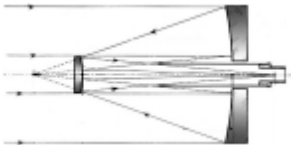
PETERBOROUGH ASTRONOMICAL ASSOCIATION

THE REFLECTOR



Volume 2, Issue 4 | *SS Columbia 1981-2003* | February 2003

Editorial

Winter is now halfway over, and soon the weather should be getting better as the sun makes it way towards the celestial equator over the next 6 weeks. This past month has been a bit better for clear nights than the previous two, but they were cold! There were a few times that I wanted to fire up the old scope, but the –20°C temperature coupled with the strong winds, made most of those times a quick naked eye night instead.

On February 7th, Jim Kendrick, of Kendrick Dew Removal fame, will be here to give us a talk and show off some new equipment. For the March 7th meeting we tentatively have Tom Kovacs of the Haliburton Forest Observatory coming to speaking to us. The March 21st meeting will feature our own Rob Fisher. Topic to be determined.

In an effort to be more responsive to member's needs we will be handing out a club questionnaire at the February 7th meeting. The purpose of the questionnaire is to get a sense of where you want the club to go. Please give the issues mentioned some thought and take the time to fill out the form. Then bring it to the February 21st meeting. We'll collect them, tally the responses and talk in more detail about what you want the club to be and where you want it to go. *Remember—it's your astronomy club and it can only be what you make it!*

As you may well know by now, the Space Shuttle Columbia disintegrated over Texas on February 1st, while making its decent to Cape Kennedy in Florida. At the time, it was traveling at an altitude of 61 km above the earth's surface and at a speed of 20,000 km/h. Streaks were seen in the sky after

Columbia's First Mission began on 12 April 1981

witnesses heard a loud sonic boom at about 9 AM EST, the same time controllers lost contact with the shuttle.

Sadly, all seven astronauts on board lost their lives that day. This is the second space shuttle mission to end in disaster and the first to occur on landing or on the approach to landing in 42 years of American space flight.

The Columbia was the first Space shuttle launched into space on 12 April 1981. It made 28 space flights, slightly over a quarter of what it was designed for. It was named after the sloop captained by American Robert Gray in 1792. Gray and his crew manoeuvred the *Columbia* past the dangerous sandbar at the mouth of a river extending more than 1,000 miles through what is today south-eastern British Columbia. The river, and hence the province, were later named after the ship.

Columbia's Final Mission—1 Feb 2003

This disaster will certainly setback many projects including those connected with the International Space Station an upcoming repair of the Hubble Space Telescope. When the Challenger blew up during lift-off in 1986, the shuttle fleet was grounded for almost three years.

Currently, there is a Russian and two Americans on board the ISS. In the meantime, the Russians will be supplying

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the station with food and supplies. In fact, the Progress M-47 supply ship lifted off from the Baikonur Cosmodrome in Kazakhstan the day after the Columbia disaster.

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HIGH FLIGHT

-John Gillespie McGee, Jr

Oh, I have slipped the surly bonds of earth,
And danced the skies on laughter-silvered wings.
Sunward I've climbed and joined the tumbling mirth
Of sunsplit clouds-and done a hundred things
You have not dreamed of....
Wheeled and soared and swung high in the sunlit silence.
Hov'ring there, I've chased the shouting wind along
And flung my eager craft through footless halls of air.
Up, up the long, delirious, burning blue
I've topped the wind-swept heights with easy grace,
Where never lark, or even eagle, flew;
And while with silent, lifting mind
I've trod the high, untrespassed sanctity of space,
Put out my hand, and touched the face of God.

John Gillespie McGee, Jr. was an 18-year-old American when he came to Britain in October 1940, during World War II, and joined the Royal Canadian Air Force. He flew in a Spitfire squadron and was killed at age 19, on December 11, 1941, during a training flight from the airfield near Scopwick, Lincolnshire.

The poem was written on the back of a letter to his parents which stated, "I am enclosing a verse I wrote the other day. It started at 30,000 feet, and was finished soon after I landed."

Jim Kendrick - From Artist To Astronomy Entrepreneur

To amateur astronomers, Jim Kendrick appears to be living our dream life. He travels to the best star parties. He's on a first name basis with the hobby's elite. And he gets to play with all kinds of neat toys - a whole store full of them. But becoming one of Canada's astronomical success stories wasn't written in the stars. In fact it had a somewhat nebulous beginning.

Jim Kendrick and the "Porta-Ball" scope

As a child, Jim was fascinated by science - astronomy in particular. Wanting to take up a career as an astronomer, his hopes were quickly dashed when he realized that astronomers no longer look through telescopes, but instead are heavily into theory and math. Being useless at math, he turned to his other major interest – art – as a means of decorating his dining room table.

In 1990, Jim began to put his skills with stained glass and painting to practical use. For a time, he even made repairs to stained glass windows and fractured statues in need of replacement parts or a new coat of paint. But the lure of the stars was still there.

Jim acquired his first telescope in 1993. It was a 4.5-inch reflector and he began to learn the night sky. But learning the constellations and the faint fuzzies was relatively easy. What wasn't so easy was pursuing his heavenly interests through dew covered optics. This was a serious problem in need of an equally serious solution.

So, while continuing his involvement at Toronto Stained Glass, Jim began

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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exploring ways to solve the problem of removing and preventing dew on telescope optics. He carefully analyzed the market at the time. He was searching for a hole to fill. What he found was an impact crater the size of a small nation.

The affordability and portability of the Schmidt-Cassegrain telescope had put a relatively large number of these instruments twixt the anxious palms of many amateurs. Happily for Jim, the SCT's design, with its big, exposed corrector plate also made it particularly susceptible to dewing over. Necessity being the mother of invention, some amateurs had experimented with wrapping toaster wires around the front of their telescopes - and it worked. But Jim wanted to put something together that was a bit less rag-tag in both appearance and function.

