PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR

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Editorial

January owes its name to the Roman god of gates and beginnings — Janus. He is often depicted with two faces, one looking forward to the future, and the other looking backward to the past. Janus stood at the threshold between the old and the new year.

Janus: The Roman god of beginnings

Looking back on 2001, it was an excellent year for the club. Over the past year, we had many noted speakers at our meetings. In May, club members went on a tour of the David Dunlop Observatory in Richmond Hill. November saw the revival of the club newsletter. In December, our web page ranked in the top 100 astronomy web pages peaking out at number 6!

On November 30th, we had our highest turnout at a meeting since I've been a member. Twenty-one people showed up to hear Rick Stankiewicz's talk entitled "Astronomy and Philately". Rick showed us how various countries, including Canada, honoured astronomy and space exploration on their stamps. I was surprised to find out that all stamps carry a date on them, although it may not be entirely obvious where it is. As with most information transfer - knowledge flows both ways. Rick was surprised to hear of a First Day Cover (see photo below) commemorating the 1972 eclipse in Nova Scotia that my mother has. In fact, it turns out that this might be a rare beast as I could find absolutely no information about it, on the net or anywhere's else. The photo on the envelope appears to be that of the 1970 eclipse (which was also visible from that location). Two eclipses in two years — not bad!

" ...you flew your Lear jet up to Nova Scotia To see the total eclipse of the sun"

— Carly Simon from "You're So Vain"

On December 14th several members braved our first major snow storm of the season to attend our "Star Trails" meeting. Members brought slides and photos of various astronomical objects taken over the years. Dave also brought pictures of the "old" club observatory. It was very interesting.

First Day Cover: Issued by Canada Post to commemorate the 1972 Total Eclipse in Antigonish, Nova Scotia. Photo courtesy of Carol Baetsen.

Inside This Issue

The new year brings with it an opportunity to think about future directions for our club. Our membership is up, which gives us opportunities to things we could not in the past. If you have any ideas, I encourage you to talk to Dave Duffus.

The new year also comes with it's own celestial delights and events. Here are some dates to mark on your calendar:

February 11-16: Winter Star Party, Florida. See *www.scas.org* for details.

February 20: The moon will occult Saturn.

February 22: Jupiter will be only 0.2 degrees (~ 1/2 a moon diameter) from the moon.

April 20: International Astronomy Day - Stay tuned to see how our club will celebrate this day.

May 4th: Mercury will be at it's best viewing for the year.

May 5: Texas Star Party. See *www.metronet.com/~tsp/* for details.

May 10: Venus and Mars will only be 0.3 degrees apart and should appear quite spectacular.

May 24-26: Riverside Telescope Makers Conference, California. See *www.rtmc-inc.org* for details.

August 8-11: Starfest, Mount Forest, ON. See *www.nyaa-starfest.com* for details.

August 9-10: Stellafane, Vermont. See *www.stellafane.com* for details.

September 26: Venus will be its brightest .

Hopefully there will be some unexpected events (i.e., comets, aurora etc.) this year as well.

Clear Skies

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Blackened Tube Telescope

Reprinted, with permission, from the March 1994 issue of the Hamilton Amateur Astronomer's newsletter "Event Horizon".

Did you know that a simple tube with the inside surface blackened, will boost your vision to almost the same as 50 mm binoculars? Of course there is no magnification, but it is low cost, lightweight, easy to use, and does not require any focusing. Also, the apochromatic, distortion free, diffraction limited optics are the best on Earth!

It works because the tube blocks the light from the other things you are not looking at. The light from all the other things, is often called stray light. If this stray light enters your eye, it makes it harder to make out dim objects. This happens because the stray light makes the area around the object brighter. We use this difference in brightness between the object and the area around it to see that something is there. So, the greater the difference in brightness, called contrast, the easier it is to see a dim object or star.

For you technical folk, the blackened tube telescope will increase your naked eye limit by about two magnitudes. So what are you waiting for, make one now! Hurry!

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On Groundhogs, May Poles and Turnips

What do Groundhog Day, May Day and Halloween all have in common? They are all cross-quarter days. Cross-quarter days are those days that are exactly half way between the equinox and solstice (or vise versa). There are four of them (the fourth one being Lammas). In old Germanic and Celtic traditions, the equinoxes and solstices marked the middle of the seasons. Resulting in the cross-quarter days marking their beginnings. Because of this, these days had great importance in these cultures.

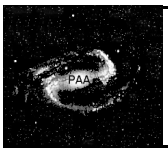
Groundhog Day (Feb 2):

The current name for this holiday is an Americanization of the old holiday called Candlemas. Candlemas is the feast day of Brìghde (or Bridget), the Celtic goddess of fire. In some countries it was believed that some type of burrowing animal, normally a hedgehog, would come out on Bridget's Day to judge the quality of the weather as per the following saying:

Candlemas is fair and clear
There'll be twa winters this year

This tradition came with the settlers to North America, but since no hedgehogs could be found, groundhogs were used instead. The above saying was re-written as:

If the groundhog sees his shadow we will have six more weeks of winter.



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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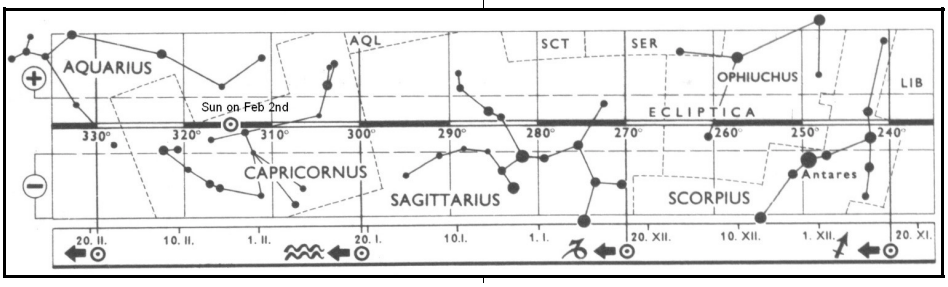
Groundhog Day is precisely half way between the Winter Solstice and the Vernal Equinox. It should be noted that, regardless of whether the groundhog sees his shadow or not, from a mathematical point of view, on Feb 2, there are *always* six weeks of winter left!



