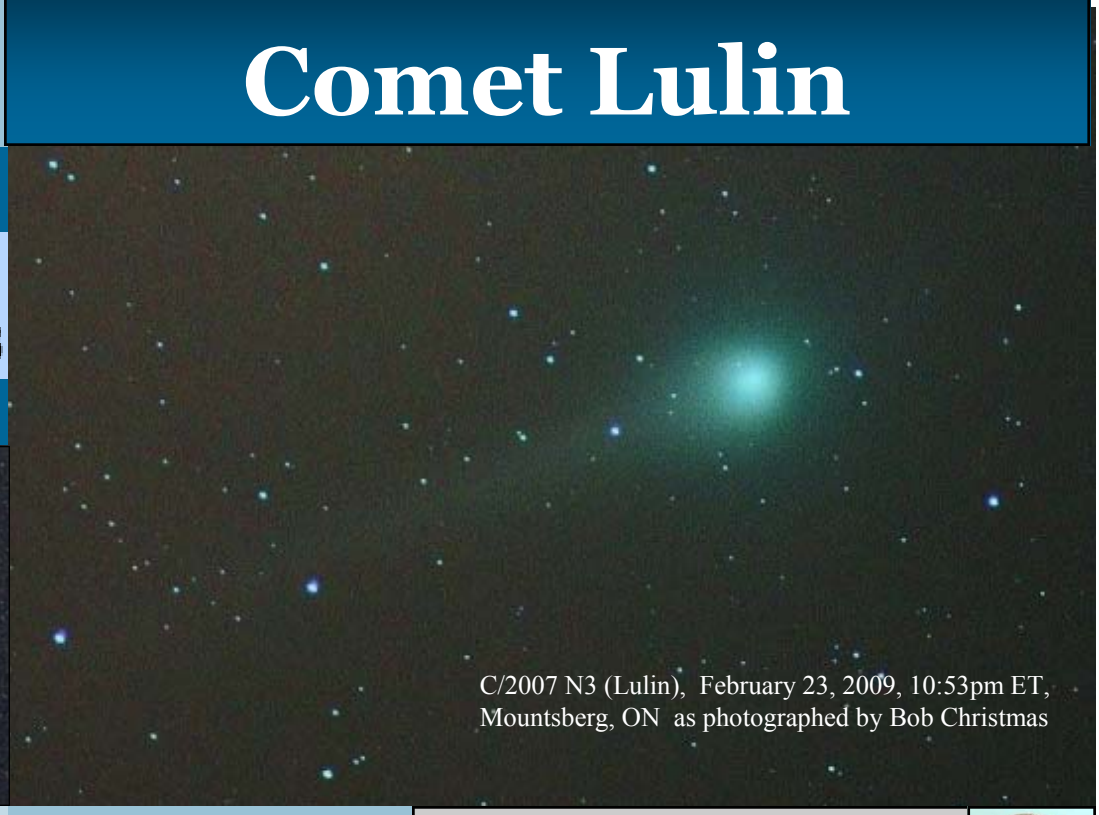
Volume 16, Issue 03

March 2009

Comet Lulin



C/2007 N3 (Lulin), February 23, 2009, 10:53pm ET, Mountsberg, ON as photographed by Bob Christmas

HAMILTON AMATEUR ASTRONOMERS

Event Horizon

Special Guest Speaker for April
By Don Pullen

As part of our IYA 2009 celebrations, we are pleased that our main speaker for the April meeting of the HAA will be Bob McDonald.

One of Canada's best known science journalists, Bob has been hosting CBC's award winning "Quirks and Quarks" radio program for more than 15 years. He is a frequent contributor on CBC's NewsWorld and the National and previously hosted the kids science program Wonder-

From The Editor's Desk

Comets are perhaps the most frustrating objects that you can imagine. How many times have we read that Comet so and so is expected to put on a great show, only to be disappointed by the reality?

Comet Lulin was expected to become a naked-eye object and, I suppose it did, however, you had to have the eyes of an eagle and some clear, dark skies to see it without optical assistance. It did, however, provide a good binocular target and was quite interesting when photographed through a telescope so I suppose that is something.

We certainly seem to have had a lot of green comets lately. Perhaps they are getting ready for St. Patrick's day!

Tim Philp, Editor

Inside this issue:

Bus trip

York University Observatory

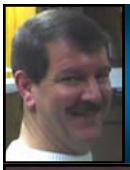
Saturday March 21, 2009

18:30hrs—Midnight

Bus leaves from University Plaza

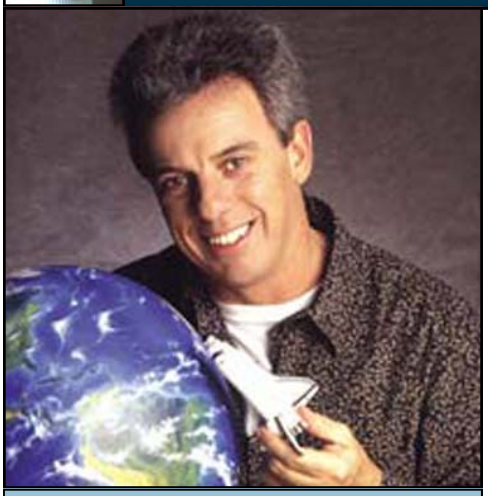
$15.00/person, $25.00/couple.

Tickets available at the meeting or through Steve Germann



April's Special Guest Speaker

by Don Pullen



Bob McDonald—Host of CBC's Quirks and Quarks. April's HAA Speaker

struck. He is also currently hosting and writing another children's Science program called "Heads Up!" which airs on TVO and the Knowledge Network. He has been a Science journalist for more than 25 years and published a book in 2000 titled "Measuring the Earth with a Stick: Science as I've seen it" which is a collection of his essays from his long and interesting writing career. He also has a blog where he doesn't pull any punches when commenting on various topics, whether they be about government's lack of support for science or nuclear energy.

Bob has won many awards for his reporting, writing and his contributions to bring science awareness to the public. These include the 2001 Michael Smith Award for Science Promotion; and the 2002 Sandford Fleming Medal from The Royal Canadian Institute. The Royal Society of Canada awarded him the McNeil Medal for the Public Awareness of Science in 2005.

Bob is a great supporter of Science and often speaks to a diverse mix of the public, inspiring them with his love for how things work and reality. He has an uncanny and very approachable ability to make any crowd feel comfortable and address them at a level they can understand. He has spoken to school kids, university students, and heads of business and government.

We are extremely pleased that Bob McDonald has agreed to speak to our members and we welcome the public to come join us for this special meeting. He will be with us on Friday, April 3, 2009 in the auditorium of the Hamilton Spectator. Be sure to get here early as we expect it will be standing room only.

Treasurer's Report

By Don Pullen

	(Unaudited)
Cash opening Balance (1 Feb 2009)	**$ 3629.96**
Expenses	**$ 285.07**
Revenue	**$ 271.00**
Closing Balance (28 Feb 2009)	**$ 3615.89**

Notes:

Major expenses included: McCallion Planetarium Trip **($200.00)**, Extra Copies of Jan EH **($7.62)**, Kids Outreach Tools **($57.77)**, Speakers Dinner **($14.22)**, Postage **($5.46)**

Major revenue sources included: Memberships **($100),** HAA 2009 Calendars **($60)**, 50/50 **($41)**, Clothing Sales **($53.00)**, RASC Handbooks **($17.00)**

From the Chair

by Steve Germann

It's already March. The UNESCO International Year of Astronomy is 2 months old...

Commemorating the 400th anniversary of the first use of an astronomical telescope (by someone who wrote about it), it's a focus for astronomy-related events of all kinds, all over the world.

