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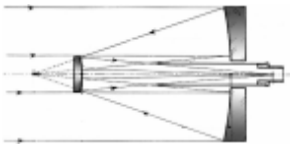
PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR



Volume 5, Issue 8 November 2006

Editorial

The month of October wasn't very good for observing, but despite all of that rain there were some high points.

Astronaut Chris Hadfield gave a couple of talks in Peterborough on October 26th. In this issue of the Reflector is a picture of our PAA President getting an autograph!

At the October 27th PAA meeting we had Steve Dodson for a guest speaker. He talked about his work in astronomy and intrigued us with the mysteries of our universe. Check out an article on all of this and more on pgs. 8-9.

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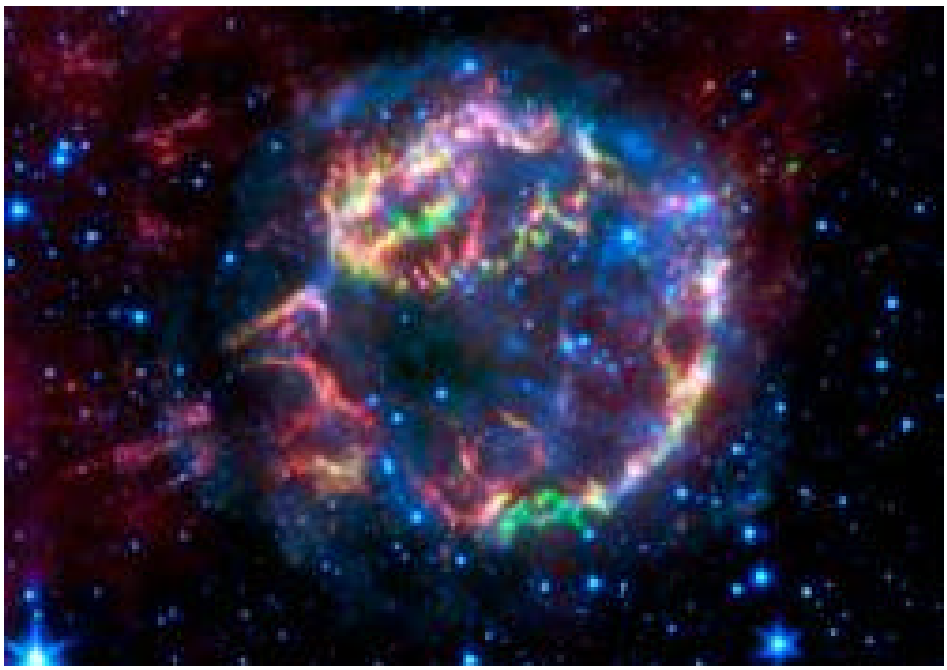

Cassiopeia A. taken by the Spitzer Space Telescope. Image credit: NASA/JPL/ Caltech

Supernova Remnant Finally Explained

It's name is Cassiopeia A. The star was 15 to 20 times the mass of our Sun. It is located in the Milky Way galaxy, and exploded relatively recently. For years astronomers have been trying to figure out how this supernova remnant was created. The Spitzer Space Telescope has now helped to solve the mystery.

Spitzer has helped astronomers to understand what happened when Cassiopeia A blew up. The original star was made up of 'shells,' with the lightest elements in the outer shells and the heavier elements in the center. Spitzer's new photographs show that the Cassiopeia A remnant is made up of shells, just like the star. This tells astronomers that the explosion was not chaotic, otherwise the remnants would be mixed and mashed together in one big cloud.

During the supernova, as the layers shot outward, they hit the shockwave from the explosion. Materials that hit the shockwave first have had more time to heat up into X-rays and visible light. We have been able to see these, but Spitzer has allowed for us to see the missing pieces. The material that is now hitting the shockwave are cooler and create infrared light, which Spitzer can detect.

When Cassiopeia A exploded, most of the original layers flew out in successive order, but some layers went out fast, while others moved at slower speeds, depending on where they started.

For more information go to:http://www.nasa.gov/mission_pages/spitzer/main/index.html or http://www.spitzer.caltech.edu/spitzer

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Inside This Issue

SuperWasp Finds Planets Beyond Our Imagination

If you've kept pace with the astronomical community's search for planets orbiting distant suns should be pretty blasé about their numbers – 200+ at last count. But check the specs on some of these far-out worlds and the word "incredible" is an understatement.

