Volume 16, Issue 2

February 2009





Event Horizon

The HAA was the center of attention at the Toronto Astronomy Festival and IYA kickoff event held at the Ontario Science Centre on Saturday, January 10, 2009. We were 1 of 4 astronomy clubs, along with some other organizations and some vendors. About 2 dozen booths in total were set up and there were a number of speakers lined up for the day.

The HAA was also present the day before (at the OSC) on Friday for the official kickoff. Steve Germann, Jackie Fulton, Jim Wamsley and John Gauvreau were hobnobbing with various From The Editor's Desk

IYA Kick Off

John 'Galileo' Gauvreau greets visitors at the Ontario Science Centre for the International Year of Astronomy kickoff

> 2009 is the International Year of Astronomy. It was chosen because it is the 400th anniversary of the first time that the telescope was turned on the skies.



Throughout the year, the Event Horizon will feature people's 'Galileo Moments'; the first time they looked through a telescope. I am sure that every experienced astronomer can remember that moment.

There is something special about your first view of the heavens. This is the year to share that feeling and that view with the general public.

(Continued on page 2) **Tim Philp, Editor**

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York University Observatory Trip

Saturday March 21

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Contact Steve Germann

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(Continued from page 1)

dignitaries and the press. John was impressively attired in his Galileo outfit and did several interviews for television, including CITY TV and CP24.

After rushing back in time for the HAA meeting Friday night, and socializing at Kelsey's after the meeting; the same 4 weary but determined members arrived early (8am) back at the OSC to get set up.

Our booth had 2 crater making demonstration kits set up on the floor for the kids (and

adults) to see how projectiles cause material to be ejected and form the various crater effects we see. We had colouring sheets that had some challenges on the back page to help further educate the young visitors to our booth. Additionally, we had a projector showing everyone how active and talented our club is with pictures from many of our events and astro-photos taken by club members. Jim brought along his 8" SCT, and binos on his new home-



made parallelogram which attracted a lot of attention. My wife Cathy and I arrived shortly after the OSC opened to help out and give others a chance to wander around. The HAA had a great location, immediately facing the stairs to the main entrance and near

the Mastermind gift shop.

We had hundreds of people stop by and all were interested in learning more about astronomy and we had a lot of fun answering questions and

providing some simple and inexpensive tips on how to get started. A number were interested in joining a club, we introduced them to some of the local clubs that were there. Some had received telescopes of various sorts over Christmas and had lots of questions about how to use them. And of course the kids

loved to play in the flour and cocoa crater making demos we had set up (thanks to Ann and Alex Tekatch for the idea). Steve did a great job of supervising this event, even if he did

(Continued on page 6)

Treasurer's Report— By Don Pullen

Feb 2009 Treasurer's Report

	(Unaudited)
Cash opening Balance (1 Jan 2009)	\$ 3477.15
Expenses	\$ 193.19
Revenue	\$ 346.00
Closing Balance (31 Jan 2009)	\$ 3629.96

Notes:

Major expenses: Jan EH printing (\$70.63), RASC Handbooks (\$83.73), Kids Outreach Tools (\$38.83)

Major revenue sources: Memberships (\$130), HAA 2009 Calendars (\$40), 50/50 (\$48), Handbooks (\$68), Planetarium Ticket Sales (\$60)

Planetarium Summary: Total Ticket sales (\$240), Cost of Shows (\$200), Profit (\$40)



Light pollution is not only bad for astronomers; there are many ways that light pollution impacts everyone.

Anyone can understand the value of a lamp-shade. The idea being, if the light hits the book but does not shine on your face, you will be able to read the book with more comfort.

Another value of a lampshade is to increase the apparent size of the illuminating source; light reflected from the inside of the shade (usually it's white) comes from a larger area, so shadows are less sharp, and if someone inadvertently looks in the direction of the light source, it's not so concentrated as to be annoyingly intense. That the same principle might apply to outdoor light fixtures probably has never occurred to some people. Because a streetlight is usually 6m or more from the things it illuminates, even though it's large, it will cause sharp shadows to be cast. Also, being bright and distant, it's a small intense source of light.

I doubt if an outdoor lighting engineer (or even a politician) would run home and discard all the lampshades in his house.

Why then do outdoor lighting fixtures lack lampshades? The obvious answer is that everyone thinks 'the more light the better', and that a lampshade is going to reduce the light: but we can see from the indoor analogy that there's more to consider.

While it's not probably appropriate to hang 'lamp shades' on street lights, the concept needs to be followed through to its logical conclusion. The lamp-shade analogy for street lights is the full-cut-off light fixture.

It's value is to help prevent direct light from reaching the eyes of people in the area, while directing the illumination onto the objects that need to be seen.

Keeping the direct light and glare out of people's eyes makes the rest of the light more effective, and in some ways, can change it from harmful to useful light.

Groups such as the International Dark Sky Association campaign for better understanding of the issues, so that the people making decisions can understand what's important.

