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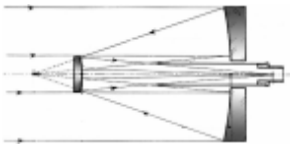
PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR



Volume 5, Issue 6 June 2006

Editorial

Summer is here, and with it, better observing conditions. After this issue, The Reflector will be taking a "summer break." For your convenience, The Sky This Month will forecast the planets throughout July and August.

The next new issue will be for October. The due-date for submitting articles will be September 15th.

For anyone who is interested, I am now adding an astrophoto page and will try to have some photos in each month's Reflector. If you want to submit your pictures, send them to me with a full description of the picture, along with how and what you used to take it.

Have a great summer!

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Discovery launches off this July 1st

After more inspections and safety measures taken by NASA, the shuttle fleet is finally back in service. Discovery did launch last year, but some pieces of foam fell from the external fuel tanks, causing great concern, because falling foam is what led to the destruction of the Columbia.

Discovery will launch this July 1st and spend 12 days off Earth. It is designated STS-121 and will link up with the International Space Station (ISS). It's mission is performing maintenance and resupplying the ISS, and also testing new safety improvements. The big debate at NASA for the shuttle program is how to end the risk of falling foam. Already, 16 kilos (35 pounds) of foam has been removed from "danger spots," but that doesn't mean foam from other areas won't dislodge. Many people still consider the shuttle unsafe, and even the Shuttle Program manager wants NASA to come up with a new shuttle design. However, the shuttle program is running out of time with a deadline to complete the ISS for 2010. If the launch is delayed in July, they may have to send the shuttle up more frequently to make up for lost time.

STS-121 crew portrait. From the left are astronauts Stephanie D. Wilson, Michael E. Fossum, both mission specialists; Steven W. Lindsey, commander; Piers J. Sellers, mission specialist; Mark E. Kelly, pilot; European Space Agency astronaut Thomas Reiter of Germany; and Lisa M. Nowak, both mission specialists. Image credit: NASA

For more information, go to: www.nasa.gov

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Inside This Issue

Moons Rising Over Scarborough

There's an old song that goes: "If you can't be with the one you love, love the one you're with." That's precisely what city-dwellers with light-polluted skies must do. Hence, I spent a lot of time photographing the Moon and planets.

This particular shot is actually 4 photographs blended together in the camera on the same frame of film. The camera used is a 1973 Olympus OM1. It is fully manual and you can trick it into thinking you have advanced the film when you really haven't. This let's you cock the shutter without moving the film forward. So you can take more than one shot on the same frame. You could call this a well-planned quadruple exposure. The film used for the shot was Fuji 400 speed print film. It was processed at a local fast-photo kiosk.

The base photograph of the neighborhood is a 4-second exposure at f1.2. It was done using a 50mm lens. The Moon shots are all 1.25 second exposures. They were shot at f5.0 with a 300mm Zuiko lens. The Moon itself was in a different part of the sky and was photographed at 15-minute intervals so that the spacing between each shot was even.

The reason I used a 300mm lens for the Moon shots is two-fold. First, had I stayed with a 50mm lens, the Moon would have been about the size of a pea in the final shots. And secondly, I wanted the Moon to appear larger like it does to the eye and brain courtesy of the horizon effect. Hence, the telephoto lens puffed up the Moon so that it appears on film more like it does in your head.

Next time you see the full Moon rising, place your thumb on the bottom of it and your index finger on the top of the Moon. Wow, it's only about the size of an aspirin. Take your fingers away and the Moon looks much bigger. That's the horizon effect. It's all in your head, as my analyst used to say.

The toughest part of this photo was making sure that I had enough room in the sky portion of the base shot to fit the Moon photos into. It worked perfectly – for once. The only other equipment used was a tripod and a remote mechanical shutter release.

4 photographs blended together in the camera on the same frame of film.

Today's digital photographers could have combined the shots after shooting and downloading them in their computers using PhotoShop to perform the magic. But I'm kind of proud that I could do it the old-fashioned way. Less money and perhaps a bit more skill were involved.

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Watching and Hearing Meteors

With the summer months quickly approaching some of our thoughts turn towards the meteor showers that will entertain us - especially the Perseids in August. With the warmer weather, it is far more comfortable for us to sit outside, under the stars, and take in the grandeur of the universe with a beautiful peppering of meteors to top the evening's stargazing off.

One aspect of observing meteor showers, that links astronomy with my hobby in radio DXing, is in Meteor Trail DX. Meteor Trail DX mainly occurs with VHF signals - between 50 and 150 Mhz - because these frequencies are usually omni-directional, line of sight transmissions. Some of the signal is beamed directly into space where it is lost. But during a meteor shower, VHF signals that otherwise would be beamed out into space, are reflected back down to the earth when they encounter the ionized meteor trail. These signals can be redirected hundreds and even thousands of miles beyond their intended service area. Because the meteor is a moving target, the duration of the redirected transmission is rather short. Depending on the degree of ionization of the meteor trail and the angle that the radio transmission contacts it, signals will last between a few and several seconds (between one and sixteen seconds).

