ent Horizon

Volume 17, Number 4

February 2010

From The Editor

As I write this, Valentine's Day is only a few days away and the frenzy for cards, flowers and chocolates is evident everywhere. As amateur astronomers,

we share a love of astronomy. After all, the word amateur means "lover". So Happy Valentine's Day to all you Hamilton Astronomy Lovers!

The newsletter

you hold in your hands got there after many hours of work by many of your fellow HAA members. The articles, photos, reports, etc. take time, thought, research and skill to craft. Please be sure to thank the authors and contributors for their work.

Ann Tekatch Editor@amateurastronomy.org



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From the Chair by Steve Germann

What can your club do for you?

Primarily, the best benefit you can get from the club is in the form of the excellent speakers the club attracts for our meetings.

By far they are the most generally useful part for the vast majority of members who have an interest in astronomy as a science, but don't do a lot of telescope watching.

Your council works hard to attract these people.

They do it 2 ways: First, by highlighting the role of the club in Astronomy outreach which we do with our annual Public Astronomy Nights in various communities in and around Hamilton.

The second way is by highlighting the quality and

quantity of the membership which will be attracted to the meeting, to hear the speaker. Our ability to interest nonmembers in our speaker's topics also helps. It's a fact that we welcome non-members and members alike to our meetings.

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From the Chair (continued)

Both of these things work in synergy. The better job we do with outreach, the more prestigious is the club and the better we can attract members who are then helping us to attract the speakers.

It's a wonder all this attraction has not resulted in some gravitational effects.

We have an exciting year of events and activities which go over and above just the meetings. In addition to our public nights, where you can come and get the thrill of watching "Galileo Moments", you can also come to Binbrook for 'The Sky this Season' and 'Messier Marathon Night' which will be in April. Then there's the annual Perseid's night, where you can watch for meteors in familiar surroundings with friends. Our planetarium night is coming up soon, and it's important for us to benefit from the organizing that has been done, and the great resource of the planetarium in town. Why not plan to bring a friend with you to see the show?

Our Imaging Clinic will be happening in April, featuring Kerry-Ann Lecky-Hepburn helping us

with her award winning techniques in astrophoto processing.

I also mention the many evenings our members invite you to come to Binbrook to observe the skies at our premier dark sky site. Not only is BCA a place where non-astronomers go to benefit from nature, it's also got the dark skies and nice southern view we need for observing.

Particularly in the summer, it's the place to be for Astronomy. Do take the opportunity to come in April and see the park, perhaps even for the first time, and then again during the late spring and summer when many members will be going there, especially on clear weekend evenings.

There's always a chance of some telescopes being set up in the parking lot after our Friday meetings, although that works best for lunar observing.

In 2010, our meeting falls on the new moon weekend almost every month until November. So it's likely that plans will be made for BCA on the following Saturday with some regularity.

This Month's Masthead Photo

This beautiful widefield photo of the Orion Nebula was taken by Don Pullen at Cherry Springs State Park in September 2008. Total exposure time was about 25 minutes. Don took the images and stacked them. Kerry processed the stacked images in Photoshop.



February 2010 Treasurer's Report by Don Pullen

(Unaudited)	
Cash opening Balance (1 Jan 2010)	\$ 4074.78
Expenses	\$ 548.65
Revenue	\$ 341.00
Closing Balance (31 Jan 2010)	\$ 3867.13

Notes:

1. Major revenue sources included: Memberships (\$85), Calendar Sales (\$160), 50/50 (\$26), Planetarium Tickets (\$70)

2. Major expenses included: HAA Calendar Printing (\$429.40), Binbrook event (\$119.25)



Cosmology Discussion Group Report by Mario Carr

For those who missed the recent Cosmology Discussion Group, you missed out on an interesting discussion about reality.

About 19 club members attended the session led by amateur astronomer extraordinaire John Gauvreau in the basement of Jim Wamsley's apartment building at

75 Main Street in Dundas at 7:30 pm on Saturday January 23. I would like to thank these two fine gentlemen for their contributions.

At the beginning of the session, John was the only one talking and I could tell that he was trying to fuel the fires of discussion. I think everyone including myself didn't know exactly what to say. As always, John's passion for astronomy

became infectious and almost everyone started to participate in heated astronomical discussions. As discussions evolved it was hard to get in a word. We talked on a variety of topics.

One topic I thought was interesting was the discussion on reality and how we are limited by our own senses so we can never really know reality. Birds and insects see in ultraviolet and their view of the world is entirely differently from what we see. Our eyes are limited to the visual spectrum but there is a full range of the electromagnetic spectrum that we cannot perceive and this can distort our reality.