There are 3 main forms of light pollution. The sky-glow from stray light directed into the sky, is one kind. The sky -glow from light that bounces off an object on the ground, and then into the sky is another.

The light that comes from a lamp directly to the eye of a person is another, and it's actually the worst kind of light pollution.

Glare causes your eyes to not darkadapt. As a result, things in shadow are harder to see.

Paradoxically, having a bright light in one area, means someone can hide in a shadow and not be seen, when if the first lamp was not there, people's eyes would adapt and probably be able to see them.

In a famous demonstration, an astronomer asked his university directors to meet him in a place lit by bright stadium lights. They did not see him approaching from a direction that the light was shining from because the glare was so extreme.

They were convinced that too much light is a problem, not just a redundancy. It turns out that reduction of glare automatically makes light pollution decrease too, for a two good reasons.

Since the light is directed where it is needed (on the ground), no light shines sideways, so there's less reflection into the sky. Since people are not seeing glare from the light fixture, less light is needed for them to see what's being lit up.

Wasted energy is saved. If each fixture were directed only in the proper directions, and if the reflectors used to do this were white, instead of black metal, and the power was reduced accordingly because all the watts are now lighting up the ground, and with no glare even less light is needed, perhaps a 50 percent saving in electricity would result.

Since the lamps are on about 10 hours a day, on average, and are probably about 400 watts, this saving would be about 2 kwh per day. Perhaps \$0.20 which in a year is about \$90. Over the 20 year life of the fixture, about \$1800... which exceeds the cost of making and installing the fixture. So there is an economic case for considering wasted energy and light installing or changing light fixtures. (but not, of course, the cost of the pole and power feed).

New fixtures are being installed on Guelph Line in Burlington. Instead of having a round ball of glass with a lamp inside, as the old 'Cobra Head' fixtures use, these have a flat pane of glass behind which the bulb shines.

As a result, the fixture is able to eliminate light leakage in the horizontal direction. I drove down the street last night and did not notice anything special about the lamps, but i am sure they contribute to less wasted light and more light getting to the ground. That they were unremarkable was a good thing.

I hope that over time, many of these new fixtures will be used. They are probably easier to maintain too, since the flat plate of glass on the underside is likely hinged. Glare from lamps illuminating billboards interferes with people's ability to see the sign itself.

Likewise, glare from lights on the side of buildings, illuminating parking lots decreases the ability to see the building's own signs.

Full-cut-off lighting means more than astronomer friendly. It means peoplefriendly. Astronomers happen to be the first group of people attuned to this prodigious waste of energy,

and loss of safety and convenience. If we can educate one person at a time with the lampshade analogy, eventually everyone will understand.

The Road Goes On and Ever On by Brenda Frederick

And so we set out one crisp, clear night, with Orion and Sirius looking over our shoulder, as if joining us on our journey. As we followed Highway 402 towards the Bluewater Bridge, the sky clouded over and we were enveloped by snow

squalls, visibility down to 100 yards and not a star in Michigan sight. was more welcoming, as the skies cleared and our familiar beacons. Orion and Sirius beckoned southward. us The other usual constellations accompanied us as well, but it is hard to gaze at the sky when one is driving. When I gave up the wheel to

my husband, I was able to observe the clarity of the stars until dawn.

That evening (January 9), Venus appeared just at sunset, much higher in the sky than I expected, but as we were in Georgia, we were considerably farther south than Oakville. Our motel, just off the interstate, was in a brightly lit area (as are most motels on 175). and I was more interested in sleep than observing, having driven some 12 of the previous 18 hours. The following evening saw us in Florida, with Venus even higher in the heavens. We stayed near Disney World, one of, if not the, brightest place on earth at night. If there were any stars to be seen, they were the ones performing on stage. Sunday night, just outside Miami, was almost as bright as Orlando.

agenda!

Sadly, Mother Nature did not cooperate much for the rest of the trip. We had fair weather in Grand Turk and for the first few hours at Half Moon Cay, but the clouds and rain rolled in

> along a cold front and stayed for our visit to Nassau and until after we had docked again in Miami.

> The road goes on and ever on....

And so we started our long drive home, stopping to visit friends along the way. Even a glorious sunset over Port Charlotte's beautiful harbor did not lead to

brilliant stars later in the evening, as the mist rolled in and the cold front followed. The snow started in Georgia, staying with us through Tennessee and Kentucky.

The last day of the trip brought sun throughout Ohio and Michigan, and upon crossing the border, we were greeted by more snow squalls – Welcome Back to Canada, weary travelers! However, an hour or so later, the skies cleared, and there were our old familiar favourites guiding us on the final stage of our journey, as we followed the stars home.