In 2004 two Hot Jupiters were discovered orbiting stars 1,000 light years and 500 light years away in the constellation Andromeda. Their discovery came about thanks to a British project nicknamed SuperWasp.

Using highly sensitive equipment Project SuperWasp scans the sky with a battery of 8 scientific camera lenses 11cm in diameter. They are stacked in a robotic fork mount that tracks the night sky. This system has a field of view about 2,000 times greater than a single telescope and can monitor the entire local sky several times per night. One snapshot captures hundreds of thousands of stars for analysis.

SuperWasp detects hundreds of thousands in a single snap-shot. One night's observing run generates up to 60 GB of data. Project SuperWasp is a UK/France initiative with camera systems in the Canary Islands and South Africa.

The SuperWasp system detects faint dips in the light from distant stars. This can be caused by a planet orbiting in front of it. To find our two super Jupiters, Project SuperWasp monitored just over a million stars.

Once SuperWasp had tracked down a batch of likely candidates, the data was transferred to the project's French counterparts at the Observatoire de Haute-Provence. Here another method of detecting extrasolar planets is employed to confirm SuperWasp's findings. Again, highly sensitive equipment monitors the stars. But instead of looking for dips in the stars magnitude, this system (called Sophie) detects little gravitational tugs on the star. These tugs confirm that something is orbiting the star and pulling on it – ever so slightly.

Once the existence of the two extrasolar planets was confirmed, other telescopes such as the Spitzer and Hubble space observatories track down further data. So what do we know about our two new Hot Jupiters now that we know where they are?

Both orbit their suns at a much closer distance than our Jupiter does. These big boys swing around their stars in less than three days. Distant Jupiter takes 12 years. Being so close to their star also makes them very hot. Both have an estimated surface temperature of about 1,800C. For comparison, our sun's surface temperature is 6,000C.

But that's normal compared to the suspicion that the clouds on these two hotties are made from rock snowflakes. That's because the types of clouds that condense at these high temperatures are made of elements that we normally think of as minerals – olivne, forsterite, and other magnesium silicates. Moving from rock clouds, we now encounter a real mush-ball.

The planet is known as HAT-P-1b and orbits a star 450 light years from Earth in the constellation Lacerta. With a girth that is 36% larger than our own Jupiter, it is the largest exoplanet found to date. But big doesn't mean brawn in this case. HAT-P-1b is only half Jupiter's density, or about one-quarter that of water (the density of a cork).
Yet as weird as HAT-P-1b may seem to be, there are others like it – including the first exoplanet ever discovered in 1999 in the constellation Pegasus. We've come a long way since – but instead of answers, we just pile up more questions.

Until we meet again, keep the lights down dim and the stars up big and bright. You'll save energy, money, and the dark Kawartha night skies.

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Aloha#7 – W.M. Keck Observatory (Keck I & II)

At the 13,647 ft (4,160 m) altitude level, there are two optical/infrared telescopes side by side, each with a 33 ft (10 m) diameter mirror, housed in twin 101 ft (30.8 m) high by 121 ft (37 m) wide domes. The mirrors are each constructed of 36 hexagonal segments (6 ft/1.8 m wide and 3 in/7.5 cm thick). They are so finely polished that if each mirror segment were expanded to the width of the earth, the highest elevation would only be 3 feet high (less than a meter)! Each segment is manipulated to help the whole mirror operate as an effective single unit. Computers control the tweaking of each mirror segment twice every second. This results in an accuracy of 4 nanometers (about 25,000 times thinner than a human hair). Now that is precise optics.

The Keck I telescope has confirmed the discovery of more extra-solar planets

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(more than 50) than any other ground based telescope. Keck I & II can be used together for the same effective resolution of a 279 ft (85 m) telescope. Keck also claims to have recorded the most distant object known to astronomers (galaxies at 14 bly).

NASA and Cal Tech run the facility, which opened Keck I in 1992, and Keck II in 1996. They are the classic "dome" shaped and are striking in comparison to the unconventional Subaru design. During weekdays, Keck I is opened to tours from 10 to 4. Unfortunately, our tour was a sunset tour, so we missed the opportunity to view the inside of any observatories while on Mauna Kea, but they still are really impressive from the outside.

