fledgling astro-nut and the prices will have you laughing all the way ho, ho, home.

John Crossen

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Discovery Day

show focuses on how to use the big dipper to find the little dipper and the North Star. Demonstrating the apparent motion of the stars which results from the Earth's rotation is yet another key point made during the show. To say that the kids like this part of the show best is a major understatement. You should have heard the ooooooh's and awwwww's as the stars spun across the sky.

The Grade 8 students enjoy much the same show, but I also take them to Orion and demonstrate how to use Orion's belt to find Taurus the bull, the Pleiades, and Canis Major, Orion's hunting dog. Again the question period can be quite lively, with a lot of interest in black holes and "spaghetti-fication." That's the gravitational process that stretches you out into stringy goop before the black hole swallows you up forever.

Verrrry scarrrry stuff!

Also on hand at the show was the PAA's Trish McCloskey who was accompanying her son Nick along with some of his friends. Trish took some video of the knight fight, which is a good thing because my shots were all too dark.

And that's how I spent the day under the stars with a dome-full of kids. Thanks also go to Vicky and Sean for inviting Buckhorn Observatory to the show. Also earning a tip of the hat is Deb Crossen who put me in touch with Vicky. It's amazing where a dinner party at the Cody Inn can take you during the following year.

John Crossen

THE UNIVERSE
YOURS TO DISCOVER

INTERNATIONAL YEAR OF
ASTRONOMY
2009

Articles

Submissions for *The Reflector* must be received by the date listed below. E-mail submissions are preferred (Microsoft Word, OpenDoc, ASCII and most common graphic formats are acceptable). Typed or hand-written submissions are acceptable provided they are legible (and not too long.) Copyrighted materials will not be published without written permission from the copyright holder. Submissions may be edited for grammar, brevity, or clarity. Submissions will be published at the editor's sole discretion. Depending on the volume of submissions, some articles may be published at a later date. Please submit any articles, thoughts, or ideas to:

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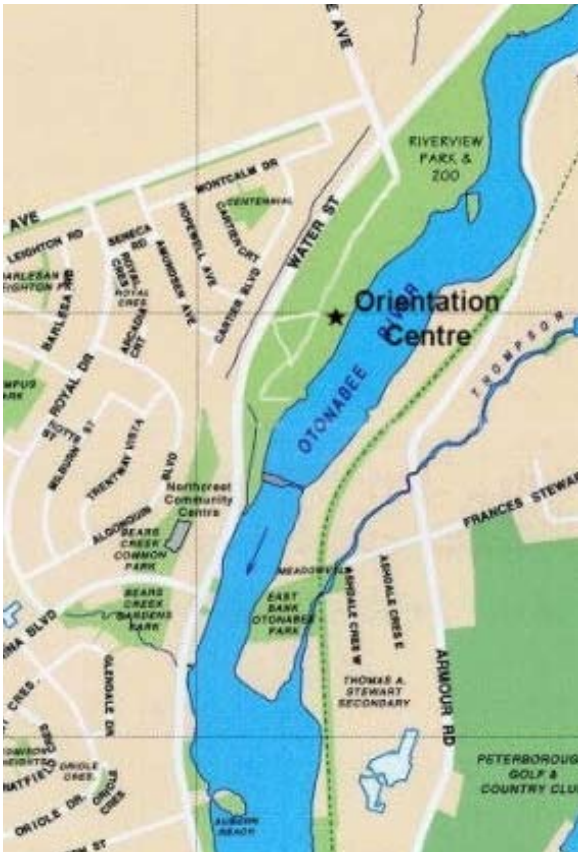
Next submission deadline:
November 23, 2008



Meetings The Peterborough Astronomical Association meets every first Friday of most months at the **Peterborough Zoo Orientation Centre** (Next to the PUC Water Treatment Plant) at 8PM. PAA executive business will be conducted starting at 7:30PM. Members and the public are welcome to attend the earlier time.