Bill Tekatch gave an interesting example of how reality can be distorted with his demonstration of polarized light filters.Light coming from a light source such as the sun is not polarized so light waves travel both in the vertical and horizontal planes. lenses, rotated it and amazingly light went through all three filters. This seems to go beyond intuition. The reason why it's doing this is complicated but the point is that we are limited by our senses and sometimes what we perceive is not reality.

As amateur astronomers this is

important to realize because what we assume may be something entirely different. An example might be the famous canals on Mars. For centuries, astronomers assumed there were canals on Mars, which turned out to be an optical illusion that distorted their observations.

Another interesting point brought up in the group is that the only way to study and

However, when light is reflected off of a surface like water, the waves are directed into the horizontal plane, which can be seen as glare.

The molecules on the chemical film used in polarized filters are aligned in a certain way that will block out most of the light waves traveling in the horizontal plane. So as Bill demonstrated, if we place two polarized filters on top of each other and rotate one of them no light will get through because both lenses are filtering out both planes of light.

Sounds straight forward, right?

But then Bill slipped in another polarized filter between the two

understand something is from the outside looking in and we will never truly understand the universe because we are part of it.

In my opinion, our first meeting of the revamped Cosmology Discussion Group was a huge hit. It was an excellent way to spend a chilly winter's night with some good people discussing astronomy. I'm looking forward to another session which will be held in April. The Cosmology Discussion Group will be offered every other month alternating with the Book Club. Details will be announced at the next meeting.



E=mC² by Bill Tekatch

Most people have heard of Einstein's famous equation. Many know that it has something to do with mass and energy. I want to show you that this simple equation has much more to it than you may have ever thought.

The most recognized fact is that it expressed the realization that mass is a form of energy. That mass and energy are equivalent was quite a step forward in itself. But there is much more hidden in this equation. The speed of light squared c^2 part can be replaced by two other constants. These are the permittivity of free space or a vacuum, and the permeability of a vacuum. Permittivity refers to the ability to transmit an electric field, and is represented by the symbol epsilon ε . Permeability is the ability to transmit a magnetic field, and is represented by the symbol mu μ . The relationship between the speed of light, permeability, and permittivity is $c^2 = 1/\epsilon\mu$. Therefore $E = mc^2$ can be rewritten as $E = m/\epsilon\mu$. Not only does this express the relationship between light and electromagnetism, but mass and electromagnetism.

Now let us do some lifting with our minds. We have a one-kilogram weight on the floor. We pick it up and put it on top of a table so that it is one metre above the floor. The mass is still one kilogram. We know that the weight now has more energy in it than it did when it was on the floor. The equation E =

mc² does not show any change, or does it? Actually it does. That is because the speed of light at the table level is greater relative to the speed of light one metre lower. The Earth's gravitational field warps space-time. So as we approach the Earth, the strength of the gravity increases as the relative speed of light decreases. We find that c at the table level is an immeasurably small 16 nano-metres / second faster than at floor level.

This is my supposition. Let us take $E = mc^2$ to a much larger scale, the entire universe. As the stars convert mass to energy, the total mass of the universe is decreasing. Less mass means less gravity and the speed of light will be faster. Astronomers look at objects far away and see them, as they appeared long ago. The spectra of stars and galaxies reveal a red shift related to distance, time, and now we know, to the mass of the universe at that time. This is just a different scale for the well-known gravitational red shift. In closing I also want to point out that the speed of light in a vacuum is always the same universal constant of 2.9979 x 10⁸ m/sec anywhere and anytime in the universe.

May 23, 2006: NASA's Hubble Space Telescope has captured the first-ever picture of a group of five star-like images of a single distant quasar.

The multiple-image effect seen in the Hubble picture is produced by a process called gravitational lensing, in which the gravitational field of a massive object — in this case, a cluster of galaxies bends and amplifies light from an object — in this case, a quasar — farther behind it.





Burlington Public Night Report by Don Pullen

Friday, January 22 saw more than a dozen members and their telescopes set up at the Nelson Arena for our Burlington Public Stargazing Night.

This year, thanks to our club chair Steve Germann being part of the organizing committee, we were able to be included as one of the many activities in the Burlington Winter Carnival. As a result, we were able to share in

their promotion and get a good location with lots of traffic. Nelson Arena was holding a Ringette tournament on the same night so it meant that there would be lots of families going in and out of the arena all night long.