After the ship left port, just as

was almost directly overhead

and Sirius, along with the rest of Canis Major clearly visible

just to the south. Without my

planisphere it was hard to iden-

tify what I was looking at, but

referring to it at home, I appar-

ently saw Eridanus, Lepus and

Cetus quite well from a more

having my big binoculars was a

bit of a drawback, but as ships

tend to move on the water, it

would have been something of

an up and down viewing, and

seasickness was not on my

southerly vantage point.

heavens reappeared!

descended.

the

Not

Orion

darkness



Winter Observing by Ray Khan

If you're like me, some winter nights, you might look out the window and secretly pray that it's cloudy Why? In my case then I won't feel guilty about having to go outside and observe in the cold, because lo and behold the clouds have appeared, or are

soon going to come, as soon as I have set my equipment up to start observing the night sky. Never mind that the weather forecast predicted a clear night! Surely the Weather Network must be wrong tomyself. night I tell Truth is, this has happened on the odd occasion, however it is a useful memory to play back at convenient times, especially when it's nice and warm inside and -7 outside.

It is remarkable just how many excuses one can in the Winter; For exam-

ple: "It's my turn to baby-sit the kids tonight". (of course you actually have to have kids to pull this excuse.) Or, "I have to get up for work early tomorrow" is a good one. (But it's true, really!!!).

Or perhaps you really can't miss the next episode of C.S.I on television.

With that in mind, I would like to offer some practical solutions to Winter Stargazing. I find the Winter Sky to be rather inspiring, and somewhat refreshing to observe. Some of the best and most memorable observing I have done has been during this season. The skies tend to be clearer, and if the air is calm, stars appear to be brighter, and there are usually a few Planets that can be observed on any given evening.

Regardless of whether you are ob-

serving from your backyard or driving to a location a little preparation goes a long way.

First, you will want to layer your clothing. Thermal underwear, available in most ski shops is a good place to start. For both your legs and upper



Winter brings clear skies and wonderful things to look at in the sky. Unfortunately, it also brings chilling temperatures with challenges to equipment come up to not Stargaze and the observer. With the proper preparation, winter observing can be fun.

A pair of comfortable pants and a

sweater, over those to minimize bulk,

I use some of the thermal clothing that

cross-country skiers wear. It allows for

more flexibility and movement. Over

the pants a windproof shell is useful

for keeping the wind at bay, and fi-

A wool hat, earmuffs, and scarf are

essential. If you prefer a hoodie, those

are good too. If your head gets cold,

your entire body feels cold. This also

applies to footwear. Wool lined Sorel

brand boots are my personal favorite.

Thermal wool socks will also keep

vour toes warm. Thin Gloves with

thermal lining are great, especially

when you need nimble fingers to

make adjustments to various bits and pieces of hardware. If you tend to be

quite sensitive to the cold, you can

nally a Long Winter coat.

body.

even purchase compact chemical heating packets which can be placed within your shoes and gloves.

Having a good size thermos to put your favorite hot beverage in is also useful if you are traveling to an observing location, In my case, I al-

> ways make sure to know where the 24 hour Tim Horton's are located if I plan to be out late, for a pit stop on the way there and back. I would suggest abstaining from alcoholic drinks, as they will dilate your pupils, amongst other things.

> Also, it is generally a good idea to plan your Observing session. With one of the many software programs available to amateur astronomers (A google search will even turn up some that are free of charge) you can plan which objects to observe and note at what time they are best viewed. You don't want to be heading out

to observe the Planet Saturn for example, and then find out it is not ris-

ing till after 2am, and you want to be back home by 11pm. Further, less time is wasted trying to figure out what to observe, and more time is actually spent observing.

Some of the other benefits to Winter Observing is that since it gets dark early, thanks to no daylight savings time, you can start observing earlier and be back at a reasonable time, if you happen to be driving to a dark sky site.

If driving to an unfamiliar location, it is usually a good idea to go observing with a buddy. Especially if it is a remote dark sky location.

IYA Kick Off by Don Pullen

(Continued from page 2)

end up covered with flour by the end of the day.

HAA members Marg Walton, Bruce Peart and Doug Black stopped by for visits as they came to take in the event and see what the OSC had to offer. Heide DeBond also visited and Steve was able to present her with the many letters of support signed by HAA members to help preserve the DDO.

There were a number of free presentations running all day at various theatres within the Centre. These included people like Ivan Semeniuk and Peter McMahon from the Discovery Channel, and Mike Hiltz of MDA (formerly Spar), the makers of the Canadarm. I personally didn't get a chance to take any in, but speaking with some of those who passed through our booth, they had been very impressed with the calibre of the presenters and information. There was a competition between the astronomy students of York and University of Toronto. I understand that UofT won

Some of the other astronomy clubs represented were the Toronto and

Mississuaga RASC's, and NYAA (Starfest organizers). Toronto RASC had a beautiful vintage brass scope on display as part of their presentation. All of the clubs were busy most of the day sharing their excitement of astronomy and providing tips on how to get started.

EfstonScience and Khan Scope Centre had booths set up and some equipment for people to see, but they weren't selling anything that day since it wasn't intended to be used as a sales venue. I was pleased that both stores respected this wish and used the day more for informing the public about astronomy. Terrence Dickenson of SkyNews fame was also present at a booth he had set up, handing out free copies and showing support for IYA.

