Volume 16, Issue 06

June 2009

HAMILTON AMATEUR ASTRONOMERS

Event Horizon

HAA's May Meeting!
By Heather Neprozel

Pumpkin Moon by John Gauvreau

On a warm spring evening Jackie Fulton, the HAA's Deputy Chairman, welcomed guests to the HAA's May General meeting. Jackie reminded everyone about Binbrook Volunteer Day and that volunteers were still being accepted. Jackie proceeded to introduce HAA Observing Director John Gauvreau. John talked about the beautiful double star Epsilon Bootes (Izar) and how in his 80mm telescope it looks yellow

(Continued on page 2)

From The Editor's Desk

Well, the good weather is here and it is time to blow the dust off of those telescopes. Old 'friends' like Scorpio and Jupiter will be getting reacquainted with you if you only take the time to get out there and look at them. Now might be a good time to think about kicking it up a notch and getting into astrophotography. No matter what you do, make sure that you actually get out there. Armchair astronomy is fun, but nothing beats the real thing.

Tim Philp, Editor

Inside this issue:

Upcoming Events

Aug 11 and 12,

Perseids Meteor Shower nights at Binbrook.

Aug 20-23, Starfest.

Mount Forest, Ont.

HAA'S May Meeting (continued)

(Continued from page 1)

and blue but is described in the Mag 6 Star Atlas as yellow and red. After doing a bit of research John has concluded that this star atlas is incorrect. Why not observe this double for yourself? John also showed images of Bob Christmas' terrific image of Comet Cardinal and M38, as well as a handful of galaxies he "scooped" up when imaging galaxies M81 and M82, and a great image of the edge-on galaxy NGC4565. You can ask John about observing tips at observing@amateurastronomy.org and you can check out Bob Christmas' wonderful images at http://home.interlynx.net/~bxmas/index.htm.

After John concluded his talk, a video clip detailed the HAA's public outreach activities on Astronomy Day, showing our day-time (solar observing) on May 2, as filmed by a CH News videographer and broadcast on the CH News at 6, just in time to promote our night-time event at Bayfront Park that evening!

Mike Jefferson showed a vintage film of a total solar eclipse occurring in 1932 in Quebec, with participants from the Hamilton area, including members of the Hamilton Centre – RASC. Considering the rudimentary equipment of the time, they did obtain good views of the eclipse during totality.

After the break John Gauvreau introduced our main speaker of the evening, Phil Mozel of the Ontario Science Centre and his presentation "Stories from the Stars". Phil started by describing how a lunar eclipse influenced the outcome of a pivotal battle between the city-states of Athens and Syracuse in 5th century BC. During the siege of Syracuse, the Athenians observed this eclipse and wondered what it might mean, if it was a sign from the gods and what it could indicate about the future. While the Athenians were distracted, Syracuse took the opportunity to attack and destroy the Athenian

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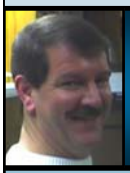


Treasurer's Report

By Don Pullen

(Unaudited)

Opening Balance (1 May 2009):	$ 4110.34
Revenues:	$ 51.00
Expenses:	$ (0.00)
Closing Balance (31 May 2009) :	$ 4161.34

Notes:

- No expenses paid in May.
- Only revenue in May was 50/50 ($51.00)

From the Chair

by Steve Germann

I was there on Saturday May 30 for the Great Outdoors Festival at Binbrook Conservation Area. I set up the GWS because of its wow-appeal for the visitors, and pointed it at the furthest terrestrial object I could see on the horizon, the fishermen in their kayaks at the far end of the lake.

All went well until late afternoon when minivan was parked in front of the path, and limited the view to a tiny fraction of what it was... but before that it was interesting.

"It's upside down" was the remark made by more than one person looking at the shore a few km away. It was also a demonstration of the effects of seeing, since the image was shimmering due to wind-induced variations of the air density along the line of sight.

The HAA is an organization dedicated to the enjoyment and advancement of astronomy. The emphasis here is on enjoyment, although some of our more active members are clearly also advancing the science in different ways.

We feature monthly meetings intended to provide information and entertainment to our members, by inviting distinguished speakers to come before an interested, attentive, informed, and appreciative audience.

Our 'The sky this month' segment is about the most informative and invigorating pep-talk for getting outside and looking up, that i can imagine. Thanks, to John Gauvreau, who enjoys it as much as we do.

Our attention, thanks, questions, praise, and comments are the payment our speakers get... something money cannot buy. We also cover some of their food or travel expenses for the night.

The key point of all this is that our speakers address the club because they enjoy astronomy, and their enthusiasm is contagious.

Annually, in each community, we set up telescopes and show the wonders of the night sky to interested members of the public. Why do we do it?

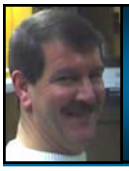
For the enjoyment of it. It's always interesting to talk to people about astronomy, since each brings their own particular history and viewpoint to the discussion.

Their attention, thanks, questions and comments are our 'pay' for setting up telescopes, pointing them, and showing the views.

What I am trying to get at is that the HAA is a channel for allowing us to do something we will enjoy doing. And specifically, you, Dear Reader, would also enjoy doing astronomy outreach. Your first step would be to linger after the meetings and do some sidewalk astronomy before heading home. But by far more enjoyable will be to come to a public event and talk to the other attendees.

In addition to the friends you will make on the evening-of, and the after-astronomy session at Horton's where we can discuss what happened, there's the above mentioned benefits of doing something and being rewarded in ways that money cannot buy.

Public events are an important means to share our hobby as well as get people interested in the universe around us. It is important to connect with young people to make their interest grow.



Binbrook Community Festival

by Don Pullen with photos from Ann Tekatch, Don Pullen, and Tim Philp

2009 is the 50th anniversary of the Niagara Peninsula Conservation Authority (NPCA). In celebration, each of the major parks under its jurisdiction are holding special events to mark this auspicious occasion. Our favourite observing location, Binbrook Conservation Area, is no exception. On May 30 and 31, it held the Great Outdoor Community Festival.

You can tell the astronomers… they are hiding from the sun!

On the Saturday, the park held a free open house for the public. It had events for the entire family. For the kids, there were magic and puppet shows, fishing, horse-drawn hayrides, crafts and kite making. Adults could enjoy and purchase some of the wares produced by local artists (including former members Cathy and Anthony Tekatch), or try their skills at the canoe races. There were demonstrations on geocaching, and hikes along various trails within the park. And to keep everyone energized, the Lions Club had set up a large BBQ under one of the pavilions providing food and drink.

