

## Editorial

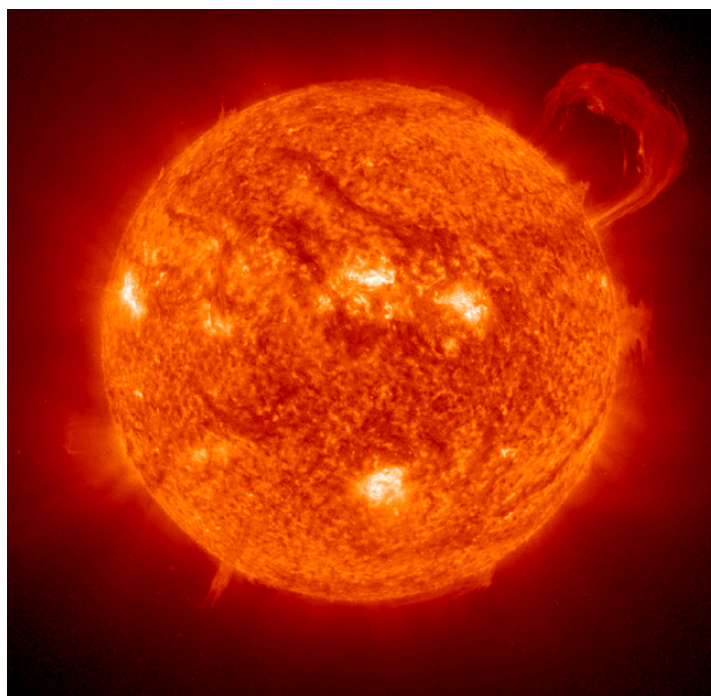
This is the season for cold and snowy observing. I hope everyone has plenty of hot cocoa (or coffee). Our PAA President is doing well, after having heart surgery last month. Here is a "Thank-you" note, below, that he asked me to put in this Reflector.

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*" Thanks for all the good wishes. I'd like to thank all you club members who took the time to wish me well during my surgery. All is well at the moment, though I have a slight infection in the leg. That's not uncommon, so it isn't a big deal. Recovery is taking a bit longer than I thought it would. I guess being 11 years older than I was during my first bypass has slowed things down a bit. However, I feel great and am able to walk further and faster each day. Thanks again for the encouragement. You're a great bunch. Clear Skies and Blurry Eyes,"*



John Crossen  
President  
Peterborough Astronomical Association



SOHO took this picture of the sun with a large prominence on September 14, 1999. A prominence is a large cloud of cool, dense plasma that has erupted and escaped the sun's atmosphere. The upper chromosphere is at a temperature of 60 000 degrees Kelvin. The white areas are the hottest, and the darker red areas are cooler.

## SOHO'S 10th Anniversary

This month the Solar & Heliospheric Observatory (SOHO) is celebrating its 10th anniversary in space. SOHO is a joint project to study our sun, involving the European Space Agency and NASA.

SOHO was launched on Dec. 2, 1995, and since reaching its planned orbit, has given us much information about our sun. Using its 12 instruments

on board, SOHO monitors the sun's violent atmosphere, along with the charged gases that are expelled into space. SOHO has also been examining the solar interior. At only 150 million km away from the sun, SOHO has given detailed views, which has never been done with any other star. Being this close has also allowed it to detect Earth-sized explosions and even the occasional tornado! For more information on SOHO go to: <http://sohowww.nascom.nasa.gov>

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## Inside This Issue

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## It is Written in the Stars. Astro-predictions for 2006.

About this time of year the soothsayers, psychics and assorted meadowheads roll out their lists of sure-fire coming events. Spend ten seconds in the supermarket checkout and the scandal rags will have summarized all the important 2006 events before they happen or the cash can register ring. Plus you'll get the "real lowdown" on Brad and Jen!

Among my favorite trash-mag-treats from the past was, "*Famed Psychic's Head Explodes!*" Caught somewhere in between stunned disbelief and falling down laughing, I could only stammer, "give that writer a Pulitzer Prize...and a six-pack." Mere mortals can't beat that kind of top-notch journalism. So here, a notch or two lower, are my fearless astronomical predictions for 2006. Read on... if...you...dare!

**Saturn will rule the winter sky.** Those of you who are early-to-rise have probably already seen Saturn crawling up the eastern, early-morning sky. On January 27 the ringed thing will reach opposition and be visible all through the night. Opposition means that it will be at its closest approach to Earth for the year and is directly opposite us and the sun. This year Saturn's rings won't be tilted quite as significantly towards us. Nonetheless, it will still be a breathtaking sight in even a small telescope. For the balance of winter and up until July, Saturn rules!

**Jupiter in Libra is a sure sign that - it's May.** While the king of planets will be rising in the morning sky of February, by May you will be able to take in the jovial giant at a more civilized hour - like after sunset. Jupiter will remain in the constellation Libra until next November when it dips beneath the western horizon. Giant Jupiter will reach opposition on May 4<sup>th</sup>. At that point in its dozen-year journey around the Sun Jupiter will shine down on us at magnitude -2.5 and will have reached a diameter of 45 arc seconds.

**In April the Moon will stand still!** No, the tides won't cease. And the world won't end." This is simply the culmination of the Moon's 18.6-year orbital cycle. It is called a "major lunar standstill." What that means is that the Moon will rise further north and set further south than the Sun ever can. The exciting thing for northern hemisphere astronomers will be the fact that the full moon will appear to be nearly straight overhead. Another treat will be the Crescent Moon's conjunction with the Pleiades on April 1 - no fooling.