Of course the highlight of the day was Galileo. Our own John Gauvreau, whose fame had preceded him, had been invited to portray Galileo for both days of the event. He was simply amazing as he continued to wander around the OSC and speak with hundreds of people. His patience never failing and always with a glowing smile, he explained why 2009 had been designated as the IYA, who Galileo was and why he was so important, and detailed in very understandable terms about his experiments and how

they changed the world of his time. I was amazed that John could still see at the end of day after having his photo taken so many times by his adoring public.

Later in the day, as things were starting to wind down, some of us had a chance to take a tour of the OSC's planetarium with Phil Mozel where he conducts various shows for schools and the public. He'll be visiting later this year to speak at one our meetings. And thanks to John and Phil, we're now working on arranging a special show just for HAA members later this year at the planetarium. Keep an eye open for details.

In a follow-up letter from the OSC, they expressed how pleased they were with the event and thanked us for our participation. Attendance was approximately triple what the OSC would normally experience for this time of year. Due to the success of this event, there has already been some discussion about holding a similar event later in the year which is being given some consideration. If there is, we'll be sure to let all our members know so more can attend this fun and informative venue. So stay tuned.



EVENT HORIZON

Galileo Moments

by Mike Jefferson

This topic should be one where I can point to a specific time and call it a Galileo Moment. However, the universe is far too large and has existed for far too long for there to be just ONE Galileo Moment. I cannot think of a single such moment. This is because there have been too many to isolate a lone experience.

My first telescope, back in the early 1980's was one such 'high'. In my mind, I had great plans to purchase a finished 8" mirror, construct a 'square' plywood tube to house it and search for a suitable, push-around equatorial mounting. It never happened – thankfully! It probably would have been a disaster. Back in those times, most such projects were exactly that and it is for this reason that I found Ron Ravneburg's talk, at Starfest, about the early days of amateur astronomy, hilarious! Do not forget, John Dobson had not quite fully escaped his monkist trappings and the alt-az design that is his brainchild was still a few years in the future. What to do? Realizing that I was not a telescope builder, I decided to purchase. I 'bit the bullet' and bought - an AstroScan – from EfstoneScience in Toronto!

I was now fully equipped with a 7X50mm binocular and the 4" red, 'portaball' AstroScan! Was it a portent of the future? I guess it was because I have never owned anything larger than 4"! Better? By far, but never larger. Even in the early days, I did know, probably due to extensive cance-tripping, the size restrictions of real-life situations.

The AstroScan was stored at my parents home in Ancaster when I was living in a one-bedroom apartment in Hamilton. I can remember being on their front lawn using it for the first time and aiming it at a very bright 'star'. It was Jupiter! That was the first time I ever saw the main belts and some of the detail through an eyepiece at 16X. I was amazed and thrilled with the view!

The second Galileo Moment came in the mid-1980's when I started a sketch of the Moon from somewhere (Continued on page 8)



Galileo Moments by Mike Jefferson

(Continued from page 7)

near here. It was in the spring. Later in the summer, I took the sketch up to Georgian Bay to complete it. Using binoculars and sketching by hand, I attempted to finish what had been started a few months earlier. However, some of my previous features were not present any longer, and there were some on the Moon that were not on my original sketch! I was completely confused until I realized that I had 'discovered' lunar libration! The Moon turns back and forth a little more than 18 degrees during its monthly voyage around the Earth.

I suppose there have been many Galileo Moments in my astronomical life. I think the most important, albeit the latest, is the creation and configuration of the LOFAR II radio-x-ray 'telescope' or SID detector. Without going into the 'techy' side of things or the frustrating details, here, there were numerous times along the path of its development that I was ready to pitch the entire device into the trash-can! Although it is electronically preconfigured and tested at the Stanford Solar Centre (just as optical telescopes are preconfigured and tested before sale - hopefully, there is (unlike optical telescopes) absolutely NOTHING TURNKEY about any radio telescope. What you FIND, is what you GET after any setup as a research-'observational' tool. So, the Eureka Moment of the first data collection is akin to the successful landing of a space probe on the surface of a distant planet. It's a game of 'wait and see'! When it is successful, the rewards are incredible! There have been many other Galileo Moments in my amateur astronomical 'career' and I could probably discuss many more. However, time, space and the editorial constraints do not permit further discussion. Hope

you have enjoyed the ones I've presented here.





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The Sky this Month by John Gauvreau

There are so many ways to get involved in amateur astronomy. In our club alone, we have had members involved in backyard observing, astrophotography, telescope making, spectroscopy, radio astronomy, cosmology and much more. However, after a long a cold winter, February might be just the time to make one think of taking up armchair astronomy. Right now, a comfy chair, a roaring fire and a good guide book to help plan those summer observing sessions sounds pretty good! Before you settle in, though, consider that February also brings some very clear nights, two beautiful planets, the winter constellations at their best, and an unexpected treat.