So, the Kendrick Dew Removal System was born in 1994. With it, a single control unit sends a glow of dew-preventing heat to the scope's primary optics, the finder and two eyepieces. Today the Kendrick Dew Removal System is in its sixth design generation and remains the core of Kendrick Astro Instruments' business. A business which now includes 12V rechargeable power packs, observing tents, a laser collimator for SCTs and a store filled with telescopes and accessories.

Jim's business has come a long way from dusty back rooms and rented garages to the well-stocked store and international clientele it boasts today. Nonetheless, Deb and I will never forget bumping into Jim on the way home from *Starfest '94*. He was coming out the front door of a country variety store when he looked up and recognized us. He broke into a smile that nearly encircled his head, then dug into his jeans pockets with both hands, pulled out fists full of dollar bills and exclaimed, "they're buying them…they're really buying them."

Today they're still "buying them"…and a whole lot more.

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Astronomy in Philately

With the recent disaster of the Space Shuttle Columbia (STS-107) on February 1, 2003, I would like to dedicate this column to the lives of the 7 astronauts that died with their spacecraft on re-entry at the end of their 16 days mission in space.

Yes, the Space Shuttle Columbia did adorn United States postage stamps in the past. On May 21, 1981, the U.S. Post Office issued a set of stamps that showed "space achievements". At the heart of the issue was a block of four stamps that showed a round trip flight of the Space Shuttle Columbia. The first flight of the Columbia was from April 12-14, 1981. The stamp sequence runs from the "liftoff", to "main booster rocket jettison", to "satellite deployment", to "re-entry". You might say that this was the "picture perfect" way in which the Columbia had preformed for most of its previous 27 missions. It's return after completing its 28th mission was not to be the same. This is really eerie when you consider that in the same week were the anniversaries of both the 1967-Apollo 1 tragedy and the 1986-Challenger disaster.

The fitting inscription on all of the 1981 stamps is, "Benefiting Mankind". It is true that space exploration benefits all of us, but it is a risky business. I hope we appreciate the sacrifices that are sometimes paid.

Your Astronomical Philatelist
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Shuttle Stamps issued by the US Post Office in 1981

The Sky This Month

MERCURY:

Mercury will be visible in the morning sky in the first half of this month.

VENUS:

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

MARS:

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

JUPITER:

Jupiter will be in Cancer and appears as the brightest object visible in the evening hours.

SATURN:

Saturn will be visible near the Taurus-Gemini boundary, not far away from the Crab Nebula (M1). The rings are well oriented for viewing the Cassini Division

URANUS & NEPTUNE:

Uranus and Neptune are not visible this month

PLUTO:

Pluto will not be visible this month.

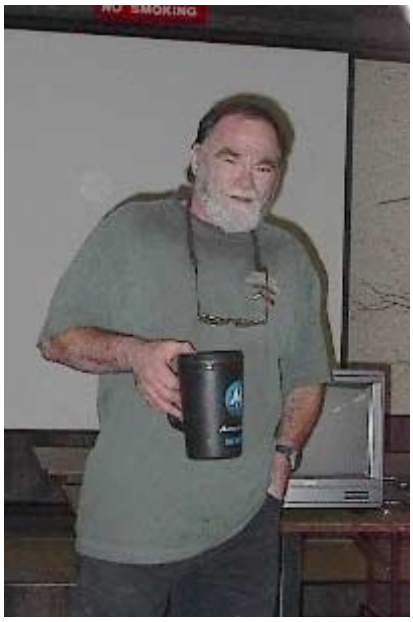
METEOR SHOWERS:

There are no major showers this month, however there are three minor showers visible from the northern hemisphere:

Aurigids:	Feb. 5-10
Delta Leonids:	Feb. 22/23
Sigma Leonids:	Feb. 25/26

Meet Dave Duffus. The PAA's Equivalent of the Big Bang

Dave is almost always the first person to show up at a meeting. With a stogy clamped between his teeth, a box of Tim Horton's doughnuts in hand and the coffee maker under the other arm, he opens the door to the Orientation Centre and we enter our 33rd year of club meetings. That's because way back in 1970 another long time club member, Frank Hancock, called Dave (who was still in high school) and said, "let's talk about starting an astronomy club." They did, and here we are today – over three decades later!



Dave with his Familiar Coffee Mug

Dave's introduction to astronomy started in the second grade with a shoebox. It seems a student teacher showed the kids how to build a mini-planetarium by poking holes in the pattern of constellations in the box, then placing a light inside. Viola, the constellations appeared on the ceiling of the darkened classroom. And young Dave Duffus was hooked on astronomy.

During the school years that followed a series of teachers took notice of Dave's interest in the stars and helped propel him along with whatever help they could provide. So, by the time Dave was in Grade 8, he was the proud owner of a *Tasco* 4-inch reflector. That really rocketed Dave into space. But it wasn't his first scope. Prior to the *Tasco*, he had a little folding monocular which he used to scan the skies.

Once Dave and Frank, along with Mike Junkin, got the club off the ground things really began to happen. Three or four public observing nights were held each year – with up to 200 guests attending on one night when there was a lunar eclipse. The club was not only active with the public, but also regularly hired a bus for trips to Toronto's now defunct McLaughlin Planetarium. As many as 48 people – members and interested guests - would clamber aboard for a Saturday trip to the stars.

At that time the club had about 15 members, many of the members were students. For observing sessions they regularly met at Nicholls Oval near Park Hill and Armour Hill. That's also where the public viewing nights were held. Dave says the trees weren't so tall then, nor was the light pollution so intensive. Club members also made frequent visits to Frank's property at Smith Line where the sky was darker.

Other "neat" things that happened during those days was the night Dr. John Percey from the U of T gave a talk to the club on the Crab Nebula. And, because one of the club members was with the Peterborough Examiner, she worked with the media and the club got to make an astronomy movie. (Wouldn't that be fun to see?)