**Prepare thyself pilgrim, for the great Zodiacal Light shall shine upon thee...** but only if you get up really early. Sometimes called the false dawn, the Zodiacal Light is comprised of dust and debris left behind by comets and asteroids. We usually see them as meteors as they burn up in our atmosphere. But in the spring and in October, you can see them lit by the sun, about an hour before sunrise. The Zodiacal Light will appear as a faintly glowing pyramid of light on the eastern horizon. You'll have to be under dark sky conditions, so if you live on a farm in the country you should have no problems, just avoid the barnyard glare bomb. If you live in the suburbs or the city, better get in the car and head for the country.

**Winged Mercury will dash across the sun.** Other than the fact that this only happens 12 times during a century, the event signifies absolutely nothing. While not quite as rare as a transit of Venus, it is just as fascinating to watch. November 8 will mark the transit of Mercury. The transit will last just 5 hours and begins at 2:12 p.m. EST. It should be viewed only through telescopes equipped with proper solar filters. You might think that this would be a yearly event, but both Earth's orbital path and that of Mercury must be on precisely the same plain so that we can see miniscule Mercury silhouetted against the Sun's giant orb.

And there you have them - my fearless predictions (thanks to the folks at Astronomy Magazine) of some of the

astronomical highlights awaiting us in the coming year. Sorry if they're not quite as tantalizing as those from the professional prophets. Then again, considering the money they fleece people for, perhaps we should we call them the professional profits.



Viewing Saturn and its rings through a telescope is one sure way to warm up a winter evening. Photo courtesy of NASA photo archives.

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## Colliding Galaxies Hit Peterborough

On December 1, 2005, Peterborough was treated to a rare event of astronomical proportions. Professor David Patton (Department of Astronomy and Physics) of Trent University gave a free public talk about his passion and area of research, Colliding Galaxies. This was done at least in part because the United Nations has declared 2005 as "The World Year of Physics". What spawned this was the fact that it is also the centennial of Albert Einstein's "Incredible Year", when he wrote five theoretical papers that changed the understanding of the world we live in and the universe beyond.

There was a moderate crowd of people (60 to 70), of which PAA members made up only about 3% (I'll let you do the math). Professor Patton was scaling down his topic to not only appeal to the

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NGC 4676 is two galaxies known as "The Mice" because of their long tails. They have collided already and will probably do so again and again.

masses, but also be understood by them. He started by explaining what a galaxy is and he had some amazing examples of computer-generated models of how stars and galaxies interact and relate to each other within the universe. The most impressive in my mind was the Millennium Simulator. This model has incorporated over 10 billion particles (each would represent a star) and it allows a zooming in and out from a region of our galaxy (Milky Way) to the outer reaches of the universe. You have to see it to believe it. To me it looked like dense web-like structure (not unlike a human nervous system). This was all in an attempt to help us understand the evolution of our universe and our place within it.

Then there was a brief discussion of quasars and black holes, which in turn lead to the collisions of galaxies and how this helps change the universe by rearranging the materials within it. In this way new stars are created and galaxies change shape and size. How common are collisions? More common than you may think. Detecting the evidence of collisions is not easy, but by applying the principles of an expanding universe and taking measurements by using the "red shift" method, there are lots of examples of images, such as in the Hubble "Deep Sky", where galaxies that appear close together can be measured for the distance from us and if the measurements are comparable, then there is a good chance they could interact. This method is used in conjunction with looking at the shapes of galaxies that appear to be interacting. We were shown a few computer simula-

tions that illustrated what can happen when galaxies collide. Nicely uniform spiral galaxies become diffuse elliptical galaxies and there can be telltale signs, such as long tentacle like arms that shoot out at odd angles. The classic example in my mind is "The Mice" (NGC 4676) in Coma Berenices, pictured above.

Then the talk turned to the Sloan Digital Sky Survey ([www.sdss.org](http://www.sdss.org)). The Sloan Digital Sky Survey is the most ambitious astronomical survey project ever undertaken. The survey is mapping in detail one-quarter of the entire sky, determining the positions and absolute brightnesses of more than 100 million celestial objects. It will also measure the distances to more than a million galaxies and quasars. From this data Professor Patton and his students are using spectral measurements to determine the speed of the galaxies. By combining all this information it is hoped that they will find up to 10,000 paired galaxies and then they can start to figure out whether they are interacting through collisions. A unique angle on the universe and the happenings within it and one that has seen some Professor Patton's students go on to Princeton.

After the images and information, a reception followed. There was then an opportunity to ask questions of Professor Patton, you know, things you've always wanted to know about colliding galaxies, but were afraid to ask. I got to ask my question. What effect has

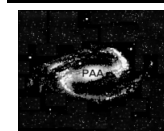
gravitational lensing have on the study of colliding galaxies? It appears, very little, the lens effect that has been studied to date appears to occur in areas where there is a clumping of galaxies and the collisions being studied are usually just as pairs, so the potential to bend light from galaxies located behind to the point of creating erroneous results is highly unlikely. To see an example of the lensing effect being described, see this link: <http://antwrp.gsfc.nasa.gov/apod/ap040807.html>

All in all, a great talk and one that was not to be missed. If you did miss this one, you can always wait for the real thing. We are expected to have a collision with the Andromeda Galaxy within the next few billion years!

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## Canada Leads the Space Race - When it Comes to Brains

It isn't all that often that Canadians have the opportunity to thumb their suspenders about something other than *Continued...*



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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their abilities at hockey or brewing beer. Well step aside Misters Gretsky and Molson, Canada's astronomers and astrophysicists are taking over centre ice.

