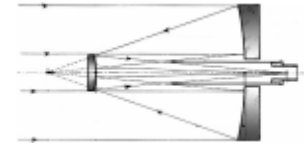


PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR



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Apollo Upgrade

The flight computer onboard the Lunar Excursion Module, which landed on the Moon during the Apollo program, had a whopping 4 kilobytes of RAM and a 74-kilobyte “hard drive.” In places, the craft’s outer skin was as thin as two sheets of aluminum foil.

It worked well enough for Apollo. Back then, astronauts needed to stay on the Moon for only a few days at a time. But when NASA once again sends people to the Moon starting around 2020, the plan will be much more ambitious—and the hardware is going to need a major upgrade.

“Doing all the things we want to do using systems from Apollo would be very risky and perhaps not even possible,” says Frank Peri, director of NASA’s Exploration Technology Development Program.

So the program is designing new, more capable hardware and software to meet the demands of NASA’s plan to return humans to the moon. Instead of staying for just a few days, astronauts will be living on the Moon’s surface for months on end. Protecting astronauts from harsh radiation at the Moon’s surface for such a long time will require much better radiation shielding than just a few layers of foil. And rather than relying on food and water brought from Earth and jettisoning urine and other wastes, new life support systems will be needed



The Chariot Lunar Truck is one idea for a vehicle equal to the lunar terrain. Each of the six wheels pivot in any direction, and two turrets allow the astronauts to rotate 360°.

that can recycle as much water as possible, scrub carbon dioxide from the air without depending on disposable filters, and perhaps grow a steady supply of food—far more than Apollo life-support systems could handle.

Next-generation lunar explorers will perform a much wider variety of scientific research, so they’ll need vehicles that can carry them farther across the lunar surface. ETDP is building a new lunar rover that outclasses the Apollo-era moon buggy by carrying two astronauts in a pressurized cabin. “This vehicle is like our SUV for the Moon,” Peri says.

The Exploration Technology Development Program is also designing robots to help astronauts maintain their lunar outpost and perform science reconnaissance. Making the robots smart enough to take simple verbal orders from the astronauts and carry out their tasks semi-autonomously requires vastly more powerful computer brains than those on Apollo; four kilobytes of RAM just won’t cut it.

The list goes on: New rockets to carry a larger lunar lander, spacesuits that can cope with abrasive moon dust, techniques for converting

see “Apollo” on page 5

Thank You!

Upcoming International Year of Astronomy Events

Wow, what a great start to spring for the International Year of Astronomy (IYA)! Just having come from last week's (March 20th) high with *The Stars Coming Out in Hastings*, at the very successful event that PAA member John Cameron orchestrated, and looking forward to Earth Hour on Armour Hill with Mark Coady, to yet another lively monthly meeting and guest speakers (April 3rd), to some 100 Hours of Astronomy observing opportunities with the public (April 3rd or 4th), to a world renowned astrophysicist, Dr. Ray Jayawardhana, as a Galileo Lecture Series speaker at Trent University on April 6th, then the annual Regional Science Fair at Trent on April 7th and finally our Astronomy on the Hill weekend on May 2nd & 3rd. All this and it is absolutely free! Don't miss out on all these great opportunities, some will be once in a lifetime. It is hard to see how it can get any better than this.

Well, to be honest it can only get and be better, if our membership kicks in and helps out in any way they can. Volunteer at or for any event and I guarantee you will be the better for it.

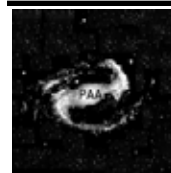
Speaking of volunteers, this year is also the Year of the Volunteer and I am happy to say that our club is one of the best for getting things done in so many ways and on so many fronts and it is all due to those that volunteer. A sincere "thank you" to all of you who do, because without your willingness to lend a hand, we could not and would not accomplish a thing. Thank you!

I hope the next *Reflector* will be able to report on a few of these above listed events. This way you can either see what you were part of or what you missed.

Something not to be missed is our new and improved PAA website. There has been a lot of work to update and improve the look and internal workings for what you see and use there. It is one of the best ways to stay up to date and "connected" as a member. Check it regularly!

Keep looking up!

Rick Stankiewicz, President



**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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Earth Hour a Success!

Well, the clouds rolled in and out and we just kept pointing our scopes in different directions to dodge them and keep viewing mother nature's celestial beauties. The Sky Quality Meter peaked at 18.8 - last year we peaked at 19.05 - the lower figures being attributed to light reflecting off of the clouds.

It was nice to see some additions to Earth Hour this year such as Tim Horton's in East City who had their roadside signage off at 7:30 PM; East City Bowl - athletic complex - who had their lights out when they were illuminating a blanket of snow last year; and, true to their word, Pepsi-QTG who had the floodlights trained on their silos at the Quaker Oats plant turned off.

One thing we did notice all night was Kawartha Downs who had their racetrack lit up - which is understandable given they had horse racing going on. Still, if they were to change those lights to full cut off fixtures then we would not notice them from so far away, their course would still be properly lit for their fans to see the races, and they would save at least 50% on their hydro bill.

Clifford Skarstedt, Peterborough Examiner photographer, was moving all evening between Armour Hill and Peterborough Square. His photos can be viewed at the link below. There are a couple of pix that are notable in that they show how they turned the hydro grid off around Peterborough Square and turned the streetlights off for a downtown city block.