We arrived early and set up near the main entrance which worked out great for us. Despite one parking lot light, we had a good view of the skies to the East, South and West, There had been lots of clouds earlier in the day, but the skies opened up and we had clear viewing for the entire time we were set up. This allowed us excellent views of Mars and the Moon. Unfortunately at this time of year, Jupiter was setting just after we arrived; otherwise I'm sure it would have been an excellent showcase object. (I did manage to make out 3 of its moons with my binoculars just before it dropped out of sight.)

The seeing conditions weren't the steadiest and it was rather chilly, but everyone was properly dressed for the cold and the really clear skies did reveal a number of excellent views despite being in the city.

The arena drew hundreds of people over the course of the evening and about 200 of those stopped to look through the many scopes and get lots of good information. This was probably one of our best-attended public events. The lines never seemed to waver and all members had curious gazers at their scopes all night. Everyone from the club did an excellent job of explaining what people were seeing, and answering questions

about the types of scopes to buy or how to get started. We also passed out lots of club material and free grab bags to interested participants. Of course there were a few people asking about "2012" and they were gently reassured that it was just nonsense.

As usual, Steve was "wow"ing people with his excellent bright images provided by his GWS, moving between the

Moon, Mars and other interesting objects. I had my 5" APO set up 2010 Burlington with the binoviewers and bar-Winter Carnival low, giving people wonderful 3D views of the Moon in great de-Calendar of Events tail. Later I switched to a 9mm January 2 to February 7 single eyepiece and was able to make out the Northern polar cap and some of the larger features on Mars. There were other DOB's of various sizes, refractors and a couple of SCT's, including Jim's new 9.25" Celestron. We had an excellent sampling of scopes from beginner to advanced which really helped to illustrate to the public all the options that are available.

> The comments were wide and varied, but always positive. Many experienced their first Galileo moment when looking deep into the craters of the Moon, or seeing the polar caps on Mars. We even had some people travel some distance (Toronto, Brantford, Stoney Creek, etc.) to get to this event, and none left disappointed.

I'd like to thank everyone from the club who came out either with their scopes to entertain and educate the public, and those who showed up to lend moral support. Every one of you

was very much appreciated by the public and by your fellow members. We have a great club that gets involved with the community and your involvement reflects well on the club back to the community. And as those of you who do participate in these types of events know, it's also a lot of fun. That makes it even more worthwhile.

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Burlington Public Night Photos by Don Pullen, Steve Germann & Ann Tekatch



Burlington Public Night Photos (continued)



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And all things Erotian. That's considered the official descriptive form for the word. Not to be confused with Erotic. We won't need to go there. The planet itself is fascinating enough. Eros is a member of the Amor group of minor planets, crossing the orbit of Mars but not that of Earth.

Eros is one of the larger Dwarf Planets, but cannot be seen "Naked Eye" (did I say that?) from here. The first near-Earth asteroid to be found and the second-largest one known. Eros was discovered in 1898 by the German astronomer Gustav Witt (1866-1946), director of the Urania Observatory in Berlin, and independently on the same day by the French astronomer Auguste Charlois (1864-1910) in Nice.

On Jan. 23, 1975, it was as close as 22 million km, but it rarely gets any closer than that. Because Eros' orbit approaches that of earth, but remains outside it, it has a long 'Synodic Period' which means it takes a long time between oppositions.

It's lost in the sky near the Sun these days, and won't be visible to us for more than a year from now.

Most asteroids we know about are in the 'Asteroid Belt'. Eros qualifies as a near-earth Asteroid, although the closest it has come to earth is only 22 million km away. Its orbit crosses that of Mars, but not that of Earth.

A 90-kg person on Earth would weigh about 60 grams on Eros, and a rock thrown from the surface at 10 m/s (within range of most people's abilities) would not fall back. Erotian gravity is strong enough that NEAR-Shoemaker orbited in February 2000. A year was spent circling the asteroid. It was able to take a very good look at the planet, sending back 160000 photos and detecting craters and boulders, as well as a lot of ground up regolith from many impacts.

The craft then zoomed into the planet, sending its last photo from an altitude of only 120 meters. I guess you can look, but don't touch, because the craft was never designed to land, and did not survive the crash. Perhaps it had a soft landing, but cannot position its antenna towards us anymore, so we cannot detect it sitting there stoically, waiting for some unlikely future rendezvous with the descendants of its creator.

Like other Dwarf Planets, Eros has a history in scientific milestones:

Eros was used in 1931 to help compute the absolute distance from the earth to the sun, using parallax methods from many places in the world. The result was considered the best measurement we had for 38 years.

