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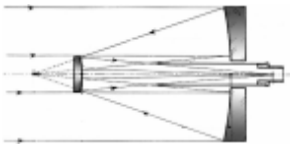
PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR



Volume 5, Issue 3 March 2006

Editorial

Spring is officially here this month, and hopefully the warm weather is not that far off. If you haven't already heard, there is a solar eclipse on March 29th. For those of us who don't have the right gear to look at this eclipse, you can go to www.nasa.gov and watch it online.

In space news, the launch of the space shuttle Discovery has been pushed back until July. Engineers need this extra time to fix a sensor on the external fuel tank. The new launch window is from July 1 to 19, 2006.

Clear skies,

Shawna Miles
shawna@property-list.net

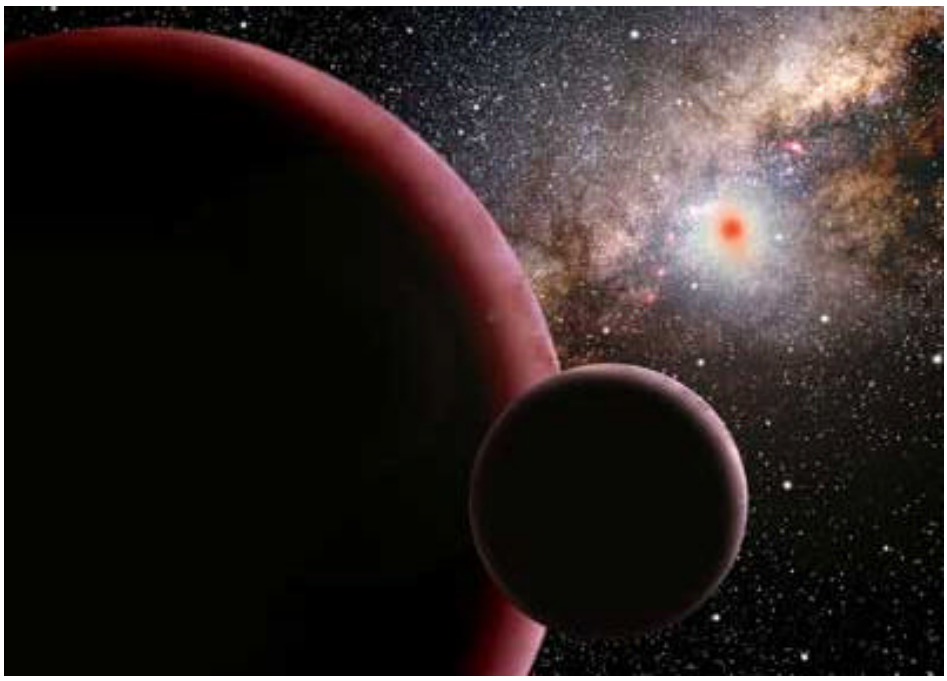
Super Earths Are Out There

Most of the planets discovered outside of our solar system are Jupiter-sized or larger. From this, it looks as though the majority of extrasolar planets out there are gaseous giants.

There are astronomers from the Harvard-Smithsonian Center for Astrophysics who would disagree with that last statement. They believe that super-Earths may be more common, as much as 3 times more common than the gas giants!

So, what is a super-Earth?

A super-Earth is a rocky planet much larger than our own; several times larger in fact. In fact, a new super-Earth was recently found. It is orbiting a red dwarf star about 9000 light-years away! This planet weighs about 13 times the mass of the Earth, and also has a diameter several times that of the Earth. Scientists believe it is probably made up of a mixture of rock and ice.



An artist's impression of a super-Earth. Image credit: CfA

A first thought might be on whether there could be life on this super-Earth. Unfortunately for this planet, life would not be possible. For starters, the planet along with it's solar system, is lacking in the necessary gases, which seem to have dissipated. Another reason is the orbit. It is 250 million miles away from its star. That's about the distance of the asteroid belt in our solar system. At this distance, the planet would be very cold, chilling to about –330 degrees F! This is far too cold for liquid water or life.

With this discovery, we can start to understand the process of solar system formation; the kinds of solar systems created by different sized stars.

For more information go to: www.cfa.harvard.edu/press/pro614.html

Shawna Miles
shawna@property-list.net

Inside This Issue

New Schedule For The Completion Of ISS

Via CBC News:

After a lengthy hiatus, NASA plans to resume building the International Space Station in September. The heads of space agencies participating in the program, including Canada, Europe, Japan, Russia and the U.S., agreed to a construction schedule at their meeting at Cape Canaveral, Fla. on Thursday, March 2nd.