There was a comfortable lobby area with plenty of free literature, scale models of the summit, interactive monitors and stunning images taken by the Keck telescopes.

How did the Keck Observatory get it name? William Myron Keck (1880-1964), the founder of The Superior Oil Company, established the W.M. Keck Foundation in 1954. This foundation has always supported imaginative innovations for new scientific discoveries and technology, so it only seems fitting that these two unique telescopes carry the name of a foundation that stands for what they accomplish.

The control centre for the Keck domes is not located in Hilo, like most of the other telescopes on Mauna Kea, but rather in the little community of Kamuela (or Waimea), on land donated by the huge Parker Ranch (at 150,000 acres, it is one of the largest ranches in the whole of the U.S.A.), located at the north end of the Big Island. This is still about 22 mi. (35 km) from the mountaintop. The view of Mauna Kea from Kamuela is breath taking even at this distance. The visitor centre here is not big, but definitely the best of all that I visited (and I saw them all). You will "keck" yourself if you miss it. This is a must see stop on any astronomy tour on the Island of Hawaii.

For more information on the Keck Observatory, see their website:
http://www.keckobservatory.org/

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Canadian Space-walker Muses On "The Smell Of Space"

It's always funny to hear astronauts making small-talk. How - I always wonder - can the traffic on the way to a public appearance or the latest episode of *Lost* compare with floating free in the vacuum of outer-space.

It was this thought that was going through my head after Canadian astronaut and STS-115 spacewalker Steve MacLean finished up an interview for *Daily Planet* and DiscoveryChannel.ca in CTV's Scarbourgh studios. In addition to doing a TV interview with Jay Ingram for the show, Jay was nice enough to tip me off to Steve's appearance and the fact that we might want to have him do some "bonus" questions for the web site, which he would ensure the asking of (being the host and all makes this an easy promise for him to make.)

After *Daily Planet*'s interview with a North Korean nuclear program expert got bumped over, Steve finally ended up sitting down in our studio (formerly the studio for the *Dini Petty Show*, for the TV trivia buffs out there) to do the interview.

But it was the small-talk before and after that I found most interesting as a space buff, as I suspect a lot of us would.

Before the interview, I was sitting in the control room, making sure our questions got asked. Jay and Steve ended up talking about the North Korean threat and how the whole morning got put on hold because Fox was first in the cue to interview the expert on the issue that we also had lined-up.

After the interview, Jay, the TV producer masterminding the interview, myself, and our intern Brian ended up being able to shoot the breeze with Steve on his way to wait for a cab. (I actually got to do a web video interview with Steve just before the original 2002 launch date of

Continued...

Canadian Space Agency astronaut Steven G. MacLean, STS-115 mission specialist, performs a task to relocate articulating portable foot restraints (APFR) during the second of three scheduled spacewalks supported by the Atlantis astronauts and the crew members aboard the International Space Station.
Image credit: NASA

his mission to the International Space Station.)

"What's the coffee like up there?" Brian asked. Apparently, NASA now uses a mixture that looks like instant coffee crystals here on Earth, but when you pour hot water over it for more than five minutes, it actually makes a brew similar in quality to something you'd get from Tim's or Starbucks. The brand is called "Kobe" and apparently astronauts swear by it these days.

One question I wanted to ask for the on-camera interview but didn't have time for was whether the Space Station *smelled*: I've read in a few places that the Mir Space Station overheated and started to reek of sweat for a while, back when one of its radiators was on the fritz. Not the case at all on the ISS, according to Steve.

"It actually doesn't smell like mutch of anything in there," Steve told me. "But the airlock actually has a distinct 'smell of space'," he said. Once materials, gasses, and other things get whisked in and out of the "doors" to the final frontier, there's a distinct smell of "off-gassing mixed with gunpowder". "Really?," I said. "Yeah," he insisted, (in a sort of "yup...seriously!" tone.)

We actually had a little more time before Steve's cab arrived to mingle and just shoot the breeze. We talked about Air Miles and airport security (Steve hasn't flown on a commercial jet for two years) and what his kids watch on TV.

It struck me that astronauts (at least the ones I've met) are real-life superheroes - ultra-capable, mild-mannered, and the best at what they do. But they're also moms, dads, people who lose their keys, and as likely as you to want to talk to friendly folk about how their work's going.

Of course, their work may involve a slightly longer commute...

