Peterborough Astronomical Association
The Reflector

Volume 9, Issue 6 ISSN 1712-4425 June 2010

Astronomy on the Hill

A FAMILY OUTING. P.A.A. member Brett Hardy lends a helping handing at the focusing lens during the Sunday session. *Photo by Phillip Chee*

To put a positive spin on last month's Peterborough Astronomical Association Astronomy Weekend we could say it was half-full instead of half-empty. That is to say the Saturday observing session was clouded over. It was not a positive feeling to wake up to clouds on Saturday morning that did not clear out during the day.

But that didn't dampen public enthusiasm for our Sunday slate of displays, activities and solar observing. While the sun did not sport any sunspots, visitors were treated to day time viewing of the crescent Moon, Venus, Mars, and even some bright stars such as Sirius, Procyon and Betelgeuse!

Peter McMahon gave a slideshow presentation of space tourism and then gave the kids a ride on his hovercraft. Unfortunately he forgot to bring the fuses and the rocket launch was scrubbed. Don't feel sorry Peter—NASA does that all the time with the shuttle!

Of course the planetarium show is always a hit and this year Mark Coady made his debut as master of ceremonies.

Check out more photos from the Sunday event on page 8.

Phillip Chee

President's Message

Spring in Full Swing

Wow, what a month May was! The P.A.A. was busier than ever. You would have thought that it was the International Year of Astronomy (IYA) all over again. For those of you that got involved in any way, I thank you.

The PAA display in the first week of May at the Peterborough Public Library looked awesome! Our annual raffle was another success. With the most ever and best selection ever of prizes it was no wonder. We might not have sold all 2,000 tickets, but we still raised over $1,600 for our public outreach and light pollution abatement programs.

We had members involved in both the regional and national science fairs.

We are getting local and national exposure in various publications and websites too.

And another great issue of *The Reflector*, that reflects well on us. Not bad for a little club like ours! I hope you read and see some of the things of which I speak in this issue.

We only have one meeting left before we take a summer break, but this does not mean we are not planning to do things. There are events to look forward to like an observing session at Emily Provincial Park on Saturday, July 17th (National Parks Day), hopefully a "star-b-que" at the Buckhorn Observatory and the Perseid meteor shower at Ashburnham Memorial Park (Armour Hill) on Thursday, August 12th.

Until next September, have a safe and star filled summer and start saving your receipts (more about this from Mark Coady in this newsletter)!

Rick Stankiewicz
President

Letter to the Editor

Summer Break

Well, it's been a busy first half of 2010 and it's not even summer. But as we take a two month break from meetings and publishing of The Reflector that doesn't mean we won't see one another during the summer. On Friday, 11 June the Buckhorn Observatory will be hosting our members' observing session. Saturday, 17 July is National Parks Day and the PAA has been invited again to Emily Provincial Park (just west of Peterborough) for a public viewing session. Then on 12 August we'll be back on Armour Hill for a public viewing of the Perseid meteor shower. This promises to be a great viewing event, weather permitting, as the crescent Moon will set by 9:30 p.m. but not before gracing us with a planetary conjunction with Mars, Venus and Saturn.

So, enjoy the summer and hope to see you at our events.

Phillip Chee,
Editor

Peterborough Astronomical Association

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

www.peterboroughastronomy.com
stankiewiczr@nexicom.net
Club Mailing Address
Rick Stankiewicz, President

Peterborough Astronomical Association
10 Hazel Crescent, RR #8
Peterborough, ON K9J 6X9
705.295.6158

FM 90.5
Community Club Awards

A new local FM station is coming on the air this summer, FM 90.5. They have partnered with an organization called Community Club Awards to help with their kickoff and, in turn, help local not-for-profit clubs and charities raise some extra funds over the summer and early fall.

It's a 12 to 13 week program. If we decide to participate it simply requires that P.A.A. members keep their "Proof of Purchase" receipts, etc., from participating local merchants (sponsors and advertisers throughout Peterborough County) and hand them in to their CCA Captain—Mark Coady—who will turn them in regularly to the campaign chairperson—Kathy Farley of FM 90.5. Points will be awarded for every penny, i.e., a receipt for $9.98 equals 998 points. Plus, there will be bonus points available from certain merchants for buying particular products or services and/or shopping on specific days or at certain times of the week. By turning our registration form in at the first opportunity we were given 10,000 bonus points.