"The decision was to put together an assembly sequence that allows us high confidence that we will finish the space station by the time the shuttle is retired," NASA administrator Michael Griffin told a news briefing after the meeting.

Construction of the space station was delayed by the 2003 Columbia shuttle disaster, which killed seven astronauts.

To get it underway again, NASA needs to prove that it has repaired problems with the space shuttle fuel tank which reappeared on the Discovery shuttle mission last July. NASA is hoping it can resume shuttle missions as early as May. They are the only spacecraft with enough room in their cargo hold to carry equipment and supplies needed to complete the space station.

The shuttle is set to be retired in 2010. To ensure all the hardware needed to complete the space station gets into orbit before then, flights carrying experiments and science equipment are being scaled back "to the bone," Griffin said.

Sixteen more shuttle flights to the space station and possibly one final servicing call to the Hubble Space Telescope, are expected. Before the Columbia accident, NASA expected to fly 28 missions to the station.

The first six missions would test the shuttle and carry smaller pieces of construction equipment to the station. The seventh, expected in late 2007, would carry the European Space Agency's Columbus laboratory module. It would be followed by the first of three launches for Japan's Kibo module.

In 2009, with four shuttle flights remaining, the station should be able to support a six-person crew.

Submitted by: Mark Coady
mark.coady@sympatico.ca

This is what the International Space Station should look like upon completion.

In A F.L.A.P. About Light Pollution!

Most of you have probably not heard of the Fatal Light Awareness Program (FLAP), but as this newsletter so often does, you will soon be educated about such things. I first heard of FLAP at a special symposium at the Leslie M. Frost Natural Resources Centre near Dorset a couple years ago. The co-founder and Executive Director, Michael Mesure, gave a talk to the group. Then more recently, I ran across an article about FLAP in a national magazine called BirdWatch Canada (Fall 2005, No.33; www.bsc-eco.org).

This magazine, as you might expect, is devoted to the study of birds in Canada. On the cover was a picture of high-rise buildings and the caption “Urban Bird Traps”! The special report inside was “Charting a Course for Bird-friendly Cities”. The following are excerpts graciously allowed to be reprinted by the editor of the magazine.

“In an unprecedented decision, Toronto City Council recently passed a motion to protect migrating birds as they pass through this urban metropolis in southern Ontario. On 14 April 2005, an overwhelming council majority supported the *Prevention of Needless Deaths of Thousands of Migratory Birds per Year in the City of Toronto Notice of Motion*, making a firm commitment to “reduce bird collision deaths by at least 50%.” Ultimately, it is hoped that the lives of over 5000 migratory birds will be saved each year.”

“Many long-distance migrants fly at night, aided by the stars for navigation. Attracted to city lights, they often become confused and disoriented. Collisions with buildings are inevitable. As well, the combination of lights and structures act as a lethal trap, preventing bewildered birds from migrating past the urban core. They often flutter around lights until finally, exhausted, they drop to the ground and become vulnerable to

Continued...

predators such as gulls, raccoons, and cats"

"Human-built structures have been recognized as a hazard to birds for more than a century. Today, it is estimated that structure and window collisions are responsible for the death of billions of birds around the world each year. Research has shown that the majority of these collisions are caused by lights that are left on at night and/or the presence of windows. Tall structures, whether they are high-rise condominiums, office buildings, transmission towers, monuments, or lighthouses, each pose a hazardous threat to nocturnal migrants.

Across North America, the current published estimate is that anywhere from 500 million to more than one billion birds die each year due to non-natural causes. Of these deaths, about two-thirds are due to collisions with modern infrastructures."

"To address the problem, the Fatal Light Awareness Program (FLAP) was established in Toronto, ON in 1993, the first organization of its kind. Michael Mesure, co-founder and Executive Director, explains how FLAP got started. "From years of witnessing the demise of thousands of birds through collisions with Toronto's towers, it became alarmingly clear that this needless cause of death could no longer be ignored. An organized effort was imperative to help raise awareness of this tragic phenomenon. Hence, FLAP was born."

FLAP has collected over 28,000 birds over the years. These specimens have included 158 different species, including rare, threatened and endangered ones. For a look at what some of this collection looks like, check out a copy of National Geographic Magazine (September, 2003 - Geographica). Of the 10,000 years a year that FLAP and its volunteers find, about 50% are still alive and most of these they attempt to release, so they can continue to flap on their birdly ways.

