PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR

Volume 1, Issue 6 | 1972-2002 | April 2002

Editorial

Thirty years ago this month, the very first issue of the PAA Newsletter rolled off the *mimeograph*. In the days before photocopiers, computers and the internet were in common usage (yes all three of these existed in 1972), this must have been quite a feat! This first issue sported a "funky" (or perhaps terminology was "groovy") cover design and articles covered such topics as the planet Mercury, quasars and sunspots. This issue and many other early issues of the club newsletter are available online at our web page *www.geocities.com/paa_ca*.


April '72 Vol. 1 No 1

P. A. A.

News Letter

The cover of the first PAA newsletter from April 1972

On March 16, several club members headed up to the Buckhorn Observatory to catch a glimpse of the universe from John Crossen's relatively dark skies. John had several telescopes setup and some members also brought their own scopes. One of the first things we viewed that evening was Comet Ikeya-Zhang. What an amazing comet! It ranks as one of the three best comets to appear in the last quarter century. It was not as bright as either Comet Hale-Bopp or Comet Hyakutake, but it is still a first rate comet at magnitude 3.7. It is possible that by the time you are reading this newsletter, it will have brightened significantly as it has passed the sun on March 19th.

Ikeya-Zhang—the first bright comet of the new millennium.

April 20th, this year, is Astronomy Day. This is a day set aside to bring astronomy to the average person. In the past this meant setting up mall displays or simply scopes in a parking lot somewhere, allowing the public to experience what we do first hand. Astronomy Day is not a new thing, but has been around since 1973. Since then, astronomy clubs, science museums, observatories,

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universities, planetariums, laboratories, libraries, and nature centers have hosted special events and activities to acquaint their population with local astronomical resources and facilities. It is an astronomical PR event that helps highlight ways the general public can get involved with astronomy. If you have any ideas or would like to arrange an event let either Dave Duffus or myself know.

Clear Skies,

Charles W. Baetsen
va3ngc@rac.ca

Buckhorn Observatory Running Day and Night

There's nothing like a couple days of clear weather to bring out the stargazers. The weekend of March 12 and 13 was precisely that. The action started Saturday afternoon with a troop of 12 Brownies dropping in for a brief talk about telescopes followed by some solar observing. The girls counted sunspots (11) and got the story on how much energy the sun puts out and how the sunspots cause the Northern Lights. They ended their visit with a picnic at the observatory. Each left with her own picture of the sun (taken the previous Wednesday) and a data sheet with interesting facts about our nearest star.

That evening the observatory played host to a number of members from the PAA and two local cottagers who brought along their 8-inch Orion Dob. Charles Baetsen and Rene Bowe also brought their telescopes.

Item one on the observing list was comet Ikeya-Zhang. It was just visible to the naked eye and a stunning sight in the giant binoculars. Its tail is quite pronounced and filled over half of the field of view. The balance of the night was spend scope hopping and engaging in astro-chatter.

The sun rose Sunday morning to launch yet another day of solar viewing. Visitors came from Peterborough, Bobcaygeon and Lakefield. Also along was a member of the RASC who was visiting his parents and just wanted to see the observatory. The sky gradually hazed over until it was difficult to make out the sunspots.

All told, the observatory played host to 35 visitors, so it was a busy weekend. But after a long and cloudy winter, who's complaining?

John Crossen
JohnCstargazer@aol.com

Old Sol came out to play the weekend of March 12-13 and put on a good show with numerous sunspots to delight the guests and spark conversations about aurora, the solar wind and why comets have tails.

Off the Beaten Path

As the sun makes it way north the celestial equator we have an opportunity to view a fine set of deep sky objects. Spring is notable, of course, for the numerous galaxies in the Coma Berenices—Virgo region. The following is a brief list of some of the not so common but spectacular objects to try an see in the next month or so.

NGC 4258 - Located in Canes Venatici, this pear shaped spiral has two main arms and lots of condensations. Also known as M106, at magnitude 9.6 this should be an easy target in scopes 6" or larger.

NGC4565 - This is the classic edge-on spiral shown in most text books. Located a degree or so west of the Coma Berenices star cluster, this is a fine object

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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in almost any scope. In a 3" this looks like a faint sliver of light, but in larger scopes, it looks much as it does in photographs.

NGC 4565—This 10 second exposure was taken by the author with the Cookbook 245 CCD camera.

NGC 3079 - Located in the front paw region of Ursa Major, this edge on spiral appears similar to NGC4565, with a magnitude of 10.6

NGC 4026 - Is a lens shaped edge on spiral, located near γ–UMa. At magnitude 10.7 this is one of the brightest objects in the region. Along your star hop from χ-UMa you may come across other galaxies in the region.

NGC 2683 - Located near the front paw of Ursa Major (but is technically located in Lynx), this bright nearly edge on spiral is an easy target in 6" scopes or larger. This is a fine object to begin your quest for NGC objects.