So how does Joe or Joan Amateur Astronomer try out this extension to their

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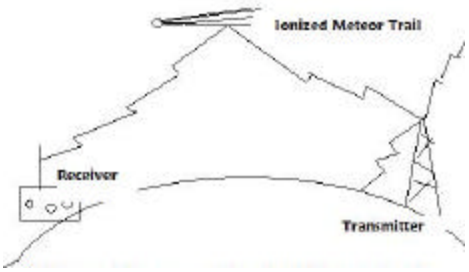

VHF transmissions are omni-directional. Those not in a line of sight with the ground are usually lost to space except when strange atmospheric conditions affect them or they come in contact with an ionized meteor trail.

hobby? Easy. Just take a portable radio or TV out with you when you are going to be observing the meteor shower. Tune to an unused or weak FM station or tune between channels 2 and 6 on a TV. Use rabbit ears or whip antennas - this won't work if you're attached to cable TV. Watch or listen for brief snippets of transmissions that break through. You are hearing, or watching, transmissions that have encountered a meteor trail, somewhere beyond your horizon, that has been redirected to you - sort of a gift from a meteor you can't even see.

So try it out this summer for the Delta Aquarids on June 27/28th and the Perseids on August 11/12th. It might just add something to your enjoyment of astronomy. And the beauty of this aspect of the hobby is that you can still observe the effects of meteors when they seem to be washed out by moonlight, like what will probably happen this year, or even when it's cloudy, or, better still, while the sun is still up.

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John Goodricke (Astronomer Extraordinaire)

When I traveled to England in 2001 I happened upon an astronomical historic site that I had not planned on and had no prior knowledge. My wife Valerie and I just toured York Minster Church in the city of York and decided to walk around the church. On a side street nearby was a bronze plaque on the wall (see me beside it in the photo below), so we stopped to read it and it turns out we had found the site of some astronomical history. The plaque read:

"From a window in Treasurer's House near this tablet, the young deaf and dumb astronomer, John Goodricke 1764 – 1786, who was elected a Fellow of the Royal Society at the age of 21, observed a periodicity of the star Algol and discovered the variation of 8 Cephei and other stars thus laying the foundation of modern measurement of the universe."

I have since found out the following information about John Goodricke. He was born September 17, 1764 in Groningen (Netherlands), the son of a British diplomat and a Dutch merchant daughter. At the age of five he got scarlet fever and lost his hearing. But after a proper education he was able to read lips and to speak. To accomplish this, his parents had sent him to a specialized school in Edinburgh. In 1778 at the age of thirteen, he was able to go to the academy in Warrington near York, which had no special treatment or equipment for handicapped persons. Goodricke looked to the stars with somewhat modest equipment. According to his observations he was the first one to calculate the period of Algol to 68 hours and 50 minutes, where the star was changing its brightness by more than a magnitude. An excerpt from his journal includes the following:

This night looked at Beta-Persei (Algol) and was much amazed to find its brightness altered. It now appears to be fourth magnitude... I observed it diligently for about an hour upwards...hardly believing that it changed its brightness, because I had never heard of any star varying so quick in its brightness. I thought it might be perhaps owing to an optical illusion, a defect in my eyes or bad air, but the sequel will show that its change is true and that it was not mistaken. (November 12, 1782)

Goodricke reported these observations in 1783 at the British Royal Society, and for explaining these observations he proposed two theories: that the distant sun is periodically occulted by a dark body, or that the star itself has a darker region which is directing to Earth periodically because of the star rotation. With his first theory Goodricke is noted as the discoverer of the occultating variable stars in the history of astronomy. For his report he got the Godfrey Copley medal from the Royal Society for important scientific discoveries. John Goodricke was admitted to the Royal Society on April 16th, 1786, when 21 years old. He barely realized this honor because he died in 1786 on April 20th in York, of pneumonia. One of the halls of the York University is named after him in remembrance.

On this same trip to England I tried to visit the William Herschel Museum in Bath, but our timing was off and it was closed when we got there and I did not get a chance to go back. I still feel fortunate to have been able to take in some astronomical history on this trip (besides Stonehenge of course), be it accidental or not. Keep this in mind the next time you travel. There is a lot out there to learn and discover, you just have to be open to it (either research ahead or be very lucky). Safe traveling!

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Modifying Your Achromatic Refractor To Improve Its Looks And Performance

1.
I have to confess, the main reason for repainting my short tube refractor was to make it look a bit more integral with the Celestron C-11 that it hitches a ride on every night. But as long as I had the optical tube apart, why not improve the scopes performance, too!

2.
Job one was to disassemble the optical tube and sand it down for painting. It had a couple of scratches on it and paint nicks, so feathering out the rough spots was important. For a final finishing I used fine steel wool. Then the OTA (Optical Tube Assembly) was washed and dried so that it was dust free and ready for painting. I used good old Tremclad Gloss Black, spraying on about three fairly thin coats with approx half an hour's drying time between each. The final result was free of paint sags and blotches. Time is your best tool.

3.
Once the paint had dried for 24 hours in a warm room, it was time to line the inside of the OTA with a flocked paper designed specifically for the task. It's available from Scope Stuff (www.scopestuff.com) and from Kendrick Astro Instruments (www.kendrickastro.com) The paper has a sticky backing, so do all your measuring and cutting before you peel the backing off. Yikes, who is that Cyclops!

