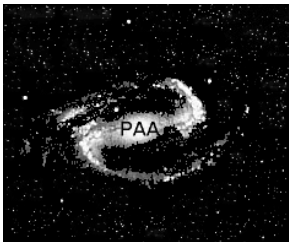
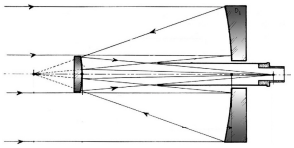


PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR



Volume 1, Issue 2 December 2001

Editorial

Winter is now upon us. With that we can look forward to longer nights. Unfortunately, although there is more time to spend on our favorite hobby, the lower temperatures usually mean we spend less time at the eyepiece. Fortunately, you can curl up in a chair with some hot chocolate and this month's Reflector as we have some really great articles this month. Thanks to all who have helped make this possible.

This past month was an active one for our members. On November 18th we were treated to the best Leonid display since 1966. From my vantage point, the storm was quite amazing from the country side near Millbrook. In terms of hourly rate, I would say that there was about 1 every 1-3 seconds. After 5:00, we sometimes saw 3 to 5 meteors appearing simultaneously. A few even appeared to explode in the sky (like flash bulbs going off), leaving nice ion trails that lasted a minute or so. I managed to get a few photograph's of the meteors, but they do not do them justice. We sure lucked out on this one. Think about it - there was a peak predicted for our part of the world, it was on the weekend, the sky was clear (almost an impossibility in November), there even was ground fog in low lying areas that cut the light pollution down quite a bit as the observatory is on a hill. Totally amazing!! To top it off my-father-in-law spotted a day time meteor around 8:30 that morning, unfortunately I was looking in the wrong direction. Judging from the brightness of some of them, this seams feasible. See a summary of member's reports inside.

In other news, PAA pamphlets have now been distributed to the library and a few local shops in town such as "Time Warp" on Charlotte Street. It seems there are some people taking an interest in the club as shown by the number of pamphlets disappearing from these places. We are also trying to consistently place ads in "Peterborough This Week" to announce our meetings and make the public aware that we exist. Hopefully, these activities will result in an increase in membership.

the club, and some from outside. So far this year we had Brian Colville, Peter Ceravolo, Alan Ward and John Crossen speak at our meetings. Last month at the November 2nd meeting, Jaan Teng treated us all to an exceptional talk. Jaan managed to keep us enthralled as he spoke about the Airy disk and it's ultimate connection to the universe via quantum physics. It just goes to show what hidden talent we have in this club of ours. After the meeting at his place, we were treated to spectacular views of

A Leonid as it flies between Orion and Saturn on the morning of November 18th.

If you haven't been attending meetings, you don't know what you've been missing. Every month we will try and have a new speaker, some from within

Inside This Issue

the moon and planets through some of his equipment.

Last month, I spent some time updating the web page (www.geocities.com/paa_ca). I encourage you to check it out. We now have some new sections available from the main page. I have even managed to post a few "old" newletters from the early days of the club. If you have any old newletters, please give me a copy and I will scan and post them for posterity.

With that said, I am looking for articles for next month's Reflector. It can be anything related to astronomy, such as observing techniques, experiences, upcoming events - celestial or social, projects, astro-photo's, reviews or whatever you fancy.

Clear Skies,

Charles Baetsen
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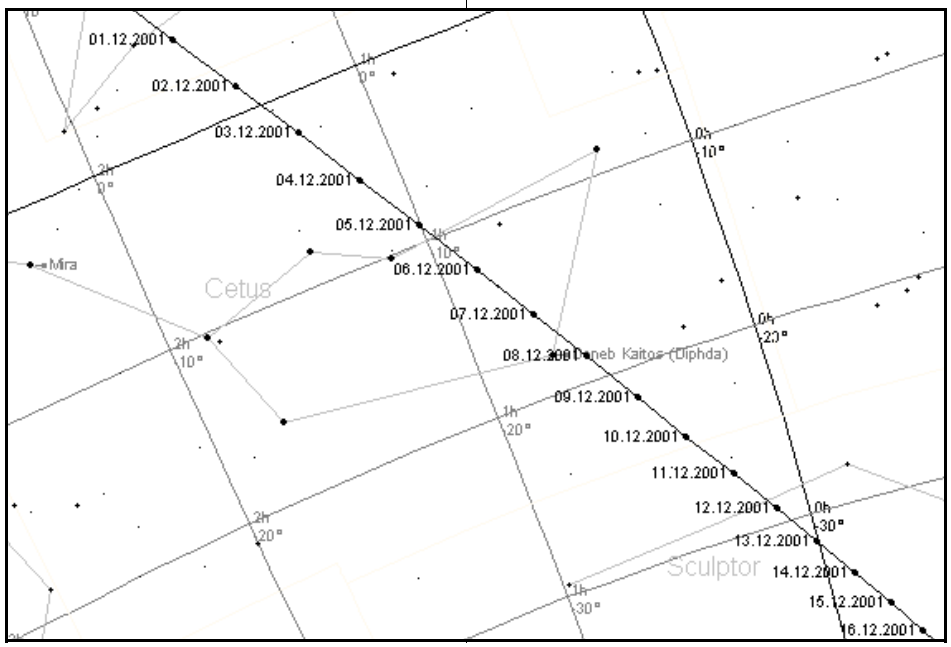
Comet LINEAR (C/2000 WM1)