Of course, the HAA was there showing our support and had a large display set up. We had colouring sheets and crater making demos set up for the kids, an information presentation and lots of scopes and binoculars. Our display was very well attended with many families stopping by to look at the sun or check out parts of the park through the binos. Many of our visitors expressed interest in astronomy so we kept busy answering lots of questions, and handed out brochures and copies of SkyNews magazine.


FOOD YUM!

While there was a threat of some nasty clouds as we set up, once the park opened and people started to arrive, the skies cleared and we enjoyed a comfortable, mostly cloud-free sky and spent a very nice day at this great local park.

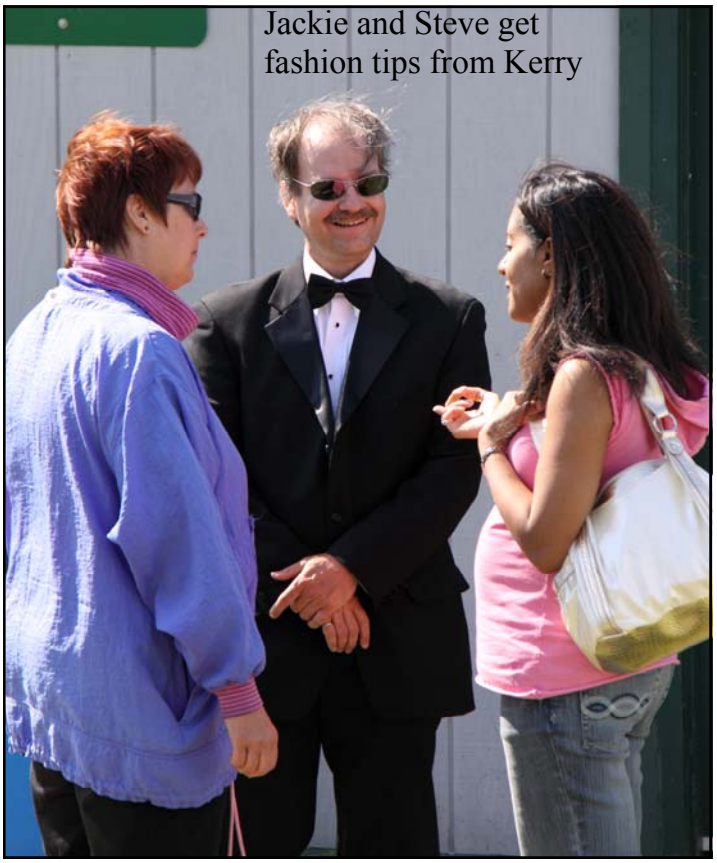
Ann and Alex were there with

(Continued on page 5)

Binbrook
(Continued)

(Continued from page 4)

the PST and a small refractor, Jim has his 8" SCT, and Rick had one of the new Lunt solar scopes set up. Heather, Moe, Joe and Don had small scopes with solar filters. Brenda had a large pair of binoculars on display and with it and the other binos on-hand, the public was able to look at birds, planes, people fishing and generally explore the park from our high vantage point. Of course Steve had brought along his Great White Scope which attracted a lot of attention. But unfortunately it couldn't shine in its full glory since it's not suitable for daytime viewing. However many people got interesting upside-down views of various park attractions.



Jackie and Steve get fashion tips from Kerry

What the best-dressed astronomers are wearing this summer

To add to the display, Steve had also brought along bubble-making equipment which was very popular for some our younger (and a few older) visitors. It was quite a sight later in the afternoon when Steve emerged from one of the port-a-johns, wearing a tuxedo and then started to make bubbles for the kids. I believe he was slightly overdressed for the occasion but someone had commented that it was a black tie affair after dark. (Actually he had to attend another function in the afternoon for a few hours, but returned later still sporting his tux to continue with the HAA demonstrations.)

A big "Thank you" goes to all of the HAA volunteers who came out for this event, not only from the HAA executive, but also from the Binbrook park staff. They really appreciated our

(Continued on page 7)

Astro-Events for 2009

by Don Pullen

For the International Year of Astronomy, the HAA has put together a list of events that either we are sponsoring, or may be participating in over the next 6 months or so. For some of these events, a few HAA members may be participating on their own, or may be going to represent the HAA, such as some of the star parties. And while most of these events are "public" in nature meaning that both public and members are welcome to the activity, some are reserved strictly (indicated) for HAA members only (part of the privileges of membership).
Please note that this list does not include any smaller events that a single individual (or maybe 2) might be undertaking such as camping trips or sidewalk astronomy plans. Please refer to our website for postings of these types of events or changes to any others. ***NOTE, Items in italics are for members only!***

Fri Jun 12 - HAA June General Meeting

June 18-21 - Cherry Springs Star Party, Cherry Springs, PA

Jul 17-21 - Star-Gazing Manitoulin

Tue Aug 11 - Perseids Public Night, Binbrook

Wed Aug 12 - Perseids Members Night, Binbrook

Aug 14-18 - Manitoulin Star Party

Aug 20-23 - StarFest - River Place Park, Mount Forest, ON

Fri Sep 11 - HAA Sept General Meeting

Sep 17-20 - Huronia Star Party - Duntroon, near Collingwood

Sep 18-20 - Black Forest Star Party - Cherry Springs PA

Sat Sep 26 - Binbrook/Camtech Star Party, Binbrook

Sat Oct 3 (4) - Burlington Public Night, Burloak Waterfront Park, Lakeshore Dr, Burlington

Fri Oct 9 - HAA Oct General Meeting (Thanksgiving weekend)