<http://photos.thepeterboroughexaminer.com/mycapture/folder.asp?event=720595>

Up on the hill, I fielded a lot of questions and comments on light pollution and the



ISS at end of Earth Hour

Why clouds played havoc with our view of the crescent moon they didn't interfere too badly with views of Saturn and the Orion Nebula. Immediately after the end of Earth Hour the International Space Station was to make a fly-by over Peterborough. We only saw the last few seconds of the satellite just before it disappeared into the earth's shadow.

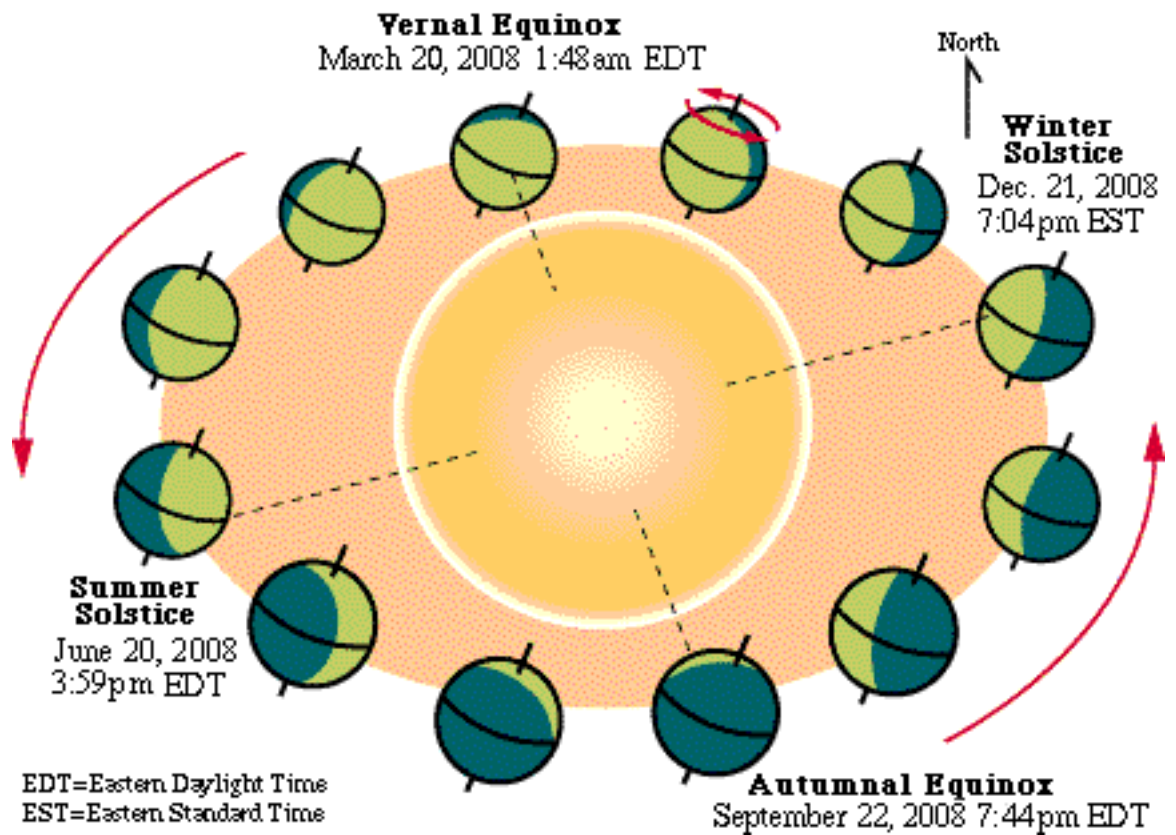
Photo: Phillip Chee

Sky Quality Meter while giving people a look through my 8 inch Intelliscope. I'm sure the final count will come from Rodger Forsyth but, for IYA2009 purposes, we managed to give over 100 people a Galileo moment.

All in all an unqualified success.

Mark Coady

The Equinoxes – when daytime equals nighttime



In case you haven't noticed, the days seem to be getting longer, and it's not just because of the switch to Daylight Savings Time. We really are enjoying a longer period of Sunlight. Plus the Sun is stretching higher in the sky each day at noon hour. On March 20th we reached the Vernal Equinox, a time when the daylight hours and the nighttime hours are almost perfectly equal – 12 hours of daylight and 12 hours of darkness. In fact the word equinox comes from Latin meaning “equal night.”

To astronomers, the Vernal Equinox on March 20th marks one of the four turning points in our cycle of seasons as we orbit the Sun. The other three are the Summer Solstice, the Autumnal Equinox and Winter Solstice. It all relates to Earth's 23.5 degree tilt and where we are in our 365-day race around the Sun.

At Summer Solstice the Northern Hemisphere is pointed towards the Sun and at Winter Solstice the opposite is true. Ever since the day of the winter solstice on December 21st, the Sun has appeared to rise higher in the sky each day at noon hour. At the Vernal Equinox on March 20th we are half way to the Summer Solstice. On that day daytime and nighttime

are equal. When we reach the summer solstice on June 21st the Earth's Northern Hemisphere is pointed directly towards the Sun. As a result we have the longest day of the year on that date. But from there on, we start our journey back to the dark side.