"Over the years, FLAP has raised awareness locally and internationally through its media campaigns and its Bird-Friendly Building program that provides guidelines on ways to prevent bird collisions with buildings. Bringing a Notice to Toronto City Council was a logical next step."

What might look beautiful to us could be fatal for a bird flying by. Toronto is already working on cutting down its light pollution.

"By-laws can be an effective tool for modifying behavior. Not long ago, City Council passed a pesticide by-law prohibiting the use of non-essential pesticides in Toronto. (Sound familiar Peterborough?) A similar type of by-law could be drafted to regulate lighting levels after hours. Public education would be geared towards encouraging tenants and property managers in the downtown area to turn off or prevent the escape of any necessary lighting by installing (and using) blinds or drapes. Turning lights off will not only reduce bird-structure collisions, but will result in significant energy cost savings. For example, the Motion cites the $200,000 per year utility cost savings that the City's Metro Hall building alone experienced after joining FLAP's Bird-Friendly Building program."

"Before Chicago's Lights-Out campaign, Toronto was considered the most bird-friendly city in North America because of the work of FLAP…..This initiative marks the beginning of a journey that will put FLAP's vision into action by ensuring bird-friendly buildings during dark, starry nights. To read Toronto's Notice of Motion and to find out how you can help, visit FLAP's website at: www.flap.org "

The update to this article is a news release that I read from February 1, 2006, which states that Toronto unanimously adopted a resolution on January 31st to protect migratory birds in ways that include the control of building lighting. This will apply to all new buildings as a starter.

FLAP, the City of Toronto and others have formed a partnership known as *Lights Out Toronto*. Starting this April, in time for the major northern spring migration of birds, the *Lights Out Toronto* campaign will start to educate the public on how those in Toronto can prevent the needless deaths of thousands of migrating birds, by a simple act like turning lights off. As a bonus, this will also greatly reduce the amount of greenhouse gas emissions and save millions of dollars each year.

To view the full report, please visit: http://www.toronto.ca/legdocs/2006/agendas/council/cc060131/plt1rpt/cl005.pdf

You would think and hope, that if Toronto can make a move in the right direction, away from light pollution, that Peterborough could too. We nee to share this story with those that need to hear it. Regardless of what your reasons are for fighting light pollution (birds, safety, cost savings, energy conservation or to preserve starry skies), we all should be doing something to move in the right direction.

Turn your lights down, when the stars come up ….. and save a bird!