Dave also owes his marriage to astronomy. It seems a young lady was organizing an astronomy night for the cub scouts one cold February night. Dave and the club were tapped for their skills. Well, one good thing calls for another and the following April the scouts asked Dave and the club to put in a repeat performance. One thing led to another and since then Dave and Wendy celebrated many orbits of the sun together.

Today the Peterborough Astronomical Association boasts a solid membership that lists men and women from all walks of life. And the club is becoming more active on all fronts.

Last year Charles Baetsen resurrected the club newsletter. Thanks to electronic technology, it's more impressive than ever before. And thanks to contributions from members Rick Stankiewicz, Rob Fisher, Will Juodvalkis and others it continues to grow.

At our last meeting Peter Shewchuk donated 150 books to the club library, which John Crossen and Charles are organizing. By the time you read this,

the total will exceed 400 astronomy books and videos.

John, with help from other members, has taken on the task of contacting outside speakers to make our club meetings even more informative and entertaining. And as soon as the weather warms up a bit, we'll be planning more observing sessions – both for the club as well as the public.

We've come a long way since Dave, Frank and Mike first huddled together. So here's our thanks to Dave and the guys for starting it all. Now it's up to each and every individual member to take up the challenge and make the next 33 years even more exciting.

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Off the Beaten Path

This month brings lots of new and interesting objects to observe in the winter sky. One of the richest regions of the sky is where the Milky Way flows over Monoceros and Canis Major. Here is a brief list of sites in this area.

Canis Major:

NGC 2204 Bright open cluster, pretty large, compressed, rich with several nice chains of stars superimposed with a background of fainter members.

NGC 2345 Pretty bright open cluster, somewhat compressed, arrowhead shape points to starless region. Star at tip of arrowhead is double.

NGC 2360 Open cluster—bright, large, compressed, rich and round. Easy to see in an average finder. This is a winter favorite.

Monoceros:

NGC 2301 This open cluster is bright, large and pretty rich with about 40 members and is easy to pick out in the finder scope. This cluster has a lovely blue and gold double star right in the center. It is definitely a cluster to put on your list.

NGC 2301 in Monoceros

Lepus:

NGC 1904 (M 79): Pretty bright, pretty large, round, very bright in the middle at 135X. Well resolved, with a compressed central section against a very grainy background. Easily seen in the finder. It is the only bright globular visible until spring.

NGC1904 (M79) located in Lepus

Cancer:

NGC 2682 Bright, very large, extremely rich and somewhat compressed with stars from 10th to 14th magnitude. Using a wide field eyepiece (like a Naglar) makes this excellent cluster fill the field of view with beautiful chains of stars and several dark lanes that meander through the cluster like dusky rivers.

IC 2392 Faint, pretty small, round and somewhat brighter in the middle. This galaxy is easier to spot with δ-Cancri out of the field of view.

NGC2672 and NGC2673 in Cancer

NGC 2672 Fairly bright, pretty large, elongated and much brighter in the middle at higher power. There is a companion galaxy (NGC 2673) superimposed on its east side and it is pretty faint, small and round.

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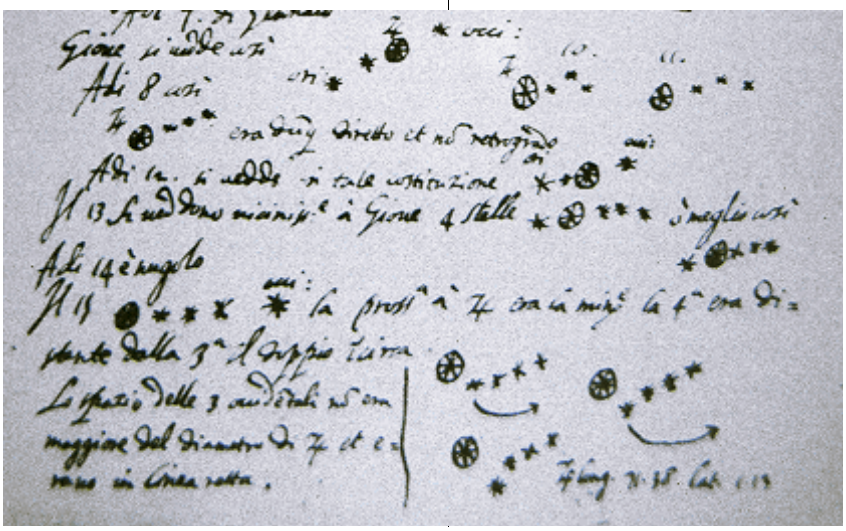
Buckhorn Observatory Passes The $1,000 Mark In Library Donations.

Just last September, the observatory presented the Galway, Cavendish and Harvey libraries with a cheque for $800. The cheque represented donations from observatory visitors for the year. Anticipating the coming winter clouds and a drop in seasonal traffic, owners John and Debbi Crossen figured that would be it for the year. Wrong! Since then another $245.89 tinkled into the donations jar. So, last week they presented the library board with a second cheque representing the balance of the donations for the 2002 year. While John and Debbi thank everyone who donated, they are particularly grateful to cottagers Anthony Balka as well as Tom and Vivian Towson who's generosity pushed the year's total over the thousand dollar mark. The observatory is closed from January to April when it will open again with a goal of topping the 2002 mark in visitor donations.

Jupiter's Moons Dance The Night Away

When it comes to moons, giant Jupiter is most attractive. That's because of the planet's mammoth size, which causes it to generate a huge gravitational pull. How much pull? How about 318 times the gravitational attraction of Earth. In fact, next to the Sun, Jupiter has the greatest gravitational tug in our solar system.

All told, there are 39 moons orbiting the planet. They range in size from a few kilometers across to one – Ganymede – that's larger than the planet Mercury. Chances are the smaller moons are fragments of two or more moons that collided millions of years ago. Some may also be asteroids or comets that have been roped in by Jupiter's gravitational lasso. That's because they orbit the planet in a direction opposite that of the larger moons and many are on a much more inclined orbital plain to the planet.