In September the Earth will be at the half-way point heading towards the winter solstice. So our 23.5 degree tilt has Northern Hemisphere pointing far enough away from the Sun that our hours of daylight and nighttime are once again equal. It's called the Autumnal Equinox. From this point on the daylight hours for those of us in the Northern Hemisphere will continue to decrease. But those living in the Southern Hemisphere will be entering their spring and for them the daylight hours will increase. Here's how we mark the four corners of our journey around the Sun for residents of the Northern Hemisphere.

On December 21st we experience Winter Solstice. Astronomers should like that date because we have the longest night of the year on the 21st. In the Northern Hemisphere we're pointed directly away from the Sun.

Next we reach the Vernal Equinox on March 20th. That's when day and night are equal. Most people just call it the first day of spring.

The next marker on our race around the Sun is Summer Solstice on June 21st. Sunbather's rejoice because this is the day we enjoy the most hours of Sunlight for the year.

The final marker is the Autumnal Equinox on September 22 when we're once again half-way between the two solstices. And just like the Vernal Equinox, daytime and nighttime are 50/50. The Vernal equinox also marks the morning when the sun appears to rise due east and set due west on your local horizon. So get out your compasses Scouts and check their accuracy.

And interesting side bar to all this is that in January the Earth reaches its closest point to the Sun on our elliptical orbit around dear old Sol. Yet January is one of the coldest months of the year for us Northern Hemisphere dweller. And in the summer months we are at our furthest point from the Sun. Again, our 23.5 degree tilt is the reason.

John Crossen

continued from page 1

lunar soil into building materials or breathable oxygen. NASA's ambitions for the Moon have been upgraded. By tapping into 21st century technology, this program will ensure that astronauts have the tools they need to turn those ambitions into reality.

Learn more about the Exploration Technology Development Program at www.nasa.gov/directorates/esmd/aboutesmd/acd/technology_dev.html. Kids can build their own Moon habitat at spaceplace.nasa.gov/en/kids/exploration/habitat.

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

Moon Phases

First Quarter	10:34 am	April 2
Full Moon	10:56 am	April 9
Last Quarter	9:36 am	April 17
New Moon	11:23 pm	April 25

The Sky this Month

Mercury was in superior conjunction on March 31. On the 26th it reaches greatest elongation east (20°) and makes a very good evening star view.

Venus is a morning star and reaches mag. -4.7 brightness by mid-month. Daylight occultation by the Moon on the 22nd.

Mars moves from Aquarius to Pisces on the 15th. It is also 0.5° south of Uranus on that date.

Jupiter is a morning planet and is high enough to be easily visible at civil twilight.

Saturn in Leo recently at opposition on March 8th. Transits on the 15th at 9:33pm.

Moon will be 2° north of M35 on the 1st. It will be 1.7° south of the Beehive Cluster on the 4th. On the 13th Antares will be just south of it. Venus 1.1° south on the 22nd and seen in a daylight occultation by the Moon.

Ceres is stationary on the 17th.

Lyrid Meteors peak on the 22nd at 6 a.m.

Scientists look deeper into space for extraterrestrial life

It's just human nature to want to know our roots. Where did we come from? Are we unique and alone? Is there a chance that the universe is populated with critters like us? Not just microbes or bacteria but intelligent life that builds, communicates and explores?

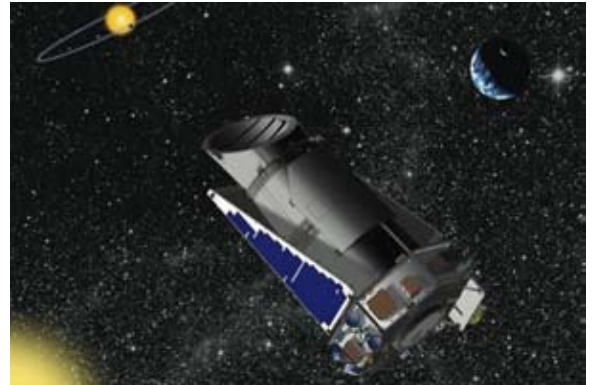
On a small scale we search out our roots via the family tree to discover ancestors whose history takes us to distant continents and back in time hundreds of years. On a grander scale, we look to the night sky and wonder if we have distant cousins out there.

On March 6th we came one tiny step closer to finding out. That's the day the Kepler Space Telescope was launched. The Kepler is named after the famous 17th century astronomer, Johannes Kepler. It is designed to find extrasolar planets – planets beyond our solar system. Since the first extrasolar planet was discovered in 1991, the number has grown to 330 distant worlds orbiting their own suns. Most are many times the size of Jupiter – a gas giant that is already a thousand times larger than Earth. These Super-Jupiters aren't easy to find, but they can be located using Earth-bound telescopes.

Two techniques are used. One measures the star's wobble. If it consistently repeats on a regular basis, that's a sign that something else is gravitationally tugging on the far-out sun. The other process is to measure the star's brightness. A consistent, regular drop in brightness indicates that something is passing between our line of sight and the star. Could it be a planet?

Kepler is designed to operate in orbit, far beyond Earth's blurring atmosphere. And it is designed to find worlds that are more Earth-like in nature. Not that there couldn't be life on a Super Jupiter, but chances are it won't be a "ditto" of you and I.

