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# PETERBOROUGH ASTRONOMICAL ASSOCIATION

# THE REFLECTOR

Volume 4, Issue 6 May 2005

## Editorial

April turned out to be a great month for astronomy, which culminated with this year's Astronomy Day event at Armour Hill. We could not have asked for better weather or a better turnout. It was a great success!

With the planetarium shows, various talks and even some rocket launches (by Discovery Channel's Peter McMahon), we had something for just about everyone. We even got a foot in the door at a future council meeting to talk about light pollution, thanks to Colin Cross and Mark Coady. Many thanks go out to those who helped out, and of course, to the Peterborough Centennial Museum and Archives for hosting the event.

With any luck, this spring will present many more opportunities to look out at the night sky. I hope to open the dome more often and resume hunting for some of those faint fuzzies on my Herschel List. This is a list published by the Astronomical Society of the Pacific which includes the 500 brightest Herschel (mostly NGC) objects.

For those of you just beginning the hobby, I highly recommend beginning a Messier hunt. The 110 Messier objects are generally quite bright and a large portion are visible in binoculars. This list can be obtained from the RASC Observer's Handbook, or from many internet sites. If you manage to see all 110 (and provide proof via a log book or drawings), the PAA will issue you a Messier Certificate.

Clear Skies,

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**Rene Bowe sets up his telescope on Armour Hill for Astronomy Day 2005. Not a cloud marred the view of a sky that blazed Kodak blue right into the sunset. It was the perfect start to a perfect day.**

## Meeting Notes

**April 1 Meeting:**

April 1st didn't bring us any tricks. Instead the night's PAA meeting was one of the highlights of our year. Our guest speaker was RASC Past President Randy Attwood, and his presentation on the Lunar Excursion Module was outstanding. Randy has long been a NASA/spaceflight fan and it showed in the depth of his knowledge about humankind's first journey to our celestial dance partner.

From the original designs submitted prior to the awarding of the construction contracts, to the final touchdown, we were treated to inside information and a cascade of photographs that none of us had been privy to before. Plus we were given some fascinating insights into the lives of the people who were on the front lines

## Inside This Issue


**Randy Atwood gave the PAA a fantastic look into the development of the Lunar Excursion Module, which took astronauts to the surface of the moon.**

during the design, construction, testing and the final lift-off moments.

Our thanks go to Randy for sharing his time and remarkable mountain of knowledge with us. And we also must also tip our Easter bonnets to Robert Fisher who put the entire event together. It was a night to remember!

Greg Haynes popped in briefly and rejoined our troop for yet another year. As delightful as it was to see Greg again, it was an equal pleasure to welcome two new members to the fold. Frances Goschl comes to us via the Class Connections' astronomy class, and Marina Bedard, a Buckhorn cottager and personal friend, also signed on board. We'll give you a bit more background on them, plus another new member, Karen Hicks, in our next issue of the Reflector. Hey, it's great to see so many ladies joining our ranks!

Also visiting for the night was Gord Burk. Mr. Burk used to teach physics and was particularly interested in Randy Attwood's talk – especially the part about orbital mechanics. We look forward to seeing you again Gord.

Rick Stankiewicz arrived with about eight new astronomy books for the PAA library. Apparently his local library was clearing its shelves, and Rick accessed a few real bargains. I'm sure the library appreciates the money as much as the PAA appreciates the books. Thanks Rick.

In addition to new members, the PAA also welcomed our second club loaner scope. Yet another 6-inch reflector, the new scope was quickly adopted by John Cameron and was whisked away to Hastings once the meeting closed. Be kind to it, John.

Also of benefit to members is the addition of *Starry Night Enthusiast* to our astronomy software selection. Combined with our *Starry Night Pro and Astronomy* editions as well as demo disks for *Red Shift* and *Desktop Universe*, we should have enough bits and bites on hand to keep the keyboard astronauts flying for months.

With the night so full of new members and a fabulous speaker, the meeting's agenda and the time available collided, so we'll have to carry some of our business over to the next meeting. That will be Friday, April 15th. It's the night before our big Astronomy Day event at the Centennial Museum and Archives (Armour Hill). So please make every effort to be there and on the following day. Your efforts on behalf of the club will be most appreciated. And besides, we've got some great speakers and we'll be sure to have a lot of fun.

