Volume 16, Issue 04

April 2009

HAMILTON AMATEUR ASTRONOMERS

Event Horizon

100 Hours of Astronomy
A Global Star Party

Photo Credit: Glenn Muller

As part of the celebrations for International Year of Astronomy, there are plans to hold the biggest public outreach ever! Amateur astronomers, astronomy clubs and other groups are setting up telescopes in public places to allow as many people as possible to look through a telescope. Dedicated communities of sidewalk astronomers are reaching out to as many people as possible in every

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From The Editor's Desk

Ok, I confess, it is my fault. I will take responsibility for the cloudy skies that we have seen for the past few days and those that we are going to experience in the next month or so.

The rule is that if you buy any new astronomy equipment, it will be cloudy for weeks. I confess that I took the plunge and bought a digital camera. Now that in itself is not enough to make things cloudy, but I did buy a T-ring and an adaptor to fit it to my telescope which puts the purchase into the astronomy range. That is enough of a connection to trigger the clouds. So for that I offer my sincere apologies for the April clouds and showers that I may have caused.

Perhaps we should all get together and make our astronomy purchases at the same time of the year and we will have clear skies the rest of the year!

Tim Philp, Editor

Inside this issue:

Astronomy Day

Saturday May 2nd

13:00—16:00hrs

Confederation Park

20:00—23:00hrs

Bayfront Park

amateurastronomy.org for details

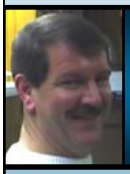
100 Hours of Astronomy (continued)

(Continued from page 1)

country around the globe.

Everyone with a telescope should bring it out under the stars throughout the 100 Hours of Astronomy – especially during the global star party! – to share the wonders of the sky with others. Along with the usual locations on streets and at shopping malls where foot traffic is high, participants are encouraged to go to non-traditional locations to reach those who cannot come to them. Military bases, rest homes –wherever there are people to look through a telescope, a telescope should be there. Amateur clubs should have members at several locations to reach as many people as possible. Groups should also approach science centres, museums, libraries and other facilities to work together in bringing astronomy to the public throughout the 100 Hours of Astronomy.

Events can be as diverse as the amateur astronomers themselves! New ideas are the key to increasing participation, attracting the public and getting the media's attention. A public observing marathon, a busy street lined with telescopes, telescopes at local historic sites – new ideas get attention. Events should be accessible to the disabled community whenever possible. The International Year of Astronomy 2009 and the 100 Hours of Astronomy Cornerstone Project are the perfect opportunity to bring astronomy to the people and showcase this fantastic science. 100 Hours of Astronomy will be the largest international astronomy event ever and everyone should take part!



Treasurer's Report

By Don Pullen

(Unaudited)

Cash opening Balance (1 Mar 2009)		$ 3615.89
Expenses		$ 657.05
Revenue		$ 1059.50
Closing Balance	(28 Mar 2009)	$ 4018.34

Notes:

Major expenses included: York University Bus Rental ($472.50), Feb EH Printing ($22.05), BASEF Cash Prize ($100.00), BASEF Book prize ($23.03), Postage & EH envelopes ($39.47)

Major revenue sources included: Memberships ($160), HAA 2009 Calendars ($252.50), 50/50 ($37), York University Ticket Sales ($510.00), EH Advertising – Camtech ($100.00)

From the Chair

by Steve Germann

It's already April, and IYA 2009 is well underway now. As I mentioned in last month's article, the Search Capability on the IYA2009 website shows that the Hamilton Amateur Astronomers is a very active club indeed.

Our plans for public outreach dovetail well with the general intent of IYA2009, that is, for people to have a 'Galileo Moment' by looking through an optical instrument at the Moon, Jupiter, Saturn, or other celestial object, and realizing how much detail and beauty there is in the sky above them, all the time.

Volunteer members of the Hamilton Amateur Astronomers will be sharing their time and enthusiasm at 5 scheduled public nights this year.

The first of these is 'coming right up' in April, either on Saturday April 4th, or if too much rain or clouds, Sunday April 5th. It will be at Murray Street Park in Grimsby.

