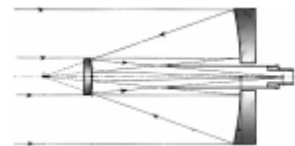




THE REFLECTOR



Volume 4, Issue 4

April 2005

Editorial

This past month, I had the opportunity to have some of my negatives scanned. It all started when a friend of mine, purchased a Nikon Super Coolscan 5000 ED, so I asked him if he could scan my old wedding negatives. When I got the results back I could not believe my eyes! Many of the negatives were scratched, and I seriously doubted what could be done with them. However, Nikon's *Digital ICE-4 Advanced* software, took care of this without problem. Not only that, but at 4000 dpi, when you zoom into the photo, you can see the grains before you reached the pixel level.

After seeing this kind of results, I decided to get some of my favorite astro-photos scanned as well. The photo on the left, is one of the few Hale-Bopp photos that I was really happy with. The original print of this photo looked ok, but the scanned image, after some cropping and enhancement, looked fantastic.

Unfortunately, I have a lot of rolls of old film, that I would like to have scanned, but I am sure, my friend would shoot me if I gave him all of that to do. The Nikon Coolscan 5000 ED is not cheap either. Henry's lists it at \$1599 + tax. Still it is very tempting. I expect that in the future the cost of these things will drop and they will appear on the used market, as people finish scanning their old negatives and slides. In the meantime, I will have to wait before I can get them all done.

This month is a very important month for the PAA. Our Astronomy Day event will take place on April 16. We are still looking for some volunteers, so if you can help, please let John Crossen know. It should be a great day as we have lots of activities lined up. We will have the inflatable planetarium there, and there



This photo of Comet Hale-Bopp was originally taken on Kodak Royal 1000 back in 1997. The negative was scanned on a Nikon Super Coolscan 5000 ED scanner. Once it in digital form, the image can be processed just like any other. This image is a cropped portion of the original.

will be several guest speakers including: Tom Kovacs, Peter McMahon, Dan Bortolotti and several PAA members. The event runs from 12:00 noon, until 9:00 pm, concluding with an observing session afterwards.

Clear Skies,

Charles W. Baetsen,
va3ngc@rac.ca

Meeting Notes

Mar 4 Meeting:

Only about 14 members attended the Mar 4th meeting. As this was an observing night, the meeting started off with Colin Cross's talk on the constellation Puppis. Later on, Mark Coady handed out light pollution brochures, which generated lots

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As fitting thanks for his fine presentation, PAA Philatelist Rick Stankiewicz presented Richard with a pair First Day Covers commemorating Canada's Alouette Satellites. Richard is shown here with the stamps and a sample of the material used for the Alouette antenna.

of discussion, with everyone participating.

Rene Bowe took the opportunity when there was some "dead air" to read out the list of Astronomy Day suggested activities from John's list of a few weeks ago. It was also mentioned that we would like to have good representation from the PAA members on that day.

Most people thought it was going to be overcast so no telescopes showed up. When we adjourned and left the building about 9:30; guess what? A lot of clear sky.

Mar 18 Meeting:

The PAA's "Mr. Satellite", Richard Mathews, did it again with a superb presentation on the man-made satellite industry. From the incredible stresses and vibrations of being launched to the hostile space environment where temperature differentials of 400 degrees or more are not unusual, Richard took us on an information-filled trip into orbit. Add in a little cosmic radiation, some meteor de-

bris and speeding space junk, and you actually start to feel sorry for those expensive bits circling Earth.

In this talk Richard took us inside the business talking about the high cost of insuring launches, penalties for late delivery and part failures, as well as some 'off the shelf' bits engineers can use to curb costs. We also learned about powering space craft like Cassini that are so far away that solar power is all but useless. Another subject broached was that of ion power which will be tested shortly.

Another aspect of Richard's presentation was the methods of getting a satellite to 'unfold' once it is in orbit. Some use spring tension and small explosive bursts to release antenna and solar panels. As an example, Richard brought along a piece of metal identical to that which was used in the Alouette Satellites.

Our thanks go to Richard once again for a very good presentation. Don't lose those Power Point CDs. We might just call for an encore.

