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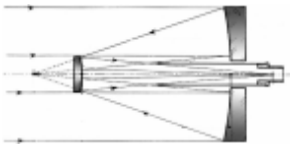
PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR



Volume 5, Issue 4 April 2006

Editorial

This month brings preparation for Peterborough's annual "Astronomy Day." It is quickly approaching us on May 6th. There will be a lot happening, so you won't want to miss it. For more information on Astronomy Day, check out the article on page 3.

On the April 14th PAA meeting we had Graham Wilson come and speak to us on meteorites. He sent me a list of books and links with more information on the subject. For those of you interested, you will find them on page 10 of this issue.

Shawna Miles
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The RS Oph Phenomenon

The date is February 12, 2006. Astronomers gazing at the night sky witnessed a faint star suddenly become clearly visible with the naked eye. Within hours, telescopes on the ground and in space turned towards the phenomenon. It just so happens that this was not the first time this star turned bright. Known as RS Ophiuchi (RS Oph), it has reached this level of brightness 5 times in the last century! The most recent occurred in 1985.

RS Oph is a binary system about 5,000 light-years from Earth. It consists of a white dwarf star that is in a close orbit with a large red giant star. A white dwarf is a star that has burnt out its main source of hydrogen and shed its outer layers. What is left of the star is very dense and about the size of the Earth.

An illustration of the RS Oph explosion. Image credit: David A. Hardy.

The two stars orbit so close that the gravity from the white dwarf is continually sucking in the outer layers of gas from the red giant. This close orbit also explains the changes in brightness that have been observed. Once the white dwarf has collected enough gas, a runaway thermonuclear explosion occurs on its surface. The energy output increases to over 100,000 times that of the Sun, and the collected gas is ejected into space at a high velocity, some several thousand km per second! This happens about once every 20 years.

RS Oph is unusual to say the least. The red giant is losing enormous amounts of gas in a wind the envelops the whole system. Every time the white dwarf explodes, ejected material slams into the red giant at high speeds.

New data is continually being brought in on RS Oph. For more on this topic, go to the RAS website at: www.ras.org.uk

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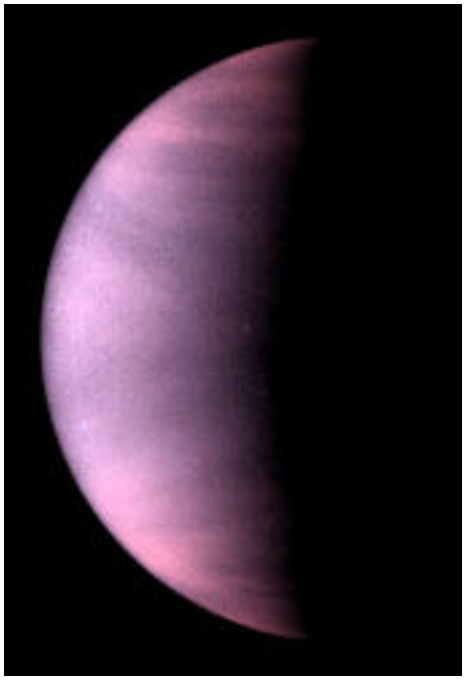
Inside This Issue

Venus. The Goddess Of Love Or A Living Hell?

Venus has long been the subject matter of poets and lovers. After all it hangs so bright and beautiful in both the morning and evening sky. But you wouldn't want to get close up. Like unsuspecting paparazzi swooping down on an aging Hollywood star – the closer you get, the more you'll regret.

The mysterious cloud cover that hides the real Venus is nothing more than greenhouse gases gone wild. The thick, silvery cloak not only reflects the sunlight to make Venus appear so bright, it also traps the surface below in a hellish prison.

Heat can't radiate out into space, so our sister planet has a surface temperature hot enough to melt solder. It's not like the molten planet in Revenge of the Sith, but it's also not the place to take Bowser out for a walk!



Yet another unusual trait of Venus is the fact that we never see it fully lit, only in phases such as shown above. Again, this is because the planet is inside Earth's orbital path around the Sun. To see it fully lit by the Sun we'd have to be between Venus and old Sol. This photograph was taken by the Hubble Space Telescope.

You'd better take a killer umbrella with you, too. Because when it rains on Venus, it isn't friendly. The closest you can come to duplicating a Venusian shower is to take a dip in a bucket of battery acid. Ouch! But let me put it another way, a couple of decades ago the Russians landed two space probes on Venus. Within a few hours their radio transmissions ended – thanks to the molten heat, oppressive atmospheric pressure, and the acid rain.