The HAA has received some really nifty IYA collector cards, which we can hand out at public events. On the card is a photo of Saturn, and some facts about the planet. This is ideal as Saturn is at opposition this month, and therefore high in the sky at midnight, and visible all night.

On the back of each card is a numerical code located on the bottom right corner. Along with it is the website for the IYA. Each number code can be entered at the IYA website... allowing the holder to register his or her Galileo Moment. This message and their name will be added to a list which will be aboard a satellite to be launched into space by the Canadian Space Agency.

The Galileo Scope has recently been announced and is now available. www.galileoscope.org/gs/ It's a small spyglass-style telescope, a modern reproduction of the one Galileo used in his early observations, but of course with somewhat better optics, and a barlow, so it can magnify to 50x. Easily assembled and geared for all ages, it can be assembled and used right away. Used with your own tripod, it will do wonders. Imagine the quantum leap in detail of the moon, and Saturn, and a nebula like M42 in Orion. He must have had the first 'Galileo Moment' and must have been keen to share it with everyone, just as many of the people who come to our public events also do. Some even phone their friends right away.

At the right time, we will be ordering a batch of them, so if you know someone who would like one, send me an email and reserve one for yourself; together we can save a bit on shipping.

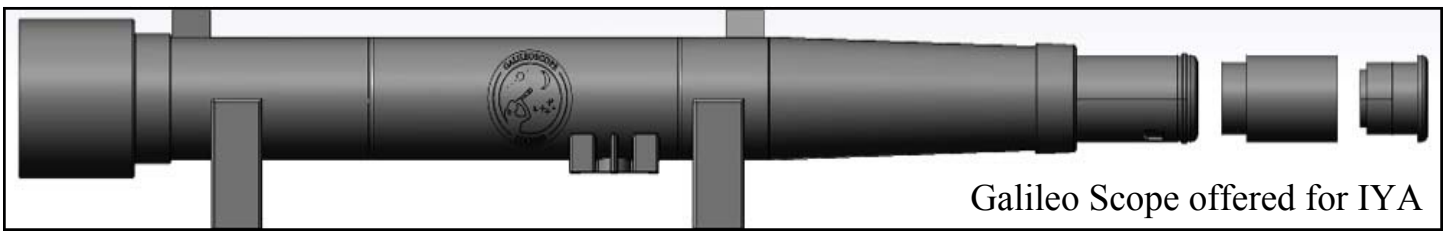
Another attractive IYA item is the Planisphere, available in English and French. We have not received our shipment yet, but when we do, we will be sure to show it off. Using it, you can determine "what's up" in the sky any time of the year, and any time of the night. It has an oval opening where a portion of a circular star map representing the sky down to about -45 degrees declination can be seen. Rotating it to the proper place for the month and hour then exposes the right part of the map.

The HAA is a partner with other Canadian organizations in the Canadian celebration of the International Year of Astronomy. Already we have participated in some events with other organizations, including the Toronto IYA Kick-off and Astronomy Show at the Ontario Science Center, and there are many more planned for the year. With all the publicity, it's likely that star parties, astronomy shows, and public events will be especially well attended this year.

Our public events and "sidewalk astronomy" contribute to the IYA organization's goal of a million 'Galileo Moments' this year. The Event Horizon will be including member's memories of 'Galileo Moments' from their own lives. Watch for them in the issues this year, and consider sending yours in too.

In addition to our own events, there are those from other organizations, many free and open to the public. We should attend them and bring our friends too. Upcoming HAA events, and others, can be found on the IYA site using their web-based search engine. It allows you to select Ontario, and "Golden Horseshoe less GTA" and then a date range. It will provide an expandable list of upcoming events. For fun, why not select from now till December 31, and review what's booked so far. We will continue to post our events as best we can. www.astronomy2009.ca

As a bonus, there's also a set of interesting and beautiful astronomical images made by Canadians, at www.galaxydynamics.org/iya2009/ There are about a hundred nicely rendered images in the gallery in 10 sections. To get to the english version, click on 'Enter the Gallery' at the top of the page.



Galileo Scope offered for IYA

March Messier Marathons

by Steve Germann

Charles Messier was an avid comet hunter. Naming the comet you discover is the reward for discovering them. Charles used his ability to name comets to apply names of various prospective patrons to them, and was amply rewarded for the favour. He discovered 13 comets which have been numbered based on when they were first found.

His equipment consisted of a few reasonably small refracting telescopes. He recognized comets because they could not be brought to a star-like focus. Even though he was in 18th century Paris, which was predominantly lit by candle light at night, (if lit at all), he was still limited to the things he could see in the sky. Seeing, and natural sky glow work against distinguishing very faint fuzzies from dim stars or background.

Even a primitive instrument will have a central axis which brings a single star to a fine focus, when properly adjusted. So even if all the off-axis stars look distorted, you can bring them to the center one-by-one and check them out. It must have been painstaking work. He made a list of the things which caught his eye that he could not bring to a sharp focus, and recorded their coordinates, using the setting circles of his telescope. Later, if he was patrolling the sky in search of comets, and he found something, a quick check of his setting circles, against his list (with a possible correction for the sidereal time) would tell him if it's just one of those troublesome objects that are not comets... and he could continue on his 'real' business of finding 'real' comets. I hope he took some time to appreciate some of the things he discovered which were not comets.

He has left us an interesting legacy. Being one of the first to search for comets, and the first to compile a list, his catalog of 110 Messier objects has a special charm. The objects in his list are the brightest examples of their type, and near enough to look spectacular in photographs. They are variously star clusters, globular clusters, galaxies, nebulae, supernova remnants, and tight asterisms. Their main claim to fame was that with his equipment, they appeared to have some 'nebulosity' as all comets do. Although he knew that some of them were definitely not comets, he put a few items in that have special charm, such as the Pleiades, the Beehive Cluster, and the Orion Nebula. Thanks, Charles.

The Observatory of Paris, the National Astronomical Observatory, is the oldest operating observatory in the world. The Paris Observatory was founded by Louis XIV. Construction of the Observatoire de Paris began in 1667 by architect Claude Perrault and was completed in 1671. The building is oriented to the four cardinal points. The meridian of Paris runs through the middle of the building.

In the 21st century, we have better telescopes. They have less distortion, and they gather more light because their size is larger. They can be used at higher magnifications and show an extended region of the sky, not just the star which is on axis, with low distortion. And, rather than costing a good fraction of a nobleman's fundraising budget, they are affordable to people with a hobby... us. As a result, we can not only distinguish them as being 'not stars' but we can appreciate their

(Continued on page 5)

March Messier Marathons (Continued)

(Continued from page 4)

appearance, sketch or photograph them, and pit ourselves against other astronomers in our ability to find them.

By a peculiar quirk of the sky, and perhaps Messier's stamina, and the fact that he observed from the latitude of Paris, France, all Messier objects can be seen from our location in Ontario, although some are pretty low in the southern sky. There's a 2 hour RA gap in the coordinates of the Messier objects, and those close to the gap are circumpolar, or nearly so, so it's a lucky accident, not recognized until the 20th century, that from mid-March to early April, someone with a clear view of the horizon and dark (nearly moonless) skies, can see all 110 Messier objects in a single night.

I have tried this project on a few occasions. My first attempt was on March 17th, 2007, when I used Binoculars, and sought just the 'binocular class' Messier objects. I got 58 of them, which was considered not bad for a beginner... but of course, it took all night to do. The location I had was not ideal, and the approaching twilight and the sky glow over Hamilton blocked my finding a few of the final entries on the list. The later the attempt, it becomes easier to find the morning objects, but harder to find the evening objects. Mid march to early April, with a new moon, is the only real chance of doing all 110 in a single night.

We are further inconvenienced by our latitude here being 20 degrees more north of the ideal latitude, 25 degrees north. I still remember the fun of trying to find them with a primitive star chart and binoculars. One thing I learned and remember to this day, is that binoculars are not good for viewing straight up, because of neck strain.

