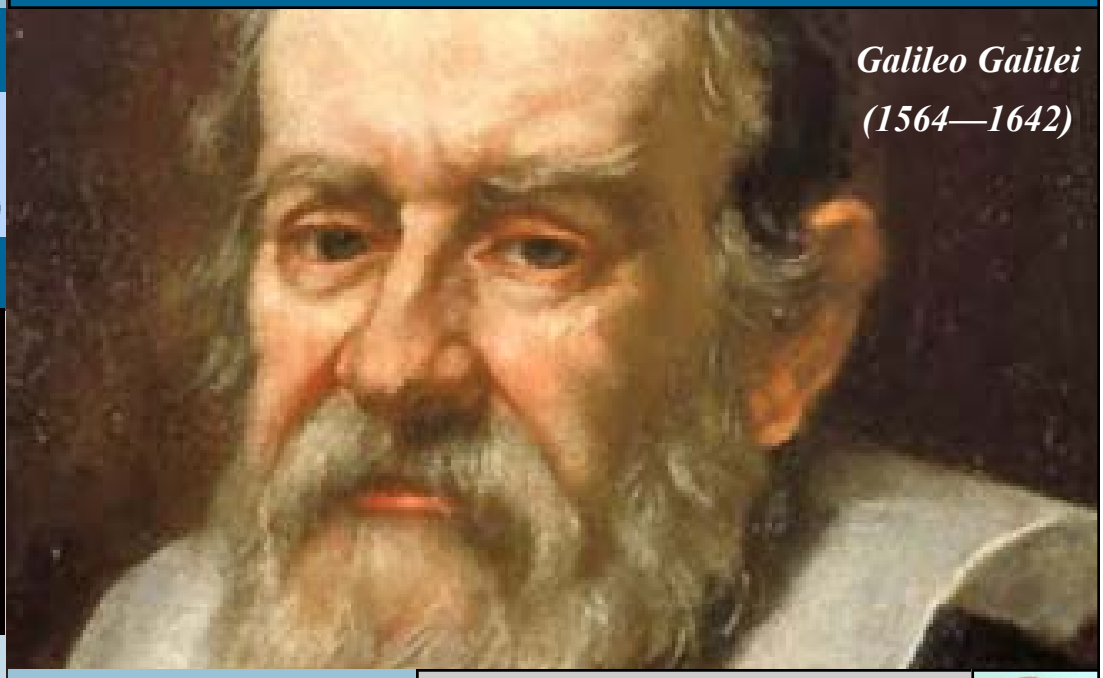
Volume 16, Issue 1

January 2009

HAMILTON AMATEUR ASTRONOMERS

# Event Horizon

# 2009
## The International Year of Astronomy



*Galileo Galilei*
*(1564—1642)*

2009 marks the 400th anniversary of the first telescopic observations of the heavens by Galileo. 1609 was a banner year for discoveries with the moons of Jupiter, craters on the moon, and sunspots all being seen for the first time.
This year, the International Astronomical Union has declared 2009 the International Year of Astronomy.
It is your opportunity to reach out to the public and show them the wonders of the universe.

**From The Editor's Desk**

**2009 promises to be a banner year for astronomy. It has been declared the International Year of Astronomy. It is not often that our hobby gets mentioned in the press as anything but a number of geeks with their heads in the clouds(!?), yet this is something special.**

**The goal is to provide a 'Galileo' moment to people who have never looked through a telescope. You remember what that felt like… your first look through a telescope! For some of you, it has been quite recent. For others like me, that moment is lost in the dim recesses of time, but I still remember it with fondness and wonderment.**

**Share your hobby this year and give as many people as you can a 'Galileo' moment.**

**Tim Philp, Editor**

**Inside this issue:**



**The HAA proudly presents the re-opening of the**

**W. J. McCallion Planetarium**

Burke Science Building, McMaster University, on Tuesday January 13, 2009.

There are a number of tickets remaining for the 7PM show. Tickets are available for $5 each on a first come, first served basis. Your last chance to get your tickets will be the January meeting of the HAA on Fri, 9 Jan 2009.


HAA 2009 Calendars are still available for $20 each. These are a great Christmas gift idea and contain lots of useful information about astronomy events in the upcoming year.

Contact Don Pullen, HAA Treasurer, for your copies.

# Treasurer's Report— By Don Pullen

**(Unaudited)**

**Opening Balance (1 Dec 2008): $ 2515.78**

**Revenues: $ 1032.00**

**Expenses: $ 70.63**

**Closing Balance (31 Dec 2008) : $ 3477.15**

**Notes:**

1) Major Expenses Included: Dec EH printing ($70.63)

2) Major Revenue Sources Included: Calendar ($440), Planetarium ticket sales ($195), Memberships ($245), Donation ($100), 50/50 ($52)

# From the Chair

by Steve Germann

Unlike most of the things we avidly observe in the night sky, the HAA does not exist in a vacuum.

We have the benefit of civilization, and in particular, the camaraderie of many active astronomy clubs in Canada and around the world. Those clubs organize star parties, which we can attend. They nurture astro-photographers, whose works we can appreciate. They sponsor contests, and recognize achievements, that raise the standard of excellence of all astronomy. They provide education and publications we can benefit from, and they host and encourage many amateur astronomers engaged in supernova searches, comet hunting, and variable star observing, which benefit us all scientifically, and aesthetically.

This year, the International Year of Astronomy (IYA), has been embraced by astronomers, both professional and amateur, all over the world, and almost all astronomy clubs in Canada, including ours, have stepped up their schedules to include events specifically in honour of the IYA. The IYA will provide additional publicity and relevance for these events, and by helping increase attendance by the general public, make them more rewarding to those who provide them.

One of the most interesting and rewarding activities we can participate in is 'Sidewalk Astronomy'.

It's a variation on our public outreach sessions in community parks, throughout the year.

In this activity, a number of people gather with a telescope, at a busy part of town, and point it at something (sufficiently bright) so passers-by can get a good look. Just seeing the Moon, or Jupiter, or especially Saturn, through a telescope, can be a wonderful experience for someone who was just walking by. The incredible detail visible on the moon with even a small instrument rewards handsomely. Our club has a very active sidewalk astronomer, Jim Walmsley, and he is fortunate to live near an ideal park for the activity: green space near a busy downtown intersection. The IYA in Canada has a goal to bring a telescopic view to a million Canadians this year.

Looking through a telescope gives you a 'live view' of the sky. Those photons are yours alone. Nobody else will ever see them.

Photography allows the photons to be shared, and accumulated.

Probably almost everyone in Canada has at some point in time seen photographs taken by the Hubble Space Telescope, or one of the other famous ground- or space-based telescopes.

These expensive instruments have a dual function. On one hand, they are tools for scientific discovery. Researchers using these instruments have learned, and told, much about the universe, and about celestial objects within it.

Information from these studies constrains computer models of star formation, evolution, and death.

Astrophysics is the branch of science that tries to understand the processes that make stars shine, and to explain what causes what we can see. In addition to optical telescopes, radio waves, gamma rays, and even gravity waves have caught the eye, figuratively, of scientists.

The second function of these excellent instruments, some more than others, is the fine astro-photography that can been done with them. The photos, once processed, are a kind of art that surpasses normal photography. At once, a beautiful picture, and at the same time a real place, worlds away from here, sometimes unimaginably large, and old.