With a temperament like that, maybe we should be glad that we can only see Venus in the morning and evening sky. And why is that you ask?

It's because Venus is inside Earth's orbital path around the Sun. We see Venus best when it is at the ends of its orbital journey around the sun. Draw three concentric circles and place a dot at the centre. The dot represents the sun – definitely not to scale. The outer ring is Earth's orbital path. The next one in is Venus'. And on the inside track is Mercury. Most of the time, Venus' orbital path will take the planet too close to the sun for us to see it. Ditto that of Mercury.

But when Venus and Mercury are at the ends of their orbits (greatest eastern or western elongation) from Earth's viewpoint, we can see them. And, depending on where we are in our orbit and Mercury and Venus are in theirs we see them either in the morning or the evening as Earth is rotating into or out of darkness.

It is interesting that the early Greeks eventually recognized that they were looking at the same object, only at different times of the day. Prior to this revelation, Venus had two different names depending on the time of day you were looking at it. In the morning it was called Phosphorus (light-bringer) and when viewed in the evening it was called Hesperus. Later the Greeks associated the planet with Aphrodite, the goddess of love. The Romans changed the name to Venus, but with the same lusty ramifications.

So that's our evil sister. Lovely to look at, but avoid getting up close and personal.

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Moonquakes

NASA astronauts are going back to the moon and when they get there they may need quake-proof housing. That's the surprising conclusion of Clive R. Neal, associate professor of civil engineering and geological sciences at the University of Notre Dame after he and a team of 15 other planetary scientists re-examined Apollo data from the 1970s. "The moon is seismically active," he told a gathering of scientists at NASA's Lunar Exploration Analysis Group (LEAG) meeting in League City, Texas, last October.

Between 1969 and 1972, Apollo astronauts placed seismometers at their landing sites around the moon. The Apollo 12, 14, 15, and 16 instruments faithfully radioed data back to Earth until they were switched off in 1977. And

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This picture of the moon was taken by the Galileo spacecraft as it was on its way to Jupiter on December 7, 1992.

what did they reveal? There are at least four different kinds of moonquakes: (1) deep moonquakes about 700 km below the surface, probably caused by tides; (2) vibrations from the impact of meteorites; (3) thermal quakes caused by the expansion of the frigid crust when first illuminated by the morning sun after two weeks of deep-freeze lunar night; and (4) shallow moonquakes only 20 or 30 kilometers below the surface.

The first three were generally mild and harmless. Shallow moonquakes on the other hand were doozies. Between 1972 and 1977, the Apollo seismic network saw twenty-eight of them; a few "registered up to 5.5 on the Richter scale," says Neal. A magnitude 5 quake on Earth is energetic enough to move heavy furniture and crack plaster. Furthermore, shallow moonquakes lasted a remarkably long time. Once they got going, all continued more than 10 minutes. "The moon was ringing like a bell," Neal says.

On Earth, vibrations from quakes usually die away in only half a minute. Even the biggest earthquakes stop shaking in less than 2 minutes. The moon, however, is dry, cool and mostly rigid, like a chunk of stone or iron. So moonquakes set it vibrating like a tuning fork. Even if a moonquake isn't intense, "it just keeps going and going," Neal says. And for a lunar habitat, that persistence could be more significant than a moonquake's magnitude.

"Any habitat would have to be built of materials that are somewhat flexible," so no air-leaking cracks would develop. "We'd also need to know the fatigue threshold of building materials," that is, how much repeated bending and shaking they could withstand."

Before man returns, however, a network of 10 to 12 seismometers will be needed to be deployed for 3 to 5 years to better study moonquakes. This kind of work is necessary, Neal believes, to find the safest spots for permanent lunar bases.

And that's just the beginning, he says. Other planets may be shaking, too: "The moon is a technology test bed for establishing such networks on Mars and beyond."

By: Trudy E. Bell for science@nasa
Submitted by: Mark Coady
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International Astronomy Day Draws Closer

International Astronomy Day is a world-wide celebration of the hobby we all love. From China to Canada, Alaska to Argentina, and just about anywhere people can gather around a telescope, the night sky will be the focus of their attention. Large groups such as the Royal Astronomical Society and smaller groups such as ours will be putting on public showings, speaking tours, solar observing, and stargazing. In the end, it will promote our hobby and our club to more people who at least have a passing interest.

Come join us this coming May 6th on Armour Hill!

This year we're adding in a raffle and are splitting the proceeds with the Centennial Museum and Archives people.

