

Deadly Planets

by Patrick L. Barry and Dr. Tony Phillips

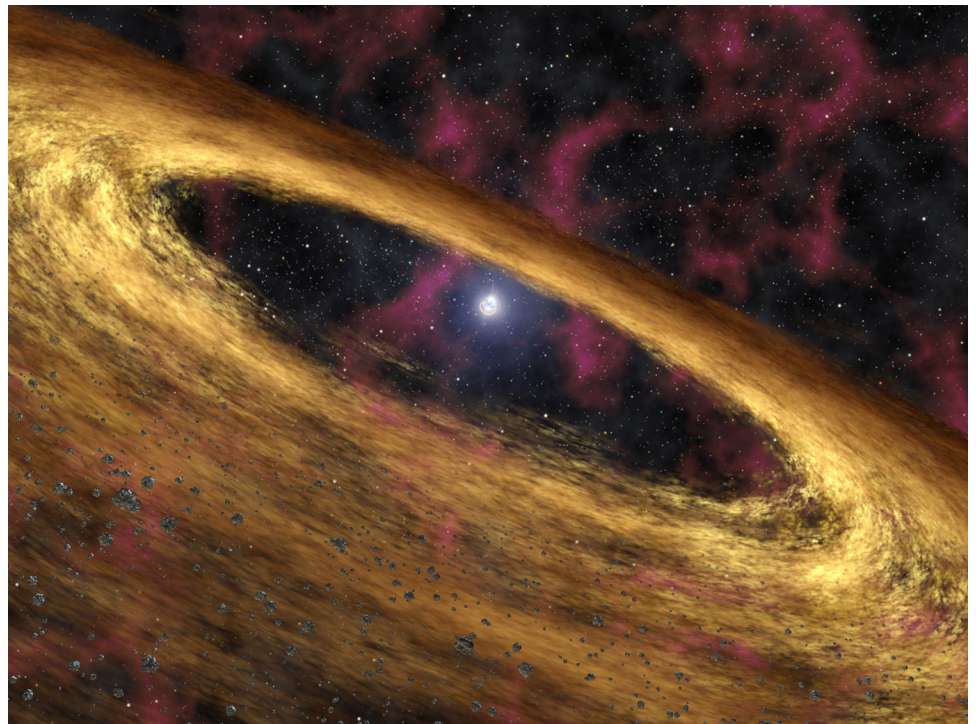
ABOUT 900 LIGHT YEARS from here is a rocky planet not much bigger than Earth. It goes around its star once every hundred days, a trifle fast, but not too different from a standard Earth-year. At least two and possibly three other planets circle the same star, forming a complete solar system.

Interested? Don't be. Going there would be the last thing you ever do.

The star is a pulsar, PSR 1257+12, the seething-hot core of a supernova that exploded millions of years ago. Its planets are bathed not in gentle, life-giving sunshine but instead a blistering torrent of X-rays and high-energy particles.

"It would be like trying to live next to Chernobyl," says Charles Beichman, a scientist at JPL and director of the Michelson Science Center at Caltech.

Our own Sun emits small amounts of pulsar-like X-rays and high energy particles, but the amount of such radiation coming from a pulsar is "orders of magnitude more," he says. Even for a planet orbiting as far out as the Earth, this radiation could blow



Artist's concept of a pulsar and surrounding disk of rubble called a "fallback" disk, out of which new planets could form.

"As deadly as pulsar planets are, they might also be hauntingly beautiful. The vaporized matter rising from the planets' surfaces could be ionized by the incoming radiation, creating colorful auroras across the sky."

away the planet's atmosphere, and even vaporize sand right off the planet's surface.

Astronomer Alex Wolszczan discovered planets around PSR 1257+12

in the 1990s using Puerto Rico's giant Arecibo radio telescope. At first, no one believed worlds could form

see "Pulsar" on page 16

As the Season Unfolds

Winter is officially over (if that's what you call what we just had) and we start to look for clear skies after the Spring Equinox (March 20th). I am writing this before Earth Hour (March 27th), so I can't say how that will go compared to the last two years, but I hope at least as good. This will be the first time that the P.A.A. has ever officially and totally "taken over the Hill" (Ashburnham Memorial Park that is). We may be doing more of this in the future too.