A recent study by Thompson Scientific, a Philadelphia-based information clearing house has shown that Canadian Astronomers are substantially ahead of their world counterparts when it comes to publishing papers and being quoted in the world science press. That, of course, means we've one-upped the Yanks, too.

If you take the 150 most frequently cited scientists in Canada and single out the astronomers you'll find that 15 of them are among the most quoted in their field. Let's see, 15 out of 150 – wow, that's almost 10%. "And I can assure you, 10% of Canadians are not astronomers," says Jaymie Mathews, Associate Professor of Astronomy at the University of British Columbia.

All this is quite surprising when you consider the fact that the Americans spend about \$7.00 per citizen on astronomical research while the Canadian government squeezes all it can out of \$1.00 (US) per person. Britain, France and Germany average about \$4.50 (US) for each of their citizens. Australia spends a bit less than that. Not only do all of the above spend more per citizen on space research than Canada does, three of the four have substantially more citizens to begin with. Obviously we're doing something right!

And that "something right" is called focused research, according to Ray Carlberg, Professor of Astrophysics at the University of Toronto. Scientists have to choose their projects wisely. "We can't do everything if we want to have impact" said Carlberg in an interview with MacLean's science writer Danylo Hawaleshka. "There are a million and one choices that you can make, and Canadian astronomers, as a group, clearly make some good ones."

So who are these beacons of academic light in the darkness of space?

Mark Halpern of the University of British Columbia was on an international

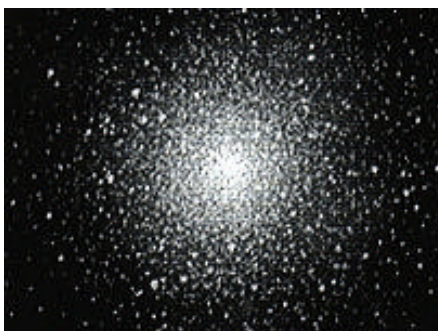
team of 17 scientists who issued a paper on mapping the radiological afterglow of the big Bang. This paper helped confirm the theory of how our universe came to be. It was cited 1,058 times, making it last year's most quoted paper.

Peter Stetson of the Herzberg Institute of Astrophysics near Victoria is known for developing a software program called DAOPHOT. It may not have a snappy name, but it is now the gold-standard for analyzing star clusters.

Don Vandenberg at the University of Victoria has won international acclaim for modeling stars of different size and composition. Scientists around the world use his findings to gauge the age of stars.

Dr. Wendy Freedman, a graduate of the U of T is one member on a team of 30 American, Canadian, British and Australian astronomers studying the age of our Universe. She and her team have been awarded the most time to date on the Hubble Space Telescope. And she has earned a number of awards during her career including the Aaronson Lectureship and Prize.

Then there are the Canadians who have not only earned their livings, but world renown for popularizing astronomy. Again, Canadians comprise a disproportionately large number of the



Despite the fact that Canadians don't have to dig very deeply into their pockets to fund astronomy research, Canadian astronomers are highly admired by their peers when it comes to reaching for the stars. Globular Star Cluster M13 in the constellation Hercules.

bright lights. Terrence Dickinson, Alan Dyer, Ken Hewitt-White, Jack Newton, head a long list of authors and active amateurs who contribute daily to the science of astronomy. While I wouldn't call us the Masters of the Universe (that would be totally un-Canadian), we have definitely made our mark in it.

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## 2006 PAA Light Pollution Program Taking Shape

The PAA Light Pollution Committee gathered Sunday afternoon, December 12<sup>th</sup> at Buckhorn Observatory to map out their strategy for 2006. By meetings end it was agreed that Peter McMahon would look after designing an additional element for the PAA's web site that highlighted our light pollution abatement activities. For 2006 we are making our brochures and presentations available to a wider target base. That group will now include cottager associations as well as the usual community and municipal groups.

Light pollution is a growing problem with cottagers as more and more city folks bring their down-town habits (and lighting) to the once-dark skies of cottage country. Suddenly the last sanctuary of the stars is at risk. People are already complaining that the joy of standing on the end of the dock and looking up at the Milky Way is growing more and more dim with each progressing year.

From my own point of view, I also get a lot of grumbles and complaints through the observatory from people who are fed up with "that moron across the lake with the spotlight that stays on all night."

Our goal will be to bring these issues to the forefront of public discussion in the hopes of taming the beastly bulb and

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returning the peace and serenity of a dark night to those who want to escape the city's glare and glare.

To that end we are preparing slide and power-point presentations as well as pulling together a new brochure that will be available to community, cottage, and civic groups. Rick and Mark will be looking into this aspect of the program.

Also present at the meeting were Susan Coady and Deb Crossen. Susan is already working on some ideas for helping to finance this venture, while Deb is pulling together an article that will highlight what we've got planned for the new year. She is also working on an official media launch of International Dark Sky Night.

As usual, we will be looking for additional hands to help make all this happen, so don't be shy. If everyone does a little, a lot will get done.

My thanks go out to Peter, Rob, Rene, Rick, Mark, Susan, and Deb for their valuable input and advice.



Peter McMahon (right) will design the LPA segment of the PAA website. Mark Coady and Rick Stankiewicz will see that it is filled with actionable materials.

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This image was captured from the north end of Peterborough, on December 27, 2000. The effect to the uninitiated is like a space invasion or some form of "close encounter". In this case, the effect only lasted for about a half hour and then a light wind changed the composition of the suspended particles in the sky and the pillars disappeared.

## Light Pillars or False Auroras

These unusual columns of light pierce the night sky, like a solar pillar accents a morning or evening sky. The causes are unique, but the effects are similar. A solar pillar is caused by the sun's rays reflecting off the underside of high-level ice crystals that are stacked on top of each other.