Detailed photos of the planet and more information can be seen here:

http://www.daviddarling.info/encyclopedia/E/ /Eros_asteroid.html

and a movie of the planet's rotation is here

http://en.wikipedia.org/wiki/File:Eros_rotatio n_Dec._3-4_2000.gif



Close-up of Eros by NEAR-Shoemaker



Member of the Month: Andrew Bruce by Jim Wamsley

During a recent conversation with our new E.H. editor, Ann Tekatch, I opened my big mouth and told her how much I enjoyed the "Member of the Month" articles we used to have in the E.H. Staring directly back at me, Ann agreed and didn't have to vocalize to let me know that "OK Buddy, go ahead". Without further ado, my selection for member of the month for February 2010 is Andrew Bruce.

I first met Andrew at Mohawk College where we were both taking a basic Astronomy Course offered by them, and taught by our own Observing Director, John Gauvreau. As I became more acquainted with Andrew, I came to appreciate his knowledge of astronomy and also got to know him better, and enjoy his company.

Since then, we have both joined the H.A.A. and have gone observing many times together. Andrew often joins club members at our observing site at Binbrook



Conservation Centre and at the alternate site on Tyneside Road. Over the years, Andrew has acquired several scopes, including a very nice refractor, a 12" Dob, and recently an 8" NexStar SE. With new equipment. Andrew's astro knowledge has also grown, and he is often found passing this knowledge along to others at many of the club public nights and sidewalk astronomy nights.

Recently Andrew has been coerced into joining the H.A.A. Council as a Councilor at Large. It is mainly thanks to his hard work that we are having our night at the McCallion Planetarium this February 26. Accomplishing this, you would think he had nothing better to do (LOL) even though his wife, Kelly has just given birth to their first child, a baby boy, William. Congratulations Andrew and family.



In the image above, that's Andrew on the left. ;)

Left: William Ryan Allan Bruce, born Jan. 28.

All photos stolen shamelessly from Andrew's Facebook page by your editor.

The Sky This Month February 2010 by John Gauvreau

"Few people realise the immensity of vacancy in which the dust of the material universe swims."

H.G. Wells, "The War of the Worlds"

H.G. Wells capitalized on an already growing interest in our planetary neighbour, **Mars**, when he set the origin of malevolent aliens so close to us. Now, it captures our interest once again. The winter sky holds so many brilliant stars, Betelgeuse, Rigel and Aldebaran just to start with, and of course Sirius, brightest of all the stars in our sky. With the cold nights of winter free of the obscuring hazes that we associate with the warmer months, we think of the winter sky as dazzling with the brightest stars. This winter, there is one object that draws our attention away from all these stellar beauties. Mars is high in the sky and visible nearly all night during the month of February. Although it doesn't quite outshine Sirius, it's vivid colour and position, removed just a little to the east of all these other stars, and yet still so high in the sky, more than compensate for its penultimate magnitude. Mars is easy to point out to others and sure to captivate their imagination, just as it has for hundreds, indeed thousands of years. Through a telescope, Mars appears as a disk 14" (arcseconds) across, but a month from now it will have shrunk to only 11". Still, it shows an abundance of surface features to the experienced observer, and even a small scope will show the polar cap gleaming a bright white in contrast to the orangish red of the planet. Don't miss this opportunity to see Mars at the best it will be for the next two years.

Saturn is the only other planet to observe at this time of year. Rising later than Mars, it clears the eastern horizon by 9:30 and by the time we meet again next month it will be rising at 7:30. By midnight it is well up in the southeast and well worth a look through your telescope. The rings still appear slim, but they still appear larger than mars, and will show detail for those who take the time to look.

The other planets are not well placed this month, with **Jupiter** disappearing into the west as it moves on its way to the morning sky, and **Venus** moving from the morning to the evening sky. Venus will be visible low in the west by month's end and will be a lovely springtime evening star for us.



This 7 degree field shows what might be seen in a pair of widefield binoculars. (image made with Starry Night software)

The Sky This Month February 2010 (continued)

Sorry to say that Valentine's will not provide the flattering light of the moon under which you might have wooed your amour, as the **Moon** is new on February 14th (well, really the morning of the 14th, which is the night of the 13th for us here in North America). **First quarter** is on Sunday the 21st, and the moon will be only 2 1/2 degrees from the Pleiades that night. A pair of binoculars will provide you with a breathtaking view that you will be sure to remember for a long time. The gibbous moon will pass by Mars on the night of the 25th, and being separated by only 5 degrees they will also make a lovely binocular pair.