By: Peter McMahon

Based in Port Hope, Peter McMahon is a proud member of the PAA and is a new media producer for Discovery Channel Canada

Hubble Identifies More Exoplanet Candidates

I discussed earlier how the UK/French collaboration called SuperWasp had punched the extrasolar planet count (planets orbiting distant stars) to the 200 mark. And in the process, it had identified some very unusual planets – one was even fluffy!

Recently it was announced that the Hubble Space Telescope (HST) has boosted the exoplanet potential count even higher with 16 new candidate stars. The project goes by the name SWEEPS which is mercifully short for Sagittarius Window Eclipsing Extrasolar Planet Search. That's a mouthful, but it does say it all.

The HST was taking exposures of the central bulge of our galaxy. That's in the direction of the constellation Sagittarius.

The eclipsing technique is one of the ways a potential extrasolar planet can be identified. When a planet comes between its home star and the HST camera, the star will dim slightly – call it a mini-eclipse. That can be a clue to the possibility that the star has at least a planet or possibly a system of planets orbiting it.

During the search, which took place from February 23 to 29 in 2004, Hubble's Advanced Camera for Surveys imaged 180,000 stars. It was the deepest look ever taken into the crowded central region of our galaxy. Now, two years later, the data has been boiled down with 16 potential new solar systems being identified.

The key word here is potential. Further study of the candidate stars will tell the tale as to their stature as planetary home stars, or just variable stars that dim on a regular basis. As of this writing, 2 of the 16 have been confirmed as having extrasolar planets orbiting them.

All of this may not seem like a lot,

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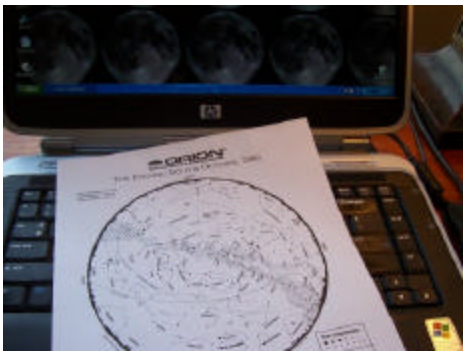

Looking for a free star chart? Visit www.telescopes.com for a chart you can print out that's almost perfect for the Kawarthas night sky. And while you're there, you may just want to scan the site for some stargazing accessories.

but for every extrasolar planet discovered, we come a tiny fraction closer to answering the big question – are we alone in the universe? Already with 200+ extrasolar planets on the books, we know that our solar system is not alone. Concentrated analysis by spectroscopy will identify planets where life as we know it might exist. And then there is still the vast arena of life as we don't know it.

Digging for data a little closer to home, I had a request last week for a star chart. After giving my reader the basics on books and magazines to buy, I decided to scan the web for some freebies. Astronomy Magazine www.astronomy.com and Sky & Telescope's www.skytonight.com offered downloadable monthly event schedules, but no printable star charts, though S&T's chart is interactive. SkyNews at www.skynews.com also has star events, but no star chart. Even the famous Abrams Planetarium, at www.abramsplanetarium.com asks that you subscribe to their newsletter and monthly sky calendar.

Finally I visited www.telescope.com the Orion Telescopes website. At last a free sky map my reader could download! When the homepage comes up, look to the right for a column called "In the Sky." The Orion Evening Sky Chart is designed for those living around 40 degrees north latitude. We're at about 45 degrees north, so the chart works just fine for folks in the Kawarthas. It is correct for the entire month at the times indicated on the chart.

And there you have it for this week - new planets orbiting distant stars, and free star charts just a click away on your computer. Until we meet again in the backyard, keep the lights down and the stars up bright. You'll save money, energy, and the beautiful Kawartha night sky.