For each week of the campaign there will be ten prizes ranging from $40 to $350. There will be ten grand prizes at the end of the campaign ranging from $100 to $1,000. Plus, if we do particpate for the entire campaign and fail to receive any prizes we will receive a special award of $1 for every $1,000 of eligible "Proof of Purchase" receipts we turn in. Every group that partipates then will receive something in the form of funding. The money will be awarded at a campaign closing event in the fall.

I hope the membership will grab hold of this opportunity for us to earn some extra dollars for the PAA while doing something we always do—shop locally.

Mark Coady

The Sky this Month

Mercury is in the eastern morning sky for the first half of the month but it's position below the ecliptic favours southern viewers. Superior conjunction on the 28th.

Venus is in the western evening sky. Crescent Moon 4° S of Venus on the 15th.

Mars is in the western evening sky in Leo. Passes 0.9° N of Regulus on the 6th.

Jupiter is in the morning sky in Pisces.

Saturn is in the western evening sky.

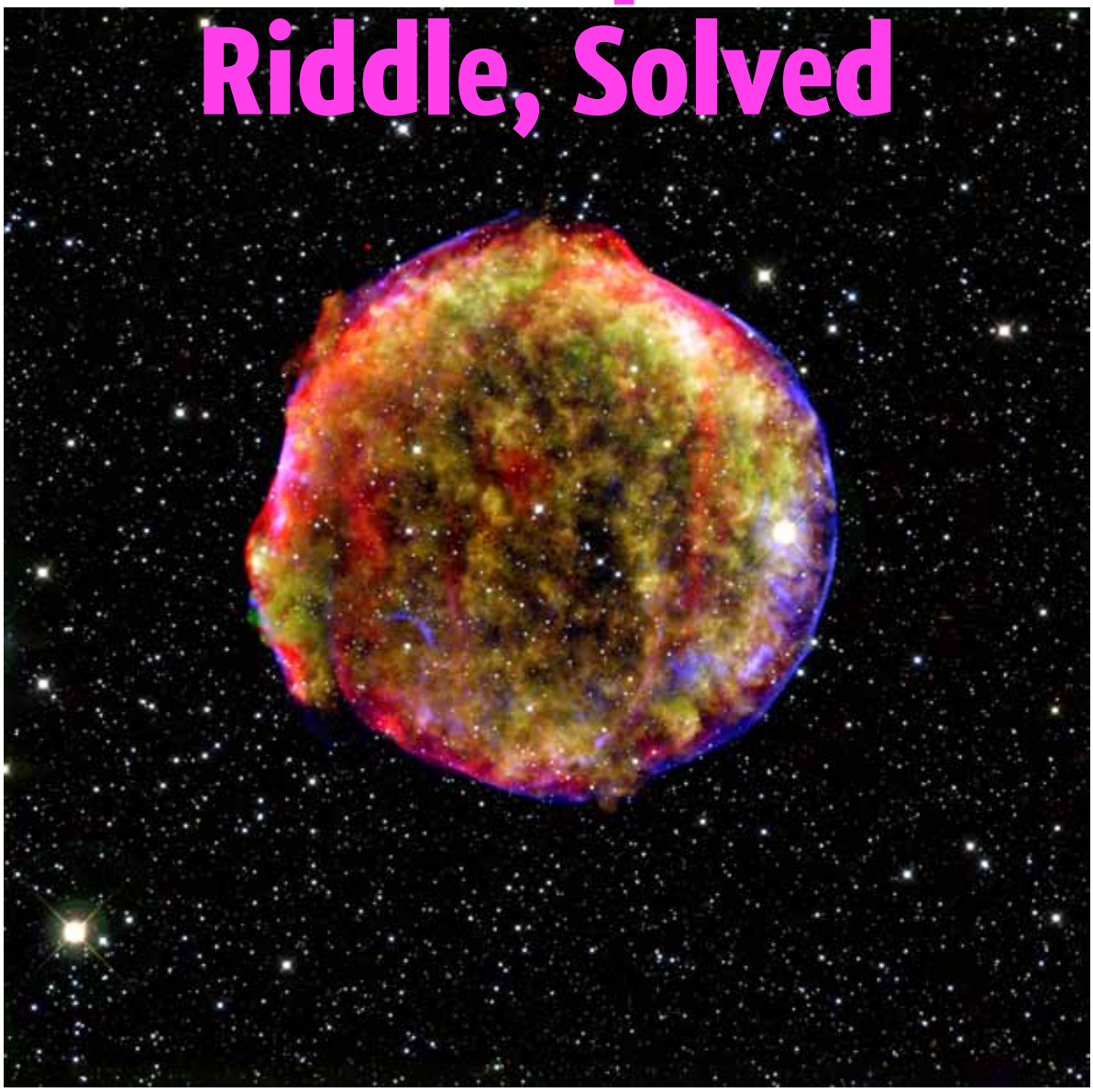
Moon 7° N of Jupiter on the 6th. The Pleiades 0.6° N on the 10th. On the 17th Mars 6° N of the Moon.