The location of the Sun on Groundhog Day

May Day (May 1):

May Day was originally called Beltane for the Celtic god Belenus. It is exactly half way between the vernal equinox and the summer solstice. It was a time of fun and games. In ancient times, lovers would sleep outdoors and celebrate the "great rite" (use your imagination) in the fields to ensure the fertility of the crops. The Druids and their successors raised the Beltane fires on hilltops throughout the British Isles on May Eve (the Celts began their daily cycle at sunset). In later times these fires were replaced with the maypole. Dances were (and still are) done around the maypole during the day. May Day came under severe attack by the Puritans who banned it by an act of Parliament in 1644. May Day did return with the restoration of Charles II in 1660, but the elements of sexual license and social reversal went underground. Since the Puritans frowned on May Day, it has never been celebrated with as much enthusiasm in North America.

Lammas (Aug 1):

This cross-quarter day has all but disappeared from the modern calendar. It occurs exactly half way between the summer solstice and the autumnal equinox. In Northern Europe, summer was considered to end at this time, as the days grow visibly shorter. The Celts honoured the god Lug (god of light) on Lughnassad. Eventually, this holiday became Christianized to become Lammas or the "Feast of the Loaf Mass". This is when early grain would be baked into loaves and offered at mass. A ceremonial highlight of this festival was the "Catherine Wheel" (St. Catherine's feast day was also on Aug 1st). A large wagon wheel was taken to the top of a near-by hill, covered with tar, set aflame, and ceremoniously rolled down the hill, symbolizing the end of summer. The flaming disk represented the sun god in his decline.

Halloween (Oct 31):

Today this is the best known of the cross-quarter days. The Celts celebrated Samhain (or summer's end) on this day. By summer's end they meant that it was the end of the warm part of the year (keep in mind that Europe's weather moderated by the gulf stream). Samhain occurs exactly half way between the autumnal equinox and the winter solstice. This was the Celtic New Year. The Celtic festival of Samhain was celebrated at the same time as Pomona, a Roman celebration of the harvest. After the Roman conquest of Britain in 43 AD, these two cultures began to merge and bobbing for apples (pommes) and harvests became part of the celebration. In 835 AD, the Catholic Church declared November 1st as All Saint's Day (or Hallowmas). The previous day then became known as All Hallows Eve (or Halloween).

In old Europe, the wealthier members of a community put together lavish Samhain feasts for their households. The poor would take on the collective identity of the community's dead, and go from door to door to receive offerings (treats) in the name of their ancestors. At each house they are given a portion of the food that has been set-aside for the dead. Not to hand out food for any reason was considered an act of impiety, and would invite retaliation in the form of property destruction (the trick). This was the origin of the trick or treat custom we see today. In order to see there way at night, people made lanterns from carved out turnips. During the potato famine in the 1840s, thousands Irish Catholics came to North America and brought this custom with them. Since pumpkins were more plentiful than turnips, it didn't take them long to start hollowing out Jack-O-Lanterns.

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New Photos from Comet Borrelly

An article by Usha Lee McFarling in the Toronto Star Sept. 30/01 (special to the Star from the Los Angeles Times) states that the images of comet Borrelly (about 220 million kilometers from Earth) taken by the NASA Deep Space 1 spacecraft, were the first close-up photos ever taken of a speeding comet and have changed a lot of what scientists thought about comets.

Laurence Soderblum led the team that captured the images and said, "comets are far more complex than we ever imagined." The new images contradict the belief that comets were "fairly homogeneous objects that generate uniform clouds of dust and gas."

"Borrelly's eight-kilometer core is far from uniform. It's an object of rugged terrain that includes two mountain peaks, smooth rolling plains and deep fractures.

The core, or nucleus is shaped like an upside-down bowling pin". Measurements show that "Comet Borrelly disrupted the solar wind in a completely unexpected manner. The nucleus of the comet did not do the disrupting; the solar wind was disrupted by charged particles that came from the comet but were only on one side of it." "It's as if a shock wave is not in front of a jet fighter but a mile off to the side," says David Young, a space physicist at the University of Michigan.

Also the nucleus is much darker in some places than others and scientists are not sure why the areas look so different. "The darker areas appear to be on the top of the peaks and are not just shadows," Soderblum adds. "The photos lend credence to the idea that comets are less like 'dirty snowballs' than 'snowy dirtballs'."

Comet Borrelly: The core displays a variety of terrains and surface textures. Mountains and fault structures, and darkened material are visible over the nucleus.

Donald Yeomans, an expert on comets at the Jet Propulsion Laboratory who was not directly involved with the mission, said "the inside of the comet is likely to be mainly ice, like a Baked Alaska dessert which is a frozen core surrounded by a crust of a different material." Also, "there is not one jet of gas coming from the comet, but jets spewing in several directions. The largest jet appears to be made up of at least three columns. And the jets spout from the smooth plains, which appear to be eroding as material spews off."

The following website shows the pictures taken by Deep Space 1.

http://nmp.jpl.nasa.gov/ds1/images.html

The following website has more info on the photos.

http://www.space.com/scienceastronomy/solarsystem/ds1_photos_010925.html

For more websites about this mission, go to *www.yahoo.com* and type in "photos" and "comet Borrelly" in the search box. This is called a Boolean search and limits the websites to those that only contain info about the photos and comet Borrelly.

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The Sky This Month

MERCURY:

Mercury will reach it's greatest eastern elongation (i.e., its furthest point east of the sun) on **January 11**. Any time around this date is a good time to catch the elusive planet in the western sky. Look for a lone white "star" in the S-SW, 30 to 40 minutes after sunset.

VENUS:

Venus is in the sun's glare, this month, and will not be visible.

MARS:

Mars is visible in the south in Pisces after dusk. Look for a 1st magnitude red "star".

JUPITER:

Jupiter will be in Gemini and appears far brighter than any star, including Sirius in the evening sky.

SATURN:

Saturn is in the constellation Taurus in the eastern evening sky. In a telescope, look for the large moon, Titan, which is near by.

URANUS & NEPTUNE:

Uranus and Neptune are in the sun's glare this month, and thus are not visible .

QUADRANTID METEOR SHOWER:

The Quadrantid meteor shower peaks on **January 3** at 1:00 pm. The radiant is located in Bootes. Unfortunately the moon rises about three hours before the radiant does, and will interfere with meteor viewing.