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and

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Black Holes Pt. III

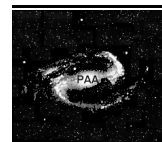
In 1915, Albert Einstein, a German-Swiss Scientist, worked out a new theory of gravitation. According to his theory, when light moves outward against a gravitational field, short wavelengths become a little longer. The stronger the gravitational pull, the longer the wavelengths. The longer the wavelengths, the redder the light is. So, the more massive a star is, the redder its light. This is called a red shift. Also, the more massive a star is, the more tightly its matter is forced together. So what happens if a white dwarf is very massive?

In 1931, Subrahmanyan Chandrasekhar (soob-rah-MAHN-yahn chan-druh-SEEK-har), an Indo-American astronomer, answered this. He showed that if a white dwarf were massive enough, it would force its way through the resistance of the electrons an collapse further. He figured out that the white dwarf would have to be 1.4 times as massive as our Sun in order to collapse further. This is called Chandrasekhar's Limit.

The problem is, about 2.5% of all the stars are more than 1.4 times as massive as the Sun. Our own galaxy, for example, is made up of about 120 billion stars. That means that about 3 billion of those stars are over Chandrasekhar's Limit. What happens to these stars?

When astronomers studied massive stars they found that the more massive a star is, the shorter and stormier its life. Its gravity pulls it together more tightly, so it needs to be hotter to keep from collapsing. Because it needs to stay so hot, it uses up its hydrogen fuel very quickly. The more massive a star is, the larger it expands when it becomes a red giant, and the more suddenly it collapses when the fuel is used up.

When a star collapses suddenly enough, it explodes in the process. The more massive it is, the greater the explosion. When



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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Canadian astronomer, Ian Shelton, was the first to see Supernova 1987-A while working at an observatory south of the equator. This supernova in the Large Magellanic Cloud, lies at a distance of 170,000 light years.

the explosion (called a supernova) occurs, it releases a large amount of its matter, leaving it less massive.

This seemed to answer the whole problem. A star, no matter how massive, would explode, hurling most of its matter into outer space, and the part that collapses is always less than Chandrasekhar's Limit. But could a star lose more than 90% of its mass in a super nova explosion?

Tune in again next month when we explore the weird and wonderful world of Neutron Stars and Pulsars.

Shawna Miles
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The PAA's Newest Scope Is An International Hybrid

This 6-inch Dob has really made the rounds. It began its life in Russia. At least that's where the optical tube and secondary mirror came from. One thing you can say about those Russians, they never under-build anything! I believe it was originally from a Talscope and it came to me via AstroBuySell on the Internet.

The focuser comes from an early 1970's Meade Schmidt/Newt that was given to me by a somewhat dismayed gentleman

who claimed that, "My grandchildren are wreckin' it. You can have it."

Thank you, Mr. Patrick McCool of Bobcaygeon.

The focuser is helical which means you turn it in and out like a screw to focus the scope. It's a bit tricky at first, but easy to master.

The primary mirror hails from China, as does the correct-view, 90-degree finder. And the Baltic Birch base had its roots (I love a pun) in the Russian forest. Of course, a nice Canadian fellow with all the right cutting tools rough-cut the base prior to finishing and assembly.

The mirror cell slipped across the border from Ann Arbor, Michigan. Plus the guy who put it all together was originally from Midland, Michigan. So the scope's international breeding may have a slight American accent.

The mirror was sold as one with a 1/3-wave front error, which is pretty standard stuff. However, on observing the Moon with the scope, it appears that the mirror is better than that. The lunar detail was outstanding as were the contrast and sharpness. It's almost the equal of my 5-inch Apo. Well, maybe I'm stretching things a bit. But it's damned good.



The latest addition to the PAA Scope family is a 6-inch Dobsonian. This scope is now available for use by any club member. It is large enough to pull into those faint fuzzies and some.

At any rate, the scope is now the property of the PAA and is available to any member who wants to take good care of it while he or she gives it a try. This one is a little heftier than our other 6-incher, so I recommend breaking it down into its two component parts – base and optical tube, before transporting the little gem.

By the way, does anybody think we should give it a name? Like Dave or Frank? It might be a nice gesture towards a couple of the club's elder statesmen – nudge-nudge, wink-wink.