Summer Solstice arrives at 7:28 a.m. on the 21st.

Moon Phases

Last Quarter	6:13 PM	June 4
New Moon	7:15 AM	June 12
First Quarter	12:29 AM	June 19
Full Moon	7:30 AM	June 26

Ancient Supernova Riddle, Solved



Left-over cloud from the Tycho supernova, witnessed by Tycho Brahe and other astronomers over 400 years ago. This image combines infrared light captured by the Spitzer Space Telescope with x-rays captured by the Chandra X-ray Observatory, plus visible light from the Calar Also Observatory in Spain.

by Dr. Tony Phillips

AUSTRALOPITHECUS SQUINTED AT the blue African sky. He had never seen a star in broad daylight before, but he could see one today. Was it dangerous? He stared for a long time, puzzled, but nothing happened, and after a while he strode across the savanna unconcerned.

Millions of years later, we know better.

That star was a supernova, one of many that exploded in our corner of the Milky Way around the Pliocene era of pre-humans. *Australopithecus* left no records; we know the explosions happened because their debris is still around. The solar

continued on next page

continued from previous page

system and everything else within about 300 light-years is surrounded by supernova exhaust—a haze of million-degree gas that permeates all of local space.

Supernovas are dangerous things, and when one appears in the daytime sky, it is cause for alarm. How did Earth survive? Modern astronomers believe the blasts were too far away (albeit not by much) to zap our planet with lethal amounts of radiation. Also, the Sun's magnetic field has done a good job holding the hot gas at bay. In other words, we lucked out.

The debris from those old explosions has the compelling power of a train wreck; astronomers have trouble tearing their eyes away. Over the years, they've thoroughly surveyed the wreckage and therein found a mystery—clouds of hydrogen and helium apparently too fragile to have survived the blasts. One of them, whimsically called "the Local Fluff," is on the doorstep of the solar system.

"The observed temperature and density of the Fluff do not provide enough pressure to resist the crushing action of the hot supernova gas around it," says astronomer Merav Opher of George Mason University. "It makes us wonder, how can such a cloud exist?"

NASA's Voyager spacecraft may have found the answer.

NASA's two Voyager probes have been racing out of the solar system for more than 30 years. They are now beyond the orbit of Pluto and on the verge of entering interstellar space. "The Voyagers are not actually inside the Local Fluff," explains Opher. "But they are getting close and can sense what the cloud is like as they approach it."

And the answer is ...

"Magnetism," says Opher. "Voyager data show that the Fluff is strongly magnetized with a field strength between 4 and 5 microgauss. This magnetic field can provide the pressure required to resist destruction."

If fluffy clouds of hydrogen can survive a supernova blast, maybe it's not so surprising that we did, too. "Indeed, this is helping us understand how supernovas interact with their environment—and how destructive the blasts actually are," says Opher.

Maybe *Australopithecus* was on to something after all.

Opher's original research describing Voyager's discovery of the magnetic field in the Local Fluff may be found in Nature, 462, 1036-1038 (24 December 2009). The Space Place has a new Amazing Fact page about the Voyagers' Golden Records, with sample images and sounds of Earth. Just in case one of the Voyager's ever meets up with ET, we will want to introduce ourselves. Visit http://spaceplace.nasa.gov/en/kids/voyager.

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

The P.A.A. at the Canada Wide Science Fair

The P.A.A. was asked to contribute, along with Buckhorn Observatory, to the Canada Wide Science Fair by providing three brief astronomy seminars for the afternoon of Monday May 17th. All students attending the fair had to sign up for three one-hour seminars for the afternoon. These seminars were wide and varied. Many encompassed the many physics and biology labs of Trent University. We were the only outside entity hosting a seminar and our contribution was the planetarium and a safe solar viewing scope. As well, we were allowed to bring in our light pollution displays and brochures. This was to be held in the Great Hall where some of you had dinner with Terry Dickinson some years ago.

As the students filed in they would be divided into two groups. One half came outside for the solar viewing through my 8 inch Celestron while the other half went into the planetarium. Then the groups swapped venues after about twenty to twenty-five minutes as we were on a fairly strict timetable.

Safe solar viewing outside the Great Hall.