Two other orbiting space telescopes, the Canadian MOST and France's COROT are



KEPLER SPACE TELESCOPE. Are we unique in the universe? The Kepler Space Telescope will be searching out Earth-sized planets that are orbiting stars like our Sun.

also searching for extrasolar planets, but only Kepler is concentrating on Earth-sized planets. During its 3.5-year tour of duty, Kepler will examine 100,000 stars for "Earth-2" planets. The qualifications are simple. The star it is orbiting must be Sun-like in size. The planet must be rocky and roughly the size of Earth. Plus the planet must be orbiting its star at about the same distance Earth orbits the Sun.

Kepler won't zero in for planetary details. Instead it acts as a filter, weeding out the planets that don't qualify. The likeliest candidates will then be tagged for detailed study to determine their atmospheres and the likelihood of water existing on their surface.

Kepler will also have a limited search area, concentrating on a chunk of sky near the constellations Cygnus and Lyra in Orion arm of the Milky Way Galaxy.

Canadian John Caldwell has spent his career with NASA working on the Hubble Space Telescope and now on the Kepler project. When asked what we will find he is quick to remind us that this branch of astronomy is very young. What we have discovered in just the last decade has reversed our thinking that we are alone in the universe. With the current extrasolar planet tally at 330, he will simply say, "I think we'll be surprised."

John Crossen

Astronomy in Philately

Jersey Post was one of the first postal services off the mark this year for the International Year of Astronomy (IYA). This small British Commonwealth Island off the coast of France, issued a special set of stamps on February 10th to celebrate the IYA theme of the 400th anniversary of Galileo Galilei's first use of a telescope to view the heavens and record what he saw. Of the many discoveries Galileo made this stamp issue captures some of the most prominent. The pictured "first day cover" illustrates an astronomical amount of information!

constellations on each stamp appear to sparkle. Each stamp is similar in that all depict portraits of Galileo and Queen of England, but they are unique in they are all different denominations, they each illustrate a different quadrant of Jupiter and each with a different Jovian moon (either Io, Europa, Ganymede or Callisto). To me the most striking aspect of each design is the combination of two different constellations on each stamp. There is Ursa Major & Cassiopeia; Bootes & Corona Borealis; Cygnus & Pegasus; Perseus & Orion, what great educational tools these can make!



The cachet includes a portrait of Galileo, framed by his 37mm refractor style telescope and the gas giant Jupiter and its four largest moons, which is what Galileo discovered 400 years ago. Looking through a crude 21power scope he did not see Jupiter or its moons with such clarity, but he did record their movement around the planet and thus was further able to prove the heliocentric universe envisioned by Nicholas Copernicus 66 years earlier.

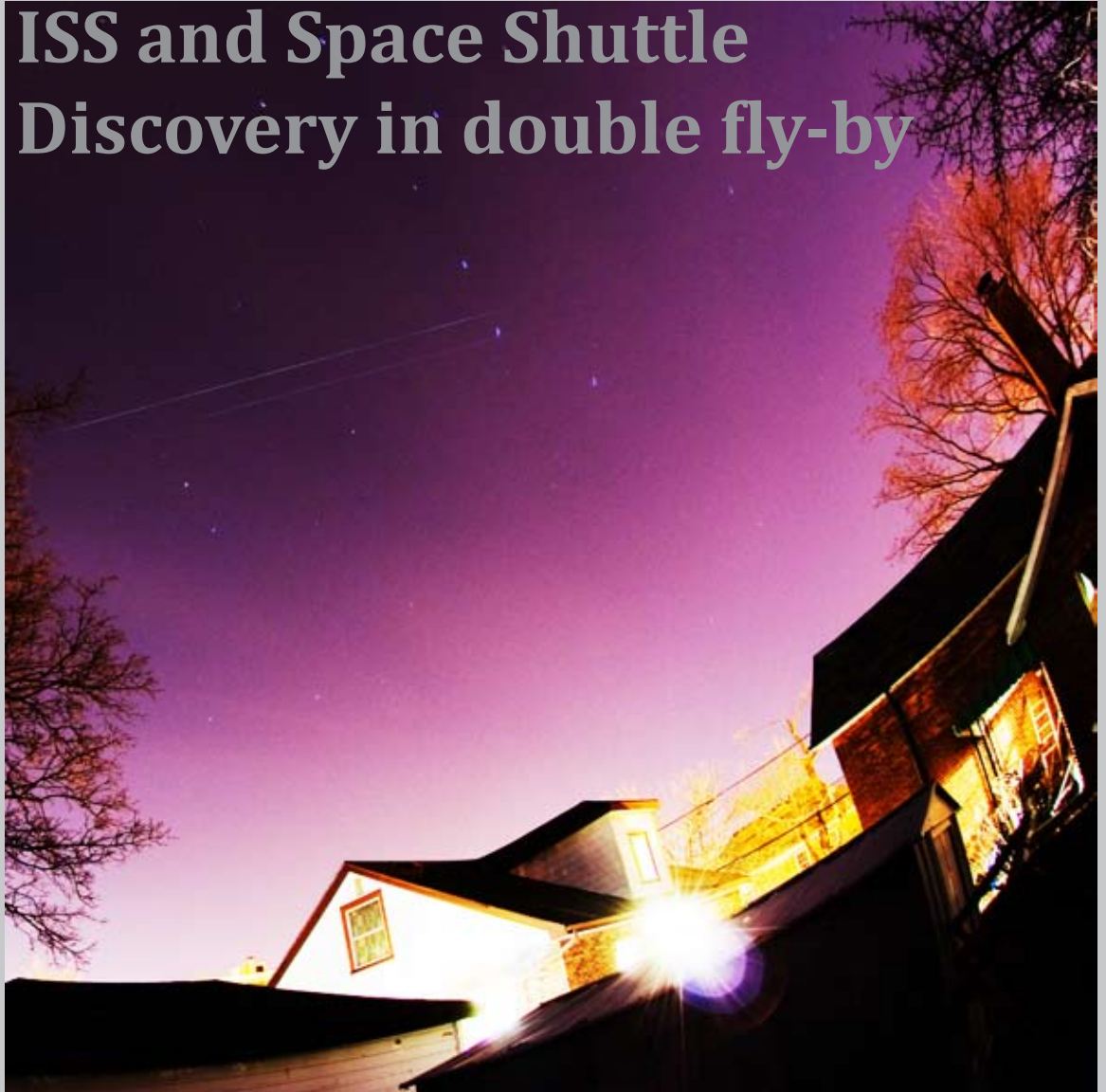
Seeing these stamps for the first time, was a Galileo Moment for me! They are stunning! The silver embossed stars that form the