Submitted by: Rick Stankiewicz
stankiewiczr@nexicom.net

NASA Space Place

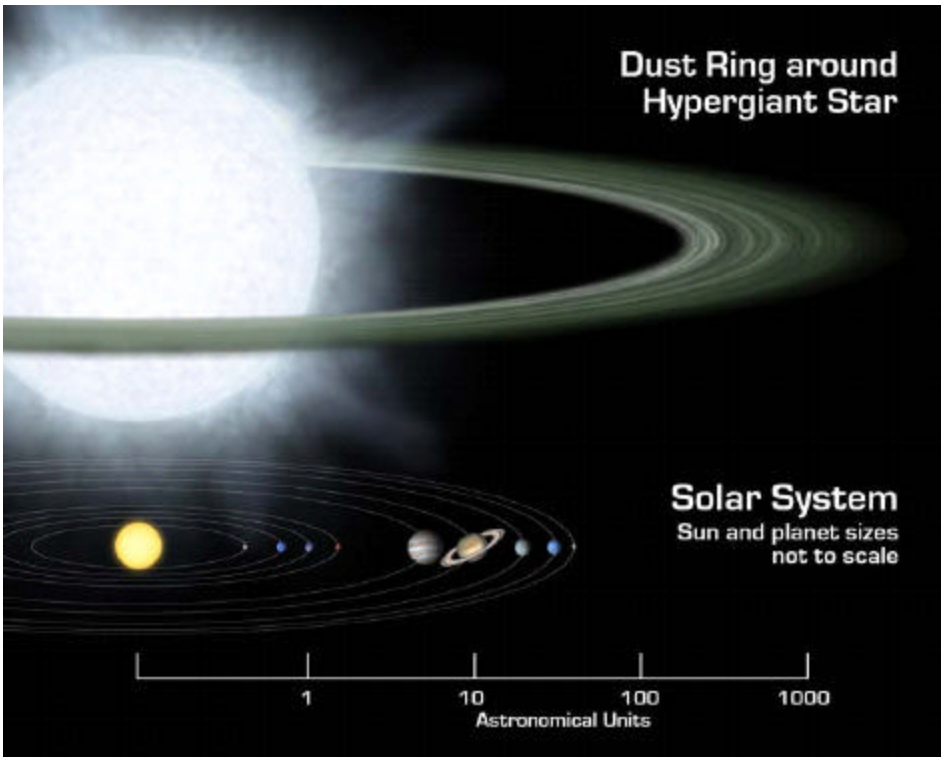
Planets in Strange Places

Red star, blue star, big star, small star—planets may form around virtually any type or size of star throughout the universe, not just around mid-sized middle-aged yellow stars like the Sun. That's the surprising implication of two recent discoveries from the 0.85-meter-diameter Spitzer Space Telescope, which is exploring the universe from orbit at infrared (heat) wavelengths blocked by the Earth's atmosphere.

At one extreme are two blazing, blue "hypergiant" stars 180,000 light-years away in the Large Magellanic Cloud, one of the two companion galaxies to our Milky Way. The stars, called R 66 and R 126, are respectively 30 and 70 times the mass of the Sun, "about as massive as stars can get," said Joel Kastner, professor of imaging science at the Rochester Institute of Technology in New York. R 126 is so luminous that if it were placed 10 parsecs (32.6 light-years) away—a distance at which the Sun would be one of the dimmest stars visible in the sky—the hypergiant would be as bright as the full moon, "definitely a daytime object," Kastner remarked.

Such hot stars have fierce solar winds, so Kastner and his team are mystified why any dust in the neighborhood hasn't long since been blown away. But there it is: an unmistakable spectral signature that both hypergiants are surrounded by mammoth disks of what might be planet-forming dust and even sand.

At the other extreme is a tiny brown dwarf star called Cha 110913-773444, relatively nearby (500 light-years) in the Milky Way. One of the smallest brown dwarfs known, it has less than 1 percent the mass of the Sun. It's not even massive enough to kindle thermonuclear reactions for fusing hydrogen into helium. Yet this miniature "failed star," as brown dwarfs are often called, is also surrounded by a flat disk of dust that may eventually clump into planets. (Note: This brown dwarf discovery was made by a group led by Kevin Luhman of Pennsylvania State University.)



Artist's rendering compares size of a hypothetical hypergiant star and its surrounding dusty disk to that of our solar system.

Although actual planets have not been detected (in part because of the stars' great distances), the spectra of the hypergiants show that their dust is composed of forsterite, olivine, aromatic hydrocarbons, and other geological substances found on Earth.

These newfound disks represent "extremes of the environments in which planets might form," Kastner said. "Not what you'd expect if you think our solar system is the rule."

Hypergiants and dwarfs? The Milky Way could be crowded with worlds circling every kind of star imaginable—very strange, indeed.

Keep up with the latest findings from the Spitzer at www.spitzer.caltech.edu/ . For kids, the Infrared Photo Album at The Space Place (spaceplace.nasa.gov/en/kids/sirtf1/sirtf_action.shtml) introduces the electromagnetic spectrum and compares the appearance of common scenes in visible versus infrared light.

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

By Trudy E. Bell

Surface Brightness or Luminance

In a previous article we discussed the terms luminous flux, intensity and illuminance. Here we try to understand the term luminance, which is the technical term for what we call the surface brightness of an object.

This concept applies to extended objects only like galaxies, planets, and the sun but not to point sources of light such as stars. Since peoples' eyes are not all the same the concept of brightness is really a relative term. To quantify surface brightness we use the scientific term luminance. How does the eye interpret

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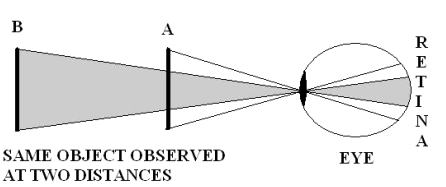
surface brightness of an object? The eye consists of a pupil to allow light to enter and a retina at its back to detect light striking the rods and cones. Suppose we have a certain number of photons per second striking one square millimeter of the retina then the brain interprets this as some value of surface brightness. If the number of photons striking the same area were to double then the eye would ideally interpret the surface brightness to be twice as great. On the other hand, if the same number of photons were to strike twice the area then the brain would interpret the surface brightness as half as large. In practice, the eye does not behave this way for all levels of surface brightness or colors so we ignore these complicating details.

