

### Editorial

The end of the year will soon be here. Looking back, I would say that except for October and November, we had a fair amount of good observing nights this year. Lets hope we will have even a better one, next year.

There is a lot of activity happening in the club these days. John Crossen has arranged for more speakers to come to our meetings in the next few months. He has lined up for the upcoming months, our own Rene Bowe, and John Hicks, Canada's premier solar observer and photographer. John also hopes to have speak Jim Kendrick of Kendrick Dew Removal fame, and Tom Kovacs of the Haliburton Observatory for this winter.



The club's new 5 mW green laser pointer for pointing out objects in the night sky.

The club has also purchased a 5 mW green laser pointer that is bright enough to point out stars and constellations, even on the driest of Ontario nights. We will be using this pointer at our "beginner's nights" and "public observing nights" to help "newbies" to the hobby get to know their way around the night sky. We will

be demonstrating this new piece of technology at the December 13th meeting. We will also be asking members for a donation to help offset the cost (~\$250.00) so please be generous as we all benefit by helping others learn the sky.

The RASC Calendars and Observer's Handbooks have arrived. If you have not picked yours up at the December 13th meeting, and you need them before Christmas please email me or give me a call at 905.983.8143 and I will try and arrange to get them to you. Failing that I will bring any unclaimed stuff to the January 10th meeting.

Clear Skies,

Charles W. Baetsen  
va3ngc@rac.ca

### Astrophotographer Gord Rife Entertains and Instructs with Some Superb Slides.

Having known Gord for the last 15 years, and always admired his astrophotos; it seemed only natural to invite him to a club meeting for a



Gord Rife speaking at the November 15th meeting

presentation of his work. Gord is very much a hands on guy, though he does admit to owning an ST-4 autoguider. He sees the telescope as an extension of his camera - just a whacking big telephoto lens. So, he builds his telescopes to optimize the 35 mm film format. And that includes grinding and polishing the mirrors.

The workhorse of his astrophoto gear

### Inside This Issue

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armada is an 8-inch F7 Newtonian. Gord also built the 4-inch Newtonian guide scope, which he aims not by moving the scope, but by tweaking the primary mirror. It's a trick he learned from Peter Cerevolo, and after all, the star images in the guide scope don't have to be perfect. Rounding out the collection of scopes that simultaneously ride on his Losmandy G-11 mount is a beautiful little 70 mm Celestron Fluorite.

Gord took us through about ten years worth of his work, beginning with some simple piggyback and tripod shots, then culminating in some excellent through-the-scope shots. He also talked about computer enhancements and re-photographing prints onto slide film. Something none of us knew was that slide film doesn't absorb blue light very well. So, if you're taking pictures of reflection nebula, like the Trifid - print film is the only way to go. Then convert it to slide afterwards.

Gord also amazed us with a shots of the Lagoon and Orion Nebulae that he had composed from five or six different shots made by other astro-photographers with different optical systems. This allowed him to blend the images so that the amount of detail across the entire photo was maximized. Aren't computers amazing!!!

Gord's advice to young astro-snappers? Start with some simple tripod stuff, then move up to piggybacking. Save the long lenses and shooting through the scope for later - when you've learned all the basics (or in other words, made all the mistakes).

Gord has just finished work on a 12.5 inch scope which he will use purely for observing. Given his penchant for perfection, I'll bet the primary is about one zillionth wave. He just loves to knock off those \$10,000 Astro Physics APO's with his homemade basement scopes. Our thanks to Gord Rife for an enjoyable and instructive evening.