There will be many other countries issuing stamps to celebrate IYA and Canada will be following suit in April, but more about that in another issue of the Reflector. For now, I will have to be content to revel in the offerings of Jersey.

Your Astronomical Philatelist.

Rick Stankiewicz

ISS and Space Shuttle Discovery in double fly-by



The International Space Station (upper trail) and the Space Shuttle Discovery (lower trail) were recorded in two long exposures on March 27, 2009 and the subsequent photos layered to show a double fly-by. The space shuttle actually preceded the ISS by about 30 seconds. Nikon D200 with Nikkor 10.5mm f/2.8G Fisheye lens, ISO 100, 90 and 60 second exposures.

The just recently completed STS-119 shuttle mission added the final set of solar panels to the International Space Station. The ISS is now a very massive satellite and even with the naked eye you can discern that it is oddly shaped. We should be able to see ISS flares just like Iridium satellites where the satellite increases in brightness as it travels across the sky above you. I didn't notice any flaring on this night. But this was the night before the shuttle mission ended and the Discovery was now undocked and orbiting ahead of the space station. The shuttle preceded the station by about 30 seconds. The size of the ISS with its solar wings makes it appear over a magnitude brighter than the smaller space shuttle.

You can see when the ISS makes a fly-by over Peterborough by going to the Heavens Above (<http://www.heavens-above.com>) web site or the Spaceweather Simple Satellite Tracker (<http://spaceweather.com/flybys/>) site.

The Orion Nebulae Complex



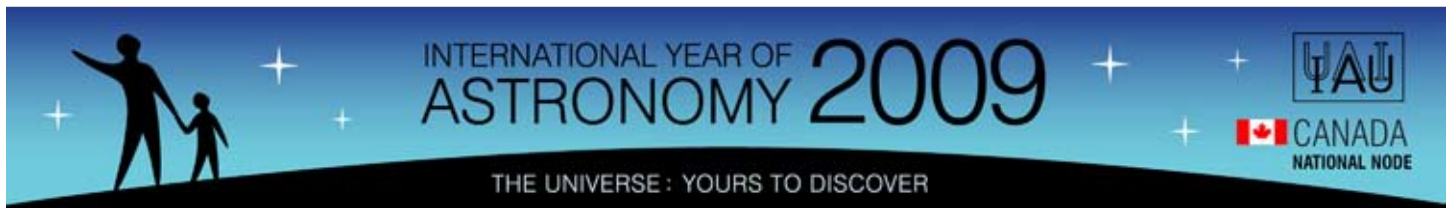
This is the cleanest photo I've taken of the Orion nebulae complex from the Flame and Horsehead nebulae to the Running Man and Great Orion Nebula (M42). This is a total of one hour's worth of exposure data (12 x 5 minutes) under a rural sky. I did use a light pollution filter to cut out the sky glow from the surrounding villages. I used a Nikon D200 with a Nikkor 200mm f/4 AI lens. Each 5 minute frame was shot at ISO 800. I subtracted out a dark frame made from a median-combined 40 frames using DeepSkyStacker software. Final curve and contrast processing was made in Photoshop CS3.

The constellation of Orion is home to a number of emission and reflection nebulae as well as dark nebulae and HII regions. Within a field of view easily covered by a 200mm focal length telephoto lens on a DSLR camera you can photograph the Flame Nebula, the Horsehead Nebula, the Running Man Nebula and the Great Orion Nebula, also known as Messier 42. These are some of the highlights of the larger Orion Molecular Cloud Complex, a region suffusing the constellation that includes Barnard's Loop, a large HII ring that cuts through Orion. The whole complex is around 1,500 light years away and several hundred light years across.

In the photograph above starting in the lower left quadrant is the Flame Nebula (NGC 2024) to the left of the star Alnitak (ζ Ori), the easternmost of the belt stars. Further to the right and slightly below Alnitak is the dark nebula Barnard 33, commonly known as the Horsehead Nebula because of a large section that resembles a horse's head silhouetted against the bright nebula IC 434.