Oct 24 - Brantford Public Night, Tourism Centre

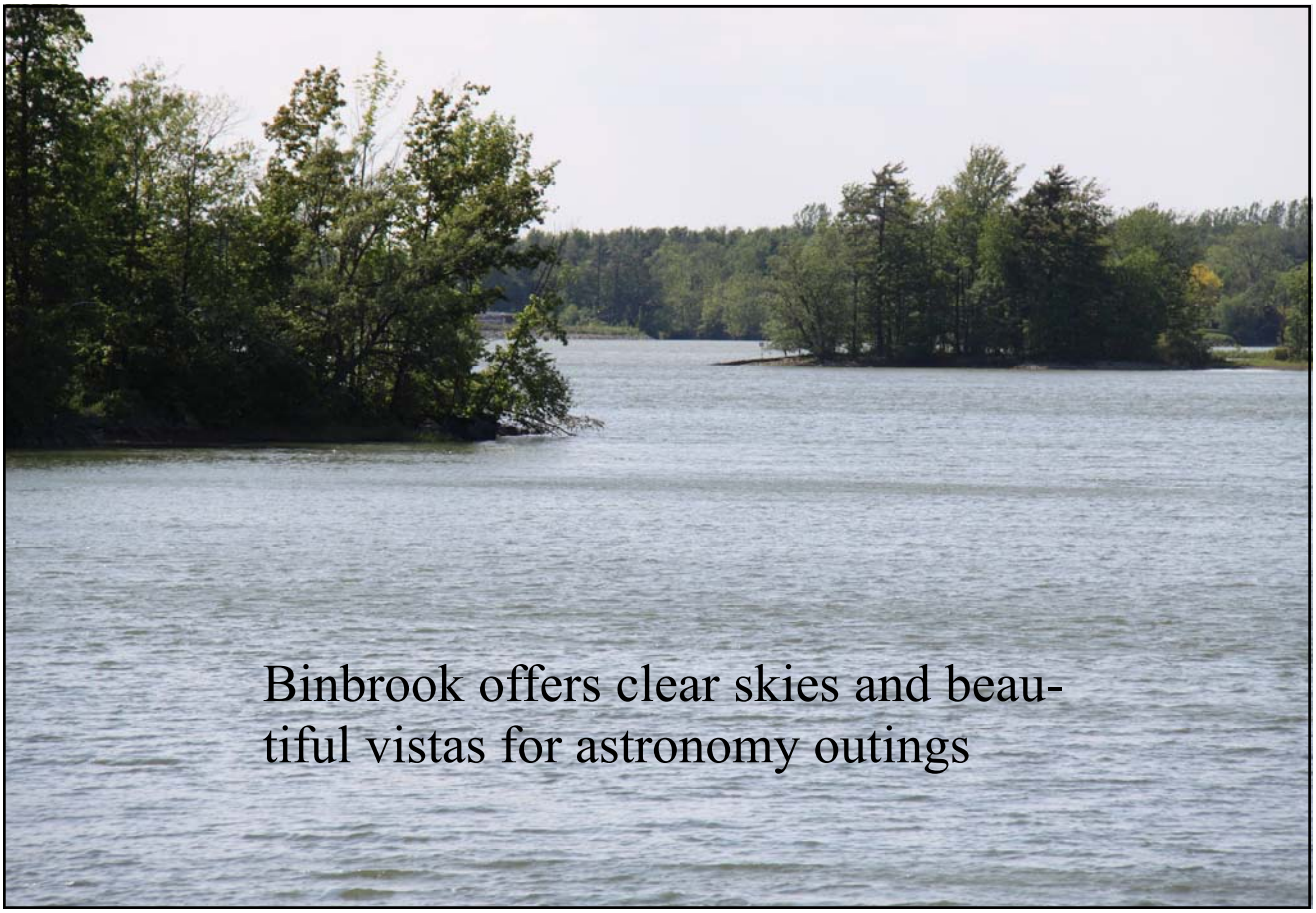
Binbrook
(continued)

(Continued from page 5)

participation. HAA visitors to our display included, Andrew, Tim, Jackie, Kerry, Bill and Skye and we thank all of them for coming by too.

By 4:30, things had started to wind down and some of the vendors had begun to pack up, so we followed suit. Many of us then retired to a local Tim's to reflect on the day. Some had also contemplated observing later in the evening, but the skies had begun to cloud over and spoiled any chance for continuing the fun into the night.

We believe that the attendance was about 200 people in total for the entire day we were there (about 80-100 to our area). It was a little less than hoped for, but still quite successful for the first time this type of event had been held and for the limited advertising that had been provided. The park staff and regular volunteers were so happy with the turn-out and how well things went, they are considering making this an annual event for the park. If so, you can be sure that the HAA will be there again next year.



Binbrook offers clear skies and beautiful vistas for astronomy outings

Sunday was reserved for the fishing derby at the park. Since this was a paid tournament and wasn't going to draw the same family groups as the Saturday did, the HAA didn't participate in this event, but it sounds like it was well attended. There were lots of prizes and they had a fish fry for those who did take part.

If you didn't get out to the park on the 30th (or 31st), be sure to visit Binbrook during one of our observing sessions over the summer or just go and visit for the day. It's a great location for a family picnic, swimming (with a splash pad for the kids), and fishing, as well as a very convenient dark-sky observing site.

May Meeting (continued)

(Continued from page 2)

Fleet.

Phil talked about his quest to find out if the story that a rock or stone representing the ancient Greek goddess Aphrodite was in fact a meteorite. After a determined attempt he verified that it was a terrestrial rock. Too bad!

Phil also detailed his attempts to track down a telescope that was part of a long-gone observatory in Woodstock, Ontario. No one knows what has happened to the rather substantial, clock-driven 8-inch refractor with an 11-foot focal length that was built for the December 1882 transit of Venus. Of course it turned out to be cloudy on the day of the transit!

Phil showed several slides from his recent visit to the Sudbury Neutrino Observatory. This underground observatory is investigating the sub-atomic particles known as neutrinos. Phil donned special gear and had to travel over 6000 feet down in an elevator and over a kilometer horizontally to get to this huge atomic detector. I am sure I would find that rather unnerving if I were to go there myself. I would feel very isolated underneath all that rock! Phil mentioned the scientists would be building a "dark matter" detector in a huge cavern.

Thanks Phil for an interesting "trip" in both time and space.

The Sky this Month

by John Gauvreau

As we near the midpoint of 2009 we have the opportunity to look upon the year as being two halves that make a whole. The first half of the year was, naturally, dominated by the winter and spring constellations. **Orion** and **Gemini** brought in the very first crisp and cold nights of January and as they gave way to **Cancer** and **Leo.** So too did the snows of winter give way to the bleak, barren ground of that middling time when the beauty of winter is passed but the colours of spring have not yet arrived. Finally, the sky heralded the coming of blossoms and leaves with the equally bright blooms to be found in **Bootes** and **Virgo**, in the likes of **Arcturus** and **Spica**, and of course the bountiful garden of **galaxies** that speaks of spring to us as much as any bird call or tulip petal. The first half of the year is passed, and now we look forward to summer and autumn, and all the celestial treasure that they promise.

We must also now bid farewell to the planetary companion that has been with us through the past months. Although **Venus** was brightest in the sky as the year began, it has truly been **Saturn** that we have followed through the sky, pointed our telescopes toward and shown to visitors. Whatever else the sky of the season has displayed, there has rarely been a night when I did not look to **Saturn** first, and sometimes last as well. **Saturn** is now sinking in to the west and by the time we meet again in September, **Saturn** will be in conjunction with the sun and we will not see it again before the calendar changes. Only last month, in May, **Saturn** showed its best ring display to us, with them tilted a little over 4 degrees. From now on they will slowly close, being less than 2 degrees in July and less than 1 degree in August. In the first days of September we will pass through the **ring** plane and they would be invisible to us here on the **Earth**, if only **Saturn** weren't too close to the sun for observation.