Raffle tickets are getting off to a slow, but steady start. At this point, less than half the tickets are even out for sale. With 18 prizes to be won and 2,000 tickets to sell, we have our work cut out for us this year, but the potential profit for public outreach and light pollution abatement programs is amazing. But any unsold ticket is money thrown away or at least lost potential. Please sell at least three books worth and get in on the Members Only Draw. Contact me directly for tickets and I can even mail them if need be. We only have until the middle of May to sell them all, so "pitter, patter, let's get at her!"

I would like to welcome back our previous members that have taken the time to renew to date, but also welcome some new members who have joined us in recent months: Glen Minshall, the Bliard Family and the crew at the Peterborough Museum and Archives (P.M.A.). We are glad to have you join us at the P.A.A. Please get involved, enjoy the benefits of membership and help make a difference! We now have a club telescope that tops out at 10" (254mm) diameter. I have seen it and it is a sight to behold!

Don't forget that our April meeting has been moved to the 9th and will be held at the P.M.A. instead of the zoo. We are looking forward to another Skype session at this meeting. We have the upcoming annual Regional Science Fair on Tuesday, April 13th at Trent University.

Keep looking up!

Rick Stankiewicz
President

Editor's Message

Spring has arrived after one of the driest and warmest winters we've seen. Not that we didn't have our fair share of snow and sub-zero temperatures (We managed to skate on our frozen pond throughout February.)

Predicting the weather for spring and summer observing is always predicated on chance. Even if we have a dry summer and fewer cloudy nights, very hot days invite smog days which would not make for great observing nights.

Let's put aside those prognostications for now and welcome this month's *The Reflector*. We have John Galle's fourth in a series writing about his adventures as an astrophotographer. John Crossen entertains and educates us with his usual wit. We have Rick Stankiewicz's fine photographs in the gallery. Yours

truly as a brief report on this past Earth Hour and Rodger Forsyth brings us a late breaking report about an astronomy night with the Bridgenorth Cubs.

Phillip Chee, Editor



**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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The Sky this Month

Mercury is at inferior conjunction on the 28th. Western evening star during the first half of the month with greatest elongation east (19°) on the 8th.

Venus is in the western evening sky. Mercury within 4° during first 10 days of the month. Crescent Moon passes 4° N on the 16th.

Mars is an evening star and increasing eastward motion. Passes near the Beehive Cluster from the 15th to 18th.

Jupiter is low in Aquarius in the morning sky.

Saturn is visible all night and is just past opposition and retrograding in Virgo.

Moon is 0.5° S of the Pleiades on the morning of the 17th (2 AM) and 5° S of Mars on the 22nd. Venus is 4° S on the 16th. Antares 1.6° S on the 3rd and 1.7° S on the 30th.

Lyrid Meteor Shower peaks at 1 p.m. on the 22nd.

New P.A.A. Member Sets The Bar!

One of the newest members to the PAA has established himself as a budding astrophotographer. Gabriel Bliard just joined our club at the March meeting and has already had an image publish on-line in the SkyNews web site's Picture of the Week (POW). It stayed posted for two weeks too! This is quite an accomplishment, as some of your other members know, like I do, that it is no easy task to be picked from all the submissions they get on a weekly basis. The attached link will speak for itself:

<http://www.skynews.ca/pages/POW.html>

If by the time you read this it is no longer on the front page go to the link for previous photos of the week: http://skynews.ca/pages/POW_previous.html

Photo of the Week #425: Old Moon, Young Astro-Imager

Congratulations Gabriel! Keep on clicking.

Rick Stankiewicz

Adventures of a Space Tourist Wannabe

Join us at our April meeting on Friday, April 9 at the Peterborough Museum and Archives as we host another Skype guest speaker. Author and P.A.A. member Peter McMahon chronicles his quest to cover the dawn of a new age in aerospace for two kids books and the mass media—includes insights from interviews with X-Prize co-founder and the first-female-space-tourist Anousheh Ansari, SpaceshipOne test pilot Brian Binnie, and NASA astronauts Suni Williams and Susan Helms, as well as a number of space tourism engineers and “space architects”. The business portion of the meeting starts at 7 p.m. and at 8 p.m. for the regular meeting.

Moon Phases

Last Quarter	5:37 AM	April 6
New Moon	8:29 AM	April 14
First Quarter	2:20 PM	April 21
Full Moon	8:18 AM	April 28

Misadventures of an Aspiring Imager

Adventure # 4

Maintaining Proper Balance and Sanity

TO CONTINUE THE SAGA. In the last installment I finally had my brand new camera set up and balanced on my mount, and the scope pointed to the target I wanted to image.