Everyone is welcome at this event, members and non-members alike. As a member, you won't have to conduct sky tours unless it's your particular strength. We will be happy to share the available telescopes that evening with you and your friends.

Please come. We get a lot of enjoyment from showing non-members the night sky, planets, and star clusters. If you have a telescope, this is the perfect time to bring it and we can help you set it up, and point it at Saturn, or some other celestial sight.

The volunteers at our public nights want to share what they have discovered and come to enjoy.

Our speaker last meeting, Dave Makepeace, raised some interesting questions about why we join an astronomy club and look through telescopes.

For him, realizing the earth is a spaceship, with him on it, was his life-changing moment. From then on, he has sought eclipses and the special connection of solar system geometry they require and exemplify.

Although we all have different reasons, I don't think we can deny that seeing our planet's place in the sky and the solar system and the galaxy is not part of it. There's also a bit of 'being there' at a celestial event, even a Lunar Eclipse visible to half the world.

For me, as a 'Big Dob' guy, what I do is done in part for the challenge and sense of accomplishment, to be able to point the scope properly and see what I am looking for. Since my telescope is big enough, I expect to be able to see without having to struggle. This is a good thing because my eyes are getting older now, and I would prefer to enjoy the view, rather than use 'averted imagination'. The deep-sky objects I seek also give me an interesting perspective on the Universe. The many-light-year sized clouds of dust in the Orion Nebula are a perfect example of something big that's doing something interesting. Some of the stars forming in the Orion Nebula are 50000 times brighter than our Sun, and will burn themselves out in a few million years or less. Since they are 1600 light years away, in a sense they may have already gone 'Supernova' and are eventually going to be eventually seen by us and our descendants as a very bright sight indeed.

(It's also good exercise just setting it up and putting it away).

Our public nights are scheduled for the first-quarter moon, for a reason.

The moon being up means that observing from dark-sky sites is fairly futile. This means less reasons for any of our members to be elsewhere on that evening.

Secondly, the moon presents a good target for inspection, by any and all optical magnification equipment we have. The moon is also totally immune to 'light pollution' and can be seen well from virtually anywhere on earth, even downtown.

It will look spectacular in hand-held binoculars, tripod-mounted binoculars, telescopes, and even photographs, suitably short or guided. Planets are also fairly immune to light pollution interference. Saturn will be a good target most of the year.

Another way we reach out to children with accessible popular science is via our invited visits to Scout troops, where we present information about the sky, the Solar System, Navigation, and other visible astronomy, and offer views through our telescopes.

It's a fine sense of accomplishment I get when kids understand what they are seeing, and get a handle on 'astronomical' distances. There is a definite hands-on educational aspect to thinking about the sky and about distances, angles, and sizes of celestial objects.

Thinking about the physics involved in stellar power, and the physics of spacecraft motion, is sufficient to keep a child interested for a long time.

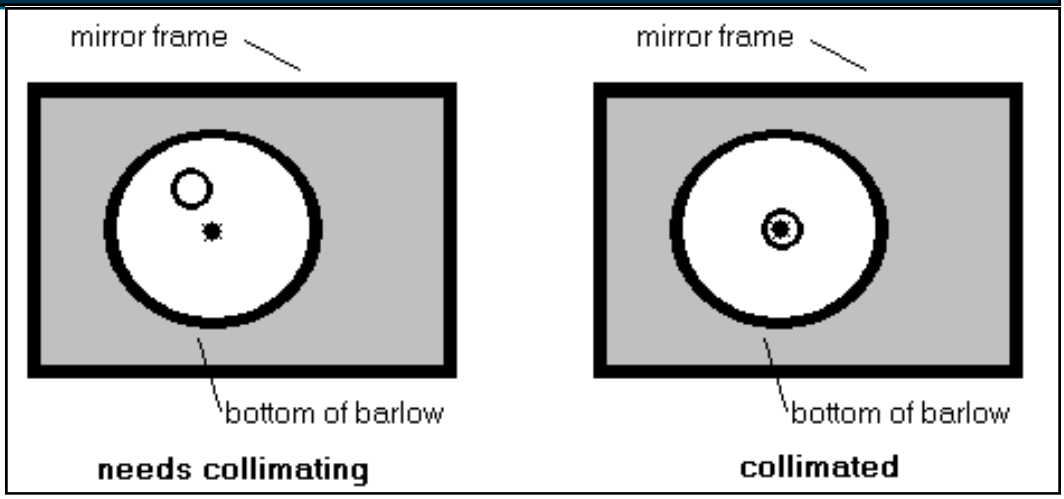
There's also plenty to learn in terms of constellations, the names, sizes and locations of the planets, in general and on a given night, and the history that went into the discovery of celestial information.