In the case of a light pillar, the source is not the sun, but rather any significant artificial source of light reflecting back off low-level ice crystals. For these reasons light pillars can only occur during the winter months. I have seen this same effect even caused by car headlights.

This is the season to be on the lookout for this phenomenon, but in my experience over the last few years I have only ever seen a couple of times in winter that the conditions are right. They can occur anytime of night when and where the conditions are suitable.

When you first notice these pillars, they will have the effect of an auroral display but then you will notice that they are stationary and all that may vary is their intensity. The color of the pillars will vary depending on the source of the artificial light. You can expect this to occur if you have sufficiently cold and stable atmospheric conditions and the proper amount of aligned ice crystals suspended over the light source. As a result, this atmospheric affect is a good example of light pollution as it is only reflecting light that is cast up into the sky.

This phenomenon can be captured by a camera the same as you would any auroral display. Experimenting with fast ASA settings, wide-angle lenses, a tripod and varying time exposures, will yield results similar to the picture above.

For more on this effect see: <http://www.sundog.clara.co.uk/halo/lpil.htm>

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## Optisan Binoculars Deliver Top Value and Great Images



An attractive armor covering helps make Optisan's Napoleon I binoculars shock and water resistant.

Good quality equipment isn't always accompanied by a high price. So when store owner Jim Kendrick suggested that I try the new Optisan Napoleon Binoculars out for use as Buckhorn Observatory's official "guest" binoculars, I had no reservations – despite their humble \$71.00 over-the-counter price tag.

My first impression was excellent. The smooth, roof prism design gives the binoculars a sleek, compact appearance. And the gray rubber armor covering adds a nice high-tech finishing touch. So they're nice to look at. How about looking through them? The large centre focus knob comes readily to hand – even when heavily gloved for winter observing. It operated smoothly and held focus nicely. Adjusting the binocs so that you were viewing one image with both eyes was a simple matter of squeezing the two sides closer together. There are roll-down eyecups for those who wear glasses while observing. And the right-hand eyepiece features a diopter so that both eyes will be at proper focus.

Optisan is a new name in the Canadian binocular market and is marketed internationally by Armsun – the same people who brought you the Lens Pen! The company is quickly building a reputation for marketing products that deliver outstanding value. The model I tested was the 8x40 Napoleon I series. At

8 power, they deliver good magnification and are still easy to hold steady by hand. They also are light enough that a child will be comfortable holding them.

Despite having a less-than-astronomically-ideal 40-mm aperture (50-mm is preferred), the Napoleons still gather enough light to deliver a satisfying field of view in low light conditions. And at 6.5 degrees, they display some stunningly wide star fields when scanning the Milky Way.

As you might expect in an inexpensive pair of binoculars, some chromatic aberration is evident on bright objects such as the Moon, Jupiter and the star Sirius. Chromatic aberration is the faint purple or yellowish glow that appears on the fringe of a bright object. This happens because all of the wavelengths of light are not coming to focus at precisely the same spot. But when you consider the fact that these binoculars sell for about the same as a season of CSI reruns, that little fault quickly relegates itself to the "minor annoyance" category.

Also included with the Napoleon 8X40 model is a carry case, neck strap, lens caps for the primary lens and a cleaning cloth. The only regrettable omission is the fact that they do not have any provision for a thread-in binocular mount.

There are a number of other models in the Optisan line, including a 7X50 pair that astronomy author Terrence Dickinson has chosen as his "best value" under \$130.00. The balance of the model line includes a number of compact sports models, lightweight birding models and waterproof marine models. If the quality exhibited by the Napoleon I series I had are any indication, the balance of the line are also superb values. For more details visit: [www.kendrickastro.com](http://www.kendrickastro.com) or try <http://www.wholesaledigital.co.za/optisan.htm>

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## Japanese Are Successful After Losing Space Probe

Last month, on November 12th, the Japanese robotic space probe, Minerva, was lost. It was part of a mission sent to study the asteroid called Itokawa. This asteroid is located between Earth and the sun, just 2 million km away from us. Minerva's mothership, Hayabusa, accidentally sent the probe shooting past the asteroid instead of landing on it. Experts believe it was a thruster malfunction.

Minerva is a 600g cylindrical probe that was supposed to photograph the asteroid's surface and record temperatures. Unfortunately, the Japan Aerospace Exploration Agency (JAXA) has lost contact with Minerva and are unsure of its current status.

However, Hayabusa continued on with its main goal - to land on Itokawa and retrieve samples from the surface, which will be brought back to Earth. This has never been done before with an asteroid. Its mission was successful after landing on Itokawa for a second attempt on Nov. 25th.

Launched in May 2003, Hayabusa has now begun its return journey and should arrive home in June 2007.



The spacecraft Hayabusa captured its shadow on the asteroid Itokawa while in its orbit.

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## The Mag-7 Star Atlas Project

On April 24, 2005, a gentleman by the name of Andrew L. Johnson came up with something quite wonderful for budding astronomers out there with access to the internet. He calls it the Mag-7 Star Atlas Project — and his goal is to provide free, useful, high quality star charts for stargazers using binoculars or small telescopes. I have used the charts, and I have found them to be rather more accurate and detailed than the ones found in the astronomy magazines. They've helped me find several of the Messier objects, and helped to highlight many interesting regions for my future deep space object viewings. They are also much easier to use than lugging a heavy star atlas around.