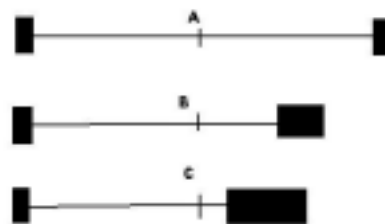
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## Balancing Your Telescope

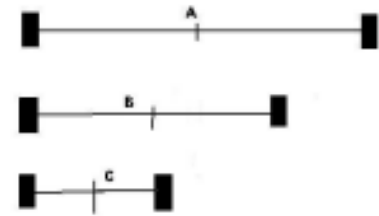
Observing through your telescope will be much more enjoyable if the telescope and equatorial mount are in perfect balance. This means that the telescope will remain pointed in whatever direction without having to lock the polar and/or declination axes. You can then guide your telescope with a simple nudge with your finger allowing you more time for actual observing with much less frustration. This balance will also make your electric drive work better and reduce wear and tear on it. We will be discussing balancing primarily for fork mounted Cassegrain type telescopes but the same principles apply to German style equatorial mounts used for refractors and Newtonians.

We will separate the parts to be balanced into the **fork** shown in Figure 3, and the **telescope** which includes everything else such as telescope tube, finder, eyepieces, cameras, and declination axis etc. The concept of center of mass can be understood by looking at Figures 1 and 2. In both figures the center of mass is at the points marked A, B, and C.

If you were to support the two masses at the center of mass then they would be in balance for any orientation of the two masses. Note that there need not be any actual mass at the center of mass.



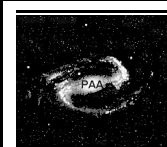
**Figure 1: One can keep the centre of mass at A, B, C fixed by increasing the mass on the right and moving it toward the left mass for all three cases above**



**Figure 2: One can also move the centre of mass at A, B, C by keeping both masses the same but moving them toward or away from each other. For equal masses the centre of mass is at the midpoint between them.**

The symmetry of an object makes it easier to determine the location of the center of mass of it. For example, a baseball bat has axial symmetry, which means that if you were to hold the bat vertically by the handle and then rotate the bat about a vertical axis through it then the bat still looks the same. In this case the center of mass must lie at some point on the axis of symmetry and closer to the bottom end which is where most of the mass of the bat is.

Similarly if both arms of the fork mount are identical in mass and distance to the polar axis as in Figure 3 below then its center of mass must also be at some point on the polar axis, which is the axis of



**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](http://www.geocities.com/paa_ca)

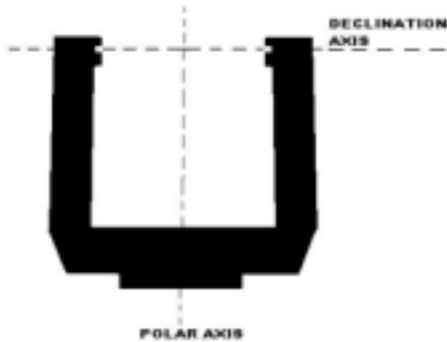
### Email

[paa\\_ca@yahoo.com](mailto:paa_ca@yahoo.com)

### Club Mailing Address

c/o Dave Duffus  
7 Riverview Hts.  
Peterborough, ON, Canada K9J1A9

symmetry. The fork will then be in balance for any rotation about the polar axis.



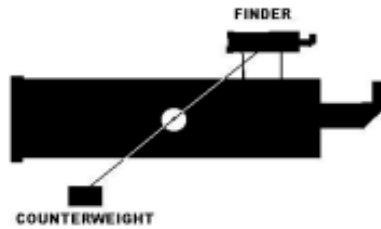
**Figure 3: The fork mount shaded in black is symmetric about the dotted vertical polar axis and so the centre of mass of the fork will be at some point on the polar axis**

It would be easier to balance your telescope if you could remove the tube from the fork and check the balance of the fork first.

Telescope tubes and declination axes are cylinders and have axial symmetry. Unfortunately, finders, star diagonals, cameras and camera mounts destroy this axial symmetry and so the center of mass is no longer on the declination axis. The more difficult task is to then balance the telescope tube itself along with accessories so its center of mass will be on the declination axis as shown in Figure 4 below. The tube will then be in balance for any rotation about the declination axis. When the center of mass of the tube and declination axis is also on the polar axis there can be no torque by any of the movable mass about either axis.