For those that fear they will miss the (barely!) **ringed planet** there is consolation. The second half of the year belongs to another giant, **Jupiter**, grandest of all **planets** and perhaps the only thing that could completely distract us from the loss of **Saturn**. With it's ever changing parade of **moons** and an unsurpassed amount of surface detail there is no better **planetary** show to be had. By the beginning of July **Jupiter** will rise by 11pm and on August 14th it is at **opposition**, meaning it appears opposite the sun in the sky, and rises at sunset. It will be visible all night at that time and outshine any star in the sky, at nearly magnitude -3.

Jupiter has an unusual companion this year. Although we are used to seeing the four **Galilean satellites** scampering around their home planet, appearing first on one side, then the other, and then perhaps hiding behind like a shy child peeking from behind a

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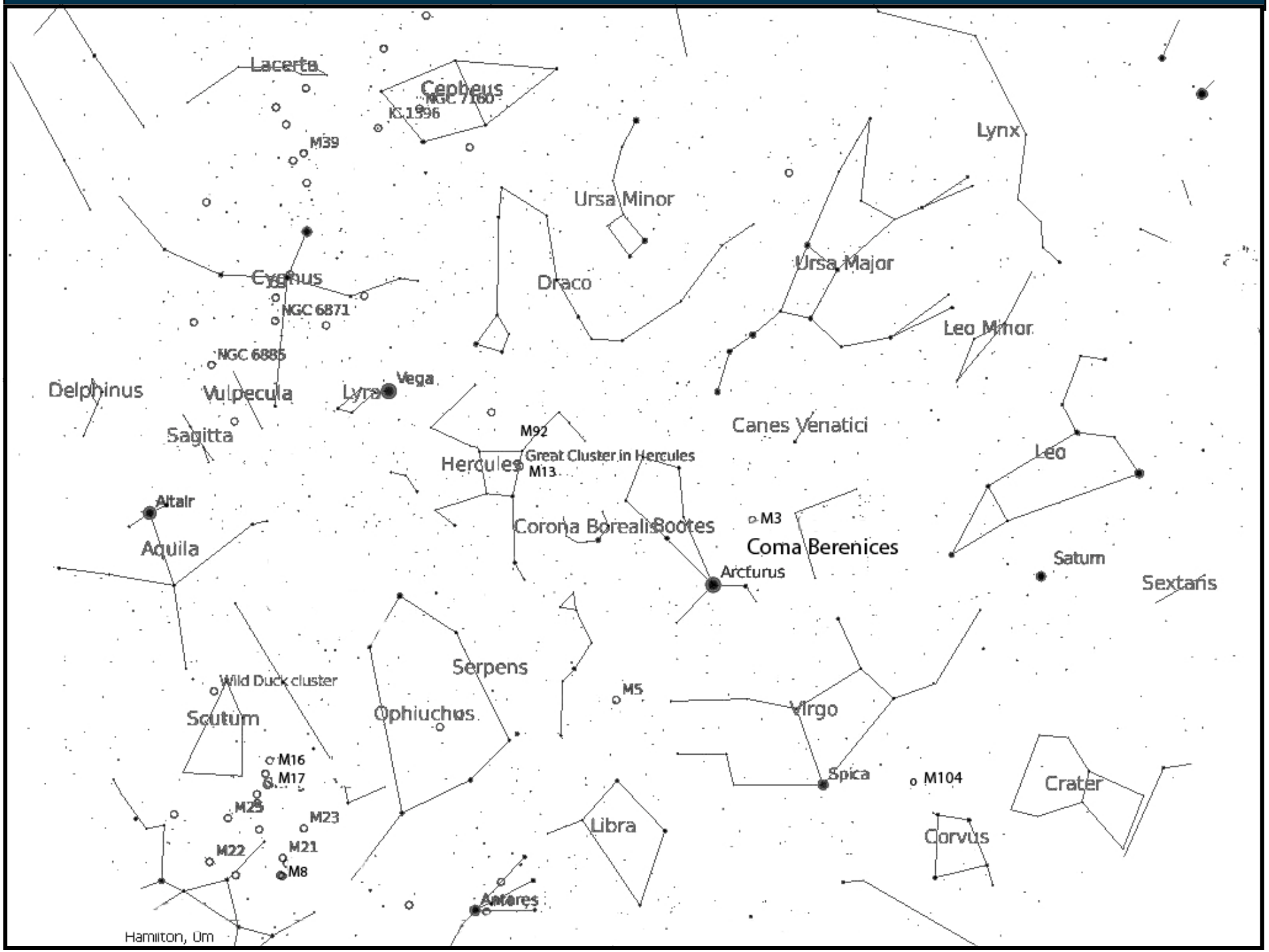
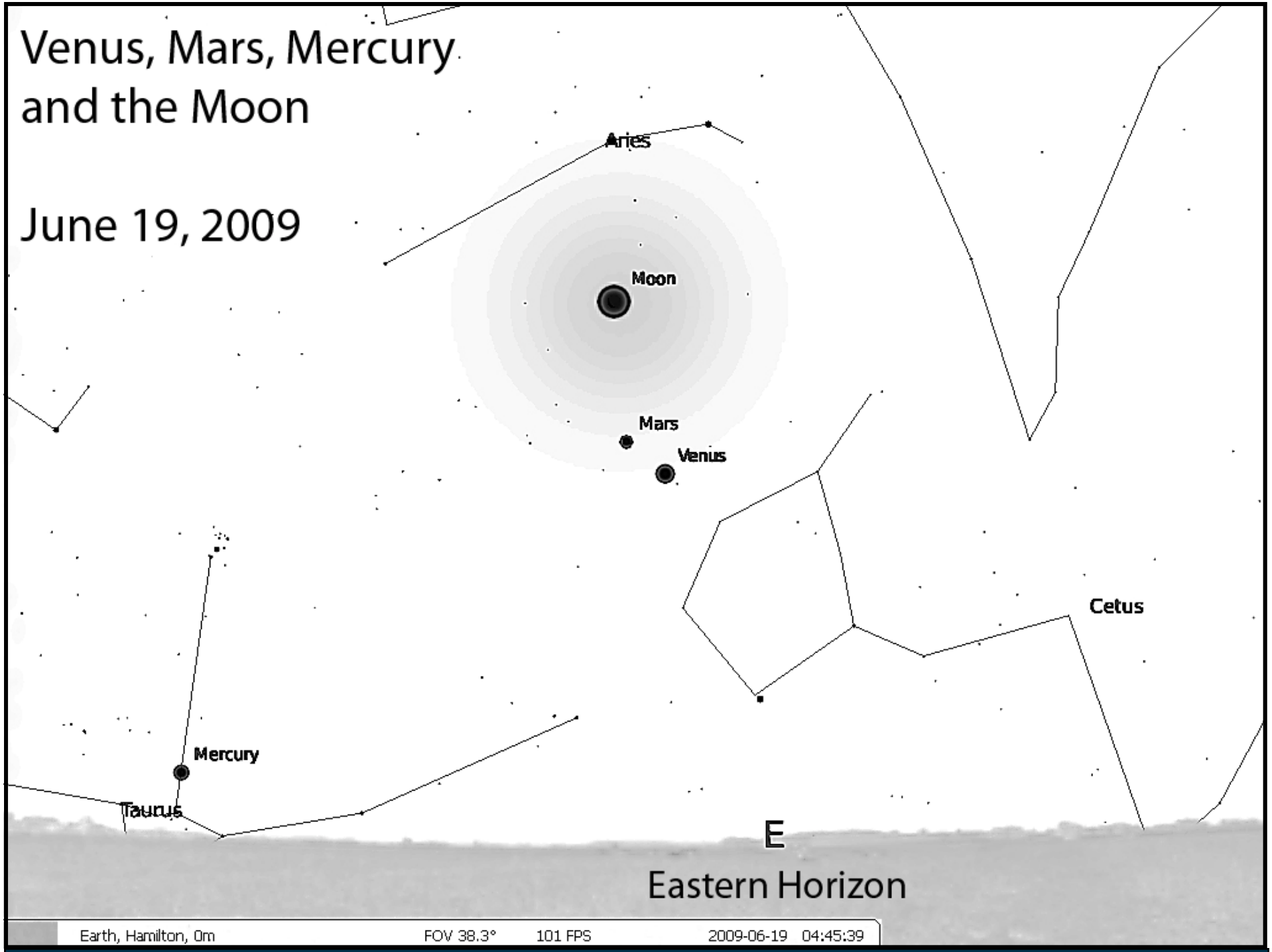
The Sky this Month