Imagers come with software to load on your computer which will start up the camera, start the cooling, if so equipped, and assist you with focusing the camera. In my case I use a package from Software Bisque called CCDSoft. There are numerous competing packages including CCDOps, Nebulosity, Maxim DL, etc., but I understand that the focusing programs are pretty well the same from all of them. I won't get into the actual operation of the software as this is far better covered by other information sources. Instead, I'll concentrate on another one of those teeny weeny little challenges that doesn't get a lot of attention in the software manuals i.e., actually achieving focus.

The basic steps in focusing is to take a quick image, have a look at it to see if it's in focus, then make an adjustment to your focuser and take another image. Pretty straightforward—right? Again, you are dead wrong.

In my first attempt I ran right to the extreme end of the focuser without getting anywhere close to being in focus. As I didn't have a clue as to what I was doing I started down a lot of false paths before coming to the realization that I was actually focusing properly but that focus would only be achieved by extending the length of the light path. Thanks to OPT in California, about the only outfit I know that always has what you want in stock (that's a plug!), I got a 4" focus

extender in 2 days. Looking back I should have done some calculations to determine if I had adequate reach with my existing focuser, but we live and learn.

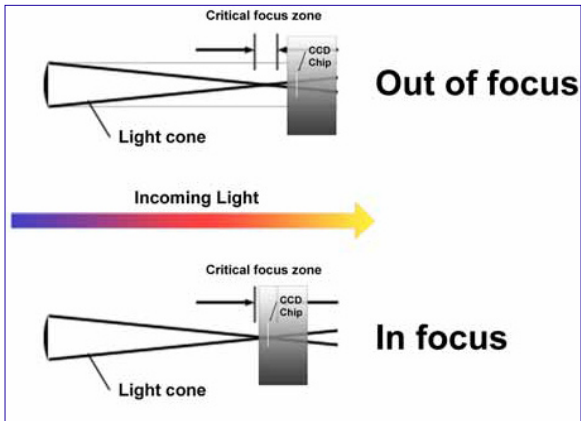
Back in action. Fire up CCDSoft and start the routine again. Definitely making progress. I could get nearly into focus—the key word in 'nearly'. With these focusing packages there is, typically, a graph of pixel brightness, and the objective is to get the highest value possible. In my case I was always missing the peak, being too much to one side or the other, but never acceptable, with the images being quite blurry. This was true even though I was ever so careful in moving the focuser just a tiny, tiny bit—I'd always overshoot.

The next approach that was suggested to me is to use the assist of artificial diffraction spikes. Initially I simply placed two pieces of black electricians tape at 90 degrees across the dew shield at the front of the scope—this certainly helped in getting very close to focus very quickly by maximizing the sharpness of the spikes. But on taking an image of 10 or 20 seconds it was apparent that the focus was not good enough. I also tried a mask attached to the dew shield with 3 odd sized triangles, but again not good enough.

Back to the books. I recalled vaguely seeing a mathematical equation somewhere that had a lot to do with focusing, but I had just skipped over that—tooooooooo booooooooooring. Shame on me.

It's called "critical focus zone", or CFZ for short. The equation is quite simple:

$$\text{CFZ} = 2.2 * (\text{focal-ratio})^2$$



Source: The New CCD Astronomy. Ron Wodaski.

The focal ratio for the Televue NP101 is 5.4, so the CFZ = 64.15 microns. Do you know how big 64 microns is, well, a strand of hair is about 100 microns!

OMG!!! No wonder I'm having trouble.

No problem, for around \$1,000 I can get a fully automated focusing system. Yeah, sure, get real, I can think of a million other things I'd prefer to spend \$1,000 on!

Again, OPT in California came to the rescue. In 3 days (and \$200 later) I received a 6:1 ratio fine focus attachment.

Now I can focus, but it's more an art

than a science, with a little bit of luck on the side. This is because focusing is not just the mechanical activity of positioning the focuser in the critical focus zone. There is that 20 miles of atmosphere between your scope and outer space that can be a real pain in the neck, and this will be the subject of my next installment.