From late November to mid December, you should be able to see a comet quite easily with binoculars in the south sky. Another Comet LINEAR is due to be visible in the northern hemisphere and should be best around early December as it leaves the constellation Pisces and heads south through Cetus. I say, another Comet LINEAR, because since the Lincoln Near Earth Asteroid Research program started in 1997, their robotic telescope has found an average of a dozen new comets every year. Most do not get as close or bright as C/2000 WM1 is predicted to get. If we are fortunate to get moonless clear skies during the first half of December, we could be in for a treat of a comet that will brighten to magnitude 4.5. This is no Comet Hale-Bopp, but is about as bright as most of the naked eye stars that make up the star cluster of Pleiades. This should be easily visible with binoculars of any size and obviously any telescope, but the real question is how visible it will be to the unaided eye? A tail should be present, but how impressive is another question. Comets can be very unpredictable at the best of times. If there is a tail it will be pointing away from the head (nucleus) of the comet in a northeast direction. This is predictable due to the fact that the tail always points away from the sun.



Finder Chart for Comet LINEAR C/2000 WM1
Chart Courtesy of Gregorio Drayer (gdrayer.tripod.com)

The attached finder chart shows where to look low in the southern sky around 8 p.m. The comet will appear to have moved a degree or so closer toward the horizon every night. After about December 18th it will be too close to the horizon to see, as it starts to slip in to the southern hemisphere.

So, bundle up and get out there on any clear night over the next few weeks and look south to see if you can spot Comet LINEAR C/2000 WM1. No doubt I will be.

Rick Stankiewicz
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Night of Fire

Events of great magnitude always seem to generate the "Where Were You When Syndrome". The aurora of November 5th was no exception.

Unlike the aurora of the previous weekend, which was muted by a blanket of Buckhorn haze and rain, the

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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performance of November 5th snapped and crackled across crisp, clear skies.

I had just finished giving an astronomy talk at the Kawartha Field Naturalist's meeting in Fenelon Falls and we were setting up my 4-inch refractor in the darkened lot behind the church where the club meets. Everyone had trained their binoculars on The Pleiades while I was homing in on Saturn with the scope. Then one of the club members mentioned the clouds rolling in from the North. Amid the resultant chorus of disappointed groans someone shouted that there was something funny about these clouds. Within minutes the gray-green haze began to dance. Then one, two and three red shafts shot towards the zenith. Thus began one of the more

Call it deja view: the cast of the October 28th, 2000 aurora also included The Pleiades, Saturn, Jupiter and Taurus.

spectacular aurora displays of the year.

It isn't often that Saturn and its rings play second fiddle to anything else in the night sky. But as the red, white and green spikes of light arched overhead, it was perfectly clear who was the "star" attraction.

As I drove back to Buckhorn the aurora continued its show despite the sky-bleaching effect of the rising moon. I could see Jupiter, Saturn, The Pleiades and Taurus clearly through the aurora's pulsing beams. That's when I realized that it was just a year ago that I was treated to nearly the same show. October 28, 2000 presented not only a great aurora, but the planets and constellations in nearly the same positions. As the accompanying photograph shows, I was at home, armed with a camera and tripod.

So where were you during the great aurora of November 5th? Hopefully not cushion cruising in front of the zombie box.

John Crossen

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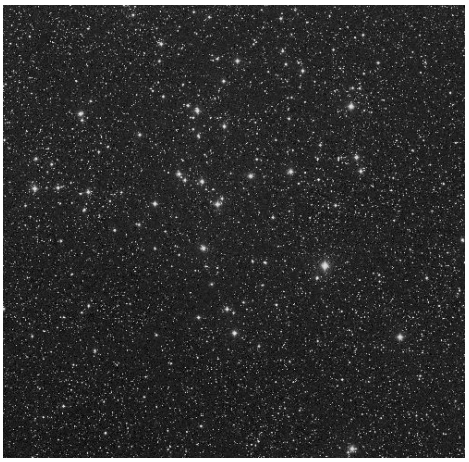
Off the Beaten Path

With the arrival of winter, comes an opportunity to view a richer part of the heavens this month. Although not as spectacular as the summer skies, the winter skies are stunning nevertheless. The winter Milky Way is embedded with many often overlooked treasures which make it worth your while to brave the cold. In fact the first two of this month's "overlooked" are actually binocular objects.



