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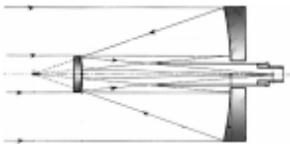
PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR



Volume 5, Issue 7 October 2006

Editorial

I trust everyone had a great summer. It's good to be back working on the Reflector. There are a few articles in this issue on what some PAA members were up to. Here are some interesting discoveries made to catch you up on only a fraction of what's happened throughout the summer:

Astronomers have used the Subaru and Keck telescopes to discover gigantic filaments of galaxies stretching across 200 million light-years in space.

New research from NASA, published in the journal *Nature* suggests that it's always raining a low level liquid methane on Titan.

ESA scientists have discovered some extremely high altitude clouds on Mars - between 80 and 100 km (50 to 62 miles) high.

Shawna Miles
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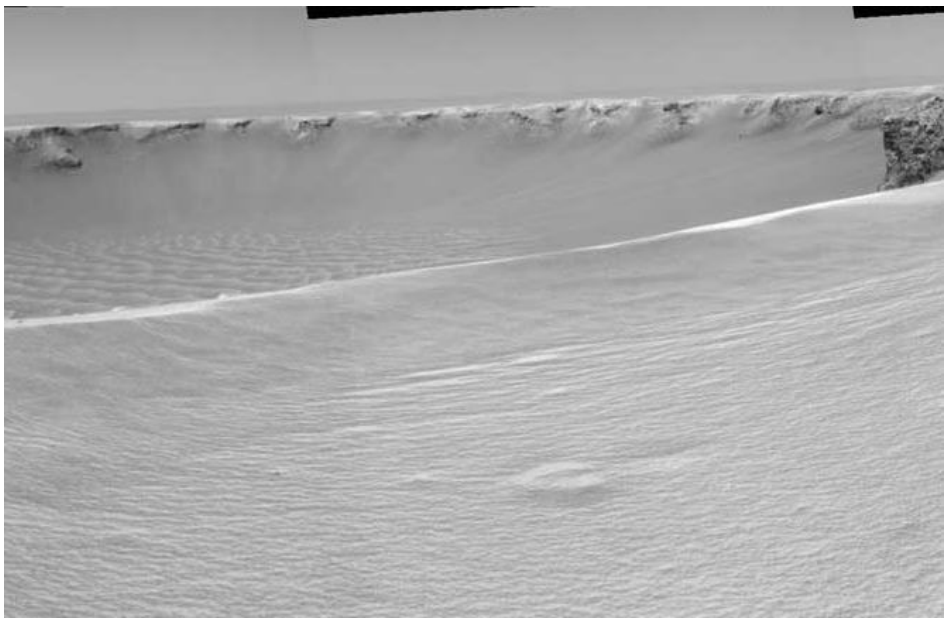
Opportunity Has Reached Its Destination

After traveling for 21 months in a desolate land, NASA's Mars rover, Opportunity, has finally reached Victoria Crater.

What makes this crater so special? It's all in the geology. The crater is five times wider than the previous "Endurance" crater it studied (which was about the size of a stadium), and has steep walls of exposed rock that were put down gradually over eons. These rock layers will give a better geologic history of Mars than anything that has been seen so far.



Victoria Crater on Mars. Image credit: NASA/JPL

By studying Victoria Crater, NASA is hoping to find out what kind of environmental conditions occurred on Mars long ago. At the rover's landing site, it was discovered that Mars had a wet era. Scientists are now wanting to know if this "wet era" started farther back in time. Victoria Crater may tell them what they want to know.

Opportunity started exploring Mars in January 2004, and since then has driven more than 9.2 km / 5.7 miles. The rover Spirit is on the other side of Mars, and to the south. It is waiting for the Martian spring when there will be more solar power before driving again.

Both rovers have been working ten times longer than the initial 3 months they were expected to. Even though they have been working well past their expiry date, NASA is putting them to work for yet another year.

For more information, go to : http://www.nasa.gov/mission_pages/mer/mer-20060927.html

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Inside This Issue

When I got this slide back, I had no idea what I had captured streaking across the sky. I hadn't seen it when I was taking the picture Then it came to me. It was a time lapse photo, and I had released the shutter just as an airplane appeared to streak into the planet Jupiter. Had I held the shutter open a split second longer, the plane would have passed in front of Jupiter. The streak was made by its landing lights. Another mystery solved!

The Leaping Star Of Harvey Township, And Other Things That Go Jump In The Night

One of the nice perks about being invited to be a guest lecturer is the chance to meet new people who share similar interests. Even more fascinating is the opportunity to hear about their celestial experiences.

The other night I had the pleasure of giving an astronomy talk to the Kawartha Field Naturalists in Fenelon Falls. At the end of my talk I fielded the usual questions about star birth, the naming of stars, why astronomers use light years as a measure of distance, and more. But the really wild and wonderful questions came up as I was packing my gear. I had just popped the slide tray into its box when gentleman sidled up next to me and asked if I had ever seen the "famous jumping star of Harvey Township?"

I had mentioned how Earth's atmosphere causes star light to bounce around and refract which is why stars twinkle. But according to this gentleman, twinkling was nothing. He had seen a star jump.

At first I hung back, waiting for the punch line. But he wasn't joking. He had pointed the star out to an amateur astronomer friend in Haliburton. They trained his friend's telescope on the star, and as his friend reeled off a number of reasons why it was impossible, the star jumped right out of the scope's field of view.