Public appreciation of these photos contributes to a favourable funding environment for the observatories: science alone can be worthwhile, but when combined with art, science's profile is raised to the point where the general public feels a connection to what's being studied. So important is this aspect of astronomy outreach, that NASA provides raw data for free to accomplished artists for post-processing, and also pays some of them.

The DDO has outreach few observatories can approach. It is the largest telescope in Canada, and was for a time, the largest telescope in the world. It remains the largest in the world that members of the public can actually step up to the eyepiece and look through.

First class science goes side by side with first class public outreach.

Spectroscopy studies at the DDO have discovered many things we now take for granted. For instance, Cygnus X1, the first black hole discovered, was inferred from observations made at the DDO.

The DDO has earned its place in the pantheon of great observatories. It is worth preserving.

Although it's not exactly on a street corner downtown, there are plans to bring the downtown to the DDO, or even to replace the DDO with downtown. In one way, bringing it closer to the public will be a good thing, but at the same time, it will mean the end of its scientific mission. Loss of the observatory altogether will cost a proud piece of Canadian history.

We have an opportunity to voice our opinion on this topic, by writing a letter to those considering protecting the observatory buildings and telescope from destruction. There's time, but not much time, to act... hearings begin on the 15th of January.

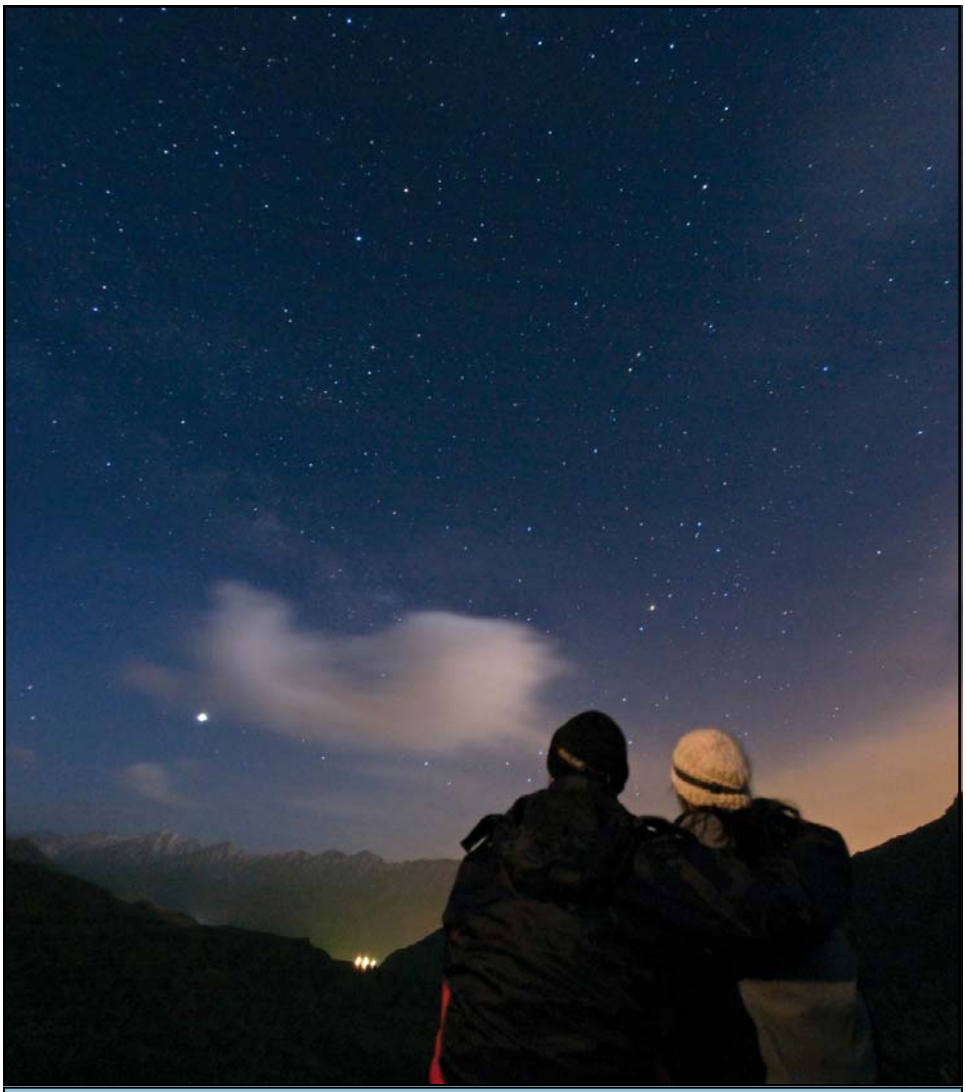
# International Year of Astronomy—2009

## By International Astronomical Union—Press Release

With 2009 just over the horizon, stargazers around the world are busy preparing for the International Year of Astronomy. A staggering 135 nations are collaborating to bring the Universe closer to Earth. Events and activities will take place over the coming 365 days and beyond, in a spectacle of cosmic proportions.

The International Year of Astronomy 2009 (IYA2009) has been launched by the International Astronomical Union (IAU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) under the theme, "The Universe, yours to discover". Thousands of IYA2009 events are described on the national websites, as well as on astronomy2009.org, and a few of the global projects are listed here.

The official IYA2009 Opening Ceremony will take place in Paris on 15 and 16 January 2009, and the press is invited to attend. It will feature keynote speakers, including Nobel Laureates, and live video feeds to scientists working in remote locations. Many nations are holding their own Opening Ceremonies in January and February, showing their dedication to the Year. But events will begin before then. Don't be surprised to see telescopes on the streets on New Year's Day. The IYA2009 Solar Physics Group have been busy planning a grand worldwide campaign, with over 30 countries involved at more than 150 venues, which will see amateur stargazers set up their telescopes on pavements as well as in science centres, letting passers-by observe the Sun using special safety equipment.



2009 is the ideal time to share your passion for astronomy with someone who has never before seen the wonders of the universe. As astronomers, we are uniquely positioned to be ambassadors for our hobby. It has the additional benefit of bringing joy to the life of someone special.

The Cosmic Diary is an example of a global activity occurring during 2009, with the release of its official website on New Year's Day. The project concerns the daily lives of full-time astronomers. More than 50 bloggers, professionals from over 35 countries and employed by organizations such as ESO, NASA, ESA and JAXA have already begun producing content, writing about their lives, the work they conduct and the challenges they face. The public can see

what being an astronomer is really like, and how groundbreaking research is conducted. Another project, 365 Days of Astronomy, will publish one podcast per day over the entire year. The episodes will be written, recorded and produced by people around the world.

100 Hours of Astronomy, another IYA2009 Cornerstone Project, is a worldwide event taking place from 2-5 April 2009, with a wide range of public outreach activities including live webcasts, observing events and more. One of the key goals of 100 Hours of Astronomy is to have as many people as possible look through a telescope, just as Galileo did for the first time 400 years ago.

The From Earth to the Universe (FETTU) Cornerstone Project is an exhibition arranged by IYA2009 that will bring large-scale astronomical images to a wide public audience in non-traditional venues such as public parks and gardens, art museums, shopping malls and metro stations. Over 30 countries around the world are currently in the development phase of FETTU projects, many with multiple locations. Some 15 countries plan to begin FETTU exhibitions within the first month of 2009, ranging in size from 25 to over 100 images on display. FETTU will be introduced to the global community at the Opening Ceremony at UNESCO headquarters in January 2009.

The World at Night is an IYA2009 Special Project that is producing and bringing to the public a collection of stunning photographs and time-lapse videos of the world's landmarks with the sky in the background. The World at Night is preparing more than 30 exhibitions and educational events around the world.