Other advantages of these charts are that you only print off the ones you need; they take up less space than books or larger star atlases; and they are cheap — you just print off an 8½" X 11" page for each chart. If you don't have a computer and printer, just ask a friend or colleague to print off a sheet or two for you. For

outside use, it is best to put the printed star maps in a transparent (non-glare) plastic sheet protector. This will keep them from getting smudged, damp with dew or wet from rain. Sheet protectors are available in varying quantities from any area office supply store.

The Mag-7 Star Atlas is comprised of 20 primary charts and one supplemental chart (11a for the many objects in Coma Berenices). The charts are organized by right ascension and declination for the complete northern and southern skies and the polar regions. Two complete versions of these charts are available. One set is in black and white for use at night outdoors (a red light might interfere with color charts) and the other identical set uses different colors to highlight deep space objects, constellation lines and boundaries as an aid for study.

Stars down to Magnitude 7.25 are plotted. The over 550 Deep Sky Objects in the atlas include the entire Messier list, the Royal Astronomical Society of Canada's finest New Galactic Catalogue list, and the Herschell 400 list. Double and multiple stars are shown on the charts by a horizontal line

through the depicted object. However, only stars with a separation of at least 0.5 arc-seconds and with a secondary component of Magnitude 11 are marked as doubles.

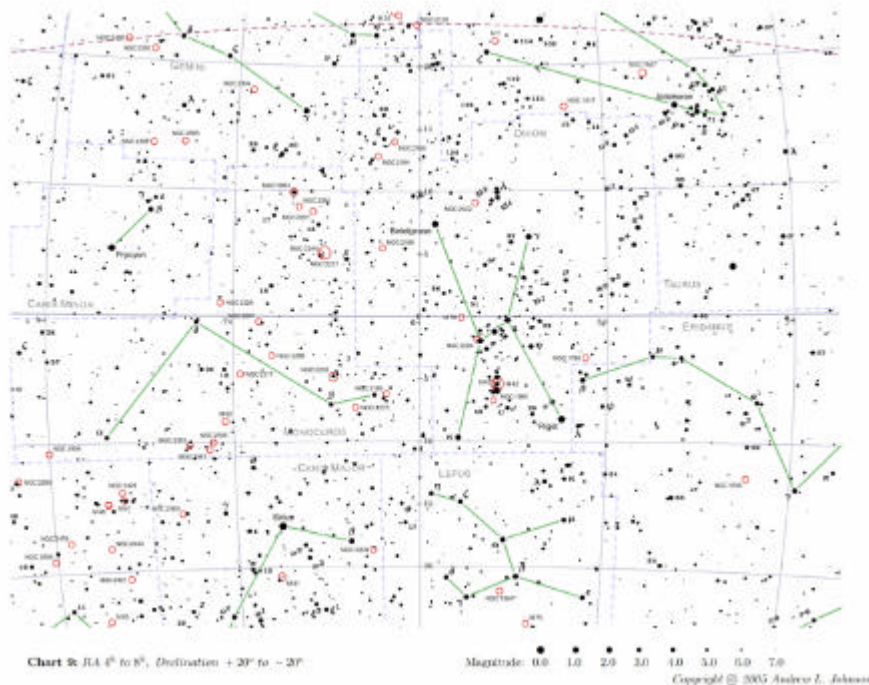
According to Mr. Johnson, these charts are offered under a Creative Commons License. You are free to download, use, and or distribute the elements of the atlas for non-commercial purposes with appropriate credit given. Also, you are permitted to create and distribute derived works from these charts.

Your results may vary depending on platform and PDF viewer. I use Adobe Reader 6.0, which works fine. I've also seen them come up easily with Adobe 5.0. While they are on the screen, you can enlarge the charts to examine the area around your favorite objects.

You can find them at Cloudy Nights, a website devoted to assisting amateur astronomers through equipment reviews, commentary forums and sponsored events/contests, has provided a home for the Mag-7 Star Atlas Project. Just go to [www.cloudynights.com](http://www.cloudynights.com), scroll halfway down the Home page and click on the 'Free Mag-7 Star Charts' link. If you can't find the link, go to the Cloudy Night search at the top right and type in "Mag-7 Star Atlas Project" — and there you are.

In Andrew Johnson's own words, "I hope beginners and experienced observers alike might find some use in these charts — as a first atlas, as a bridge atlas between planisphere and a deeper atlas, as a binocular atlas, as printable charts for outlining observing plans and/or recording small field notes, or to make wallpaper for your outhouse. At the very least, when you take family or friends on an observing outing it is easy (and affordable) to ensure everyone has an atlas of their own to refer to. The free licensing makes these charts an open resource for teachers, astronomy outreach programs, and anyone else who wants to use them!

Dean Shewring  
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A colored December star chart from the Mag-7 Star Atlas.

## Looking Back on an Exciting Year for Astronomy

Remember the old adage that “change is the only thing that remains the same?” The year 2005 certainly provided a memorable series of events to that end.

The space program got back on target with the eventual launch of space shuttle Discovery after the Columbia disaster of 2003. It was a long time coming, and it still had some hidden glitches, but all’s well that ends well and it certainly did. The entire situation underscored the fact that NASA’s shuttle fleet is long overdue for a redesign. And that’s well underway as I write this article.

Commercial space flight got its first boost with the successful launch of the piloted rocket Space 1 from the belly of a high-flying jet. The rocket did indeed reach the 60 km threshold of outer space twice and in doing so claimed the Xprize. The fact that the pilot was already in his 60’s was a nice touch – for us old folks.