Stay tuned for more misadventures, including:

- the real meaning of **seeing**
- **polar align** or else...
- **auto guiding** ain't so automatic
- **backlash** really hurts
- what the heck is **PEC**
- why I am becoming a **computer** geek
- being **colour** blind doesn't help
- **digital developments**
- and I thought **curves** was all about beautiful women and fast cars
- keeping things in **balance** and **sharp**
- **presenting** the snaps to the world
- and what makes it all worthwhile

Stay tuned
John Galle



Photo by John Gallen

If you're a fool for planets April is your month

ALL FIVE OF THE NAKED-EYE planets are visible this month. Giant Jupiter awaits early risers in the pre-dawn sky. It's located near the constellations Aquarius the water bearer and Pisces the fish. I guess the jovial giant must be thirsty.



CONSTELLATION LEO. Leo, king of kitties reigns high in the south just after darkness. He's big and easy to spot—even from the suburbs. Saturn is the bright star-like object between Spica in Virgo and Regulus, the lion's heart in Leo.

At the opposite end of the day, Mars is just sinking out of sight in the western sky along with Gemini the twins at sunset. Meanwhile Venus and Mercury are also visible in the western sky as twilight turns to dusk and then night. Venus is the very bright star-like object. Mercury is below it and not nearly so bright. Binoculars will help you see the little fellow in the sunset's glow. Mercury will be at its best during the first ten days of April, so see it now or see it not.

Saturn is well up in the southeast at nightfall and is currently residing in the constellation Virgo between the bright stars Spica in Virgo and Regulus in Leo the lion.

This year Saturn's rings are beginning to tilt more towards Earth so the planet will be a bit brighter thanks to the reflective surface of the rings combined with the planet's gaseous surface. But you still won't be able to see the dark divisions between the rings. That'll have to wait until next year when our view of Saturn reveals more of its rings.

The king of the jungle is also the king of the night sky. As darkness falls—and it's arriving later each day—Leo the lion rides high in the southern sky. The lion is one of the few constellations that really looks like its namesake. Imagine the lion in profile stretched out like an Egyptian sphinx. The large backwards curve at the front represents Leo's head and shaggy mane. The star-triangle at Leo's rear outline his back haunches. At least that's how I see him.

Beneath Leo is the constellation Virgo and parading across the sky in front of his majesty is Cancer the Crab along with planet Mars. Gemini too is up, but the twins are rapidly racing towards the western horizon which will soon hide them both.

Lunatics will be treated to a waxing Thin Crescent Moon on April 8, First Quarter (Half Moon) on April 21 and a Full Moon on April 28. New Moon (no Moon) is on April 14. Those of you who would like a peek at the Moon or Saturn will be pleased to know that Buckhorn Observatory officially opened for the season on April 1. There's something auspicious about that date that probably applies to all stargazers.

John Crossen

Let's Rock Around the Asteroid Belt



ASTEROID IDA. Asteroids vary in size from small pebbles to huge rocks such as Ida shown here. Ida is 56km x 24km x 21km and has its own small moon (to the right) called Dactyl that is gravitationally controlled by Ida.

NESTLED BETWEEN MARS AND JUPITER A HUGE RING OF ROCKS KNOWN AS THE ASTEROID BELT ORBIT OUR SUN. BACK WHEN I WAS IN HIGH

school a popular theory was that the rocks in the Asteroid Belt were chunks of a planet that had been blown apart. As dramatic as that theory was, it appears today that a different culprit was at work—gravity. To point the finger of blame, it was Jupiter's tremendous gravitational tug. Here's how we now think it worked. Are you ready for a little time travel? Good, because we're going back about 4.5 billion years.

As the planets slowly coalesced from the dust ring surrounding our new-born Sun they became large clumps. As you might imagine our solar system was a busy and chaotic place. Lots of clumps were bumping and banging into each other. Some clumps stuck together and became even larger while some were ground down into dust again. To make a very long story short, the planets as we now know them eventually took shape... with one exception.

Giant Jupiter with its massive gravitational pull kept the clumps between its orbit and that of Mars from coalescing. Today instead of a planet we have the ring of rocks we call the Asteroid Belt. Not as exciting as blowing a planet up, but reality seldom is.

How powerful is Jupiter's gravitational attraction? Those of you who were adults in 1994 should remember how Jupiter split apart an incoming comet. It was named Comet Shoemaker/Levy 9 in honour of its codiscoverers, Gene and Carolyn Shoemaker and Canadian David Levy. As it was on its return orbital path to deep space, the real fireworks took place and the broken pieces were drawn into Jupiter where they left Earth-sized holes in the cloud tops of the gas giant. If any one of those 11 pieces of comet debris had collided with Earth, I wouldn't have written this and you wouldn't be here to read it. So instead of thanking our lucky stars, thank planet Jupiter's gravity.