All of the students enjoyed the experience of seeing their home star despite the fact that there were no sunspots to be seen and clouds did wreak havoc all afternoon long. There were many questions fielded on the sun, the universe, and my telescope. The planetarium was obviously the big hit. Many had no idea what a planetarium was. John, being the consummate story-teller, had them all spellbound.

Students outside the planetarium.

I also had the opportunity to talk to the students about our fight for light pollution abatement. All seemed interested, especially when I could mention the potential threats to the environment if it goes un-checked. As they left, John and I handed them a goodie bag that included one of our LPA brochures, a Buckhorn Observatory information card, an RASC planisphere (courtesy of the RASC via Kim Hay—the education committee chair), and the latest edition of Sky News. It was a very successful afternoon.

Mark Coady

John and Mark in front of the LPA display.

The Canada Wide Science Fair an inspiring event

Take 494 of Canada's brightest high school science students and pour them into the Evinrude Centre. Separate into junior, intermediate and senior levels. Now mix thoroughly with a like number of judges and let cook for two days. The end result will tickle the taste buds of any science buff.

Two days of judging projects impressed me with the variety of subjects that captured the young scientists' imaginations. Projects ranged from how to more efficiently generate energy from cow dung (did you know there's a difference between dairy cattle manure and that of beef cattle) to sophisticated robotics, extracting oil from used coffee and self-sufficient energy generating systems for long-term space exploration. And that was just a sampling of the junior level where I was assigned.

The enthusiasm these young scientists conveyed as they talked about how they originated their hypotheses and designed their experiments was impressive. From employing good test methodology with control groups to closely monitored variables, their work was remarkable.

Sometimes the project failed. But failure or success wasn't the point. What was important was gaining a deeper understanding of their subject and properly engaging the scientific process to arrive at a final truth – whether it was positive or negative.

It was difficult finding an astronomy project at the CWSF. Interest in the subject has tailed off greatly since the days when there were men walking on the Moon. Barrack Obama's recent scuttling of the manned Moon missions and lunar colonization won't help things in the future either. However my group did manage to find a couple of projects that involved some elements of astronomy.

One young scientist used her knowledge of the ecliptic to figure out exactly how to position the solar panels on her farm. Her goal was to achieve maximum efficiency. Another young fellow addressed light pollution via a Moose detector. Let's just say it's a long story and an even longer stretch to include it in the astronomy category.

Three young scientists from the area were among the winners. One, Lakefield District Secondary School student Alyson Bell took home $40k in scholarships and cash! Next year she may go on to the world event in Stockholm, Sweden.

Ultimately, what struck me most was how good and proud this young generation made me feel. Canada's future as a leading research innovator is in some young, but very capable hands.

John Crossen

Only the Sun itself could beam down brighter than the smile on this young scientist's face. Her project to maximize the efficiency of solar panels by proper placement meant aligning them with the ecliptic. Smart you lady!

PHOTO GALLERY

Astronomy on the Hill

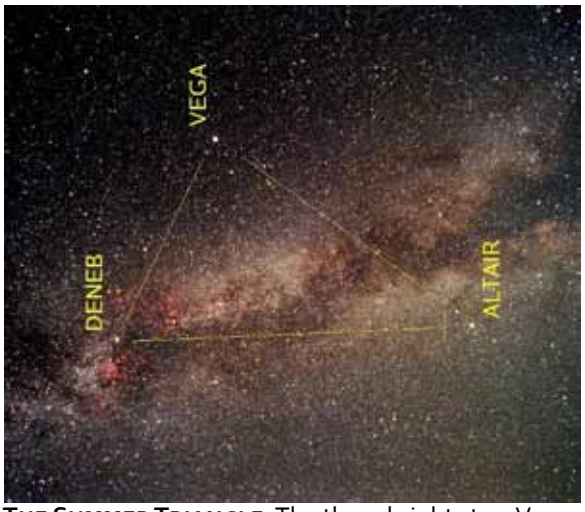
A few photographs from the P.A.A. Astronomy on Hill Weekend. This was the May 16 afternoon solar observing session. However we were able to see a 2-day old Moon in daylight as well as Jupiter, Sirius, Betelgeuse, and Mars. All photos courtesy of Rick Stankiewicz except top-left by Phillip Chee.

Venus Moon Conjunction

After Astronomy on the Hill was over on Sunday, May 16, the sky show continued with a beautiful display of the crescent Moon and Venus. Earlier in the day P.A.A. member, Brett Hardy treated the crowd to daylight telescope views of the Moon and Venus. But the beauty of both these celestial objects is manifest set against a twilight sky as shown above.