Rick Stankiewicz will do a presentation on Mauna Kea and the big telescopes there. John Crossen will bring the BHO/PAA Planetarium along for 4 performances. A number of you will have your solar scopes set up. And if the weather cooperates, we'll have some stargazing in the evening. Jupiter, Mars, and Saturn will be up.

Last year's Astronomy Day Star Party was a real success - thanks to the weather gods and the hard work of PAA members. We'll need more of the same this year. So if you haven't joined up for the fun, let club President John Crossen know @ 657-7718 or johncstargazer@aol.com

Thanks and clear skies,

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The comets are coming!

The Internet chatter on astro-sites has been all about the upcoming comet shower. That's right, comet (not meteor) shower. It seems that Comet 73PSchwassman/Wachmann has now broken into 20 pieces, perhaps more. Thus we will be treated to a "string of pearls" as the comet's remnants pass by Earth.

Originally Arnold Schwassmann and Arno Arthur Wachmann (Hamburg Observatory, Bergedorf, Germany) discovered this comet on photographs exposed for a minor planet survey on May 2, 1930. The comet was then described as diffuse and magnitude 9.5.

In 1995 the comet caught the collective eye of astronomers when it broke into three pieces as it passed Earth on its Journey around the Sun. Earlier this year as it returned and reports that it had

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further broken into 8 chunks came out from the big observatories. Now we can look forward to a string of 20 – perhaps more – comets.

Of particular interest are fragments B and C. Fragment B now glows at about 15 times its brightness when first observed. This brightening is quite likely due to the comet chunk further breaking apart.

The comet chunks will pass within 7 million miles of Earth, making this the closest comet pass of the last 20 years. But there is no chance of any of hunks hitting our big blue ball.

If you're looking for something spectacular, this event won't be it. Unlike the massive recent comets Hyakutake and Hale/Bopp which could be seen with the naked eye in the heavily light-polluted skies of Toronto and other major cities, this event won't be anywhere near as spectacular.

Recent reports and estimates suggest that chunks B and C may brighten to about 4th or 6th magnitude. So you'll need a dark sky spot in the country and at least a pair of binoculars to see the passing parade of the dying comet. This isn't to say that the parade of comets is going to be one gigantic snore, but such events tend to become overblown in the regular press, so I'll play things down to avoid disappointing any of you.

Our comet shower is scheduled to begin in late April and early May. So if you have a decent telescope or a friend with one, perhaps you'd better start chatting him or her up. Also, be aware that observing will be hampered by the bright full Moon by May 13th.

Binoculars may show this comet's C-component within the southern end of the Keystone of Hercules. On the night of May 7-8, it will appear (at mag. 4?) between Beta and Gamma Lyrae, the pair of 3rd-mag. stars 2 degrees apart at the south end of the parallelogram of Lyra, some 6 to 7.5 degrees SSE of Vega. After passing through the Summer Triangle, the comet fragment comes within 0.08 a.u. (about 7 million miles) of Earth on May 12, but will likely be no brighter than magnitude. 3.5 at best, in a bright moonlit sky.

I'll keep you updated if anything significant occurs. So until we meet again, keep the porch lights down and the stars up big and bright.

Here are some websites for more comet information:
http://www.aerith.net/comet/catalog/0073P/2006.html
http://www.cometobservation.com
http://ssd.jpl.nasa.gov/horizons.cgi

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Aloha #3 – Caltech Sub-millimeter Observatory (CSO)

Here is another in my continuing series on the observatories of Hawaii's Mauna Kea. This past February's trip to the Big Island of Hawaii included views of both the dome housing the CSO antenna disk, located below the summit of the mountain, at the 13,375 ft (4,077 m) level and the control centre headquarters at the unassuming, Georgina and William Gimbel Building, located at the University of Hawaii (Hilo Research Park) (see image below and note the full cut-off fixture). Inside this building there was a scale model of the dome and telescope sitting on the reception counter (see image above).

This radio telescope is operated by the California Institute of Technology (Caltech). The telescope operates in the millimeter to sub-millimeter range of radio waves (0.3 to 1.0mm). This means that the wavelengths used are those not visible to the human eye because they are operating between the infrared and microwave bands. This type of radiation can provide details about the chemical composition, density and temperature of

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The control center headquarters at the Georgina and William Gimbel Building.

interstellar clouds for example. How can this be done, well the primary mirror is 34 ft (10.4 m) in diameter, consisting of 84 hexagonal aluminum panels that can be individually adjusted for maximum performance. The dish of this telescope has been machined to an accuracy of less than 20 micrometer of a true parabola. This allows for the collection of the radiation to the "sensing elements" that record the required data.