John Crossen
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Your Guide to 10 Brightest Stars

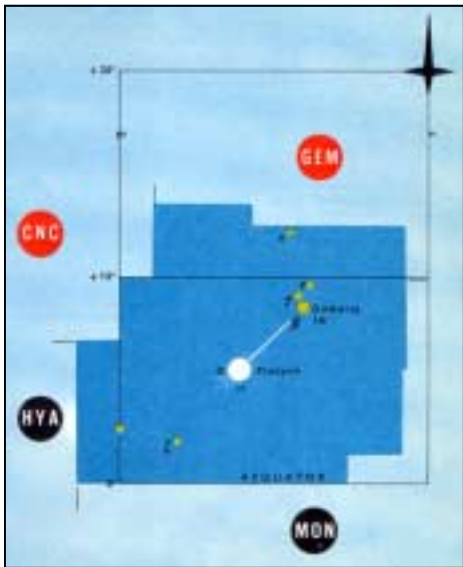
8—Procyon:

Procyon resides in the small constellation of Canis Minor, the Little Dog. The constellation symbolizes the smaller of Orion's two hunting dogs (Canis Minor and Canis Major).

The word Procyon is Greek for "Before the Dog," for the reason that in the Northern Hemisphere, Procyon announces the rise of Sirius the Dog Star. Procyon is a yellow-white main-sequence star, twice the size and seven times more luminous than the sun. With the exception of Alpha Centauri, it is the least intrinsically luminous star on this list. Like Alpha Centauri, it appears so bright only because at 11.4 light-years, it is relatively close.

Procyon is an example of a main-sequence "sub giant" star, one that is beginning the death process by converting its remaining core hydrogen into helium. Procyon is currently twice the diameter of the sun, one of the largest stars within 20 light-years.

Canis Major can be found relatively easily east of Orion during Northern Hemisphere winter months. Procyon, along with Sirius and Betelgeuse, form the Winter Triangle asterism.



Procyon is the brightest star in the constellation Canis Minor, or the Little Dog. It is one of the few stars with a Greek name as most star names are Arabic.

Procyon is orbited by a white dwarf companion detected visually in 1896 by John M. Schaeberle. The fainter companion's existence was first noted in 1840, however, by Arthur von Auswers, who observed irregularities in Procyon's proper motion best explained by a massive albeit faint companion.

At just one-third the size of Earth, the companion dubbed Procyon B contains 60 percent of the sun's mass. The brighter component is now known as Procyon A.

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DISCOVERIES

Welcome to another edition of Discoveries. Remember that if you find some news about an astronomical discovery - send it along to me at the address at the end of the article.

Spacefaring Japanese

from *CBC News*

Japan's JAXA space agency successfully launched their first rocket into space on the weekend of February 26th and 27th..

It is the first step in an aggressive plan to explore, utilize, and possibly start colonizing the space around the Earth.

First, a series of satellites, designed to detect earthquakes and tsunamis as they are developing, will be launched over the next few years. These satellites will have the capability of alerting people via their cell phones, greatly increasing the chances for people to escape to higher ground.

By 2015, robotic explorers will be probing the moon and, by 2025 it is hoped that, a solar powered research laboratory will be established on the moon with scientists being stationed there for several months at a time.

Spitzer Finds More Galaxies

from *CNN*

The Spitzer space telescope has done it again. Several galaxies have been found some 11 billion light years from earth. These galaxies are some 10 trillion times brighter than our sun. Until recently, despite their brightness, they have been blotted out by cosmic dust.

Project Genesis Not Lost

from *the BBC*

Project Genesis saw a probe in Earth orbit for three years collecting samples of the solar wind. It was supposed to return to earth via a parachute and be snatched out of mid-air by a helicopter stunt team. But, alas, the parachutes failed and last September Genesis crashed in Utah.

But fear not. Scientists claim that they had recovered a significant amount of solar wind atoms from the wreckage to actual work with.

More Evidence of Life on Mars

from *the BBC*

An Italian scientist, Vittorio Formisano, speaking at a Dutch conference announced that Mars' atmosphere has been noted to contain certain gases, notably methane and formaldehyde. This could signify that there is current

biological activity on the red planet. Further soil analysis will be needed to confirm or disprove this.