Phillip Chee

The Summer Triangle Rises at Last



The Summer Triangle. The three bright stars Vega, Deneb and Altair mark the corners of the Summer Triangle. They are also the brightest stars in the trio of constellations known as Lyra, Cygnus and Aquila.

The asterism denoting my favourite time of the year is currently scaling the eastern sky. Look to the east about 10:30 p.m. and you'll see one bright star quite high above the eastern horizon. That's Vega, pronounced Vee-ga. At this time of year it's the highest star in an asterism known as the Summer Triangle. Beneath Vega is a slightly dimmer star named Deneb. To the right of Deneb and much closer to the horizon is Altair of Forbidden Planet fame. Canadian actor Leslie Neilson played the lead role.

But hey, this is an astronomy column. So connect the dots and, bingo, you have the Summer Triangle. Plus, if you're under dark rural skies, you'll also have the Milky Way cutting straight through it. What we see as the Milky Way is just an arm of our galaxy. If you've seen it, consider yourself among the privileged few. Thanks to light pollution from ineffective, money-wasting urban lighting a third of the world's population never see it. Ok, soapbox my stint is over.

Once you've located the Summer Triangle, look for it on succeeding clear nights. You'll notice that it is slowly moving up the eastern sky each successive night. As summer progresses it moves further up the sky until late July when it's almost straight overhead by 10:30 pm.

The planets are still bountiful in June. Venus (also known as the evening star) will be at its highest this month. It's as bright as an aircraft landing light high in the southwest. Look for it at twilight as it gradually moves down towards the western horizon during the course of the night thanks to Earth's rotation.

Mars is almost out of sight because it is setting along with the constellation Leo. On June 5 and 6 it will be less than one degree from Regulus, the heart of the lion. At this point it is so small that even a telescope won't reveal any detail. Besides, it's almost drowned out in the glare of the sunset.

Saturn on the other hand still rules the night sky. Though it too is following the tail of Leo and drifting towards the western horizon. Those with even a small telescope can make out the rings at about 50x (power). Currently Saturn's rings are almost edge on from Earth's point of view in our orbit around the Sun. Still the ringed thing is an impressive sight. Many of today's "nerds of the night," (myself included) were first hooked on astronomy when we viewed Saturn. My moment of epiphany was when I was 10 years old and had a wobbly little 50mm scope.

Mercury is lost in the setting Sun's glare and Jupiter and Uranus don't rise until the wee hours of the pre-dawn sky. So Venus, Mars and Saturn will have to keep you planetophiles occupied in June.

Until we meet again by the backyard telescope, keep the bug spray out and your lights dimmed down. Thanks for reading my column. It's nice to know somebody else wants to know what's up.

John Crossen

Canada Day Line-up Tops July Skies

On July 1 look to the southwest an hour after sunset. You'll see three planets and one star forming a line towards the horizon. Highest up is Saturn. Next in line is Mars. The star Regulus follows. And the line-up ends with bright Venus, also known as the evening star.

Like all planetary alignments, the line up signifies nothing other than a good photo opportunity. So anyone worrying about the world coming to an end with the planets slamming into each other should stop reading the trash rags. Just go out in your yard and enjoy the sight.

This month Scorpius the scorpion takes centre stage once darkness falls. The big bug is about 25 degrees above the horizon, so make certain that you have a clear view to the south.

The brightest star in Scorpius is Antares which is Arabic for "rival of Mars." That's because Antares is a red giant star and looks very much like the planet Mars to the naked eye. While you're Antares gazing think about this. Antares is so large that if you put it at the centre of our solar system, it would engulf Mercury, Venus, Earth and Mars.

If you have a pair of binoculars, train them on Antares then look a bit to the south and right of the bright star. Under dark skies you will see a large globular star cluster known as M4. It is quite dim, but should show up readily in a pair of 7x10 binoculars.

According to Greek mythology, the Scorpion bit Orion the hunter on the foot. This ended the mighty hunter's life. So Zeus decided that the two should never meet again. Thus he cast Scorpius into the summer sky and Orion was honoured with a prime position in the winter sky. Look for Orion next February when he owns the southern sky.