One of IYA2009's aims is to raise awareness of light pollution, and how the beauty of the night sky is progressively being drowned out, particularly over urban areas. The project Dark Skies Awareness is tackling these issues head-on in a practical, inclusive manner. One way in which it is doing this is by holding star-counting events, where the public are encouraged to see how many stars in a particular area of the sky are actually visible from their location. When compared with data from truly dark sites, the results are often very surprising! The "How Many Stars" event will run from January 2009.

A list of event highlights is available on the official IYA2009 website:

www.astronomy2009.org/highlights.

From there it is also possible to contact the National Nodes, responsible for organizing local events in the many participating countries.

During 2009, the sky will provide some exciting events, including the longest total solar eclipse of the 21st century, occurring on 22 July 2009 and lasting 6 minutes 39 seconds over a narrow corridor through countries including India, Bangladesh and China. A strong shower of Leonid meteors is also expected in mid-November 2009, with forecasters predicting upwards of an incredible 500 shooting stars per hour. In mid-October in the northern hemisphere, Jupiter will be placed at dusk, a perfect time to show public the giant planet and its moons. These are an impressive sight through even a small amateur telescope.

IYA2009 seeks to involve the public at large in its activities, and to this end amateur astronomers have been called upon to help organize and run events. Known for their enthusiasm, this army of helpers is growing every day, preparing to promote astronomy in a stunning variety of ways. In fact, so many thousands of people across the globe are already involved, they have formed the world's largest ever astronomy network.

Catherine Cesarsky, IAU President, says: "135 countries have committed themselves to the Year, all pulling together toward the common aim of making astronomy accessible to the public. IYA2009 will reinforce the links between science education and science careers, stimulating a long-term increase in student enrolment in the fields of science and technology and an appreciation for lifelong learning."

With such a range of activities planned, now is the ideal time to learn more about the cosmos and our place within it. The International Year of Astronomy 2009 promises to make the Universe yours to discover, beginning on 1 January 2009.

# Pretty Pictures

By Tim Philp

We live in an age of instant information. The sheer amount of data that is available at our fingertips is staggering. Nowhere is this more evident than in the field of astronomy.

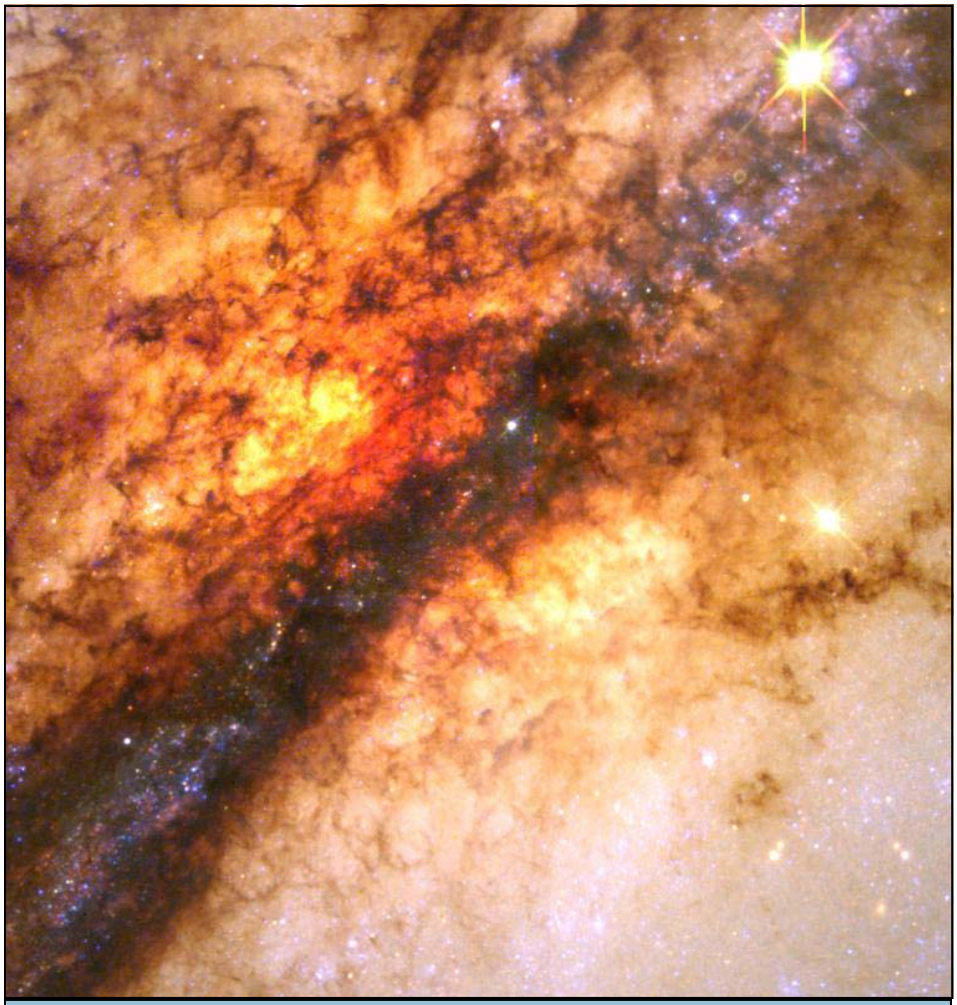
With a click of a mouse you can access information from observatories all over the world. Indeed, this technology can give you access to real-time information from space probes beyond our planet.

While this communications boom has been wonderful for astronomers, both professional and amateur, it has also bred very high expectations for what can be seen through a telescope in your backyard. These high expectations can make it difficult to appreciate the wonderful things that you can see with a modest telescope or a simple pair of binoculars.

Perhaps the biggest offenders in feeding these high expectations are the space probes that we have sent to other worlds and the various space telescopes that have flooded the Internet with images of astounding clarity and beauty.

The Hubble Space Telescope has given us images of stars and nebulae that are absolutely incredible and have entered the human consciousness. Who can forget the image entitled "Pillars of Creation" showing the birthplace of stars?

Young people come to public outings expecting to see similar images and sometimes walk away disappointed when they don't see full-colour images in the eyepiece of the small amateur telescope. Of course, in most cases, the large space-based telescopes do not see the same images that are presented on the Internet either.



Modern technology has given the world some of the most spectacular pictures imaginable such as this view of the heart of the Centarus Galaxy. Unfortunately, newcomers to astronomy expect to see similar views through their simple equipment. Managing expectations of beginners is a serious impediment to getting into the hobby.

Most pictures taken by astronomers are not the same images that you would see if you were looking through that telescope with your naked eye. These pictures have been heavily processed and, often bear no resemblance to the actual object.

The reason for this, of course, is that astronomers are not in the business of creating pretty pictures, even though that is often the result. Most pictures taken for science purposes are either taken through specialized filters or are heavily processed

# Pretty Pictures

By Tim Philp

using computer software in an effort to show structural details that would not be apparent to the naked eye.

For instance, ionized hydrogen often glows with a soft orange colour, ionized oxygen with a subtle blue-green colour. When photographed using these special filters, you can bring out the structure of a nebula and are able to glean information that is not seen without such specialized filters.

Many of the pictures from Hubble and other space probes are 'false colour' pictures that do not look like the object at all, even if you took the picture through their telescope. These pictures are heavily processed to enhance contrast and some of them even show details that cannot be seen using visible light.