**April 15th:**

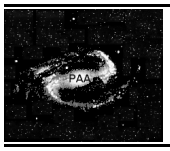
'Twas the night before A-Day! The April 15th meeting was well attended by everyone eager to pin down their chores for International Astronomy Day. Perhaps the best part of it all was the fact that we had more than enough people to handle the tasks. That meant that no one would be overworked. Mark and Susan Cody brought us up to speed on the latest events in the light pollution battle, Rick Stankiewicz filled us in on his contributions to the LPA cause and everyone was assigned a task for A-Day. Joining us as a guest for the meeting were Gord Simpson along with son Kurt and Kurt's buddy, Joseph. Gord brought along his H-alpha scope the following day and was a big hero as Tom Kovacs, who was going to bring one, couldn't make it.

**April 29th:**

A group hug beneath the stars. The PAA April 29th gathering was in essence one big group hug and a large round of applause for the weatherman. The meeting took place at Don and Carol McDonald's Observatory near Hastings. And the reason for all the merriment was that International Astronomy Day had been an outstanding success.

Attendance was about double the previous year. The PAA/BHO Planetarium was a big hit, upstaged only by Peter McMahon's rocket launches for the kid's show. The weather was absolutely perfect during the day and held through the evening to provide excellent viewing of Jupiter, the First Quarter Moon and Saturn.

Our thanks to Dan Bortolotti and Peter for their superb astronomy talks and to the weather people for cooperating – at last. We also must tip our caps to the weather folks a second time, as the weather at Don and Carol's cleared


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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nicely and everyone had the opportunity to get in a little observing along with downing doughnuts and coffee. Thanks Don and Carol.

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# Signals from the Stars

As members of the PAA you are obviously interested in the universe in all it diversity and are eager to interact with it in every way you can, though at the moment we are pretty well limited to just looking. Going out there is not an option, though we live in hope that someday this will be possible. Communicating with alien life is still a dream, as indeed is alien life itself.

But with all the billions of possible worlds that must exist and the infinite variety of conditions and climates they offer, the odds, though long, are beatable. The chance for intelligence is there, slim but certainly real. If there is a chance at finding it we should grasp that opportunity and look for it. And, with your help we just might find something.

Not that at this stage I'd like to see mankind out there visiting other worlds. Our history of exploration and exploitation is fraught with murder, torture, extermination and enslavement. And that was our own species. Imagine how we might treat creatures who possessed something we wanted and who looked like rats or lizards, however peaceful and non-aggressive their lifestyle or high their intelligence.

No, considering what we have done and are doing to our own world and its creatures, letting mankind loose into the cosmos at this point in our development might be a little like letting loose a plague on the universe.

Happily, though, our ability to travel across space is rudimentary at the moment and to cross the gulf of light years an impossible dream, so that's not a worry that should slow us in our present quest for knowledge. With luck, by the time we can visit other worlds we'll be a tad more mature. Meanwhile we can go ahead and explore the heavens by remote control, casting our electronic nets for signs of intelligence among stars that are safely well beyond our reach.

And, as it happens, you yourself can sit down at your home computer and take part in the search. Admittedly you'd have to be lucky (there are a lot of zeros involved in the odds) but you just might be the one to tap into ET's private line and change the course of history.

The way to do it is through the largest radio telescope in the world, the Arecibo scope in Puerto Rico, which records the incredible incoming cacophony from space and passes the possible signals on to giant computers at the University of California at Berkeley.

Those computers do a tremendous job analyzing the data but they can't possibly handle all the emanations that come in from all the stars and quasars and pulsars and black holes and distant galaxies, billions and billions of bits of information, most of it random intergalactic noise but not necessarily all of it.

Somewhere in all that senseless chirping and buzzing and clattering could be the call that would change our world and everything in it -- and it is possible you could be the one who picks up the phone.