NGC 2683 in Lynx

M83 - Located in Hydra, this curious galaxy is considered by some to be the toughest of the Messier objects to get from a northern latitude, however it is possible to see this object even in a 3" scope under reasonably dark skies.

If you need some excitement put back in to your observing, or you have finished your Messier list and don't know what to look at next — go off the beaten path and enjoy some of the above objects.

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Understanding the Stellar Magnitude Scale

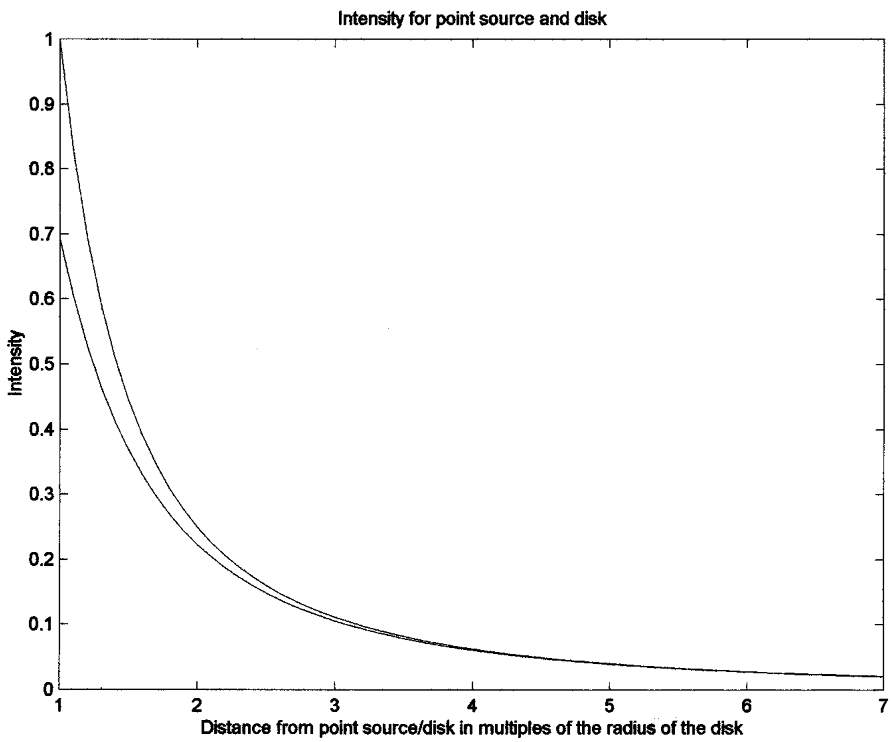
This article first appeared in the February 2001 issue of the North Shore Erie Amateur Astronomer's newsletter "The Stargazer". Reprinted with the Author's permission.

We say the Sun is magnitude –26, Venus is magnitude –4, Vega is magnitude 0, or Uranus is magnitude +7 when viewed from earth. We refer to the brightness of stars, planets and galaxies in magnitudes but what does this really mean? The first observation is that the fainter the object, such as Uranus, the higher its magnitude and the brighter the object, such as the Sun, the smaller its magnitude. Smaller has the mathematical meaning in that negative numbers are smaller than positive numbers. The second observation is that this scale is not linear. For example –26 is about 7 times –4 but the Sun is much more than 7 times the brightness of Venus. The magnitude scale is a logarithmic scale. There are several different kinds of magnitudes but as used in this article we will mean the **apparent visual** magnitude. As we will explain below this means that the brightness of an object will depend on being viewed from earth in visible light and includes the effects of a changing intrinsic brightness produced by the changing phase of the object, such as Venus for example, as it travels in orbit around the Sun. There is also the **absolute** magnitude of a star, which is the apparent magnitude of the star as it would appear at a standard distance of 10 parsecs away (one parsec is about 3.26 light years). The brightness ratio for absolute magnitudes is a ratio of the intrinsic luminosity of the two stars. This means that if one star has twice the luminosity of another than it produces twice the light energy of the other. Another type of magnitude is the **colour** magnitude. If the light from a star is first passed through a **blue filter** and then its brightness is measured we refer to the star's **blue** magnitude.

First let us define the symbol **md** as the **m**agnitude **d**ifference between two celestial objects. For example the magnitude difference between the Sun and Venus is –4-(-26) = 22. Then the **ratio** of the brightness of the Sun and Venus is equal to 100 raised to the **power** of **md/5** where **md/5** is **22/5** = **4.4**. Now $100^{4.4}$ is about 631 million. This means that the Sun is about 631 million times brighter than Venus when viewed from earth. We have used this formula to calculate the brightness ratios from the magnitude differences in the table below. As another example, if the magnitude difference is 5 then md/5 is 5/5=1 so then the ratio of the brightness is 100^1, which is 100. So a magnitude 5 star is 100 times fainter than a magnitude 0 star but it is also 100 times brighter than a magnitude 10 star.