The shower takes it name from the obsolete constellation *Quadrans Muralis* "The Mural Quadrant", that was located between Bootes and Hercules.

Looking for Beauty in Heaven

All feelings or emotional reactions ultimately are tuned to sexual reproduction. "Intelligence" is a meta-emotion layer that supervises our animal feelings and promotes reproduction by *all* means. (Allows us to develop human clones, for example).

Our basic feelings are tuned to the appreciation of physical symmetries in a prospective sexual partner. This symmetry is connected to 'good' genes. (For example a person with a lopsided face is likely to be rejected as a lover.)

Intellectual "beauty" arises from our primitive sense of looking for symmetry. Thus our science looks for mathematical symmetries.

A = A

is more beautiful than

B = infinity squared x π.[χ] / 0

The form of our sciences and mathematics arise from our human perceptions. Mathematicians use equations for establishing equilibrium. Scientists search for super-symmetries. Any lopsided concept, we naturally feel, needs balancing.

Beauty is in the eye of the beholder—or is it! Which one do you find more appealing?

Our concept of time has a past and a future. Without a past we can't conceive a future and without a future we cannot have had a past. We see ourselves halfway between a Big Bang and a Big Crunch. Perhaps a more balanced picture is a 4 dimensional continuum where we sit as a 4-D co-ordinate amidst everything – both past and future. The time dimension, like the space dimensions has both a positive and a negative direction.

So, lets point our telescopes at Betelgeuse, which has a spatial distance of 500 light years. What we observe is Betelgeuse at about 1500AD. Christopher Columbus is just setting foot in America!!!

Next we swing our scope over to the Andromeda galaxy. (Approx 2.4 million light years away). What we see is how Andromeda was when our first hairy hunchback human ancestor stumbled across the grassy Serengeti plains in North Africa. Since Andromeda has been hurtling toward us at 75miles/sec (approx 1 AU/year), it is now actually 500 AU closer to us than where we think we see it.

According to conventional wisdom, a photon of light left Andromeda 2.4M light years ago and is now captured by our eye. The photon in its travel is actually a wavelike thing. So we can think of it as a wave propagating from Andromeda in a positive time direction, and arriving at a later date on Earth. It is thus called a Retarded wave. This is a very lopsided concept.

Feynman developed a theory which is much more beautiful. First, an atom in Andromeda emits a half-sized *retarded* wave, which travels forward in time at the speed of light. An atom in the retina of your eye recoils as it absorbs this photon 2.4 million years later, and then emits a half-sized *advanced* wave that goes *backwards* in time at the speed of light heading back to Andromeda. The timing of the emission and adsorption produces phase addition (negative time wave going backward adds to the original positive wave at all points), and it appears that a full wave has been absorbed by your retina.

When Maxwell originally derived his famous equations for electromagnetic radiation (such as light waves), there were two solutions --- one wave propagating forward and one wave going backward in time. Thus our concept now matches the beautiful symmetry of Maxwell's math. Doesn't that make you feel good?

Note: for more mind-mangling madness see Nick Herbert's *Faster Than Light* from whence I swiped most of the above ideas.

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Constellation of the Month: Orion the Hunter

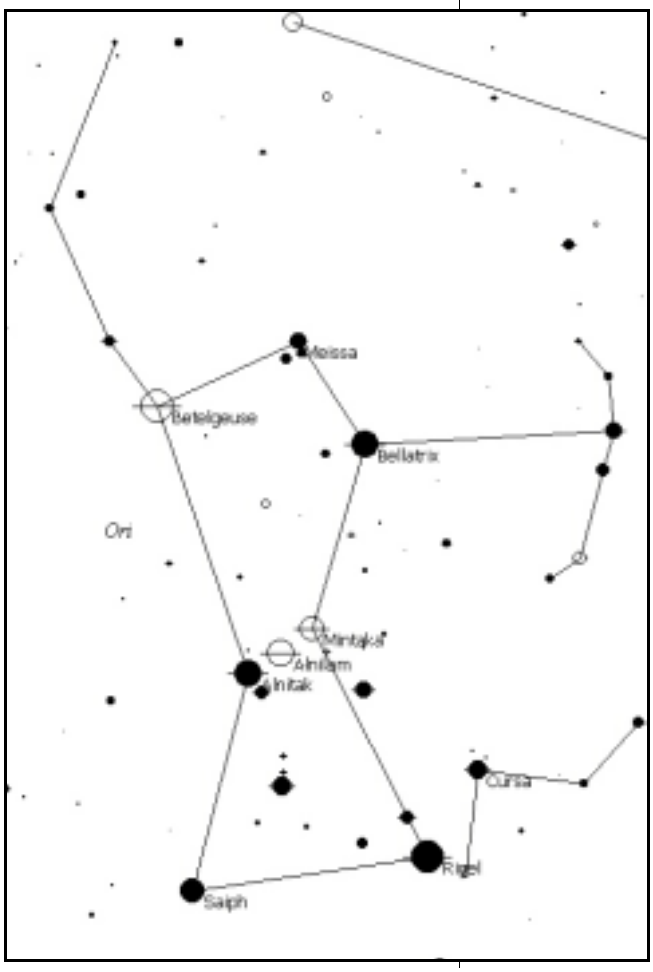
Eighty-eight constellations may grace the night sky, but sometimes I think there are only two that matter. In the summer, it's Sagittarius - home to numerous nebulae and star clusters. But once the short days are upon us and the snowflakes fly, nobody owns the heavens like Orion, the hunter.

Orion is a big guy, covering well over 20 degrees of sky. Put him in a police lineup and he's instantly recognized thanks to the three bright stars that signify his belt. So what's he wanted for? Carrying a concealed treasure. It's hidden in the handle of his sword - the magnificent Orion Nebula. But let's save that for last. Orion has a number of other identifying marks.

Perhaps best known is the bright star Betelgeuse. At magnitude 0.4, it is one of the brighter stars of the winter sky. Betelgeuse is classified as a Red supergiant. And I do mean supergiant. It would take our sun 1,000 times over to fill Betelgeuse's mammoth interior. Betelgeuse is also a very old star and sometime soon (in the next million or so years) it is expected to go supernova.

In Arabic Betelgeuse means armpit of the

mighty one. So whether it goes super nova or not, you probably wouldn't want to stand near to it.