One of the more interesting aspects of this whole process is that the area of the sensing element must be operated at temperatures only a few degrees above absolute zero. As a result, liquid helium must be used to cool things down. This has allowed the CSO to be used in studying the formation and evolution of stars, as well as the structure and dynamics of galaxies. This telescope is so precise that it can single out individual elements, like carbon monoxide, as a spectral emission and image its location throughout the universe.

Construction for the CSO started in 1985, was dedicated on November 22, 1986 and saw first light in 1987. The CSO is the only professional observatory in the world without a specific operator. The observing astronomer has full control of the telescope during their observing session. Most of the use of the CSO is by non-Caltech personnel, believe it or not. The dome that houses this telescope

This picture shows the smaller CSO to the left of the Subaru and Keck domes.

is smaller and very compact compared to most of the other scopes near the summit (see image above of CSO in the foreground, left of the Subaru and Keck domes). The whole structure must rotate, to allow full views of the sky. It actually looks like a dome with no sides, sitting on the ground. The next image (below) shows the dome closer as I saw it in the closed position.

Why does a telescope like this need to be on top of Mauna Kea? The main reason is the truly clear observing conditions on Mauna Kea. Sub-millimeter astronomy is difficult because the type of radiation required is readily absorbed by water vapor. At sea level it would be almost impossible to detect this type of radiation, but as you increase the elevation, the amount of water vapor becomes less. With Mauna Kea being one of the highest and driest locations in the world, the atmosphere is transparent enough to carry out this kind of astronomy. Unique science in a unique location.

For more information, link to the CSO at: www.submm.caltech.edu/cso/

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The CSO dome in the closed position.

Oh no, the UFO's are back!

Regular as clockwork, I receive calls about unidentified flying objects any time Venus is in the dawn or evening sky. After all it is very bright. And sometimes Venus appears to flash and flicker, first red, then green, maybe even red – very scary! But that's only because our sister planet is often viewed when it is low on the horizon. At that altitude, its light passes through a thicker mass of Earth's atmosphere than it would if the planet were higher in the sky. It is Earth's unsteady atmosphere that makes Venus seem to flicker. The same thing happens every autumn when the bright

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star Capella rises in the northeast. Yikes, more little green men! So where are the little green women?

Nonetheless, I received a phone call last Sunday morning from the CBC Fresh Air show asking about a strange flashing light near the east/southeastern horizon. Once again my old friends the UFO's were back! And, while a little demon inside me wanted to feed the excitement, I once again had to be the spoiler. So I gave the standard "flicker 'n flash" explanation. At which point could almost hear the hiss of air leaking from the ballooning imaginations of the UFO-wanna-believers in the audience.

Now before you turn me into a grouchy old spoil sport let me say that I don't believe that we are alone in the universe. To quote Jody Foster from the movie Contact, "If there's no one else out there it would be a terrible waste of space."

We have plenty of credible evidence that other planets are orbiting stars like our Sun. Some show spectroscopic signs of having oxygen and water, two essential ingredients for life as we know it. But we also know that even here on Earth we find living creatures thriving on carbon dioxide in caves, and living near deadly (to us) thermal geysers beneath the sea. Even deep in the frozen ice of Antarctica microbial life forms have been witnessed. So there's an equally good chance that life as we don't know it exists out there, too. But the big question is, are they intelligent?

Often mistaken for a UFO, the brightest object in this picture is Venus. It is so bright because its thick clouds reflect about 70% of the sunlight that reaches it back into space.

Face it UFO buffs, there is only one critter here on Earth that can build a rocket ship. And that bunch of rascals only graduated from ape-hood a few million years ago.

Other planets may harbor life forms, but at what stage of development are they? Will they evolve into intelligent beings? If so, will they survive technology? After all, we can now blow our world apart just by squeezing a button. And with the Bush-whackies and radical Muslims going at it, somebody's just liable to get a bad case of thumbs. Oops, so long everybody.

Next add in the fact that it will take some amazing technology to travel the distances between just our local stars. The nearest star after our Sun is 4.2 light years away. So if someone somewhere out there could travel at the speed of light – 300,000 kilometers per second – they'd be there in 4.2 years. Most stars are thousands of light years away. Our own galaxy is 100,000 light years across. The next nearest galaxy is five or six times further away than that and most are millions of light years distant. For us, at least, intergalactic travel with today's technology would make as much sense as trying to drive to Europe in your father's Buick. Blub, blub, gurgle - it's just not going to happen.