How? Well, the big computers do most of the work but astronomer Carl Sagan of Cosmos fame and his wife, who were instrumental in setting up the Search for Extraterrestrial Intelligence (SETI) organization to gather and decipher this information, realized they couldn't do it alone no matter how powerful the Berkeley computers. There was just too much data. So they came up with the brilliant plan of downloading bits and pieces of the signals to astronomy fans and their home computers for preliminary analysis

That way our computers could take on a lot of the load, particularly in preliminary analyses of narrow-band transmissions, the most likely form of radio waves to penetrate the noise cluttered depths of space intact.

And they devised a software program to do just that. It comes in the form of a screen saver that you download from *http://setiathome.berkeley.edu* and set up to run when you are not using your computer. It downloads data from the main computers at Berkeley, processes it and, when through, notifies you by blinking its icon that it wants to upload the results for study at SETI headquarters. Or, if you have broadband, you can program it to report itself and just leave it alone to do its magic.

A record of all this is kept and if your machine discovers ET you'll go down in history. Though to say the odds are long is something of an understatement.

The program is simple to use, you don't have to be a computer genius to figure it out and tens of thousands of people are running it. And, since it uses your Central Processing Unit to do its work it puts no particular wear on your machine.

On my old, slower computer, where I had programmed the software to come on five minutes after I left the keyboard and work away on its own, it took years and a whopping 28,496 hours, 9 minutes and 12.1 seconds of CPU time to do just 155 computations, but these days, with a much faster machine and broadband I'm more productive.

I've set the new computer to run the program in the background whenever it's able and report to Berkeley,. and over the last several months I have processed 154 interceptions in just 1,500 hours, 23 minutes and 03.1 seconds of CPU time.

Nothing from E.T. yet, but I keep hoping. Unless, of course, he's waiting for you.

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# International Astronomy Day Is a Big Local Success

A giant ball of fire rolled over the horizon on the morning of April 16th. Not a cloud marred the view of a sky that blazed Kodak blue right into the sunset. It was the perfect start to a perfect day. And I do mean perfect.

At 10:30 the setup crew was doing precisely that. And, after a bit of niggling with the Planetarium and discovering that it would take a little longer to get our eyes dark-adapted on such a bright day, we were off and rolling.

The guests started rolling in about noon, and we all got busy, very busy. The PAA information booth was a beehive of activity. And the Light Pollution Abatement display was a remarkable hit with everyone. I think we have made more than a subtle point here. In fact, we're invited to make a presentation to City Council. Not bad for a first time effort!

The PAA/BHO Planetarium hosted five shows during the five hours that it was up. And it was mentioned by more than one or two guests that they thought it was "way cool."

Peter McMahon thrilled the kids and oldies alike with his rocket launches and neat games. Plus his talk later that night was very well received. I can say ditto for our other guest speaker, author Dan Bortolotti. Dan's repeat of his Saturn talk led off the evening's indoor activities and provided the perfect stepping stone for Peter's talk on Saturn's moon Titian. All this, while the draw between the two talks netted us 4 winners – thank you very much Efston Science.

The perfect end to a perfect day came as Armour Hill bristled with telescopes like a porcupine in a dog pen. According to Jane Wild of the Peterborough Centennial Museum and Archives, it was the most telescopes she had ever seen on "the hill."

My thanks to everyone who made the event possible, especially you hard-working PAA volunteers. You did yourselves proud, and the results were right there in living colour in Monday morning edition of the Peterborough Examiner. I thank you all for a job well done.

John Crossen
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**The PAA/BHO Planetarium was "pumped up" and ready. John Crossen and Marina Bedard provided the public with a tour of the night sky in the daytime. Many a "way cool" was heard by passers by.**

**Rob Fisher was one of the many smiling faces that greeted those who went into the museum to listen to talks or find out more about the Club.**

# Ontario's Draft "Biodiversity Strategy" – Act Now!

Ontario's draft biodiversity strategy is now available for public review and comment. The draft strategy was developed through a broad, cooperative process, including contributions from industry, environmental, government and other organizations, as well as members of the public.