Brightness Ratio	**Magnitude Difference**
1	0
1.096	0.1
2	0.752
2.512	1
4	1.505
100	5
10000	10

We can obtain values not listed in the table by **multiplying** the brightness ratios and **adding** the corresponding magnitude differences. For example a brightness ratio of 4*100*1.096 = 438 has a magnitude difference of 1.505 +5 + 0.1 = 6.605 and so on.



In the second half of this article we will discuss how the magnitude of a source of light varies with distance from the source when the source is a point and also an extended object in the shape of a disk. For a point source such as a star, the intensity of light or apparent brightness varies inversely as the square of the distance from the star. Consequently if you double the distance from a star the brightness ratio of light decreases by a factor of 4, that is, it appears one-quarter as bright as before. This is a decrease of 4 in the brightness ratio so the apparent magnitude of the star will increase by 1.505 as given in the table. Another doubling of the distance will add another 1.505 to the apparent magnitude of the star.

The figure above compares the variation of light intensity or brightness with distance from a disk and a point source both of which emit light at the same rate. We say the disk and point source have the same luminosity. The upper curve is the inverse square law, which is appropriate for the point source. The lower curve is for the extended disk. At a distance from the disk equal to one radius of the disk, the brightness of the disk is 68% of the brightness of the point source. Similarly at a distance of 2 radii from the disk the brightness of the disk is approximately 0.22 compared to 0.25 for the point source. For distances from the disk that are less than 4 times the radius of the disk, the apparent brightness of the disk is less than the point source.

As you can see the intensity or brightness of the disk does not vary inversely as the square of the distance until the distance is at least 4 times the radius of the disk. For greater distances, the variation of brightness with distance is virtually the same for both. In this case the extended disk behaves like a point source. To test your understanding of the apparent stellar magnitude scale, please try to answer the following questions.

The magnitude of a full moon viewed from earth is about –12.6 and the earth is about 200 times the moon's radius away from the moon. Hence the moon can be considered a point source. You will need to use the table on the previous page.

1) What would be the magnitude of the full moon if it were only half as far from earth?
2) If there were 2 identical full moons close together in the sky at the moon's distance from earth what would be their combined magnitude viewed from earth?
3) How far from a full moon would you have to be so its apparent magnitude would be zero (just like Vega)?

The answers to these questions will appear elsewhere in this issue of the "The Reflector".

Anton Jopko
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The Sky This Month

MERCURY:

Mercury will be visible in the evening in the last week of April. Look for a lone white "star" in the NW, 30 to 40 minutes after sunset..

VENUS:

Venus is slowly climbing higher in the west It is the brightest object in the night sky this month.

MARS:

Mars is visible in the south in Taurus area after dusk. Look for a 2nd magnitude red "star".

JUPITER:

Jupiter will be in Gemini and appears as the second brightest object at night.

SATURN:

Saturn is in the constellation Taurus in the western evening sky.

URANUS & NEPTUNE:

Uranus and Neptune are emerging from the sun's glare this month, but are still not easily visible.

PLUTO:

Pluto is visible in the morning hours in the constellation Ophiuchus near η-Oph. A large telescope (≥ 8”) is needed from a dark sky to see this planet. At mag 13.8, this illusive object is on the verge of invisibility, so a good chart (like that in the Observer’s Handbook or Sky and Telescope) is needed to confirm it’s sighting. Ideally this planet should be viewed over a number of days to detect movement across the starry background.

METEOR SHOWERS:

There is one major shower this month:

Lyrids: Apr. 16-25

There are also several minor meteor showers this month. For details on these see *http://comets.amsmeteors.org/meteors/april_radiants.html*

Constellation of the Month: Leo the Lion

Leo is one of those rare constellations that actually look like what they are supposed to be. Connect the dots and bingo, you've got a lion. Indeed, if the ancient Sumerian, Babylonian, Persian, Syrian, Greek and Roman cultures agreed on one thing it was that this particular configuration of stars looked remarkably like a lion.

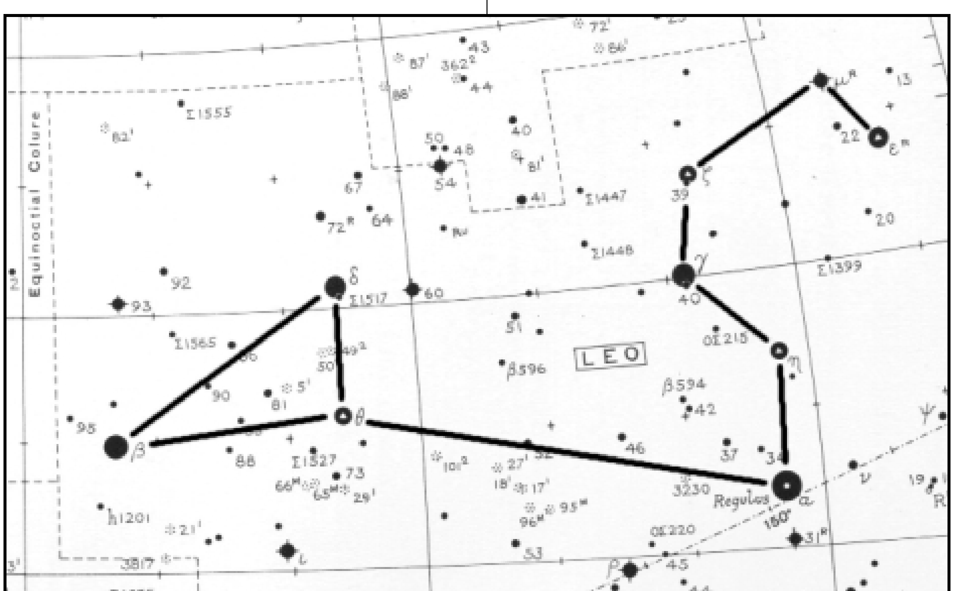
A little ocean hopping to South America and we discover that members of the ancient Inca culture came to nearly the same conclusion. However, in keeping with the local wildlife, their mighty cat was a puma. Leo the Puma? It just doesn't have that ring, does it?