And so the debate bubbles on. It's good exercise for the brain and the imagination. But before you report a UFO, make certain that it isn't just dear old Venus playing tricks on your eyes.

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Meet The Meteor That Made The World Safe For Humans

Today we're all familiar with the theory that the dinosaurs became extinct courtesy of a gigantic meteor impact 65 million years ago. The theory first began to take shape about 25years ago thanks to a father and son team. Walter Alvereze (the son) had noticed a high amount of iridium in a layer of clay that was relatively close to Earth's surface. Alvereze realized that this large of an amount of iridium could only come from a meteorite because all of Earth's iridium is lies deep within our planet.

Iridium is a heavy element and would have sunk towards Earth's core about 4.5 billion years ago when our planet was a gigantic molten blob. A meteorite on the other hand is a relatively small rock that would cool rapidly. Hence the iridium in it would be much more evenly distributed throughout it. When a large enough meteor impacts the Earth, the dust and vaporized materials (including iridium) it sends up could quite likely cover the Earth and rain down on it for years.

Both Walter Alvereze and his Nobel-peace-prize winning father, Luis, also noticed that the age of the iridium layer in the clay was remarkably close to the

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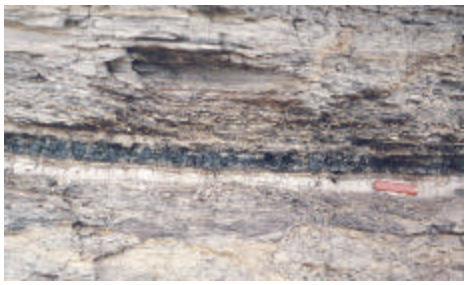

Photograph of the K/T boundary sequence 2000 km away from the impact site at Raton Basin in Colorado. The light gray unit in the middle of the photograph (marked with the red knife) is composed of two layers that mark the K-T boundary. A coal deposited in the Tertiary Period, after dinosaurs disappeared, is deposited on top of the K-T boundary layers.

age at which the dinosaurs became extinct. They also were aware that these iridium-rich clay layers were distributed around the world. So the impact must have been a very big one.

Known as the K/T Boundary this period between the Cretaceous and Tertiary periods was witness to something that wiped out 75% of the living species on land and in the world's oceans. Thus the great meteor extinction theory was born. But where did the celestial exterminator come down?

Pemex, the Mexican National Oil Company had been drilling near Chicxulub in the Yucatan Peninsula near an area filled with sink hole and was been pulling up core samples filled with crystalline melt rock. Could this have been a gigantic impact site? Additional geophysical data collected years later proved the hypothesis to be correct. Seismic, magnetic, and geographical data defined an impact that had eventually formed a crater 180 km in diameter. The clincher came when the Land Sat satellite photographed the area and the telltale shape of a meteor impact basin could be traced in the local geography.

The results indicate that a meteor about 10 km across had slammed into our pretty blue planet. It was traveling at about 30 km/s. Within 3 seconds the huge mountain of rock had ploughed through our atmosphere and punched a hole in our planet more than 10 km deep and 100 km in diameter. (Structural phenomena such as the side walls collapsing would widen it even more.)

It hit with the force of over 100,000 tons of TNT or about 6 million times the energy released in the Mount St. Helens volcanic eruption. The impact and the series of magnitude-10 earthquakes that followed set up a series of tsunami with waves up to 100 meters high. Forests were flattened as far as 1000 km away. Fire and molten debris rained down on plants and animals thousands of kilometers away. But the impact and the firestorm were just the beginning. A highly toxic acid rain forms when vaporized sulfur and nitrogen mix with water. It doesn't just affect plant life and plankton. Creatures breathed it. And when it got into their lungs it burned the tissue. They died.

Perhaps the most amazing thing about this impact wasn't so much its size. We've been hit with bigger bangs – near Sudbury to name just one site. But where it hit is what maximized its destruction.

Earth's surface is about 70% water, so chances are one would hit there. Hit in an area where the land and shallow water are close together and the results can be even more devastating. It was just one chance in a hundred that the meteor would hit where it did, but as Professor Dawson said, "The dinosaurs were having a very bad day."

And that, as it turns out, was a very good day for you and me. After all, we'd be nothing more than walking cans of "dino dinner" if the big boys were still around. And Tim Bits? Well, it wouldn't be a brand name. Happily we mammals flourished after the dinosaurs were gone. And that's why we should thank our lucky stars – or meteors to be precise. Well, just as long as we aren't hit by another big one soon.