This month we have a special and always welcome visitor in our skies; a **comet**! These rare and often unpredictable guests from the outer solar system are each unique and offer a fine excuse to get outside on a cold winter night. **Comet Lulin** is a fast moving comet and over the next month will come and go from our skies. Rising late at night, a great time to spot it will be on February 16th, when it will pass only 3° north of **Spica**, the brightest star in **Virgo**. You will need binoculars, but once you spot it, the comet will be easily identifiable, looking like a big soft fuzzy cotton ball. Because **Comet Lulin** will pass so close



to **Earth**, it shows a high degree of apparent movement, travelling 3° in the sky each night, so don't expect it to stick around **Spica**! A week later it has moved to Leo, and on the 23rd it passes only 2° from Saturn! What a lovely sight that will be in binoculars or a wide field telescope. The next night it makes its closest approach to **Earth**, and will be moving through 5° of sky per day. Spend some time at the telescope, because during a short observing session the comet should show obvious movement. A **comet's** brightness is unpredictable, but it might be visible with the naked eye by now. As it moves away it will fade quickly, but keep an eye on it's retreat; you never know what will happen with **comets**!

Of course, there's much more to see out there than a comet. The western sky continues to be dominated by **Venus.** Already appearing, when viewed through a telescope, much like a first quarter **moon**, a month from now, at mid March, it will appear as a thin crescent. Keep an eye on its rapidly changing phases, and recall that it was observations of this very kind that provided resounding proof in the 17th century that **Venus**, and the other planets, orbited the **sun**.

The **moon** makes its monthly pass by **Venus** on the evening of the 27th this month. In the evening sky, **Venus** will appear just to upper right of the **moon**. Most binoculars will be able to fit both objects at the same time. The **moon** isn't full again until the evening of March 10th, so we have lots of dark nights to enjoy the **comet**.

Saturn will be the finishing touch to most people's observing sessions as it sits just below Leo. By

(Continued on page 12)

The Sky t



his Month



The Sky this Month by John Gauvreau

(Continued from page 9)

the beginning of March it rises at sunset and sets at sunrise, which means it spends the entire night visible in the sky. This occurs when **Saturn** (or any other **planet**) is directly opposite the sun from us. This event is called 'opposition' and for **Saturn** it happens on March 8th. At opposition a **planet** is at its highest point in the sky around midnight, and it will be worth the wait to see this ringed beauty high above the adverse effects of our atmosphere. The rings are tilted only 2.5°, so be sure to catch a view of them while they appear razor thin.

Ceres is also in **Leo**, and also at opposition this month. Although it is almost 7th magnitude, it is still an easy object in binoculars, and would be a fine addition to your list of observed **solar system** bodies. Discovered on the first day of the 19th century, it was once considered a **planet**, then identified as the largest of the **asteroids**, and now carries the label of 'dwarf planet', although that may change again.

The nights are growing shorter yet warmer, and the





sky will move on from winter to spring. The same night that Saturn is at opposition we will move our clocks forward and observe Daylight Savings Time. Many observers curse this change in the clock, since it means the sky appears to stay light an hour later, so advantage take of the chance to see our old favourites Orion. Gemini, Auriga and the other constellations of winter at their best, while you can.



January Meeting Wrap-up by Heather Neproszel

Chairman Steve Germann welcomed attendees to the Spectator Building on January 9th (SRO) for the first General Meeting of the HAA for the year 2009. Steve briefly mentioned that there were still a number of HAA 2009 Calendars for sale – a surprise as these calendars are informative as well as beautiful. Steve also announced the Grand Re-opening on Thursday of the McCallion Planetarium on the McMaster University Campus. The planetarium has

undergone a renovation and it is good to have a functioning planetarium back in operation in the Hamilton area. This re-opening is very appropriate as 2009 is of course the International Year of Astronomy. The HAA is helping to celebrate the 400th anniversary of astronomer Galileo's invention of the telescope by organizing and participating in several events, the first one of which is the HAA hosting a booth on January 10th at the On-

tario Science Centre during the IYA events kick-off. Visitors will see a slide show detailing the various astronomical activities of HAA members, as well as a fun demonstration event for kids (as well as adults) showing how impact craters are formed. Steve Germann and John Gauvreau will be participating.

Steve next introduced John Gauvreau, the HAA's Observing Director, to the floor for this month's presentation of "The Sky Tonight". John started by showing us a beautiful image of the moon taken by Andrew Bruce using a 80mm refractor and a Canon XSi DSLR camera. John then took us on a detailed trip through a very rich part of the northern sky in winter. This area stretches roughly from Sirius to Aldebaran and includes parts of the Milky Way, Orion's Belt and the showpiece of the winter sky, the Orion Nebula (M42). John pointed out the star cluster Collinder 70. I was surprised to learn from John that there are as many 6, 7 and 8 magnitude stars in the vicinity of the belt of Orion as are in the Pleiades (M35), a beautiful star cluster in Taurus. Or how about a football shaped asterism in near the foot of Orion?