Stock 2: The Muscle Man Cluster

Stock 2 - Otherwise known as the "Muscle Man" cluster. It is located a couple or few degrees north of the Double Cluster, near the Cassiopeia-Perseus border. In contrast to the Double Cluster this is a large, fairly circular cluster, which appears somewhat dense in binoculars, although not through a telescope. Stock 2 clearly resembles a stick figure flexing its biceps, hence the nickname of the Muscle Man Cluster. It is an ideal binocular open cluster at 20x.

NGC 2174 with M35 nearby

NGC 2174 - This is an overlooked nebula just south M35 in Gemini. NGC 2174 is best viewed in binoculars from a dark site. Large 20x80 binoculars show the object as a faint smudge surrounding an 8th magnitude star.

NCG 188 - Located near Polaris, it is one of the oldest open clusters in the galaxy. In a 6" or 8" scope it appears as a hazy cloud with an integrated magnitude of 8.1. Using averted vision and sufficient magnification, it appears as a rich cluster of stars.

NGC 2336 - This spiral galaxy located in Camelopardalis, appears somewhat elongated in small telescopes. It too is located near Polaris.

M 76 - This is commonly known as the "Little Dumbbell", because of its resemblance to M27 in Vulpecula. This is one of the faintest Messier objects and hence is often overlooked. Located in Perseus, it looks more like a dog biscuit than a dumbbell.

NGC 1245 - A beautiful open cluster containing over a 100 stars. Visually it appears to have nebulosity surrounding it. However, this is an optical illusion, caused by a background of fainter stars superimposed on the brighter ones.

NCG 1528 -This magnitude 6.5 open cluster is located on the galactic equator in the northern part of Perseus. This is a fine object in both binoculars and small scopes.

If you are tired of the same old stuff, take a walk on the wild side and wander off the beaten path.

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The Sky This Month

VENUS and MERCURY:

Venus and Mercury will be too close to the sun this month and will not be visible.

MARS:

Mars is visible in the south in the constellation Aquarius after dusk, but has faded to become a mildly interesting object.

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. It should look impressive throughout December, outshining Capella and nearby Aldebaran. The size of the planet and the tilt of its rings are nearly at their maximum, so spend some time with a telescope studying and sketching it. Look for the large moon Titan which is close by.

URANUS & NEPTUNE:

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

GEMINID METEOR SHOWER:

The Geminid meteor shower will peak on **December 13** at 11:00 pm. This is quite a good shower to look out for, being comparable to the Persieds in the summer.

Catching A Comet?

Is it possible to catch a piece of a comet? It is - if you use film. I refer of course to photographing these frozen travelers from our outer solar system. When we are lucky enough to see one of these astronomical wonders in the night sky some people would like to photograph the event for posterity sake.

It is easier than you may think. You don't need CCD cameras and big telescopes to do the job, but they sure are a nice way to go.

With some basic equipment you can try and capture an image of a comet yourself. Start with a tripod, camera that can take time exposures and some "fast" film. The camera needs to be able to keep the shutter open for several minutes so many newer automatic cameras will not work for this application. The film I prefer is 800 ASA Konica Centuria. It works well for recording dim objects and performs well for many applications in astrophotography.

Just setup your camera with the longest lens you have (135 mm or 200 mm), open up the aperture (f/2.8 or whatever) as wide as you can and centre the comet or at least the area of the sky where it is supposed to be. Focus on infinity and keep the shutter open as long as you want. Start at 30 seconds and work your way up to 5 minutes. It is totally experimental, but worth a try. This technique will result in star (comet) "trails". The comet will be the fuzzy streak in the image. If a comet is a particularly bright one, like Hale-Bopp was, then you can use a wide-angle lens with great affect. Potentially a 30 second exposure can produce a picture with no star trailing and a comet that shows up nicely even with a tail!

If you are fortunate enough to own a telescope that has a motor drive (to track

Comet Hale-Bopp

the movement of the stars), then all you need is a means to attach your camera to the scope. These things are called "piggyback mounts" and do a nice job of following the heavens so that the stars in the background of your image are round points of light and the comet will be a fuzzy ball (hopefully with a tail) that stands out in your picture. Being able to track a comet for several minutes is a great way to register an image. I have used to technique with some success this past July when Comet LINEAR 2001 A2 was visible at magnitude 4.4 in the constellation Pegasus. A camera with a 135 mm lens mounted on a little motor driven telescope and tracking open for 4

minutes registered a distinct fuzzy head of the comet in a nice star field. If you are lucky it may even register as a slightly different colour too.

Any way, no matter what you decide to do or how you decide to do it, have fun! Look out for a Comet LINEAR C/2000 WM1 coming to a southern sky near you in early December. Try and get a piece of the action!