From 1758 to 1782 Charles Messier, a comet-hunting French astronomer (1730 - 1817), sought to catalog the location of deep sky objects that could easily be mistaken for comets in small telescopes. Each March, observers have a chance to observe all 110 Messier objects.

Our club sponsors an annual 'Messier Marathon' in which members can sign up sponsors for each Messier object located. Goto scopes are a no-no. You have to use star charts and your wits, and perhaps a bit of advice from your friends. Ideally you should get a good enough look to be certain you are in the right part of the sky. (Your dentist is an ideal sponsor. He's looking forward to your return visit to collect the money too).

We should not forget the reason he wrote them down, that is, to help find comets. Comet Lulin is in the sky but fading fast. It will be difficult but not impossible to see after the full moon this month, so it's a chance to mix a real comet with the 110 Messier objects and see for yourself how similar they can look.

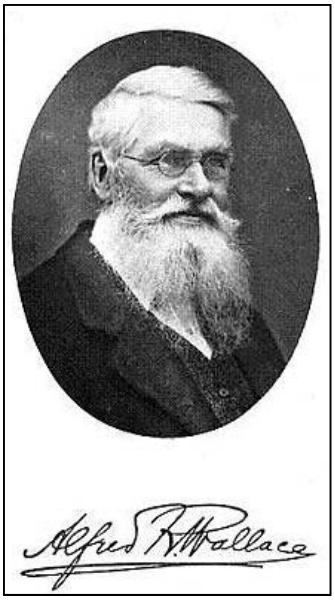
18 months ago I began a 'Sequential Messier Marathon' with the goal of observing and sketching all 110 of objects, in numerical order. There's some advantages... it cannot be done in a single night, (for instance, M3 has set before M2 comes into view), so I get more time to observe other things as well. I have been snagged on M68 for a long time, since early July of last year, when it set at sundown. It is low in the southern sky so it's only visible from early December to June. I hope to catch it this month, and then get M69 and M70 when they come into view in the early morning.

M71 is the hardest Messier object to get during the Messier Marathon, as it rises into the twilight. Waiting a few weeks will make it easier, but then M74 and M77 will be out of sight until the summer time. So it's going to take years to finish my marathon.

In the meantime, I can enjoy the comets.

Alfred Russel Wallace—The Other Darwin

by Glenn Muller



Scientist, naturalist, astronomer, and author; Alfred Russel Wallace was a man who pursued life's great mysteries across the world, and into the expanse of Space. In seeking sound scientific solutions to the riddles of the Victorian Age his research would parallel Darwin's theory of evolution, oppose Lowell's theory of Martian canals, and would explore, somewhat paradoxically, the realm of spiritualism.

Born in 1823, Wallace spent his adolescence in Hertford, England where his father was the Town's librarian. Though Alfred read most of the library's books on science he was not an attentive student. So, when the family was swindled out of their holdings in 1835, he was pulled out of school and sent to live in London with his older brother John.

A series of trade-related jobs would expose him to drafting, map-making, geometry, trigonometry, construction, mechanics, and agricultural chemistry. Wallace began attending lectures of various scientific societies with an interest in botany, geology, and astronomy. Accepting a teaching post at a collegiate school, he soon became acquainted with Henry Bates, a young naturalist whose etymological collections captured Wallace's imagination.

In 1847, a book titled *A Voyage Up The River Amazon* prompted him to become a full-time naturalist and, with his friend Henry Bates, embarked on a South-American natural-history collecting expedition on April 25, 1848.

Wallace and Bates worked the Amazon for the next eighteen months until, for reasons unknown, parted ways. For the next two years Wallace continued to survey unmapped regions of the Rio Negro, creating maps that would be the standard for many years. Bates would become a leading naturalist and make significant contributions to early theories of natural selection.

Over time, Wallace would also form an appreciation of how mechanisms of slow, ongoing, processes could effect long-term change. Though not coming to any conclusions about biological change, he did theorize on how the Earth's orbit and precession may effect a change in the climate.

Deciding to return to England in 1852, he packed four years worth of research and samples onto a brig and set sail for home. It would be an ill-fated crossing. Out at sea, the brig caught fire and sank with Wallace's entire collection. For ten days he and the other survivors struggled to stay afloat in badly-leaking lifeboats. Picked up by a passing cargo ship he was nearly sunk again by a series of storms and would spend a total of eighty days crossing the Atlantic.

With insurance money from his lost collection, and a grant from the Royal Geographical Society, he funded an eight year expedition through the Malay Archipelago. It was during a bout of malaria, on that trip, that Wallace clicked to the idea that creatures best able to adapt to their environment inevitably have the best chance of survival, and of passing along that advantageous trait.

He sent a paper on the subject to his acquaintance, Charles Darwin. Darwin, as we know, had been on this track for several years but was months from publishing his own detailed account. Not wanting to be scooped, Darwin sent some of his unpublished segments, along with Wallace's paper, to a meeting of the Linnean Society. He then quickly produced a compact version of his work which became the famous book, *On the Origin Of Species.*

Though overshadowed by this work Wallace's contribution is still recognized by insiders. In fact, it was his suggestion that Darwin use Herbert Spencer's phrase *"survival of the fittest"* to convey the idea of natural selection in layman's terms.

In the 1860's, Wallace became a spiritualist. He believed that spirits of the dead reside on a higher plane than humans and are able to assist the living by conversing through mediums. This belief was shared by flamboyant astronomer Camille Flammarion who, along with Percival Lowell, had advanced the theory of Martian canals.

Having read Lowell's book, *Mars and Its Canals*, Wallace would take his esteemed colleague to task with a book of his own entitled *Is Mars Habitable?* This book, published in 1907, refutes Lowell's canal theory by using research from several leading astronomers of the day. His main arguments were that spectroscopic analysis had shown no signs of water vapour in the Martian atmosphere, that Lowell had grossly miscalculated the temperature range of the planet, and that low atmospheric pressure and topographical features would make the postulated global canal system, with abundant liquid water, impossible.

But, Wallace then goes on to provide an explanation as to how the straight-line canal-like features could have formed. If nothing else, this subtly illustrates that Lowell's prestige was such that his peers never doubted the data, just his interpretation of it.

The colourful life of Alfred Russel Wallace would end naturally in 1913. There are so many interesting aspects to it that they cannot be all told here. However, several biographical books and essays are available, both online and through your local library. Peter Raby's *Alfred Russel Wallace: A Life* – University Press, 2001 is particularly recommended, and Wallace's own 54 page *Is Mars Habitable?* can be downloaded in popular document format from www.manybooks.net.

February HAA Meeting Highlights

by Heather Neproszel

Attendance at the February meeting was super. Being inside where it is warm sure beats freezing outside at a telescope!

HAA Chairman Steve Germann welcomed 67+ attendees on a cold and clear Friday night to the HAA's monthly General meeting held at the Hamilton Spectator building. Jim Wamsley and Don Pullen greeted people at the door – early birds receive free tickets for door prizes and hot coffee was available, a welcoming touch on such a frosty evening. Steve invited Mike Jefferson to make a brief update regarding the LOFAR II spectroscope. Peter McHugh has made a video of LOFAR readings and some adjustments will be made to the LOFAR. It will be interesting to see this video when it becomes available.

Next up Steve introduced HAA Observing Director John Gauvreau and his presentation of The Sky this Month. In the spirit of celebrating Galileo's invention of the telescope 400 years ago, John mentioned astronomer Tycho Brahe's Theory of the Universe, published 400 years ago, and based on the ancient Greek astronomer Ptolemy's theories. Tycho's theory, where the Sun and Moon orbit the Earth, is of course is incorrect, but at least the dude was looking up and thinking about what he saw!