While there is no reason in the universe why this would or could happen, I was promised a visit by the gentleman and we'd watch for it. That is an evening I'm looking forward to. Most things can be explained. So until I see it, the famous jumping star of Harvey Township will be an unsolved mystery to me. But the weird and wonderful tales continued, this time in the form of a meteorite tale.

According to the woman recanting the story, a meteor flashed through the night when she was a young girl and slammed into the ground behind the family barn. The next day the there was a burnt hole in the ground surrounded by a white powder and all of the grain for about 30 feet around had been leveled. That's unusual, considering the fact that meteorites are actually cold. After spending millions, perhaps billions of years in the coldest place imaginable – outer space, a few seconds of atmospheric heat will strip away the surface of a meteorite, and even leave a charred coating. But the nucleus is so cold that the meteorite will feel cool to the touch. So what burned the grain?

My first guess was lightening. And the lady did mention a blazing ball flashing through the sky. Balled lightening isn't unheard of and it could burn the ground where it hit. But wait, we're not done yet. The next year, the grain in the area where the meteor landed grew to unusual heights. Yikes, another unsolved mystery!

So what are tales like this all about? People have definitely seen something. And I don't have an answer for them.

Arthur C. Clark spent a lifetime exploring the paranormal. And he's no whacky guy. Until somebody comes up with an answer, stories like these are unsolved mysteries.

I thank my audience for their fascinating tales of the unexpected. Until we meet again in the backyard, keep your lights down and the stars up big and bright. You'll save money, energy, the beautiful Kawartha night sky and maybe even the famous jumping star of Harvey Township. I gotta see that one!

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The Apollo Chronicles IV

This is the fourth in a series of articles in the "Apollo Chronicles."

Wide Awake on the Sea of Tranquillity

Neil Armstrong was supposed to be asleep. The moonwalking was done. The moon rocks were stowed away. His ship was ready for departure. In just a few hours, the Eagle's ascent module would blast off the Moon, something no ship had ever done before, and Neil needed his wits about him. He curled up on the Eagle's engine cover and closed his eyes.

But he could not sleep.

Neither could Buzz Aldrin. In the cramped lander, Buzz had the sweet spot, the floor. He stretched out as much as he could in his spacesuit and closed his eyes. Nothing happened. On a day like this, sleep was out of the question.

July 20, 1969: The day began on the far side of the Moon. Armstrong, Aldrin and crewmate Mike Collins flew their spaceship 60 miles above the cratered wasteland. No one on Earth can see the Moon's far side. Even today it remains a land of considerable mystery, but the astronauts had no time for sight-seeing. Collins pressed a button, activating a set of springs, and the spaceship split in two. The half named Columbia, with Collins on board, would remain in orbit. The other half, the Eagle, spiraled over the horizon toward the Sea of Tranquility.

"You are Go for powered descent," Houston radioed, and the Eagle's engine fired mightily. The bug-shaped Eagle was so fragile a child could poke a hole through its gold foil exterior. Jagged moonrocks could do much worse. So when Armstrong saw where the computer was guiding them--into a boulder field--he quickly took control. The Eagle pitched forward and sailed over the rocks.

Meanwhile, alarms were ringing in the background.

"Program alarm," announced Armstrong. "It's a 1202." The code was so obscure, almost no one knew what it meant. Should they abort? Should they land? "What is it?" he insisted.

Scrambling back in Houston, a young engineer named Steve Bales produced the answer: The radar guidance system was pestering the computer with too many interruptions. No problem. "We've got you..." radioed Houston, "We're Go on that alarm."

And on they went. Things, however, were not going exactly as planned. The Sea of Tranquillity was supposed to be smooth, but it didn't look so smooth from the cockpit of the Eagle. Armstrong scanned the jumbled mare for a safe place to land. "60 seconds," radioed Houston. "30 seconds." Mission control was hushed as the telemetry came in. Soon, too soon, the ship would run out of fuel.

Capcom later claimed the "boys in mission control were turning blue" when Armstrong announced "I [found] a good spot." As for Armstrong, his heart was thumping 156 beats per minute according to bio-sensors. The fuel gauge read only 5.6% when the Eagle finally settled onto the floor of the Sea of Tranquillity.

Houston (relieved): "We copy you down, Eagle."

Armstrong (coolly): "Houston, Tranquility Base here. The Eagle has landed."

Immediately, they prepared to leave. This was NASA being cautious. No one had ever landed on the Moon before. What if a footpad started sinking into the moondust, or the Eagle sprung a leak?

Continued...

Apollo 11 earthrise. Image credit: NASA

While Neil and Buzz made ready to blast off, Houston read the telemetry looking for signs of trouble. There were none, and three hours after touchdown, finally, Houston gave the "okay." The moonwalk was on!

At 9:56 p.m. EDT, Neil descended the ladder and took "one small step" (left foot first) into history. From the shadow of the Eagle, he looked around: "It has a stark beauty all its own--like the high desert of the United States." Houston reminded him to gather the "contingency sample," and Neil put some rocks and soil in his pocket. If, for any reason, the astronauts had to take off in a hurry, scientists back on Earth would get at least a pocketful of the Moon for their experiments.

Soon, Buzz joined him. "Beautiful view!" he exclaimed when he reached the lander's broad footpad. "Isn't that something!" agreed Armstrong. "Magnificent sight out here."

"Magnificent desolation," said Aldrin.

Those two words summed up the yin-yang of the Moon. The impact craters, the toppled boulders, the layers of moondust--it was utterly alien. Yet Tranquillity Base felt curiously familiar, like home. Later Apollo astronauts had similar feelings. Maybe this comes from staring at the Moon so often from Earth. Or maybe it's because the Moon is a piece of Earth, spun off our young planet billions of years ago. No one knows; it just is.