Galileo's Notebook Showing the four New "stars" around Jupiter

But the moons we're concerned with here are the four largest. They're the ones first Galileo saw on January 7th, 1610 when he trained his telescope on Jupiter. This is why they are often referred to as the Galilean moons.

In order of their orbits out from Jupiter they are Io (pronounced e-o), Europa, Ganymede, and Callisto. The names were chosen because they are the names of the ancient god Jupiter's personal attendants. Three of the moons – Ganymede, Io, and Callisto – are larger than our own moon. Europa is smaller, but not by much. And they all orbit Jupiter much faster than our Moon orbits Earth. Io takes just over 42 hours to orbit Jupiter. Europa laps Jupiter in 72 hours. Ganymede takes 191 hours (just over 7 days) to make a trip around the planet. And furthest out is Callisto, which crosses the start/ finish line in a bit over 16.5 days. That's fast. Our Moon, which is an average of 400,000 kilometers distant and takes 27 days to complete one orbit. Callisto is nearly 2 million kilometers from Jupiter's gaseous surface. So 16.5 days is a very fast 'round, indeed.

The rapid orbits of Jupiter's moons have given rise to the term "dancing moons." And indeed, one of an amateur astronomers' delights is watching the four moons change positions from night to night. Some nights they are perfectly balanced with two moons like parentheses on each side of the giant planet. Other nights they will alternate 1 and 3 from side to side. And on some nights one or two will appear to be missing. That's because they are either passing behind Jupiter or moving across in front of it. In the later case, look for a black dot on Jupiter's surface. That will be the shadow of the moon as it transits Jupiter's surface.

For the next couple of months, Jupiter's orbital plain in relation to that of Earth will show the moons edge on. So you may even be treated to the sight of one moon eclipsing another. Neat stuff!

The Galilean moons have unique personalities. Io is the most volcanic body we know of in our solar system. The Galileo spacecraft photographed the plum of one of its volcanoes its small wonder then that Io's surface is very hot and covered with molten sulfur. Pewwww! It wasn't me, man.

Europa shows evidence of huge flowing oceans beneath its icy surface. This is one of the areas NASA will be exploring in its search for distant life forms. Anybody bring his or her SCUBA gear? Ganymede and Callisto are also worlds of ice and craters, but with no hint of water beneath. None of the Galilean moons has what would even remotely resemble a breathable atmosphere by our standards.

Next time you're out with your scope or even hand-held 10x binoculars have a look at Jupiter's frolicsome foursome. It's been just under 400 years since they were discovered.* But they're just as fascinating now as they were on that night long ago when Galileo turned his telescope skyward and said, "Hold the pizza Mama, this ya gotta see"!

**Records kept 2,000 years before Galileo, show that one of Jupiter's moons was observed naked eye by Chinese astronomers. Sharp sighted folks they must have been!*

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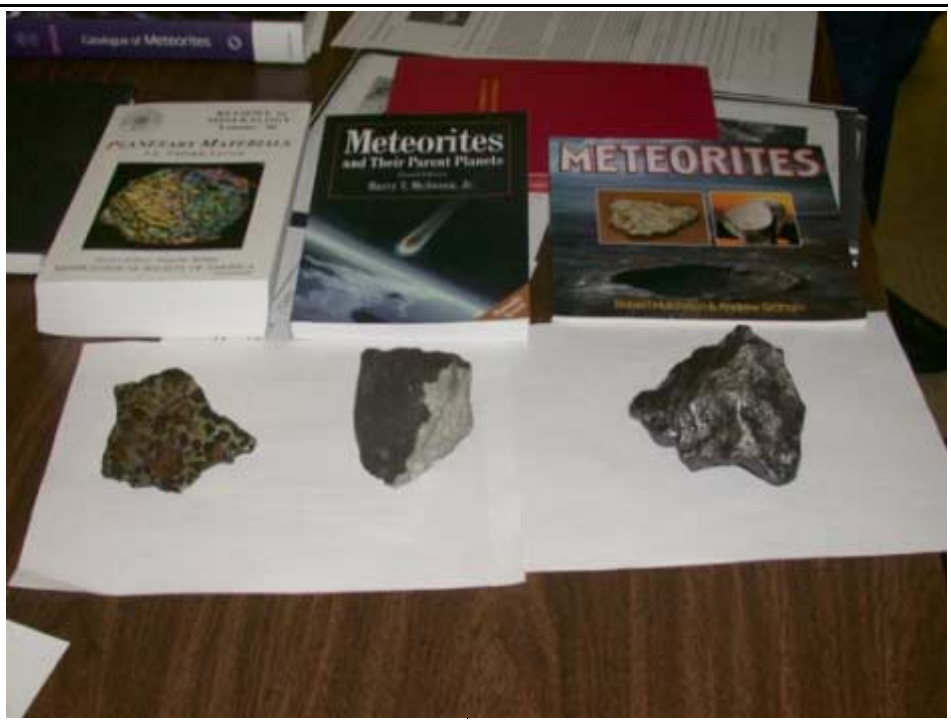
Meteorites – Out of this World!

On January 15th, 2003, there was a special treat at the Peterborough Zoo Orientation Centre. Graham Wilson was a guest speaker brought in for a regular meeting of the Peterborough Rock and Fossil Club. Graham is an expert on meteorites and he had lots of information to impart and it had quite an "impact" on me. There was a good turn out of about 20 people and it was interesting that half the crowd was PAA members. There were slides, books and actual meteorite samples to illustrate the three main categories that classify meteorites. The slide show went for over an hour and then came the show and tell. Graham had three good-sized samples of meteorites borrowed from Ottawa. There were nice specimens of the "stony", "stony-iron" and "iron" meteorites. They are all quite heavy for their relative size and have magnetic properties, related to their composition of nickel-iron and other trace elements. As their names imply, the look of each type is distinct (see photo).