Rick Stankiewicz
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Leonid Reports

Here is a sampling of member's reports after the Leonid "Storm" of November 18th , 2001.

I was over the hill to the north (of Millbrook). I am sure I heard the Baetsen gang at times when there were good displays? The coyotes were really active too. At various times there were different packs "talking" to each other (from one woodlot to another).

I was out in the area at 1:00 a.m. and the meteors had started then. I can honestly say that the peak was between 4 and 6. It was just as some of the experts had predicted. It was not a "storm", but a really nice "shower"! Unfortunately, I was in a lower spot for the first part of the evening. I noticed the wind picked up around 2:00 and a foggy mist rolled in around 4:00. I was trying to run 3 cameras, then things started to fog up. I moved to higher ground and that bought me sometime. Some of those fireballs were something! I won't know for a few days what I captured on film, but I tried a lot of time exposures.

- Rick Stankiewicz

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An average observing night under the stars will reveal about a half dozen meteors. But last night (well this morning) we were treated to a total of 1,300 meteors in just a little over an hour. Deb, myself and local cottager/ astronomy buff Gord Simson arranged ourselves so that each of us was observing a specific 1/3 segment of the sky. At the peak of the shower - about 5:20 a.m. - the count reached 100 in a three minute period. We actually had trouble keeping up the count during some of the bursts. Most of the meteors were just quick little streakers, but about a dozen treated us to bright bursts with smoking tails. One actually lit up the ground around us.

If you saw the shower you witnessed a once in a lifetime celestial display. And if you missed it...well shame on you.

- John & Deb Crossen

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I got up around 4:00 and went outside around 4:45 to 5:30 but because I am in the city I only saw 1 about every 5 minutes. That was pretty disappointing, but at least I saw more meteors that night than I have ever seen.

- Lyn Jackson

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I set my alarm and got up at around 4 am. From my back yard in West End Peterborough I also saw a very good rate of meteors. There appeared to be a lot of ambient light in the Peterborough sky and I think it was due to a lot of moisture starting to develop. When I got up again after 8 am, it was quite foggy. The sky directly overhead was fairly dark, fortunately, and that is how I was able to see that the meteor shower was quite active. Well worth getting up to see it.

- Bill Hopkins

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Astro Humour

You Know You're an Astronomer When…

- you set your alarm clock for PM instead of AM—intentionally!
- you know there are actually 14 constellations in the Zodiac, and Moonchild is not one of them!
- you can identify a lone star when the sky is 99% overcast.
- you name your pet dogs "Phobos" and "Deimos", and feed them ALPO
- you have fully multicoated contact lenses
- you've been solar observing with your Dobsonian and only half of your face is sunburned
- you plan your family vacations around the new moon
- your dome light in your car is tinted red
- you tell your friends next morning that your red eyes are from partying rather than stargazing
- you know which moon resembles the Death Star
- you wear sunglasses all day to preserve your night vision

A Ring of Time

I love timepieces! I have six watches that work and about a dozen that are in various stages of disarray. However, I recently picked up two timepieces that have no crystals, springs or sprockets but manage to keep track of the time by using the sun as well as the stars.

My wife is an avid gardener and is always picking up the Lee Valley

catalogue to see what she can buy next. One day while I was stuffing the catalogue under the couch cushions to hide it from my wife, I noticed two very cool pieces of what can only be described as art.

Regardless of all the variables, if you have two sundials in the same location, then they will display the same time. That, if nothing else, is reassuring.

The first one is a large ring that would have caused even Bilbo Baggins to toss his "Precious" into The Cracks of Doom. It has a dial where you set the month, and

This thing all things devours:
Birds, beasts, trees, flowers
Gnaws iron, bites steel;
Grinds hard stones to meal;
Slays king, ruins town,
And beats high mountain down.

— Riddle about Time. from "The Hobbit" by J.R.R. Tolkien

writing on the inside where you observe what time it is. Basically you hold the ring by its chain and face it towards the sun. The sun shines through a small hole in the ring and a ray of light illuminates the time of day for you. I still marvel at the ingenuity of the people who came up with this method more than 2000 years ago (i.e. the sundial). Also, engraved inside the ring are the great words of wisdom, "Carpe Diem". If you used this device on a ship maybe you could loosely translate this as "Seize the Fish", but for the rest of us of course it means, "Seize the Day".

"There was no "before" the beginning of our universe, because once upon a time there was no time."

— John D. Barrow

That's great for daytime, but what do you do if you're out observing and you have to be home in time to do some grave robbing? The Nocturnal dial might be the thing for you. You look through a hole in the pendant and sight Polaris through the central hole. Align the pointer with the two stars at the end of the scoop of the Big Dipper and voila, you're home in time for breakfast, a few gold rings richer!