For example if the finder is near the eyepiece but offset from the center of the tube then you will need to add a counterweight to the tube near the other end and with a similar offset on the opposite side of the tube as shown in Figure 4.

Flexibility in adding weights to telescope tubes in the appropriate places has been a neglected area by manufacturers. Some



**Figure 4: To balance the Finder about the declination axis (shown as the white circle), a counterweight must be added below the telescope so that the centre of mass of the finder and counter weight lies on the declination axis**

ingenuity on your part may be needed to remedy this problem. In any case trial and error with counterweights using the principles above should produce a balanced scope and mount.

Balancing a telescope on a German style equatorial mount is usually simpler because weights can be added to the tube and declination axis without having to worry about their possible collision with the polar axis of the telescope.

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## Undercover in Durham

*...if you should choose to accept this mission and you are discovered, the PAA will disavow any knowledge...this tape will self-destruct—if not properly stored.*

I think it was Sun Tzu, or was it Yoda who said; “*know your enemy?*” Anyway, with this thought in mind I attended a meeting of the Durham Region Astronomical Association, which meets once a month in Oshawa. I felt like Indiana Jones hiding in the cult temple when the leader says, “there is an infidel among us!” Actually, their equivalent was a handshake and a guest list you needed to fill out - but you get my point!

I arrived at the local school where the meetings are held and immediately noticed a lack of stuffed animals (flashback to the Peterborough Zoo site where we hold our meetings). I was missing these cute, furry critters but soon ran into Charles Baetsen (who is neither cute nor furry - OK he's a little bit furry) and I no longer felt like a stranger in a strange land. Another thing that struck me was the numbers that were attending the meeting. There were at least 40 people there, and later we learned that the membership of the group was approximately 100. Who says that there is no one interested in astronomy in Durham Region? I also learnt that their observing site (DRAACO), which is approximately at Hwy 115/35 and Taunton Road is also fairly active. I am told that you will usually find someone observing there on any clear night.



**Dr. Peter Martin**

As it turns out, Charles and I picked a very good night to attend as they had as a guest speaker, Dr. Peter Martin of the Canadian Institute for Theoretical Astrophysics, who was lecturing about his work on the International Galactic Plane Survey. Dr. Martin was a very interesting speaker with a good sense of humour which kept what could be a dry subject, interesting.

As the lecture came to an end, I thought about Charles' wise words, which were “You'll know it's a good astronomy club if they go out for a beer afterwards”. Maybe these words aren't in the same league as Sun Tzu's, but if you know Charles, then you know that most of his sentences have the words “astronomy” or “beer” in them! The meeting was adjourned and there was an announcement that people would be going for drinks at the local watering hole. Charles and myself decided that

further research on this club was needed and that we would join them (the sacrifices we make for the PAA!). As we drank our draft and ate our chicken wings (hot - of course) we began to know the members of the DRAA. I was very impressed with the commitment to their fledgling club (which is about a year and a half old) and their enthusiasm. This is a club that I feel will continue for many years. After a few hours of talking astronomy and a belly full of chicken wings, it was time to say goodbye.

If you ever have a chance to check out another astronomy club, I highly recommend it. If nothing else, it will make you appreciate what your own club has to offer.

Will Juodvalkis  
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*As the Roman's used to say "Fab Est Ab Hoste Docere" or "Never adverse to learn from Foe" -ed.*

## The Sky This Month

### MERCURY:

Mercury will be visible in the evening sky for much of this month.

### VENUS:

Venus is now climbing high in the morning sky. This is an excellent time to catch it if you can wake up before the sun.

### MARS:

Mars will be visible this month in the early morning hours, not too far from Venus.

### JUPITER:

Jupiter will be in Leo and appears as the brightest object at night. It will be visible in the late evening hours.