Getting back to the present day, John pointed out that the coming month will be the best time to observe the planets Venus (now shining brilliantly in the evening western sky) and Saturn, the latter shining brighter as it approaches Opposition (opposite the sun in our sky on March 8 2009). Saturn's rings are now nearly closed and this affords us the possibility of seeing more of Saturn's moons. These moons can be obscured when located in front of the rings due to a lack of contrast between rings and moon or simply when hidden behind the rings. Venus's phases are slimming down (you will see a slimmer and slimmer crescent) as the month ends and into the first two weeks of March. John announced his "naked-eye challenge" for this month: to observe Venus with 3 dimensions.

The big observing highlight this month of course is Comet Lulin, rising in the southeast at about 10:30 pm. Lulin can be observed in the constellation Virgo and will be moving backwards along the ecliptic (a comet behaving badly: comets usually follow the ecliptic) into Leo and then Cancer. The comet will be an easy binocular target, but a challenging naked-eye object.

HAA Observing Director John Gauvreau provided the astronomical highlights for the club.

Also of note: the constellation Gemini (the twins) will be riding high above the horizon this month, a great time to be observing one of John's favourite double stars: Castor. Having trouble determining which bright star is Castor and which one is Pollux in Gemini? Pollux is brighter. John asks us to take a look and observe the brightness and colour differences, if any, between the two stars that make up the double star Castor. Also, John points out that Castor is in fact a multiple star: Castor A is itself a triple star, Castor B is a pair and Castor C is a pair of red dwarfs stars. You will probably see only the main A, B and C stars though, with the brighter A and B stars paired pretty close together and the much dimmer C at a greater distance (but still within a telescopic field of view). Not far from Castor and into the dim constellation Lynx (brightest star is Alpha Lyncis at 3.14 magnitude) we find NGC 2419. NGC 2419 is a globular star cluster known as the "Intergalactic Wanderer". This object is the most distant globular cluster associated with our galaxy, the Milky Way. It is 300,000 light-years away from earth. It is one of the most intrinsically bright globulars: the fourth brightest actually. For a while it was thought to be completely separate from the Milky Way, hence the "intergalactic" moniker. However, even though it resides way out in the exurbia of our galaxy, this globular is not "wandering". Just prefers the country to the city is all.

At the end of John's presentation Steve Germann asked about whether Comet Lulin would pass near "The Beehive" or M44? John answered that the comet will be moving away from earth at that point and will be getting dimmer. Best to get out and observe at the earliest chance possible – the comet will still be bright and you never know about the weather.

At break, photos of the HAA's display and presentation on IYA (International Year of Astronomy) Kick-off at the Ontario Science Centre were shown. Steve Germann noted that Denis Gray, one of the organizers of IYA Kick-Off congratulated the HAA's efforts in making Toronto Astronomy Festival at the OSC such a successful event. Kudos to

(Continued on page 13)

My Galileo Moment

by Glenn Muller

My earliest astronomical memories are as diffuse as nova remnants, yet enough tendrils remain for reconstruction if I may be more general than specific.

Like Galileo's initial instruments, my first scope was also difficult to use. It was a 60mm Tasco reflector with a non-removable sliding zoom eyepiece. The attached tabletop tripod would never tighten sufficiently to hold position, making it almost impossible to bring a target into focus. That is, if I even managed to acquire a target. The finderscope was mounted impossibly close to the tube, and so small that in order to see anything you had to detach it from the scope, which rather defeated the purpose.

That made it a one-object scope and the object was the Moon. Yet, the millisecond glimpses of craters seemed ample reward for my persistence, and I well-remember the highlight from this time; my first (and only) view of Saturn. While I held my breath, a tiny ivory orb with wings hovered for a brief moment before my eyes. How I longed to show my friends - how they longed to see it – but it was soon lost and never recovered.

Almost forty years later, I had an unexpected reunion with that scope. My younger brother had kept it – proof in itself he'd never actually used it. As with many childhood memories where size is relevant, my old scope had shrunk over time down to 40mm. Only slightly larger than Galileo's first model, with somewhat better glass, it brought me frustration, joy, and burning desire to have something better.

I have no doubt that Galileo felt the same way.

The Sky this Month

by John Gauvreau

We have already set our clocks to accommodate **Daylight Savings Time**, and this harbinger of **spring** means the sky darkens a little later, but we also enjoy the benefits of the season too. There have already been some lovely warm days and it is nice to go out observing without having to wear absolutely *everything* you own. The **Vernal Equinox** arrives on March 20th, and with the official beginning of **spring** comes longer days and shorter nights. Those nights offer some lovely sights for all observers.

Venus has been our evening companion for many months now, but at last this excellent apparition will come to an end. The final days of March will see **Venus** leave the evening sky and sink into the western horizon. **Venus** finally reaches the **Sun** and passes in front of it on March 27th. When **Venus** or **Mercury** follow their orbital paths between us on **Earth** and the **Sun** it is called ***inferior conjunction***. When they or the other planets find their orbits have taken them to the exact opposite side of the **Sun** and they appear to pass behind it, it is call ***superior conjunction***. On the 27th though, when **Venus** experiences inferior conjunction, it doesn't pass directly in front of the **Sun**; if it did, we would see **Venus** transit the **Sun**. In fact, Venus usually passes a little above or below the Sun. This time it will pass 8° above the **Sun**, and that means we have the opportunity to see something unique; in fact, 2 unique things. Because the **ecliptic** appears angled to the horizon, **Venus** appears to set about a half hour after the **Sun** on March 27th, and it also appears to rise about a half hour before the **Sun** on the same day. So you can see **Venus** as both a morning star and an evening star on the same day! Still, it will be a very challenging observation that will require a clear horizon (well, two clear horizons) and a keen eye to spot **Venus** in the bright twilight. Try using binoculars to sweep the area, but be absolutely sure that you wait until the **Sun** has completely set, since even a moment of viewing the Sun can cause permanent eye damage.

The other opportunity presenting itself is the chance for telescope observers to see the atmosphere of **Venus** illuminated from the far side and thus appear as a ring encircling the **planet**. Even in the days before and after inferior conjunction you will be able to notice that the cusps of the crescent extend well beyond the half circle that we are used to seeing when the **moon** is in a similar phase. Again, observers should use extreme caution to avoid accidental observation of the **sun**. If you do get up early for a morning view of **Venus** you will also be treated to a preview of the summer **constellations**, and be sure to look for **Jupiter**, which is low in the southeast before dawn.

The loss of **Venus** in our sky does not leave us empty handed though. **Saturn** is in **Leo** and so is well up in the east when it gets dark and continues to climb as the evening progresses. Now is an excellent time to observe **Saturn**, as it is well placed and visible for most of the night. The **rings** are inclined about 3° to the **Earth**, and so continue to show as a very thin line crossing the **planet**. Telescope observers should be keeping an eye out for **Saturn's** many **moons**. Including **Titan** (which is very bright and can wander quite far from **Saturn**, so don't mistake it for a background **star**!) four **moons** are 10th magnitude or brighter and 2 more are around 11th mag. How many can you see?