The IYA represents a unique combination of celestial beauty, and education. It's the place to be.

Collimation Tips

by Glenn Muller

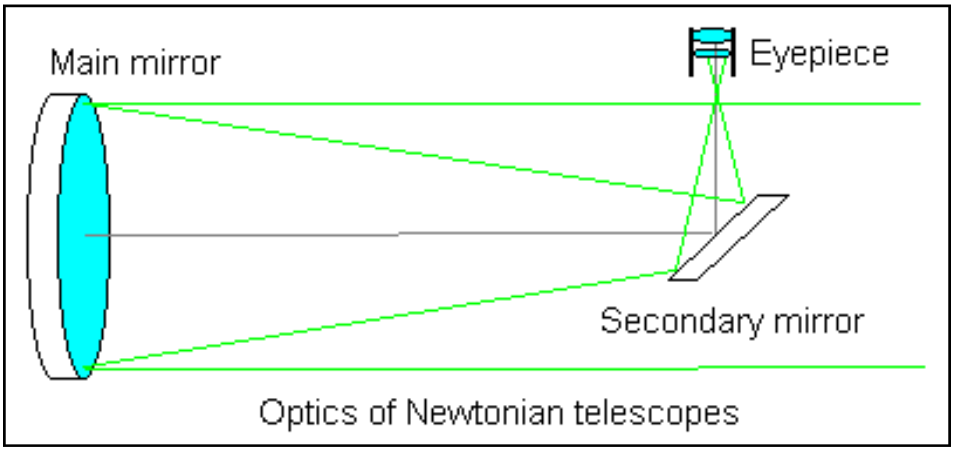
As an advocate of the simplicity of dobsonian-style telescopes, I find the main factor that steers people away from reflectors is the occasional need for collimation. Which is a shame because routine collimation is no harder than polar aligning and often takes less time.



There are pages of instruction on the Internet, but the method I find easiest and most effective is one that uses a barlowed laser collimator. These are quite easy to make if you already have a laser collimator and a barlow.

As popular as laser collimators are, their one drawback is the possible inaccuracy of the beam. In fact, given a choice between a plain laser collimator and a simple sight-tube Cheshire eyepiece collimating tool, I would pick the Cheshire every time. BUT, a barlowed laser collimator is a different story.

Having said that, it's not a bad idea to test your laser for "trueness". First, make a "V" wedge out of something like Styrofoam that will hold the laser in place while you rotate the housing. With the beam shining on a piece of paper attached to a wall, mark where the spot hits for each quarter turn. If the beam hits the same mark for each turn, the laser is true. If you end up with a four separate marks after a full rotation then carefully adjust the laser's alignment screws to fine-tune the beam's aim. Warning: perfectionists will drive themselves crazy with this but the beauty of a barlowed laser is that *pretty close* is good enough.



Now when I say that collimating takes less time than polar aligning, I'm referring to a scope that is at least roughly aligned to begin with. Sometimes a recently purchased scope or one that has been disassembled will need major adjustment to bring the mirrors into alignment. To do this, you would start with the Cheshire sight tube to make sure that the secondary mirror is fairly well centered under the focuser. After that, the barlowed laser collimator will come into play.