It is intriguing to think of what these "rocks" represent. Real pieces of outer space! Things not of this planet! We have all likely seen a meteor or "falling star". Those are usually the result of dust or sand-grain sized particles burning up as they travel through earth's atmosphere. Meteorites are the result of much larger bodies of material that start with enough mass (meteor) to travel through our atmosphere as a "fireball" or bolide, survive this hot entry and land as a meteorite. Rene Bowe related a story of the witnessing of a bolide by three PAA members a few years ago (Dec.2/00). Rene, Bill Plewes and myself were coming back from Brian Colville's observatory around 1:00 a.m. when there was a large green fiery object to the south of Hwy #7 near Lindsay. It appeared to breakup and was traveling horizontal to the ground. Graham pointed out that eyewitness accounts could be very deceiving. The distance and angles involved can put a possible impact site a long ways from where you think it should be.

Graham Wilson



Various Meteorites

PAA member Robert Fisher actually brought a meteorite sample that he had acquired recently and had Graham inspect it (see photo). Robert's sample originates from a meteorite find in Africa. Amazing to know that you have a piece of "outer space"! I wonder if anyone else in the PAA has any meteorite samples?

Graham pointed out as well that not all meteorite like things are created equal. There are lots of rocks out there that appear to be meteorites, but are not. So, when is a meteorite not a meteorite? When it's a meteor-wrong! This is a term used to describe something that can be confused with the real thing. Things such as human-made slag, concrete, metals and alloys can fool the untrained eye. Then there are the unique objects called tektites. These are glassy looking globules (often round or tear dropped shaped). They are not meteors, but are

Graham Wilson examining a meteor from PAA member Rob Fisher

associated with areas of large meteor impacts. It is thought that these are the result of earth being fused into these "rocks" from meteorite impacts that send this material into the atmosphere and then comes raining down as tektites. There was a person at the talk who had a nice collection of tektites that he collected from the Far East many years ago (see photo below).

Tektites

This presentation was a great opportunity to combine my interest in astronomy with another hobby of mine, rock collecting. I guess you really can, catch a falling star and put it in your pocket. With any luck, maybe we can get Graham to attend a PAA meeting in the future and let the rest of our members learn first hand about this fascinating subject. It truly is, out of this world!

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Mysteries of Deep Space Scores Another PBS Win.

If you find it hard to pass up a PBS documentary, *Mysteries of Deep Space* is guaranteed to further your addiction. Knowledgeable, lively writing keeps this layman-level trilogy moving along nicely. Superb graphics demonstrate key points quickly and clearly. And who can argue with commentators like Margaret Geller, Sandy Tabor, Saul Purlman along with the planet-discovery team of Geoff Marcy and Paul Butler? And those are just a few of the breakthrough-making astronomical luminaries who appear throughout the series. *Mysteries of Deep Space* also acknowledges the shoulders today's young astronomers have built upon with historic film footage of Albert Einstein, Edwin Hubble, and more. Three one-hour videos make up the series, which is broken down to cover the three key issues confronting us today.

The segment titled *The Search for Alien Worlds* chronicles our fascination with, and fantasies about alien civilizations, from the days of Aristotle to the turn of the century with its Moon Men and Martian canals. It then takes us to the giant Keck telescope where new extra solar planets are being discovered and to the SETI dish which is constantly scanning the sky for a message from beyond Earth.

Exploding Stars and Black Holes explores these phenomena which have not only shaped the landscape of the universe, but (in the case of super nova) are the birthplace of the very elements to comprise our world and ourselves. Yes, we really are star stuff!

To the Edge of the Universe delivers precisely what its title implies. You'll join Margaret Geller as she presents her breakthrough work in mapping the universe. Then you become a member of the team of young astronomers responsible for the historic Hubble ten-day exposure of distant galaxies. And you'll sit beside astronomer Sandy Tabor as she and her team captures the ancient light from strange galaxies that formed billions of light years ago.

Mysteries of Deep Space is nicely packaged and contains brief descriptive notes of each segment on the back of its respective cassette cover. Film veteran Stacey Keatch handles the narrative that ties them all together.

The three-video set is available at the PBS on-line bookstore ($49USD), most astronomy shops and through the PAA library. Running time – 3 hours (1 hr. per tape).

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A Brief History of Space Flight
Part 1: The Early Years

The first man to write about a trip to outer space was the Greek satirist Lucian of Samosata, who lived in the 2nd Century AD. He was the first known science fiction writer in history. In his *"True History"*, he describes how heroes, are hurled into the air by a waterspout and thrown onto the Moon. Since his time, we moved ever closer to making his dream a reality.

Sputnik 1

Even in Lucian's time, some of the ground work was already laid. The Chinese had already developed firecrackers and gun power. These eventually lead to the development of canons and other weapons, whose theory was based on the use of explosive chemicals to fire projectiles in the air.

Exactly what one would need if they were to leave the confines of this Earth! During these intervening years man continued to wonder and fantasize about a trip in space.

The father of modern rocketry is generally considered to be Konstantian Tsiolkovsky of Russia. In 1903, his 1898 article *"The Investigation of Outer Space by Means of Reaction Apparatus"* was published. In it he suggested the use of liquid propellants for rockets in order to achieve greater range. In 1926 Tsiolkovsky suggested the use of artificial earth satellites, including manned platforms, as way stations for interplanetary flight, and in 1929 he put forth an idea for a multistage rocket .

The next great rocket pioneer was America's Robert H. Goddard. He conducting theoretical and experimental research on rocket motors at Worcester, Massachusetts. He began to make systematic studies about propulsion provided by various types of gunpowder. On March 16, 1926, Goddard had constructed and tested successfully the first rocket using liquid fuel. Eighteen years after his successful demonstration, Goddard's pioneering achievements came to life in the German V-2 ballistic missile.