Occasionally a couple of them bump together. That can lead to one of them being nudged out of orbit. If it heads inwards towards Earth, that can be bad. Ask any dinosaur. Astronomers currently have a project called Near Earth Objects (NEO) which monitors potentially dangerous Asteroids that cross Earth's orbital plane.

In the next few articles we'll enter the realm of the gas giants—Jupiter, Saturn, Uranus and Neptune. Until then keep your lights aimed down and the stars up bright.

John Crossen

PHOTO GALLERY

Venus Rising...



...as an evening star, that is. As we head in to spring, our inside neighbouring “sister planet”, Venus, becomes our twilight beacon in the western sky. It became very obvious to me the season had start for this on the evening of March 17th (three days before the Spring Equinox). From my backyard near Keene, I watched as a 2-day old crescent Moon hovered over a bright Venus hanging low in the western horizon. The right-hand images show Venus setting into the twilight clouds, which changes the hue of this brightest of all planets. I used a tripod mounted Canon 400D camera and Sigma zoom lens (between 70 & 100 mm) and exposures between 0.8 & 2 seconds, f/4 to 4.4 aperture and ISO 200 & 800.

So keep “looking up”, you just never know what you might see.

Rick Stankiewicz

One Bright Sundog



On March 4, 2010 I caught an unusually bright sundog (parhelion) to the left of the Sun late in the afternoon from downtown Peterborough. What is particularly nice about this shot is the interesting cloud formation that trails off to the left. It reminded me of a Phoenix or an apparition of some sort. I have not seen a Sundog this bright in years. This classic colouring is never a pure spectrum of colour. Like this image, they might show hints of greens and blues but they are subtle because all the colours at the extreme opposite end of the spectrum (reds, oranges and yellows) overpower them. Hexagonal shaped ice crystals in the atmosphere help create this rather common phenomenon. However, they are usually much more subtly coloured and less obvious than these images. It sure pays to be prepared though.

All I had at the time to capture some of it was a small Panasonic TZ-5 camera (ISO 100; exp.1/500; f/10).

This photo shows a partial 22 degree halo starting upward, like a partial rainbow, at 22 degrees radius from the Sun, which is just blocked out of the frame to the right.

Rick Stankiewicz

Visit our Moon

Been There, Done That



GOLF ON THE MOON. Astronaut Alan Shepard smacked three golf balls while on the Moon using a make-shift six iron.

WE'VE SENT PROBES INTO Jupiter, spacecraft to Saturn, other ships are on their way to Mercury, Venus and Pluto but the Moon is the only other place in our solar system where mankind—critters like you and me—have left our footprints. And, while it appears that NASA's plans to return to the Moon in 2020 are on hold, we still have an interest in our celestial dance partner.

The Moon is roughly one quarter the size of Earth and has less mass. That translates into about one sixth the gravitational pull. So 100 pounds on Earth would only weigh 15 pounds on the Moon. That means we could all jump about six feet high. Wouldn't that make for some interesting basketball games?

Of course you'd have to hold your breath because the Moon has no atmosphere. Hum, bummer! Then again, with no wind resistance and lower gravity even a sacrifice bunt at the ballpark could be a home run. And think of the distance you could get with a ski jump! Let's hold the

next Olympic Games on the Moon. Actually we already have in a round—about miniscule way. Astronaut Alan Shepard smacked a golf ball across the Moon's surface during the Apollo 14 Moon Mission.

On a more sobering note, the side of you facing the Sun would be heated to about +200 °C while your opposite side would be about -185 °C. Better pack a space suit along with your spare socks.

Speaking of space suits, having to wear one would take away any advantage the lower gravity would give you. The suits weigh in at 400 pounds, so jumping six feet off the lunar surface would be reduced to a mere shuffle through the lunar dust.

The Moon, like all the planets, shines because it reflects sunlight. It has no internal heat or light source. The Moon's core cooled a few billion years ago. Without a spinning hot metallic core the Moon has no magnetic North or South Pole and that means no magnetosphere such as the Earth has to protect it from cosmic rays from the Sun. [see "Moon" on page 15](#)

Live Large

Move to Jupiter

ICAN'T THINK OF ANYTHING SMALL about Jupiter. The planet itself is 1,000 times larger than Earth. Its largest moon, Ganymede, is bigger than the planet Mercury and our own Moon. And if you're counting moons, Jupiter leads the pack with 69 natural satellites orbiting it.