At this time of year, Orion is about 40 degrees above the southern horizon at 9:00 pm. Three stars in a straight line form his belt. Four other stars form a box around them and signify Orion's limbs

Three bright stars define Orion's other limbs. Bellatrix marks Orion's left arm, while Rigel and Saiph are the kneecaps. But Orion's real treat lies below the belt, so to speak. There, shining in the handle of his sword is the gem of the winter sky - the Orion Nebula.

Easily visible to the naked eye, the Orion Nebula shines at a distance of 1,600 kilometers from Earth. Imagine our solar system's diameter (about 18 million km.) as a single link of chain. Now multiply it 20,000 times over and you have enough links to form a chain that spans the width of the Orion Nebula. Bigness just runs in Orion's family!

The Orion nebula is also known as M42 in the Messier Catalogue. That means that it is the 42nd object that French comet hunter Charles Messier listed in his now famous compendium of objects that were not comets. That list, compiled in 1801 towards the end of Messier's life, has gone on to become the observing bible of many backyard astronomers. So even though he is credited with discovering 14 comets, Messier is better known for his "not comets."

M42 is known as an emission nebula, meaning that the huge clouds of dust and gas that comprise the nebula are illuminated by interaction with the newborn stars that lie within it. Most obvious of those is the grouping of four known as The Trapezium. To see them you'll need a telescope at about 75 power.

Orion was born in ancient Greek mythology and is accompanied in his hunt by two dogs. Canis Major (the big dog) is quite obvious with Sirius, the Northern Hemisphere's brightest star (magnitude -1.4), as its eye. Much dimmer Procyon designates Orion's second canine companion, Canis Minor.

It is said that Orion met his demise thanks to a bite from Scorpius the scorpion. And, so that they would never meet again, the gods cast Orion into the winter sky and Scorpius into the summer night.

Orion also has a taste for women, which is why he is continually chasing The Seven Sisters of the Pleiades across the sky. But that's a tale for telling at another time.

THAT'S A MOUTHFUL

Betelgeuse - bet - el - jews
Bellatrix - bell-lay-trix
Rigel - rye-gel
Saiph - Saw-eef (also pronounced "safe")

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Archaic Star Name of the Month

In the 17th and 18th centuries I was known as **Cynosura,** otherwise known as the star of Arcadia, the earthly home of Callisto. The Anglo-Saxons of the 10th century called me **Scip-Steorra**. In Latin, I was often referred to as **Navigatoria**. The Chinese called me **Ta Ti** (the Great Imperial Ruler of Heaven). In Northern India, I was known as **Grahadhara** (the Pivot of the Heavens) – which star am I?

Answer next month

Measuring the Speed of Light—Part I

Introduction:

The measured value for the speed of light is 299,792,458 m/s, exactly. The measurement that I will likely arrive at will be an order of magnitude different from this modern value. So why bother trying to take on an experiment that will probably take six months to finish and result in a value that is unusable by modern standards? There are several reasons to do this experiment, but for me it was

because:

- It's a good project to keep me busy during the long and boring winter nights.
- The project involves observing Jupiter and it's moons, which are easily observable from the city (where I live) and during the winter.
- It's a great way to learn more about astronomy.
- It involves brushing up on some of my computer programming skills.

History

So what kind of genius mind would conceive of using Jupiter's moons to help him calculate the speed of Light? The man's name was Olaf Roemer (1644-1710). He observed the occultation of Jupiter's moons and the times at which they happened throughout the year. He noticed that the calculated period of occultation for Io, for instance, was not constant but seemed to increase when the Earth would get further away from Jupiter and decrease when the earth was closer to Jupiter. For example, If Roemer saw Io disappear behind Jupiter on Jan 1st at 10:00 and he knew the period of Io, he could calculate when the moon should disappear again on say, July 1st. From his calculations he would predict that Io would disappear behind Jupiter at 9:00. However, Observations showed that it took 20 minutes longer than his calculations. He deduced that this effect was due to the amount of time it takes for light to reach the Earth from Jupiter as observed from the closest and farthest distance (i.e. the diameter of Earth's orbit. Refer to Figure 1). He determined that the speed of light was 2 X 10^8 m/s. Not a bad measurement, considering it was done over 300 years ago with timepieces of the day!

The Experiment (Current Day)

I, unlike Roemer, have access to the internet, and various other magazines and books which can give me all the tables and times that I need so I'm not out every night trying to catch an occultation of one of Jupiter's moons.

I wrote a program where I could input the time and date that Io would disappear and it would calculate the predicted time it would disappear in the future. Since this program did not correct for the time of light travel, it should give different times from tables, which correct for this effect (Refer to Figure 2).