Truly, much of the scene was weird. The airless landscape jumped out at the astronauts with disconcerting clarity and, as a result, the horizon felt unnaturally close. Worse yet, the whole world seemed to curve, a side-effect of the Moon's short thousand-mile radius. "Distances [here] are deceiving," noted Aldrin.

The sky was equally baffling. Although the Eagle had landed on a bright lunar morning, the sky was as black as midnight. An astronomer's paradise? No. Not a single star was visible. The glaring, sunlit ground ruined the astronaut's night

Buzz Aldrin and the Eagle. Image credit: NASA

vision. Only Earth itself was bright enough to be seen, luminous blue and white, hanging overhead.

Armstrong was particularly fascinated by moondust, which he kicked and scuffed with his boots. On Earth, kicking dust makes a little cloud in the air--but there is no air on the Moon. "When you kick the surface, [the dust goes out in] a little fan which, to me, is in the shape of a rose petal," recalls Armstrong. "There's just a little ring of particles--nothing behind 'em--no dust, no swirl, no nothing. It's really unique."

Enough of that. It was time for work.

Almost forgotten in Apollo lore are the checklists sewn to the forearms of the spacesuits. These "honey-do" memos from NASA were jam-packed with activities--from inspecting the lander to deploying the TV to collecting samples. Some of the tasks were as detailed as bending over and reporting to Mission Control how it went. They had a lot to do.

Neil and Buzz deployed a solar wind collector, a seismometer and a laser retroreflector. They erected a flag and uncovered a plaque proclaiming, "We came in peace for all mankind." They took the first interplanetary phone call--"I just can't tell you how proud we all are," said President Nixon from the Oval Office. They collected 47 lbs of moon rocks and took 166 pictures. Check. Check. Check.

Finally, after two and a half busy, exhilarating hours, it was time to go. The checklist continued: Climb back in the Eagle. Stow the rocks. Prepare the ship for departure (again). Eat dinner: Beef stew or cream of chicken soup. And finally, sleep.

That was the limit. "You just are not going to get any sleep while you're waiting [for liftoff]," Aldrin said after the mission.

The Eagle was not a sleepy place. The tiny cabin was noisy with pumps and bright with warning lights that couldn't be dimmed. Even the window shades were glowing, illuminated by intense sunshine outside. "After I got into my sleep stage and all settled down, I realized there was something else [bothering me]," said Armstrong. The Eagle had an optical telescope sticking out periscope-style. "Earth was shining right through the telescope into my eye. It was like a light bulb."

To get some relief, they closed the helmets of their spacesuits. It was quiet inside and they "wouldn't be breathing all the dust" they had tramped in after the moon walk, said Aldrin. Alas, it didn't work. The suit's cooling systems, so necessary out on the scorching lunar surface, were too cold for sleeping inside the Eagle. The best Aldrin managed was a "couple hours of mentally fitful drowsing." Armstrong simply stayed awake.

When the wake-up call finally came, "Tranquility Base, Tranquility Base, Houston. Over."

Armstrong answered with alacrity, "Good morning, Houston. Tranquility Base. Over."

The long day was done. It was time to go home, to Earth, for a good night's sleep.

Author: Dr. Tony Phillips
Credit: Science@NASA
Submitted by: Mark Coady
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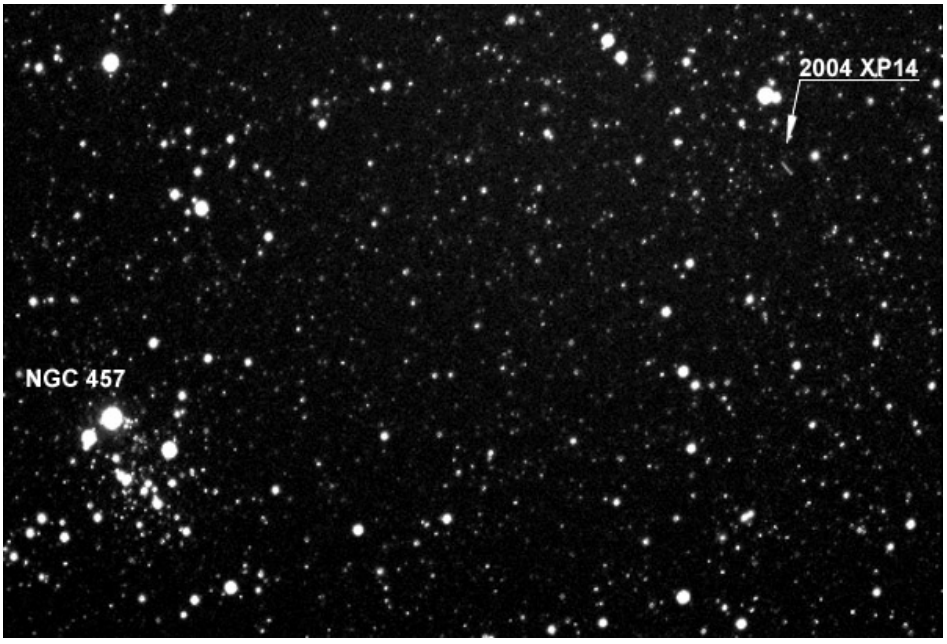
Near Earth Asteroid (2004 XP14)

So what did some PAA club members do this summer? Two of them had an amazing adventure trying to record Asteroid 2004 XP-14. Near Earth Asteroids are something that we do not tend to think about very much, but they can be quite fascinating, as Brett Hardy and I found out this past July 3rd.