To be different, the Chinese claimed Leo was a horse. Then again, they had an odd version of checkers, too.

By 8:00 in mid-March, The Lion has already sprung free of the horizon and begun stalking the night sky. Leo's brightest star is Regulus, which means "little king" in Latin. Its position within the constellation is just about where the lion's heart would be. Regulus has a magnitude of 1.4.

Bringing up the rear of Leo is the 2nd magnitude star Denebola. You'll find it at the eastern vertex of the right triangle that forms Leo's hindquarters.

The balance of the stars in Leo range from 3rd magnitude down to magnitude 4.4. So if you can see all the stars in the constellation, you're probably viewing it under a sky with a limiting magnitude of at least 5. That's not bad in today's light-polluted world.



Leo the Lion

To the rear of Leo is the dim constellation Coma Berenices. For years I knew it as an open star cluster which presented a beautiful sight in binoculars or my finder scope. In addition to representing the golden tresses of the Egyptian queen Berenice, this constellation/cluster is said to be the tuft on the lion's tail.

Leo is rife with galaxies, and to me that means it's springtime again. Among Leo's brighter galaxies are 5 Messier objects. M65 and M66 form a close-set pair of spiral galaxies near Leo's haunches. They are about 10th magnitude and can just be seen in binoculars on a very clear night. Galaxies M95 and M96 may be found below and to the east of Regulus. Just north of them is yet another galaxy, M105.

So let's break out the scopes. The beginning of galaxy season has entered with a roar.

That's a mouthful.
Leo…………...LEE-oh.
Regulus……….RAY-gu-lus
Denebola………Duh-NEB-oh-lah
Coma Berenices…….KOH-mah-bear-NEE-seez

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Archaic Star Name of the Month

My early name was Mirak which got corrupted to form my current name. I am not alone in the sky as I have a companion who's old name was Al Sadak meaning “the test”, for the two of us were used as an eye test to the ancient Greeks. Which stars are we?

Last Month’s Answer:
Alphecca (α-CrB)

Power on the Go

Remember the nights of observing when you would pile your scope, eyepieces and red flashlight out of the car and settle in for a night of observing?

For most of us those days are gone. With the new Goto scopes, CCD cameras, clock drives, laptops, coffee makers, heated socks etc., the power demands of your system could require a small nuclear reactor!

The Jazz250—enough power for all your observing needs

Enter the Xantrex Jazz 250. OK, it's not a reactor, but with 250 watts of power - it's just as good.
.
My wife picked up this portable power supply from Costco and I couldn't be more pleased with it. For about $120 the Jazz 250 provides the user with 250 watts of 120 Vac power. There's also a 12 Volt outlet for any other 12 Vdc devices you may have. The unit can recharge its 17 Amp-hour battery from your car, your home power, or even a solar cell. A LED indicator displays its state of charge. Also, you get a set of jumper cables for when your car battery quits on you after a long night of observing. As an extra bonus there is also a built in fluorescent light that can light your way home (The light can last up to 46 hours in the low setting and a bit of red paper could be used over the light in order to view your star charts).

An audio alarm will also sound if there is a low battery, an over-temperature condition, or reverse polarity, and the unit will shut down. The only complaint I have is that when you power audio or visual devices (i.e. stereo or TV) there is a bit of interference due to the modified square wave output of the unit. However, for anything astronomical you can't go wrong buying this portable power supply.

As a bonus, attach a solar cell and let the sun's rays charge the battery by day and use those captured photons to power your equipment by night. What could be cooler than that!

Will Juodvalkis
wjuodvalkis@yahoo.com

Some Key Specifications

Battery	12 Volt 17 Amp-hour
Built in fluorescent lamp	Two 4 watt bulbs
120 output power	Continuous –230W/ 10 min – 250W/ surge-500 Watts
120 V output waveform	Modified sine wave
Recharge time	35 hours

Finder Scope Trick

Taken from Internet Newsgroup Sci. astro.amateur

There is a little trick I use with a straight finder scope that makes things much easier to find. First, align the finderscope (but you knew that already.)