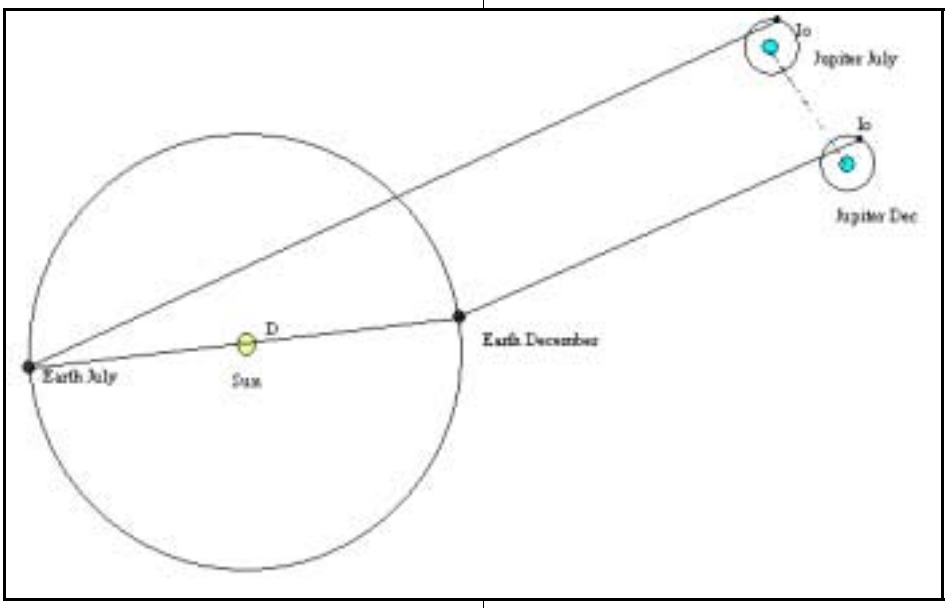

Figure 1 - The relative distances of the Earth and Jupiter

The next thing I did was consult the magazine, Sky and Telescope to determine when Io was going to disappear in Jupiter's shadow. Although this event happens every 1.7 days, it was a challenge to try and observe this. It was either too cloudy, or too late or the event happened during daylight hours. Also, you had to observe the event near opposition and conjunction, which occur in on January 1st and July 20th, respectively. However I found an occurrence on November 27th at 11:00 PM. This sounded about ideal for a person who's normal bedtime is about 10:30 PM (My wife is still amazed that I'm interested in a hobby that I can't stay awake for). In preparation, I dialed into the Internet and went to the American Atomic Time Clock site at *www.nist.time.gov* and synchronized my watch. I concluded that if my time was within a couple of seconds of ATC, this would be close enough because Sky and Telescope's times for Io were only to the minute. As the night approached it was obvious that the rain was not going to let up so I packed up for the night with hopes that another opportunity would present itself before the end of the year.

Several dates came and went, it was either too cloudy or the occultation was happening at 4 in the afternoon or 4 in the morning. It's seems like I couldn't catch a break! However, December 28th came and despite the 6 feet of snow that fell in Buffalo and parts of Ontario, Whitby happened to have partly cloudy skies. I again adjusted my wristwatch to the atomic time and got ready to start my observing. Sky and Telescope predicted that Io would disappear behind Jupiter at 6:57 PM EST. I brought my scope out to my deck about an hour earlier and waited for it to cool down in the chilly December night. With the almost full moon hovering very near Saturn, I set my sights once again on Jupiter's moon Io and an event that has happened countless times throughout time, but which I have never observed myself. As the time grew near I noticed that the wind or something else was causing my scope to vibrate quite severely. I quickly realized that it was my Shetland sheepdog bouncing tennis balls of the deck in hopes that I might throw one or two into our snow-filled

yard (My Sheltie's name, by the way, is Halley Sojourner, named after a comet and the Mars rover which "seeks out the truth"). So with my sheltie at my side, I witnessed the occultation of Io. Jupiter was low in the sky and it was fairly hard to judge the exact moment, but as Io disappeared, I estimated the time to be 6:56:19 P.M. In a world of multi-million dollar movies with their computer generated effects its hard to compare this with the relatively routine and uneventful occultation of Io but I wonder, was I the only one to witness this event at this time? The thought that Io disappeared exclusively for me was a nice one and seemed to lift my spirits for the rest of the night.

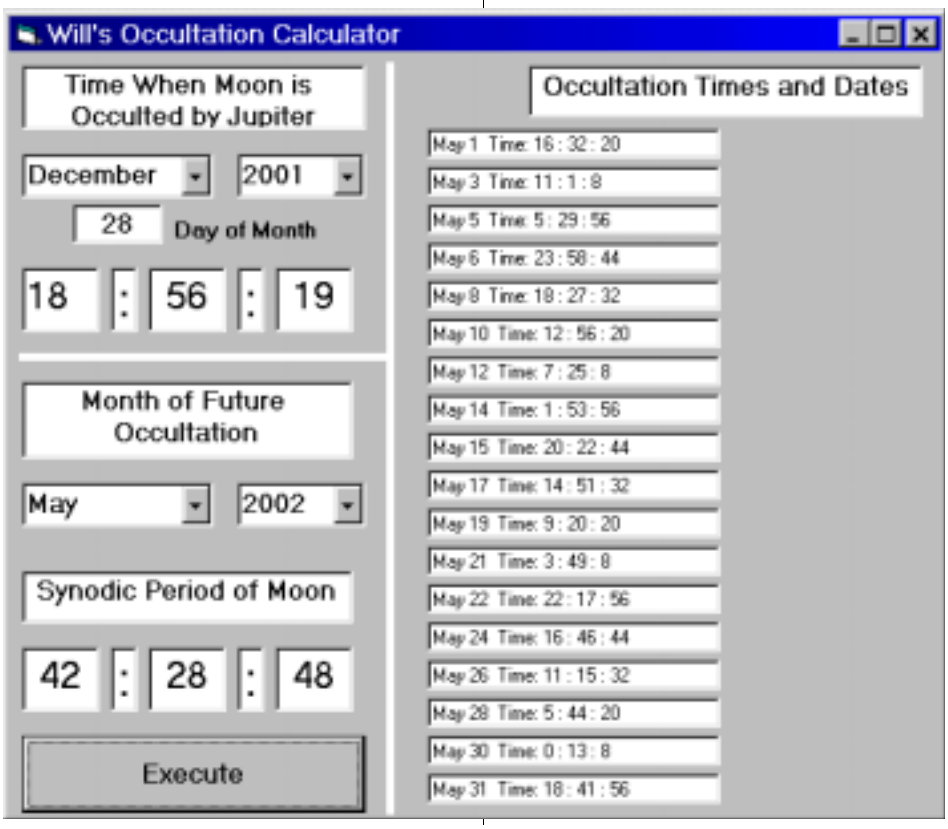

Figure 2 - Io Occultation disappearance calculated for May

Almost 3 hours later, I found myself back outside and witnessing Io's reappearance. It was much harder to estimate this event. Sky and Telescope predicts its reappearance at 9:17 P.M. EST but my estimate was 9:18:00 P.M. It was tricky because it would appear that you started to see Io peaking out behind Jupiter but then it would seem to disappear and you were left wondering whether you just imagined it.

Now I had the times that I needed so that I could predict the same events happening about six months from now when we here on Earth are on the other side of our orbit. Shortly after consulting the RASC Observer's Handbook, however, I discovered that from June to August of 2002 Jupiter would appear too close to the sun so observations at this time would be difficult if not impossible. My calculations would have to be for the month of May. When the data of my witnessed event was entered into the computer program several potential dates and times came up.

When a quick calculation is done for the speed of light using 60 minutes as an average time difference, we get:

c = distance/time
≈ 2 AU/ 60 minutes
= 2 (1.495978707x10^{11}) / 3600
= 1x10^{8} m/s

The 60 minute difference in time seems wrong to me (should be more like 20 minutes) so if anyone can verify my calculations and let me know where the errors are, I would appreciate it. The proof of my prediction will be seen some time in May…….