It is clear that even a clock will not give you the true reading of time for your location, because the same time is used within a 15° longitudinal area.

These pendants are not for everyone, but if you can appreciate a classic timepiece that's as much a piece of art as it is a piece of history, then they may be for you.

Will Juodvalkis
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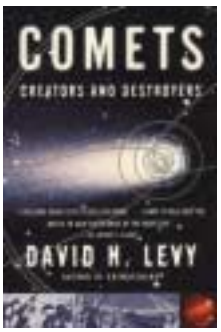
Book Review:



Comets: Creators and Destroyers, by David H. Levy, 1998, Touchstone, New York, N.Y., 256 pp. ($17.00 CDN)

I picked up this book within the last year and found it to be a great primer for any one interested in comets. As you would expect from one of the preeminent comet discoverers of the last century, the author is well versed on the subject. Having discovered at least 21 comets and authored nineteen books and numerous articles, Levy is more than qualified to write on this topic.

Levy takes the reader from the origins of comets in the Oort Cloud region through human history to modern times. This includes the impact of Comet Shoemaker-Levy 9 on Jupiter in 1994. This book is written with the layperson in mind. It never gets bogged down with technical terms or jargon. Comets: creators and destroyers leaves you with the impression that Levy is a real "down to earth" person, unlike the subject of the book. I liked reading about his personal experiences of discovering comets.

The author explores various theories around the role of comets as being vehicles that bring life to other worlds, including our own (life creators). At the other end of the spectrum he discusses the role that comets can play in changing worlds, as we know them (life destroyers). He adds to the awe inspiring, fear and beauty of these "ghostly apparitions".

I found the book not only interesting but also entertaining. He starts each chapter with an appropriate quote from well known literary sources like Yeats, Tennyson or Shakespeare. This really

The Bayeux Tapestry: "These people marvel at the star" (i.e., Comet Halley) in 1066 just before the Battle of Hastings.

illustrated peoples' historic fascination with comets.

I found this book informative, easy to read and well worth the money. It is just possible that if you keep your eyes peeled, you may pick up a copy in the bargain bin at Chapters for half the list price as I did. I recommend getting a copy and reading it before Comet LINEAR C/2000 WM1 arrives. You will appreciate your experience all that much more.

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Summer Viewing

It was the best part of summer for viewing. The first cut of hay was removed form the field, the night air was more stable, and on that particular night the viewing was perfect. This was to be the perfect night for the 12.5" reflector's first serious exposure to starlight. The 80 mm refractor which gave me that breathtaking first view of Saturn was now mounted on the 15-inch tube of the Dobsonian as the finder scope. The hay field offered an excellent clear view of the sky with slight loss of about 5 degrees of the northern horizon. The south was tantalising clear, except for the occasional airliner blinking its way through the 'Teapot'. The transporting and set-up of the scope in the dark had been quick and simple. Focusing in on the Milky Way through the 32 mm lens was simply startling. Slowly wandering through the night sky was mesmerising until I forgot that I was on a stepladder. The disruption afforded my companion an opportunity to quickly take-over the scope and have a quick look.

Armed with my newly acquired book titled "The Messier Album" by John Mallas and Evered Kreimer and Wil Tirion's "Sky Atlas 2000.0-Field Edition", which I had spent extra monies to have covered in moisture proof plastic, we were ready to explore the heavens. After a short discussion and consultation with "The Messier Album", we decided that it would only be fitting that from somewhere in our Galaxy, the Milky Way, we would look at M31 the galaxy in Andromeda. Checking the Sky & Telescope's handy monthly sky chart, and as if it might not be correct, we would confirm Right Ascension and Declination with map number four of Wil Tirion's Sky Atlas 2000.0, which the stars and objects are in white on a black background. After several minutes of holding and rotating 'chart 4' to vary parts of the sky, whilst trying to see with a small red lens flashlight, and not wanting to admit our confusion, we decided that the Sky & Telescope chart was quicker.

It is hard to believe that it has been over twenty odd years ago since we first set up the old blue cannon in the hay field. Many things have changed and some have not. Guide scopes are image corrected to charts and the sky. Illuminated projected bulls-eye finders make spotting viewing targets easier. Computerised Schmidt-Cassegrain telescopes with Global Positioning Systems that align themselves with a touch of a button have been available for years now. The updated version of Wil Tirion's Sky Atlas is still available The Messier Album I haven't seen for some time. My favourite is still "Deep Sky Objects: A Guide for the Amateur Astronomer" by Jack Newton. If you can find one, cherish it.

The "Teapot"

The wonder and experience of lying in a newly mowed hay field viewing the summer sky by eye between sessions through a telescope will not change and that is what memories are made of.

Peter Shewchuk
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Leonids At Chandos

November 18, 2001 will likely be my meteor storm milestone for all time. I had returned to the dark skies of Chandos Lake, with a clear, new moon night and several Leonid meteors spotted by midnight. Expecting the peak activity around 5 am, I tried to sleep for a while beforehand, but was too excited by the prospects to come.