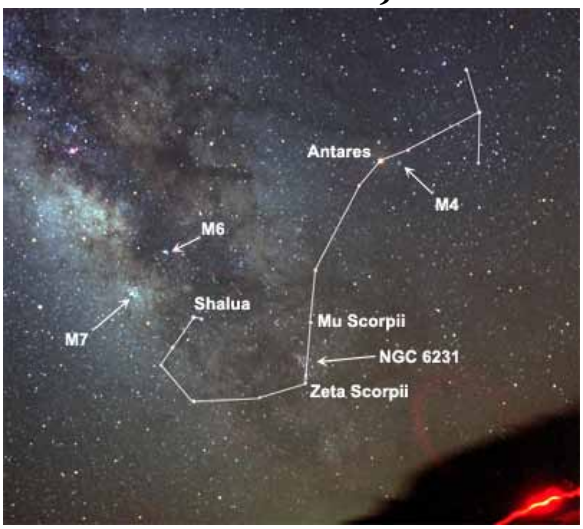
Aside from the planetary line up beginning the month, July doesn't have much to offer this year for planet buffs. On July 9 Regulus and Venus will be 1.1 degrees apart. The pairing should make for a pretty conjunction. Then on July 30 Saturn and Mars pass each other by less than 2 degrees.

The binocular brigade will find another treat in the scorpion's stinger. It's an open cluster known as the Northern Jewel Box. Just to the left and above Scorpio's stinger two beautiful open star clusters provide a delightful sprinkle of starlight. Closest to the stinger is M7 which is also known as Ptolemy's Cluster and above it is M6, sometimes referred to as the Butterfly Cluster.

Night hawks will see the jovial giant, Jupiter, rising in the late night sky. By dawn the big fellow is high in the southeast. He'll be better placed for telescopic viewing by the end of the month and by mid August Jupiter will be available at a more reasonable hour for the nine-to-five set.

Until we meet again by the backyard telescope, keep your yard lights aimed down and the stars up big and bright.

John Crossen



Scorpius. Even a scorpion has its good points. Three star clusters are visible in binoculars. Near Antares is M4, a globular star cluster. Bringing up the rear of the big bug is the Jewel Box of the North, M7 and M6. All are open star clusters.

A "Star" is Born

May 21st, 2010, was not like any other day for my wife and I. It started with a phone call at 6:00 a.m. for a quick trip to Ottawa. It appeared that the "stars had aligned" and our first grandchild was on the way. The next question was, "When?" I know you are likely asking yourself, why am I reading about Rick's family life in *The Reflector*? Bear with me, there are astronomical connections.

Our son and daughter-in-law were are the hospital before we could arrive in Ottawa, so we waited patiently at their house as the day progressed and we awaited news of the birth of our grandchild. None of us knew the expected sex of the baby and the parents were not even letting the potential names "out of the bag" ahead of time.

As the official family photographer and chronicler of events, I thought it would be nice to be prepared with some images that were unique for the day of the birth of our grandchild, so I had pictures of some lilacs that we passed on our way to Ottawa, but nothing else news worthy was happening the rest of the day. Suppertime had come and gone and no news of a birth yet. Then about 8:30 p.m., I looked out the front door and noticed the Sun had set and thought this might make a memorable moment.

Then while I was outside taking this image I looked high above the house to the south and saw a beautiful Moon that was one day past the first quarter (start of a waxing gibbous phase), so I captured it potentially for the album.

This was about 8:46 p.m. and then I looked to the western sky to see the planet Venus shining like a beacon in a twilight blue sky and a jet condensation trail was drifting by and it just happened to be tinted "pink" by the sunset.

continued on next page

continued from previous page

This all happened by 8:51 p.m. and still no news of any baby. So, I packed up my camera and tripod and headed in for the evening, content with what I had chronicled, in case the baby arrived before midnight.

At 10:05 p.m. the call came from a very proud father that our granddaughter had been born! She was healthy (7 lb. 14 oz.) and mom was doing fine too. So when was our granddaughter born? It turns out, at exactly 8:44 p.m.! Little did I know, that this little Taurus was entering the world just as I was taking my pictures to start her baby book. The next day we had our first chance to see our granddaughter. It also turns out that like the names of many stars in the night sky, her name is Arabic. Our own little Arabic star had been born and her name is Safa, which means "purity" and for our family, pure heaven!

Grandpa Rick
President, PAA

Stephen Hawking: Humans Should Fear Aliens

World renowned scientist Stephen Hawking believes extraterrestrial life almost certainly exists—and humans should be extremely cautious about interacting with it.

"To my mathematical brain, the numbers alone make thinking about aliens perfectly rational," Hawking says in a new Discovery Channel series called Stephen Hawking's Universe. "The real challenge is to work out what aliens might actually be like."