All this adds up to a false picture of the universe for the average person who might expect to be able to see similar images through a backyard telescope. These expectations sometimes hide the tremendous progress that has been made in amateur-class instruments. In fact, amateurs are taking pictures using modest, low-cost, instruments that rival pictures taken by professional astronomers only a few years ago.

Even though some people are disappointed when they expect to see 'Hubble-class' pictures there is still a magic that happens when you get your first look at the sky through a good telescope. I can still remember my first look at Saturn through a 4.5 inch telescope more than 40 years ago.

With modern equipment, amateur astronomers are able to produce images that rival Hubble images in their beauty. With commonly available image processing software and special, inexpensive filters, amateurs can even do real science. While they can never compete with a space-based telescope, many amateur images can be strikingly beautiful.

# Astronomical Highlights of 2009

By Ray Badgerow

**Here are some of the major astronomical events of 2009 ,based upon the Astronomical Calendar 2009:**

- Jan. 26: **Annular solar eclipse** visible from S. Indian Ocean, Indonesia
- Feb: **Comet C/2007 N3 Lulin** may reach naked-eye brightness.
- Feb. 25: **Asteroid Ceres** at **closest opposition** since 1857, until 4164 May 9.
- Mar. 27: **Venus** passes inferior conjunction **well north of the Sun**(8.16$^{o}$).
- July 22: **Longest total solar eclipse of the century** (6m40s)
- Sept. 3: "**Jupiter without Satellites**" . A rare event.
- Sept. 4 : **Saturn's** rings **appear edge-on**.

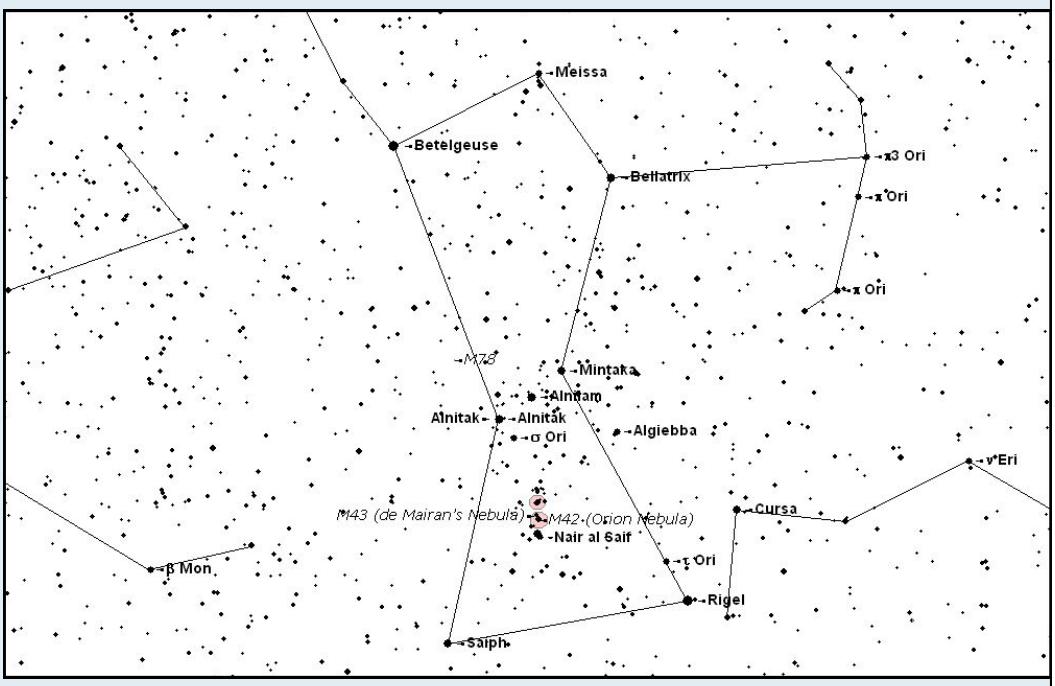
**Also, various grouping of planets low in the morning sky: February, March, April, June, October.**

# The Sky this Month

by John Gauvreau

The car comes to a stop and in the moments after the engine is off I sit and get used to the quiet. Stepping outside, the cold air hits me and I immediately do up my coat and get my gloves on. January is a cold time to be out observing, but as soon as I look up I remember why it is so worthwhile. Although it is not late, it is already dark, and the winter sky is out in all its brilliance.

Before I start to set up the telescope I take a few minutes just to look around. The **winter constellations** have more stars of first magnitude than any other season. **Orion** alone has not only **Rigel** and **Betelgeuse**, but also **Bellatrix** and even the belt stars are barely below first magnitude. I follow the three belt stars, so nicely lined up and even, to the upper right as they want to lead me to **Taurus** and its bright orange star, **Aldebaran**, nestled in the **Hyades**. By continuing along the same line I come to the **Pleiades**. I am tempted to get my binoculars out right now for a look at this cluster, but in a minute will do. By going back to **Orion's** belt and following them in the other direction, down and to the left, I am led to **Canis Major**, **Orion's** canine hunting companion. There like a beacon in the southeast, is **Sirius**, the brightest star in all the sky, shining out at magnitude -1. Rising with it but a little farther east is **Procyon**, marking the location of **Canis Minor**, and above it are **Castor** and **Pollux**, the twin stars of **Gemini**. **Castor** will be something that I want to look at in the scope tonight, as it is a lovely **binary**. Higher still, in fact nearly overhead, I come to **Auriga** and it's bright star **Capella**. That's eight first magnitude stars, not even counting the ones that are close but not quite at that level. No wonder the winter sky looks so bright.