Moving to the right-hand side of the photo in the sword region we see three nebula regions separated by dust lanes. The bluish nebula is NGC 1977, the Running Man, is a reflection nebula. This is simply a dust region that reflects the light from nearby stars. Just below (to the right in the photo) are M 43 and the much larger M 42 nebulae. This is a region of active star and protoplanetary formation.

Phillip Chee



The Stars Come Out in Hastings — in Pictures



PAA Member Brett Hardy (blue/black jacket), wows the locals with his “portable solar observatory” in the parking lot of the local library, before the sunset and the “Stars Came Out in Hastings” on March 20th. Brett had dozens of visitors to his scope throughout the evening and it is no wonder why. His new 6 inch diameter, TMB refractor telescope is a monster to be reckoned with and the views are amazing.



It was a pretty packed house as “The Stars Came Out in Hastings” event got underway at the community centre hall on March 20th. Thanks to the Coordinator, PAA Member John Cameron, there were lots of visual displays around the room and presentations by fellow members John Crossen, Colin Cross, Dean Shewring and even Andreas Gada, who provided a professionally produced DVD on a variety of celestial events. The crowd was wowed by all they saw and heard, if the questions that followed were any indication.



PAA President Rick Stankiewicz sends us a photo report from the Hastings IYA event from March 20, 2009.



PAA member Colin Cross was just one of the many “Stars That Came Out in Hastings” on March 20th. He gave a quick spring constellation tour to a very enthusiastic crowd before fellow member Dean Shewring turned out the lights and tuned on the PAA’s new portable planetarium. All this in time, before the International Space Station (ISS) crossed across the northern sky that everyone could see from the library parking lot.



PAA Past President John Crossen, gets peppered with questions about the heavens, after he gave a slide show tour of the universe like Hastings had never seen before. This March 20th event was a well run and much credit belongs to John Cameron for his initiative and hard work.

The search for extraterrestrial life

A report from Mars



MARS SCIENCE LAB. The Mars Science Lab has been put on hold temporarily. It will do more experiments and more sophisticated ones than the current rovers.

By extraterrestrial life I'm not referring to little green men and women. Instead I'll settle for microbes and bacteria at this stage of the search. Here's what we now know.

Water is a key ingredient for life to take root and thrive. Mars definitely had a watery surface at one time. Ancient river beds that crisscross its surface were our first clues. Then one of the Mars Rovers, detected hematites – those little rocky nodules they jokingly called blueberries. Hematites only form in a watery environment here on Earth, so how did they form on Mars? The chances are they came to be in the same way.

Two years later the Phoenix Lander made it conclusive that Mars was once a wet world

when it discovered water ice in the samples it was testing in its onboard mini-lab. In fact, Phoenix had landed on top of a huge sheet of water ice near the North Polar Cap.

Remote sensing equipment aboard orbiting surveillance satellites had already indicated that it was lurking just beneath Mars' dusty red surface. From our own experience at Earth's North and South Poles we knew frozen water existed in these chilly remote regions. So why not on Mars? Bingo, we were right.

By the way, I keep referring to water ice because Mars' Poles are largely covered in ice formed from carbon dioxide. It's what we called "dry ice" when I was a kid.

Now there is further evidence of there currently being life in some form on Mars. Four years ago the British, working through the European Space Agency (ESA), found traces of methane in Mars' atmosphere. Recently the National Aeronautics and Space Administration (NASA) came up with similar findings – and in substantial quantities.

Anyone who has been to a cattle farm knows that methane gas is the unpleasant byproduct of thriving life forms. Perhaps that's why cowboys wore a bandanna over their noses. But methane can also have a geological origin. So we wait for further evidence.

The Mars Science Lab mission has just been postponed by NASA. This new rover would have been much more sophisticated than the two which are currently trundling across the Martian surface. For starters it is about the size of a small car. And it can cover a lot more ground than the current rovers – up to 30 meters per day. That may not sound like much, but it's a blinding speed compared to the creeping of Spirit and Opportunity.

A reputable scientist has just put forward the concept that water existed on the Martian surface as recently as the dawn of mankind here on Earth. That's a scant 2.5 million years ago. The blink of an eye in cosmological terms.

We've come a long way in understanding our neighbour. We've gone from the 1930s and a planet laced with canals and populated by a dying civilization thirsting for water to the sober reality of a dusty world with no visible inhabitants on its surface.

There is concrete evidence that all the elements for life to take root did exist on Mars at one time. We're getting closer to the truth and the facts are currently in life's favour – at least life in some simple form. Tune in again in a couple of years. If we don't know for sure, we'll certainly be much closer to the truth.

John Crossen

Find your birthday star!

Light traveling in empty space is the fastest thing in the universe. It travels at 186,000 miles (300,000 km) per second!

The stars are so far away from us that their light still takes a long time to reach Earth. One light year is the distance light travels in a year: 5,878,499,812,499 miles (9.4 trillion km). The closest star apart from the Sun is 4.2 light years away, so its light takes 4.2 years to reach Earth.

Tell the Birthday Stars computer when you were born, and it will look for a star that is your age in light years away from Earth. This means that the light we're seeing from that star today actually left the star around when you were born, and has taken your entire life to reach Earth.

From month to month and year to year you may see your birthday star changing. This is because as you get older the light from more and more distant stars has had the time to travel to Earth in during your life.