To make your own barlowed laser collimator, I recommend using a short barlow; the cheaper the better so you can dedicate it to the task. You will need to make a circular disc that just fits snugly over the barlow's lens. The disc can be cut out of a thin plastic jug or a piece of cardboard, but it should be white. The next step is to

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Collimation Tips
(Continued)

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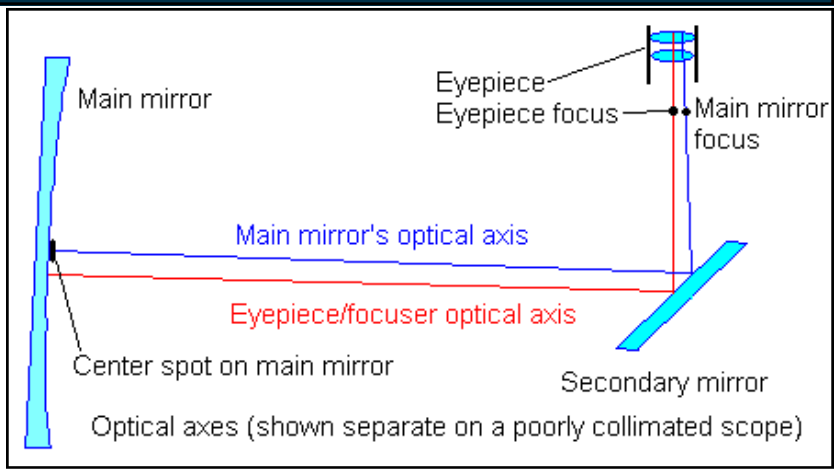
make a circular hole in the dead center of the disc about 3 - 5mm in diameter. Then attach the disc over the barlow lens.

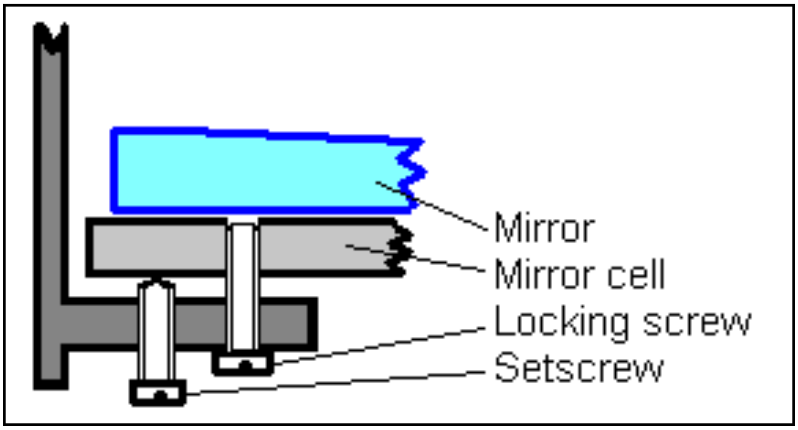
The modified barlow is then put onto the end of the laser collimator and the set screw(s) tightened. If you are thinking ahead of me, you'll have figured out that the barlow lens will diffuse the laser beam. Once the unit is inserted into the focuser and turned on, what you'll get is a diffuse beam of light shining onto the secondary mirror and reflected down onto the primary mirror.

Thanks to the initial work with the Cheshire, the red beam should be pretty well centered on the secondary mirror. However if the beam is not subsequently hitting the center of the primary mirror you will need to adjust the tilt of the secondary until it does. Once the beam covers the center of the primary, you are almost done (it is perfectly safe to look down the OTA to check this, and don't worry if the beam isn't exactly round).



Generally, a reflector's primary mirror will have a small spot or paper ring placed dead center on its surface to aid in collimating. This is a vital component for this method, and at this point that spot or ring should also be within the diffused beam of the collimator.

The final step involves a small hand held mirror. With the mirror in your hand, insert it into the tube opening at the front of the telescope. Hold it below the secondary at an angle that allows you to see the bottom of the barlow in the focuser tube. What you should see is the white disc with a bright center beam coming through the center hole. You should also see the dark silhouette of the primary mirror's center ring or spot (see diagram). If the silhouette is centered on the bright beam then your mirrors are correctly aligned. If the silhouette is not centered, play with the primary's alignment screws until it is.



I believe that part of the fear factor for those who shy away from collimating comes from the sheer length of the explanations – like this one. But in reality, most of the time all you'll need to do is the final step as described in the previous paragraph. Yes, really.