Comments are welcome on the draft Ontario Biodiversity Strategy to ensure the final strategy will meet the needs and expectations of Ontarians. You can comment for 30 days beginning April 25, 2005. Click on the link to the Environmental Registry Notice of Proposal below for more information: Link

Direct link to Draft Biodiversity Strategy: *http://www.mnr.gov.on.ca/mnr/*

*biodiversity/Biodiversity_eng.pdf*

The Ontario Biodiversity Strategy provides a broad framework for actions that will help protect Ontario's rich variety of plants, animals and natural ecosystems. It will help the government, stakeholders and the public coordinate and focus priorities and share responsibility for action. The strategy will also provide the context for current initiatives in the areas of protected areas, sustainable natural resources management, stewardship, and conservation of Ontario's fish and wildlife.

Due to input by several members of the Peterborough Astronomical Association into another draft of this document in March of this year, there is a reference to the concern of "light pollution" to the environment, included in this currently posted draft of the strategy. Check out the direct link provided about and look at Item 3.1, page 15 and read the last sentence under, "Pollution". If you would like to see something different than what is there, now is the time to comment through the Environmental Bill of Rights (EBR) process. Time is quickly running out by the time you read this. Click on this Link to the EB Registry and follow the instructions to comment. Your support of this very important issue is critical. We need a stronger message sent to the drafters of this document to seriously consider light pollution as a factor that is affecting our environment and it needs to be studied and addressed through this provincial strategy.

Act now or blame no one but yourself in the future. We owe it to future generations to protect our natural environment.

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# PAA Members - Marina & Richard

Marina Bedard is a familiar face around Buckhorn Observatory and at the annual PAA BBQ and "Hawg Wrassle". Now she and husband/actor/handyman, Richard Bacarri, will become even more familiar to us as members of the PAA.

**Marina Bedard is one of our latest members. She is a familiar face around Buckhorn Observatory and at the annual PAA BBQ.**

Marina's interest in astronomy may well stem from her lifelong career of flying near the stars with Air Canada. At any rate they prefer to view the stars via their 8-inch SkyWatcher and 12.5-inch Discovery Dobs. They also have a 4.5-inch Bushnell back in Toronto for lunar and planetary observing.

Marina and Richard have a cottage (and will soon have a home) in the Buckhorn area. That's how I came to meet them as visitors to Buckhorn Observatory about 4 years ago. Since then Marina and Richard have volunteered to help out on busy observing nights with their telescopes and expertise.

You may also have met them on our annual PAA BBQ. Marina can usually be spotted fluttering around the bb-q with Deb, while Richard studies the laws of gravity with a bottle of Fiddler's Elbow.

Most recently Marina took on a couple of shifts in the PAA/BHO Planetarium on Astronomy Day. Welcome to the club – officially now.

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# Astronomy in Philately

The lunar cycle is something that we tend to take for granted. Every 29-¼ days we get another chance to see the beautiful phases of our closest natural satellite, the moon.


On June of 1964, Albania issued a set of four stamps that celebrated the lunar cycle by showing four main phases of the moon. In order of appearance (pictured here) are a "full moon"; "waxing crescent"; "quarter moon" & "waning crescent". The settings are interesting, as the backgrounds are varied with a backdrop of stars, to reflect a mountain range, a sea, a city and a cloudy night sky. A nice set, I think you will agree.

This set of stamps is not easily identified as Albanian, as the word "SHQIPERIA" across the bottom would throw you off. A reference key is needed to figure out stamps of this type, as not all countries that use their language on the face of their stamps, is easily recognizable.

So, the next time you look into the night sky and see the moon, think of Albania and how over 40 years ago they captured the very phase you may be gazing upon. Keep looking up.

Your Astronomical Philatelist,

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# Star hopping from the Dipper to the Kite

There are a number of constellations which we first see in the spring that will be visible throughout the summer months, too. For the next few issues of the newsletter, I'll highlight a new constellation each month. So by mid-summer you'll be as familiar with the stars overhead as you are with the trails and lakes underfoot.

Let's begin with a constellation that everyone knows, the Big Dipper. Right now it's almost upside down, high in the northern sky. Once you've located the Big Dipper, follow the arcing line that its handle makes over to the nearest bright star. That star is called Arcturus. It's the 4th brightest star in the night sky, so finding it shouldn't be hard. Just remember "arc to Arcturus" and look for the bright star at the end of the arc.