Click on the following weblink at the Joint Astronomy Centre to see what star is linked to your birthday. This year, mine was 46 Pegasi (or Xi Pegasi), a 4th magnitude star in the constellation of Pegasus. It takes the light 53 years to reach earth from here this star is located, so the light I see from that star today left the star about when I was born. Pretty cool when you think about it. Give it a try or at least on your birthday this year, as you celebrate another trip around the Sun, find your birthday star, look at it and appreciate it and what it represents.

<http://outreach.jach.hawaii.edu/birthstars/>

Rick Stankiewicz

(53 years young and starting another trip around the Sun)

Earth lucks out again, as large asteroid streaks past again

While we weren't looking on March 2nd, an asteroid whistled past Earth, missing us by about 1/5th the distance to the Moon. That's just 72,000 km, most new car warranties today would still have 28,000 km left on them.

If it had just been a little feller, say a meter or two across, that wouldn't have been too unnerving. However this tumbling space rock was estimated to be nearly 47 meters across. If that had smacked into us, the results could have been devastating.

In 1908 a meteor about 50 meters across slammed into our atmosphere and blew apart about 10 km above Earth's surface. Happily it happened over a remote and sparsely populated region of Siberia known as Tunguska. But the results were still chilling.

The resulting blast was about one thousand times greater than the nuclear bomb the Americans dropped on Hiroshima. It leveled nearly 80 million trees, covering more than 2,150 square kilometers. The impact registered on seismometers around the world. A

city the size of London or New York would have been leveled. If it had remained intact and slammed into the ocean, a massive tsunami could have been created. Fortunately what happens in Tunguska stays in Tunguska.



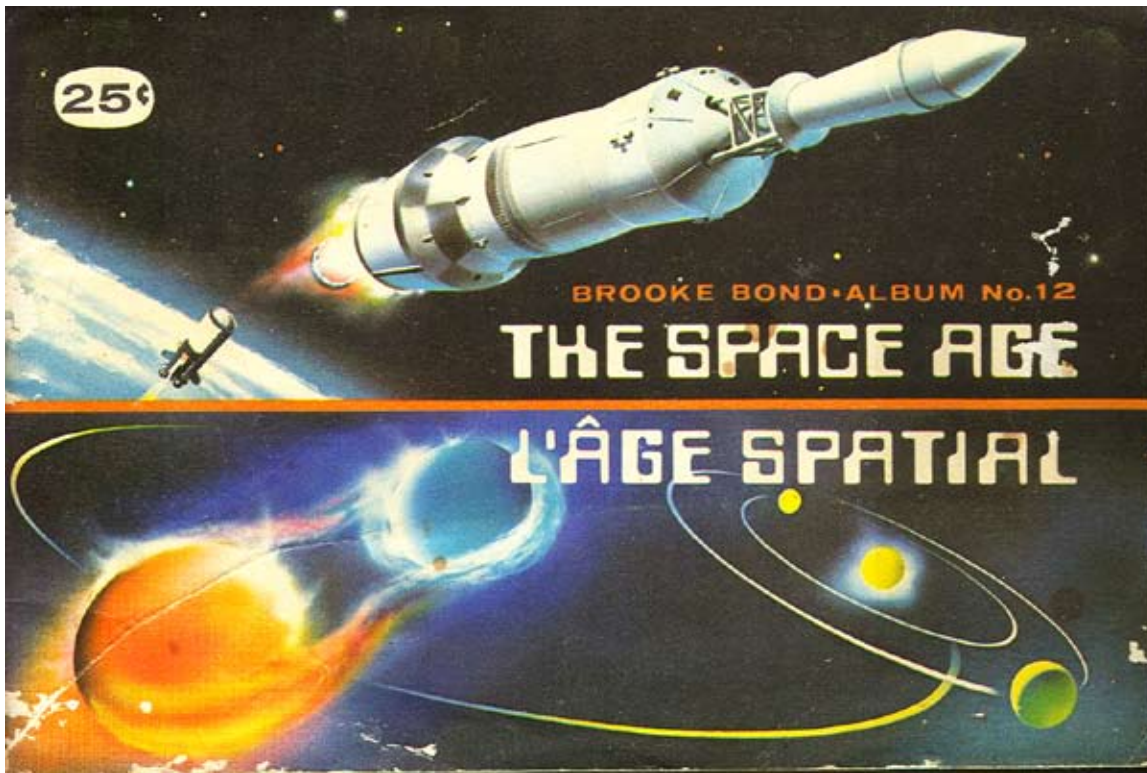
TUNGUSKA BLAST. Artist's rendering of the 1908 Tunguska blast when an asteroid blew up above a remote section of Russia. Courtesy Sky & Telescope Magazine.

At its closest approach, the asteroid (now known as 2009 ND DD45) was over the Pacific Ocean near Tahiti. It could be observed from Australia, Japan, and China, but not from North America or Europe. Aside from the asteroids that have hit Earth, the closest listed approach to Earth in recent history was a 10-meter asteroid designated 2004 FU162, which skimmed within 6,500 kilometres of Earth's surface.

Asteroid 2009 ND DD45 was discovered two days after its near miss by Rob McNaught at Siding Spring Observatory in Australia. According to McNaught it was "a dim speck about 1.5 million kilometres away." Scientists calculating its orbit then back-tracked its flight path to find that we had once again avoided a cosmic collision - just.