With all these intriguing sights it is easy to forget the **Moon,** but now is a wonderful time to do some **lunar** observing. Because the **Moon's orbit** is inclined to the **Earth's** orientation, we see that sometimes the **Moon** climbs high in the sky and sometimes it stays low. Different seasons mean

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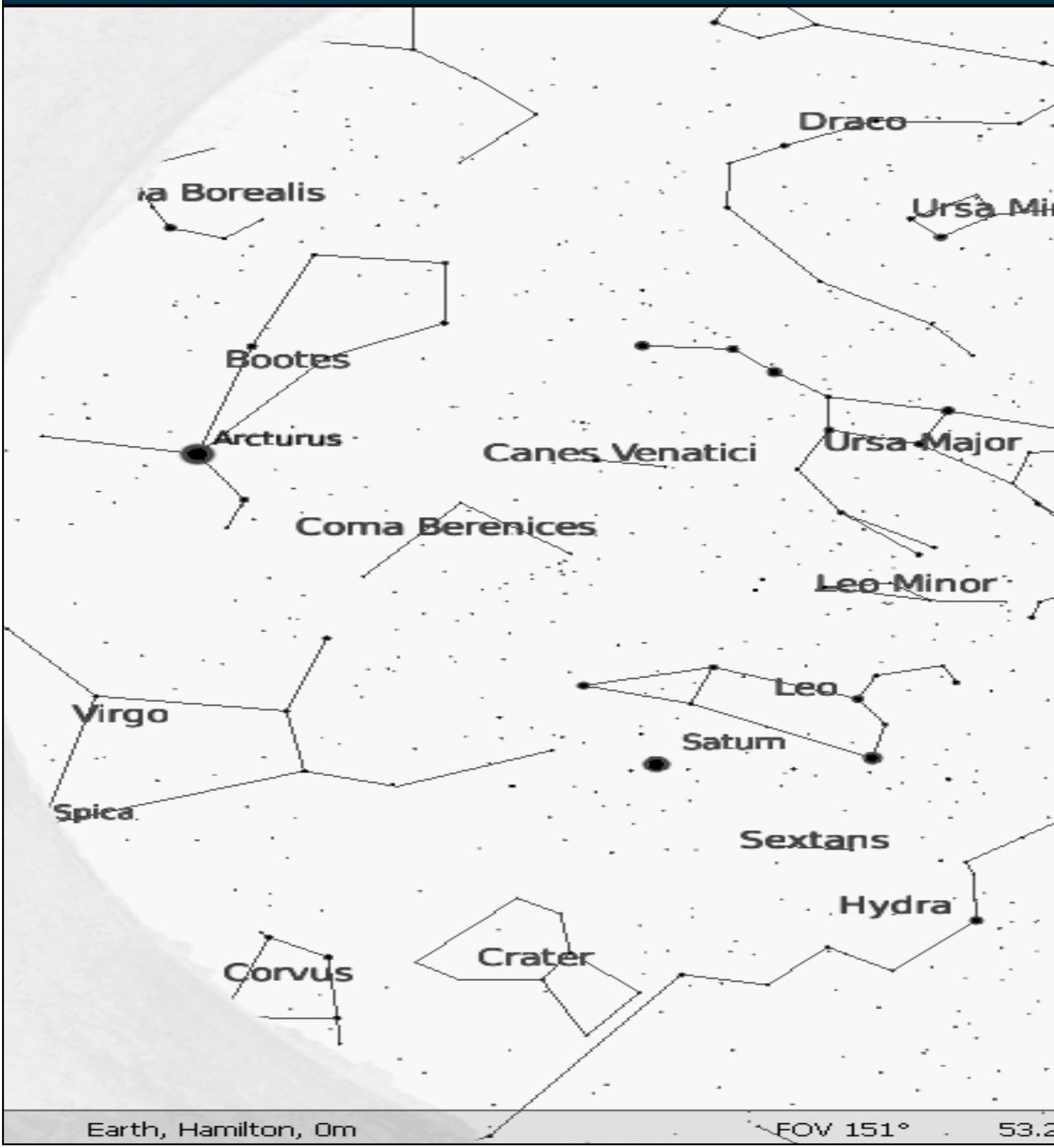
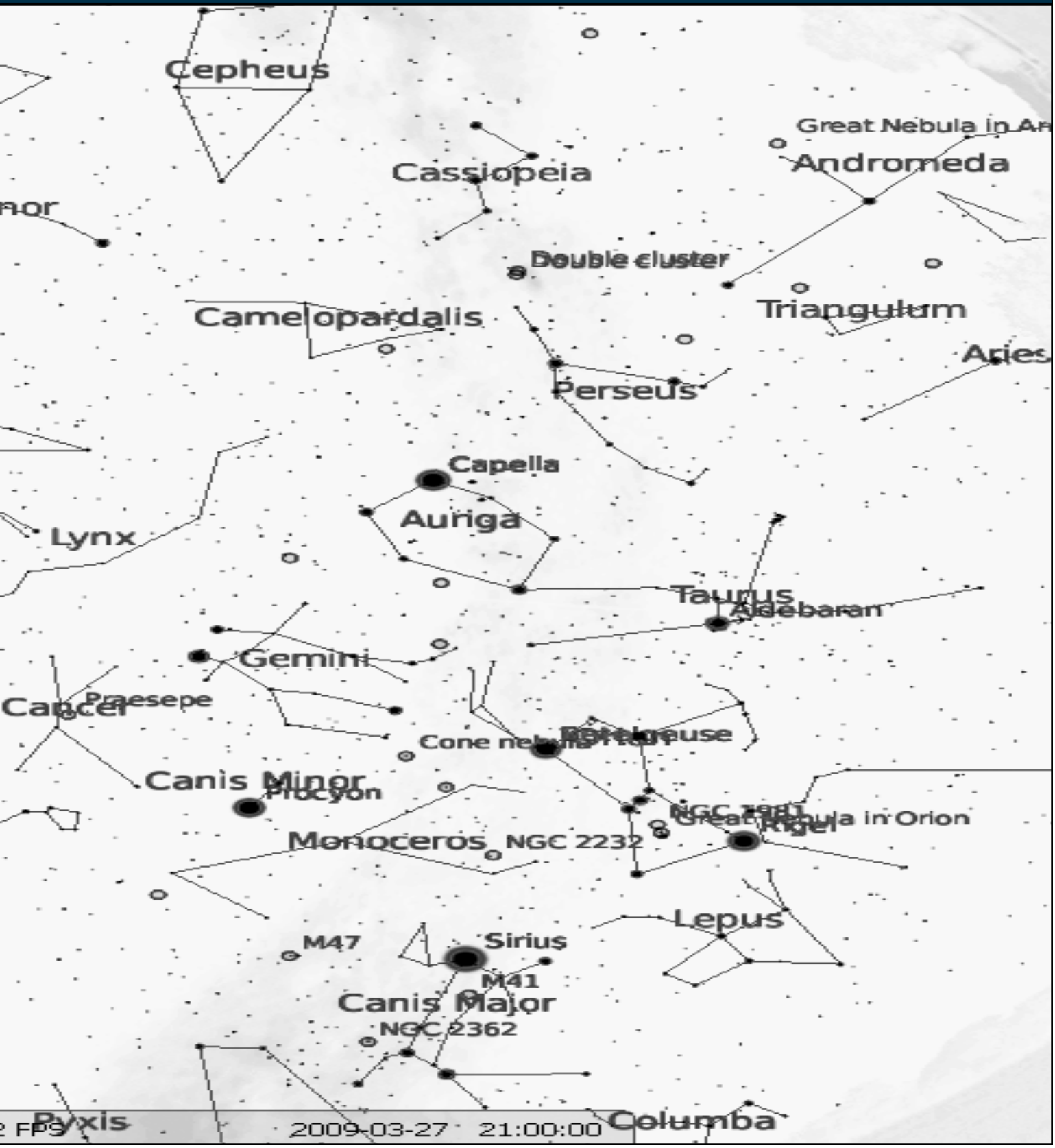
The Sky t