Far Too Young for X Rays

from *universetoday.com*

Scientists using the European Space Agency's XMM-Newton Observatory have discovered a young protostar some 10000 to 100000 years young in the area of R Corona Australis some 500 light years from Earth.

What is so amazing about this is that this protostar is emitting X rays at a level far too high for such a young star. Surrounding matter is being attracted to the star some 10 times the level of gravity that it should exert. Super magnetism is the reason given for this.

Oxygen on Saturn?

from *universetoday.com*

Cassini has discovered oxygen in the atmosphere of Saturn. What is so special about this is that molecular oxygen (O₂), like we have here on the Earth, is a by-product of plant respiration - they take in carbon dioxide (CO₂) and exhale oxygen. Now scientists have to figure out how Saturn is producing oxygen without any life on the planet.

Mark Coady
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PAA welcomes Denis Gauthier

Denis Gauthier (yes that's with one 'n') keeps time by tapping his toes and watching the stars. How so? For starters Denis plays mandolin with a bluegrass band on nights when he isn't stargazing with the club's 6-inch loaner scope. Denis hails from Cavan and comes to us via the Backyard Astronomy Course at Class Connections. Welcome aboard, Denis. We hope you'll enjoy the club and that your sky skills will rocket ahead this summer. Want to book a bluegrass band for a summer bar-g-q? You can reach Denis at 705-944-5810



Denis Gauthier is one of the PAA's newest members. Welcome aboard Denis!

The Sky This Month

MERCURY

Mercury is a morning object.

VENUS

Venus is currently obscured by the glare of the sun, but will slowly be making it way out of the western haze.

MARS

Mars is visible in the morning sky.

JUPITER

Jupiter is at opposition on April 3rd, and will remain visible throughout much of the night in April.

SATURN

Saturn is well placed for observing this month. It is located in the constellation Gemini. It sets around just after midnight.

URANUS

Uranus is located in Aquarius and is not visible this month

NEPTUNE

Neptune is located in Capricornus, but is hidden by the glare of the sun.

PLUTO

Pluto is located in Serpens Cauda and not visible at this time.

METEOR SHOWERS:

There is one major shower this month:

Lyrids: Apr. 16-25

There are also several minor showers visible from the northern hemisphere. For more information on these, see <http://comets.amsmeteors.org/meteors/calendar.html>.

Comet Machholz

It is just another fading memory in the night sky, but for those of you who followed any the most recent comet happenings, you will know that I am referring to Comet Machholz (C/2004 Q2). Although this recent comet was not the brightest in recent memory (we were all spoiled by Hale-Bopp), in binoculars or a telescope, there was no mistaking this fuzzy green glow as a comet. As is typical though, the best views of the comet were by taking time exposures with either digital or film technology.

You may recall that California astronomer Don Machholz discovered this comet in late August 2004. We were fortunate with this comet to have



Comet Machholz taken on January 14th. Note the gas tail.



Comet Machholz looks dramatically smaller on Mar 14th.

it visible across the northern hemisphere from mid-December 2004 through to the end of April 2005. We have not had a comet in the sky for over four months in quite sometime. As of this writing the comet is low in the northern sky and only a magnitude 8.1 apparition. By the end of the month it will have faded to magnitude 9.0, so say good-bye now.

During its orbit through our solar system Machholz was closet to Earth on January 7th, at a distance of 52 million kilometers, putting it between the orbits of the Earth and Mars. I got out on the night of January 14th and exposed some 800 ASA print film to get the attached image. This was only a 3-minute exposure using a 135mm lens while piggybacked on my Meade ETX scope. If you look closely you can see the faint "ion tail" (caused by the solar winds) pointing to the left of the comet nucleus and the main "dust tail" (caused by its forward motion) pointing downward in this image. At this time the comet was at magnitude 4.2 as it entered Perseus located high in the western sky.

For comparison, the next image is what I recorded in a 3-minute exposure and a 50mm lens on the same film, March 14th. By this time its magnitude had dimmed to 6.7. The bright star in the lower right is Polaris.

I hope you did take the opportunity to catch a glimpse of this comet as it arched across the night this winter. If not, at least now got to see what you missed. Until next time, keep looking up!