### SATURN:

Saturn will be visible near the Taurus-

Gemini boundary, not far away from the Crab Nebula (M1). The rings are well oriented for viewing the Cassini Division

### URANUS & NEPTUNE:

Uranus and Neptune are not visible this month

### PLUTO:

Pluto will not be visible this month.

### METEOR SHOWERS:

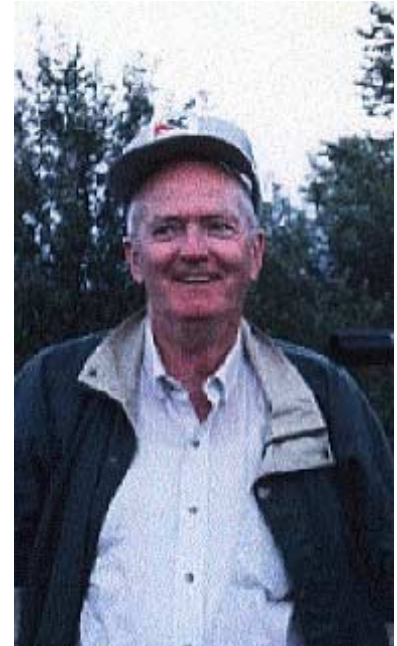
Geminids: Peak on December 14 at 10:00 UT. This is a fantastic shower that is often overlooked because it occurs when the weather is very cold. It actually out-performs the more famous Perseid shower in August.

There are several minor meteor showers this month. For details on these see <http://comets.amsmeteors.org/meteors/calendar.html>.

## Meet PAA Members Don and Carol MacDonald.

While visiting Don and Carol to pick up some pictures of their observatory for another article in this issue of *The Reflector*, it occurred to me that it would also be a good time to put together the first in a series of brief verbal sketches of our members. The following is what was conveyed over chicken sandwiches, coffee and a few dozen chocolate cookies. By virtue of happenstance, Don and Carol have the dubious honour of being the first to be interviewed. But you could be next. Yikes!

The MacDonalds live on 79 acres of rolling, forested land near Hastings, a few miles east of Keene. They first purchased the property in 1991, and the following year began building their home. Ten years, and about 15,000 seedlings later, their dream home is



**Don MacDonald**

complete, though they're still working on the property. Don plants about 500 new seedlings each year (none near the observatory). He also is building a series of hiking trails through the property. Currently he has about 2.5 miles completed.

While Don is looking up at the stars, Carol is examining planet Earth. She enjoys learning about the different types of trees and plants that grow on their property and is also an avid birder. Carol is a retired teacher, but her inquiring mind just keeps on learning. Don, too, is retired, but his woodworking skills and 'round-the-property chores, combined with his interest in astronomy keep him well occupied.

Don has always been fascinated by astronomy, and according to Carol, he read every astronomy book in the high school library. But it wasn't until 1984 that Don first bought a telescope.

Today Don has a tidy little roll off roof observatory, built around an 11-inch Celestron Goto scope. While Don learned his way around the night sky years ago, he says it's great to be able to just go out, flip a switch and look at things instead of fumbling around finding them. The Goto also eliminates the back bending, squint-

ing and gymnastics involved in telescope aiming.

This is the second observatory Don has built. The first was at his previous home. Don says an observatory is a big help in keeping warm during winter observing. The walls cut down on the wind chill and that keeps you at the eyepiece longer. Having your gear all set up and ready to go also takes a lot of the hassle out of observing and gets you out on those marginal nights when it just wouldn't be worth all the work.

Don also owns a Meade 102 mm ED refractor, which is his "portable scope." Perhaps you enjoyed a look through it at the PAA Observing Run last August. Don has it mounted on a nice little Televue equatorial mount. According to Don, the two work well with each other.

Don became a member of the PAA in 2001 and is a regular at meetings. He and Carol are happy to welcome members out for a night's observing at the observatory. By the way, if you're interested in buying his old (non-Goto) C-11, it's up for sale.