Then use your right eye to look in the finder. Also use your left eye to look at the object that you're homing in on. Move the scope. The two images will get closer and closer as the scope sites up until they merge into one image. You even get a stereoscopic effect.

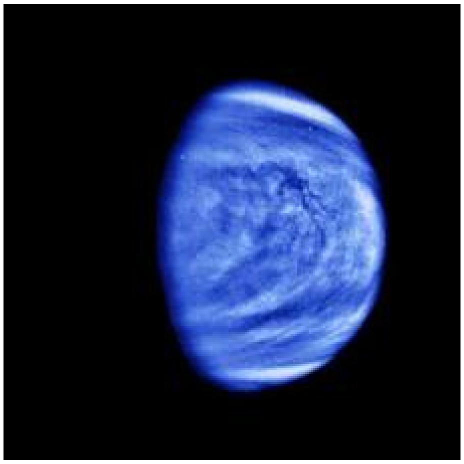
This makes it so much easier to find things since you are not wandering around using only the finder. You can actually see the target with your left eye at the same time. Try it. You know that you are doing it right when you get that 3D effect as the images merge.

Of course, if you have a diagonal finder, all bets are off. Unless you're a fish. Then it might work.

Steve Crisp

Venus - Goddess of Beauty or Earth's Evil Twin?

In the early 1900's the concept of Venus being Earth's sister planet was a popular, though somewhat romantic notion. Who could blame the scientists of the time? Venus is after all about the same size as Earth. And, while Venus orbits closer to the Sun than Earth, it isn't nearly as close as sun-baked Mercury. Plus, Venus is the bright and beautiful morning and evening star. Small wonder then that its thick layer of clouds prompted only the most optimistic of speculation as to what lay beneath.



Venus - Earth's Evil but Beautiful Twin

Some envisioned a race of tall, elegant human-like beings. Others forecast lush jungles and rolling seas - a virgin planet teeming with wildlife. Limited by what they could see through their telescopes, even astronomers could only guess at what was lurking beneath the Venusian clouds.

In recent times we have landed probes on Venus. Sophisticated unmanned spacecraft have orbited Venus and penetrated its cloak with radar to map its surface. The result? If you still want to think of Venus as Earth's twin planet, think - evil twin.

In 1969 the Soviet space probe Venera 7 landed on Venus and transmitted data back to Earth for 23 minutes. The atmospheric pressure was a probe-crushing 90 times that of Earth and the temperature was a scorching 477 degrees C. Later, a host of Russian and U. S probes succeeded in photographing its surface and analyzed the Venusian atmosphere. Their findings painted an even more foreboding picture.

The thick layer of clouds was composed of deadly sulfuric acid. And the planet's surface was covered with giant volcanoes spewing massive flows of lava. So, for all the romantic thoughts the name Venus conjures up, the real Venus is anything but beautiful as far as humans are concerned.

Viewed from Earth, Venus is still one of the sky's most beautiful objects. Its thick clouds reflect about 80% of the sun's light, so other than the Moon, Venus is the brightest night celestial object we can see.

Compared to Earth, Venus has the inside track around the sun. Thus, our views of it are limited to the evening and early morning sky. This is also why we see Venus go through phases, like the moon. And why we can never see Venus fully lit. From Earth we can only see the portion of the planet that reflects the sun's light to us. As Venus moves along its orbit we gradually see more or less of it illuminated by the sun. How much we see all depends on where Earth, Venus and the Sun are in relationship to each other.

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Astronomy in Philately

This is the first stamp issued by the United States with an astronomy theme. Issued at the regular domestic rate of 3 cents, the Palomar Mountain Observatory was released to commemorate the 20th anniversary of the observatory's opening. The central design of the stamp is dominated by an exterior view of the observatory. This stamp was first placed on sale at the observatory, on August 30, 1948.

Palomar Mountain Observatory—The US's first astronomical stamp

Palomar Observatory is located on Mount Palomar, 80 km northeast of San Diego, California. It is owned by the California Institute of Technology (Caltech). Plans for this observatory were begun in 1928, and in 1948 the Hale reflecting telescope and the 48 inch (1.22m) reflecting-refracting Schmidt photographic telescope began operation. The Schmidt telescope can accurately photograph large areas of the sky, and in its first several years of operation it was used to make a photographic atlas of the entire sky. The Hale telescope, weighing 480 metric tons, is used not for visual observation but for making photographic and photoelectric records of the faintest and most distant objects in the sky. The 200 inch (5m) mirror is a ribbed casting of Pyrex glass. The surface of the parabolic mirror was coated in a high vacuum with a thin film of highly reflective aluminum. This is the telescope that has made the observatory famous. Other telescopes at the observatory include an 18-in (46-cm) Schmidt telescope and a 20-in (50-cm) photoelectric telescope.

William Parsons on his Irish estate built one of the first giant telescopes in 1845. Its mirror was 72 inches (1.8m) in diameter and until 1908, was the largest in the world. In 1917, the 100-inch (2.5m) Hooker Telescope was built by American astronomer George Hale on Mount Wilson, California. It was Hale who started work on the even larger telescope that would bear his name once completed at Mount Palomar.