In summary, a barlowed laser removes the frustration factor associated with a slightly misaligned beam, or a unit not completely snug-centered in the focuser. This, in turn, really speeds up the process of collimation The fact that the silhouette of the primary's center mark ends up in the center of your focuser tells you that captured photons will travel the optimum path to your eye. And here endeth the lesson.

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!***

Apr 2-5 - 100 Hours of Astronomy (HAA Meeting and Grimsby so far)

Fri Apr 3 - HAA April Meeting

Sat Apr 4(5) - Grimsby Public Night - Murray Park

Sat Apr 18 - Sky This Month/Season Live - Binbrook

Apr 18-19 - NEAF - Suffern, NY (near NYC)

Sat Apr 25 - RaptorFest - Niagara Fruit Education Center, Grimsby, Hwy 8, east of Fruitland Rd

Sat May 2 - Astronomy Day - Bayfront Park

Fri May 8 - HAA May General Meeting

Sat May 9 - Binbrook Clean-up Day

May 21-24 - Cherry Springs camping/ observing, PA

Sat May 30 - Binbrook 50th Anniversary Day, Binbrook

Fri June 5 - Imaging Clinic with Kerry - at Jim's

Fri Jun 12 - HAA June General Meeting

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

Jul 17-21 - StarGazing 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, Brantford

February HAA Meeting Highlights

by Heather Neproszel

A pleasant mild night was the back-drop for the HAA's monthly general meeting at the Spectator building on Frid Street. Chairman Steve Germann welcomed attendees and mentioned that a few HAA 2009 Calendars were still available and on sale at $15.00. My calendar has been used quite regularly during the last couple of months, especially to look up moon phases and transit times at a glance.

The HAA is organizing and/or participating in so many events in this International Year of Astronomy (IYA) that a printed list of events was available for attendees to peruse. Also upcoming for April and May: On April 4, the HAA will have a Public Night in Grimsby at Murray Street Park. On April 25 the HAA will be participating at "Raptor Fest" (also in Grimsby) with a daytime astronomy event. The HAA will be observing International Astronomy Day on May 2 at Bayfront Park with public observing from 8-11 pm. May 9 is Friends of Binbrook Day at Binbrook Conservation Area involving litter clean-up and trail management. And May 30 is Binbrook Conservation Area's 50th Anniversary and the HAA will help celebrate with a daytime astronomy event.

Next up was HAA Observing Director John Gauvreau and "The Sky this Month". John had as always an interactive and entertaining talk that touched on the weather (it's getting warmer, hooray!!!); IYA (did you know that Galileo was the first person to resolve individual stars in the beautiful open cluster in Cancer called "The Beehive", aka Praesepe, aka M44)? M44 contrasts nicely with M67 which is older and dimmer; and beautiful astrophotos taken by members Andrew Bruce (M42, Andrew's first foray into deep-sky imaging) and Bob Christmas (Comet Lulin passing near Saturn), great images guys!

Following the conclusion of John's talk, Steve introduced Margaret Walton and her presentation "Sidewalk Astronomy in Africa". Marg and her husband Bruce Peart spent 3 and a half weeks in southern Africa in the fall of 2008. The trip took them from Cape Town to Namibia and Botswana and finally to Zambia. They traveled by day and camped out under the brilliant desert sky by night. Because it was a camping trip they traveled "light" – just carry-on luggage. So they did not take a telescope but were equipped with 10 x 30 image stabilized binoculars and a small spotting scope that Marg modified by adding a red pointer with some adhesive tape. The binoculars were a great choice as

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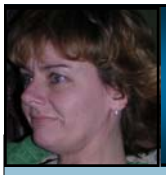

My Galileo Moment

by Lori Asaro

The skies are full of wonders and as parents we try to introduce our children to these wonders. A few summers ago our family had the opportunity to do just that. While on a camping trip in Gananoque (at the KOA), we had the privilege of experiencing something amazing. The KOA had arranged for an astronomer to visit the campground, complete with his scope to provide a night time educational session on the summer sky and the use of telescopes for the hobbyist. I wish I could remember the speakers name but sadly cannot. His presentation focused primarily around what we could see with the naked eye or the use of binoculars. We also all got the chance to see through his scope. His talk continued with discussions of shooting stars, meteors, etc.