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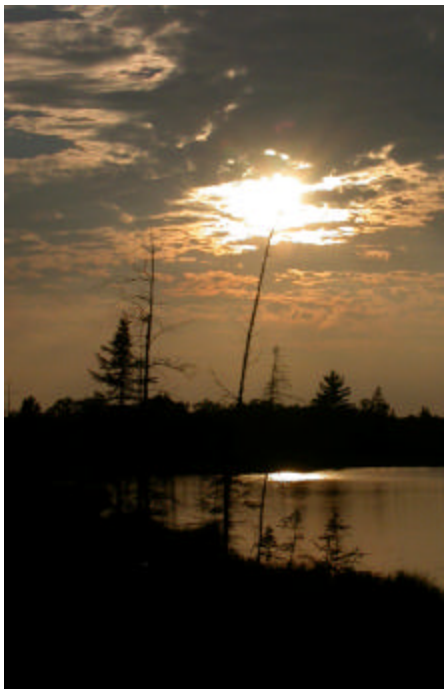
Scouting Trip To The Torrance Barrens

On the long weekend in August I worked in a trip to the Torrance Barrens Conservation Reserve, just north of Bracebridge, off Muskoka Rd.#169 (south of Bala). It was less than ideal conditions for observing (nearing full moon), but the visit was worth the effort. I had heard of this spot for several years and had driven by it on business trips up north, but had never checked it out for myself.



This picture shows some of what you can see at Torrance Barrens.

At the welcoming sign of the Torrance Barrens Conservation and Dark Sky Reserve.

Torrance Barrens is an almost 5,000 acre (1990 ha) area of unique geologically terrain, characterized by low Precambrian bedrock ridges, wetlands of peat bogs and scrub oak and pine trees. The first of its kind in Canada, the Torrance Barrens has been officially recognized as a Dark Sky Reserve since 1999. It is becoming a bit of a Mecca for astronomers in southern Ontario. One visit and it is easy to see why. This undeveloped landscape is primitive by any standards with the low trees and relatively unobstructed horizon, but for observing the night sky, it is near perfect. There is a rough parking lot, one "port-a-potty", a couple signs and walking trails that lead off into the barrens and that is it. No fees station, no campsites and no lights. The road in off Hwy#169 is paved, but that is the only "improvement" you will see.

What really adds to this Reserves astronomical charm is that the local municipalities have embraced the concept of fighting light pollution and as a result there is no sky glow to worry about. The idea is that there won't be development of this area that is typically associated with a "park". The down side is that you cannot camp in the Reserve, but there is lodging available close by in Bala or Bracebridge. I stayed in a B&B only 9 km away when I visited the area.

I briefly experienced the barrens in

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both the day and night time. My impressions were great, given the short time I was there. If there were time to walk any of the three trails and experience the habitat and the unique wildlife in the area it would have been even better. I can only image what a new moon would have done for the skies here. I took a few time exposures of the Big Dipper over a bog and oak tree, but the nearing full moon was not conducive to great images. I look forward to a better-timed visit with clear skies and no moon to contend with. Would it be worth considering for a PAA field trip in the future?

For more information see: http://www.muskokaheritage.org/natural/torrancebarrens.asp

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NASA Fact

www.nasa.gov

* On March 16, 1926, Dr. Robert H. Goddard successfully launched the first liquid fueled rocket. The launch took place at Auburn, Massachusetts, and is regarded by flight historians to be as significant as the Wright Brothers flight at Kitty Hawk.

NASA Space Place

Deadly Planets

About 900 light years from here, there's 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 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 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. Last year, a group of astronomers led by Deepto Chakrabarty of MIT 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."

More news and images from Spitzer can be found at

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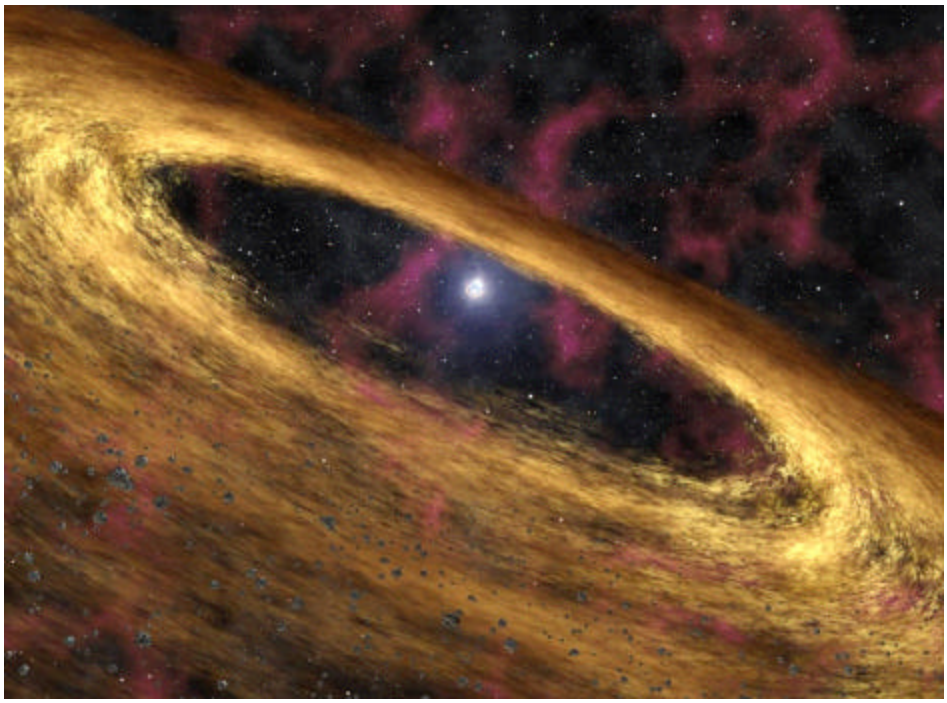