With the focus on the International Year of Astronomy John talked a bit about what Galileo could see with his telescope. As Galileo had built his scope in the fall, observed in December and published in March, it is interesting to note that he did not include the Orion Nebula in his observations. However he did note the Trapezium Theta. An interesting glimpse into how good (or bad) the optics of Galileo's telescope really were.

To finish his excellent talk John noted a couple of significant dates coming up: A conjunction of the Moon and Venus on January 29 and then looking ahead to February 3 when the Moon occults the Pleiades. John will conduct "The Sky Tonight Live" at Binbrook Conservation Area at 7:00pm on January 17 with a cloudy date set for January 24.

At break Steve noted the probable redevelopment of the David Dunlap Observatory property in Richmond Hill, which potentially represents the permanent loss of a significant Canadian astronomical site to commercial and residential development. In light of this the HAA has drafted a letter in support

> of conservation of the site, as it now exists. The letter was available to be signed by those interested in preserving Canada's astronomical and science history as represented by the DDO. The letter(s) will be mailed to the development meetings to be held a week after the HAA January meeting.

> The door prizes were held with the lucky winners receiving wall art donated by Tim Harpur. Thanks Tim.

Also at break Tim Philp asked attendees to write articles for inclusion to the HAA's monthly newsletter, the Event Horizon. In the spirit of the International Year of Astronomy (IYA) Tim encouraged us to write about our own "Galileo Moments".

Doug Welch introduced our highlighted speaker for the night, Paul Mortfield and his presentation "A Remote Observatory". Paul detailed how off the shelf technology can help us take great astrophotos. Paul talked about his first efforts at astrophotography as a teenager when he took his first picture of the moon, and how proud he was (and still is) of this photo even today as he images distant nebulae and galaxies with ever increasing sophistication and equipment.

(Continued on page 17)



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.



Finding and Viewing Messier's Objects A book review by Mike Spicer

Springtime approaches and with it. discussion of Messier marathons as if they were some form of Olympic sport to test the skill and endurance of amateur astronomers and their instru-The ments. marathon involves trying to observe all of the Messier objects in one dusk-to-dawn night - and it's possible to do that in early spring each year. No amateur worth his



salt would suggest using one of those new-fangled "go to" computerized telescopes to do the Marathon - - you have to "star hop" by identifying the patterns in the sky

that lead your telescope to these celestial gems if you can't find them with the naked eye or in binoculars!

Advance planning for the marathon is



important. There are several good texts devoted to identifying the Messier obiects - Steven O'Meara's volume one in the Deep Sky Companions series (Cambridge U., 1998) is depopular spite its poor sky charts. I prefer Ken Graun's Messier book which

was published in 2005, costs less, bears up well in field work, is far less wordy, in print that is much easier to read at the scope, with dewrepellant hardcover, concise information, excellent fullpage sky charts and realistic images of what the objects look like in a 4" scope.

Readers may recall my positive review of Ken Graun's *What's Out Tonight?* in the June 2007 *Event Horizon*. I liked his clear writing style and organization of data in that almanac and now he has done it again with Messier objects. Each object gets a double page treatment with (a) Messier's original description, (b) description as an NGC object in Dreyer's catalogue, (c) object location by RA, Dec and constellation,

(d) best times to observe the object, (e) a summary of facts about the object, (f) author's description using a 4" refractor, (g) measuring how easy the object is to locate, and then to actually observe it, (h) a calibrated photograph of the area of the object.

The book would be valuable if that's all it contained, but there is much more! A lengthy introduction explains the life and times of Charles Messier with descriptions of 18th century Paris, comet-hunting in those heady days, the Cluny observatory, biographies of his friends Pierre Méchain, Joseph de Lalande and his employer and mentor, Joseph Delisle. There's even a biography of John Dreyer, compiler of the New General Catalogue.

I highly recommend Ken Graun's contribution and hope you make it **The Next Step** before you foray into the night observing Messier objects!

Building a Parallelogram Mount

After pricing parallelograms on the internet and at the stores. I decided to build one myself. I had found several designs for them on the net. Using them and finding some bits and pieces in my shop, I laid out my plans.

I had an old camera tripod to use for a base. Removing the



drilled out the rest of the shaft with a 1/2 " bit in my drill press. Using a 1" drill bit i reamed out just enough material so the head of a 1/2" X 2" bolt would fit through the base and clear the tensioning bolt. I used a lock nut to attach this to the parallelogram.

For the parallelogram itself I purchased a 8' length of 3/4" aluminum square stock

template to drill the matching holes in the long bar.

I had 2 "L" brackets 7 1/2"long with holes pre-drilled at 5 1/2". I cut one side of these off, leaving 1 1/2" at the base. I also purchased 20mm threaded rod and two 20mm nuts. After welding one of these nuts to the short end of the "L" bracket, I attached the threaded rod to the nut and used the second nut to lock both nuts together.