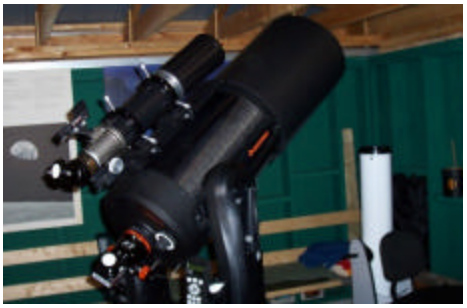
4.
Here's the Cyclops-eye view of the flocking going into the OTA. Because this paper has a dark black fuzzy coating, it absorbs stray light that can blur lunar and planetary detail.

5.
Even the tube's internal baffles were flocked on both sides to further reduce stray light bounce. By the way, the baffles in this scope (a SkyWatcher) simply pulled out. They are not welded in. They are snug, but they do pull out with a bit of effort. I have done the same with Celestron, SkyWatcher, Tal, Antares, and Orion refractors OTA's. All come from the same Chinese manufacturer (Synta), but with different names.

6.
As long as the OTA is disassembled, you might as well darken the objective lens edges. This is another way to reduce unwanted light from bouncing around inside the OTA. A simple Sharpie Chisel-Tipped pen delivers a very dark edge with about two coats. Do hand the lenses with care. And don't forget the order you removed them in. After the edge darkening process I usually clean both sides of the primary lenses before re-installing them in the lens cell.

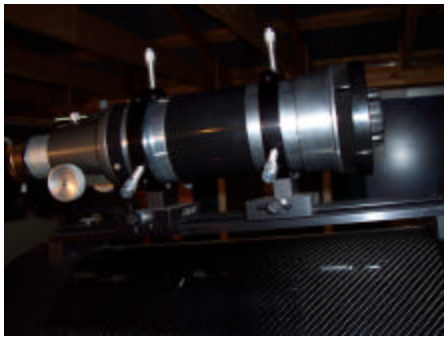
Continued...

7.
And here we are almost ready for reassembly. The lens cell was originally painted with that universal black/gray speckle stuff, but I discovered that underneath it all was a nice aluminum cell. Hummmm with a little polishing I had a brushed aluminum finish that matched the focus knobs and made the little Sky-Watcher look just like those high-end scopes with the $1000+ price tags. No, it still won't perform up to the high-end level. But the improved contrast is quite noticeable. Pop in a Baader Fringe Killer filter and you're about as close to Apochromatic as you'll get with elbow grease back-yard technology.



8.
Not only are my views of the sky improved, but so is my view of the scope with the C-11. So was it worth all the effort…

9.
…Here's a brace of refractors ranging from 80mm to 150mm, all received the same treatment and they all deliver great performance for a very reasonable price. If you've got the bucks, go high end, because you can't achieve perfection on a budget. But if you're not blessed with mega-sheckles, break out the flocking, the sharpie, and start sanding. By the way, there's a place in Bobcaygeon that'll churn out decals to your specifications for about $2 a pop. Nice custom touch at a very nice price.



10.
Once you've given your scope a custom paint job, why let it get marred and scratched? This little 4-inch Sky-Watcher short tube serves as a mega-finder with a 32mm Erfle eyepiece most of the time. But when I need a guide scope I just pop in a 3X barlow and my guiding eyepiece. Unfortunately the adjustment screws for lining the finder up with the main OTA or my chosen guide star also dig into that perfect finish I worked so hard to achieve. So I wrapped my scope with foil tape in the areas where the thumb screws make contact with the OTA. It adds a nice professional look and keeps your OTA free of scratches. It can be removed with GooGone or GoofOff, water, and a healthy heap o' cussedness.

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Secrets Of The Big Dipper

On a dark Kawartha night you look up and one of the first star patterns you spot is the Big Dipper. It is the only star pattern that just about everyone in North America knows on sight. Orion – the king of the winter sky – runs a distant second. But in other cultures our familiar Dipper goes by different names.

The English refer to it as the plough. And with minimal imagination, it does resemble a plough with its long handle. Europeans often refer to the Dipper as the horse and wagon. I can see the wagon – minus its wheels – but old Dobbin seems to have slipped out of the tongue of the wagon. In China it represents a courtroom scene with the cup portion being the judge's bench. The three handle stars are the lawyers and the crook.

The North American Indians have a different tale. To them the Dipper is really the body of a great bear. The three stars that form its tail are hunters. All year they track the bear around the North Pole. Then in the fall, one of them shoots the bear. As the bear bleeds, the trees turn red. Fascinating, but don't use this answer on your biology test.

Aside from the obvious fact that you're freezing, sweating, or being eaten alive by bugs, you can use also use the dipper to tell what season it is when you see it at sundown.

In spring the Dipper is almost straight overhead. Come the summer, it is standing on its cup as the sun dips beneath the western horizon. In the fall it rides parallel with the northern horizon. And in the winter the Dipper stands on its handle.

If you noticed that I didn't call the Big Dipper a constellation in my opening sentence, you are on to something. That's because the Big Dipper isn't a constellation at all. It is a grouping of stars called an asterism. An Asterism is a pattern of stars that look like something familiar.

Our Native People, along with the Greeks and Romans got it right, because to them the whole constellation looked like a great bear. That's why it is called Ursa Major or the Great Bear. Take a look at any star chart and you'll see that the dipper portion is only part of Ursa

Continued...