In the early 1930's, rocket clubs sprang up all over Germany. One of these clubs, the Verein fur Raumschiffarht (VfR), had the young engineer Wernher von Braun as a member. During this time the German military was searching for a weapon which would not violate the Treaty of Versailles. The military visited the VfR and, being impressed with their enthusiasm, gave them $400 to build a rocket. This when Wernher von Braun's talent was recognized. During the Second World War, von Braun had successfully developed the V-2 rocket. His dream was to develop a rocket to go to the moon, not a missile. When the first V-2 hit London von Braun remarked to his colleagues, *"The rocket worked perfectly except for landing on the wrong planet."*

At the end of the war, he surrendered to the Americans who "scooped" him up along with train loads of V-2 rocket parts. Unfortunately, most of his production team was captured by the Russians.

Wernher Von Braun

In the Soviet Union, Sergei Korolev headed a group to search the German factories for their rockets and bring back V-2 rocket scientists and engineers. From the first German V-2 weapons collected by Korolev and his team in 1946 he developed Russia's first large liquid fuel missile, the R-1, first flown in 1948. The development of the R-series of rockets over the next decade resulted in Lucian of Samosata's fantasy become a reality with the launch of Sputnik.

On October 4, 1957, the Soviets successfully launched the first artificial earth satellite called Sputnik 1. Before this satellite was launched, the earth's atmosphere was studied only up to about an altitude of 30 km and practically nothing was known about outer space. Many difficulties had to be overcome in developing instruments and insuring their operation in flight let along in getting them up there. Since this was the first object placed in orbit, scientists wanted to maximize the knowledge it would bring back, while minimizing it size, with a bit of publicity thrown in for good measure.

Sputnik was made spherical so that they could easily calculate the density of the outer atmosphere from drag measurements. Two 1 W transmitters operating at 20.005 MHz (in the SW band) and 40.002 MHz were placed inside Sputnik. These transmitters enabled scientists to determine the effect of the ionosphere on radio waves by measuring the time differential between the satellite's optical and radio rising. In addition, temperature inside the capsule was also relayed back by changing the frequency of the "beeps". They also allowed the Russians to "prove" their feat to the West.

Vostok R-7 Rocket, like the one that carried Sputnik into space.

Less than a month later, the Soviets launched another Sputnik with the dog Laika on board. The purpose of this launch was to observe the effects of weightlessness and cosmic radiation shielding on a biological system. After the success of this launch, scientists concluded that animals could endure lengthy periods of space travel, paving the way for manned flight. For the dog to survive they had to provide for the circulation of air in the absence of gravity. To accomplish this, highly active chemicals were used to produce O_2 and

absorb excess CO_2 and H_2O vapour. Also on this mission, it was discovered that the flux of charged particles (which are responsible for aurora) increased with altitude and geomagnetic latitude.

The Soviets later sent other satellites mainly to investigate radiation shielding for a possible manned flight.

On the 16 December 1957, the United States was prepared to answer the Soviets with it's own satellite, Vanguard 1. When it reached 6 feet off the ground it fell back and exploded. Back in 1954, Wernher von Braun proposed sending a single satellite on board a US Army Redstone rocket. It would have been cheap and fast, but it was turned down in favour of Vanguard. After the explosion, the White House gave Von Braun permission for his "Project Orbiter". Within 90 days the first U.S. satellite, Explorer I was put in orbit. Explorer I weighed 5.6 kg, much smaller than Sputnik (83.6 kg), but despite its small size, it was able to discover the Van Allen radiation belts.

These few missions laid the groundwork for future missions that would end up with a man on the moon.

To be continued….

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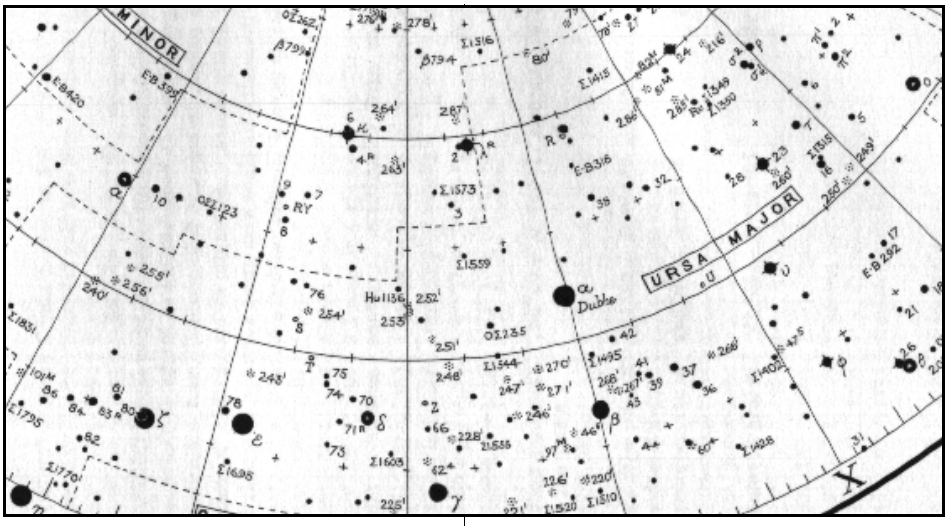
Has Anybody Seen The Plough Lately?

That's the Big Dipper in merry old England. In most of Europe it was called the wain or wagon. During the 1800s slaves seeking freedom followed the "drinking gourd" to Canada. Ancient Egyptians saw the thigh of a bull. In China it was viewed as a scene from the Tseih Sing, or government. And, of course, to the Native Americans this familiar constellation is known as the Great Bear – Ursa Major if you want to put a party dress on it.

With so many different names, it's not surprising that an equally varied number



of tales surround its origin. Amazingly, both the ancient Greeks and the Native Americans saw it as a bear. To the latter, the three stars that form the handle are three hunters that are chasing the bear across the sky. In the autumn they finally shoot the bear with an arrow. The blood trickling from the bear's wound is what turns the trees red in the fall.

The Greeks took a different tact stating that it is actually Callisto, a handmaiden greatly desired by the god Zeus. Hera, his wife got wind of the potential affair and turned the unfortunate Callisto into a bear. Zeus then placed her in the heavens along with her son, Arcas, who became the little bear – a.k.a. Ursa Minor.