The Sky this Month

The Sky this Month
(Continued)

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protective parent, we might see a distant relative if we look just slightly farther afield. **Neptune** is in the same part of the sky as Jupiter, and can actually appear in the same telescopic field of view at times. One such opportunity arises on (and around) July 9th, when the two planets will appear only half a degree apart. If you have never seen the most distant planet in our **solar system**, here is a chance like no other.

And what of the other wanderers in our sky? The predawn mornings bring rewards to those that are willing to get up early (or those young enough to stay up that late!). **Venus** will be summering in the eastern sky before **sunrise**, and during July will be very high and prominently placed. You might be inclined to look at **Venus** and **Jupiter** (by the morning hours still lingering in the west) as a matching pair of bright points on opposite sides of the sky, but I would draw your attention to another pairing. Just as **Jupiter** has a travelling companion in **Neptune**, so **Venus** has a companion in **Mars.** In fact, on June 19th they will make a lovely pair visible in the east only 2 degrees apart, and positioned just below the visiting **crescent moon**. If you have a keen eye, or even better, a pair of binoculars, look to the lower left of the planetary pair to spy **Mercury** just above the predawn horizon. It is situated in **Taurus**, between the **Hyades** and the **Pleiades**.

The **Moon** this month is new on June 22nd, just a day after the **summer solstice**, which marks the northernmost passage of the **sun** and the first day of **summer**. It also means long days, and short, although moonless, nights.

Don't forget that August brings one of the years favourite astronomical events, the **Perseid meteor shower**. On the night of August 11th and the morning of August 12 you will need nothing more than your eyes and a comfortable spot to gaze up from and wait for those shooting stars to streak across your sky. The **moon** will be full a few days earlier, so the waning gibbous phase may interfere with the early morning **meteors**. Still, for all the observations to be had at a telescope, there may be nothing more relaxing than just staring at the soft summer sky, punctuated with moments of daring and excitement, as **comet** dust turns into natural sparklers for their oh so brief encounters with the **Earth**.

The **Milky Way**, the **Summer Triangle**, **constellations** like **Sagittarius** and **Cygnus** will hold our attention over the next few months and will adequately show the second half of the year to be every bit the equal to its predecessor. Enjoy your summer, both days and nights, and don't forget that all observing reports are welcome on the club's blog, or by emailing; **observing@amateurastronomy.org**.

Through the Looking Glass

by Greg Emory

Historically speaking, mankind has always had a need to keep track of time. Prehistoric and Neolithic man keenly observed every change in the seasons and used such to answer their important questions on a large scale. When do we plant? When do we harvest? When do we marry and when do we celebrate?

These peoples built henges and other works to allow for telling of the gross time. By aligning the Sun, Moon or specific stars with windows or pillars, these societies knew when to till the soil, plant seeds, harvest food or the like. The alignment and construction of the henge was not a quick little project for idle hands. First came mound, then timber structures. Stonehenge as we know it is the fifth stage of this construction. The stones were not introduced until the third refinement.

When we encounter something new or unknown we often fail to understand it, or worse still demonize it. Further still, we may be afraid to admit to friends and colleagues of our interest or belief in certain phenomena. I posted a picture of my wife in a crop circle outside my office at work several years ago. It was funny, my as of yet "uneducated" students asked questions and were open to different possibilities. Some of my colleagues, who allegedly have an education, immediately dismissed the picture and the phenomenon. When I explained that my wife had taken me into a few crop circles and that upon observation I was convinced that they were not man-made. I was told I was wrong – no questions, scientific curiosity or acceptance of alternative hypotheses. I don't know the what, why or how of their existence, but it was not a man-made hoax.

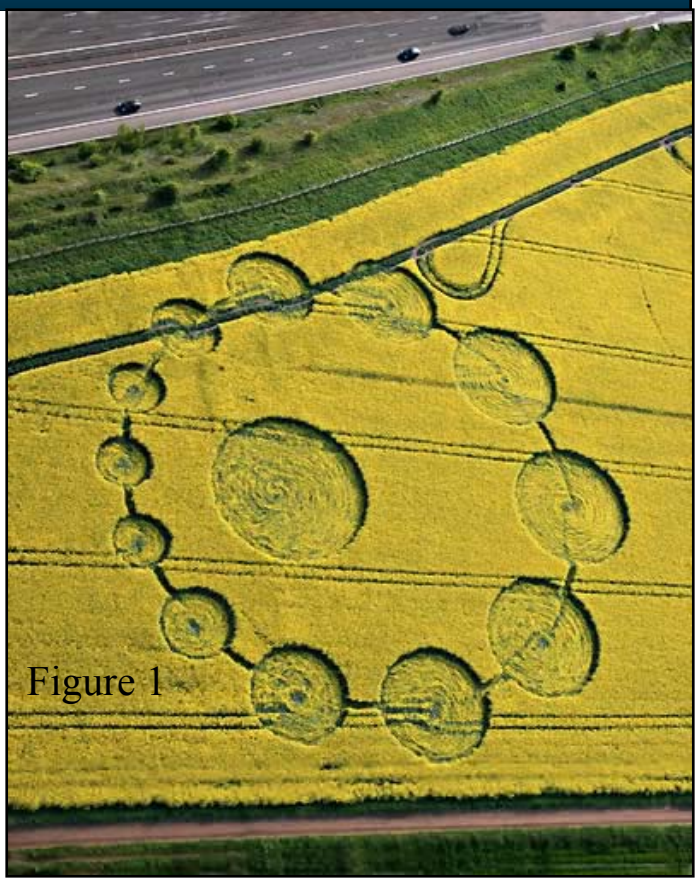


Figure 1

Don't believe me about this reluctance to embrace the unknown? Start a conversation about UFO's and extra-terrestrial life – and time how long it takes for someone (usually me) to make a joke about probes and abductions.