Arcturus is the key star in a constellation named Bootes. Pronounced Boo-OH-teez, this constellation looks to modern eyes like a slightly bent kite. Viewed through the more romantic eyes of mythology, Bootes represents a herdsman with the star Arcturus as his head and the wider portions of the kite shape being his body. Legend also has it that Bootes invented the plow. So Bootes is also associated with agriculture.


**α-Bootis or Arcturus, can be easily found by following the curve of the dipper's handle to the bright star. One only need remember the phrase "Arc to Arcturus".**

Jumping back to more modern times, the constellation contains a few celestial sights worth viewing in binoculars or a telescope if you have one.

At the left-hand side of the wide portion of the kite shape is a binocular double star. The two stars are about 121 Light Years distant* and shine at 4th and 6th magnitudes. Visible in a 4-inch or larger telescope, is the double star Izar. Both its component stars reside about 210 Light Years from your eyelids.

At one point in time the entire constellation Bootes was known as Arcturus. The name comes from the Greek word, *arktouros,* which means guardian of the bear. This is most likely because of its proximity to Ursa Major or the Great Bear as the Big Dipper is properly known.

Next month we'll meet up with a guy named Hercules and run smack into a huge ball of made up of about a half million stars that are almost as old as the universe itself.
Until then, keep looking up – unless of course you're walking on a dock.

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# The Sky This Month

**MERCURY**

Mercury is visible in the morning, but will be difficult to see.

**VENUS**

Venus is should be visible after sunset near the end of the month. It will remain an evening object for the rest of the year.

**MARS**

Mars is visible in the morning sky.

**JUPITER**

Jupiter is located near γ-Virginis and will remain visible throughout much of the night.

**SATURN**

Saturn is located in the constellation Gemini. It sets around just after 11 pm.

**URANUS**

Uranus is located in Aquarius and is not visible this month

**NEPTUNE**

Neptune is located in Capricornus, but is hidden by the glare of the sun.

**PLUTO**

Pluto is located in Serpens Cauda and is visible in the early morning.

**METEOR SHOWERS:**

There is one major shower this month:

Eta Aquarids April 21-May 12

There are also several minor showers visible from the northern hemisphere. For more information on these, see *http://comets.amsmeteors.org/meteors/calendar.html*.

# More Moons Found Orbiting Saturn

A dozen new moons have been discovered circling Saturn in a direction opposite to its spin. This suggests that they formed elsewhere in the solar system and were captured by the planet's gravitational field. The 12 new moons, which range in size from, three kilometers to seven kilometers wide, were discovered December 12, 2004, by Brian Barsden of the Harvard-Smithsonian Center for Astrophysics in

Cambridge, Mass. Astronomers had previously identified 34 moons orbiting Saturn.

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## Jupiter Leads the Moon Race with 63 Orbiting Its Girth

Sometimes the term "moon" can be a bit misleading. Especially if you think moons are all large round objects such as our own lunar dance partner. Certainly Jupiter's four Galilean moons resemble our own Moon, at least in shape. But many of Jupiter's outer moons are just big chunks of rocky material. They aren't even round.

That's usually a sign that they are bits left over from an ancient crash, either with another moon, an asteroid or a comet. Some may simply be asteroids that have been caught in Jupiter's monster gravitational hug. But big, small, round, or not, they are orbiting Jupiter on a predictable course and regular as clockwork. So, we call them moons.

Many of Jupiter's new, outer moons are known simply by a series of numbers. And their brightness or lack of it makes them impossible targets for backyard telescopes. Finding them and plotting their courses are the work of professional planetary astronomers.

While mighty Jupiter leads the moon race with 63 moons (current count), Saturn boasts 37 moons, plus its stunning ring system. Next down in the moon count is Uranus with 27 orbital buddies. And farther out, Neptune has so far yielded a count of only 13 moons to astronomers while distant Pluto makes do with one moon. Moving in towards the sun, Mars has two moons, Demos and Phobos, while Earth has but one moon called Moon. Venus and Mercury are moonless.