Major. Its long standing history as a bear to many cultures is why Ursa Major is officially sanctioned as one of the 88 constellations by the International Astronomical Union.

Nearly anyone can find the Big Dipper on a dark, Moonless night. But the Little Dipper plays a game of peek-a-boo that befuddles many. Answer – let the Big Dipper be your guide.

Draw an imaginary line through the two stars that comprise the end of the Dipper's cup and extend it across the sky in a straight line (a bit more than the width of your hand with the fingers spread) to the first bright star you come to.

That star will be Polaris, also known as the North Star. A lot of people think the North Star is supposed to be very bright. Not so. It's about 3^{d} magnitude and doesn't even make the top 40 list of bright stars. But it does have a story to tell.

The group of stars we call The Big Dipper isn't a constellation. It's an asterism. The constellation the Dipper is in is called Ursa Major or the Great Bear. Keen-eyed observers will notice that the second star in the Dipper's handle is a double. The two stars in this system are Alcor and Mizar.

For starters, Polaris is the first star in the handle of the Little Dipper. Follow the handle to the Little Dipper's cup and you will see that it pours into the cup of the Big Dipper. Because of the way the two asterisms (the Little Dipper isn't a constellation) are situated relative to each other, the cup of one will always pour into the cup of the other.

No one knows for certain who determined that the North Star was always in the north, but current thinking credits the Arabs with that discovery. The reason being that travel on the desert during the day would have been very hot and tiring. Travel at night, on the other hand, would have been cool and comfortable. But where are the landmarks?

The North Star was the guiding light. Face it and south is behind you. To your right would be east. And to your left is west. Now you know which direction you were traveling in. Sailors in ancient times were confronted with the same featureless landscape at sea. So, they did their directional calculations at night using the North Star. It's a handy fact to remember if you're a wilderness hiker. Just don't get lost on a cloudy night.

The reason the North Star doesn't move around the sky like its celestial comrades is the fact that it is positioned almost directly over Earth's North Pole. Draw a line down from Polaris and it will pass through the centre of the Earth and out through Antarctica towards the South Pole. In short, it is the axis on which the world turns. Think of the North Star as the centre of the celestial wheel. The Earth rotates from west to east and the stars appear to move from east to west.

I mentioned earlier that the Little Dipper was also an asterism. To be technically correct, the dipper portion is the body and tail of the little bear or Ursa Minor. Again, we have simplified the shape down to a familiar household implement. But to ancient cultures, Ursa Minor was the prodigy of Ursa Major, or Mamma Bear if you prefer.

And there you have it. The secrets of the dippers large and small revealed. Until we meet again, keep the lights down and the stars up big and bright.

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Aloha#5 – Sub-millimeter Array (SMA)

As part of my continuing tour of the telescopes of Mauna Kea, the Sub-millimeter Array (SMA) is next. I regret that this is the only facility that I did not manage to capture an image of while at the summit of Mauna Kea in February of this year. This is due in part by the poor lighting (sun was directly behind this complex at the time we were touring late in the afternoon) and because it was one of the first things I saw while on the tour and I did not know what to expect, so while being overwhelmed by the whole event I never got back to capture this set-up. It reminded me a bit like the pictures I have of the Very Large Base Array in New Mexico, but in miniature. The image here is from the SMA website and shows what I saw on my visit.

The SMA is set-up at the 13,386 ft. (4,080 m) level elevation and is a joint project between the Smithsonian Astrophysical Observatory (Cambridge, MA) and the Academia Sinica Institute of Astronomy & Astrophysics (Taipei, Taiwan). With first light for this facility in 2002 (not completed and dedicated until Nov./03), it makes it one of the newest on Mauna Kea. The SMA consists of eight dish type antenna, that are each almost 20 ft (6 m) in diameter, weighing 94,600 lb. (42,910 kg.) each and there are twenty-four different locations or pads that these antennas can be moved and operated from on Mauna Kea. They have a combined pointing accuracy of 1 arsecond and a maximum resolution of 0.1 to 0.5 arcseconds. This would be equivalent to being able to see an object

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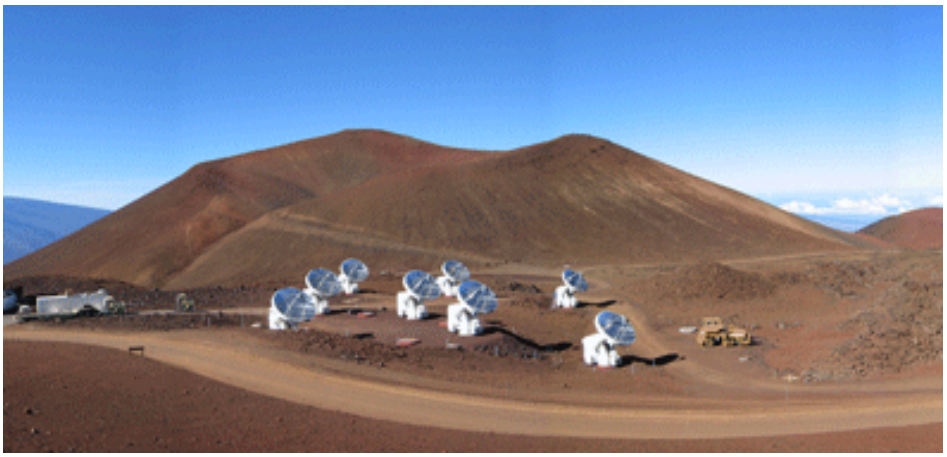

This image is from the SMA website and shows what I saw on my visit.

the size of a period on this page, from a distance of one mile!