Astronomer/astrophotographer, John Chumack (of GalacticImages@com fame) from Dayton Ohio, was vacationing in the Rice Lake area and hooked-up with myself and Brett to spend the night at Brett's "Cedar Knoll Observatory" in an attempt to observe and image one of the largest and closest asteroids to happen near Earth in recent years (one of 796 potentially hazardous asteroids being tracked on the NASA SpaceWeather website). Neither Brett nor I had ever been involved in tracking an asteroid, let alone recording one. On the other hand, John was an expert in this field, having done this sort of thing from his observatories throughout the United States many times over the years.

The challenges were many on this night however. John was not using his usual equipment, other than having brought his own CCD camera (SBIG model ST-9E) and laptop computer. Brett had no experience with CCD cameras or tracking asteroids, but he had the facilities required to pull it off and he knew his equipment well. I had never observed an asteroid before, but was anxious to try to get a visual on this reportedly 11.1 magnitude piece of space rock, as it tumbled on an orbit that was only 1.1 lunar distance (LD = 240,251 mi.; 384,401 km or 0.00256 AU) from Earth, using Brett's 7 inch (178mm) TMB refractor.

It was midnight before our trio gathered at the observatory and started to get set-up. The weather was next to perfect, but the mosquitoes were out in good numbers too. The set-up included running a copy of the latest ephemeris from the JPL website, to accurately track the route of the asteroid. The CCD camera was mounted on the 4 inch (102 mm) TeleVue "Genesis" apo refractor that was being piggybacked on the TBM. Focusing of the camera was only accomplished after much trial and error and the eventual addition of an extension tube. Then the proper coordinates were punched into the computer and the beefy AstroPhysics 1200 GTO mount whirred to a point in the northeast sky below Cassiopeia. We waited to see if we would intercept this asteroid that would be traveling so fast that it be covering the diameter of full moon in just four minutes. The screen of the computer represented the approximately one degree of the sky that the camera was imaging every ten seconds.



The near earth asteroid 2004 XP14 and NGC 457 (the E.T. or Owl Cluster).


Our trio at the dome of the Cedar Knoll Observatory (L to R – Rick Stankiewicz, Brett Hardy, John Chumack).

We did not have to wait long for results however. By about 01:48 EDT we registered a streak on the screen. We had nailed it! This asteroid traveling at 39,000 mph (62,400 kph) was well centered on the screen and after about 35 separate images it left our field of view and it was off to the next set of coordinates to intercept it as it climbed in the night sky. Would we be able to leapfrog like this all night? You bet we did! We captured screen after screen of data and ended up with enough images to create movies of this 600 yard/meter wide asteroid traversing the star filled background at only 268,873 miles (430,197 km) from Earth. All the time I was trying to get a visual observation of this event in the eyepiece of the TMB, but there was no way that I was able to see the faint object being recorded by the CCD camera. I suspect that this asteroid was actually closer to a 12.0 mag. object, like some were projecting, rather than the 11.1 mag. being advertised for this event or maybe it was because I could never get

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truly "night adapted", due to always looking at the computer monitor (I did not want to miss anything).

Throughout the night we recorded hundreds of images of the asteroid, but we were fortunate enough to also capture nice NGC object in the same frame, passing satellites and even a possible micrometeor burst. The nicest framing includes NGC 457 (The E.T or Owl Cluster) and 2004 XP14 (see attached copy). To see a sample of the animation that was generated from the combining of many ten second exposures, see the following link:
http://www.galacticimages.com/astronomical_events.html

This was a great example of a group effort that paid off. For Brett and I, it has been the hi-light of our astronomical year to date. I think you will agree from our results, that the blurry eyes and mosquito bites were worth the effort.

P.S. A similar article has been run in the current issue (Sept./Oct., 2006) of SkyNews Magazine.

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NASA Space Place

Celebrating 40 Years of Intent Listening

In nature, adjacent animals on the food chain tend to evolve together. As coyotes get sneakier, rabbits get bigger ears. Hearing impaired rabbits die young. Clumsy coyotes starve. So each species pushes the other to "improve."

The technologies pushing robotic space exploration have been like that. Improvements in the supporting communications and data processing infrastructure on the ground (the "ears" of the scientists) have allowed spacecraft to go farther, be smaller and smarter, and send increasingly faint signals back to Earth—

For over 40 years, the "Mars" 70-m Deep Space Network antenna at Goldstone, California, has vigilantly listened for tiny signals from spacecraft that are billions of miles away.

and with a fire hose instead of a squirt gun.

Since 1960, improvements in NASA's Deep Space Network (DSN) of radio wave antennas have made possible the improvements and advances in the robotic spacecraft they support.

"In 1964, when Mariner IV flew past Mars and took a few photographs, the limitation of the communication link meant that it took eight hours to return to Earth a single photograph from the Red Planet. By 1989, when Voyager observed Neptune, the DSN capability had increased so much that almost real-time video could be received from the much more distant Planet, Neptune," writes William H. Pickering, Director of JPL from 1954 to 1976, in his Foreword to the book, *Uplink-Downlink: A History of the Deep Space Network, 1957-1997*, by Douglas J. Mudgway.

Mudgway, an engineer from Australia, was involved in the planning and construction of the first 64-m DSN antenna, which began operating in the Mojave Desert in Goldstone, California, in 1966. This antenna, dubbed "Mars," was so successful from the start, that identical 64-m antennas were constructed at the other two DSN complexes in Canberra, Australia, and Madrid, Spain.