It is interesting to note that Galileo's first look at Jupiter and its four main moons planted the idea of a mini solar system in his head. To him, if those moons were orbiting Jupiter, wouldn't it be logical to assume that Earth and all the planets known at that time were orbiting the sun? Logical perhaps, but also dangerous thinking for the times as Galileo found out while living out his final days under house arrest.

To make matters even more ironic, most planetary astronomers consider Jupiter to be a failed star. After all, Jupiter puts out more heat than it absorbs from the Sun. Were it about 80 times larger, it would have been a brown dwarf star. A brown dwarf star with 63 planets orbiting it! And that would, indeed, make it a solar system all its own. So Galileo was much closer to the truth than he could ever have imagined.

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## Black Holes Pt IV - Neutron Stars & Pulsars

In 1934 Swiss-American astronomer, Fritz Zwicky and the German-American astronomer Walter Baade puzzled over what would happen if a star collapsed so suddenly that the electrons were smashed as it squeezed together.

The nucleus in the atom is made up of two kinds of particles: protons which have a positive electric charge and neutrons which have no charge. The electrons have a negative charge, even in the smashed atoms of a white dwarf. However, if an electron and proton are forced together and made to join, the opposite electric charges cancel each other out, leaving a neutron with no charge.

If the mass of a collapsing star were greater than Chandrasekhar's Limit, or the collapse was rapid enough, all the electrons would be forced into the nucleus of the atom. The electrons would then join with the protons to form neutrons. The collapsing star would then consist of neutrons only. Now that there are not electrons, the neutrons can come closer to each other until they touch, creating a neutron star. If our Sun, which is 864,950 miles across were to shrink down to become a neutron star, it would be just 9 miles across. But it would still have all of its original mass.

If a neutron star is only a few miles wide, how can we ever check o see if Zwicky and Baade's theory is right? Even if you have the best telescope you wouldn't be able to see it. But there is a way.

The surface of a neutron star should be at a temperature of 10 million degrees. That is far too hot for it to give off much in the way of light. But it would give off a great deal of radiation, such as X-rays and radiowaves. X-rays can't get through our atmosphere, but fortunately, beginning in the 1950's scientists started sending rockets into space. They received X-rays, but were unable to prove that they were coming from stars.

However, in 1931 Karl Jansky, and American engineer, discovered that there were radiowaves coming from the sky. In the 1950's astronomers built special instruments called radio telescopes to catch these radiowaves and study them. By the 1960's it seemed to some astronomers that in some cases the radiowaves grew stronger and weaker

**Our sun has a tremendous gravitational pull. To escape its grip a rocket would have to be traveling at nearly 600 km/sec.**

**A pulsar from the Crab Nebula. Red represents radio emission, green is visible emission, blue is X-ray emission and the dot at the very centre is the pulsar spinning at 30 times per second.**

very quickly. Unfortunately, their radio telescopes couldn't catch these changes.

It wasn't until 1967 that a radio telescope was made that could catch these changes. Within a month Jocelyn Bell, a student in astronomy, was catching short pulses of radio waves from a particular place in the sky. The pulses never varied in their timing by even as much as a hundred millionth of a second. She and a fellow astronomer found a few more places in the sky where there were rapid pulses of radio waves. They didn't know what caused these pulses, so they just called them pulsating stars, which was soon shortened to pulsars.

What caused these pulses and what were they coming from? The Austria-born astronomer Thomas Gold felt that the pulse could only be coming from something small enough to spin very quickly. The only thing he could think of was a neutron star. They are so small and have such strong gravitational pulls that they can turn on their axis in less than a second without breaking apart. Thomas Gold also suggested that the radio waves might only come out from certain spots on the neutron star's surface. Each time the neutron star turned, a spray of radio waves would sweep out in our direction. And not just radio waves, other kinds of radiation would come out at us in pulses, too. For instance the Crab Nebula neutron star sends out pulses of X-rays. So pulsars are just rapidly spinning neutron stars.

In the next issue of the Reflector we'll discuss escape velocity and get up close to a black hole. Yikes!