When the SMA operates in full array (feeding all their signals to one super-computer), they have the combined effect of being able to resolve objects 30 times better than the largest single dish antenna sub-millimeter telescope. These antennas do not operate as single units, but rather as a combined force that would be the equivalent baseline the length of five football fields. The plan is to have the SMA incorporated with two other single dish sub-millimeter antennas on Mauna Kea (James Clerk Maxwell Telescope and the Caltech Observatory) for even greater resolution. These new combinations may add up to 50 percent greater resolution.

It is no fluke that the SMA is located on top of Mauna Kea either. Sub-millimeter wavelengths are readily absorbed by water vapor in the atmosphere, so the closer to sea level this form of radiation travels, the more is lost for use for astronomical observations. The higher and drier the better and you guessed it, Mauna Kea is "clearly the best"!

So why is astronomical study using sub-millimeter radiation so important? The main reason this form of study is important is because unlike visible wavelengths of radiation, sub-millimeter emissions are able to penetrate through the dark cold interstellar material of space and give us a "picture" of the universe that is not possible with optical telescopes. With so much dust and gas in the universe and star forming regions (that visible light can not penetrate), sub-millimeter wavelengths of light can witness the birth and death of stars, worlds colliding and even tell us the temperature on Mars.

As with the previous observatory described (May/06 Reflector), the SMA is actually operated at the University of Hawaii (Hilo Research Park) some 42 km (26 mi) away. There were no tours being offered, but they were nice enough to provide some free literature about their facility and the work they do. Unlike the observatory and facility I will be telling you about in the next issue of The Reflector, this facility was very unassuming, but the work being done and the information being gathered (going into books), can not be judged by it's cover.

For more information link to the SMA website:
http://sma-www.harvard.edu

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Solution To Light Pollution In A Box For Just $39.95

If you like saving money and the night sky, this stylish outdoor lighting fixture is bound to be a hit. It is fully-shielded, which means the light only goes down to the ground – where you want it. Hence, there's no need for a mega-watt, money-burning glare bomb. It also has a built-in motion sensor. So rather than paying to light up an area from dawn to dusk, it's only on when you or your guests are in the area and need the light.

The Hampton Bay lamp is available at Home Depot (Code #148 675). It bears the International Dark-Sky Association's seal of approval and is a perfect replacement for those outmoded coach lamps that blast the light everywhere – including in your face.

The lamp can be set for dawn to dusk if you really need it. But it is smarter to activate it via the motion sensor, which has adjustable settings incase you want it on while you've got the BB-Q going. And it looks great at the house or cottage.

Speaking of the cottage, with the onset of cottage season, I often hear complaints about "that moron across the lake with the 150-watt flood light that he leaves on all night" or the neighbour "whose dock lights shine into my yard". If you think of light as noise, you'll get the idea very quickly.

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This fully-shielded patio lamp saves energy, money, and the night sky. It is approved by the International Dark-Sky Association and is available at Home Depot in Peterborough for $39.95.

Most people come to cottage country to escape the city's racket, crowded streets, and glaring lights. A little quiet and the feeling of solitude are all they want. Beneath the dark skies of the Kawarthas people rediscover the stars and the serenity of the night. Or just sit and listen to the crickets and frogs while the wind glides through the pine trees. I may sound like a meadow-headed peace-muffin, but that's what makes the country different from the city. Here are some other night-friendly, neighbor-friendly lighting ideas you might want to consider.

1. Keep your outdoor night lighting to a minimum – especially dock lights.

2. Put all exterior lighting on motion sensors.

3. Avoid using flood lamps or coach lamps that blast light everywhere.

4. When installing any outdoor lights, make certain that they do not shine onto your neighbor's property. It's called light trespass.

Whether you're the government, a business, or just sitting around home, smart lighting saves money, the environment, and the night sky. We'll get back to astronomy in the next installment. Until then, keep the stars up and the lights down.

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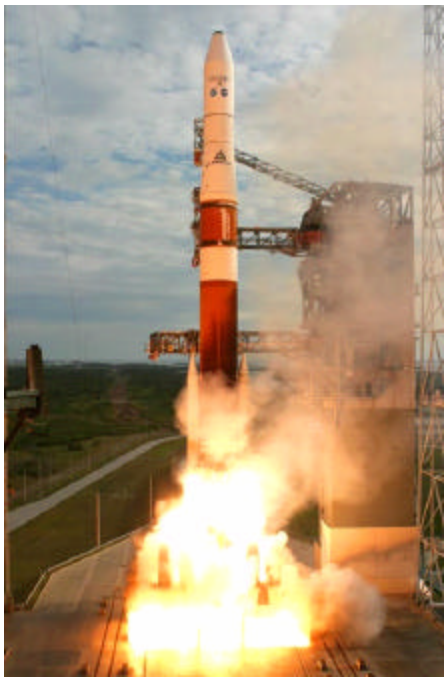
NASA Space Place

From Thunderstorms to Solar Storms…

When severe weather occurs, there's a world of difference for people on the ground between a storm that's overhead and one that's several kilometers away. Yet current geostationary weather satellites can be as much as 3 km off in pinpointing the true locations of storms. A new generation of weather satellites will boost this accuracy by 2 to 4 times. The first in this new installment of NOAA's Geostationary Operational Environmental Satellites series, called GOES-N, was launched May 24 by NASA and Boeing for NOAA (National Oceanic and Atmospheric Administration). (A new polar-orbiting weather satellite, NOAA-18, was launched May 2005.)