Stay tuned.

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Off the Beaten Path

This month as winter is upon us, observing times comes at a premium. To help maximize your observing sessions, I have prepared the following list of interesting and often overlooked objects to observe this month.

NGC1907 - This tiny smear of light is located south west of M38 in Auriga. It may seam uninteresting but it is a curious group of stars in contrast to M38.

IC405 - Called the "Flaming Star" nebula, it is a faint wispy emission nebula (read: use filters) that is powered by the unusual star AE-Aur. This star normally shines at 6th magnitude, but is capable of irregular and bizarre flares, hence dropping in brightness.

IC 405 in Auriga

NGC1931 - Known as the "Peanut Nebula", this peanut shaped emission nebula lies midway between M36 an Psi-Aur. In an 8" scope it looks like a double lobed patch of light.

NGC1535 - Located in one of the lesser observed constellations, Eridanus, it is one of the best planetary nebulae to observe their characteristic colors. This 9th magnitude object, unmistakably shows a strong bluish-green hue in almost any scope.

Eskimo Nebula – Taken by Charles Baetsen using the Cookbook 245 CCD camera

NGC2392 - Well known as the "Eskimo" nebula because of its mottled disk surrounding this planetary. It is located halfway between Kappa and Lambda - Gem, and is a pretty object in a 6" or larger scope.

NGC2371/72 - This is a somewhat larger planetary than M76 (the Little Dumbbell) in Perseus. This 13th magnitude object has a low surface brightness and appears like two half circles almost in contact with each other.

With any luck you will be able to find most of these objects on that next clear cold night. Be adventuresome and go off the beaten track. Enjoy the new scenery.

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The Sky Watcher 8” Dobsonian - Beginner's Luck for $599.

At last somebody got it right! Here's a first-time scope with a large enough aperture to resolve most globular clusters. A finder big enough to find actually something. A two-inch focus assembly - standard. And to top it off, this little rascal has decent optics and is easy to use.

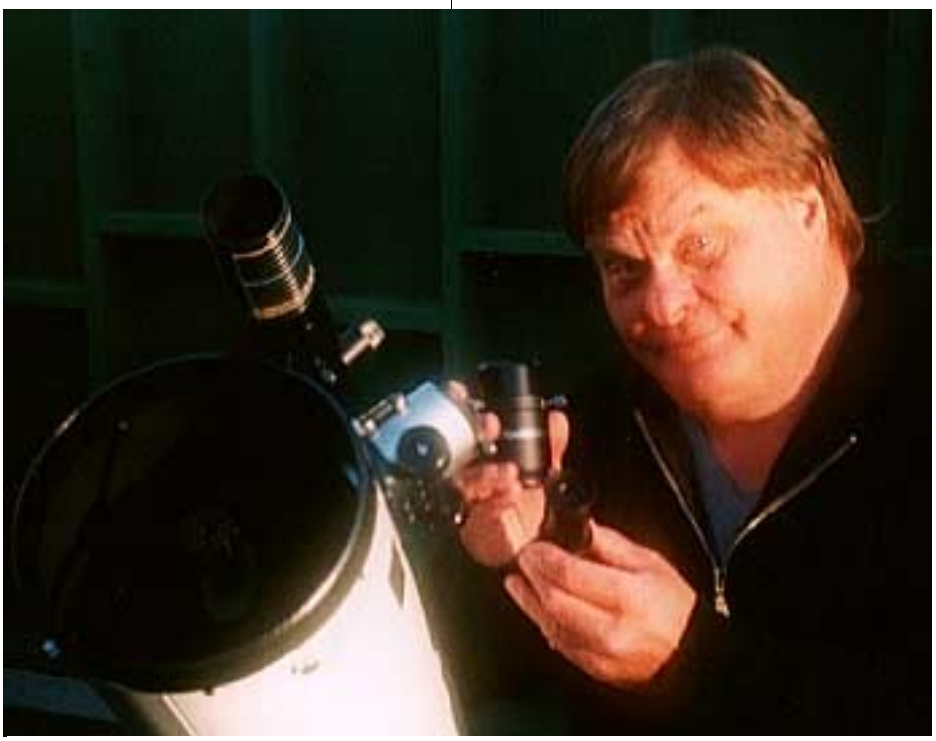
Assembly took about two hours and required nothing more than the two wrenches and screwdriver supplied by the manufacturer. The instructions were clear and concise and all the bits slipped together precisely and easily. In two hours I went from two cardboard cartons to a fully assembled telescope ready for first light. And that, too, came as a pleasant surprise.

Using the 10 mm eyepiece for 120X, the scope revealed Saturn's rings and the Cassini division crisply. Jupiter displayed four weather bands along with the four Jovian moons. The 25 mm eyepiece gen-

Sky-Watcher 8” at a glance

Specifications:

Brand - Sky-Watcher (8-inch Dobsonian style)
Aperture - 200 mm (8”)
Focal length - 1200 mm
Focal ratio - f5.9
Finder - 8x50 straight-through
Focus System - Crayford style, 1.25/2.00 inches
Eyepieces Included - 25 mm (48 power) & 10 mm (120 power)
Tube - metal, 10" diameter
Mirror Cell - 3-point adjustable
Secondary - 4-vane adjustable spider
List Price - $599.00 (taxes extra)
Dealer - Earth & Sky Adventure Shop Ltd. Ajax, Ontario



John At Scope With Eyepieces

The Spring on each side of the rocker box put enough downward pressure on the Teflon pads to hold the optical tube steady with most eyepieces

erated 48 power in this scope and showed the crab nebula quite distinctly. The

Switching from 2" to 1.25" eyepieces isn't a simple matter of dropping the 1.25"-adapter into the top of the 2-inch adapter. You have to swap one for the other.

lower power also did justice to the Pleiades and the Double Cluster. Upping the power to 120 again, I could resolve many of the stars in globular cluster M15. Later that night I took in the Orion Nebula for the first time this season. It was well worth waiting up for.

But the most surprising thing of all is that the scope was delivering this performance straight of this out of the box, no collimating required. Not having to go through a half-hour of mirror tweaking is nothing short of a blessing for someone who is using this as his or her first scope, or a as step up from a department store refractor.