Our friends John and Marie were with Karen and I at the family cottage, where we had enjoyed last year's Leonid shower with a peak rate of ~120 per hour. This night (Nov. 18th), I gave the wakeup call at 4 am when I could already see more. With no wind, we stretched out on lawn chair pads and blankets on the front deck.

A few Leonids streak through Canes Venatici. Photo by Rob Fisher

For the next hour, the frequency increased with brighter streaks, some glowing green. We faced the zenith and slightly west, for most of the meteors appeared from Leo in the east. However, we did see a number traveling more towards the north. Soon, the whole sky filled with trails and we counted up to five per second.

Some left smoky traces, as at the left of the photograph. The Big Dipper star trails are in the top centre and three Leonids zoom by at the right and one at the left. I was shooting with a 28 mm lens, f/2.8, Fuji 800 and exposures up to ten minutes. Other friends reported fog to the north and south of Chandos, but our great viewing lasted all night.

The frost made rocks, docks and camera lenses slippery, but we sat down beside the lake to finish the spectacle. There were thousands per hour by 5:30 am, certainly worthy of the term meteor storm. Difficult to leave at dawn's light, this was a highlight of my astronomical observing that will be hard to surpass.

Rob Fisher
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Buying A Telescope

Since Christmas is coming many newcomers to astronomy maybe thinking about buying a telescope. The following guide is taken from the Hamilton Amateur Astronomer's "Telescope Buying" brochure.

One of the first questions you need to ask yourself is:

Am I ready to buy a telescope?

You should have some basic knowledge of the sky before you consider a telescope purchase. If you cannot answer questions like the ones that follow, you should spend some time talking to people with more experience or read astronomy books and magazines before making a purchase.

- How do I find the North Star?
- How do I find the magnification of a telescope?
- Which planets are visible in the sky tonight?
- Why should I choose a scope with 1.25" eyepieces over one with 0.96" eyepieces?
- Which planet has visible phases like the moon?
- Which galaxy (other than our own) can I see without a telescope or binoculars?

A good telescope will set you back $400 or more. A cheaper telescope may cause a great deal of frustration. Before buying anything, join a local club first and spend time looking through other people's telescopes. The most important thing you can do is to ask questions of someone who has prior experience using a telescope.

What Should I Look For?

The most important feature of any telescope is the **aperture**. (The aperture is the diameter of the main lens or mirror on the telescope). The larger the aperture the more light the telescope can collect, which results in brighter images.

The next most important item is the telescope **mount**. It must be sturdy and easy to adjust. Wobbly mounts are the number one reason that newcomers get disillusioned with the hobby.

You will also need a good **finder scope**

to help find small objects more easily. As with the main telescope a larger aperture is better. The minimum acceptable size is 6x30 (i.e., magnification of 6x and aperture of 30 mm).

A good beginner's telescope is one which includes at least one good quality eyepiece. Eyepieces come in various focal lengths (which determines their magnification). They will fit one of three "standard" eyepiece holders: 0.96", 1.25" or 2". **Avoid** scopes that accept **0.96" eyepieces**. These generally indicate a poor quality product. Choose scopes that uses 1.25" (the most common type) or 2" eyepieces. A scope that accepts 2" eyepieces, normally comes with an adapter to accept the more common 1.25" eyepieces as well.

What Types of Telescopes are Available ?

There are many types of telescopes available, each having its own unique advantages and disadvantages. The three most common types are the Refractor, the Reflector and the Schmidt-Cassegrain.

REFRACTOR

Refractors use **lenses** to collect and focus light to an eyepiece located at the back of a tube. This is your "typical" telescope that most people identify with. They provide high contrast images but tend to be limited to small sizes due to cost. The number one problem with this design is a noticeable blue colour around bright objects caused by chromatic aberration. This type of telescope is most frequently chosen for viewing the planets.

REFLECTOR

Reflectors use a curved **mirror** at the bottom of a tube, which reflects light back to a small, flat mirror positioned at a 45 degree angle which deflects the light to an eyepiece at the side of the tube. They provide the brightest images for the money. Because of this, these are ideal for deep-sky observing. Short focal length (< f/4) reflectors can have image distortion at the edges of the field (called coma). This effect can be compensated for with the use of better eyepiece designs. Longer focal length reflectors do not have this problem.

SCHMIDT-CASSEGRAIN

Schmidt-Cassegrain telescopes have a special front lens called a **corrector plate combined with mirrors** like the reflector. Instead of sending the light out the side of the tube like the reflector, the smaller mirror is curved to send the light an the eyepiece at the back end of the telescope. These telescopes are the most compact are frequently chosen for astro-photography. Schmidt-Cassegrains are most often associated with computer control for locating objects easily..