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NASA Space Place

Who Wants To Be A Daredevil?

When exploring space, NASA naturally wants to use all the newest and coolest technologies—artificial intelligence, solar sails, onboard supercomputers, exotic materials.

But "new" also means unproven and risky, and that could be a problem. Remember HAL in the movie "2001: A Space Odyssey"? The rebellious computer clearly needed some pre-flight testing.

Testing advanced technologies in space is the mission of the New Millennium Program (NMP), created by NASA's Science Mission Directorate in 1995 and run by JPL. Like the daredevil test pilots of the 1950s who would fly the latest jet technology, NMP flies new technologies in space to see if they're ready for prime time. That way, future missions can use the technologies with much less risk.

Example: In 1999, the program's Deep Space 1 probe tested a system called "AutoNav," short for *Autonomous*

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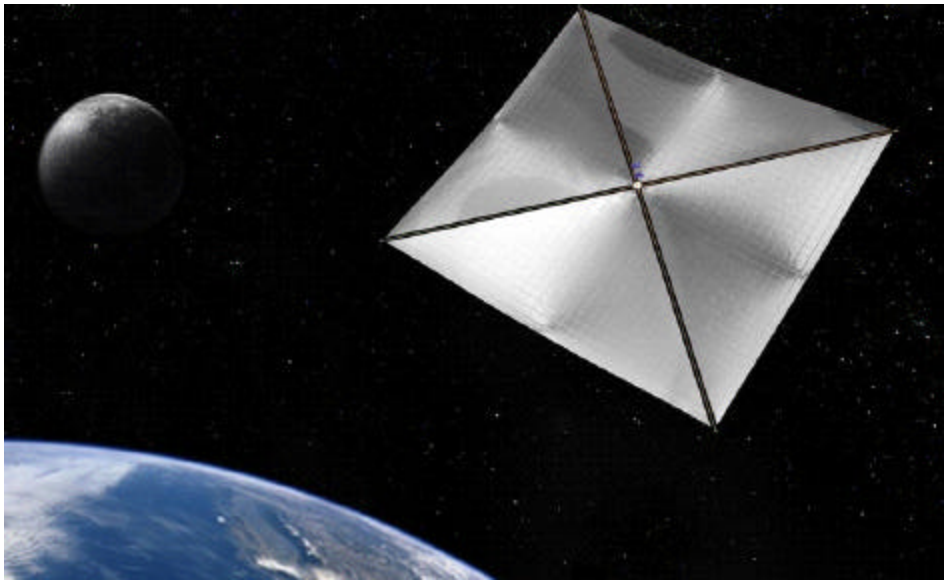

Artist's rendering of a four-quadrant solar sail propulsion system, with payload. NASA is designing and developing such concepts, a sub-scale model of which may be tested on a future NMP mission.

Navigation. AutoNav used artificial intelligence to steer the spacecraft without human intervention. It worked so well that elements of AutoNav were installed on a real mission, Deep Impact, which famously blasted a crater in Comet Tempel 1 on July 4, 2005. Without AutoNav, the projectile would have completely missed the comet.

Some NMP technologies "allow us to do things that we literally could not do before," says Jack Stocky, Chief Technologist for NMP. Dozens of innovative technologies tested by NMP will lead to satellites and space probes that are smaller, lighter, more capable and even cheaper than those of today.

Another example: An NMP test mission called Space Technology 9, which is still in the planning phase, may test-fly a solar sail. Solar sails use the slight pressure of sunlight itself, instead of heavy fuels, to propel a spacecraft. Two proposed NASA missions would be possible only with dependable solar sails—L1 Diamond and Solar Polar Imager—both of which would use solar sails to fly spacecraft that would study the Sun. "The technologies that we validate have future missions that need them," Stocky says. "We try to target [missions] that are about 15 to 20 years out."

A menagerie of other cool NMP technologies include ion thrusters, hyperspectral imagers, and miniaturized electronics for spacecraft navigation and control. NMP focuses on technologies that have been proven in the laboratory but must be tested in the extreme cold, vacuum, and high radiation environment of space, which can't be fully recreated in the lab. New NMP missions fly every year and one-half to two years, taking tomorrow's space technology for a daredevil test drive.

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

Peterborough Regional Science Fair May Launch A Few Astronomy Careers

Take about 150 of the smartest kids in the region and turn them loose on a raft of science projects. Bingo you've got some of the most innovative minds available hopped up on youthful energy and enthusiasm. The results of which are remarkable. And the rewards for which – both now and in the future – may also be quite remarkable.