The Space Age

Brooke Bond Album no. 12



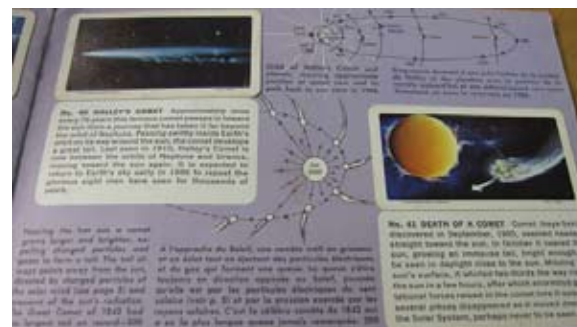
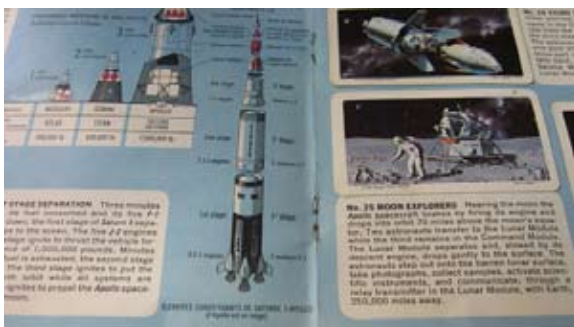
PAA member, Doug Armstrong, handed me a very interesting artefact at the end of our March meeting. It was a tea card album from the Brooke Bond Food company, formerly the owner of the Red Rose Tea trademark (now owned in Canada by the Unilever company.)

From 1959 to 1975 they packaged an annual set of 48 collector cards in Red Rose Tea boxes with a different theme each year. You could purchase a separate album for 25 cents to place your cards in.

The 1969 set was called “The Space Age” and the 48 paintings on these cards

are wonderfully bright and optimistic to accompany the text in the album that provided a brief introduction to various astronomy topics from space flight, the solar system, deep space objects and atmospheric optics. The brief introduction in the album was written in May 1969, two-months before the Apollo 11 manned moon mission. But because they were very optimistic, cards 22 to 27 detail the Apollo moon landing.

Phillip Chee



continued from page 14

Tunguska

On a lighter note, the “Pals of Pluto” have reason to celebrate. Illinois has voted to recognize Pluto as an official planet. The planet-come-dwarf-planet-now-planet again (at least for Illinois residents) was discovered by Clyde Tombaugh. It happens that Tombaugh was an Illinois boy, so maybe there’s a bit of favoritism going on here.

At any rate, Tombaugh was a self-educated astronomer whose planetary images caught the eye of Vesto Slipher, the head of Lowell Observatory in Flagstaff, Arizona. He hired young Tombaugh and put him to work searching for Planet X. Percival Lowell, the observatory’s founder, had calculated that such a planet should exist. Tombaugh found it in 1930 and the far-flung rock was given the name Pluto by 11-year old Venetia Phair of Oxford, England who won the “name the new planet” contest.

At any rate, I don’t think any publishers are going to print an “Illinois only” version of their planetary text books, so chances are the title of dwarf planet will stick. Still, it’s a wonderful tribute to one of the last do-it-yourself astronomers of the century.

John Crossen



THE UNIVERSE
YOURS TO DISCOVER

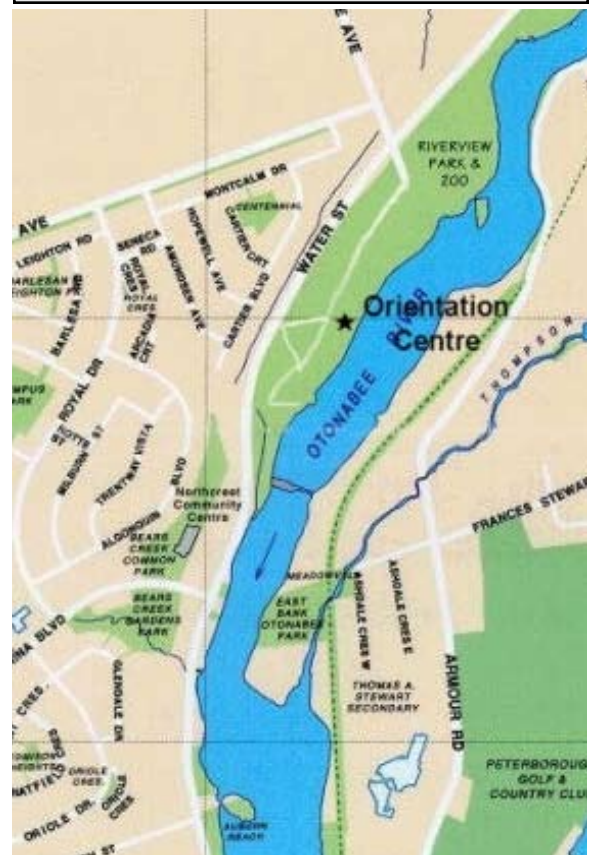
INTERNATIONAL YEAR OF
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Articles

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

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

**Next submission deadline:
April 27, 2009**



Meetings The Peterborough Astronomical Association meets every first Friday of most months at the **Peterborough Zoo Orientation Centre** (Next to the PUC Water Treatment Plant) at 8PM. PAA executive business will be conducted starting at 7:30PM. Members and the public are welcome to attend the earlier time.