Rick Stankiewicz
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The Lion Springs Loose

The lion in this instance is the constellation Leo. And like the mud, slush, and March Break, it is one of the first welcome signs of winter's demise. The big cat rises just after sunset, and is quickly identified by the sickle shape that represents the lion's head. A fast check in Terry Dickinson's *Night Watch* and you'll discover that Leo is one of the few constellations that really look like what it is supposed to represent – a lion.

Those of you with binoculars will discover a couple of worthwhile targets near Leo. Just ahead of, but below Leo's head is a large open star cluster known as The Beehive. One look at it in binoculars and you'll see how it got its name. Known to astronomers as M44, this cluster is just visible to the naked eye.

And in a telescope at low power it pops into life like a rocket burst on Canada Day. M44 is actually in the constellation Cancer the Crab. If you have a small telescope you can also track down another 'M' object – M65 in Cancer.

Shifting back to the constellation Leo, you'll also discover a beautiful double star. Look for the brightest star in the sickle shape. That's Regulus, the lion's heart. Now, two stars up from it, and the first star in the crook of the sickle is Algjeba. It is a double that's quite attractive in a small telescope. It's also worth a try in your binoculars.

Bringing up the cat's caboose is another large open star cluster that's actually classified as a constellation. This particular one is often called the tuft on the lion's tail. It is also known as Coma Berenices and therein resides

a tale of tails.

According to Egyptian mythology Coma Berenices represents the amber tresses of the Queen Bernice II. Her husband, Ptolemy III, had gone off with his army on a particularly dangerous military mission. Bernice, who was particularly proud of her long, beautiful hair, promised the gods that she would cut it off if Ptolemy III returned safely.

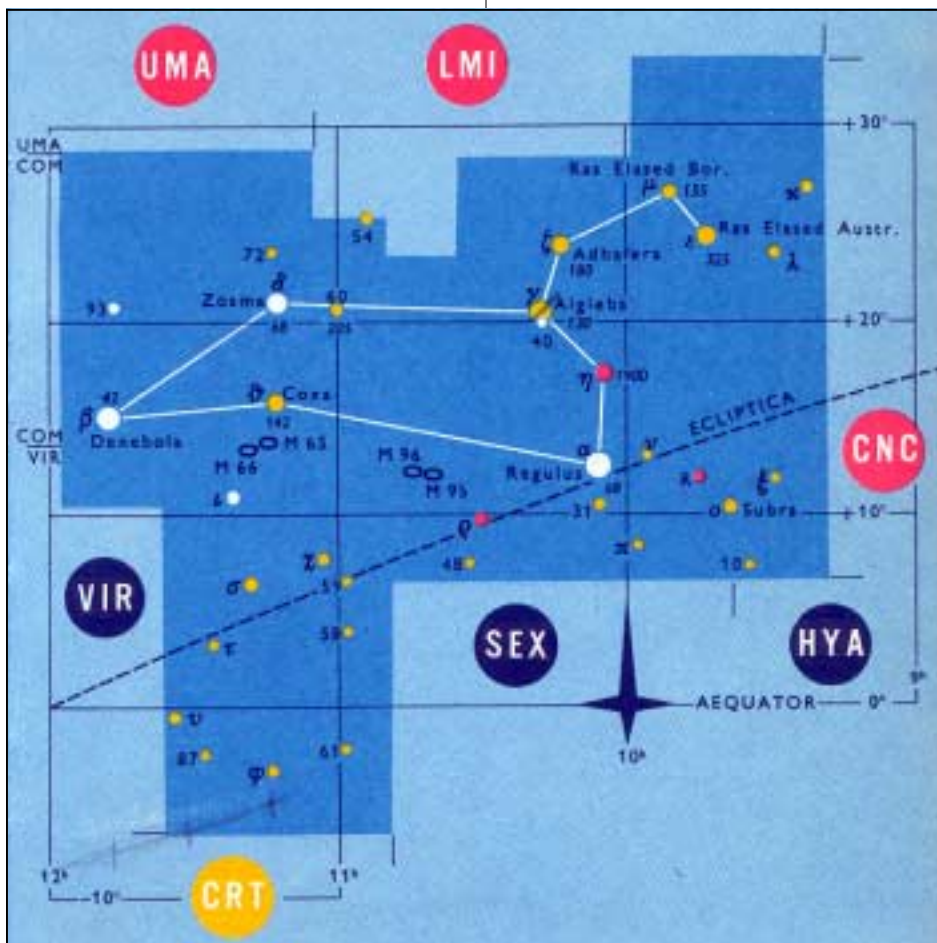
To shorten the story, he did and she did, placing her lovely locks in the temple of Aphrodite, the goddess of beauty. During the night, Bernice's tresses vanished leaving both Ptolemy III and Bernice angered. To save face, and perhaps a few lives, Conon, the court astronomer announced that Bernice's gift had been so well received by Aphrodite that she had taken the hair and placed it in the night sky for all to admire. With that he pointed out the star cluster just behind Leo. Fortunately for Conon neither of the Royals was particularly astute astronomically speaking, so to this day Coma Berenices is said to be the treasured tresses of a grateful Queen.