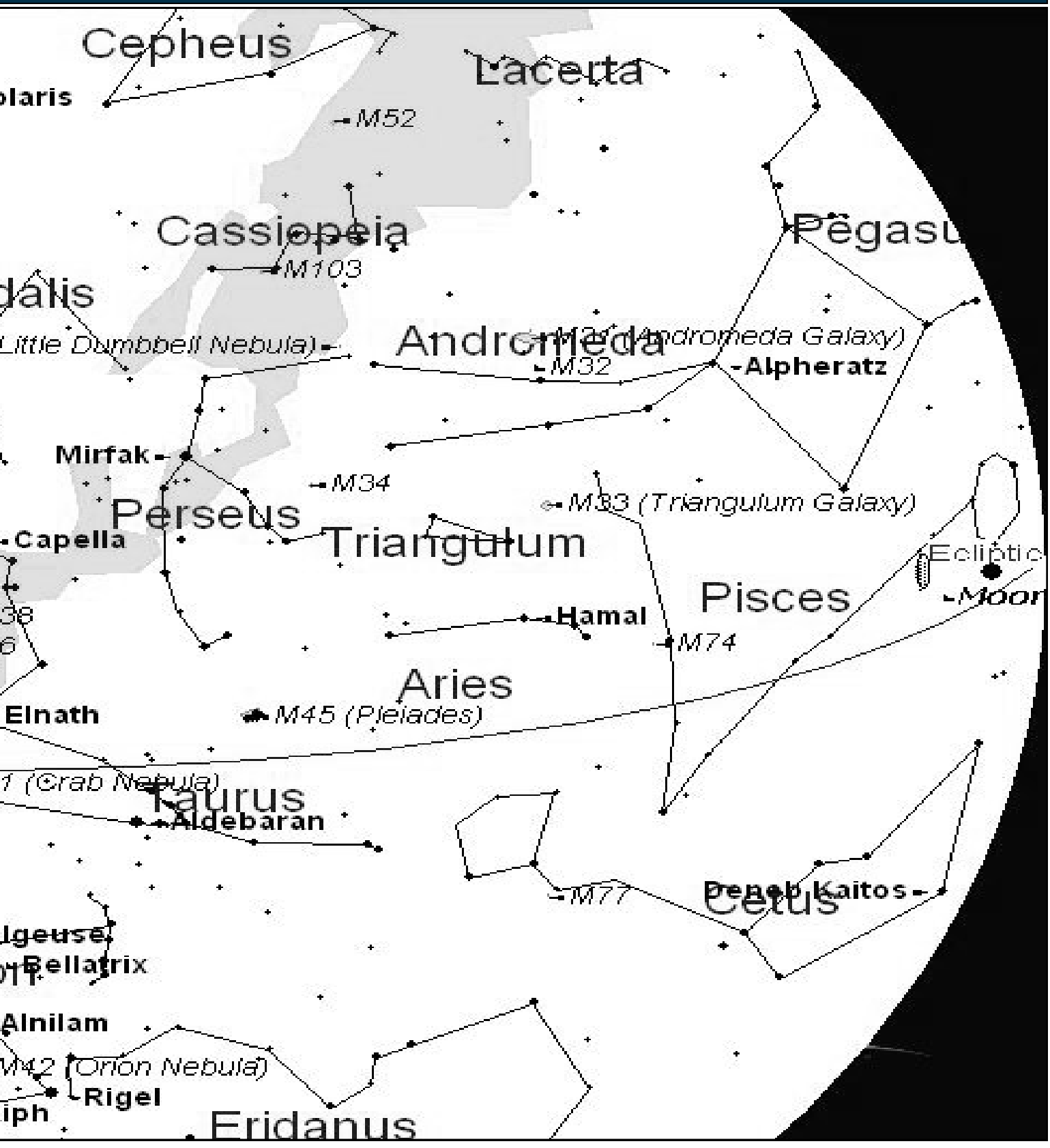

I turn my back to this sight for a moment, and sure enough, there in the west is **Venus.** Outshining any other thing in the sky except the **Sun** and the **Moon**, it makes even **Sirius** look pale. It is magnitude -4.4 and in a dark location it is bright enough to cast shadows. I wonder if I brought a piece of white paper to experiment with. Perhaps a blank page in a book will do, but right now it is time for the telescope to come out. Tonight I have brought along my little Dobsonian. It sets up in a minute and I slide in an eyepiece. There's **Venus**, or at least half of it. Right now, in the middle of the month, it at its greatest elongation from the **sun**. That means it is as far from the **sun** and as easy to see as it will get this season. Through the scope it looks like a first quarter moon, but by the end of the month it will be a crescent. I must remember to look on the night of January 30th. Not only will

*(Continued on page 12)*

# The Sky t


Venatici
Alioth
M94
M40 (Double Star WNC4)
M106
M109
Dubhe
M82 (Cigar Galaxy)
M108
M81 (Bode's Galaxy)
Ursa Major
Camelopard
M76
Leo Minor
Lynx
M66 (Leo Triplet 2)
M65 (Leo Triplet 1)
Leo
M105
Algieba
M96
M95
Regulus
Menkalinan
Auriga
Castor
Pollux
Cancer
M44 (Beehive Cluster)
Gemini
M35
M67
extans
Alhena
Canis Minor
Procyon
Alphard
M48
Monoceros
Alnitak
M50

# his Month


Cepheus
Lacerta
olaris
M52
Cassiopeia
Pegasu
M103
dalis
Little Dumbbell Nebula)
Andromeda
M32
Alpheratz
Mirfak
M34
Perseus
M33 (Triangulum Galaxy)
Capella
Triangulum
Ecliptic
Pisces
Moon
Hamal
M74
Aries
Elnath
M45 (Pleiades)
Taurus
Aldebaran
M77
Cetus
Bellatrix
Alnilam
Rigel
Eridanus

# The Sky this Month

by John Gauvreau

*(Continued from page 9)*

**Venus** show a nice crescent, but only 5 degrees away will be the crescent **moon**. What a nice pair that will be.

**Mercury** is there too, low in the west. I have to look through the last bits of twilight to see it, but it's worth the effort. At the time of our meeting, **Mercury** is still visible, but in a week, by the 16th, it will be gone. **Mercury** is so fleeting, and so appropriately named.

I can't see it now, but if I wait until midnight I will see **Saturn** rising in the east. Just below **Leo**, it will be a yellowish star that shines at 1st magnitude. I have been watching **Saturn** for a while now, as the rings flirt with being edge on. They appear razor thin right now, and that makes seeing the moons easier. Tonight, with my little dob, I can see **Titan**, **Dionne**, **Tethys** and **Rhea**. I wonder which ones I am missing? With a bigger scope you could see more. On the night of January 14th or the morning of the 15th I could use the moon to help me locate **Saturn**. The planet will be just over 5 degrees up from the moon. That's the same distance as there is between the pointer stars in the **Big Dipper**, or about the same as three finger widths. Hold your hand at arms length, as far as you can reach, and hold out three fingers. Rest the bottom one on the **moon** and look at the sky above the top finger. There's **Saturn**!

I look back to the scope and think about where to start. The **deep sky** holds many treasures no matter what you are observing with. There are the three **open clusters**, **M36**, **M37** and **M38** in **Auriga** that look so nice, not to mention the nearby **open cluster M35** in **Gemini**. If I go the other way, then high overhead is the **Double Cluster** in **Perseus** and many more in **Cassiopeia**. All of these will look great in the scope and can be seen in binoculars too. Perhaps the best place to start is in **Orion**. I just can't resist the **nebula**, **M42**, that looks good every time. It's even bright enough to see with the unaided eye. Can you tell that the middle star of **Orion's** sword is not really a star? Does it look fuzzy to you? Yes, that's just the place to start.

Before I turn to the scope again I look around the sky one more time. I note that at this time of year you can do something that you can't do at any other time. I try a little experiment and start in the northwest, near **Venus**. There, to the right of **Venus**, is the bright star **Deneb**. Because it is so far north in the sky and because the sky darkens so early at this time of year, I can still see this last remnant of the **Summer Triangle** even now, in January. I follow a path up to the **Great Square** of **Pegasus** and it's autumn companions **Andromeda** and **Cassiopeia**. The winter **Milky Way** leads me down towards the great **constellations** of winter, **Orion** and **Gemini**, and there, rising in the east, I can just make out **Cancer**. It is low and I can't see much, but I have always thought of **Cancer** as a **Spring constellation**. By April it will be high and we will be enjoying views of **M44**, the **Beehive**. But that will wait for another night. For now, I enjoy the spectacle of the whole year laid before me across the sky. The last of summer in the west, through the fall, winter and the first hints of spring in the east. So much to see before the night is done; so much to see.

Send your observations, reports or observing suggestions to **observing@amateurastronomy.org** and I will share what I can.

# Through the Looking Glass

by Greg Emery

"Starlight, star bright, first star I see tonight…." a rhyme we all know. The first star we do actually see, if it is a star at all, is in most cases one of the brightest stars visible around sunset. When we look at stars, the apparent differences are readily visible. A star's brightness is measured in terms of magnitudes. The magnitude scale is not a linear scale like age, distance or temperature but a logarithmic one.