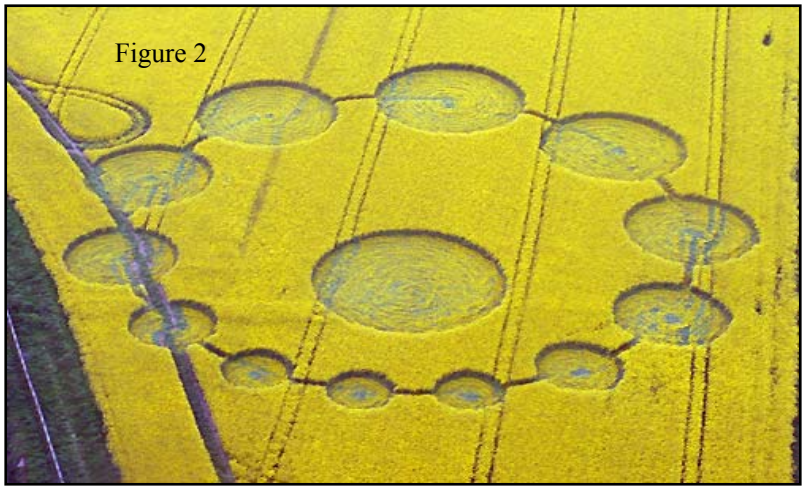


Figure 2

Why am I going down this path and where does it end? Figure 1 and Figure 2 are aerial images of a Crop Circle in the UK from last month. Looks pretty neat, huh? Regardless of your view as to its origin, the question remains: is this an artwork or a message? What message could there possibly be that is embedded in this crop field? If the cynical among you are thinking that it is a hoax, the crop appears to be oil seed rape (canola). This crop does not lend itself well to human traffic, like corn or heavier crops do.

Many people believe that a message embedded in Figure 3 is the early Archemedian representation of pi, the transcendental number.

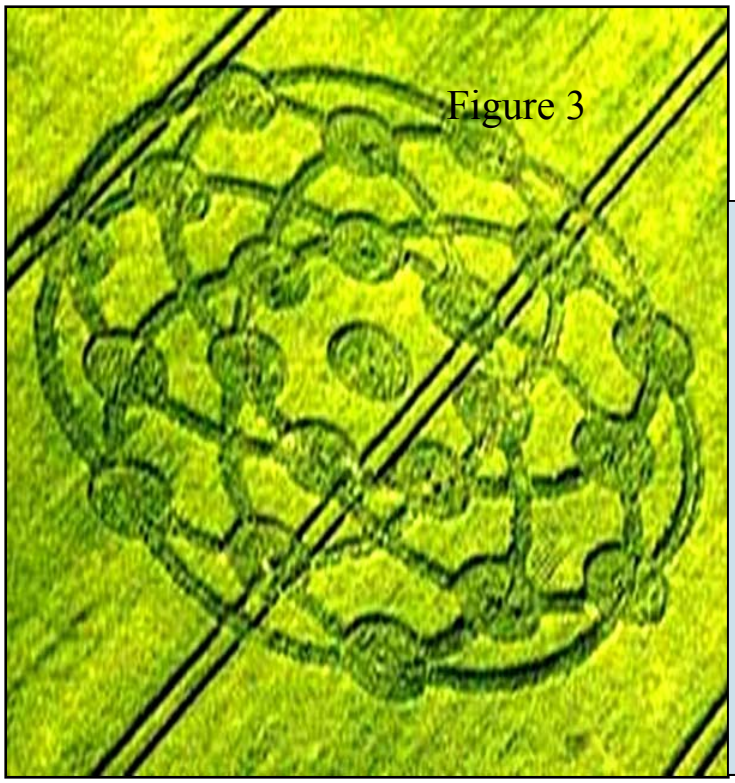
(Continued on page 14)

Through the Looking Glass (continued)

(Continued from page 13)

Figure 3, it is believed, represents pi by having 22 circles distributed over 7 interconnected circles. Early representations of pi were given as 22 divided by 7. Or maybe this is just a beautiful piece of art.

Returning to Figures 1 and 2, some have interpreted it as being the Sun (central circle) orbited by the earth. The circles on the elliptical orbit represent the full moons of the orbit. I haven't (and don't intend to) analyze these circles – but some feel that the formation indicates that there may be an event of astronomical significance around the June full moon or the July full moon.

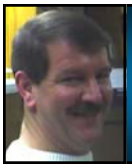


Editor's Note:

Crop circles have always been a topic of hot debate, however; there have been many demonstrations of how these circles are constructed. For more information, check out:

www.astrosociety.org/education/resources/pseudobib03.html

However, this does not detract from the author's point that we should not be too quick to judge a strange new phenomenon. **As always, the scientific method is the best way to explore such mysteries.**—Tim Philp, EH Editor



Galileo Moment

By Don Pullen

From as far back as I can remember (and I remember some select events from the age of 3 or 4 such as the Cuban Missile Crisis or the Kennedy Assassination), I've had a fascination with science and space. Being a product of the early manned missions, I recall feverishly following the Gemini and Apollo programs (and subsequent Apollo-Soyuz, Skylab and early Shuttle missions). I had models of the various rockets, and Earth and Moon globes. I would hang them from the ceiling and position the rockets, following their flight paths. I regularly corresponded with NASA, JPL and other space agencies in the US, collecting tons of material (oh where is that stuff now - I'd be rich). We even managed to arrange private tours of Kennedy during some of our early Florida trips because of the connections I had made (and subsequently, regrettably lost). (That was really something to be able to walk around the launch pad with Apollo 8 ready to shoot for the moon for the first time early in Dec 68. Man, it was BIG!!!)