For those with telescopes, there's plenty to see between the lion's nose and the tuft of his tail. Galaxies M65 and 66 make a great side-by-side paring. And you'll also come across third NGC member of the party a bit further out. Reduce your power and you'll be looking at the famous Leo Trio in one field of view.

If you want to impress your friends, tell them that M65 and M66 are both about 40 million light years away. That's 10 trillion kilometers times 40 million! Better pack a lunch and a change of gotchees, it's a long trip.

By the way, if you think M65 and M66 look to close together in your scope, wrap your brain around this – they are separated by 180,000 light years. I guess that's close in cosmic terms. Let's see, my mini-van gets about 455 km per tank full. Sure hope there's a Can Tire along the way.

Also lurking in Leo are galaxies M105 along with M95 and M96. A quick peek



Leo the Lion is one of the few constellation that actually resembles what it is. It is also a great treasure trove of galaxies.

at your star chart will show them to be about half way between the star Regulus and the Leo Trio. They're not quite as big and bright as M65 and M66, but reside at about the same distance from your eyeballs.

Also rising just after Leo is the planet Jupiter. This year Jupiter is in the constellation Virgo. If you look nearly straight overhead at this time of year, you'll also spot Saturn in the constellation Gemini.

And there you have the Lion's share of astronomical entertainment for April. Two star clusters, six galaxies, one double star and two planets. They should keep you occupied for many nights.

John Crossen
JohnCstargazer@aol.com

Astronomy in Philately

Gagarin, Yuri A. (1934-1968), Soviet cosmonaut and first human to fly in space. Gagarin flew into space aboard Vostok 1 on April 12, 1961, and made one orbit of the earth. This year marks the 44th anniversary of this historic flight into space. Gagarin was born in the former Union of Soviet Socialist Republics (USSR). As a young man he joined a flying club and learned to fly airplanes. His instructor recommended him to the air force, and Gagarin began attending the Soviet Air Force Academy in 1955. He graduated from the academy with high distinction in 1957, shortly after the launch of Sputnik 1.

Gagarin applied for the six-week cosmonaut screening process in 1960 with just 230 hours of flying experience. He and 19 others were selected to become cosmonauts. Of these 20 men, 12 eventually completed space flights. Gagarin and fellow cosmonaut Gherman Titov, front-runners in their class, were both contenders for the Vostok 1 flight.

Gagarin was chosen to fly aboard Vostok 1 just four days before the launch date. He boarded the Vostok craft roughly 90

minutes before lift-off on April 12, 1961. On the pad, he listened to piped-in music and received word that he had been promoted to the rank of major. There was at least one delay in the countdown, due to a faulty valve. At 9:07 AM, Vostok 1, using the radio name CEDAR. Approximately 327 km (203 mi) above the earth at his highest point, Gagarin's ship made a single orbit around the planet. The total time of the flight was 1 hour 48 minutes.

Gagarin was exposed to about six times the normal force of gravity on the earth during the launch phase and about eight times the normal force of gravity during the re-entry. During his one orbit around the earth, he ate and drank (no one had ever done this in weightlessness before), monitored the capsule's systems, and evaluated his ability to observe features on the earth (he had no camera). The capsule's control panels were locked, since everything was either automated or controlled from the ground, but Gagarin had the code to unlock the controls in a sealed envelope in case there was an emergency. Vostok 1 landed in a field near Saratov, observed only by cows and a few peasants. Information that emerged in the late 1980s about the Soviet space program suggests that Gagarin actually bailed out of Vostok 1 at an altitude of about 6 km (about 4 mi) and descended under a parachute separately from the capsule.