Draco
a Borealis
Ursa Mi
Bootes
Arcturus
Canes Venatici
Ursa Major
Coma Berenices
Leo Minor
Leo
Virgo
Satum
Spica
Sextans
Hydra
Crater
Corvus
Earth, Hamilton, 0m
FOV 151°
53.2

his Month


Cepheus
Cassiopeia
Great Nebula in An
Andromeda
Double cluster
Triangulum
Camelopardalis
Aries
Perseus
Capella
Auriga
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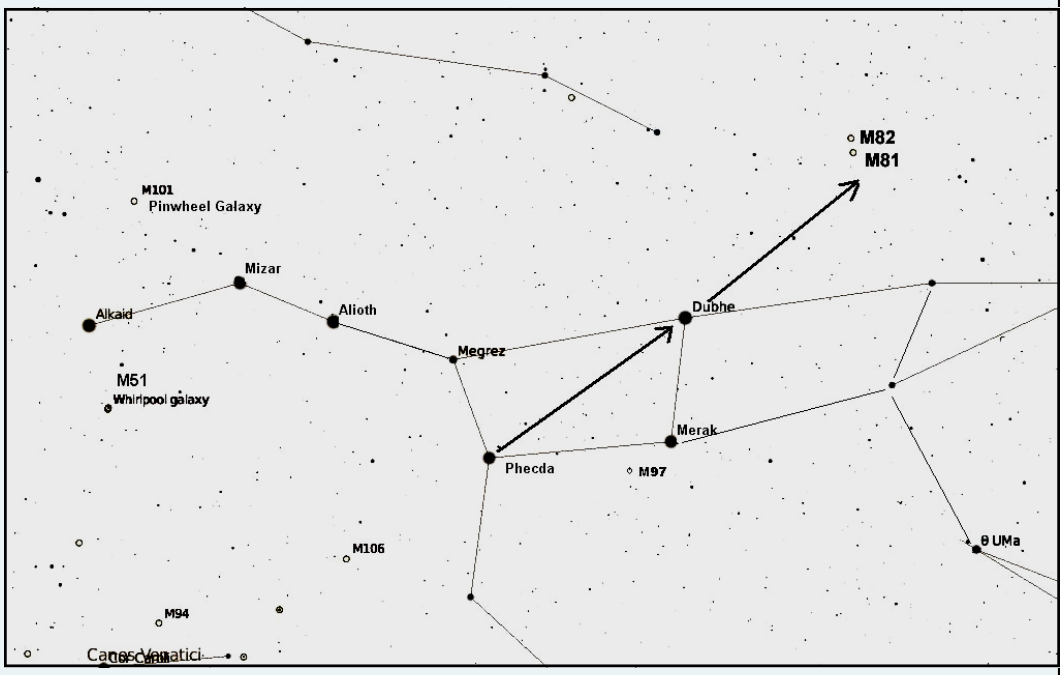
Aldebaran
Gemini
Praesepe
Cancer
Cone nebula
Canis Minor
Procyon
Great Nebula in Orion
Rigel
Monoceros
NGC 2232
Lepus
M47
Sirius
M41
Canis Major
NGC 2362
Pyxis
Columba
2009-03-27 21:00:00

The Sky this Month
(Continued)

(Continued from page 9)

different phases of the **Moon** climb high and the spring gives us a chance to observe the first quarter **Moon** at it's highest. Less atmosphere to look through means a steadier view and a chance to see fine detail on the lunar surface. A good printed atlas like Rukl's or an online atlas like the **Virtual Moon Atlas** can really enhance your observing experience as you try to hunt down smaller and smaller features. Some of those little **craterlettes** are only a kilometer or so across. How small a crater can you see in your scope? I would love to hear about your results.



The **spring** sky brings with it the spring **constellations** of **Cancer**, **Leo** and the large but dim **Hydra**. **Spring** also sees the return of **Ursa Major**, and its most famous **asterism**, the **Big Dipper**. Some cultures equate the return of this constellation with the idea of the bear returning to the landscape after a winter of hibernation, and this is reinforced by our view of the **Great Bear** rising from the northeastern horizon. We can be happy to see him, as now is the best time to view two of **Ursa Major's** best **deep sky** objects, **M81 and m82**. This pair of **galaxies** is undergoing a series of passes with each other as their mutual gravity pulls them together again and again. Close together in space means they are also close enough together to fit into the same telescopic field of view and offer a lovely contrast in appearance. One is a **spiral**, seen obliquely, and the other is an irregular galaxy. Being only 12 million **light years** away, they are bright enough to show in binoculars or the smallest scope and big enough to show a wealth of detail in a larger scope (can you see the mottled appearance of irregular **M82**?). Locating them in the sky uses a similar process as finding the **pole star**. Instead of following the bottom right **star** of the bowl (**Merak**) to the top right star (**Dubhe**) and leading on to Polaris, use the bottom left star of the bowl (**Phecda**), then cut diagonally across the **Dipper's** bowl to the top right star (**Dubhe** again) and keep going an equal distance and direction. This should land you within a degree of the **galactic** duo, as they lead the **Dipper's bowl** though the sky and are high in the north right now.

So **north**, **south**, **east**, **west** or high overhead, spring begins with a beautiful sky and offers a lot to see. Don't let the rain discourage you; get out there and observe what you can, and tell me all about it (send reports, observations, images or questions to observing@amateurastronomy.org)

February HAA Meeting Highlights
(Continued)

(Continued from page 7)

all (including Steve Germann, Jackie Fulton, Jim Wamsley, Don Pullen) who helped organize and present for this fun and educational event promoting astronomy during IYA 2009. Of course I cannot neglect to mention the wonderful pics of John Gauvreau as Galileo: John may I say you look great in your renaissance outfit. I bet visitors to the OSC had fun to chatting with the famous astronomer!

Also at break a gracious and charming Alex Tekatch assisted with the draw for the door prizes. Chris Elliot donated a copy of "The Observers Handbook" for the draw. Thanks Chris. Other winners were in receipt of the "Deep Space Catalogue" and "Solar Express".

Steve also announced the planned bus trip to the observatory at York University on March 21. Details will be presented on the HAA website.

Dr. Christine Wilson provided the main talk for the evening.

After the break Steve introduced our highlighted speaker for the evening, Dr. Wilson, from the Department of Physics and Astronomy at McMaster University presenting "Millimeter Wave Astronomy - Beyond the Visible Universe: Galaxy Collisions, Star Formation and Galactic Evolution." Dr. Wilson started by saying that her talk would center around three topics: First: What's exciting in the "invisible universe". Second, probing star formation in our own neighbourhood (the Milky Way) and star formation in galactic nurseries.

Dr. Wilson explained that visible light is just one small part of the entire electromagnetic spectrum and astronomers need to use other wavelengths of light because most of the regions of the universe involved in star formation are in fact quite cold. Stars form in cold, dense clouds of gas and dust. Dust absorbs and scatters visible light. So many star forming regions of space are dark at visible wavelengths. However, astronomers do look for thermal emission from these dust grains. And in the emission lines from molecules: molecules emit energy in discrete (individually distinct) narrow energy ranges. Astronomers want to identify where the hydrogen is on this hunt in clouds of gas and dust. Astronomers use rarer molecules as traces to identify where the hydrogen is and carbon monoxide can be used as a tracer to find where the hydrogen is.

Dr. Wilson demonstrated in images how much more could be seen when observing at infrared and near infrared wavelengths. Dr. Wilson talked about the "SCUBA" camera being used at the James Clerk Maxwell telescope in Mauna Kea in Hawaii. This camera measures continuum emission from cool dust. At the time the pictures were taken this camera was the best sub-millimetre telescope in the world. Dr. Wilson compared an image of Orion taken in visible light side by side with one taken at 60 microns, which showed quite a bit more detail. Orion is the closest star-forming region to our own earth.

Astronomers are also trying to find the origin of mass distribution in the universe. So they study clumps of gas. The distribution of clump masses of gas is the same as for young stars. There is a linear relationship between the rates of star formation and how much dense gas is available. Dr. Wilson showed radio images of the "Antennae" galaxies in Corvus. Two spiral galaxies are merging, or colliding. Stars and gas have been pulled out by tidal forces. Globular clusters are forming in this region of space. Globular clusters are very old and of interest to astronomers.