He suggests that aliens might simply raid Earth for its resources and then move on: "We only have to look at ourselves to see how intelligent life might develop into something we wouldn't want to meet. I imagine they might exist in massive ships, having used up all the resources from their home planet. Such advanced aliens would perhaps become nomads, looking to conquer and colonize whatever planets they can reach."

He concludes that trying to make contact with alien races is "a little too risky." He said, "If aliens ever visit us, I think the outcome would be much as when Christopher Columbus first landed in America, which didn't turn out very well for the Native Americans."

Previously, Hawking has argued that humans must colonize space in order to survive and thrive. "Sooner or later disasters such as an asteroid collision or a nuclear war could wipe us all out," he told Britain's Royal Society in a 2006 speech. "But once we spread out into space and establish independent colonies, our future should be safe."

Rick Stankiewicz, PAA

Maximize Your Eyes
Come to the Dark Side

Let's leave the black holes, exoplanets and gamma ray bursts behind for a while and get down to Earth. Your backyard will do just fine. After all, my column is called "the backyard astronomer." Whether you're a naked-eye observer, do your gazing through binoculars or have a telescope, here are some tips that will help you get the most enjoyment out of your observing time.

As Darth Vader said in Star Wars, "come to the dark side." To me that means making sure your observing spot is good and dark. The idea is to expose your eyes to as little white light as possible. Astronomers call it dark adaptation. As your eyes slowly become accustomed to seeing in the dark, your pupils gradually enlarge to let in more light. After about a half an hour in a good dark location an adult's pupil grows to about 5mm in diameter, slightly less for us older star-geezers.

With your eyes dark adapted, you can see more stars. Faint constellations become visible. Even some of the brighter star clusters will appear as dim, misty patches. If you're using binoculars, the same applies. Only now you can pick out some dim galaxies and faint nebulae. The same goes for those with telescopes. Suddenly planetary details become more obvious and again, the faint fuzzies are more apparent.

So always choose the darkest observing location possible. And once you're there, give your eyes time to get used to the dark. You'll see more.

Another trick is to use averted vision. What that means is to look towards, then slightly away from the object you're trying to see. It takes a bit of practice, but what it does is to use a portion of the light-sensing area in the back of your eye that is more receptive to light.

Dark Sky Observing. Observing from a dark rural location will maximize your eyes and your observing fun. Just don't forget the bug spray.

For instance, from the observatory I can see the Andromeda Galaxy without a telescope or binoculars. I know where to look. But if I look straight at it, I see nothing. No cigar. However, if I look a bit to the left or right of where it should be, it pops in and out of sight. I've demonstrated this countless time to visitors to the observatory and after a few moments I usually hear "hey, it works!"

Now that your eyes are dark adapted, how do you keep them that way? Obviously you want to avoid bright lights. But how do you read your star chart or planisphere? Then welcome to the red light district. A dim red light is more than sufficient to let you read your charts, and red light doesn't ruin your dark adaptation.

For city dwellers my advice is to get out of town. It's virtually impossible to compete with downtown light pollution. But all is not lost. The Moon and planets are still good targets for the city-bound astronomer. However, if you want to make the most of your observing experience, a quick trip to the countryside, a friend's cottage or farm is a real eye opener.

And there you have it. Come to the dark side, Luke. It really is better.

John Crossen

Misadventures of an Aspiring Imager

Adventure # 6

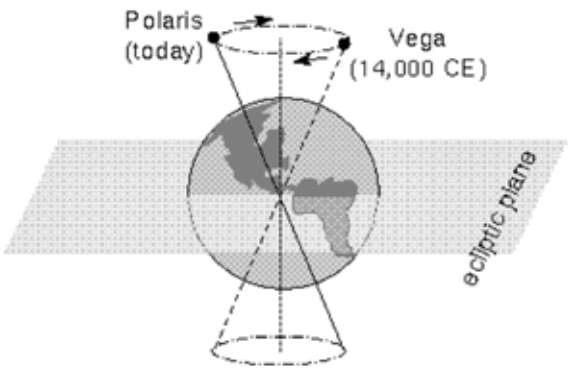
Polar Align, or Else!

So, at this point, if you recall, I have setup and balanced my telescope, and been able to actually focus my camera, despite the vagaries of "seeing" and miscellaneous other challenges. Must be getting fairly ready to actually taking a picture—right? Again, you guessed wrong, there are still a few procedural matters that require attention. One of these is polar alignment. What the heck does this have to do with imaging? Actually, quite a lot, if you want a decent picture.