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## Poet's Corner

*I met a man he saw dark patches  
in the Milky Way, like  
dappled shade on a sunny day.  
Where other people saw  
jewels in the night, he saw dark-  
ness in the day. This  
is a man who thought his own  
way.*

- Will Juodvalkis



## Off the Beaten Path

Well, winter is almost here, and with the weather we had for the last month there is no guessing that it is about to arrive. With almost an entire two months of cloudy nights, I bet all of you are suffering from cabin fever. When the good weather arrives again (albeit cold weather), you can try your hand at the following list of easily located objects visible this month.

**NGC 1555** - Located around T-Tauri, this faint and small patch of nebulosity requires both aperture and high magnification to spot. This is *Hind's Variable Nebula*, whose variability is associated with the famous variable, T-Tauri.



**NGC 1647 in Taurus**

**NGC 1647** - This rich but spread out group of some 52 stars is located in the middle of the bull's forehead. This cluster is more obviously a cluster in binoculars or a finder than it in the main scope.

**NGC 1817** - Bright, rich, about 120 stars at 165X. Many dim members "fill in" this cluster. NGC 1817 and NGC 1807 are in the same field of view at 100X, these two clusters are not condensed and form a *Poor Man's Double Cluster* in the same wide angle field of view.

**NGC 650 and NGC 651 (collectively M76)** - Bright, pretty large, elongated,



**M76 in Perseus**

this planetary nebula located in Perseus, and is the dimmest Messier object. It is often called the *Barbell* or *Little Dumbbell* because of its' resemblance to M 27 in Vulpecula. In an 8" it shows the dual structure that made William Herschel assigned it two numbers.

**NGC 1513** - Also located in Perseus, this bright, large, rich and somewhat compressed cluster includes a nice arc of pretty bright stars on the North side. The bizarre thing about this cluster is that it is shaped like a horseshoe.



**NGC 157 in Cetus**

**NGC 157** - This bright, large galaxy, Located in the constellation of Cetus, is easy to find in an 8" scope. This galaxy shows some mottling in moments of good seeing. NGC 157 is located roughly one third of the way between Iota and η-Cet.

**NGC 246** - Is a very nice planetary to break up all these galaxies and clusters. It

is bright, large and round with several dark areas that combine to look like this is a doughnut someone took a bite from (something that typically happens after many an observing session). An O-III or UHC filter makes this effect more noticeable.

Charles W. Baetsen  
va3ngc@rac.ca

## PAA Members Enjoy Dark Sky And Hot Coffee At Macdonald Observatory

Well, actually it was PAA member Don MacDonald's observatory. You see instead of the usual Friday night club meeting on October 18<sup>th</sup>, Don hosted a group of us at his observatory East of Keene. The night was crisp and clear, and the observatory's location has nothing to the south but trees and Lake Ontario.

Don's observatory features a traditional roll-off roof, which he pushes manually to open and close. Inside the neat-looking structure there's room for about eight people to snuggle around the



**The Inner Sanctum—housing a computerized Celestron C-11**

Celestron 11-inch goto scope. It was a pleasure to watch Don punch in the numbers, then wait for the big scope to silently swing around to the chosen object. No bending and stooping required. Also no grunts, groans or creaking joints. As the night progressed, we did most of the usual fall Messier objects and had a good look at Saturn, though it was low in the

eastern sky.

In addition to Don's scope, Colin Cross brought along his new 10-inch Dob (congratulations, Colin) and John Crossen arrived with a pair of 11x80 binoculars on a tripod. Lyn Jackson produced a star chart and continued connecting the dots to form the basic constellations. Lyn's come a long way. Perhaps it won't be long before it's time for a closer look. Other members who joined the observing run included Gary Gauthier, Jaan Teng, George Bryant and Dave Duffus .