And why such long tails for a pair of bear? That's because they stretched when Zeus lifted them into the heavens. Yet another variation claims that two bears were causing great trouble in the countryside. Hercules was assigned to dispatch the troublesome twosome and did so by flinging them into the sky – via their tails. Perhaps both the tails and the truth, are being stretched here.

On a more factual side, Ursa Major does contain half a dozen Messier objects, though none are star clusters. Best known are the companion galaxies M81 & M82 along with M101, an 8th magnitude galaxy. Other star cities in the bear include M108 and M109, dim 10th and 11th magnitude galaxies respectively. There are about four dozen additional galaxies in Ursa Major, but most of them are 11th magnitude or fainter. On the non-galactic side, the Owl Nebula, also known as M94, also roosts in the big bear. Yet another sight worth observing is Mizar, the second star in from the end of the handle. It is an optical double star. Both can be seen by sharp-eyed observers, and a pair of binoculars will quickly reveal the duo. Mizar and Alcor are often called the horse and rider, with Alcor being the rider.

The Big Dipper is a circumpolar constellation. This means that it can be viewed year round from northern latitudes. The two end stars in the bowl of point towards Polaris, the North Star, which is also the first star in the handle of the little dipper.

The Plough, The Bear or The Drinking Gourd, call it what you will, just about everyone can point the dipper out. In fact, it's a toss-up as to whether Ursa Major or Orion is the most familiar constellation to John Q. Public.

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Amazing Space

The science of astronomy generates some rather interesting numbers. Some are incredibly large. Others are infinitesimally small. And others are just plain weird. Here are some examples:

We all know that the greater the aperture of a telescope, the more light it can gather. And most of us are familiar with the fact that the pupil of the average human eye is only about 5 millimeters wide. So what would it take in human terms to equal the light gathering power of the Mt. Palomar 200-inch telescope? Would you believe about 20,000 eyeballs! So if 10,000 people all joined hands, concentrated real hard and looked at the moon, could we see the astronaut's footprints? Nawwww!

During the Middle Ages, building cathedrals also built the status of the kingdom and honoured the deity. In France, during this time, a larger portion of the national budget was spent on cathedral construction than the United States spent sending Neil Armstrong and those who followed to the Moon.

Light travels at 300,000 kilometers per second. The maximum speed limit in Canada is 110 kilometers per hour. Traveling at the national max, it would take 103 years to reach Mercury. A drive to the Moon would consume a leisurely 5 months. But distant Pluto would take 6,735,159 years on the road. And that's with no Tim Horton's or nature breaks. It's also 3 times longer than humanoids have populated the Earth.

Carl Sagan once said that Jupiter was a failed star. Unfortunately this implies to most people that if it were just a bit larger, Jupiter would be a star. Actually the gas giant would have had to 80 times more massive than it is to reach the threshold mass required for becoming a star. That's because it requires a core temperature of about 30 million degrees C to ignite the thermonuclear reaction that powers a star. Jupiter, massive as it is, would only generate temperatures of about 30 thousand degrees C at its core. Not even close!

The famous globular star cluster M13 in the constellation Hercules is 21,000 light years away. That means that the light falling on your eyes would have left the giant cluster before the bow and arrow were invented.

The largest pulsar known (PSR1937 +21) is about the size of Kingston, Ontario. Yet it is 500,000 times heavier than planet Earth. And it is spinning at a dizzying 642 times per second. Small wonder then, this ex-star generates so much energy.

About 99 percent of the stars seen on a typical night are larger, more massive and brighter than our sun. They, and our sun, are moving at 400,000 kilometers per hour as they circle about the hub of our galaxy, the Milky Way.

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Poet's Corner

A Valentines Day Thought...

The mountains rose above the land like arc weld beads 'cross copper lands. As the rising sun painted red to white and shadows shrank back time. Sundials reset themselves and nobody was there. I know they were reset by you, with breath and tossled hair.

- Will Juodvalkis

Classifieds

For Sale:

1.24" Diagonal for SCT Asking $50.00

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

For Sale:

8" Dobsonian Telescope for sale. The primary mirror is an 8" f/4.66 mirror with special coatings on it (Cr + Al + SiO). This mirror was made custom for me by Moonward Optics. The f/4.66 mirror gives this telescope a short (portable) size of 37". Also comes with Rigel Quik Finder for easy aiming of the scope. Asking $500.

Contact: Will Juodvalkis
Phone: 905-839-1151 x6767
E-mail: wjuodvalkis@yahoo.com

For Sale:

Various Eyepieces: 1.25" and 0.965"

- Meade 13.8 mm 1.25" Super Wide in excellent condition - $150.00
- Meade 32 mm Plossl – old 5-element design in pristine condition – $70

0.965 eyepieces

- Beautiful Takahashi 25 mm Orthoscopic hardly used - $70
- Excellent Celestron 7 mm Orthoscopic like new - $30
- Meade 0.965 2x Barlow lens - $35

-

Contact: Peter Lanscale
Phone: 905-985-5160

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:

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4094 Squair Rd
Orono, ON
L0B 1M0

or via e-mail at:
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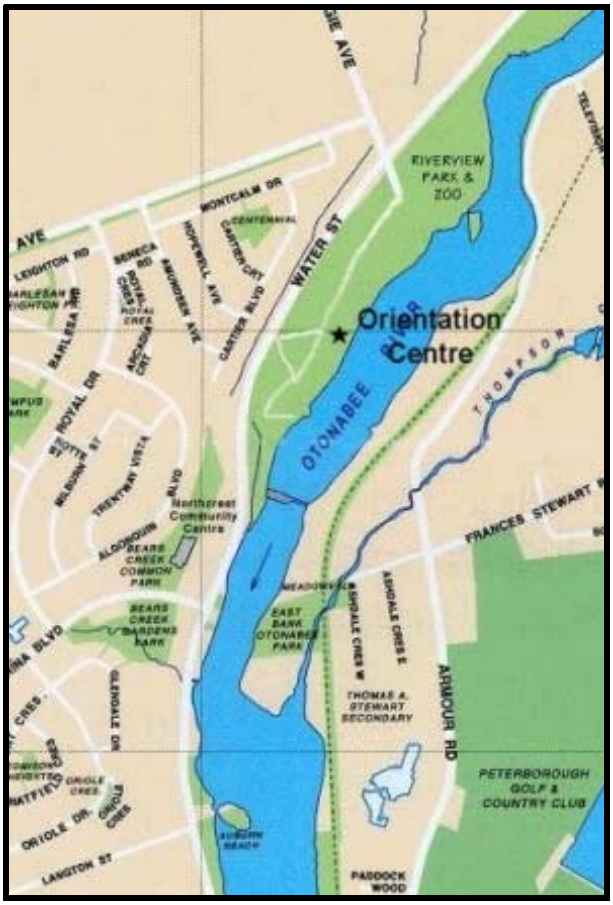
NEXT ISSUE'S DEADLINE IS