A worldwide hero's welcome awaited



This Polish stamp shows a Vostok spacecraft, like that which took Yuri Gagarin into space in 1961



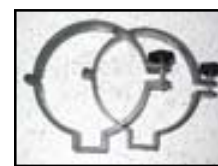
This Soviet stamp commemorates Yuri Gagarin's pioneering trip into space on 12-April-1961.

Gagarin when he returned to Moscow. He was appointed a deputy of the Supreme Soviet, awarded the Order of Lenin, and named hero of the Soviet Union. He became active in cosmonaut training. Gagarin was on the backup crew for Soyuz 1 and reportedly was a leading candidate for the planned Soviet piloted lunar landing. He was killed on a routine jet proficiency flight in March 1968.

Gagarin's ashes were interred in the Kremlin wall. He and his historical flight are remembered officially in many ways. A titanium obelisk, which reaches a height of 40 m (120 ft), was erected at the Vostok 1 landing site. A crater on the far side of the moon is named for Gagarin.

Rick Stankiewicz
stankiewiczr@nexicom.net

Classifieds



Rings for 4.5" reflector. Pair of telescope rings that fit 4.5" reflector (Synta, Skywatcher, Celestron, Orion etc.) Asking \$25.

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

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
4094 Squair Rd
Orono, ON
L0B 1M0

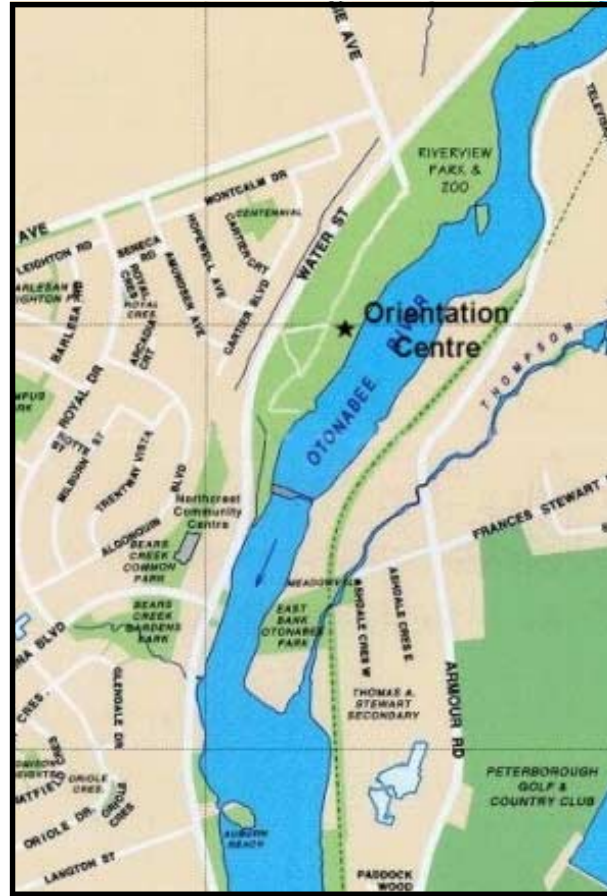
or via e-mail at:
va3ngc@rac.ca

**NEXT ISSUE’S
DEADLINE IS
May 9th, 2005**



MEETINGS

The Peterborough Astronomical Association meets every second Friday at the Peterborough **Zoo Orientation Centre** (Next to the PUC Water Treatment Plant) at **8:00 pm**.



1 CALENDAR OF EVENTS 1

- April 1, 2005 **General Meeting**—Randy Atwood on the Lunar Excursion Module
- April 15, 2005 **General Meeting**—Astronomy Day preparations/Movie
- April 29, 2005 **General Meeting**—Observing Night - Don McDonalds Observatory
- May 13, 2005 **General Meeting**—Thomas Kovacs of the Haliburton Forest Observatory

1 MOON PHASES 1

- Last Quarter (☾) April 1, 2005 May 8, 2005
- New Moon (●) April 8, 2005 May 16, 2005
- First Quarter (☽) April 16, 2005 May 23, 2005
- Full Moon (☾) April 24, 2005 May 30, 2005