As Mudgway noted in remarks made during the recent observance of the Mars antenna's 40 years of service, "In no time at all, the flight projects were competing with radio astronomy, radio science, radar astronomy, SETI [Search for Extraterrestrial Intelligence], geodynamics, and VLBI [Very Long Baseline Interferometry] for time on the antenna . . . It was like a scientific gold rush."

In 1986 began an ambitious upgrade program to improve the antenna's performance even further. Engineering studies had shown that if the antenna's

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diameter was increased to 70 m and other improvements were made, the antenna's performance could be improved by a factor of 1.6. Thus it was that all three 64-m DSN antennas around the world became 70-m antennas. Improvements have continued throughout the years.

"This antenna has played a key role in almost every United States planetary mission since 1966 and quite a few international space missions as well. Together with its twins in Spain and Australia, it has been a key element in asserting America's pre-eminence in the scientific exploration of the solar system," remarks Mudgway.

Find out more about the DSN and the history of the Mars antenna at http://deepspace.jpl.nasa.gov/dsn/features/40years.html. Kids (and grown-ups) can learn how pictures are sent through space at http://spaceplace.nasa.gov/en/kids/phonedrmarc/2003_august.shtml .

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

By Diane K. Fisher

Fall n' Stars 2006

Fall n' Stars, which is a star party hosted by the Belleville and Kingston Centers of the RASC, was held September 22nd to 24th. For the first time the PAA was part of the organizing committee. I represented the PAA and had the task of arranging for the speakers, to manage the silent auctions for astronomy books and magazines, and to keep PAA members informed of the event. Over the past few months we secured books being discarded by our own library, Buckhorn Observatory, and the boxes of Sky and Telescope and Astronomy magazines that had been donated to the PAA, over the past couple of years. I also secured fellow PAA members, John Crossen and Peter McMahon, to be our speakers.

Our own John Cameron, who had come for only a couple of hours as a day participant, won the draw for a hand made observing chair.

The star party is held in the Boy Scout Camping Area of Colonel Roscoe Vanderwater Conservation Area, which is on the Moira River by Thomasburg, Ontario (just off of HWY 37 some 20 km north of Belleville). It is a completely rustic environment with no electricity or plumbing. Participants either camp or vie for limited bunk beds in a sheltered building called "The Longhouse". This building has kitchen facilities, with propane appliances, and the building has propane lanterns on the wall – which illuminate the building sufficiently yet don't seem to affect your night vision much. The main part of the building has the tables and chairs used for our Saturday banquet, presentations, and other events. It is heated by woodstoves. Toilet facilities are a short walk away in clean and pleasant outhouses – this may put you off but remember that this is a Boy Scout camp– and the facilities are much cleaner than many I have noticed in provincial parks.

Saturday morning we gathered under a small pavilion where swap/buy/sell tables were set up. Following this, we held an impromptu "show and tell" about some aspects of astronomy. Arlynne Gillespie, of Kingston RASC and the event's chair, showed off an IDA approved wall lantern she had just picked up from Home Depot. Mark Leeming and Greg Lisk, both of Belleville RASC, respectively showed off an 8 inch Orion Intelliscope and a very nice meteorite collection.

Saturday afternoon saw our two speakers making their presentations. Our own Mark Coady stood in for the ailing John Crossen and put on an interesting, and well received, presentation on how to go about fighting light pollution. Peter McMahon put on a light hearted, and also well received, presentation on how actual stars, planets, and other heavenly bodies, appear in sci-fi.

Then there was the catered banquet. For $18 you got your choice of Roast Beef, Turkey with Dressing (or both), three types of salad, corn, carrots, two types of gravy, rolls with butter, coffee, tea, and selected desserts. And seconds, thirds, whatever, were free!!! The food for the banquet was one of the best I have ever had the honor of tasting.

After the banquet there was the door prize draw. I won a certificate entitling me to a copy of "Earth Centered Universe Pro Edition" which I will be mailing in shortly. Kim Hay, of Kingston RASC, took the one year family membership in the PAA. Our own John Cameron, who had come for only a couple of hours as a day participant, won the draw for a hand made observing chair donated by master carpenter, Joseph Shields, of the Belleville RASC – which I promptly delivered on my way home on Sunday.

Then there was the silent auction. All magazines and most of the books were sold. All of these fundraisers help keep the cost down.

Following the auction, David Cotterell, of Belleville RASC, conducted an Astronomy Trivia Challenge. This is something he has done at Starfest for many years. For this time it consisted of three teams of five members. The team, that I was on- which we named "Stellarly

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Challenged", won the challenge by a very narrow score.

Then we assembled around a campfire for a few hours of laughs and singing old folk songs. It made me think back to my days as a Boy Scout – although the lyrics in the songs we were singing were somehow cleaner than what we sang way back when.

After complimentary coffee and juice on Sunday morning, came the time to tear down and clean up the park. Although it was sad parting, I know I will be back again next year. Despite the fact that the park is a little small for full sky observing, it is intimate. This is a small star party where everyone seems to make new friends, quite easily.

And, for $50 I paid – which included my weekend registration, Saturday banquet, and the best designed star party t-shirt I have ever seen, it was more than a bargain, it was an outright steal!

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Aloha#6 – Subaru Telescope

The next telescope on our tour around the summit of Mauna Kea on the Big Island of Hawaii is the national astronomical observatory of Japan, "Subaru" telescope. The term S*ubaru* is Japanese for the well-known open star cluster of the *Pleiades* and is derived from the word *sumaru*, meaning, "get together" or "tie together".