Imagine we are facing a vertical surface on a wall with dimensions of one meter by one meter. The area of this surface is therefore one square meter. Let us imagine that the brightest part of a flame from a wax candle has an area of one square centimeter. It would then take 10,000 candle flames to completely cover the surface of one square meter. For simplicity we also assume the luminous intensity of each candle is one candela. The surface brightness of the surface would then be 10,000 candelas per square meter. This is called the luminance of the surface. This is also the luminance of one candle flame since the surface brightness is still the same. **What happens to the perceived surface brightness of the candles if we observe the surface from twice the distance from it?** The answer will likely surprise many. The perceived surface brightness of the candles by the eye, or luminance, does not change!

The figure below shows the surface of candles at positions A and B with B being twice the distance of A from the eye. The shaded region in the figure



A table of luminance values.

Object	Luminance cd/m^2	Luminance mag/ arcsecond^2
Sun	**2x10^9**	**-10.7**
Clear Day sky	**8,000**	**2.8**
Full Moon	**2,500**	**4.1**
Wax Candle Flame	**10,000**	**2.6**
Cloudy Sky	**2,000**	**4.3**
Andromeda Galaxy M31	**0.001**	**20.1**
Clear Night sky	**0.0004**	**21.1**

shows the light emanating from the surface at position B. The portion of the retina now illuminated is one-quarter as large. (half of the height by half the width). The illuminance on the lens of the eye for position B is also one-quarter that at A since illuminance varies inversely as the square of the distance. So the number of photons per second striking unit area of the retina is still the same. The surface brightness is still the same!

We now define the term luminance to be the luminous intensity of the surface per unit area of the surface. If the surface does not have uniform surface brightness then we calculate the average surface brightness by dividing the total luminous intensity by the total surface area. In the table below we list several objects with their surface brightness or luminance. In particular the wax candle has a luminance value of 10,000 cd/m^2.

In the Observers Handbook there is another way to define surface brightness or luminance. This is magnitude per square arcsecond. There is a formula there to convert cd/m^2 to mag/ arcsecond^2. What is an arcsecond? An arcsecond is an extremely small angle. For example, the planet Neptune subtends an angle of two arcseconds from earth. A square arcsecond is then a solid angle of one arcsecond by one arcsecond. In this unit, the Sun's luminance is –10.7 mag/arcsecond^2. What this means is as follows. The Sun subtends a solid angle of approximately 2,700,000 square arcseconds. The star Sirius is mag –1.44. To make Sirius mag –10.7 you would have to make it brighter by 9.26 magnitudes or 5000 times. Then take 2,700,000 of these super bright stars and cover the face of the Sun using one super star for each square arcsecond. All these stars would then be as bright as the real Sun, which has magnitude -26.7. As another example, for a cloudy sky the luminance is 4.3 mag/ arcsecond^2. This means if you took a star of magnitude 4.3 and covered each square arcsecond of the sky with it then the surface brightness of the cloudy sky would be the same as the sky full of stars.

In the table above, using values from several sources, we list some luminance values in both sets of units. It seems strange that the luminance of the full Moon is less than the clear sky value however. The reason may be that the eye is less sensitive to the blue light of the sky.

While researching this topic on the internet we came across the following method to estimate the luminance of a scene using the exposure meter on your camera.

Luminance in cd/m^2 =12.4 x (focal ratio)^2/(exposure time in seconds x ISO film speed). For example if you shoot a picture outdoors in the summer in full sun at f/16 on ISO 100 film for 1/200 second, the luminance is approximately 6350 cd/m^2 . This is also a good example showing that surface brightness does not depend on the distance to the object since distant portions of the scene are equally exposed on the film as closer portions.

By Anton Jopko
amj@kwic.com

The VLBA antenna taken from near the summit of Mauna Kea. The ancient volcanic cinder cone nearby gives a different perspective to this large dish, but then so does over a thousand feet in elevation.

Aloha #2 – The Very Long Baseline Array (VLBA)

Hawaii's Mauna Kea is home to many astronomically based wonders. This includes links to the world's largest telescopes. On my recent trip to the summit in February 2006, our tour included a side trip to a unique piece of scientific equipment.

If you have seen the movie "Contact" or even if you read last months issue of The Reflector, "NASA Space Place – Moving a Mountain of a Dish" (pg.7), you will have an idea of what I am talking about. If you compare the picture of the "dish" in the last issue of The Reflector to this one included here, you will notice a striking similarity. However, the antenna in this article is part of the Very Long Baseline Array (VLBA) of 10 such antenna dishes, placed from Mauna Kea in Hawaii, to St. Croix in the Virgin Islands.