Astronomers seek ever-larger mirrors to increase the power and efficiency of telescopes. However, huge mirrors are expensive and difficult to make and they are challenging to move while tracking celestial targets. One particularly daunting problem is that a solid glass mirror is heavy. The Hale telescope weighs 14 tons, and was once considered the practical limit for telescope size. For thirty years this appeared to be the case, until in 1977 the Russians completed the 240-inch (6m) Bolshoi Telescope in the Caucasus Mountains. Although larger than Hale, design flaws prevented it realizing its full potential. Then in the 1990's came the revolutionary idea of 400 inches worth of segmented mirrors, like those used in the Keck Telescopes (Hawaii) and use of computer controlled "adaptive optics". Ground based observing has never been the same!

Your Astronomical Philatelist

Rick Stankiewicz
stankiewiczr@cogeco.ca

Classifieds

For Sale:

Slip on bracket for 50 mm finder with shoe - $15:00

Celestron Piggy-back Mount - $15

Manfroto 410 camera/slow-motion mount - $200

Bausch & Lomb 4000 Series Telescope
Fork-mounted with R.A. motor drive - $325 Includes: Star diagonal, 6x30 dovetail finder, visual focal reducer, 120V cord, all original owner's manuals, camera adapter piggy back mount, table-top screw-in legs (adjustable for polar alignment), hard shell carry case.

Typical B&L 4000 (not actual scope)

Contact: John Crossen
Phone: 705-657-7718
E-mail: johncstargazer@aol.com

For Sale:

8"-f/7.5 Dobsonian
8-inch f/7.5 Newtonian on specially designed Dobsonian mount that is extremely light and portable. Comes with Quick Finder and homemade finder scope (approx 9x50). Excellent Optics. Overall tube length is 62". Asking $600.00 or B.O.

8" Dobsonian

Contact: Charles Baetsen
Phone: 705-876-0986
E-mail: va3ngc@rac.ca

Stellar Magnitude Answers:
(from pg 4)
1.) -12.6-1.505 = -14.1
2.) -12.6-0.752 = -13.35
3.) $2^{(12.6/1.505)} = 331$

Time Travel

In addition to April Fools Day, the first full month of spring has played host to a number of astronomically important events. Here are just a few of them:

April 1, 1997 - Comet Hale-Bopp makes closest approach to the sun
April 2, 1845 - First photograph taken of the sun
April 3, 1966 - Luna 10 becomes the first spacecraft to orbit the Moon
April 4, 2002 - Last quarter Moon @ 10:29 a.m.
April 5, 1990 - First air-launched satellite (Pegsat) launched
April 6, 1993 - Pioneer 11 launched
April 7, 2002 - Daylight Savings Time begins @ 2:00 a.m.
April 8, 1966 - First orbiting astronomical observatory (OAO-1) launched
April 9, 1959 - NASA selects original seven Mercury astronauts
April 10, 2002 - Moon at apogee (farthest from Earth)
April 11, 1986 - Halley's Comet closest approach to Earth - 39 million miles
April 12, 2002 - New Moon @ 3:21 p.m.
April 12, 1961 - Yuri Gagarin first human in space
April 14, 1629 - Christiaan Huygens born
April 15, 1867 - Wilbur Wright born
April 16,.1946 - First captured V2 rocket launched from White Sands, N.M.
April 17, 1970 - Apollo 13 crew returns to Earth
April 19, 1971 - Salyut 1, world's first space station launched
April 20, 1967 - Surveyor III lands on Moon
April 21/22, 2002 - Lyrid meteor shower
April 23, 1858 - Max Planck born
April 24, 1970 - China becomes 5th nation to launch its own satellite
April 25, 2002 - Moon at perigee (closest to Earth)
April 26, 2002 - Full Moon
April 28, 1906 - Bart Bok born/1928 - Eugene Shoemaker born/1900 - Jan Oort born
April 29, 1985 - STS 51B launched

Solar Powered Observatory

When building my observatory a few years ago, I made the decision to use a 12 Vdc power supply to supply my electrical needs for my equipment. I choose this type of electrical supply for the following reasons:

1. I could place the observatory anywhere on the property
2. Most of my equipment could run off of 12V, and those that didn't could be powered from the 12 Vdc with an inverter.
3. Did not want the hassle and expense of digging a trench to run a cable.

Power Supply showing battery and connections

Although this setup worked quite well it had some drawbacks—namely keeping the battery charged. Many a night I would want to do some astrophotography and to my dismay, the battery would almost be dead. To get around the inconvenience of taking the battery home periodically for charging, I decided to install a solar panel to keep it topped up.

Recently, at a hamfest (basically a giant garage sale for amateur radio equipment), I picked up a 12V—1A solar panel for $35.00. Now all I had to do was mount it and connected it to my battery. I mounted the solar cell in a wooden case with a plexi-glass cover for protection (from flying balls etc.). This wooden mount is angled at 30º from the vertical so that the maximum strength of the sun hits it in winter when it is needed most.