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# Seeing the Sun in a Whole New Light

One of the prime activities at last weekend's International Astronomy Day Celebration was observing our nearest star, the Sun. Most of the telescopes on hand were equipped with white-light filters that reduce the Sun's brightness down to about one ten-thousandths of what it would be without a filter. This allows the observer to view events on the Sun's surface such as sunspot activity. These dark spots are simply the result of being cooler than the surrounding area. That works out to about 5,000 degrees C instead of 6,000 degrees C. But don't for a second think that sunspots are actually dark. If you could peel one off of the surface of the sun, it would still glow more brightly than the full moon. As Einstein might say, all things are relative.

New at this year's Astronomy Day was a telescope equipped with a Hydrogen Alpha filter. Owned by Kawartha cottager and frequent PAA guest, Gord Simpon, this little scope is dedicated to solar observing. So unlike the other scopes with white-light filters that come off to allow night time viewing, the Coronado PST (Personal Solar Telescope) is strictly a one-trick pony. But what a trick!

Viewing the sun in a very narrow Hydrogen Alpha band width reveals the tenuous gas just above the Sun's surface or photosphere. Known as the chromosphere, this superheated gas (about 1 million C) is where the real action is. All those really cool (pun intended) solar photographs of the solar flares licking out into space were taken with this type of filter. And while they look like little flares – they are only small in comparison to the Sun. You

**The solar flares pictured here only appear to be small. They actually extend for thousands of kilometers above the Sun's surface. Never attempt to view the sun with anything other than a filter designed specifically for observing the Sun. Damage to your eyes will be instantaneous and permanent.**

have to remember that our sun may be classified as a yellow dwarf, but it is still over a million times larger than planet Earth. So what appears as a little spit of flame off the solar surface can be 10,000 km or greater in length.

If the lineups at the Coronado Personal Solar Scope were any indication of the fascination it generated in our local star, then it was one of the big hits of the day

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## Your Guide to 10 Brightest Stars 9 - Achernar

Achernar is derived from the Arabic phrase meaning "the end of the river," an appropriate name for a star that marks the southernmost flow of the constellation Eridanus the River.

Achernar is the hottest star on this list. Its temperature has been measured to be between 24,740 and 33,740 degrees Fahrenheit (14,000-19,000 Kelvin). Its luminosity ranges from 2,900 to 5,400 times that of the sun. Shining at magnitude 0.45, its light takes 144 years to reach your eye.

Achernar is more or less tied with Betelgeuse (No. 10 on the list) for brightness. However, Achernar is generally listed as the ninth-brightest star in the sky because Betelgeuse is a variable whose magnitude can drop to less than 1.2, as was the case in 1927 and 1941.

For Northern Hemisphere observers, Achernar rises in the southeast during the winter months and is visible only from latitudes south of 32 degrees north; those further north only see a portion of the constellation.

For "Star Trek" fans: Eridanus is home to Epsilon Eridani, the star around which Mr. Spock's home planet of Vulcan revolves.
Achernar is a massive class-B star containing up to eight solar masses. It is currently burning its hydrogen into helium and will eventually evolve into a white dwarf star .

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## Read All About It!

The PAA library has expanded by seven new titles and two new DVDs. Our thanks go out to Rick Stankiewicz who capitalized on the Peterborough Library's book sale, Mark Coady who wound up with two copies of *The Practical Astronomer.* Something had to go, and what better place than the PAA's library. We also thank John Crossen for contributing the two DVDs. They are backups copies from his own collection.

Rick's contribution includes *Edwin Hubble, A History of Astronomy, The Astronomer's Universe, Newton's Clock (Chaos in the Solar System), Seeing the Deep Sky, The Comet is Coming,* and *End- Cosmic Catastrophe and the Fate of the Universe.*

They alone should hold us through a couple of cloudy Novembers. To review them all would take a couple of weeks, but with authors such as Canadian comet hunter David Levi, S&T's Fred Schaaf, an Herbert Friedman the level of quality is nothing short of astronomically high.


On the DVD side of things we welcome a couple of rainy night specials to our Earth Sciences collection. *Lightening* is a superb study of this foul weather companion that is responsible for a remarkable number of injuries and deaths each year. Filmed by the NOVA people it takes you on an adventure that releases balloons and fires rockets into storm clouds to learn more about what causes lightning and how to help prevent costly damage to electrical equipment, power grids and ourselves.