By about 10:30 the clouds began to roll in. Seeing as how most of us had been out since 7:30 we were all ready for hot coffee and doughnuts. So we adjourned to the house where Don's wife, Carol, had very kindly prepared a table-filled with pots of coffee and platters of wonderfully sugary stuff. Great for rebuilding the old energy supply!

Many thanks Carol and Don. Let's do it again this summer. That great southern view with Sagittarius must be marvelous.

John Crossen  
JohnCstargazer@aol.com

## Amazing Space

### Power play - NASA style



The space shuttle's main engines produce a remarkable amount of thrust. They also produce some amazing numbers. For instance, each engine can lift 375,000 pounds and outrun a speeding bullet.

Take that Superman! The engines consume fuel that's colder than interstellar space, yet their exhaust is as hot as a small star. And last, but definitely not least, when the three



**Don MacDonald's Roll-off Roof Observatory**

engines are all firing together they unleash as much power as 23 Hoover dams.

### Probing Jupiter.



**Galileo Space Probe**

The mini-probe which was fired from the Galileo spacecraft into Jupiter on December 7, 1995 hit the top clouds traveling at 170,000 km/h. Within two minutes it had slowed to 160 km/h. It's camera took pictures to a depth of 160 km beneath the clouds. As the probe journeyed deeper into the gas giant's interior it encountered winds of 483 km/h. Eventually the probe was vaporized by Jupiter's atmosphere at a temperature of 1,870 degrees Celsius.

During its terminal decent the probe relayed a fountain of information back to astronomers. For instance, Jupiter's radiation belt produces the strongest radio waves in the solar system. Lightening only occurs on Jupiter about one tenth as often as it does on Earth. But the biggest surprise was the fact that the probe detected no water in any form. Of course, this was only a sampling from a single area on the mammoth planet.

### The Pleiades - an Australian tale.

While we associate this naked-eye open cluster with the story of the seven sisters and Orion in hot pursuit, the aboriginal people of have a slightly different tale to tell. As in the northern hemisphere, the seven stars represent a group of women. However, it is the Moon (known as Kulu) who is in their pursuit. Two lizard men (Wti-kutjara) came to their rescue

and killed Kulu with their boomerangs. As the blood drained from Kulu's face, he turned white and rose into the sky to become our Moon. The lizard men became the constellation Gemini and the women became the Pleiades. If there's a lesson here, it's "*don't go chasin' women.*"



While we're talking about the Pleiades, ever noticed the stars on the grille of a Subaru? Next time, look a little closer. They, too, represent the Pleiades, though all seven of the sisters didn't make the cut.

### Mutiny in orbit.



**Skylab**

The third Skylab crew were the only astronauts to refuse orders from mission control. It was all part of a psychological experiment to discover the effects prolonged space travel in a tightly confined space might have on future crews. At one point members of the crew actually refused to carry out their duties until a new schedule was negotiated with Mission Control. Mind you, Mission Control was intentionally being overly demanding on the crew.

John Crossen  
JohnCstargazer@aol.com

## Classifieds

### For Sale:



**Meade 1.25" 90° diagonal** for Schmidt-Cassegrain Telescopes . Asking \$55.

Contact: Charles Baetsen  
Phone: 905-983-8143  
E-mail: va3ngc@rac.ca

### For Sale:



**8" Dobsonian Telescope** for sale. The primary mirror is an 8" f/4.66 mirror with special coatings on it (Cr + Al + SiO). This mirror was made custom for me by

Moonward Optics. The f/4.66 mirror gives this telescope a short (portable) size of 37". Also comes with Rigel Quik Finder for easy aiming of the scope. Asking \$500.

Contact: Will Juodvalkis  
Phone: 905-839-1151 x6767  
E-mail: juodvalkis@opg.com

### For Sale:

**6-inch Newtonian Telescope** for sale. If you're ready to buy that first scope, here's a good one which I've had a look through it myself. It's has only been used a few times. The scope comes with a German equatorial mount, eyepieces, red dot finder and some astronomy books. The asking price is \$800.