The year also saw the Cassini Mission spaceship arrive at Saturn and begin its 4-year-long exploration of the planet, its rings, and nearby moons. Speaking of which, we also made our second landing on a moon in our solar system. This time it was Saturn’s moon Titan, a frigid world that in some ways resembles the atmospheric conditions on early Earth-only much colder. Titan’s atmosphere is made of methane as are its lakes. It is so cold that Titan’s water behaves like ice – only this ice is as hard as granite. But the cycles of evaporation, clouds, rain, and puddling are much the same as on Earth. As the Huygens probe was parachuting down to Titan’s surface we received our first pictures of this strange new land. And as usual any answers we received only led to more questions.

The Hubble Space Telescope began a long series of ups and downs with heated debates on whether it was worth keeping what many claim is “the 21 Century’s



There’s a new space race underway in 2006 with the US, China and Russia heading for the Moon. Japan is already landing on a distant asteroid as my keyboard clatters into the cloudy night..

most valuable scientific instrument, alive for another few years or de-orbiting the scope and bringing it to a fiery end at sea. The cost of sending up another NASA crew in the aging shuttle fleet is tremendous, yet the HST’s contribution to space exploration has been equally so. The risk to human life is the last nagging thought. The sight of Columbia breaking into pieces as it tumbled through our atmosphere is hard to shake from the mind. But I’ll bet you anything there’s a NASA crew who would jump at the chance to mend Hubble until its replacement can be launched.

More recently we amateurs enjoyed the close approach of Mars during October and November. Any clear night was given over to observing the red planet for those precious few moments when our atmosphere steadies enough to reveal some Martian surface detail. As luck would have it, on October 28<sup>th</sup>, the night of Mar’s closest approach our portion of North America was covered by a huge jet stream that made a good view of Mars nearly impossible. Still, I

enjoyed a couple of nights when the planet was much better detailed.

As I finish this article off, a huge new telescope is nearing completion. Located on Mount Graham, The Large Binocular Telescope features two 8.4 meter mirrors with adaptive optics to cancel out the blurring effects of Earth’s atmosphere. It will be the world’s most technically advanced telescope. With it astronomers expect to take their first images of planets orbiting distant suns. The LBT will be completed in the spring of 2006.

And that in a very brief summary is the year that was, astronomically speaking. Each year we seem to move ahead faster and faster. Technology begets more technology, and we keep on progressing. So, as we prepare to bid farewell to 2005, I can scarcely wait to see what the new year will bring. One thing for certain, there will be more change.

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## An Astronaut’s “Passionate Vision”

Coming to a museum near you. A customized exhibit of photographic works by Roberta Bondar (Canada’s first female in space) is here in town at the Peterborough Centennial Museum & Archives (Armour Hill), until January 15, 2006. You may have read about in the newspaper or you may have heard me mention it at a recent meeting. I have seen it myself and I must say, “This is a must see!” If you miss this opportunity you have missed a rare event indeed.

A special room has been dedicated to the 46 images that make up this unique record of Canada’s National Parks. These images range in size, but on average would each be over a meter square, but some are over 2 meters long. Many shots are views that we would otherwise never see because they are taken for helicopters and other aircraft. My favorite of

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Astronaut Roberta Bondar was one of the first Canadian astronauts, and became the first Canadian woman in space.

the whole exhibit is the Mount Logan and Logan Glacier. The moon is hanging in a blue evening sky as the setting sun paints a pastel pink and blue cast to the snowy foreground of mountaintop and glacier. This image was taken on the eve of the anniversary of the Apollo 11 moon landing, a special image indeed. Roberta Bondar's images are typical of her style. I once heard her say that she does not want images that show human influences. You will not see canoes, roads or habitation in her work and this holds true in this exhibition. Also part of this exhibit is an interactive monitor where you can click on an image and have Robert Bondar tell you a little something about it.

Roberta Bondar is to be congratulated on her amazing work with the camera in capturing the essence of Canada's national parks in their raw and natural beauty. As well, Peterborough is to be applauded in efforts to secure such an exhibit for the people of Peterborough. I am amazed that this exhibit is "free" for the viewing (donations gratefully accepted of course). Experience it for yourself while you still can (only until January 15, 2006). You will never get a better chance and definitely not at this price.

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## The Sky This Month

### MERCURY

Mercury reached its greatest elongation on December 12<sup>th</sup>. It can be found in the low east-southeast in the early morning. Mercury will get dimmer throughout the month, because as it moves closer to the sun, it is moving further away from Earth.

### VENUS

Venus is visible after sunset. It will remain an evening object for the rest of the year. It is low in the southwest.

### MARS

The red planet will be an evening object this month. It can be found in Aries.

### JUPITER

Jupiter is in Virgo, low in the east before dawn.

### SATURN

Saturn is in Cancer. It will increase in magnitude throughout the month.

### URANUS

Uranus is located in the center of Aquarius. At a magnitude of about 6.0, it is at the limits of naked eye visibility.

### NEPTUNE

Neptune is in the constellation Capricornus, but is a low 8.0 magnitude. A finder chart like that published in S&T or the RASC Observer's Handbook is required to locate this faint bluish planet.

### PLUTO

Pluto is not visible this month.

### METEOR SHOWERS:

The Geminids will peak on December 13<sup>th</sup> and the Ursids on December 22<sup>nd</sup>.

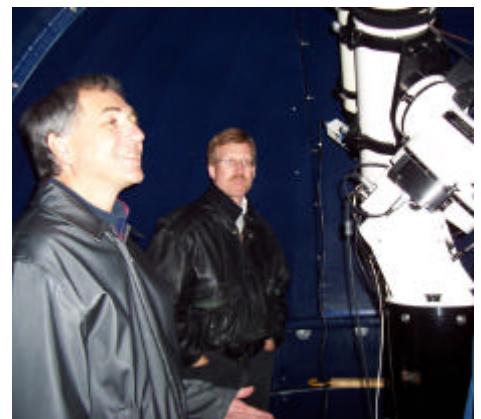
For details, see <http://comets.amsmeteors.org/meteors/calendar.html>.