Not two minutes after he began talking about these, the sky lit up off to the north with a spectacular sight, a real meteor blazing a trail to earth. Needless to say we all thought it was some kind of trick/joke as the timing was way too perfect. However, we were assured it was the real thing. The display only lasted a few seconds but the memory of the experience has lasted to this day for all of us. My kids still talk about it.

The night got late and the kids tired out but my husband and I spent several more hours with that ever-so-accommodating astronomer, gazing at the endless skies. We've all become avid fans of the night skies since then and were even lucky enough to visit the Echo Valley Observatory in Huntsville last spring where we got some great views of Saturn and the moon. We even got some decent photos by holding my digital camera to the lens of the telescope. This trip too was one that my children remember with excitement. We're hoping to go back again this coming summer.

We're just a regular family. We don't have any great knowledge of the vast universe and all it holds but we do have a fascination for it and stargazing is a great simple activity that allows us to share and learn as a family. I highly recommend it to everyone.

The Sky this Month

by John Gauvreau

Each year astronomers mark the passing of the seasons by watching the sky roll by and bring the different constellations into view. The thought of the **Summer Triangle** and the rich **Milky Way** of **Sagittarius** speaks to us of summer as much as the high temperatures and green fields do to other people. **Andromeda** conjures up the smells of crisp autumn nights and just thinking about **Orion** makes my fingers cold! These perennial favourites are like old friends that visit on schedule each year as part of our annual routine, like the start of the school years or a Christmas holiday. There is a permanence to them, and we know that just as these starscapes were the first things we learned as we grew to love astronomy in our youth, so they will be there with us to the end. Spring comes to us now with the **Big Dipper** and its arcing tail leading to **Arcturus**, the great galaxy fields of **Virgo** and the first sighting of **Hercules** and the great **globular cluster M13** coming up in the east.

We also know that despite the appearance of an unchanging sky, that there are constantly new things to see, and unique events like **conjunctions**, rare visitors like **comets** and arrangements of **stars** and **planets** that are simply too aesthetically lovely to miss. The month of April offers all of these things to us.

Comet C/2008 T2 is known as **Comet Cardinal**, named for Rob Cardinal from the University of Calgary. This **Canadian discovery** will be closest to the **Sun** in June, but should be visible by late April. On the night of April 23rd the **comet** will pass by **M37**, a beautiful open cluster in **Auriga**. After being treated to **Comet Lulin** it is great to have another **comet** so soon. Keep an eye on this one over the next couple of months to see how it develops.

We recall that last month **Venus** passed **inferior conjunction** and became a morning object. We have the opportunity now to watch as the planet passes though all the same phases that we observed in the evening sky, but in reverse. It appears as a crescent low in the east before sunrise and will over the next few months rise higher and higher and also show a fuller phase. Now getting up before sunrise may not be your cup of early morning tea, but for those that can come in to work a little late on a Wednesday morning, one of the best events of the year occurs in the daylight of April 22nd. Starting just after 9am the thin **crescent Moon occults Venus** in the eastern sky. Both of these objects are bright enough to see in the sunlit sky, but for those with binoculars it will be much easier to keep track of **Venus**. Telescope observers will particularly enjoy the view as we here in the Hamilton area enjoy a **grazing occultation**, meaning that **Venus** will glide along the southern edge of the **moon** and be only partially covered by the **moon** at any given time. The whole event will be over in about 20 minutes, but what a sight! These two matching celestial crescents side by side in the sky, the **moon** gliding along in its orbit, its motion visible against the more distant **planet**. Do all you can to see this one; you'll remember it for a long time.

Only a few days later the **Moon** will have passed its New phase and will appear in the evening sky. On April 26th the thin crescent **Moon** will join **Mercury** low in the western sky. About a half hour after sunset you might catch the pair in the darkening sky if you have a clear western horizon. This is about as good as **Mercury** will get for this apparition, so this is a great night to catch it. If that wasn't enough, use your binoculars to spot the **Pleiades** in between the **Moon** and **Mercury**!