Artist's concept of a pulsar and surrounding disk of rubble called a "fallback" disk, out of which new planets could form.

http://www.spitzer.caltech.edu/ . In addition, The Space Place Web site features a cartoon talk show episode starring Michelle Thaller, a scientist on Spitzer. Go to http://spaceplace.nasa.gov/en/kids/live/ for a great place to introduce kids to infrared and the joys of astronomy.

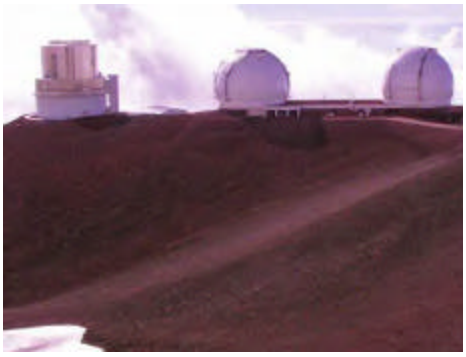
This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

By Patrick L. Barry and Dr. Tony Phillips

Hawaiian Quake Rocks The World's Largest Telescopes

On October 15th, the island of Hawaii experienced its largest earthquake in 20 years. The initial quake hit magnitude 6.7 and was followed by 20 aftershocks, resulting in interruptions to power and communications as well as structural damage to buildings. High atop Mauna Kea, the world's largest telescopes were both shaken and stirred.

The massive 10-meter mirrors of the Keck telescopes appear to be undamaged. However, the guiding and pointing systems were affected and will have to be repaired before observations may be resumed.



A recent series of earthquakes on the big island of Hawaii shook up the astronomical community. Fortunately the telescopes, located at the 15,000 foot level on Mauna Kea, survived with remarkably little damage.

Next door, the Gemini North Observatory reported that its 8-meter telescope shook hard during the quake, but other than being moved in its azimuth track, suffered no structural or mirror damage. A date for resuming operation has not been determined.

The Canada-France-Hawaii Telescope, which is home to a 3.6 meter optical and infrared telescope, reported that the dome has moved on its track and can't be rotated. The CFHT staff is hard at work to get the scope back on schedule as quickly as possible.

Also nestled atop Mauna Kea is the United Kingdom Infra-red Telescope. It had just finished an observing run about an hour before the quake struck. The UKIT, along with the James Clerk Maxwell Telescope suffered no mechanical or optical damage.

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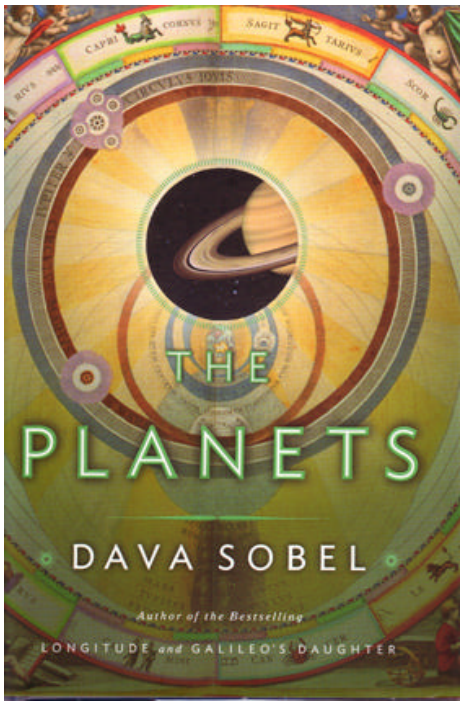
Book Review: The Planets, by: Dava Sobel (2005)

Some of you may recognize the author of this book, not only for her unusual name, but also as author of two best selling books "Longitude" and "Galileo's Daughter". If you liked any of her previous works, you will not be disappointed in this most current effort. This book is still only available in hardcover ($35 CDN), but I do not regret the expenditure in these 270 pages.