## The PAA in 2006

I don't think you can ever have too much of a good thing. So we're taking all events, activities, tours and people who made 2005 such a banner year and kicked things up a notch.

On the observing front we've added Jaan Teng's and Brett Hardy's observatories to our dark-sky sites. We'll also be making the trek to BHO a bit more often. Those Mag 6.0 skies are hard to resist. We'll also continue with our seasonal observing challenges. So far we've stumbled through the teapot and the Milky Way. Next up we'll do a Moon tour and this winter when the dipper is high in the sky, we'll set our sights on the galaxies that inhabit its surroundings. It's good to see our members learning their ways around the night sky. Members like Dean, Jess, Harold, Linda, Rick, Rob, and even myself are nailing down the Messier objects. Early next January we'll compare notes and see who's been working hard and who caught "cloud fever."

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Deep sky observing will get an extra boost in 2006 thanks to Brett Hardy and Jaan Teng.



Star party anyone? The Huronia Star Party is on our list of July 2006 events.

In the world of real tours, we've already been invited back to Haliburton Forest Observatory for an overnight visit. Located just north of Haliburton, the observatory is part of the Haliburton Forest Preserve, so we'll also have the Wolf Sanctuary and the Tree Canopy tours to occupy our spare time. Toss in a couple of good local restaurants, and it all makes for a pleasant get-away.

Our trip to Trinity College was quite a success last year and bears repeating again for those who missed it. The time and date are still up for grabs for this tour, plus we may just make the pilgrimage back to Canada's astronomical crib, David Dunlap Observatory in Richmond Hill. That tour will be later in the year – say September.

On the guest speaker front, our own Richard Matthews will be representing us as a guest speaker at Randy Attwood's Mississauga chapter of the RASC and the Kingston RASC Chapter as well. On the receiving end of things, we'll be welcoming Graham Wilson, Stargazer Steve Dodson, Professor David Patton from Trent University, and some new speakers from our own group, including Brett Hardy who is going to bring us up to speed on video astronomy.

We also have a busy schedule of public activities lined up. John Crossen is pulling together The Frank Hancock Award for grade six astronomy students.

The Light Pollution Abatement LPA committee is putting the final touches on its program of combating cottage light pollution for the coming summer as well as plans for involvement in the Kawartha Signature Site.

This year International Astronomy Day arrives on May 6<sup>th</sup> and we haven't yet begun planning for this major event. In addition to providing a platform for presenting the PAA to the public via our Portable Planetarium (a new projector is coming), various displays and talks, the event will also serve as the announcement window for our Frank Hancock Award Winner.

We will also be doing a major presentation at Emily Park during August or early September. Toss in an exciting joint star party with the Belleville and Kingston RASC chapters, plus our own Star-Bar-B-Cue and it's going to be one beautifully busy year.

John Crossen  
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## Meeting Notes

**November 25, 2005**

It turned out to be a better night for talking than it was for observing. Only

the brightest of objects were visible at all (Mars still shining the brightest).

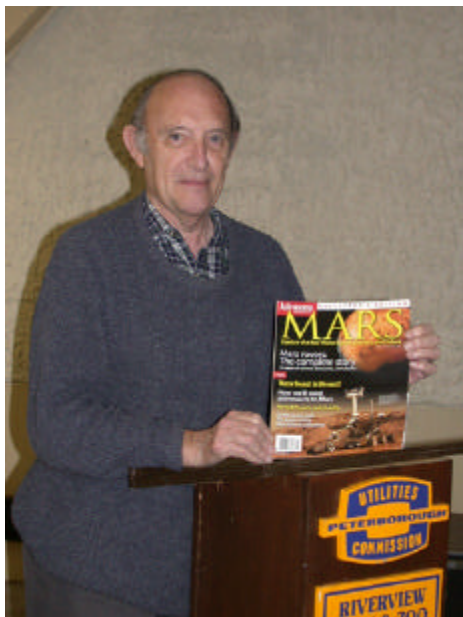
Our own members came through in the crunch again and we had a good meeting (15 in attendance) filled with tidbits (not Timbits) of information. There was an update on our Prez. He is up and walking, but not running yet. We hear that Debbie is getting him out and about for a change of scenery the odd time. Stay on the "straight and narrow" for a speedy recovery John. We are all looking forward to seeing you soon.

There were updates on a few items as well. A government magazine with an interview with Marc Garneau (astronaut/Deputy Minister-CSA) was donated to the library. Colin Cross gave a talk on a new book available through Astronomy Magazine called "Mars." This collectors edition, which Colin had recently purchased, has just about everything you wanted to know about Mars exploration (involving the NASA Spirit and Opportunity rovers), but were afraid to ask. This included a look into the future of what might be in store for the world of exploration.

Then Mark Coady had the floor to update us all on the previous weekend public open house for the Kawartha Highlands Signature Site. He and Susan attended and scooped a copy of the draft management plan document. There is

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Colin Cross introducing a new book available through Astronomy Magazine called "Mars."

now 45 days for which to respond to the draft plan and it's contents. Several of us will be pouring over the document to see what we as a club can suggest around things like "dark sky reserves or observing sites" and the like.