If you'd like a little more excitement than a lightning bolt can generate, try looking a hurricane straight in the eye. That's precisely what happens in the NOVA DVD special *Hurricane.* Climb aboard a specially- prepared plane and join a crew from the National Hurricane Centre on a flight that takes you straight into the centre of Hurricane Gilbert. Inside you'll meet a spectacular canyon of clear sky surrounded by a wall of whirling clouds ten miles high. Oh, and you'll also meet some of Gilbert's buds on the DVD – like Andrew and Camille.

Once again our library grows with some valuable material for anyone interested in astronomy or our favourite planet, Earth. Thanks to Rick and Mark for their generous contributions.

While we're on the subject of books and people, the PAA library could use a full-time librarian. Yep, it's that big. And it looks like it's going to keep on growing! You'll need some garage space to stow all the stuff and we'll be glad to help you load and unload at the meetings. Please give it some thought. The PAA library is one of the major benefits the club offers. So heading it up is one of the most important ways you can help us keep up our high level of member service.

John Crossen
JohnCstargazer@aol.com

# 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:

Charles Baetsen
4094 Squair Rd
Orono, ON
L0B 1M0

or via e-mail at:
**va3ngc@rac.ca**

**NEXT ISSUE'S DEADLINE IS**

**June 6th, 2005**

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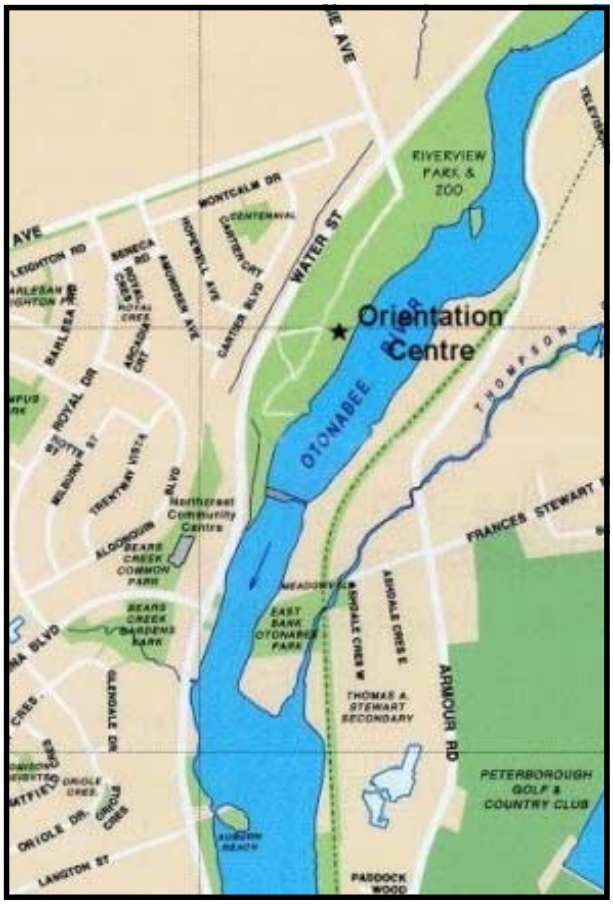
# MEETINGS

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**.




## CALENDAR OF EVENTS

| | |
|---|---|
| **May 13, 2005** | **General Meeting—**Thomas Kovacs of the Haliburton Forest Observatory. |
| **May 27, 2005** | **General Meeting—** Observing Night - Buckhorn Observatory (if clear). |
| **June 10, 2005** | **General Meeting—** Topic TBA - Orientation Center at the Riverside Zoo. |
| **June 24, 2005** | **General Meeting—** Topic TBA - Orientation Center at the Riverside Zoo. |

## MOON PHASES

| | | |
|---|---|---|
| **Last Quarter (☾)** | **May 8, 2005** | **June 6, 2005** |
| **New Moon (●)** | **May 16, 2005** | **June 14, 2005** |
| **First Quarter (☽)** | **May 23, 2005** | **June 22, 2005** |
| **Full Moon (○)** | **May 30, 2005** | **June 28, 2005** |