I then attached the parallel bars to the "L" brackets using 5/8" bolts, washers and the other half of the

> "L" bracket for strength. I found some black plastic plugs to finish the open ends of the bars.

> For counter weight I just used a 10 lb. barbell weight and clamps from Canadian Tire. The total cost for materials was about \$55.00, which is a far cry from the internet or store prices.

> This was my Prototype and I am very pleased with the result, but am planning changes for the next model.

crank for the elevator shaft, I was able to pull it out of the leg portion of the tripod. I cut the gimbaled head off the shaft flush.

After dismantling the head, I

and cut it to 46" for the top bar and 26" for the bottom bar. I Drilled 5/8"holes on each end of the shorter bar 3/4" from the end. I used these holes as a



EVENT HORIZON

January Meeting Wrapup by Heather Neproszel

(Continued from page 13)

Paul talked about the issue of light pollution and it's effect on his efforts at astrophotography. Even in light-polluted Richmond Hill, Paul has taken some great astrophotos at his "Betelgeuse Bar & Grill" Observatory, along with collaborator Stef Cancelli. Paul has a 16-inch telescope and a 4-inch Takahashi for wide-field shots. He showed comparisons pictures of M106 taken at a dark sky site at Kitt Peak in Arizona and at Richmond Hill. Obviously the pristine skies at Kitt Peak are an advantage, but it is interesting to note how good his images taken in badly light polluted Richmond Hill are though.

Paul has a goal, and that is to move beyond imaging nebulae and to image distant galaxies, some with very low surface brightness. And to get the best possible images his abilities and equipment can get. So what happens when you live in Richmond Hill Ontario but require dark, dark skies? Paul has set up his own remote observatory in California where through his computer at home he can control his telescope remotely in the Sierras Mountains.

What are the major considerations in setting up your own remote observatory? Budget, equipment (fail safes, reliability), location and infrastructure. Paul showed us the Sierra site, which was dedicated to several remote observatories, all of them roll-off roofs, one of which was Paul's. This location has over 250 clear nights a year, an impressive number indeed. And it is blessed with great seeing. In comparison there are 60-65 clear nights in the Toronto area in a year.



Paul has a weather station and a webcam to do remote diagnostics. For example, with the web-cam he can diagnose problems like cord-wrap. However. Mother Nature has a way of making a point when a gull pooped all over the plastic dome above the all-sky camera. Thankfully there is a technician that oversees the site. So having a remote observatory has not eliminated all of the challenges encountered in doing astrophotography. Problems such as operator error, equipment failure and dust still need to be properly diagnosed and solved.

Paul uses an Apogee CCD camera with a 4kx4k chip (16 mega pixels). He also uses Bisque Paramounts. And processes his raw images using Maxim DL and T-Point software. He showed very impressive images of The Cocoon and M101. His image of M101 was taken with a 3 hour-long exposure comprising of 12 15-minute exposures. With this set -up he can see faint images down to magnitude 24. As long as Paul has an Internet connection he can do astrophotography. Also impressive were images of Vanderburg 482 where he and a colleague have created a 2.5D simulation by layering the image. Paul also has beautiful images of M33 and NGC 604. He says one of his goals in setting up the remote observatory was to get away from shooting in very narrow bands such as H-Alpha as he had to in Richmond Hill.

Paul has made some interesting observations while working on his astrophotography. He had processed impressive images of The Running Man Nebula and Barnard's Star. Paul noted that an interesting aspect of Barnard's Star is that since 2004

this object is moving 10 arc seconds a year. Paul imaged IC 405 and discovered asteroids in the field while imaging this galaxy.

The next phase for Paul Mortfield's astrophotography efforts? Another remote observatory, this time in the southern hemisphere. Perhaps South America or Australia.

At the end of his informative and entertaining presentation Mike Jefferson presented Paul Mortfield with a HAA hoodie and a framed poster of an "event". Paul Mortfield is "the godfather" of the LOFAR II spectrograph. Thank you Paul for your interesting presentation.

www.backyardastronomer.com

After the conclusion of Paul's talk and the meeting, members congregated at Kelsey's on Main St for some good food and more astro-conversation.

Another great meeting night for the HAA!



The Astronomers—Galileo

Galileo Galilei (15 February 1564 – 8 January 1642) was a Tuscan physicist, mathematician, astronomer, and philosopher who played a major role in the Scientific Revolution. His achievements include improvements to

the telescope and consequent astronomical observations, and support for Copernicanism. Galileo has been called the "father of modern observational astronomy", the "father of modern physics", the "father of science", and "the Father of Modern Science." The motion of uniformly accelerated objects, taught in nearly all high school and introductory college physics courses, was studied by Galileo as the subject of kinematics. His contributions to observational astronomy include the telescopic confirmation of the phases of Venus, the discovery of the four largest satellites of Jupiter, named the Galilean moons in his honour, and the observation and also worked in applied science and technology, improving compass design.