These antennas are smaller than the giant Deep Space Network dishes. Every location of the VLBA has a single antenna that is 82 ft. (25m) in diameter, weighs about 240 tons and is almost as high as a 10-story building when they are pointing straight up.

The VLBA antenna on Mauna Kea is the only "telescope" there, not located at the summit. We had to drive a bit off the main access road to check out this complex at the 12,205 ft. (3,720 m) level, in fact you could not even see it from the road. It was a very impressive site and the map of where the ten antennas are located, was attached to the fence surrounding the complex (see other attached image).

These radio antennas are run by the National Radio Astronomy Observatory (NRAO) in Socorro, New Mexico.

An antenna from the Very Long Base Array (VLBA).

This array of antenna is like having a 5,000 mi. (8,046 km) wide eye to look at the universe. They reputedly are able to produce the sharpest images of any other earth or space-based telescope. The precision is such that they can reach a resolution of less than one milliarcsecond ($1/1000^{th}$ of a second of arc). This is equal to being able to read a newspaper headline in Vancouver from Ottawa! To top this, they can apparently reach even higher resolution when they work in concert with other antenna around the world on specific projects. This array saw "first light" in May of 1993, after over seven years of construction and the spending of $85 million (U.S.).

The VLBA has been involved in many discoveries over the years. Some the accomplishments include: super massive black holes; radio jets; low luminosity galaxies; accretion disk in NGC 3079; and microquasar flares, to name a few.

For more information on the VLBA, see: http://www.vlba.nrao.edu/

Rick Stankiewicz
Astro-Keener
stankiewiczr@nexicom.net

Jacob's Ladder 2020

Everyday space travel, like what has been envisioned by science fiction writers, has, so far, eluded mankind. The extreme dangers and costs of going into space have, to a large part, made the dreams of the average person going to the moon, or beyond, just that - a dream.

To make that dream a reality would require some kind of a breakthrough. Well, sometimes breakthrough science can happen during a simple coffee break, at least it can at the U.S. Los Alamos National Laboratory in New Mexico where it's possible to eavesdrop on some big brains hatching a bold scheme that will transform the planet. You might remember the name "Los Alamos". In

Continued...

1941, the world's greatest physicists gathered there, in secret, to build the atomic bomb. They were hidden away, courtesy of the U.S. government, under the code name the Manhattan Project. When they had finished, they had packed the power of the atom into a weapon so awesome that it ended a war and launched the nuclear age.

Fast forward to the present day some 60 years after Project Manhattan was closed down. A few passionate scientists at Los Alamos are working, on their own, for free, and in their spare time, on a new vision that will revolutionize space travel by making it far safer and far cheaper - a space elevator.

Imagine for a moment - what if there was a better way to get into space, say a ribbon slicing through the atmosphere that spacecraft could climb? It's an extreme version of an elevator that seems to be right out of science fiction by writers like Arthur C. Clarke - or maybe not so strange. As long as man has been able to stare at the stars the idea has been there - in Biblical stories like Jacob's Ladder and the Tower of Babel. It was a mystical dream of something tall enough to reach into the heavens. At some point in the near future - maybe twelve to fifteen years off, it just might become a reality.

Right now, the only way into space is to be strapped to a rocket. It will boost a satellite or a shuttle into orbit, but it's like getting into space on the back of a bomb. It's dangerous and it's quite expensive - the cost of launching a payload into low earth orbit is around $5000 per kilogram and that cost rises to $20000 per kilogram if you want to explore other planets or deep space. It's hoped that the space elevator would lower these costs to around $100 per kilogram.

Meet astrophysicist Bryan Laubscher. "The whole beanstalk idea and the whole idea of putting a ribbon into space and just climbing it is a hard concept to sell to people on Earth who are used to rockets," he says. "That's the way to get into space, a man's way. Climb in there and they light that thing and hope it doesn't blow up."

With technology always advancing, this could be in our future. An artists impression of a possible "space elevator."

Then there's Ron Morgan, health physicist. He admits he's obsessed. "We're definitely on the ground floor," he says. "I think of a project that is going to change the world, absolutely. I believe that we could have the first Earth to space elevator in 12 to 15 years."

And there's Mervyn Kellum who's studying the business opportunities that would open up if the elevator made space travel suddenly easy. "It's a concept where we can dramatically lower the transportation costs, access to space." Kellum says.

The space elevator starts with a basic platform in the ocean, near the equator. Attached to the platform is a paper-thin ribbon no more than a meter wide that stretches 100,000 kilometers into space, about one-quarter of the way to the moon. There it's tied to a satellite that pulls the ribbon taut and keeps it straight as it orbits in synch with the Earth's rotation. The platform and the satellite would be so positioned that it could easily be moved to make way for other satellites and avoid space junk.