Dean Shewring brought in a sheet of the newly issued U.S. stamps that have four constellations depicted on them. A nice addition to any collection, they are available through Canada Post. Stop by any postal outlet and pick-up a copy of the "Collection" magazine (free) and you will see the details for ordering in there.

Then Dean gave us a review of a recent CBC's "Quirks and Quarks" radio show. The title was "To Boldly Go or Stay at Home: Do We Really Need Humans in Space?". This rather provocative lead in was all we needed to get some discussion going. I have to admit that when you hear that it will cost \$300 billion to send a human to Mars and the cost of sending rovers Spirit and Opportunity to Mars cost \$300 million, you have to stop and think about it. Robert made a good point though, does it have to cost \$300 billion? There are alternatives to NASA's type missions. Do the answers lie within? The debate continues.

Rick Stankiewicz  
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December 9, 2005

This past Friday's meeting was chaired by Mark Coady as our illustrious President is still recuperating from heart surgery and our Vice-President had an unforeseen commitment to look after.

First a word about our guest - Stan Nowicki, a former member of the PAA from 30 years ago, and who is possibly leaning towards joining up again. Stan brought in a box full of old Sky and Telescope magazines with some dating back 30 years. They have been placed in the library. Because the box is so heavy I recommend members request a particular issue.

Colin Cross took us on another trip to deep space with a presentation on Canis Major and Puppis. Puppis, the Stern, is part of a massive constellation called Argo Navis - the ship of Jason and the Argonauts. It was carved up into four smaller constellations by Nicolas-Louis de Lacaille in the 1750's -Puppis the Stern, Pyxis the Compass, Carina the Keel, and Vela the Sail.

Next up Mark Coady gave a heads up for this week's Geminid meteor shower which will peak on December 13th and 14th. He showed a picture of Gemini to indicate where the radiant (originating point) of the shower will be. Best viewing, cloud cover permitting, is after 9 PM. Mark also showed how radio and television transmissions can be reflected great distances by the ionized trail of meteors and gave pointers on how to listen or watch for these short - between 1 and 14 seconds - bursts of signals. Mark then discussed a couple of things on the Light Pollution front. A draft of a light pollution brochure was passed around. The final printing will be sometime in the new year. The aim of this brochure is to educate cottagers about local light pollution issues and how to deal with them. It will be distributed at public outreach nights and put on display at municipal and tourism offices.

Mark Coady  
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Have a  
Merry  
Christmas  
& a  
Happy  
New Year!  
See You in  
2006!

J O K E I J O K E I J O K E I J O K E I

Earthling: We put a man on the moon in 1969.

Martian: Big deal! We're going to send a team to the Sun.

Earthling: You're mad! They'll be burned up before they even get close.

Martian: We're not that stupid! We're sending them up at night!

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## ARTICLES

Submissions for *The Reflector* must be received by the date listed below. E-mail or “sneaker-net” (i.e., floppy disk) submissions are preferred (Microsoft Word, ASCII and most graphics 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 this address:

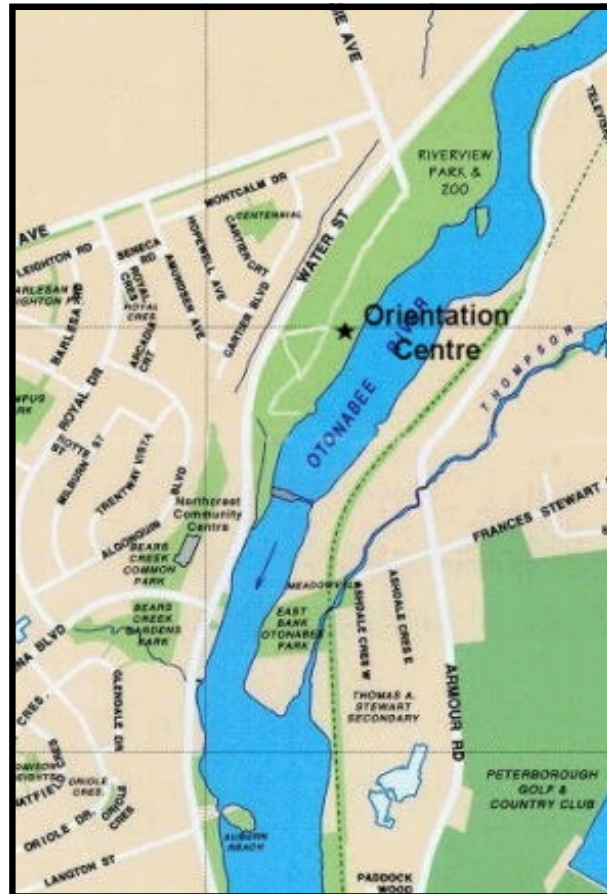
Shawna Miles  
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**NEXT ISSUE'S  
DEADLINE IS  
Jan. 11, 2006**  
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## MEETINGS

The Peterborough Astronomical Association meets every second Friday at the Peterborough **Zoo Orientation Centre** (Next to the PUC Water Treatment Plant) at **8:00 pm**.



### 1 CALENDAR OF EVENTS 1

|                   |   |
|-------------------|---|
| December 23, 2005 | NO MEETING  |
| January 6, 2006   | General Meeting— Observing Night - Buckhorn Observatory |
| January 20, 2006  | General Meeting— Orientation Center                     |

### 1 Moon Phases 1

|               |                               |                  |
|---------------|-------------------------------|------------------|
| New Moon      | December 1, December 31, 2005 | January 29, 2006 |
| First Quarter | December 8, 2005              | January 6, 2006  |
| Full Moon     | December 15, 2005             | January 14, 2006 |
| Last Quarter  | December 23, 2005             | January 22, 2006 |