Based only on uncertain descriptions of the first practical telescope, invented by Hans Lippershey in the Netherlands in 1608, Galileo, in the following year, made a telescope with about 3x magnification, and later made others with up to about 30x magnification. With this improved device he could see magnified, upright images on the earth – it was what is now known as a terrestrial telescope, or spyglass. He could also use it to observe the sky; for a time he was one of those who could construct telescopes good enough for that purpose. On 25 August 1609, he demonstrated his first telescope to Venetian lawmak-



analysis of sunspots. Galileo di Vincenzo Bonaiuti de Galilei also worked in applied sciance and technology improv

> ers. His work on the device made for a profitable sideline with merchants who found it useful for their shipping businesses and trading issues. He published his initial telescopic astronomical observations in March 1610 in a short treatise entitled Sidereus Nuncius (Starry Messenger).

> On 7 January 1610 Galileo observed with his telescope what he described at the time as "three fixed stars, totally invisible by their

smallness", all within a short distance of Jupiter, and lying on a straight line through it. Observations on subsequent nights showed that the positions of these "stars" relative to Jupiter were changing in a way that would have been inexpli-

> cable if they had really been fixed stars. On 10 January Galileo noted that one of them had disappeared, an observation which he attributed to its being hidden behind Jupiter. Within a few days he concluded that they were orbiting Jupiter: He had discovered three of Jupiter's four largest satellites (moons): Io, Europa, and Callisto. He discovered the fourth, Ganvmede. on 13 Januarv. Galileo named the four satellites he had discovered Medicean stars, in honour of his future patron, Cosimo II de' Medici, Grand Duke of Tuscany, and Cosimo's three brothers. Later astronomers, however, renamed them the Galilean satellites in honour of Galileo himself.

> Galileo's championing of Copernicanism was controversial within his lifetime. The geocentric view had been dominant since the time of Aristotle, and

the controversy engendered by Galileo's presentation of heliocentrism as proven fact resulted in the Catholic Church's prohibiting its advocacy as empirically proven fact, because it was not empirically proven at the time and was contrary to the literal meaning of Scripture. Galileo was eventually forced to recant his heliocentrism and spent the last years of his life under house arrest on orders of the Roman Inquisition.

Space Place—Severe Space Weather By Dr. Tony Phillips

Did you know a solar flare can make your toilet stop working? That's the surprising conclusion of a NASA-funded study by the National Academy of Sciences entitled Severe Space Weather Events-

Understanding Societal and Economic Im-In the 132pacts. page report, experts detailed what might happen to our modern. high-tech society in the event of a "super solar flare" followed by an extreme geomagnetic storm. Thev that almost found nothing is immune from space weathernot even the water in your bathroom.

The problem begins with the electric power grid. Ground currents treme storm can melt the

copper windings of huge, multi-ton transformers at the heart of power distribution systems. Because modern power grids are interconnected, a cascade of failures could sweep across the country, rapidly cutting power to tens or even hundreds of millions of people. According to the report, this loss of electricity would have a ripple effect with "water distribution affected within several hours: perishable foods and medications lost in 12-24 hours; loss of heating/air conditioning, sewage disposal, phone service, fuel resupply and so on."

"The concept of interdependency," the report notes, "is evident in the unavailability of water due to longterm outage of electric power-and the inability to restart an electric generator without water on site."

It takes a very strong geomagnetic storm to cause problems on this scale-the type of storm that comes along only every century or so. A point of reference is the "Carrington Event" of August-September 1859, tion. The total economic impact in the first year alone could reach \$2 trillion (some 20 times greater than the costs of Hurricane Katrina).

The report concluded with a call for

infrastructure designed to better withstand qeomagnetic disturbances and improvements in space weather forecasting. Indeed. no one knows when the next super solar storm will erupt. It could be 100 vears away or just 100 days. It's somethina to think about ... the next time you flush.

One of the jobs of

ronmental Satel-



named after British amateur astronomer Richard Carrington who witnessed the instigating solar flare with his unaided eye while he was projecting an image of the Sun on a white screen. Geomagnetic storms triggered by the flare electrified telegraph lines, shocking technicians and setting their telegraph papers on fire; Northern Lights spread as far south as Cuba and Hawaii; auroras over the Rocky Mountains were so bright, the glow woke campers who began preparing breakfast because they thought it was morning!

"A contemporary repetition of the Carrington Event would cause ... extensive social and economic disruptions," the report warns. Widespread failures could include telecommunications, GPS navigation, banking and finance, and transportalites (GOES) and the Polar-orbiting **Operational Environmental Satellites** (POES) operated by NOAA is to keep an eye on space weather and provide early warning of solar events that could cause trouble for Earth.

You can keep an eye on space weather yourself at the National Weather Service's Space Weather Prediction Center.

www.swpc.noaa.gov. And for young people, space weather is explained and illustrated simply and clearly at the SciJinks Weather Laboratory, scijinks.gov/weather/howwhy/ spaceweather.

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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Next Meeting

Friday, March 13th, 2009 7:30 PM @ The Spectator

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