Even the weather on Jupiter is big. The Giant Red Spot is a storm that has been swirling for over 300 years. Since telescopes were good enough to see it, the GRS has been whirling away. And it's fair to assume that it was going at it for hundreds of years prior to the invention of the telescope. Like everything else on Jupiter the GRS is big. Earth and Venus would fit inside it side-by-side with ease.

I frequently liken Jupiter to a politician—all puffed up, but full of nothing but air.

That's because Jupiter is the first of the four "Gas Giant" planets that orbit in the outer regions of our solar system. It is comprised of a thick outer layer of hydro-

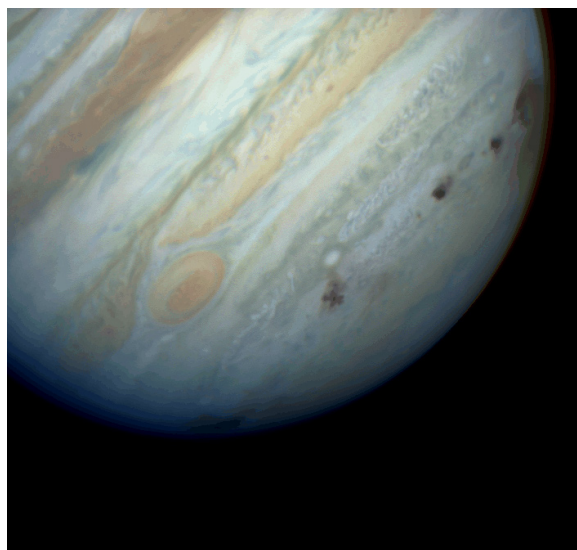
gen and helium gas—the same stuff stars are made of. This atmosphere is broken down into the dark bands and lighter zones you see in photographs. The light zones are higher up in its atmosphere. They are similar to the high and low pressure zones on Earth's, except Jupiters rapid rotation stretches them into the belts and zones seen though a telescope.

How fast does Jupiter rotate? The gas giant takes less than ten hours to make one complete revolution. Puny little Earth takes twenty-four hours to rotate once. So Jupiter is pretty nimble for a giant. Jupiter's rapid rotation also stretches it so that it is bigger around than it is tall—kind of like me—except I can't blame it on centrifugal force.

The deeper you go into Jupiter's atmosphere the more the pressure increases. At some point, astronomers think the helium gas becomes liquid. Moving further in, we suspect there is a solid core.

Jupiter is similar to the other gas giants

[see "Jupiter" on page 15](#)



JUPITER IMPACTS. I had the pleasure of seeing the impacts through my telescope 16 years ago. The "Wow Factor" was extreme to say the least. Hubble photo.

Earth Hour on the Hill



Ice Halos. With a thin veil of clouds not providing the clearest of views of Mars and Saturn, the Moon was still able to wow the crowd. It didn't hurt that ice halos graced our lunar companion. We were witness to a brilliant display of a 22° halo, upper tangent arc, circumscribed circle, moon dog, and parhelic circle.

Photography by Phillip Chee

EARTH HOUR 2010 WAS MARCH 27 FROM 8:30 P.M. TO 9:30 P.M. The Peterborough Astronomical Association (P.A.A.) hosted a public observing night atop Armour Hill in Peterborough. P.A.A. executives and volunteers setup telescopes including the new club 10" reflector that Rodger Forsyth and Trish McCloskey put many hours in making viewing-worthy.

This was the third Earth Hour the club has used as a public observing and outreach night. A waxing gibbous Moon, Mars, and Saturn provided viewing highlights. Though there was no International Space Station this year a number of ice halos did grace the Moon.

New this year was our ability to control the upper parking lot and restrict access only to club members with viewing

equipment and members of the public with accessibility requirements. A stronger due diligence requirement from the City of Peterborough made this possible and we are planning to take advantage of this.

The *Peterborough Examiner* and CHEX-TV both mentioned our public observing event in Earth Hour publicity. This likely contributed to the estimated 100 people on Armour Hill during Earth Hour. Additionally, Jay Scotland's Weather Blog highlighted one of Phillip Chee's photos and time lapse movie of the event. You can see them at <http://chexweather.blogspot.com/2010/03/heavenly-halo.html>.

Phillip Chee

Astronomy Badges For the Bridgenorth Cubs

Another very successful evening (Tuesday, March 30) with the cubs. Trish McCloskey and I did our astronomy presentation with the Bridgenorth Cubs tonight. The cubs were split into four groups and each group was given a sheet about a constellation. Rick Stankiewicz had provided us with a sheet to which I added some folklore to them.