In addition to adding the solar panel, I also wanted to improve the power supply. The original power supply was a commercially available "porta-pack" that I got from Canadian Tire for $39.99 a few years ago. This type of supply is excellent for powering your equipment when out at a star party, but just doesn't have the capacity when it comes to a permanent installation. To increase the capacity I obtained a 7.5 A-hr battery (i.e., it will take 7.5 hours to discharge it at 1 amp). In addition, I also added switches to control the lighting and a car adapter plug to power any accessories I have. The circuit of this system is displayed below.

The solar cell is connected directly across the leads of the battery (positive to positive and negative to negative). This charges the battery during the day for use at night. At this point, you can install an optional diode to block current from flowing from the battery to the solar cell at night, but I found that this was probably not necessary and omitted it. The battery is what actually supplies the current to the observatory. It passes through a fuse (always good electrical practice) to my lighter socket and the lighting,. I installed a 3 position switch that allows me to turn on either the red light (for viewing charts etc.) or both the red and white lights at the same time. The diode D1, is used to block current to the white light when the switch is in the down position. When the switch is in the up position,

A view of the observatory with the solar panel installed

the current will flow through D1 to light L1 (red light) and also through L2 (white light) giving me the desired results.

In the future I would like to install additional light plugs (to power additional devices) and adding a LED bar graph to indicate the charge left in the battery.

To date this setup seems to be working well. I still have to see how it performs in the winter time when it is cold, there is little sun and the sun is at a low latitude.

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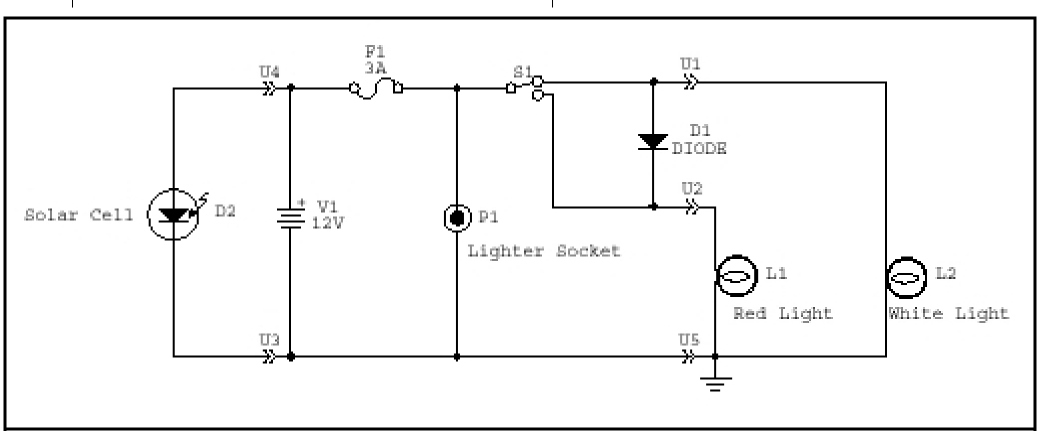