The idea of magnitudes relates back to the ancient Greeks (we always seem to be blaming them!). They grouped or classed the brightest stars in the sky together and described them as of the First Magnitude. The next group of stars, somewhat dimmer, were classed as the second magnitude. Science, in the never ending need to quantify things, determined that a star 100 times fainter than another star, would be designated as being 5 magnitudes fainter. A factor of 100 times corresponds to 5 magnitudes, which works out to 1 magnitude difference being a factor of 2.512 in apparent brightness

When we look at a star the brightness that we perceive is controlled by two factors: how far away the star is and how much light the star is giving off. Think of a candle held relatively close to your face, that same candle will not seem so nearly as bright from 5 m away. If we have an idea of the distance of the star from us, we can correct the brightness or magnitude to a set distance, this is referred to as absolute magnitude. At this standard distance (32 light years away from Earth) our Sun would appear as a moderately dim star of magnitude 4.8.

Our Sun has another striking feature, in addition to being so close and so bright, it is yellow. Our Sun is definitely not red or blue. The colour of a star is determined by the surface temperature. Any object will emit energy (radiate) at a wavelength (colour) determined by the surface temperature of the object. Our Sun is yellow because of the temperature of the surface of the Sun. The cooler the surface temperature the closer to red the star will appear. When talking about the surface temperature of stars, the term cooler is a relative thing. The table below gives you an idea of colour and temperature. When we see a blue star, we are seeing a star with a high surface temperature and a star with a large absolute magnitude. Blue stars are very bright, red stars are usually quite dim. A graph of the surface temperature (or colour) and absolute magnitude yields a trend. The hotter a star, the higher the absolute magnitude. The relationship encompasses about 90% of the known stars, only dwarf stars and the giants or supergiants stars deviate from the trend. This trend is very easily seen in the Herztsprung – Russell Diagram, named after two astronomers (whose names unfortunately escape me at the moment).

| Surface Tem- | Colour | Spectral | Example |
|---|---|---|---|
| ≥25000 | Blue | O | λ-Orionis |
| 25000 - 10000 | Blue | B | Rigel, Spica |
| 10000 - 7500 | Blue- White | A | Sirius, Vega |
| 7500 - 6000 | White | F | Procyon |
| 6000 – 5000 | Yellow-White | G | The Sun |
| 5000 – 3500 | Orange | K | Arcturus |
| 3500 - 2500 | Red | M | Antares |


# The Telescope—The Window on the Universe

By Tim Philp

***"Oh telescope, instrument of much knowledge, more precious than any sceptre! Is not he who hold thee in his hand made king and lord of the works of God?***
***Johannes Kepler (1571 - 1630)***

When we think of astronomy, we automatically think of the telescope. This device has become synonymous with stargazing to the point where many people think that you cannot do astronomy without one. Certainly astronomy was performed with only the naked eye, but it was the invention of the telescope that transformed it from superstition to science.

The invention of the telescope is somewhat shrouded in mystery, however, there are records that seem to indicate that such a device has been possible for at least 2500 years. In fact, the technology to construct such a device has certainly existed since Roman times. It is possible that the technology could be much older than even the Romans.

The invention that forms the basis for the telescope is the convex lens. This is a lens that is thicker in the middle than at the edges. Perhaps the best modern example of this kind of lens is the simple magnifying glass.

Crystals of this shape have been discovered in the ruins of the civilizations of Ancient Troy, Carthage, Egypt, and Rome. While these crude lenses are not the optical wonders that we are used to with today's technology, they did indeed serve the purpose of magnifying objects so that they could be seen better than with the naked eye... particularly for older people. The short focal length of

*(Continued on page 18)*

# Dark Sky Parks

by Steve Germann

Cherry Springs State Park, (CSSP) in Pennsylvania, is our closest International Dark Sky Park.

It is also the first park east of the Mississippi to receive this distinction. (the only other such park is in Utah).

Neighboring communities have ordinances to ensure that the park remains a premier observing site for amateur astronomers.

The observing field at CSSP has everything an amateur astronomer could hope for, well, except showers and a warm room.

There's wall-socket power at posts distributed around the field.

There's fresh well water to drink. Heated washrooms, lit with low-intensity red lights.

There are also 4 observatory domes, rent-able for $20 per night, where you can set up scopes, and then retreat by day to your comfy hotel room, or tent, opening up at night when conditions are right, and closing in a pinch in case of inclement weather.

There's also rules against white lights, and no non-astro-campers allowed. Tree plantings along the roads are helping to block errant vehicle lights, and a gate at the park entrance can be closed at dusk to keep out casual traffic.

Soon there will be wireless Internet that can be used to email friends and encourage them to travel when the weather is fine.

The Internet is also useful for getting weather maps and updates to software, comet ephemera, etc.

On any moonless night, you can expect a half-dozen astro-photographers, and as many others with telescopes, to be enjoying the sky and the company of each other. The Internet will allow me to keep current at emails by day, while spending more time observing.


The community of Galeton, a few km from the park, has also earned the designation as a Dark Sky Community, and has strict rules governing the generation and scattering of unnecessary light.

I visited CSSP on 3 occasions last year. Twice for official star parties, and once with Ed Smith, for a few nights in late July. The skies at the park really are as dark as they say they are. It's worth it to just see the milky way shining in splendour from horizon to horizon.

The zodiacal light coming up in the morning is bright enough to see with unaided eye, and is like a false dawn.

*(Continued on page 16)*

# Dark Sky Parks

by Steve Germann

*(Continued from page 15)*

The friends of Cherry Springs can be proud of this excellent light-pollution-free zone they have protected.

CSSP is at an altitude of 730 meters, higher than even Lake Superior Provincial Park (400 m), which I also visited last year, and the higher altitude means less reflection and less scattering of incoming light. Thus better contrast in the sky.

Light paths closer to the horizon also travel through less atmosphere.

Also, being a few degrees further south than Hamilton, there's a bit more access to the southern sky views.

I recently purchased a 'Galaxy Pass' for the park. This pass (for $55) allows me flat rate access to the park by night, bypassing the normal pay-and-display price of $10 US per night.

Now, I can just write the Galaxy pass number on the envelope instead of depositing cash.

There are 2 annual star parties at CSSP, one in June, and one in September, and there's several opportunities when HAA members plan to visit for a few nights. The advantage of going when there's no party include lower fees, less crowds, choice of setup location, and most importantly, the ability to bail out if a storm is on the horizon, or delay arrival. A trip with a group of HAA members is being cooked up for May.

By way of comparison, the Binbrook Conservation Area (BCA), is closer to home. With the use of my trusty Sky Quality Meter, I have measured both parks for sky quality at the zenith. CSSP tops out around 22.

Binbrook around 20.6. Starfest has been as dark as 21.6.

Lake Superior Provincial Park was about 22.3. (Sky quality is not like golf. Bigger numbers are darker)

The biggest difference between Binbrook, less than 40 minutes away, and CSSP, about 280 minutes away, (and across an international border), is that CSSP does not have 'light domes' from nearby communities, for instance, Hamilton. Both offer excellent views near zenith, of dark star fields and the milky way. A full appreciation of the value of Binbrook is needed in order to justify the expedition to CSSP.

Even though Hamilton has a light dome, it's to the north, and it does not block as much of the sky as it would if it was to the south of the park. This is because objects close to the northern horizon at one point will be near zenith

6 months (or 12 hours) later. For objects to the south, they will be lost below the horizon 6 months or 12 hours later.

We cannot make BCA much darker, but we can try to preserve what we have.

We can encourage Canadians to appreciate the night sky and perhaps developers will use full cut-off street lighting in new communities.

With its legislated protection against light pollution, CSSP will remain the best place to go for dark skies.