Full Moon is on Sunday February 28th, when the moon rises at 6:34 pm. Many members have demonstrated how fun it is to observe the full moon rise. Like last month, this month's full moon occurs very near perigee, the point in the moon's elliptical orbit at which it is closest to Earth. There is a noticeable difference in apparent size of the moon between perigee and apogee (the moon's farthest point in its orbit). This will make the full moon seem particularly large and bright!

This is also a great time of year to look for the **Zodiacal Light**. Just after the sky has darkened completely in the west, look for a soft triangle of light that rises from the horizon and leans to the left as it follows the path of the ecliptic into the evening sky. You need a very dark observing site for this; so don't be disappointed if you can't see it from the city. I've only ever seen it from the darkest of rural locations, such as the places where you might go for a star party. So what is this mysterious pyramid of light? The fact that it hugs the ecliptic is a clue. The zodiacal light is caused by sunlight reflecting off the dust of the solar system. Every time you see a shooting star you are actually seeing a tiny



That glow rising from the horizon isn't light pollution or the dawn; it's the zodiacal light. (I took this shot at Cherry Springs in September of 2008)

The Sky This Month February 2010 (continued)

piece of dust, which originated as a scraping of an asteroid or released particle from a comet, as it collides with Earth. Those many, many pieces of dust are all floating around out there, and when the sunlight catches it just right, you can actually see them. Just as they are visible in the western evening sky right now, the light is also visible in the autumn in the morning eastern sky.

"No one would have believed, in the last years of the nineteenth century, that human affairs were being watched keenly and closely by intelligences greater than man's and yet as mortal as his own; that as men busied themselves about their affairs they were scrutinized and studied..." (H.G. Wells, the opening line from the *War of the Worlds*)

Well, perhaps that isn't happening, perhaps nobody is looking down on us from Mars. But we are certainly looking back. Step outside and look up at that brilliant red light coming down on us across those interplanetary distances and think of all we have learned about Mars in the past century. Think of the canyons like Valles Marinaris, and volcanoes like Olympus Mons. Think of what we've learned of its history, about how there used to be water there and now it's so arid. Think of those spacecraft that have visited there, and think of those robotic rovers wandering its surface and the amazing images they've sent back. Perhaps the Martians never came here, but we have been there, and you can visit yourself this month, with nothing more than an hour of your time at the telescope.

As always, please feel free to send any comments, observations or pictures to **observing@amateurastronomy.org**..

Book Club Meeting

Get ready for the first ever Hamilton Amateur Astronomer's Book Club meeting and explore strange new words from the comfort of Jim Wamsley's basement.

Would you like to learn more about astronomy? Then join our book club!

What better way is there to learn about astronomy and science fiction than to read a book and discuss it? It's also a great place to socialize with other like minded people and a chance to learn something new. After each meeting we will choose a book for the next meeting.



The club will meet every two months so you will have plenty of time to read the next book. All we ask is that you read the entire book by the meeting and make sure that you contribute to the discussions. It's like everything else in life; the more you put into it the more you will get out of it.

Since there isn't a lot of time until our first meeting we will go easy on you and have chosen to discuss the movie, Avatar . If you haven't seen it yet then get out there and watch it.

The number of participants is limited so make sure that you sign up early. You can sign up by contacting Mario Carr at mariocarr@cogeco.ca and mark your calendars for our first meeting at 7:30 pm on Saturday Feb. 27.







"Hubble Discovers New Star Cluster!"

NGC0214 a.k.a. St. Valentine's Star Cluster

The Hamilton Amateur Astronomers' First Council 1993-1994



Left to Right: Grant Dixon, Charles Baetsen, Stewart Attlesey, Patricia Gassmann-Marsh, Doug Welch, Ann Tekatch, Ev Butterworth and Patricia Baetsen. Photo taken by Bill Tekatch and provided courtesy of Charles Baetsen.

UPCOMING EVENTS

February 26 - HAA trip to McMaster's McCallion Planetarium February 27 - HAA Book Club inaugural meeting. Topic: "Avatar" (see inside for details) March 12 - General Meeting, 7:30 pm Hamilton Spectator building. March 20 - Brantford Public Star Party, see our website for details.

2009-2010 Council

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Second Chair	Jackie Fulton
Treasurer	Don Pullen
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Observing Director	John Gauvreau
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> http://www.npca.ca/conservationareas/binbrook/

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