Located at an altitude of 13,658 ft. (4,163 m) this telescope has been operational since 1999. It took eight years to construct the 140 ft. (43m) structure to house the telescope. With an aperture of 26.9 ft. (8.3m), this 8 in. (20 cm) thick, 20-ton primary mirror is also the largest and smoothest single-piece mirror of all the telescopes on Mauna Kea. There are 261 computer controlled "fingers" that maintain the shape of the main mirror to within one part to a billion. Now that is superb optics! It can operate in the full wavelengths of light, from ultraviolet to infrared, so it is considered to be an "optical" telescope as well as infrared. With an 80-mega-pixel camera as part of the package, it is no wonder that this telescope is as good as it is! What adds to the flexibility of this prime focus camera is it's a wide view. It can record an area of the sky as large as a full moon.

The uniqueness of Subaru is evident the first time you see it because the shape of the structure that houses the telescope is not a typical dome shape, but rather an unusual cylinder shape covered in aluminum. It was felt that the shape of this structure would be best to minimize air turbulence when using the telescope.

This structure was closed for most of the time I was at the summit, but it did open up before I left the summit at twilight. It is a striking sight to see; as its silvery panels turned to a golden hue, with the setting sun. This is in contrast to the two classic shaped Keck domes situated beside Subaru that still appeared a bright white over the same timeframe.

Some of Subaru's firsts include, in 2003, the discovery of the most distant galaxy (12.8 bly), the detection of a massive black hole 12.7 bly from Earth, nine new satellites of Saturn in 2006 (added to the 12 new ones found in 2005),

This telescope is also operated 26 mi. (42 km) away in Hilo, at the University of Hawaii, Research Park, like most of the other telescopes on Mauna Kea. It is one of the newer and larger facilities operating there. I was fortunate enough to have paid it a visit. For the public, there was a small indoor display of images taken by the Subaru, a scale model of all the telescopes on Mauna Kea and a working 1/100 scale cut-away model of the Subaru itself. Outside there were a few display boards that explained the workings and accomplishments of Subaru. All of this was self-guided, but it was free. I have just discovered however, that as of May 12th, this visitor center has been closed to the public. The reason being, there is now a new exhibit at the newly opened Imiloa Astronomy Center of Hawaii, just a block away. There may possibly be more on this in a future newsletter.

For more information, link to the Subaru website: http://www.subarutelescope.org/

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Subaru's silvery panels turned to a golden hue, with the setting sun. This is in contrast to the two classic shaped Keck domes situated beside it.

International Space Station Grows

With the successful unfurling of two giant solar arrays the International Space Station (ISS) grew in size and capabilities. The two arrays span nearly 73 meters (240 feet), so they add considerable size to the shuttle.

The two panels, known as 4A and 2A were built by Lockheed Martin and will generate about 23 kilowatts of usable power. That's enough to run six average households. In deploying the solar panels, Canadian Astronaut Steve MacLean became the first Canadian to operate Canadarm2. MacLean was also the second Canadian to walk in space.

For the astronauts aboard the ISS, the solar displays will mean more power to accommodate more experiments, improved living quarters, and future expansion

For those of us who are Earthbound, its increased size means the ISS will have a larger surface area to reflect the sun's light. And that means it will also be more visible. So now that the ISS is bigger, brighter, and even easier to spot, how do you know when it's going to pass over our chunk of Canada?

The website www.heavens-above.com is the place to go. Simply log on, then plug in Buckhorn Observatory's latitude and longitude - N44?.39'53" and W78?.21'57" and it will tell you the times, altitude, and duration of the ISS passes. If you live in the Kawarthas, the Buckhorn Observatory's coordinates will work just fine. If you have a GPS and a laptop, you can plug into heavens-above just about anywhere you travel in the world.

Coming back down to Earth, the Peterborough Astronomical Association held it's forth annual Star-B-Q session on September 15-17. The main excuse for the get together is observing, and the astronomy club was treated to three nights of clear skies – though not without a few cloudy periods.

Everyone is set up for observing at the PAA Star-B-Q.

From Friday to Sunday nights the clouds dominated the day and the early portion of the night, despite Environment Canada's predictions for a fantastic, sunny and clear weekend. Perhaps it was divine intervention or just the power of wishful thinking, but the clouds eventually parted allowing PAA members and their guests a view of the heavens above for three consecutive nights. Unfortunately the Saturday night session didn't clear until the later hours of the evening, so the public observing was cancelled. Grrrr!

In addition to observing and telescope talk, the club members also honored their counterparts for their support of the club over the past year. Colin Cross, Susan Coady, Boyd Wood, and Fran Goschl, along with Bob and Joanne Stockton were awarded "Snappy Caps" courtesy of Kendrick Astro Instruments of Toronto.
But the top award went to Mark Coady who, along with wife Susan, worked to promote light pollution abatement in the Peterborough area. Their efforts, along with help from Peterborough Councilor Henry Clarke resulted in the Council agreeing to install more economical, lower wattage full-cut-off street lights on all new developments. It also resulted in the council agreeing to look into light-pollution abatement rulings for future commercial development.

That's all the news from above and below for this week. Until we meet again, keep the lights down and the stars up big and bright. You'll save money, energy, and the beautiful Kawartha night sky.

John Crossen
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October Brings New Sights & Shows

October is my favorite time of year to stargaze. It gets dark earlier, so I don't have to burn the midnight oil to enjoy my evening star-feast. Plus autumn brings with it some new celestial sights.

Nicely positioned for observing in the eastern sky are the constellations Cassiopeia, Perseus, and Andromeda. Each newcomer promises more to come, because right behind them Auriga and the Seven Sisters of the Pleiades are just peeking over the horizon.