There are some Canadian parks which are in the process of implementing the protection of their dark skies. Notably around the Huntsville area. Not having to cross an international border will be an attraction, but there's more to a dark sky park than dark skies. The IYA is bringing appreciation of the skies to a new level of public awareness. Perhaps the extra amenities needed to make a dark sky into an Astronomy Field will be implemented in Canada at some point, and our choices will expand.

Although BCA does not allow overnight (overday?) camping for astronomers, it does have a few notable advantages. The nearby lake can act as a funnel for fog, leaving the skies clear above the park even when nearby communities are fogged in.

That's when BCA is darkest. The light from Hamilton cannot get through the fog. Sometimes when the Clear Sky Clock reads 'white' it's actually good observing time at BCA.

# Member of the Month—Ray Khan

by Thérèse Emberly

Ray has been involved in the astronomy hobby for decades, not just as an amateur observer but in retail of astronomy equipment and accessories, as well.

Ray has given presentations to HAA at several monthly meetings over the past few years. He is a great source of information on the latest astro-gadgetry and never fails to bring a few items with him to meetings. Ray has obtained for HAA several contacts who turned out to be excellent presenters themselves, including Nicole Debond (Lunar Geology) and Eric Briggs (Lunar viewing, Supernova searching, Shuttle Launch).

If you have been interested in amateur astronomy for a while, you likely have shopped at Khanscope, Ray's astro store on Dufferin Street . Always a fun and informative place to visit. Ray has a booth at Starfest every summer, rain or shine and attends several other star parties.

From the moment I was introduced to Ray, he struck me as someone dedicated to improving our hobby. I liked his outgoing nature and his sense of humour. He has always given me good advice. Hamilton Amateur Astronomers is lucky to have an experienced and motivated member like Ray Khan.

# The Sky This Month LIVE!

by John Gauvreau

**Come out to the Binbrook Conservation Area for a Guided tour of the night sky. This special night is open to all HAA members. Here is your chance to learn your way around the real night sky. Telescopes will be available for all to use and plenty of help will be available. Highlights of the night's observing program will include the winter constellations, Venus, Saturn, the Andromeda Galaxy and the Orion Nebula.**

## Saturday January 17th, 2009 at 7:00pm

**Rain (snow or cloud) date Saturday January 24th at 7:00pm**

**Directions to the park are available on our website, and confirmation or cancellation due to weather will also be posted on the website (blog).**

**Dress warm, and see you there!**

**(contact observing@amateurastronomy.org for more information)**

# The Telescope—The Window on the Universe

by Tim Philp

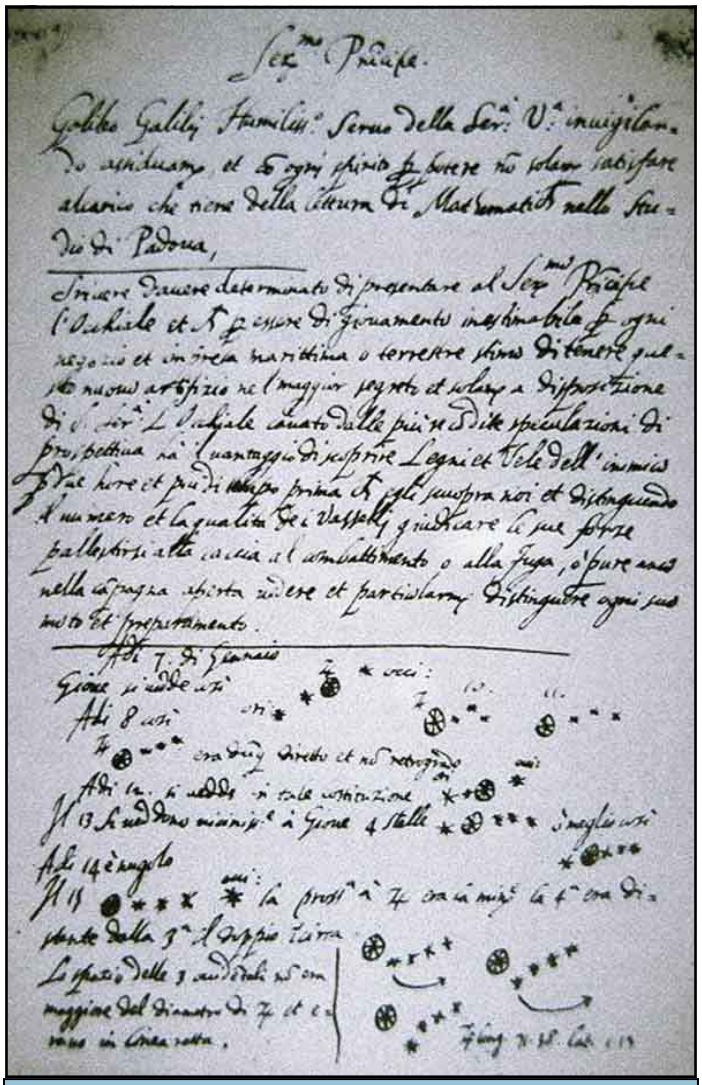
*(Continued from page 14)*

these lenses would have rendered them only useful for that purpose, but the basic technology was there to grind crystals into lenses that could have been used to make a telescope.

The first record that we have of a telescope-like device is in an ancient book by a brilliant Arabian astronomer and mathematician, Ibn Alhazen. His book told of concave lenses that were thiner in the middle than at the edges. Both types of lenses are required to construct a telescope. By the 13th century, Oxford scholar and Franciscan monk, Roger Bacon wrote a treatise about using lenses to see at a distance. Other writers such as Giovanbaptista Della Porta a 16th century Italian spectacle-maker wrote about using lenses to see things at a distance as did many others.

While these accounts indicate that it is possible that a telescope was made in ancient times, we have no evidence that one was actually constructed. The first telescope that we can say for sure was actually built was constructed in 1608 by Hans Lippershey, another spectacle-maker in The Hague. Lippershey called his new invention a 'looker' and he sold it to the Estates of Holland for the use of the military. He was paid 900 florins for the device, but he was required to double the tube and construct what we know as binoculars today.

In a dispute that has echoed down through the years whenever any invention that is worth a lot of money is created, others soon turned up with telescopes of a similar design. In fact, within three weeks of Lippershey's patent application, two others claimed the discovery for themselves.



It was on this page that Galileo first noted an observation of the moons of Jupiter. This observation upset the notion that all celestial bodies must revolve around the Earth. Galileo published a full description in *Sidereus Nuncius* in March 1610.

While Lippershey only considered the use of the telescope for earthly pursuits, it remained for a professor of mathematics at the University of Padua in Italy, Galileo Galilei (1564 – 1642) to actually point a telescope skywards. Working from accounts of Lippershey's telescope, Galileo constructed a small telescope that magnified about three times. This device enabled him to see magnified images of terrestrial objects. He became so skilled at constructing telescopes, that he eventually made one that would magnify 32 times.

The quality of his telescopes was good enough that he was able to see mountains on the moon and, in an observation that was to shake the very foundations of church doctrine, discover moons orbiting the planet Jupiter. This observation was further proof to him that the Earth was not the centre of the universe, as church teachings ordained. His writings on this topic resulted in his imprisonment for many years, until the end of his life.

Of course, the telescope invented by Lippershey had its problems such as colour fringing around the images caused by the properties of the glass used in the telescopes of the day. It was not until modern times with the use of exotic glass technology that this problem was able to be solved.