After the groups studied their sheets we turned out the lights and used the Homestar portable planetarium. Each group was then instructed to find their constellation. When a group claimed to have found theirs we gave them a laser pointer to show everybody where it was, then using a red flashlight one of the cubs read questions about their constellation and provided answers if no one could answer the question. The leader of each group read the folklore. We also used my Meade MySky at the end to get folklore in more detail.

They only had three cub leaders there so P.A.A. member Nicholas filled in as a fourth leader. He did a good job.

The cub leaders were really impressed and in fact gave out astronomy badges to all the cubs. They all found their constellation and actively participated.

We also made up a kit for each cub and leader. The kits contained a star finder, L.P.A. brochure, sidewalk astronomy guide and a club business card.

At the end there was a discussion about having the cub pack host an observing session. We thought we could use the club's 10", Nicholas's scope, my 4.5" and the S.C.T. in the SkyShed. I will offer this but only if we have volunteers to man the scopes. A telescope should not be left unattended. If you are interesting in volunteering let me or someone on the executive know.

Rodger Forsyth



TAKING A PEEK. Peterborough Astronomy Association telescopes were setup atop Armour Hill on March 27 for Earth Hour providing the general public with a view to the night sky.

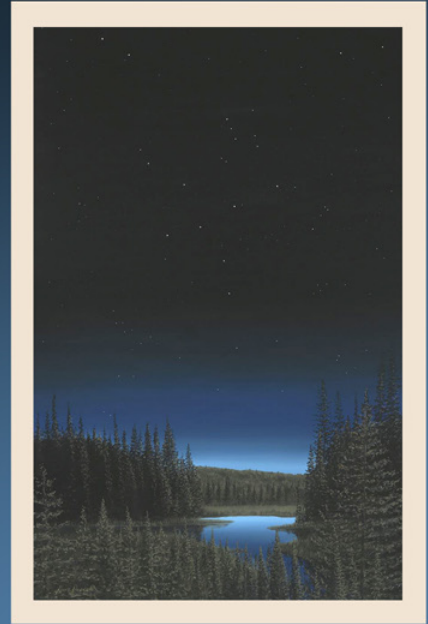
Photo by Phillip Chee

Astronomy on the '10 Hill *Raffle*

Tickets:

\$2 each / \$5 for 3

Available from: Peterborough Astronomical Association
Peterborough Museum & Archives



Prizes:

* Framed, "Northern Cross" ltd. ed. art print by artist, Kelly Dodge (shown)

* 5" dia. "SkyWatcher - Heritage" telescope (shown)

Draw Date:

May 16 at 4:00pm

Join us for

Astronomy on the Hill

May 15 8:00pm to 11:00pm

Night viewing on Armour Hill.

May 16 1:00pm to 4:30pm

Activities at the Museum -

featuring science journalist, author and children's instructor, Peter McMahon.

Enjoy solar viewing, a planetarium and displays.

FREE ADMISSION

The Museum and Armour Hill are located at 300 Hunter Street, East in Peterborough.



for more information
(705)743-5180

www.peterboroughastronomy.com
www.peterboroughmuseumandarchives.ca

Raffle licence number:
#M 358113

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Jupiter

in that it also has rings, but nowhere near as spectacular as those of its neighbour, Saturn. Instead, Jupiter's hula-hoops are extremely thin and aren't even visible from Earth.

Jupiter also holds the honour of being the first planet ever to be hit by a comet and have the event witnessed from Earth. The year was 1994 and Carolyn Shoemaker noticed something unusual on an astronomical photographic plate she examining. She, her husband Gene and Canadian comet sleuth David Levy were hunting comets, and oh boy did they find one. It looked like a train of comets. Later it was determined that Comet Shoemaker-Levy nine had broken up as it passed through Jupiter's gravitational range.

As is the case with most comets, the pieces continued their orbit around the Sun. But on the way back towards the outer solar system, each of the separate parts of the comet smashed into Jupiter's cloud-thick atmosphere. The dark circles the impacts left behind lasted for weeks before Jupiter's rapid rotation stretched them into oblivion.

So live large on Jupiter where a 150 pound man would weigh in at 354.6 pounds. Not as much as you'd expect, but then being mostly gas, Jupiter's mass betrays its gigantic size.