Quality imaging is all about removing as many potential sources of error as is possible. A very significant source is target tracking. In fact, there are two sources of error, as all imaging mounts, either Equatorial or Alt-Azimuth (with a wedge), move in two directions, i.e. Right Ascension (RA) and Declination (Dec). Polar aligning, if done properly, will virtually eliminate the Dec movements.

Proper polar alignment will also help correct another possible source of error. If the scope is not exactly aligned with the North Celestial Pole (NCP) and you are taking a relatively long exposure image there will be a perceptible drift in the position of stars, making the image of stars elongate. Autoguiding will alleviate this - but this introduces a new set of challenges.

So, all you have to do is line up your mount's RA axis with Polaris, and, voila, end of one source of error. Ah, but it's never that easy. For starters, probably



The Earth's rotation axis precesses (wobbles) with a period of 26,000 years.

Complements www.astronomynotes.com

like 90% of the population, I thought the earth rotated around an axis that lined up with the pole star. Not quite! Actually the earth wobbles a bit, and the axis changes gradually over time. Right now NCP is about one degree from Polaris. You can get freeware programs (I use Polar Finderscope) that will show you the exact location of NCP relative to reference stars.

My equatorial mount has a polar scope built into the RA axis, with an etched star chart of the polar region which is visible by means of a light source. The alt and azimuth directions can be altered by means of screw drives. So polar aligning entails levelling the mount and then lining up the NCP with the polar scope. Quite easy except that I get a crick in the neck as eyeballing the scope is awkward.

And not always this easy. It took a number of frustrating nights to realize that my scope was not exactly aligned with the polar scope, resulting in a weird drift. Thank

continued on next page

continued from page 15

Alignment

goodness for star parties, as there's always an expert around to figure these things out for you!

In any event, for very precise imaging the use of a polar scope does not have sufficient accuracy. Drift alignment is the only way to go (if you get my drift !!!).

Drift alignment is done by observing a star drift in declination. This can be done visually, but is more commonly done using your imager, while tracking is turned off. There are numerous computer programs out there to help—I use one called PemPro from CCDWare. This program makes it really easy—just follow the instructions and very exact polar alignment will be achieved. Well, maybe. As usual, there's always a catch. If astronomical seeing is poor then the target star is going to be hopping around all over the place, so you are going to have to make some guesses on what's acceptable.

However, all is not lost. Autoguiding will help to compensate for poor polar alignment, although it is also dependent on good seeing.

As I said in my last instalment: For imaging seeing is all important.

Stay tuned for more misadventures, including:

- auto guiding ain't so automatic
- backlash really hurts
- what the heck is PEC
- why I am becoming a computer geek
- being color 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

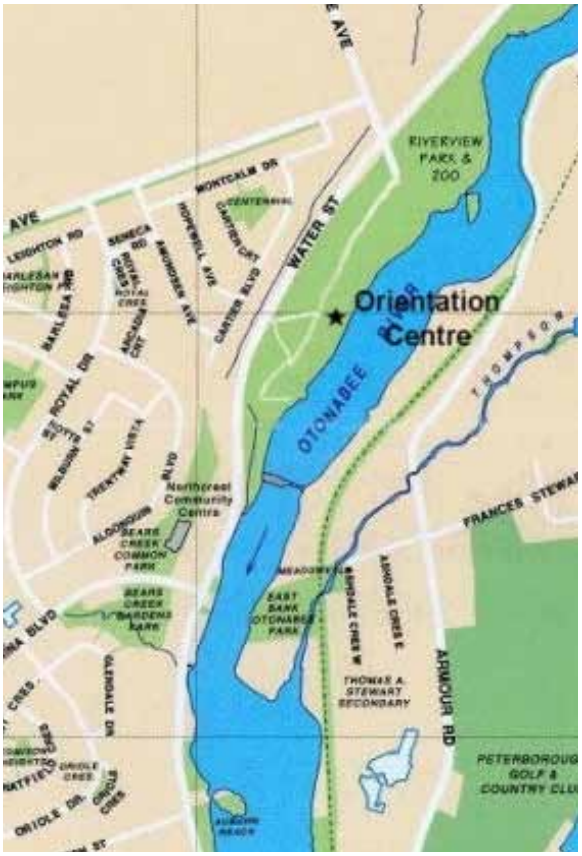
Stay tuned, John Galle

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:

Phillip Chee
445 Park Street North
Peterborough, ON K9H 4R1
phillip.chee@gmail.com

Next submission deadline:
August 27, 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 p.m.. P.A.A. executive business will be conducted starting at 7:30 P.M. Members and the public are welcome to attend the earlier time.