Mar. 3rd, 2003

⌘

MEETINGS

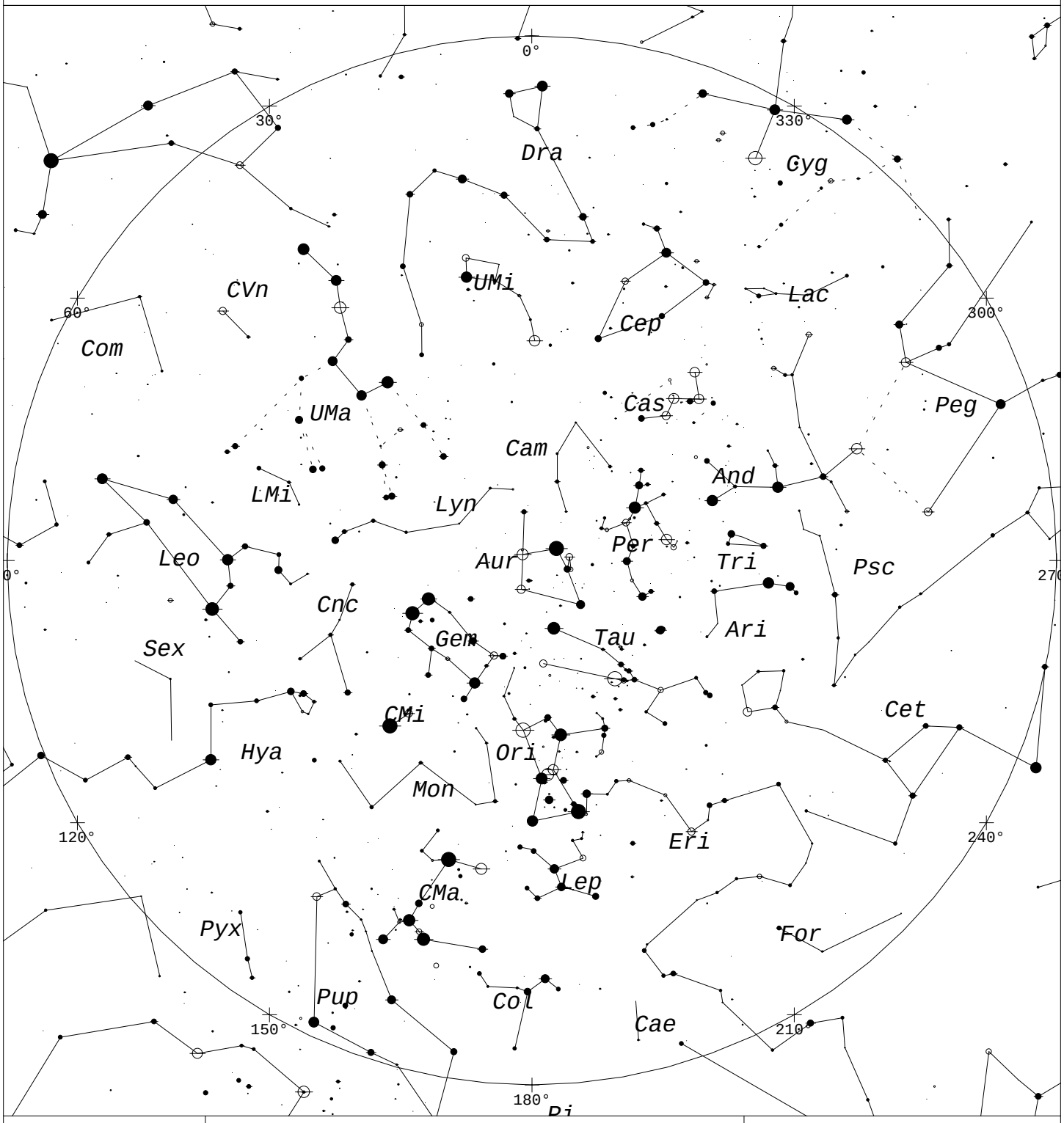
The Peterborough Astronomical Association meets every second Friday at the Peterborough **Zoo Orientation Centre** (Next to the PUC Water Treatment Plant) at **7:30 pm**.



CALENDAR OF EVENTS

February 1, 2003	**New Moon (●) —** Chinese New Year! (can someone say lunar calendar)
February 7, 2003	**General Meeting** — Jim Kendrick—come see a rundown on the latest arrivals from Vixen and see a dedicated Solar Scope!
February 9, 2003	**First Quarter (☽)**
February 16, 2003	**Full Moon (○)**
February 21, 2003	**General Meeting**—Member Survey. Beginner's Observing Night at Armour Hill (weather permitting) after meeting.
February 23, 2003	**Last Quarter (☾)**
March 7, 2003	**General Meeting**— Topic to be Announced

February 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-Feb-2002
Location: 43° 39' 0" N 75° 0' 0" W

UTC: 02:00:00 2-Feb-2002
RA: 5h48m23s Dec: +43° 38' Field: 182.0°

Sidereal Time: 05:48:22
Julian Day: 2452307.5833