"The idea is somewhat like taking a ball on a string, spinning it around in your hand," Laubscher says. "It doesn't just flop down, it actually opposes the force of gravity and stands outward. That's really what's happening with this cable."

Spacecraft would ride up the cable on an electrically powered climber that would be fuelled by ground-based lasers shining onto solar panels. Once above the Earth's atmosphere the spacecraft would be released to orbit the Earth and do whatever business it was sent to do. Or it could ride the elevator right to the end and be thrown toward Mars or Venus.

"It helps to be a scientist rather than a science fiction writer," Laubscher says. "It helps that carbon nanotubes are known. That really helps a lot. And it maybe helps being at Los Alamos."

Carbon nanotubes? Until 10 years ago, there was nothing to build a space elevator with. It would take every scrap

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of steel on the face of the planet and the thing would be huge and impossibly heavy. So scientists were forced to fantasize about a space elevator built with a magic material they called "unobtainium." Then, in 1991, the magic material was discovered when scientists first fabricated carbon nanotubes. They're hollow carbon tubes 100 times stronger than steel yet so tiny 50,000 of them would fit inside a human hair and they have all the strength of a diamond yet are six times lighter than steel.

There are still a lot of engineering problems to overcome - such as how to stretch carbon nanotubes without breaking them. But as Ron Morgan says, "They do have the right strength-to-weight ratio, properties. To actually build a cable you just have to work on them. It's kind of an engineering problem"

And there is a lot of government funded research on carbon nanotubes going on at Los Alamos right now. Enough so that every breakthrough they accomplish brings the possibility of a space elevator a little bit closer to reality.

By Mark Coady
mark.coady@sympatico.ca
with files from NASA and CBC News

Did You Know…

- Doctors from NASA and the Canadian Space Agency are working on a series of experiments where surgeons will attempt procedures in weightless situations, like underwater or special aircraft that simulates weightlessness. Future missions to space may have at least one surgeon and several of the crew trained in surgical techniques. With humans spending longer periods in space, it's just a matter of time before they'll need surgery.

- The Hubble Space Telescope has provided evidence that Pluto and its three moons probably formed at the same time, and out of the same material. Long ago, two Pluto-sized Kuiper Belt objects may have collided together. Hubble revealed that Pluto and its moons have identical colors; exactly what you would expect from this kind of an origin.

The Sky This Month

MERCURY

Mercury is lost from view in the sunset. It will be better viewed in April.

VENUS

Venus is in the predawn southeastern sky. It is at greatest elongation west on March 25th.

MARS

Mars is an early evening object, located in the constellation Taurus.

JUPITER

Jupiter is found in the late evening. It is in the constellation Libra and is second only to Venus in brilliancy.

SATURN

Saturn can be observed in the early hours of the morning. It is located in Cancer.

URANUS

Uranus is too near the sun to be seen this month.

NEPTUNE

Neptune is also hidden in the solar glare.

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:

There are no major meteor showers this month.

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

Huronia Star Party May Be Small, But It's A Big Hit!

Summer is coming and that means its star party season. From coast to coast in Canada, the warm, stable weather during the months of July and August bring out the scopes and tents that dot farmer's fields and signal a star party.

In Canada the granddaddy of all star parties is StarFest which is held in a large park near Orangeville. It has good dark skies, swimming pools, and famous guest speakers like Jack Newton, David Levi, and Donald Parker. It also has long lineups for meals, and about 1,300 people tenting cheek to jowl. If you haven't been to StarFest, go. It is a unique experience filled with telescopes like you've never seen before and retailers for every corner of the country. But if you like things to be a little less impersonal and foreboding in size, HSP is the place to be.

The Huronia Star Party was born in 1991 in a farmer's field north of Alliston, Ontario. The original event took place in Henry Kuper's field and was partly run by his son, Tubo along with an enthusiastic group from the South Simco Amateur Astronomers. With the exception of Tubo, the same gang is still running the show. But a few years ago, the event moved to Camp Saulaine to take

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HERE'S JUST A TASTE OF WHAT'S UP AT HSP 2006

Fantastic door prizes – some really good stuff
Daytime hiking along the river
Children's play area
Solar Sketching Workshop
Beginner's Workshop
The Eclipse in Turkey
How Space Affects Earth
The BHO/PAA Planetarium
Digital Imaging
Swap Meet – bring money
Open air music – yes music, and it's good
Professor Paul Delaney – From Stardust to New Horizons
Fabulous buffet dinner
And observing, observing, observing

advantage of some major upgrades – like running water, real toilets, showers, indoor sleeping accommodations, and indoor facilities for the commercial displays and speakers. For those of you who are familiar with star parties, those are luxuries – big time! And if I don't mention the great food, Mark Coady will release wild skunks in my sleeping bag. In a word, it's terrific. Not to mention that it's on time and hot. Add in the fact that HSP takes place on 250 acres of rolling hills along the banks of the Nottawasaga River.