This was the first year that the Peterborough Astronomical Association has been involved in the awards. Just as a coincidence, the science fair began the same year the PAA formed– 1970. So as the PRSF celebrated its 36th year, the PAA was proud to join in with an award in remembrance of one of our founding members, Mr. Frank Hancock.

Club members had all agreed that we should do something in Frank's honor. And it was eventually agreed that an annual award for $100 would be given to the best science project in the astronomy category. The Physics Department of Trent University promotes the event, so we worked through them to become part of the yearly fair.

The morning of April 11th found Mark Coady and me standing at the end of a footbridge across the Otonabee River on the Trent U. campus. We had our telescopes set up for sun-gazing and happily a few sunspots were available for viewing. We attracted quite a crowd and at one point had about 75 science fair entrants descend upon our two telescopes at once. Needless to say Mark and I kicked into overdrive and whistled the kids through while explaining what sunspots were, why they were, and what their affect is upon us.

Both the students and the faculty were delighted to have us there and I wish more members could have made it. Maybe next year – ask the boss for a day off.

At any rate, we met up with Professor David Patton again and I was introduced to Jim Sutcliffe, Trent U's Dean of Science. I also made the acquaintance of Peter Adams, who in addition to being a well-known Peterborough political figure is also a long-time supporter of the

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Beatrice Muldoon was the winner of the first Frank Hancock Memorial Astronomy Award. John Crossen and Jean Hancock are seen here with the award.

Sunspots were all in style as students from surrounding schools and Trent U. lined up to have a look through Mark and John's telescopes.

science fair. We also managed to promote the PAA to some of the Trent U. students
and I managed to flog a few brochures on behalf of Buckhorn Observatory.

Joining us for the awards ceremony was Jean Hancock. Jean and I presented the award. The winner was Beatrice Muldoon of Campbellford, Ontario. Beatrice's project was about the Moon. She won one award for her lunar project earlier in the ceremonies and by the time they got around to announcing that she had also won Best in Category, she was on her way back to Campbellford. So all we can say is congratulations Beatrice, your cheque is in the mail – really!

Also joining us was PAA Treasurer, Rene Bowe. Perhaps it is just another coincidence, but after the ceremony Jean presented Rene and I with an envelope. Rene opened it and the winner was….the PAA to the tune of a cheque for $1,000! Our thanks to Jean and to the memory of Frank. We'll put the money to work for the promotion of astronomy.

After dropping Jean off at her home and giving her a very big hug, I arrived at BHO to discover that the PAA had also been made the adopted parents of a Macaw. So there you go. A happy ending to a truly remarkable day. Let's do it all again, next year.

John Crossen
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The Sky This Month

MERCURY

Mercury will reach its greatest western elongation on April 28th, but it's in the predawn sky and won't be very good for observing.

VENUS

Venus is still shining brightly and can be found low in the sky, just before sunrise.

MARS

Mars is best observed in the early evening. It passes from Taurus to Gemini this month.

JUPITER

Jupiter rises in the southeast and is visible all night. It is in the constellation Libra.

SATURN

Saturn has a magnitude 0.2. It is located in Cancer.

URANUS

Uranus is still quite close to the Sun, making it difficult to see.

NEPTUNE

Neptune also appears close to the Sun - and may be hard to find in the glare. It is in the constellation Capricornus.

PLUTO

Pluto is in Serpentis, but has a magnitude of 14, making it well beyond the site of all but the best telescopes.

METEOR SHOWERS:

The Lyrid Meteors peak on April 22nd.

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

Meeting Notes

March 31, 2006

It was popcorn and movies night at this meeting. Club members gathered around the tables (yes the tables were back) for a private screening of The Dream Is Alive. Rob Fisher brought along a bonus feature in the form of his DVD interview with Graham Ferguson, the film's producer/director. Thank you very much Rob. It was a very nice finishing touch.

April 14, 2006

This was one of the highlights of our year's speaker engagements. Dr. Graham Wilson entertained and informed with the focus on Canadian meteorites. It was the perfect follow-up to Professor Peter Dawson's talk on the K/T Boundary Extinction a week earlier at Trent U.

Peter Lanskail of the South Simcoe Amateur Astronomers joined us for dinner prior to the talk as well as the evening with Graham. Peter won the 50/50 draw and the meteorite that Rob Fisher donated to sweeten the pot.

Continued...