Mind you, summer's favorites aren't gone, not quite yet. As the Summer Triangle moves further west, summer stalwarts like Hercules, Aquila, Cygnus, Lyra, and Sagittarius, are still visible during the early hours of the evening.

Combine the new fall constellations and summer's oldies with a crisp, bug-free October night and you've got a little

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On October 9th, the waning gibbous Moon will occult (pass in front of) the Seven Sisters of the Pleiades. The occultation begins about midnight in the Kawarthas. This is a spectacular binocular event. Photo by John Crossen.

chunk of stargazer paradise. Here are some highlights of October's sky:

Oct. 1 Uranus will be a half a degree beneath Lambda Aquarii where it will remain for the next five nights.

Oct. 6 Full Moon rises at 11:13 p.m. This full Moon is known as the Hunter's Moon.

Oct. 9 The waning gibbous Moon occults the Pleiades. In our area the event will begin about midnight. This should be a real treat in binoculars.

Oct. 13 Last Quarter Moon phase. If you're up late, this is a beautiful phase of the Moon when viewed through binoculars or a telescope.

Oct. 16 Saturn is the bright, star-like object just above the waning crescent Moon in the dawn sky.

Oct. 17 Mercury is just visible east of the Sun, very low in the western evening sky.

Oct. 20 For the next two weeks the zodiacal light will be visible in the predawn sky. Look to the east for a faint pyramid of light in the predawn sky. Make certain that you are in a dark sky area away from the interference of city lights.

Oct. 21 The Orionid Meteor shower begins about 11:00 p.m. Look towards the east. The shower won't be bleached out by the Moon, and should deliver about 20 little streakers per hour. It will reach its peak in the hours after midnight. These meteors are the remnants Comet Halley's tail left behind as it crossed Earth's orbital path. They burn up, blazing brightly, as they strike Earth's atmosphere.

Oct. 22 New Moon phase, so there's no moonlight to drown out the stars. You have my permission to stay up all night.

Oct. 29 Daylight Savings Time ends as the first quarter Moon rises. Break out the binoculars, and count the craters along the Moon's terminator.

Those are the highlights of the October Sky. Get out and enjoy them with the naked eye, binoculars, or a telescope. For a good star chart and more details on the events, pick up a copy of SkyNews at Chapters in Peterborough. Until we meet again in the backyard, keep your lights down dim and the stars up bright. You'll save money, energy, and the dark Kawartha night sky.

John Crossen
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ASTROPHOTO

Harvest Moon Sept. 7/06 by Rob Fisher in Peterborough using Meade ETX 70 and LPI.

The Sky This Month

MERCURY

Mercury appears quite low in the West-southwest as it gets dark.

VENUS

In the morning sky, it is too close to the Sun to be easily observed.

MARS

Mars also appears too close to the Sun for observing this month.

JUPITER

Jupiter is in Libra. It still in the West-southwest at nightfall, and sets before mid-evening.

SATURN

Saturn doesn't rise until after midnight, but is well placed, in Leo, in the East-southeast sky at morning's early light.

URANUS

Uranus is in Aquarius. Barely visible to the naked eye, this gas giant is up most of the night, setting in the early morning hours.

NEPTUNE

Neptune is in Capricornus. The outermost planet in the solar system sets by midnight. A telescope is necessary to see this distant object.

METEOR SHOWERS:

The Orionid Meteor Shower peaks on October 21st at 11am, with about 20 meteors per hour at maximum.

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

Meeting Notes

August 18, 2006

A Night of Distant Jewels

The PAA met at Brett Hardy's Cedar Knoll Observatory located a little north-west of Peterborough for an observing session. At 8 o'clock, there were a half dozen members in attendance — but we were facing a layer of cloud overhead and the prospects of seeing anything at all were bleak.

Mark Coady brought us up-to-date on our light pollution project by passing around a PAA plaque for presentation to Peterborough City Council in recognition of their efforts to reduce light pollution. Then our session took an unexpected turn. A couple of tiny patches of open sky, overhead and to the south-west, allowed us some sky-watching opportunities.

Jupiter was the first bright object visible in the south-west at sunset. I successfully identified all four large Galilean moons (though Europa was just a guess). The twin cloud bands in Jupiter's atmosphere were easily observed using Brett's 7" refractor.

The clouds parted more generously overhead, so we looked at objects in the constellation Lyra. We examined ***Epsilon Lyra*** first — the famous "double-double" — and all four stars were easily resolved in the 7" refractor. Next we looked at ***Zeta***, a noticeably bright but uneven star pairing. Finally we observed ***Delta***, a beautiful contrasting orange-blue double star nestled in the small open cluster sometimes designated 'Stevenson 1'.

Moving over to Cygnus, we checked out ***Omicron 1*** in the leading wing of the swan. It's a triple star with contrasting colors of red, blue and white (it looked like orange, white and white to me, though). We then briefly examined ***NGC 6871***, a faint open cluster in that same constellation. Moving to Draco, we saw the ***Nu Draconis*** double star in the head of the dragon, followed by a close look at the nearby triple system of ***16/17 Draconis*** (16 and 17 make a wide pair, while 16 itself is a close double).

Brett switched to the monitor to try and pick up details of fainter nebula. We saw the Box Nebula (***NGC 6309*** or ***PK 9-14.1***) near the southern border of Ophiuchus and, although it presented its characteristic distinct shape, was very small on screen. In contrast, the Sagittarian Lagoon (***M8***) nebula and nearby (southern edge of Serpens Cauda) Eagle nebula (***M16***) showed their best features with a bright, colorful and detailed display on the monitor. It demonstrated for us how useful a video camera can be in observational astronomy.