Of course you can still camp out under the stars if you wish because there's more to HSP than the guest speakers and excellent facilities. This is a small star party where people make friends and then look forward to renewing those acquaintances the next year and the year after that and on again. Since HSP began I have only missed two years – both because I was sick. In fact I still have a pink HSP '91 cap and the autographed copy of NightWatch that Terry Dickinson signed for Deb and me. It's about two editions out of date now, but I can't part with it or the memories.

This year we're organizing a PAA group tour to HSP. Mark and I will be going for sure (separate tents, please – he snores). Plus I'm taking the BHO/PAA Planetarium along for a noon-hour show on Saturday. Accompanying this article is a list of the speakers and sponsors. Have a look. And if you want to join the fun, pick up an entry form from either myself or Mark. See you at HSP – July 27 (pre-registrants only) to Sunday morning when EfstonScience buys us all breakfast – thank you very much.

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.

Website
www.geocities.com/paa_ca

Email
Paa_ca@yahoo.com

Club Mailing Address

John Crossen
2254 County Road 507
Buckhorn, ON, Canada K0L 1J0

Meeting Notes

March 3, 2006

Friday March 3rd's PAA meeting was an observing session with Jaan Teng and Susan Phair hosting twelve of their fellow members at their home just to the south and east of Peterborough. Jaan and Susan live on 120 acres and their house is a good 700 feet in from the road. Considering its closeness to Peterborough, Jaan and Susan have a very nice site for dark skies. On arrival we were greeted by their dog, Sherlock, who acted as greeter and parking lot attendant and then shepherded us into their home.

The skies were especially fine as we viewed the Orion Nebula and Saturn through Jaan's 8" Schmidt, the PAA's 6" Dob, my 90mm MAK, and Harold Briggs' brand spanking new 5" MAK (how come I don't get stuff like that for Christmas, Santa?). We were also treated to a slide presentation on meteors put on by Jaan and Susan Phair's hospitality and hot coffee - which came in quite handy for those of us braving the cold night air to take in the astronomical sights.

We all agreed that Jaan and Susan have a wonderful home and a very nice dark sky site and we all look forward to returning for another observing session. Thanks Jaan and Susan.

Mark Coady
mark.coady@sympatico.ca

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

Sherlock Holmes and Dr. Watson go on a camping trip. After a good dinner and a bottle of wine, they retire for the night, and go to sleep.

Some hours later, Holmes wakes up and nudges his faithful friend. "Watson, look up at the sky and tell me what you see."

"I see millions and millions of stars, Holmes," replies Watson.

"And what do you deduce from that?"

Watson ponders for a minute.

"Well, astronomically, it tells me that there are millions of galaxies and potentially billions of planets. Astrologically, I observe that Saturn is in Leo. Horologically, I deduce that the time is approximately a quarter past three. Meteorologically, I suspect that we will have a beautiful day tomorrow. Theologically, I can see that God is all powerful, and that we are a small and insignificant part of the universe. What does it tell you, Holmes?"

Holmes is silent for a moment. "Watson, you idiot!" he says. "Someone has stolen our tent!"

! 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:

Shawna Miles
2192 Bass Lake Rd.
Bobcaygeon, ON
K0M 1A0

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

NEXT ISSUE'S DEADLINE IS
Apr. 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

March 31, 2006	**General Meeting—** Movie Night - "The Dream Is Alive" -Riverside Zoo
April 14, 2006	**General Meeting—** Dr. Graham Wilson - The Cosmos Comes To Visit - Riverside Zoo
April 28, 2006	**General Meeting—** Club Observing Night - To Be Announced

Moon Phases

First Quarter	**March 6, 2006**	**April 5, 2006**
Full Moon	**March 14, 2006**	**April 13, 2006**
Last Quarter	**March 22, 2006**	**April 21, 2006**
New Moon	**March 29, 2006**	**April 27, 2006**