New GOES-N satellite launches, carrying an imaging radiometer, an atmospheric sounder, and a collection of other space environment monitoring instruments.

Along with better accuracy at pinpointing storms, GOES-N sports a raft of improvements that will enhance our ability to monitor the weather—both normal, atmospheric weather and "space weather."

"Satellites eventually wear out or get low on fuel, so we've got to launch new weather satellites every few years if we want to keep up the continuous eye on weather that NOAA has maintained for more than 30 years now," says Thomas Wrublewski, liaison officer for NOAA at NASA's Goddard Space Flight Center. Currently, GOES-N is in a "parking" orbit at 90° west longitude over the equator. For the next 6 months it will remain there while NASA thoroughly tests all its systems. If all goes well, it will someday replace one of the two active GOES satellites—either the eastern satellite (75°W) or the western one (135°W), depending on the condition of those satellites at the time.

Unlike all previous GOES satellites, GOES-N carries star trackers aboard to precisely determine its orientation in space. Also for the first time, the storm-tracking instruments have been mounted to an "optical bench," which is a very stable platform that resists thermal warping. These two improvements will let scientists say with 2 to 4 times greater accuracy exactly where storms are located.

X-ray images of the Sun taken by GOES-N will be about twice as sharp as before. The new Solar X-ray Imager (SXI) will also automatically identify solar flares as they happen, instead of waiting for a scientist on the ground to analyze the images. Flares affect space weather, triggering geomagnetic storms that can damage communications satellites and even knock out city power grids. The improved imaging and detection of solar flares by GOES-N will allow for earlier warnings. So for thunderstorms and solar storms alike, GOES-N will be an even sharper eye in the sky.

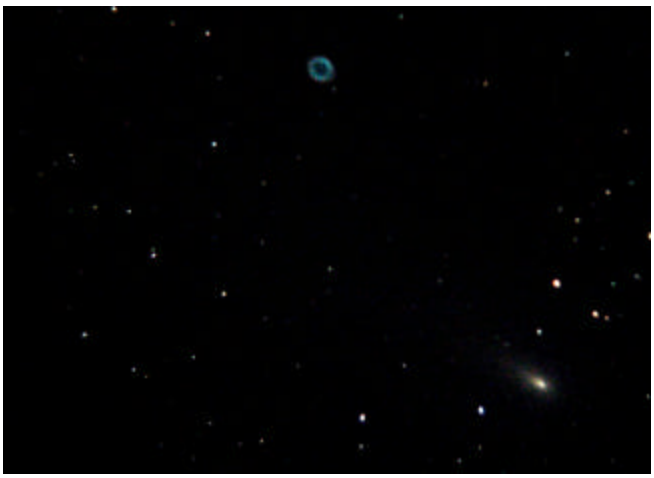
Find out more about GOES-N at goespoes.gsfc.nasa.gov/goes . Also, for young people, the SciJinks Weather Laboratory at scijinks.nasa.gov now includes a printable booklet titled "How Do You Make a Weather Satellite?" Just click on Technology.

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

*****FAR OUT* ASTROPHOTOS*****

These are some of my early experiments with digital photos, having done film for several years. Both photos were taken with a canon point and shoot camera, through the eyepiece of an 8" meade lx90 SCT. Each is a composite of about 20 images stacked and processed using registax freeware. Above/left is Saturn. The above/right was a really unusual alignment of Jupiter's and 4 of its moons, also, the great red spot is barely visible in the lower ring. Images taken by: Jim Webster



The above/left is a shot of the comet sw73 fragment C passing by the Ring Nebula from May 07 2006. I used a Meade 8" LX200GPS, Canon A95, A-focally using a Digi-t adapter and a 35mm plossl EP. It is a 15 second exposure at 3.2 aperture setting.

The above/right is of Jupiter. Same scope and camera, but using a 15mmplossl and a 2x Barlow, camera set to movie mode and 300 images stacked in registax3. Images taken by: Ian Haas

NASA Facts

www.nasa.gov

* The term "aeronautics" originated in France, and was derived from the Greek words for "air" and "to sail."

* The Dryden Flight Research Center (DFRC) is NASA's center for aeronautical flight research and atmospheric flight operations. DFRC is chartered to research, develop, verify, and transfer advanced aeronautics, space and related technologies. It also serves as a backup landing site for the Space Shuttle and a facility to test and validate design concepts and systems used in development and operation of the Orbiters.

* NASA's Environmental Research Aircraft and Sensor Technology program (known as "ERAST") develops pilotless airplane technology. It also works on making science instruments very small so that they can be carried on remote-controlled aircraft.

* 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.

The Sky This Month

MERCURY

Mercury can be seen briefly in the morning this summer. It reaches its greatest elongation on August 6th, seen just below Venus.