Sobel takes you on a unique tour of our solar system, at least how it was known to have existed up to a year ago. Yes, Pluto was a planet then! The amount of research that went into this book is quite evident and makes for a



good read whether you are a novice or expert in the field of astronomy. There is something for everyone here.

The unique thing about this book is the way the author has made each chapter as different as the piece of the solar system she is describing. Some are written in a narrative style and others in much more of a first person experience. As you might expect, each chapter is a different part of the solar system and each includes the history of the their discovery and what makes them what they are, but it is the style of each chapter that I found intriguing. If you were a Martian rock that could talk, you would have written Chapter 6 on Mars, or what better way to learn about the discovery of Uranus and Neptune than from a letter by Caroline Herschel (circa 1840's), a novel approach for any novel.

In any case, I would recommend this book to anyone in the club. I liked getting re-acquainted with our celestial family and learning more about our collective history. I guarantee that no matter how much you think you know about our solar system, you will end-up learning even more.

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The Sky This Month

MERCURY

Mercury has a greatest elongation (East) on the 17th, but appears quite low in the West-southwest as it gets dark.

VENUS

Venus is in superior conjunction with the Sun this month, and will be better observed next month.

MARS

Mars, too, is a no-show this month because it appears too close to the Sun.

JUPITER

Still in the West-southwest at nightfall, Jupiter sets before mid-evening, so look early. It is in Libra

SATURN

Saturn is the best placed planet visible to the human eye this month, but it is a morning object. It doesn't rise until after midnight, in Leo.

URANUS

Uranus is in Aquarius. It is barely visible to the naked eye, this planet sets about two hours after Neptune.

NEPTUNE

Neptune is in Capricornus. Look westwards after sunset for it; this gas giant sets before midnight.

METEOR SHOWERS:

Leonids on November 17th and the Alpha Moncerotid meteor shower on November 21st.

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

Meeting Notes

October 13, 2006

For once Friday the 13th was good news. The night's meeting was very well attended and we were delighted to welcome new member Margaret Scorthorn. Margaret had attended a few meetings back in the 1990's so even though she was familiar to our meeting room, most of us were new to her. Margaret does her observing with a pair of binoculars and is quite enthused about the club and her astronomical hobby. Welcome aboard Margaret.

New publications also took the spotlight as John presented the latest editions of such helpful magazine offerings as *Celestial Sampler* by Sue French, *Cosmos* and *Atlas of the Stars* collector's editions from Astronomy Magazine, and Sky & Telescope's *Sky-Watch 2007,* an essential guide to planning next year's observing schedule for club members.

Of particular interest to club members is the latest edition of a British magazine called *Sky at Night.* In addition to having some superbly written articles and telescope tests, the Magazine comes with an interactive CD ROM that features none other than the renowned Sir Patrick Moore and a raft of international astronomy experts discussing the latest in celestial events. I find it to be a fascinating disc that one can enjoy at his or her leisure. And it is very professionally done. Total cost for the magazine and CD ROM is about $14 and well worth every cent. I think of it as a gift from the British.

John also discussed the Lunar Observing Challenge and distributed copies of a Moon map as well as October's sky map to the assembled guests. The challenge will be broken down into naked eye, binocular, and telescope categories so that everyone can be equally embarrassed , or pleased with themselves and their achievements. The rules and targets will be distributed via email shortly.

Mark Coady, our light pollution guru, updated everyone on his achievements in the dark. One item we'll keep our eye on is the assistance and the performance one of our municipalities can give to a person who contacted us about a gross light polluter on their lake. I received some pictures they had taken at night. To be honest, I have seen tacky theme parks that were less obtrusive. Mark put the party in touch with local officials. Now we'll wait and see what transpires.