What About Binoculars?

Binoculars are an excellent way to get into astronomy. A good pair of binoculars can be purchased for less than $150. If your interest in astronomy diminishes they can be used in many other ways.

As with a telescope, the larger the main lens the better. Binoculars are classified with numbers like 7x50. The 7 refers to the magnification and the 50 refers to the lens diameter in millimeters. Magnifications of more than 10 are not recommended since it may be difficult to hold your hands steady enough for a good view. Avoid "zoom" binoculars or those that have fixed focus.

There are many objects in the night sky that can be viewed very nicely with a good pair of binoculars.

How Much "Power" Do I Need?

Beware of any telescope advertised with high numbers like "400x" or described as "high power". Power (or magnification) is not important. For a given telescope, the power is determined by the eyepiece ONLY. If you change the eyepiece - you change the power. High magnification is not necessarily a good thing. The higher the power, the harder it is to keep what you are looking at in the eyepiece, because the field of view is reduced. In addition, the image also gets dimmer. As a general rule-of-thumb, the highest magnification that can be used without degrading the image is 20x per cm of aperture. For example, the maximum useful magnification of a commonly found 50 mm refractor from a department store would be 100x, yet these are often advertised as 400x or more! It can do it, but it is analogous to saying your car can go 220 km/h, even though you probably couldn't control it at that speed.

What Can't A Telescope Do?

- Even at high magnification, planets will still appear as small disks. It requires a trained eye to pick out the details.
- Nebulae and galaxies will almost always appear in black and white. The colours and details that you see in magazines or books are the result of long time exposures or very sensitive detectors.
- Stars will always appear as points of light no matter what magnification is used

Summary

The main points to remember when buying a telescope are:

- The **diameter** of the main lens or mirror **is the most important feature**. The larger the size, the more light the telescope can collect.
- The telescope should have a good **sturdy mount**.
- **Choose** a scope with **1.25" eyepieces** over one with 0.965" eyepieces.
- A 6x30 or larger **finder** is desirable.
- **Talk** to others who are knowledgeable about telescopes.
- **Forget about magnification**. A range of 30x to 120x covers most useful magnifications.