All our attempts to observe Neptune were frustrated by clouds. Even the monitor showed only a bright smudge. Though it was gradually getting clearer, an increase in the numbers and ferocity of the local mosquito population finally curtailed our observing session around 10:30 pm. It served, though, to demonstrate that even a cloudy evening can provide unexpected night sky jewels — as long as you bring a few observing targets, a bit of patience and lots of bug spray.

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September 1, 2006

John Crossen opened the meeting with some news updates on NASA's new shuttle program and their plans to head back to the Moon in 2015, perhaps earlier. Lockheed Martain got the job of designing and building the new space shuttles. It's a $7.5 billion project that will involve constructing a fleet of shuttles. Dubbed the Orion Shuttles, they look amazingly like the old splash-down craft from the 60's.

Other news of interest was the capturing of a supernova event using the Swift space telescope. What made this special was the fact that astronomers were able to witness the event from beginning to end. Usually we don't pick up on this Gamma Ray Bursts until the event is in progress. This particular supernova

Continued...

occured in a dwarf galaxy that was 470 million light years distant. Or in other words, the event happened 470 million years ago and we're just getting the light from it now.

Mark Coady brought the group up to speed on the trip he, Susan and Rick Stankiewicz recently took to Hall's lake to talk about light pollution in cottage country and to give cottagers a sky tour. According to Mark, the talk they did last year must have worked because residents mentioned that instead of 15 offensive flood lights being left on all night, the count was down to two. Thanks guys, the word is getting out there.

John Crossen then announced the upcoming Moon Marathon that would be taking place in October. He will be challenging clubbies to locate a number of lunar landmarks using their binoculars and telescopes.

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Goodbye John Kidner, We Will Miss You

I knew John Kidner most of the 20 years that I have been involved in astronomy. He and Susanne operated Perceptor, one of the friendliest astronomy shops I have ever had the pleasure of browsing through.

John and Susanne were instrumental in bringing me into the hobby and encouraging my astronomical endeavors. I can't recall a time when visiting the store that John didn't greet me with a warm smile and a friendly handshake. It was he who showed me the images on his computer after Hubble had its vision fixed. The before and after comparison was astounding.

John Kidner knew just the books to suggest for my fledgling astrophotography career. And I have two awards on my wall signed by no less than Terry Dickinson and Jack Newton attesting to the value of John's advice.

When I became the Editor for the South Simcoe Amateur Astronomers newsletter, John and Susanne were there to help with loaner products for articles I was writing. And their support of the club extended further with some outstanding door prizes for the annual Huronia Star Party.

The Kidner's table at star parties was always a treat to visit, and I remember his HSP special price on an eyepiece that I still cherish. It was my birthday, so with a little begging, Deb acquiesced – after all, who could refuse a deal like this!

The most important aspect of doing business with the Kidners was the sense of trust and honesty they instilled in me. John's advice always came straight from the hip. If he didn't think something was quite right for you, he'd suggest an alternative with a gentle smile and the usual twinkle in his eye.

This year's HSP was a little different. For the first time since 1991, John and Susanne weren't there. Most of us knew that John was having some health problems, but no one suspected how serious they really were. And so we carried on hoping to see John at next year's HSP.

John Kidner

On September 5th, 2006 John Kidner succumbed to lung cancer. But rather than dwell on John's passing, I will remember his life and all that he did to encourage myself. The term "beginner's luck" was never more appropriate than when my fledgling steps in this hobby led to Perceptor's front door. Goodbye John Kidner, we will all miss you.

The PAA has pledged $100 to the Stedman Community Hospice in John's honour. Buckhorn Observatory has matched this pledge, and PAA members Rob Duncan, John Duncan, Brett Hardy, and Fran Goschl have all made individual contributions. If you would like to make a donation, please send it to: Stedman Community Hospice, c/o St. Joseph's Lifecare Centre, 99 Wayne Gretzky Parkway, Brantford, ON.

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J O K E ! J O K E ! J O K E ! J O K E !

Two astronauts were in a space ship circling high above the earth. One had to go on a space walk while the other stayed inside.

When the space walker tried to get back inside the space ship, he discovered that the cabin door was locked, so he knocked.

There was no answer. He knocked again, louder this time. There was still no answer.

Finally he hammered at the door as hard as he could and heard a voice from inside the space ship saying, 'Who's there?'

! J O K E ! J O K E ! J O K E ! J O K E

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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ARTICLES

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

Shawna Miles
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K0M 1A0

or via e-mail at:
Shawna.mi@sympatico.ca

Please contact me first if you are sending a large file.

NEXT ISSUE'S DEADLINE IS
Oct. 15, 2006
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MEETINGS

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

CALENDAR OF EVENTS

October 13, 2006	**General Meeting—** Club Observing Night - Don MacDonald's
October 27, 2006	**General Meeting—** Steve Dodson – topic to be chosen - Riverside Zoo
November 10, 2006	**General Meeting—** Movie Night – "Hubble: 15 Years of Discovery" - Riverside Zoo
November 24, 2006	**General Meeting—** Club Observing Night - Brett Hardy's

Moon Phases

Full Moon	**October 7, 2006**	**November 5, 2006**
Last Quarter	**October 14, 2006**	**November 12, 2006**
New Moon	**October 22, 2006**	**November 20, 2006**
First Quarter	**October 29, 2006**	**November 28, 2006**