Around this time, I remember my grandparents had first given me a microscope for one Christmas (I think I was 7) and then for the next, a small 3" telescope. I was so thrilled with this new instrument. Now I could watch as man shot for the moon. (My grasp on reality was somewhat more limited than it is now - at least I hope so). So I was quite heartbroken when I first tried to use my new scope. It had a rickety small table-top mount that was next to useless for keeping any image stationary. And the optics were not very impressive. I'm sure it was quite an expensive scope at the time (mid-60's), but the re-

(Continued on page 18)

Imaging Clinic—

By Steve Germann

On Friday evening, June 5, about a dozen budding astro-photographers gathered at Jim's place for the annual imaging clinic. Each of us had a laptop with some of our recent astro-photos on it.

Kerry explained the basics of acquiring photos, emphasizing that we need to use RAW mode, and the importance of taking 'darks' and 'flats', and what those are.

A demonstration of Deep Sky Stacker followed, and we learned that if you have enough data, and the exposures are set for long enough, it usually just computes away and gives you something to continue working on.

Don't try to use DSS for processing the image though, and don't panic when the result from DSS looks 'very' dark.

The next step uses a program which can do layers and curves, in 16 bit.

I use Cinepaint on Linux, and others

had downloaded a 30 day trial of CS4 or other programs similar to that.

Key to making a good astro-photo is to tease out the very faint detail in the images, in a way that does not amplify the noise inherent in low-light pictures.

A trick for brightening the images without bloating the stars came first, along with a demonstration of the effects of using and not using the trick. Key is to set the 'black point' not to zero.

Next, the value of layers, for keeping things organized, and seeing the effect of each operation.

There's an operation that requires holding several keys at once on the keyboard. Thus demonstrating that astro-photography requires physical coordination as well as cleverness.

By operating on an image that had not been stacked with flats, Kerry showed us the tell-tale effects of no flats; the long and the short of it is, "Use Flats".

Having a 'darks' library and a thermometer are key to making good use of the camera's integration ability. Specifically, you should make all your exposures the same duration, and have lots and lots of them.

For my camera, 30 seconds is about the limit... which means that I will get very faint exposures.

I found out that an electronic control for triggering the camera can be bought on eBay for about $38.

Kerry does her darks at the end of the session, while packing up, so as to not waste observing time, and maintains a library sorted by temperature, so that some sessions don't require taking any darks at all. The warmer it is, the more important it is to match darks to your exposure's temperature.

We were then showed how to use layers and masks, to enhance colour and keep the background dark instead of blotchy or speckly.

Finally, there was a demonstration of some third-party tools for suppressing and differentially filtering noise to get rid of things like horizontal banding in the image.

Everyone agreed they had learned a lot, and hoped for more imaging clinics to sharpen their knowledge.

There's a possibility of a beginners and advanced class next year.

The evening finished with a celebration of Jim's 29th birthday with some chocolate cake. Mmmm

A Chance Sighting of the IIS

By Glenn Muller

A few weeks ago, May 24th to be exact, I'd just set up my 12" dob for a backyard observing session when a bright point of light near Vega caught my eye. As I watched it track from NNE to ESE I quickly realized it was the ISS.

Its construction nearly complete the International Space Station, with expansive solar panels, now has a huge reflective surface and when its angle between the Sun and a ground-based observer, in this case me, is just right the resulting brilliance can now outshine Venus.

To get the most out of observing sessions I generally make an observing plan, beforehand. That is, I'll compile a "hit list" of objects that are good targets for a given night. While I'm at it I'll also check online at www.Heavens-Above.com to see if the ISS is scheduled to make a visible pass. Since my last hit list was recent, yet unused due to a cloudy night the previous week, I was unaware of this ISS "flare" event.

However, as it headed toward the horizon, its apparent motion slowed and I saw an opportunity to catch it in the scope. Like a hunter after ducks, I led my quarry in the Rigel Quickfinder then immediately shifted to the low-power eyepiece in the focuser.

My aim was accurate for no sooner had my eye met the lens than the satellite shot into the FOV. The dob advantage came into play as I could now steer the scope at the exact angle and speed needed for a prolonged glimpse. I've tried this a few times and the practice was now paying off.

The angle that resulted in a flare for me was also perfect for seeing structural detail. Although I could not discern the exact shape of the central living/working modules, the flanking solar panels were in stark contrast to the dark background of Space to such extent that I could see the two longitudinal gaps that separate the sections of each set of panels.

While I only held the gold and silver satellite in view for four or five seconds, at the most, it's amazing how well one's eyes and brain can process such fleeting information. The resultant image was one that I won't soon forget.

Louis Pasteur once said, "In the fields of observation, chance favours only the prepared mind." That may be true – but I'm certainly glad that chance found me standing next to my scope when it happened along.

Driving to the Stars

by Tim Philp

The solar system is a big place. We often forget this when we think about controlling robotic spacecraft on Mars or in orbit around Saturn. It only took the Apollo astronauts 2 ½ days to get to the moon, so it must be close by.

Well, not exactly.

Actually, space is not that far away. To get to the altitude of the International Space Station, it would only take you a little over three hours if you traveled by car - that is, if your car could travel straight up at highway speeds.

To understand just how big the solar system is, let's take a look at travel times at speeds that we are more familiar with - the family car. Let's also assume that you obeyed the speed limits on the 403 and only traveled at 100 kilometres per hour. At these speeds, just how far away is the moon or, indeed, the planets?

Let's start with the moon. If you were to start out for the moon, and traveled at 100 kilometres per hour, it would take you about 3850 hours - just over 5 months to get there. I am not sure I would want to hear the kids say, 'Are we there yet?' for 5 months! Don't forget, the moon is the closest body to the Earth and you will be able to get there much faster than anywhere else.

This situation gets much worse if you start to look at the planets. This summer, Mars was quite close to the Earth, but it was even closer two years ago. Perhaps one of the closest approaches ever will take place in 2729 when the distance to Mars will be only 55,651,000 kilometres from the Earth. That is practically next door.

Now, let's get in the car and head for Mars. At our 100 kilometre per hour speed limit, it will take more than 1500 years to get to Mars. Don't forget, there are no service stations or rest stops available along the way. That is a long time without a bathroom break! You had better buy that extended warranty for the car.

Even the sun is a long distance from the Earth. It is so far away that it takes the light from the sun, traveling at just under 300,000 kilometres per second more than 8 minutes to make the 149,597,892 kilometre trip to the Earth. By car, this trip would take almost 4100 years.

As you can see, the solar system is probably much bigger than you think it is. It gets even worse when you consider traveling to the outer planets. Even a trip to Jupiter, the closest of the outer planets at 588 million kilometres, would take more than 16,000 years. Don't even think about a trip to Pluto, the farthest of the 'official' planets. That trip would take 118,504 years for the 4.325 billion kilometres trip.