We also welcomed three new members on board. Shawna's sister Lauren joined the flight crew. Plus Dean Shewring convinced his friend Lloyd to join the team. And lastly Barb James added her name to the PAA List of Fame. Welcome aboard Lauren, Lloyd, and Barb. Your space flight lifts off now.

We were also delighted to greet PAA Long-Distance Members Marina(soon to be a local) Bedard, and Gord Simpson along with John and Diane Duncan to the night's festivities.

Mark Coady and Susan brought along a few "garage sale" items and donated the proceeds of their sale to the club. As a result, John Cameron walked off with a 60mm Tasco Fiasco for just $30.00 – including tripod. Bob and Joanne Stockton were last seen drooling over another tripod that Mark had brought along. Plus John Crossen sucked up and bought a $10.00 1.25" focuser for $10.00. Thanks Mark and Susan for the generous contribution. The club walked away $60+ bananas richer.

John Crossen passed the duty roster around for May 6th and the International Astronomy Day activities on Armour Hill. It's going to be another great gathering if the number of names on the dotted lines is any indication. Now come on Mrs. Weathervain and be nice!

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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During the coffee/smoke/water-a-tree break, John also talked about the PAA's warm welcome to the Peterborough Regional Science Fair, our donation of $100 for a prize in PAA Founding Member, Frank Hancock, and the wonderful gift of $1000 that Jean Hancock gave to the club. Charity may begin at home, but comes back many times over.
Thank you, Jean.

And that was the night that was. The PAA thanks Graham Wilson for a marvelous talk. Our best wishes to Graham in all your future trips, treks, and meteor sightings. We'll be looking for your article in the next issue of the RASC Journal.

John Crossen
JohnCstargazer@aol.com

Meteor Links From Graham Wilson:

In terms of books, the one that seems most approachable yet detailed is:

NORTON,OR (1994) Rocks from Space: Meteorites and Meteorite Hunters. Mountain Press Publishing Co., 449pp. --- I think a more recent edition is also available.

Probably harder to find, but I'd think accessible through interlibrary loan, is

NININGER,HH (1972) Find a Falling Star. Paul S. Eriksson, Inc., New York, 254pp. This is a popular book on meteorites and meteorite hunting (the ninth book published by Harvey Nininger between 1933 and 1972), with notes on many meteorites, especially in USA and Canada. I expect all his works are out of print at this time. Nininger made many scientific contributions to meteoritics, but his lasting importance is probably the enthusiasm with which he promoted the significance of meteorites to a broader audience.

There is so much stuff on the Web, not all of it good nor reliable—here are a couple of big-league international sites, and two Canadian. NASA and some of the big museums also have very impressive web pages on meteorites.

INTERNATIONAL

http://www.meteoriticalsociety.org
http://tin.er.usgs.gov/meteor/metbull.php

... the second one is a searchable catalogue of approved meteorite names, a huge production available via Met.Soc. and the Met.Bulletin

CANADIAN

http://www.planetarium.montreal.qc.ca
http://miac.uqac.ca

For good measure, there are some meteorite pages on my Turnstone web site - the first two and the catalogue will have the widest interest ---

Meteorite identification / tektites:
http://www.turnstone.ca/mets.htm
http://www.turnstone.ca/tektite.htm

Specific meteorites, such as:
http://www.turnstone.ca/holbrook.htm
http://www.turnstone.ca/millbill.htm
http://www.turnstone.ca/moorabie.htm

Canadian meteorites, concise catalogue:

http://www.turnstone.ca/canamet3.pdf
(includes a list of Canadian impact structures)

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

Two aliens landed their ship on a golf course and watched a young man golfing.

First he hit it into the high grass, mumbling and cursing he retrieved his ball. Then he hit it into the sand bunker shouting curse words he retrieved the ball. Next he hit a perfect hole in one, then the first alien said to the second, "Uh-oh cover your ears he's going to be really mad now"!

! 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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NEXT ISSUE'S DEADLINE IS
May 13, 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

April 28, 2006	**General Meeting**— Club Observing Night - To Be Announced
May 6, 2006	**General Meeting—** International Astronomy Day - Armour Hill
May 12, 2006	**General Meeting—** Brett Hardy - Video Astronomy - Riverside Zoo
May 26, 2006	**General Meeting—** Club Observing Night - Buckhorn Observatory

Moon Phases

First Quarter	**April 5, 2006**	**May 5, 2006**
Full Moon	**April 13, 2006**	**May 13, 2006**
Last Quarter	**April 21, 2006**	**May 20, 2006**
New Moon	**April 27, 2006**	**May 27, 2006**