The Sky Watcher arrives with two 1.25-inch eyepieces, a 10 mm and a 25 mm. Both are Modified Achromatic designs. The 25 mm eyepiece describes itself as a "Wide Angle", but that refers to its capabilities as a low-power (and therefore wide field of view) eyepiece, not the optical design. The 10 mm says "Long Eye Relief" on its barrel, but you'll have to press your eye up fairly close to enjoy the full field of view. Despite my quibbling with the marketing department's descriptive verbiage, both eyepieces performed well.

The scope also came with three other features I liked. The metal optical tube (cardboard just never cut it with me) lends a feeling of quality. Also, the tube is 10-inches in diameter to allow shorter cool down time when moving the scope from indoors to out. And finally, the unique spring system keeps the scope nicely balanced, even with hefty 2-inch eyepieces.

Love this little scope as I do, not everything with the Sky Watcher is perfect. The drawtube on the focus assembly is bigger than a 2-inch eyepiece. So there is a separate 2-inch adapter you have to use. Then when you want to switch to 1.25-inch eyepieces you have to remove the 2-inch adapter and put in the 1.25-inch adapter. I tried using the 1.25" inch adapter from another telescope's 2-inch

The Sky-Watcher is just the right height. Your eyepiece swings through an arc that allows you to remain comfortably seated when viewing most celestial objects

diagonal in the Sky Watcher's 2-inch adapter. It fit, but due to the height of the 2-inch adapter's barrel, none of my 1.25-inch eyepiece would come to focus. Considering the Sky-Watcher's outstanding value and quality, that's a very minor annoyance.

My only question? Where was this scope when I was tearing up my fingers tying to tighten down the nasty little screws on that wobbly 60 mm peashooter I got for Christmas 13 years ago?

John Crossen
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Eclipse or Conjunction?

On December 30, 2001, North America was treated to a lunar eclipse. It was not the usual "Umbral" kind, when the moon enters the earth's inner shadow (umbra) and we are shown a darkening and colour change to the lunar disk. Rather, this eclipse was the "Penumbral" kind, when the moon is only covered by the outer shadow (penumbra) of the earth. What this meant for those of us in the northern part of the continent was that we would not likely see any appreciable change to the moon, even during the eclipse maximum (at 5:30 AM).

Eclipse/Conjunction of December 30, 2001. Photo taken by Rick Stankiewicz

However, the added bonus was to be a nicely placed conjunction of Jupiter next to the moon at the same time as the eclipse. With this promise in mind, I got up in the wee hours of December 30th to check on the eclipse and the conjunction. Murphy's Law held true once again—almost! A thin veil of clouds had started to creep in from the west and this threatened to wipe out the whole event. The full moon did manage to shine through the cloud, but there was no way to tell that there was any sort of eclipse happening. In fact the clouds only helped make it impossible to get a decent photograph of the lunar disk. The moon was very disappointing!

The surprise was that Jupiter was shining so bright it actually shone through the clouds! Jupiter was like a diamond in the sky and only about 1½ degrees from the full moon. It was really a sight to behold and to photograph. Jupiter was only 2 days from "opposition" as it sat next to the moon low in the western sky. Now this was worth getting up for! I had just gotten a new digital camera for Christmas, so I thought I would try and record the events as described. You can judge whether this was an eclipse or a conjunction. The attached image says it all!

Rick Stankiewicz
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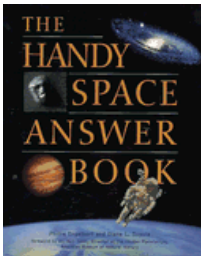
Book Review:



The Handy Space Answer Book, by Phillis Englebert & Diane L. Dupuis, 1998, Visible Ink Press, Detroit, MI., 576 pp. (~ $24.00 CDN)

As the name implies, this book is "handy". Even though with the Internet, the world can be your resource. If you are looking for an off the shelf reference and interesting reading, this book is definitely the one. I actually picked up this book in a bargain bin at an Indigo Bookstore a year ago. I only paid $10.00 for it and of course I do not regret it.

I have found this book to be a layperson's encyclopedia to commonly asked questions about space. The format is not like the average encyclopedia though. It is structured more like "questions and answers". This makes for interesting reading when you want to run through a chapter to learn about a particular subject area. The nine chapters cover subjects like, Galaxies and Stars, Our Solar System, Observation Facilities, and Humans In Space. I found that if the topic you were interested in does not jump out at you, the index will come in handy to narrow the search. Even basic questions like, "What are the planets in our solar system?" is answered in a paragraph, but there is also references made to the search for both the mysterious Vulcan (between Mercury and the Sun) and Planet X (beyond Pluto).

I found there was just the right number of black and white photos scattered throughout the book to satisfy my curiosity. Now I know what the 17th century Danish astronomer Olaus Roemer looked like.

There are even a few interesting sidebars slipped in for good measure like, "Why was the world's first space walker almost assassinated?" I will not tell you the whole story, but lets just say that Alexei Leonov was mistaken for Soviet President Leonid Brezhnev.

Any inquisitive mind that has an interest in space will find this book worthwhile reading and a handy reference. I suspect it will not only answer your questions, but also raise a few questions you may not have thought of. I would recommend this book for any astronomical library

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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:

Charles Baetsen
244 Ridgewood Rd.
Peterborough, ON
K9J 8A3

or via e-mail at:
va3ngc@rac.ca

NEXT MONTH'S DEADLINE IS

Feb 4th, 2002

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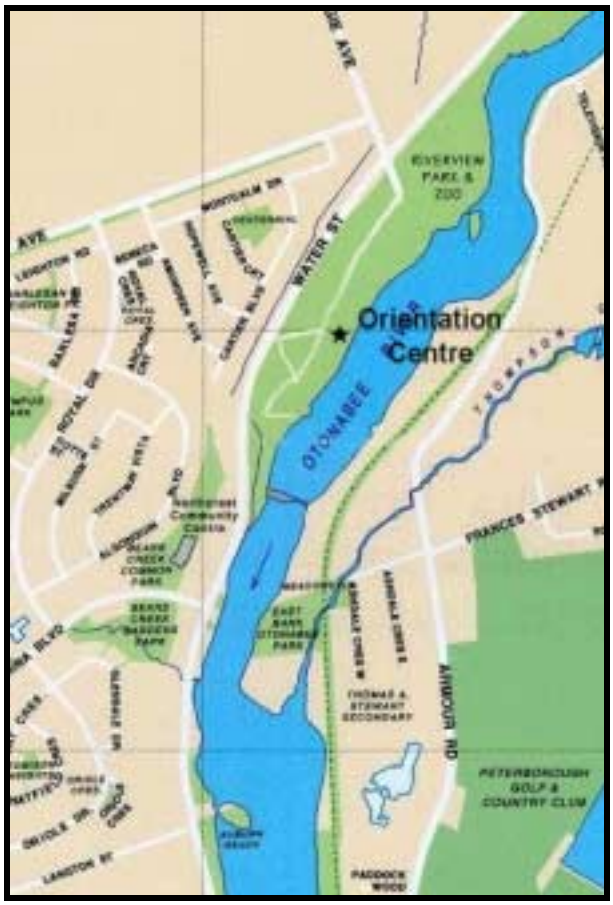
MEETINGS

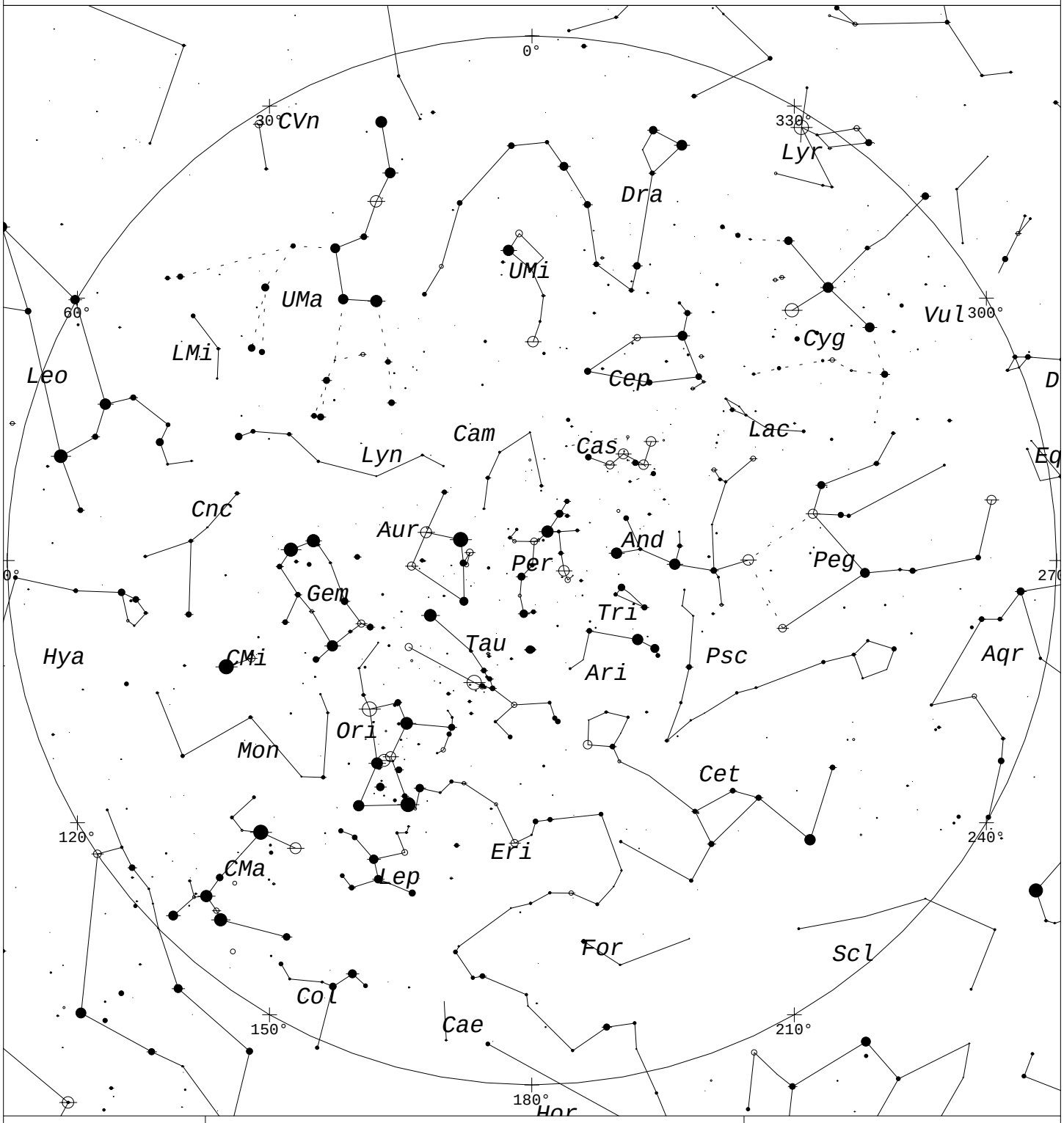
The Peterborough Astronomical Association meets every second Friday at the Peterborough **Zoo Orientation Centre** (Next to the PUC Water Treatment Plant) at **7:30 pm**.



CALENDAR OF EVENTS

January 3, 2002	**Quadrantid Meteor Shower** — Peaks at 1 pm. The radiant is located in Bootes
January 5, 2002	**Last Quarter (☾)**
January 11, 2002, 7:30 pm	**General Meeting** — Diane Patterson
January 13, 2002	**New Moon (●)**
January 21, 2002	**First Quarter (☽)**
January 25, 2002, 7:30 pm	**General Meeting** — Greg Haynes will be demonstrating astronomical software
January 21, 2002	**Full Moon (○)**
February 8, 2002, 7:30 pm	**General Meeting** — Tony Wallace: A Winter Camper's Secrets for Cold Weather Observing

January Skies



STARS			SYMBOLS		
<1	3.5		Multiple star	Dark nebula	Radio source
1.5	4		Variable star	Globular cluster	X-ray source
2	4.5		Comet	Open cluster	Other object
2.5	>5		Galaxy	Planetary nebula	
3			Bright nebula	Quasar	

Local Time: 21:00:00 1-Jan-2002 UTC: 02:00:00 2-Jan-2002 Sidereal Time: 03:46:09

Location: 43° 39' 0" N 75° 0' 0" W RA: 3h46m10s Dec: +43° 38' Field: 182.0° Julian Day: 2452276.5833