Of course, the solar system as a whole is actually only our backyard. If we were to consider a trip to the nearest star, the numbers change dramatically. The closest star to the Earth is so far away that it takes light, traveling at the fastest speed possible about 4.26 years to get to the Earth. That is a distance of 40.3 trillion kilometres. It would take our well-worn car almost 46 billion years to get there. And that is only the closest star.

As you can see, the universe is a very big place indeed. We are used to hearing about robotic spacecraft and rocket ships traveling to familiar places in the solar system. Popular science fiction such as Star Trek blithely talk about interstellar travel as if it is the simplest thing to do. As you can now appreciate, even going to our own moon is a feat that is worthy of wonder and praise for its difficulty and technical achievement.

Galileo Moment
(continued)

(Continued from page 14)

sults were more than disappointing. I do remember getting a few quick glimpses of the moon's surface a few times, but nothing that I could study. And certainly Mars or Jupiter weren't even contenders and I wasn't going to be able to see any rockets blasting off from my south-central Ontario location.

And thus my hopes of becoming an observational astronomer were dashed for several decades. I had to console myself with the images coming back from Apollo and Viking as we ventured forth into the solar system. Sure, I brought out the scope a few more times over the years to try again and again on the moon, comets, or for projection of solar eclipses. But each time the results were disappointing and the attempts became fewer and farther between.

Jump forward a few decades and we're into the 90's. I'm dating a wonderful girl (who later became my wife) and there was supposed to be an impressive comet approaching Earth which could be seen in telescopes and might even become naked eye visible. Thoughtfully she took it upon herself to go to Black's and buy the best scope they had, thinking that I would be thrilled that she could buy me something that I would enjoy for many years (after all, our first date was watching the Perseids meteor shower in 1994 so she kind of guessed I liked astronomy). Fortunately it had a slightly better mount so it was stable without any wind, but it was difficult to re-position. And the optics were still a disappointment with a non-standard, built-in variable zoom eyepiece. However, not to hurt her feelings, we did take it out to look at Hale-Bopp. By this time, it had become naked eye visible so at least we were able to locate it in the scope (a small fuzz became a bigger fuzz). And I did have some success being able to look at the moon, but only at it's lowest magnification. In the following year, we used it for Hyakutake. It didn't mark my beginning of becoming a regular observing astronomer, but it was a start.

Skipping forward a few more years and we get to 2004. I was browsing the internet one night and happened to come across the website for the HAA and saw that they were having a public observing night at Binbrook (Perseids night in Aug). Since I had some time, I decided to head out and see what was going on. I was a little shy that night and didn't talk to many people, but they seemed like a nice bunch. I then attended their Sept meeting and I liked what I saw. I decided then I was going to get more serious about astronomy and bought a decent pair of 7x50 binoculars and a copy of NightWatch (I had already been a subscriber to SkyNews for a few years). These were the best investments I could have made. I had fun finding that I could see galaxies and nebulas, and I could see the Galilean moons of Jupiter - things I had read about or saw pictures of, but never had seen with my own eyes.

But my best Galileo moment came when I had borrowed a friend's 90mm Mak and mounted it to my camera tripod and saw Jupiter for the first time - I was aghast. There was a fully resolved disk, not just a point. And even better, I could make out bands on the surface of the planet. I think I let out a small shriek for the first time in 40 years, and then I was silenced by the wonder that laid before me. Here was the giant planet revealing many of its wonders for me. I didn't realize such beauty or majesty could exist for mere mortals to behold. I thought such images were only possible through photography or space probes.

That was the defining moment for me and ever since I have been hooked on astronomy. I have since purchased and gone through several scopes including a 6" reflector, a 4" achromat and a 7" Mak. I have been able to re-experience that thrill with each new scope and the new items or the greater detail that I've been able to see. And now I get to provide the same thrill for others whenever we hold our public nights. Truly a wonderful and rewarding hobby.

Space Place
More Energy from Less Sunlight

Helen Johnson, a spacecraft technician at NASA's Goddard Space Flight Center, works on one of the three tiny Space Technology 5 spacecraft in preparation for its technology validation mission.

For spacecraft, power is everything. Without electrical power, satellites and robotic probes might as well be chunks of cold rock tumbling through space. Hundreds to millions of miles from the nearest power outlet, these spacecraft must somehow eke enough power from ambient sunlight to stay alive.

That's no problem for large satellites that can carry immense solar panels and heavy batteries. But in recent years, NASA has been developing technologies for much smaller microsatellites, which are lighter and far less expensive to launch. Often less than 10 feet across, these small spacecraft have little room to spare for solar panels or batteries, yet must still somehow power their onboard computers, scientific instruments, and navigation and communication systems.

Space Technology 5 was a mission that proved, among other technologies, new concepts of power generation and storage for spacecraft.

"We tested high efficiency solar cells on ST-5 that produce almost 60 percent more power than typical solar cells. We also tested batteries that hold three times the energy of standard spacecraft batteries of the same size," says Christopher Stevens, manager of NASA's New Millennium Program. This program flight tests cutting-edge spacecraft technologies so that they can be used safely on mission-critical satellites and probes.

"This more efficient power supply allows you to build a science-grade spacecraft on a miniature scale," Stevens says.

Solar cells typically used on satellites can convert only about 18 percent of the available energy in sunlight into electrical current. ST-5 tested experimental cells that capture up to 29 percent of this solar energy. These new solar cells, developed in collaboration with the Air Force Research Laboratory in Ohio, performed flawlessly on ST-5, and they've already been swooped up and used on NASA's svelte MESSENGER probe, which will make a flyby of Mercury later this year.

Like modern laptop batteries, the high-capacity batteries on ST-5 use lithium-ion technology. As a string of exploding laptop batteries in recent years shows, fire safety can be an issue with this battery type.

"The challenge was to take these batteries and put in a power management circuit that protects against internal overcharge," Stevens explains. So NASA contracted with ABSL Power Solutions to develop spacecraft batteries with design control circuits to prevent power spikes that can lead to fires. "It worked like a charm."

Now that ST-5 has demonstrated the safety of this battery design, it is flying on NASA's THEMIS mission (for Time History of Events and Macroscale Interactions during Substorms) and is slated to fly aboard the Lunar Reconnaissance Orbiter and the Solar Dynamics Observatory, both of which are scheduled to launch later this year.

Thanks to ST-5, a little sunlight can go a really long way.

Find out about other advanced technologies validated in space and now being used on new missions of exploration at nmp.nasa.gov/TECHNOLOGY/scorecard. Kids can calculate out how old they would be before having to replace lithium-ion batteries in a handheld game at spaceplace.nasa.gov/en/kids/st5_bats.shtml.

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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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Friday, September 11th, 2009

7:30 PM @ The Spectator

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