Circuit Diagram for Solar Powered Observatory

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

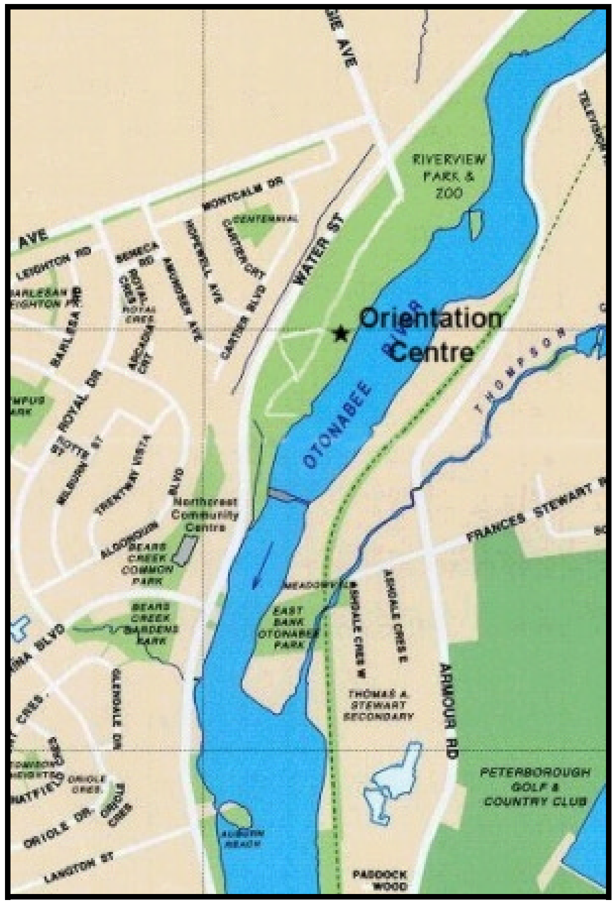
NEXT MONTH'S DEADLINE IS

April 29th, 2002

⌘

MEETINGS

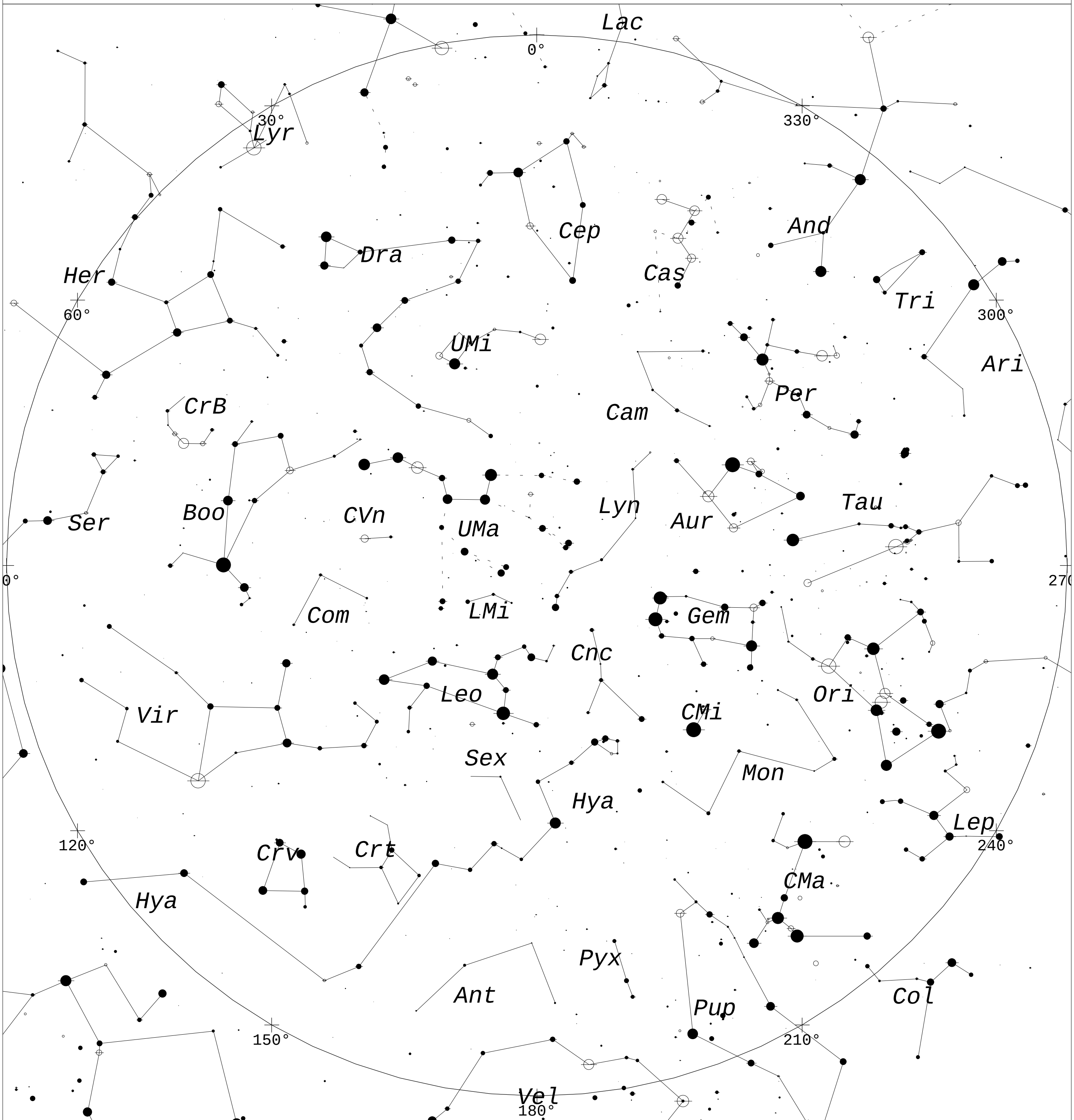
The Peterborough Astronomical Association meets every second Friday at the Peterborough **Zoo Orientation Centre** (Next to the PUC Water Treatment Plant) at **7:30 pm**.



CALENDAR OF EVENTS

April 4, 2002	**Last Quarter (☾)**
April 5, 2002, 7:30 pm	**General Meeting** — TBA
April 12, 2002	**New Moon (●)**
April 19, 2002, 7:30 pm	**General Meeting** — TBA
April 20, 2002	**First Quarter (☽)**
April 26, 2002	**Full Moon (○)**
May 3, 2002, 7:30 pm	**General Meeting** — TBA

April 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-Apr-2002
Location: 43° 39' 0" N 75° 0' 0" W

UTC: 02:00:00 2-Apr-2002
RA: 9h40m59s Dec: +43° 38' Field: 182.0°

Sidereal Time: 09:40:59
Julian Day: 2452366.5833