If you're interested in more details call  
Contact: Frank or Leslie at:  
Phone: 707-454-2385  
E-mail: lschmohl@sympatico.ca

## ARTICLES

**S**ubmissions 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  
4094 Squair Rd  
Orono, ON  
L0B 1M0

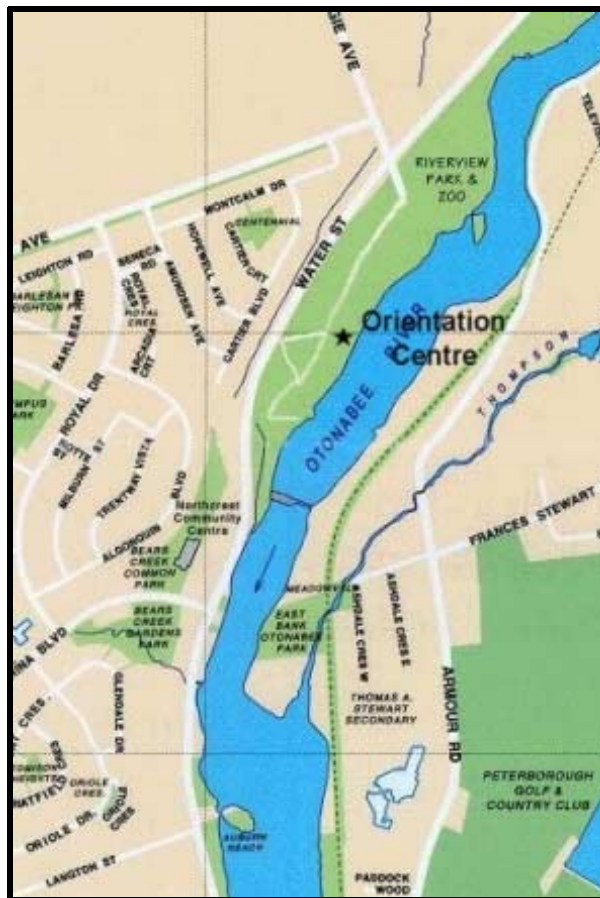
or via e-mail at:  
va3ngc@rac.ca

**NEXT ISSUE'S  
DEADLINE IS  
Jan. 6th, 2002**



## MEETINGS

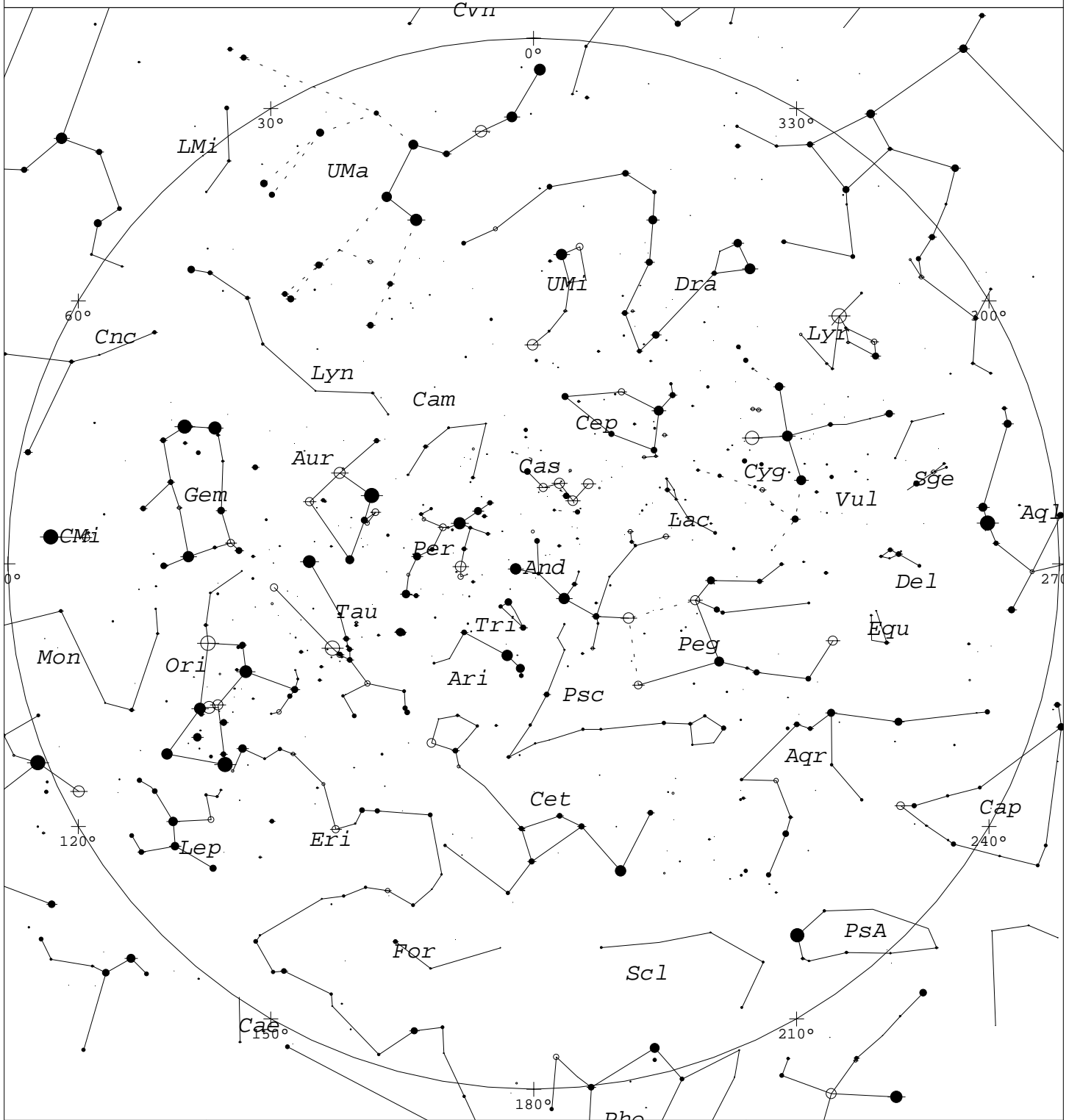
The Peterborough Astronomical Association meets every second Friday at the Peterborough **Zoo Orientation Centre** (Next to the PUC Water Treatment Plant) at **7:30 pm**.



## 1 CALENDAR OF EVENTS 1

December 4, 2002	New Moon (●)
December 11, 2002	First Quarter (☾)
December 13, 2002	General Meeting — Members Night.
December 14, 2002	Geminid Meteor Shower Peaks.
December 19, 2002	Full Moon (○)
December 26, 2002	Last Quarter (☾)
January 10, 2003	<b>General Meeting</b> — Rene Bowe—Building a 10” Reflector Telescope. Weather permitting we will have an observing session afterward at Armour Hill

# December Skies



STARS		SYMBOLS	
● <1	• 3.5	● Multiple star	⊠ Dark nebula
● 1.5	• 4	○ Variable star	⊕ Globular cluster
● 2	• 4.5	☄ Comet	⊙ Open cluster
● 2.5	• >5	○ Galaxy	○ Planetary nebula
• 3		□ Bright nebula	⊗ Quasar
			△ Radio source
			⊗ X-ray source
			○ Other object

Local Time: 21:00:00 1-Dec-2002  
 Location: 43° 39' 0" N 75° 0' 0" W

UTC: 02:00:00 2-Dec-2002  
 RA: 1h42m59s Dec: +43° 38' Field: 182.0°

Sidereal Time: 01:42:58  
 Julian Day: 2452610.5833