Dr. Wilson also showed images of the Atacama Large Millimetre Array or ALMA, which is an array of 54 x 12m radio telescopes high up on the Atacama Desert in Chile (a pristine environment for astronomy), plus 12 x 7m telescopes in a compact array. This telescope will have fantastic resolution and sensitivity, which will lead to very fast observations. This is an exciting time for Dr. Wilson and her colleagues. The first science from ALMA is expected in 2011. Dr. Wilson has been involved in this project since 1999. ALMA is located over 5000 metres high and the thin air makes physical activity difficult. The stations in the array are connected by roads and big equipment is needed to put these telescopes in place. Canada has a significant contribution to this project: the receivers at one particular wavelength (ALMA Band 3) (100 GHz) are being built at the Herzberg Institute of Astrophysics in Victoria, BC.

ALMA will be imaging the formation of structure. With ALMA, astronomers hope to probe planets forming in gas disks around stars; gas raining down from a core to form a new star; disentangling the time sequence of galaxy mergers; massive black holes in the center of galaxies and what is happening to the gas a few light years away and dust-enshrouded galaxy formation in the early universe. Dr. Wilson says ALMA will revolutionize our knowledge of the "invisible universe".

At the end of her presentation Steve Germann thanked Dr. Wilson for her fascinating talk. It is always a pleasure to hear from a professional astronomer doing real science. Thank you Dr. Wilson.

As attendees left the meeting and headed over to Kelsey's for some tasty food and drink, Glenn Muller had set up his 6 inch reflector just outside the entrance of the Spectator building and was treating people to a great view of Saturn. I could clearly see the Cassini division in the rings, despite how "closed up" the rings are at this point in time, and not far from the planet at about 7 o'clock position I could see Titan, Saturn's largest moon. What a fun way to end the meeting! Thanks Glenn!

Tech Tip—Adjusting Binoculars

by Tim Philp

Binoculars are a great way to start astronomy, however, it is very important that you adjust the binoculars to your eyes to get the best views.

Start by adjusting the inter-pupilary distance. This is the hinge that moves the eyepieces closer together. Look through the binoculars and move the eyepieces closer or farther apart until you see a round field of view without any shadows around the edges. When you are sure this is right, you might check the scale that is sometimes on the hinge for your personal adjustment so you can move them back again when someone else uses the binoculars.

Next, focus on an object in the distance by only looking through the lens that does not have an adjustment on the eyepiece by closing one eye. Focus the image so it is as sharp as possible.

Then, without moving the focus adjustment, look only through the other lens and move the diopter adjustment on the eyepiece until the image is sharp and clear.

Note the diopter setting on the adjustment for future use after someone else adjusts your binoculars to their eyes.

Binoculars are a great inexpensive tool to explore the night sky. They are inexpensive and require little setup and maintenance. A bit of time spent adjusting them to your eyes will increase your enjoyment and your views of the heavens.

Clear skies!

HAMILTON AMATEUR ASTRONOMERS

2009 MESSIER MARATHON

The Messier Catalogue is a list of 110 deep sky objects (galaxies, nebulae, star clusters, etc.) that are visible in backyard telescopes. Each year, during early spring, it is possible for an observer to see all 110 objects in a single night. This is a challenge that few have mastered! The person you are sponsoring has accepted the challenge to find as many Messier objects as they can in a single night sometime between March 1, 2009 and April 30, 2009 . On the back of this sheet, they will note the objects they found, the date they attempted the marathon, and the equipment (telescope, binoculars, naked eye) they used.

The Hamilton Amateur Astronomers is a registered charitable organization. The money raised by this marathon will enable us to continue our work in public awareness and astronomy education. Donations of $10 and more will receive a tax receipt. Thanks for your support!

Name	Address	Phone No.	Pledge Per Object	Donation	Paid?
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Cheques should be made payable to: **HAMILTON AMATEUR ASTRONOMERS** P.O. Box 65578, Dundas, ON L9H 6Y6

HAMILTON AMATEUR ASTRONOMERS

2009 MESSIER MARATHON

Participant's Name:	Location of Marathon
Date of Marathon:	Equipment Used:

Listed in order of appearance from West to East. Objects visible in binoculars are marked * and those visible to the naked eye are marked **

OBJECT	Seen?	OBJECT	Seen?	OBJECT	Seen?	OBJECT	Seen?
M77		M95		M87		M62*	
M74		M96		M89		Butterfly *6M Cluster	
M33*		M105		M90		M7*	
Andromeda **31M Galxy		M65		M88		Wild Duck *11M Cluster	
M32		M66		M91		M26	
M110		M81*		M58		Eagle Nebula *16M	
M52*		M82*		M59		Swan Nebula *17M	
M103*		Owl Nebula 97M		M60		M18*	
Little Dumbbell 76M		M108		M49*		M24*	
M34*		M109		M61		M25*	
Pleiades **45M		M40*		Sombrero 104M Galaxy		M23*	
M79*		M106		M5*		M21	
Orion Nebula **42M		M94*		Hercules **13M Cluster		Trifid Nebula 20M	
M43		M63*		M92*		Lagoon Nebula *8M	
M78*		Whirlpool 51M Galaxy		Ring Nebula 57M		M28*	
Crab Nebula 1M		Pinwheel 101M Galaxy		M56		M22*	
M35*		M102		M29*		M69	
M37*		M53*		M39*		M70	
M36*		Black Eye *64M Galaxy		Dumbbell *27M Nebula		M54	
M38*		M3*		M71		M55*	
M41*		M68		M107		M75	
M93*		M83*		M12*		M15*	
M47*		M98		M10*		M2*	
M46*		M99		M14*		M72	
M50*		M100		M9		M73	
M48*		M85		M4*		M30*	
M44* Beehive Cluster		M84		M80*		M67*	
M86		M19*					

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Through the Looking Glass

by Greg Emory

The setting of our clocks forward this past weekend leads one to contemplate time. Time is something we all take for granted. We will always have time tomorrow, the next day, next summer. Eventually we will run out of time. But what is this thing we call time? Time was once described as "that thing which prevents everything from occurring simultaneously". Another definition of time is "that which we use to measure the order of occurrence of events".

There are many ways for mankind to measure time—the natural day night cycle, the passing of the seasons, the cycle of the moon, the position of the stars. There are different measures of time. The actual value of time, at this instant, can be described in civil time, local mean sidereal time, local mean solar time , Greenwich mean sidereal time. If you are interested in timing occultations or similar events, then these time differences are important. To the less precise among us, we can get by with civil time or local mean sidereal time (LMST) which corresponds to the Right Ascension on Meridian. The Right Ascension divides the sky into 24 hours, the LMST tells the astronomer which of these subdivisions is currently overhead.

If the time issue seems complicated, it is. When we use time to measure the passage of days, which turn into months and the months into years, we create another tangled web of detail. How do we keep track of the exact passage of the year? We use a calendar. The calendar is dependent upon the reasons for its use. There are 40 or more calendars in use today. Three main categories of calendars are: solar; lunar and lunisolar. The Gregorian calendar, in use today, is a solar based calendar designed to keep the passage of the seasons in synch with the months and days. An example of a lunar calendar is the Islamic calendar which tracks the phase cycles of the moon, without regard for the tropical or seasonal calendar. A lunisolar calendar, such as the Hebrew or Chinese calendars, uses the lunar phases to track the passage of months, and after a couple of years an extra month is thrown in so as to synchronize the calendar back to the tropical or seasonal year.

A page from the Hindu Calendar 1871–1872.