Stewart Attlesey

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

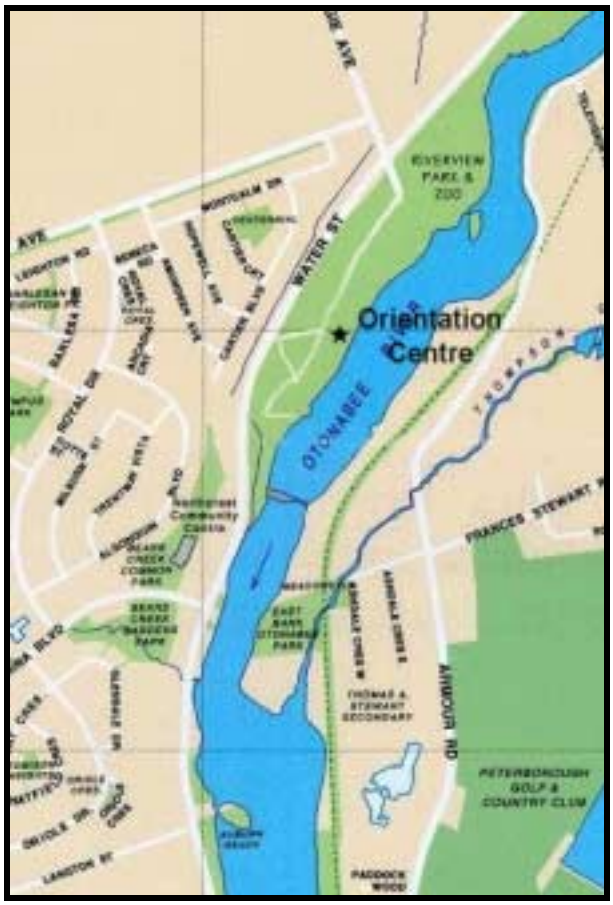
NEXT MONTH'S DEADLINE IS

Jan 9th, 2002

⌘

MEETINGS

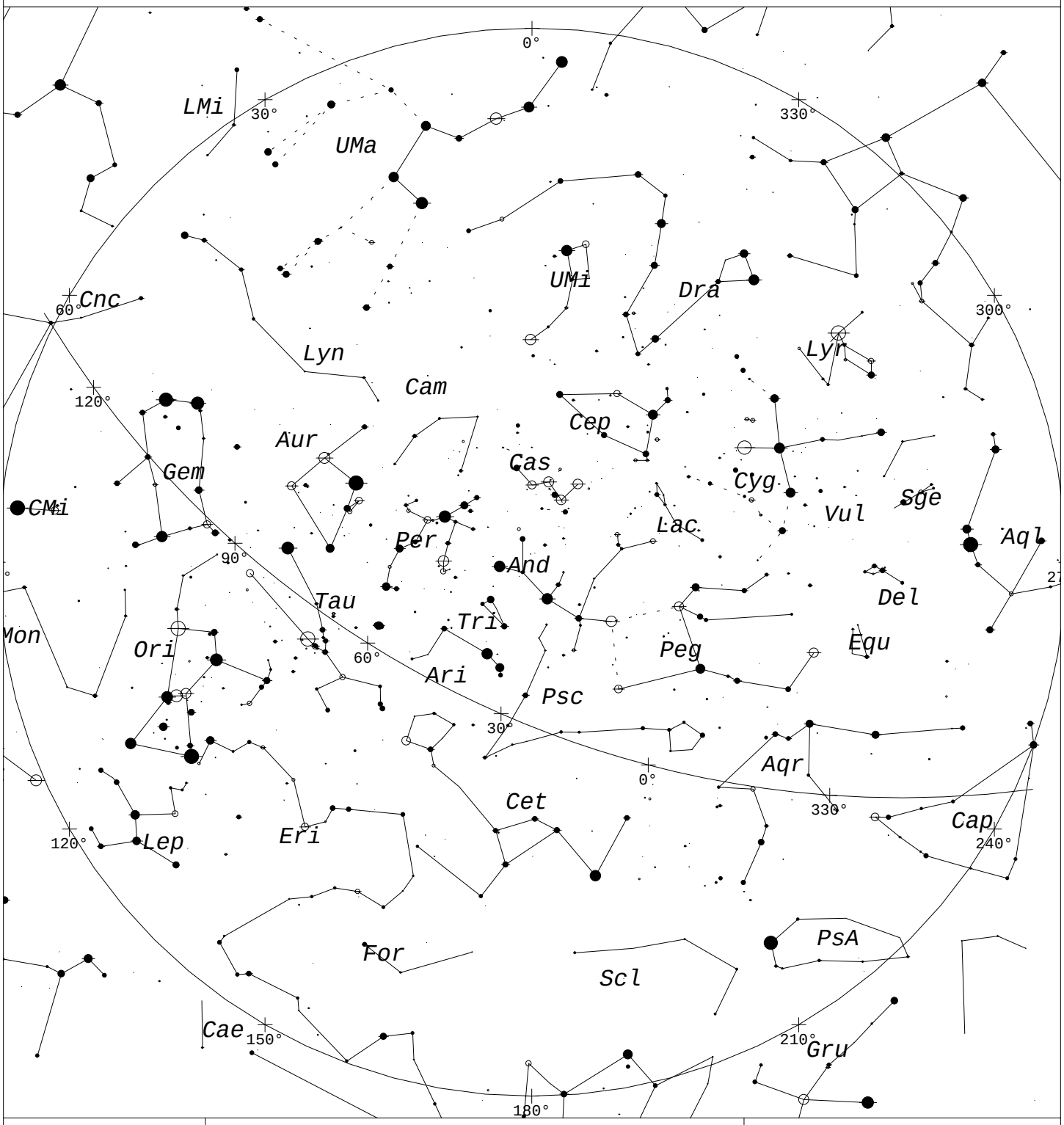
The Peterborough Astronomical Association meets every second Friday at the Peterborough **Zoo Orientation Centre** (Next to the PUC Water Treatment Plant) at **7:30 pm**.



CALENDAR OF EVENTS

December 7, 2001	**Last Quarter (☾)**
December 13, 2001	**Geminid Meteor Shower** — Peaks at 11:00 pm
December 14, 2001, 7:30 pm	**General Meeting** — Star Trails: bring in your pictures/slides of star trails (or any other astro photos) to the meeting. The best picture will win a roll of film.
December 15, 2001	**New Moon (●) —** Annular Eclipse (not visible from Ontario)
December 22, 2001	**First Quarter (☽)**
December 28, 2001	**General Meeting — CANCELLED** due to the holidays
December 30, 2001	**Full Moon (○) —** Penumbrial Lunar Eclipse
January 11, 2002, 7:30 pm	**General Meeting** — Greg Haynes will be demonstrating astronomical software

December Skies



STARS

<1	3.5
1.5	4
2	4.5
2.5	>5
3	

SYMBOLS

Multiple star	Dark nebula	Radio source
Variable star	Globular cluster	X-ray source
Comet	Open cluster	Other object
Galaxy	Planetary nebula	
Bright nebula	Quasar	

Local Time: 21:00:00 1-Dec-2001 UTC: 02:00:00 2-Dec-2001 Sidereal Time: 01:26:24

Location: 43° 39' 0" N 79° 22' 48" W RA: 1h26m25s Dec: +43° 38' Field: 180.0° Julian Day: 2452245.5833