VENUS

Venus will be low in the morning sky to the east before sunrise. It shines at a magnitude –3.8.

MARS

Mars will be getting as dim as it ever gets at about magnitude 1.8. It will be visible in July, but hard to see in the western evening twilight. By August, Mars is lost behind the Sun.

JUPITER

Other than the moon, Jupiter is now the brightest object in the evening sky and will stay the most prominent evening planet this summer. In July it is seen south at night fall. By the end of August it has moved southwest, setting around 10:30pm.

SATURN

Saturn is low in the west-northwest for a few hours after sunset. It is not far from Mars. Saturn and Mars will be lost completely to the Sun's glare by the end of July. It emerges from behind the Sun near the end of August. Saturn can then be seen very low in the east just before sunrise.

URANUS

Uranus is in Aquarius. It will stay low in the south all night this summer. At magnitude 5.7, it is bright enough to see with binoculars.

NEPTUNE

Neptune is in the constellation Capricornus. Neptune is at Opposition on August 10th. This will be the best time to view the planet, but will still appear as a blue dot in all but the most powerful telescopes.

PLUTO

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

METEOR SHOWERS:

The Perseid meteor shower peaks on August 12th with about 60 meteors an hour.

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

Meeting Notes

May 26, 2006

Prior to our regular meeting at 8:00, the members of the PAA executive gathered to discuss a number of key issues that needed to be settled prior to John Crossen's retirement as President of the club. Here, in short form, are the conclusions we arrived at. None of these changes will take affect until January of 2007 when a new President and executive committee are chosen by club members. The new board will then either ratify the changes or modify them to suit the club's needs at the time.

The Club Library will continue, but on a smaller scale and with a different method of delivery. The number of books has been thinned down because we had a number of different titles that encompassed essentially the same topics. To further reduce our listing of books, two small boxes of children's and beginner books have been set aside that will circulate through the school systems when the students are studying astronomy. They will not be given to the schools as permanent additions to their libraries. Instead they will be moved from one school to another when and where needed. The remaining books and videos will be posted on the club website. If you are interested in a particular

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title, you may e-mail your request to Bob and Joanne Stockton and they will bring it to the next meeting. For those rare critters (read dinosaurs) without e-mail we will print off a list of available titles and they may phone the Stocktons – but not collect.

Club Dues will increase, but not for single memberships. Instead student memberships will rise from $10/year to $15/per year. That may at first seem like we are hitting the least able to pay. But $15 is still half of what a regular membership costs. And to be honest, one CD is all they will have to not purchase in order to become a club member. Or three lipsticks or two six packs. Heck, one popular DVD costs almost twice as much as we are asking for a year's student membership. It was also agreed that the age limit for students be set at 25 years.

Also hit with a price increase is the family unit. Again, the jump will be just $5/year. So instead of $40 it will be $45. Compared to the single member price, families pay only $15 more and the whole gang gets in on the fun. You can't take the ankle-biters to McDonald's for much less. And our Happy Meal is a year-long feast for the eyes. Also contains no salt or trans-fats.

The Reflector will continue unchanged. It was agreed that the current format is excellent and that the only modification would be to the section on sky events. They should be for the coming month because the newsletter has a long history of coming out at the end of each month. Other than that the superb format established by Charles Baetsen will continue at the capable hands of Shawna Miles.

Mandatory e-mail capability for executive committee members bit the dust after a tight vote. Hence, A.G. Bell's invention still rules. So let your fingers to the walking and your mouth do the talking.

No meetings for the dud months of December and August. Everyone is busy during these two months and it is difficult to get people out to meetings and events when they are on the far side of the country visiting relatives or on holidays. So, other than an informal observing session – no meetings at the Zoo in December or August!

Pauline Drake of the Peterborough Centennial Museum and Archives accepts a $118 cheque from John Crossen, President of the PAA. The money was donated to the museum in thanks for their sponsorship of International Astronomy Day. Also on the PAA's "thank you" list are Jane Wild and Don Willcock, both of whom were key players in the Event.

Sponsorship of a Zoo beast is how we pay our rent for the clubroom at the Zoo. It was agreed that two payments of $100 be made to the Zoo to cover our rent for the year. That's dirt cheap! We will dump our next $100 into the feed trough at the end of July. We are currently the official sponsors (parents) of two Macaws. The club Treasurer will make the payment.

After much arm wrestling it was agreed that the position of Event Planner should be established. Working with the Event Planner would be a committee consisting of: an Observing Director, a Director of Volunteers, and a Promotional Manager.

The Event Planner will work with the Observing Director to establish a basic observing/meeting/speaker schedule for up-coming year. He or she will be the one-source contact for all club activities. All of the following will report to the Event Planner.

The Director of Volunteers will be charged with the responsibility of enlisting member support to make things happen – like Astronomy Day and public observing sessions. For major events such as Astronomy Day, the Director of Volunteers may wish to set up different sub-committees to take care of raffle ticket advanced sales as well as the numerous volunteers required for set up, tear down, and children's astro-activities. Susan Coady had some excellent ideas on this subject.

The Promotional Manager will see to it that the media and the public are informed of all club activities. This job will be critical when we have guest speakers, Astronomy Day, and public observing sessions. He or she will work closely with the Event Planner.