Because of this, for many years, astronomers abandoned the refracting telescope, one that uses lenses, in favour of a design that used mirrors in place of the problematic lenses. Today, both kinds of telescopes are in common use with many variations on each design. Both Lippershey and Galileo would be astounded if they could move forward in time 400 years and take a quick peek through one of today's inexpensive optical wonders.

# Space Place—Superstar Hide and Seek

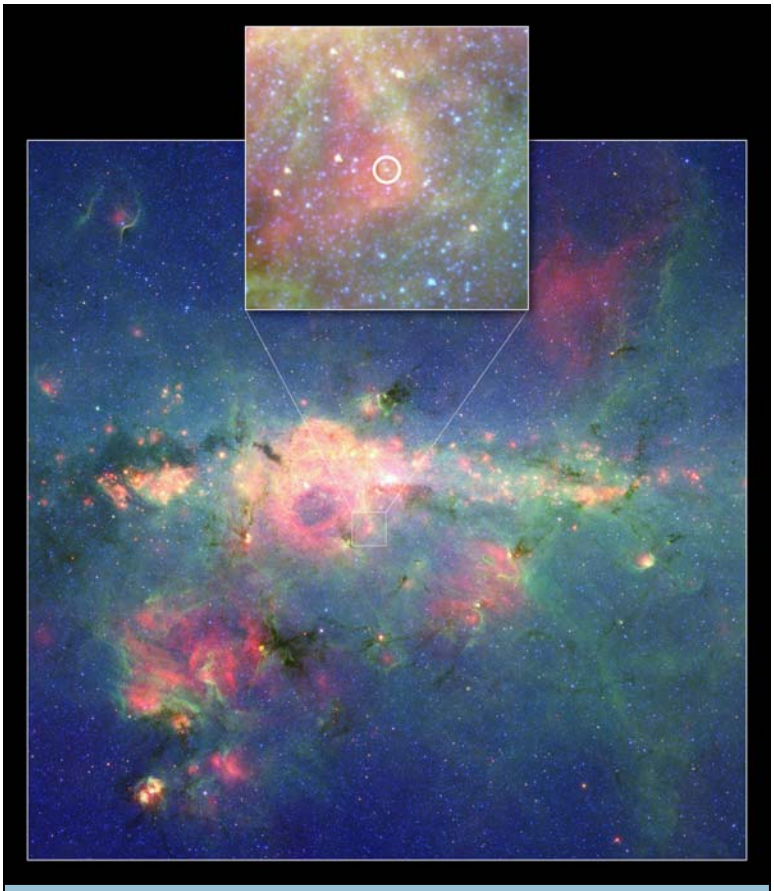
By Dr. Tony Phillips

It sounds like an impossible task: Take a star a hundred times larger in diameter and millions of times more luminous than the Sun and hide it in our own galaxy where the most powerful optical telescopes on Earth cannot find it.

But it is not impossible. In fact, there could be dozens to hundreds of such stars hiding in the Milky Way right now. Furiously burning their inner stores of hydrogen, these hidden superstars are like ticking bombs poised to 'go supernova' at any moment, possibly unleashing powerful gamma-ray bursts. No wonder astronomers are hunting for them.

Earlier this year, they found one.

"It's called the Peony nebula star," says Lidia Oskinova of Potsdam University in Germany. "It shines like 3.2 million suns and weighs in at about 90 solar masses."



The "Peony Nebula" star is the second-brightest found in the Milky Way Galaxy, after Eta Carina. The Peony star blazes with the light of 3.2 million suns.

The star lies behind a dense veil of dust near the center of the Milky Way galaxy. Starlight traveling through the dust is attenuated so much that the Peony star, at first glance, looks rather dim and ordinary. Oskinova's team set the record straight using NASA's Spitzer Space Telescope. Clouds of dust can hide a star from visible-light telescopes, but Spitzer is an infrared telescope able to penetrate the dusty gloom.

"Using data from Spitzer, along with infrared observations from the ESO's New Technology Telescope in Chile, we calculated the Peony star's true luminosity," she explains. "In the Milky Way galaxy, it is second only to another known superstar, Eta Carina, which shines like 4.7 million suns."

Oskinova believes this is just the tip of the iceberg. Theoretical models of star formation suggest that one Peony-type star is born in our galaxy every 10,000 years. Given that the lifetime of such a star is about one million years, there should be 100 of them in the Milky Way at any given moment.

Could that be a hundred deadly gamma-ray bursts waiting to happen? Oskinova is not worried.

"There's no threat to Earth," she believes. "Gamma-ray bursts produce tightly focused jets of radiation and we would be extremely unlucky to be in the way of one. Furthermore, there don't appear to be any supermassive stars within a thousand light years of our planet."

Nevertheless, the hunt continues. Mapping and studying supermassive stars will help researchers understand the inner workings of extreme star formation and, moreover, identify stars on the brink of supernova. One day, astronomers monitoring a Peony-type star could witness with their own eyes one of the biggest explosions since the Big Bang itself.

Now *that* might be hard to hide.

Find out the latest news on discoveries using the Spitzer at www.spitzer.caltech.edu. Kids (of all ages) can read about "Lucy's Planet Hunt" using the Spitzer Space Telescope at spaceplace.nasa.gov/en/kids/spitzer/lucy.

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*

HAMILTON AMATEUR ASTRONOMERS


HAMILTON AMATEUR ASTRONOMERS

PO Box 65578
Dundas, Ontario
L9H 6Y6

General Inquiries
secretary@amateurastronomy.org
Membership
membership@amateurastronomy.org
Meeting Inquiries
chair@amateurastronomy.org
Public Events
publicity@amateurastronomy.org
Observing Inquiries
observing@amateurastronomy.org
Newsletter
editor@amateurastronomy.org


We're on the Web!

www.amateurastronomy.org

## Article Submissions

**The HAA welcomes your astronomy related writings for the Event Horizon newsletter. Please send your articles, big or small, to:**

**editor@amateurastronomy.org**

**The submission deadline is two weeks before each general meeting.**


*The Event Horizon is a publication of the Hamilton Amateur Astronomers (HAA) The HAA is an amateur astronomy club, for people of all ages and experience levels, dedicated to the promotion and enjoyment of astronomy . The cost of the subscription is included in the $25 individual or $30 family membership fee for the year. Event Horizon is published a minimum of 10 times a year.*


# 2009 HAA Council

| | |
|---|---|
| Chair | Steve Germann |
| Second Chair | Jackie Fulton |
| Secretary | Darrell Maude |
| Treasurer | Don Pullen |
| Membership Director | Jim Wamsley |
| Observing Director | John Gauvreau |
| Event Horizon Editor | Tim Philp |
| Webmaster | Bob Christmas |
| Recorder | Ann Tekatch |
| Councillor | Brenda Frederick |
| Councillor | Heather Neproszel |
| Councillor | Ray Badgerow |
| Councillor | Gary Krevenky |
| Councillor | Harvey Garden |

## Next Meeting

## Friday, February 13th, 2009

## 7:30 PM @ The Spectator

Observing site for the HAA provided with the generous support of

**Binbrook Conservation Area**..

Come out observing with other members and see what a great location this is for stargazing, a family day or an outdoor function.
Please consider purchasing a season's pass for $70 to help support the park.
www.conservation-niagara.on.ca/conservation_areas/binbrook/binbrook.html
(905) 692-3228

Domain name and web hosting for the Hamilton Amateur Astronomy club supplied by

**Axess Communications**

Corporate and Residential DSL and Web Hosting

Www.axess.com

support@axess.com