John Crossen

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Moon

So any flare up on the Sun would spell near-instant death to the astronauts walking on the Moon. Had there been any major solar flares when the Apollo astronauts were on the lunar surface they would not have had sufficient shielding to protect them.

Happily it's a lesson we didn't have to learn the hard way.

I often think of the Moon as a time capsule. Its surface hasn't changed much over millions of years. You can thank the fact that dear old Luna has no air, water or tectonic plates for that. With no wind or water erosion the surface features remain unchanged. And without any tectonic plate shifts, there are no Moon quakes to disturb things either.

In fact the astronaut's foot prints and the tracks of their rovers still remain unchanged.

Next up we'll visit Mars, one of my favourite choices for setting up a colony. Can you imagine your children being the grandparents of Martians—well if babies are born on Mars we can't call them Earthlings can we?

John Crossen



ROUND TABLE PLATFORM. Mark Coody demonstrates the Round Table Platforms equatorial tracking platform. Adds equatorial capability to Dobsonian mount.

For Sale

Available is a Round Table Platforms equatorial platform custom made by Brian Reed that allows Dobsonian telescopes up to 12.5 inches in aperture to track objects for up to 75 minutes within $5^\circ \pm$ of 44.3° N. Short period astrophotography (less than 1½ minutes) is possible when using the platform. Price is \$400 for P.A.A. members or best reasonable offer.

Contact Mark Coody at:
lightpollutionabatement@gmail.com
or call 705-292-9916.

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Pulsar

around pulsars—it was too bizarre. Supernovas were supposed to destroy planets, not create them. Where did these worlds come from?

NASA's Spitzer Space Telescope may have found the solution. In 2005, a group of astronomers led by Deepto Chakrabarty of M.I.T. pointed the infrared telescope toward pulsar 4U 0142+61. Data revealed a disk of gas and dust surrounding the central star, probably wreckage from the supernova. It was just the sort of disk that could coalesce to form planets!

As deadly as pulsar planets are, they might also be hauntingly beautiful. The vaporized matter rising from the planets' surfaces could be ionized by the incoming radiation, creating colorful auroras across the sky. And though the pulsar would only appear as a tiny dot in the sky (the pulsar itself is only 20-40 km across), it would be enshrouded in a hazy glow of light emitted by radiation particles as they curve in the pulsar's strong magnetic field.

Wasted beauty? Maybe. Beichman points out the positive: "It's an awful place to try and form planets, but if you can do it there, you can do it anywhere."

Find more news and images from Spitzer at <http://www.spitzer.caltech.edu/>. In addition, The Space Place Web site features several games related to Spitzer and infrared astronomy, as well as a storybook about a girl who dreamed of finding another Earth. Go to <http://tiny.cc/lucy208>.

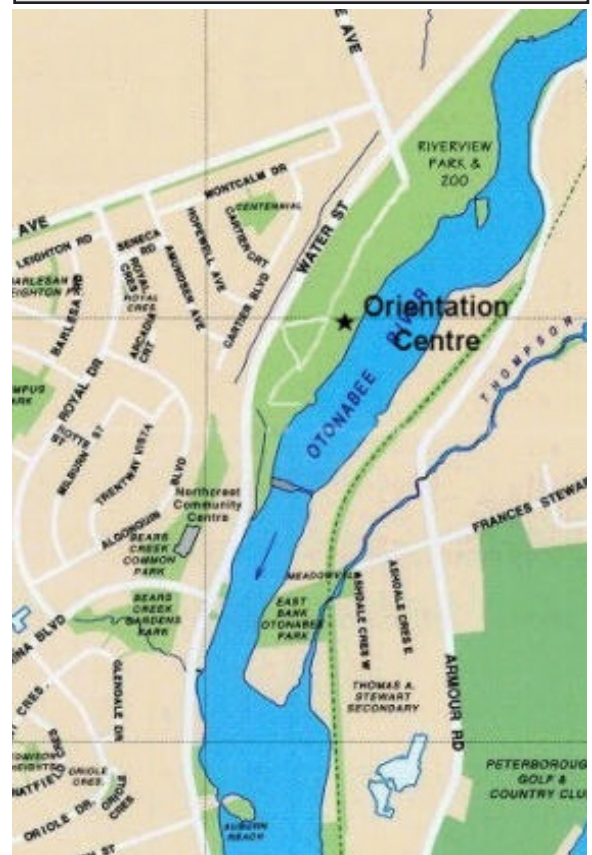
This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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:
April 25, 2010**



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.