The Light Pollution Committee needs to be larger than one person. Mark Coady has been an absolute beaver on behalf of us all (no dark sky/no astronomy) and deserves a lot of help. Single-handed he is pulling together promotional materials, making presentations to public groups, and representing us to city councils. As

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Mark said, “If I don’t get some help, we won’t have a Light Pollution Committee.

That summarizes the core of our executive meeting. Following the exec-hawgwrassle, the members gathered for a bull session and a tour of Buckhorn Observatory where a number of them chose books from the club library for their own libraries at home. We were pleased to host two guests from outside the club (fellow astronomer Gary McCoy and his friend Frank Duddus) were filled with questions about Meade LX200 telescopes. Hopefully we were capable of answering them sufficiently, thanks to Brett Hardy who is an LX200 owner and an expert at Starry Night Pro, which was another topic our guests were interested in.

June 9, 2006

John Crossen opened tonight's meeting with the announcement that the PAA library of books, software, and video's is now online. Visit the PAA website at (www.peterboroughastronomy.com) and you'll find them listed in the "Resources" section. To order a book, software or video, contact Bob or Joanne Stockton (ouse@pipcom.com) or 705.639.5591 and make your request. They'll bring it to the next meeting. That'll make it easier than toting around boxes of books and stuff to the meetings. We ask that you return all materials at the following meeting because one of your fellow club members may wish to borrow it next.

Mark Coady gave the group a brief rundown on the Fall 'N Stars starparty scheduled for September 24th. It will be a three-club event bringing together the Kingston and Belleville RASC chapters with the PAA and possibly the York Simcoe astronomy club, too. Scott Gilbert, the York Simcoe President called today and was inquiring about it.

Presently the guest speaker line up includes John Crossen with a talk on Buckhorn Observatory and its work with schools and community groups. Peter McMahon will speak on his adventures in the outdoors while searching for the ultimate observing spot in Canada. Rock Mallin will speak on video astronomy and the MallinCam, one of the most advanced cameras in the business. If you'd like to be a speaker, let us know soon so we can get you on the schedule. Mark also passed around some brochures for the Huronia Starparty scheduled for the week of July 28. It's a good one and a number of PAA members will be attending it. John Crossen will bring along the planetarium for a show. Dark skies and good food plus a friendly small-group atmosphere make HSP one of the best starparties I know of.

John Crossen also brought the group up to date on the recent discussions with Randy Attwood about the PAA becoming a chapter of the RASC. Crossen expressed his view that the club is now an active group with over 50 members thanks to our hard work. "I'm not sure I'm ready to trade my sense of pride in our accomplishment for the event insurance policy and the speaker pool that the RASC can offer." But the fact is if enough PAA members are interested in becoming an RASC chapter, it will be a group decision by membership vote in the end. More to come as things develop.

The club also auctioned off some more books and brought in an extra $53 thanks to purchases by Rob Fischer, The Stocktons, Harold Briggs and Rene Bowe.

The PAA loaner scope is available again for club members. First to speak up and say "Me" gets it. Contact John Crossen at johncstargazer@aol.com and you can either pick it up or he'll bring it to the next meeting.

Colin Cross wound the meeting up with a presentation on the Messier and NGC objects in Scorpius, Sagittarius, and Ophiuchus. It won't be long and we'll be checking these constellations and all their globular clusters out in the summer sky. Thanks Colin, for a great presentation.

Rene Bowe made out a cheque for $118 that will be donated to the Peterborough Centennial Museum and Archives as thanks for their help on Astronomy Day. That was the night that was.

John Crossen
JohnCstargazer@aol.com

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 !

Scientists at NASA have developed a gun built specifically to launch dead chickens at the windshield of airliners, military jets and the space shuttle, all traveling at maximum velocity. The idea is to stimulate the frequent incidents of collisions with airborne fowl to test the strength of the windshields.

Some engineers heard about the gun and were eager to test it on the windshields of their new high speed trains. Arrangements were made. But when the gun was fired, the engineers stood shocked as the chicken hurled out of the barrel, crashed into the shatterproof shield, smashed it to smithereens, crashed through the control console, snapped the engineer's backrest in two and embedded itself in the back wall of the cabin.

Horrified, these engineers sent NASA the disastrous results of the experiment, along with the designs of the windshield, and begged the U.S. scientists for suggestions.

NASA's response was just one sentence, "Thaw the chicken."

! 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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K0M 1A0

or via e-mail at:
shawna@property-list.net

NEXT ISSUE'S DEADLINE IS
Sept. 15, 2006
⌘

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

July 7, 2006	**General Meeting—** Andre Bordeleau - Montreal Planetarium - Riverside Zoo
July 21 , 2006	**General Meeting—** Public Observing Night - Emily Conservation Area
August 4, 2006	**General Meeting—** PAA Tour to Anne Currie Observatory - Port Hope
August 18, 2006	**General Meeting—** Club Observing Night - Brett Hardy's

Moon Phases

First Quarter	**June 3, 2006**	**July 3, 2006**	**August 2 & 31, 2006**
Full Moon	**June 11, 2006**	**July 11, 2006**	**August 9, 2006**
Last Quarter	**June 18, 2006**	**July 17, 2006**	**August 16, 2006**
New Moon	**June 25, 2006**	**July 25, 2006**	**August 23, 2006**