* Changes to the club's meeting and operating proceedures that will take place in January were also discussed. They are as follows:

* The club will hold one meeting per month on the first Friday of the month. Club observing nights will be on the Friday near or just after New Moon with the following Saturday night as a back up date. Meeting time and location will remain the same. Observing sites and times will flex with the seasonal sunset times.

* The club will cease activities during the busy summer months of July and August.

* Past President, Dave Duffus, will be granted honourary Life Time Membership for his years of service to the club.

* Donations to chareties or for funeral expenses must be determined and approved by the PAA executive committee.

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Chris Hadfield Capped A Great Month For Astronomy

The skies may have been cloudy for most of October, but it was still a great month for astronomy buffs. Not only were we treated to two superb talks

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PAA President, John Crossen, getting an autograph from Canadian astronaut Chris Hadfield.

from Canada's first man to walk in space, Colonel Chris Hadfield, but we had a visit from one of Canada's best-known amateur astronomers, as well as some great news from on recent launches from NASA, the rovers on Mars, and the opening of a new observatory in New Mexico.

Canadian astronaut Chris Hadfield addressed a packed Wenjack Theatre at Trent University last Thursday morning. Next he was off to Hastings and Medoc to join secondary school students as they communicated with the International Space Station (ISS) via a radio link. Later Colonel Hadfield returned to Peterborough where he talked on how living in zero gravity on the ISS has helped us learn more about osteoporosis.

I had the pleasure of attending his morning talk at Trent. It was an absolute delight as Colonel Hadfield took us through the development of our first steps in space, from Sputnik to the international space station, and on to its most recent additions courtesy of The Canada Arm II. It is an awe-inspiring experience to hear about space travel from someone who has been there and done it. And it was equally inspiring to understand the role Canada has played, and will play in the future of space travel.

Last Friday night members of the Peterborough Astronomical Association hunkered down with Stargazer Steve Dodson as he gave the club a brief history of cosmology, then treated everyone to a sneak-peak at a new telescope he was developing. Steve's new scope is based on the popular Dobsonian design, but is even more compact, lightweight, and portable.

The Mars Rovers, Opportunity and Spirit entered the record books in October as Spirit celebrated its 1000th day (called a Martian sol) roving the red planet. The rovers were originally intended to last for a 90-sol tour of duty. Now entering their third year, the rovers have answered the question, was there ever water on Mars, with a positive yes.

Stargazer Steve Dodson demonstrated his unique telescope design at a recent meeting of the Peterborough Astronomical Association. At 13" aperture, it is a large scope. But it all breaks down and can fit into a mini-sized car with ease.

The recently launched Mars Reconnaissance Orbiter (MRO) will now determine if there is any water beneath the surface of Mars. Part of its scientific gear uses radar to map the distribution of rocks, ice and water up to 1km below the Martian surface. If there is water still in existence, the next Martian mission will include a drilling rig to tap into the Martian aqua and analyze its content – especially for any microbial life forms.

October also saw the opening of New Mexico Tech's new "Eye on the Universe", a $50 million optical observatory and research facility. The ribbon cutting was on October 26th and took place at the new facility which is located atop the 10,800 foot high Magdalena Mountains.

October's agenda also included NASA's successful launch of two probes to image our Sun. Coincidentally, they were launched the morning of Chris Hadfield's talk and will be used to monitor the harmful radiation of solar flares as part of an early-warning system for future space-walkers and residents of the International Space Station.

Clear nights or not, October was a good month for astronomers and astronomy. Until we meet again in the backyard, keep the lights down dim and the stars up bright. You'll save money, energy, and the beautiful Kawartha night sky.

John Crossen
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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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J O K E ! J O K E ! J O K E ! J O K E !

An astronaut in space was asked by a reporter, "How do you feel?" "How would you feel," the astronaut replied, "if you were stuck here, on top of 20,000 parts each one supplied by the lowest bidder?"

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

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:

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

NEXT ISSUE'S DEADLINE IS
Nov. 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

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
December 8, 2006	**General Meeting—** PAA Christmas Cookie Crunch - Riverside Zoo

Moon Phases

Full Moon	**November 5, 2006**	**December 5, 2006**
Last Quarter	**November 12, 2006**	**December 12, 2006**
New Moon	**November 20, 2006**	**December 20, 2006**
First Quarter	**November 28, 2006**	**December 27, 2006**