The Gregorian calendar has 365 days per standard year with an extra day inserted every fourth year unless the years are exactly divisible by 100. However if the year is divisible by 400, it will have a leap year. This creates a calendar with a mean number of days 365.2425 days. This amounts to an accumulated error of 1 day every 2500 years (or 0.0001095 %). The Gregorian calendar consists of 12 months with 30 or 31 days. One month, February, has 28 days or 29 days in the event of a leap year.

The Hebrew Calendar is a tabular or calculated calendar. The start of the new month is determined by tabular New Moon. This Tabular New Moon (molad) is based on an average or mean lunation cycle. When needed, months are inserted into the calendar to keep synchronicity with the tropical year. This is done based on the Metonic cycle (235 lunar cycles in 19 years). The Islamic calendar is based on the lunar cycle. Each month is started with the first perception of the new crescent.

There are many more calendars, including the Julian Calendar. The Julian Calendar is the precursor to the Gregorian Calendar. It consists of years of 365 days, with every fourth year having 366 days. The relative simplicity of the Julian Calendar is also why many astronomical calculations rely on using the Julian Day. Caesar did mess up one thing however, in my opinion. Why start the year with January 1? Wouldn't it be so much nicer to have the start of the year in the spring?

Terrestrial Planet Finder—Kepler

by NASA/Ames Research Centre

What is Kepler's mission?

The Kepler Mission is a NASA Discovery Program for detecting potentially life-supporting planets around other stars. All of the extra-solar planets detected so far by other projects are giant planets, mostly the size of Jupiter and bigger. Kepler is poised to find planets 30 to 600 times less massive than Jupiter.

How will it accomplish its mission?

By a method known as the ***transit method*** of planet finding. When we see a planet pass in front of its parent star it blocks a small fraction of the light from that star. When that happens, we say that the planet is ***transiting*** the star. If we see repeated transits at regular times, we have discovered a planet! From the brightness change we can tell the planet size. From the time between transits, we can tell the size of the planet's orbit and estimate the planet's temperature. These qualities determine possibilities for life on the planet.

What instruments will Kepler use?

The Kepler satellite has a 0.95-meter diameter telescope that is a photometer having a field of view a bit over 10 degrees square (and area of sky the size of about two open hands). It is designed to continuously and simultaneously monitors brightnesses of 100,000 stars brighter than 14th magnitude in the constellations Cygnus & Lyrae.

How difficult is Kepler's task?

To detect an Earth-size planet, the photometer must be able to sense a drop in brightness of only 1/100 of a percent. This is akin to sensing the drop in brightness of a car's headlight when a fruit fly moves in front of it! The photometer must be space based to obtain this precision.

Space Place—
Where Did All These Gadgets Come From?!

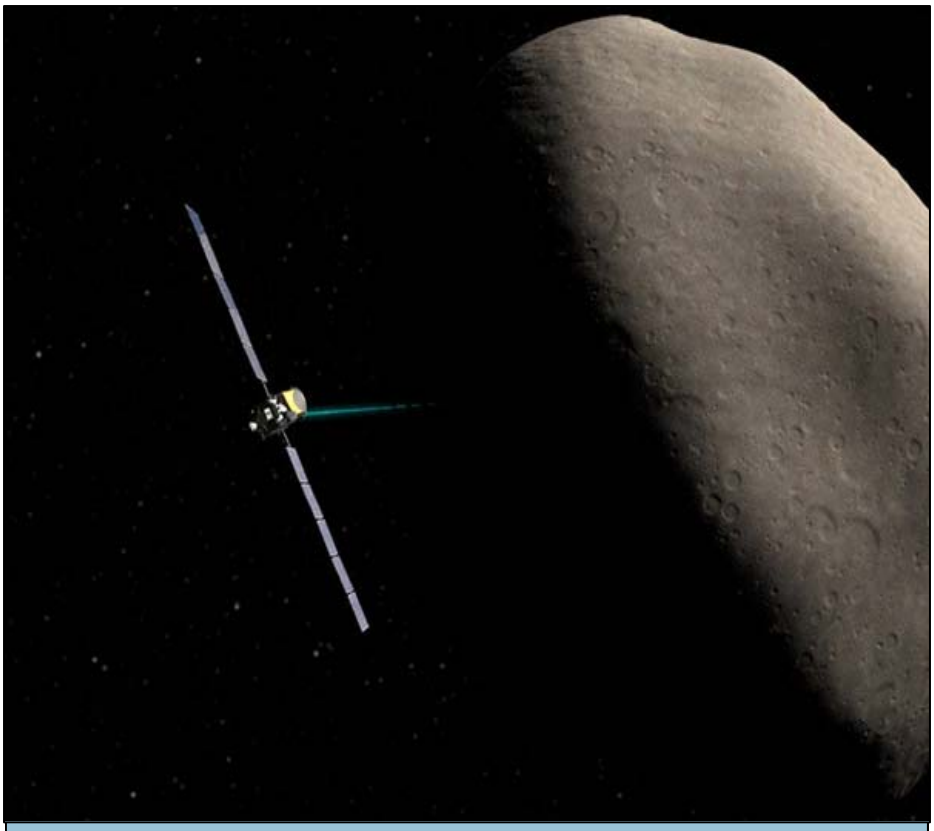
Ion propulsion. Artificial intelligence. Hyper-spectral imagers. It sounds like science fiction, but all these technologies are now flying around the solar system on real-life NASA missions.

How did they get there? Answer: the New Millennium Program (NMP). NMP is a special NASA program that flight tests wild and far-out technologies. And if they pass the test, they can be used on real space missions.

The list of probes that have benefited from technologies incubated by NMP reads like the Who's Who of cutting-edge space exploration: Spirit and Opportunity (the phenomenally successful rovers exploring Mars), the Spitzer Space Telescope, the New Horizons mission to Pluto, the Dawn asteroid-exploration mission, the comet-smashing probe Deep Impact, and others. Some missions were merely enhanced by NMP technologies; others would have been impossible without them.

"In order to assess the impact of NMP technologies, NASA has developed a scorecard to keep track of all the places our technologies are being used," says New Millennium Program manager Christopher Stevens of the Jet Propulsion Laboratory.

For example, ion propulsion technology flight-tested on the NMP mission Deep Space 1, launched in October 1998, is now flying aboard the Dawn mission. Dawn will be the first probe to orbit an asteroid (Vesta) and then travel to and orbit a dwarf planet (Ceres). The highly efficient ion engine is vital to the success of the 3 billion mile, 8 year journey. The mission could not have been flown using conventional chemical propulsion; launching the enormous amount of fuel required would have broken the project's budget. "Ion propulsion was the only practical way," says Stevens.



Dawn will be the first spacecraft to establish orbits around two separate target bodies during its mission—thanks to ion propulsion validated by Deep Space 1.

In total, 10 technologies tested by Deep Space 1 have been adopted by more than 20 robotic probes. One, the Small Deep Space Transponder, has become the standard system for Earth communications for all deep-space missions.

And Deep Space 1 is just one of NMP's missions. About a half-dozen others have flown or will fly, and their advanced technologies are only beginning to be adopted. That's because it takes years to design probes that use these technologies, but Stevens says experience shows that "if you validate experimental technologies in space, and reduce the risk of using them, missions will pick them up."

Stevens knew many of these technologies when they were just a glimmer in an engineer's eye. Now they're "all grown up" and flying around the solar system. It's enough to make a program manager proud!

The results of all NMP's technology validations are online and the list is impressive: nmp.nasa.gov/TECHNOLOGY/scorecard/scorecard_results.cfm. For kids, the rhyming storybook, "Professor Starr's Dream Trip: Or, How a Little Technology Goes a Long Way" at spaceplace.nasa.gov/en/kids/nmp/starr gives a scientist's perspective on the technology that makes possible the Dawn mission.

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

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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.

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Next Meeting

Friday, April 3rd, 2009

7:30 PM @ The Spectator

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