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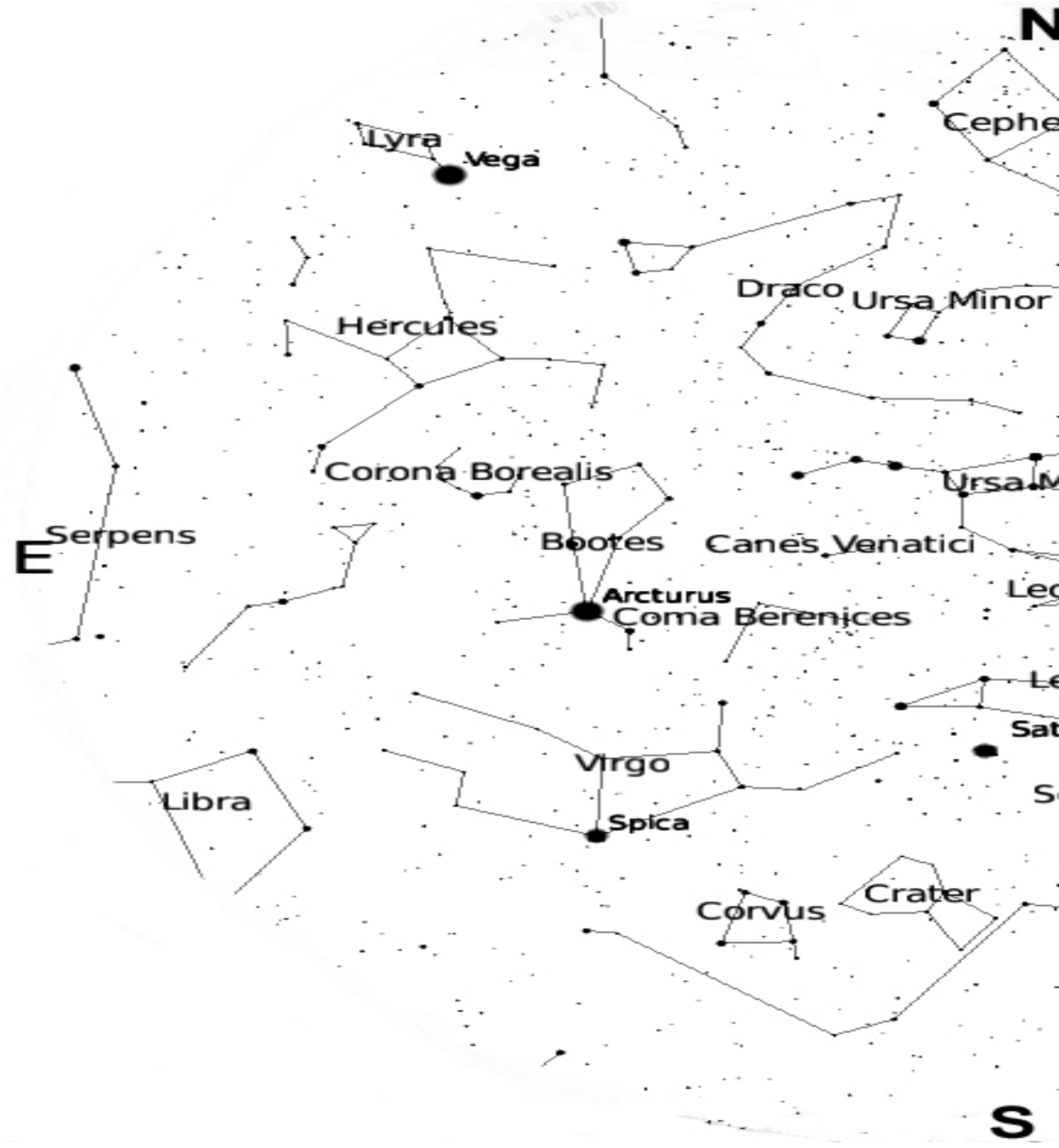
N
Lyra
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Draco
Ursa Minor
Hercules
Corona Borealis
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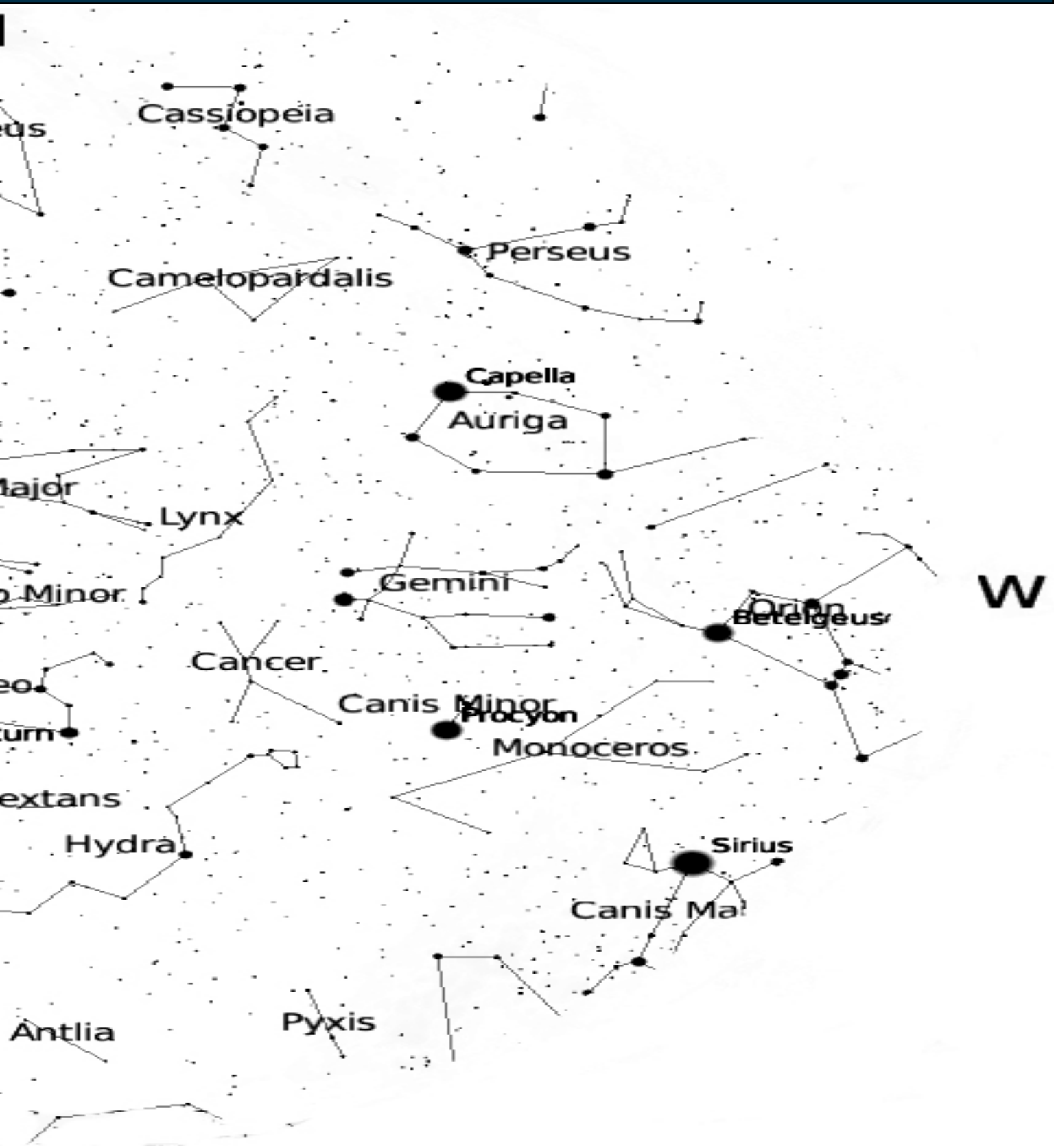
Cassiopeia
Perseus
Camelopardalis
Capella
Auriga
Lynx
Gemini
Cancer
Canis Minor
Procyon
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Sirius
Canis Ma
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The Sky this Month
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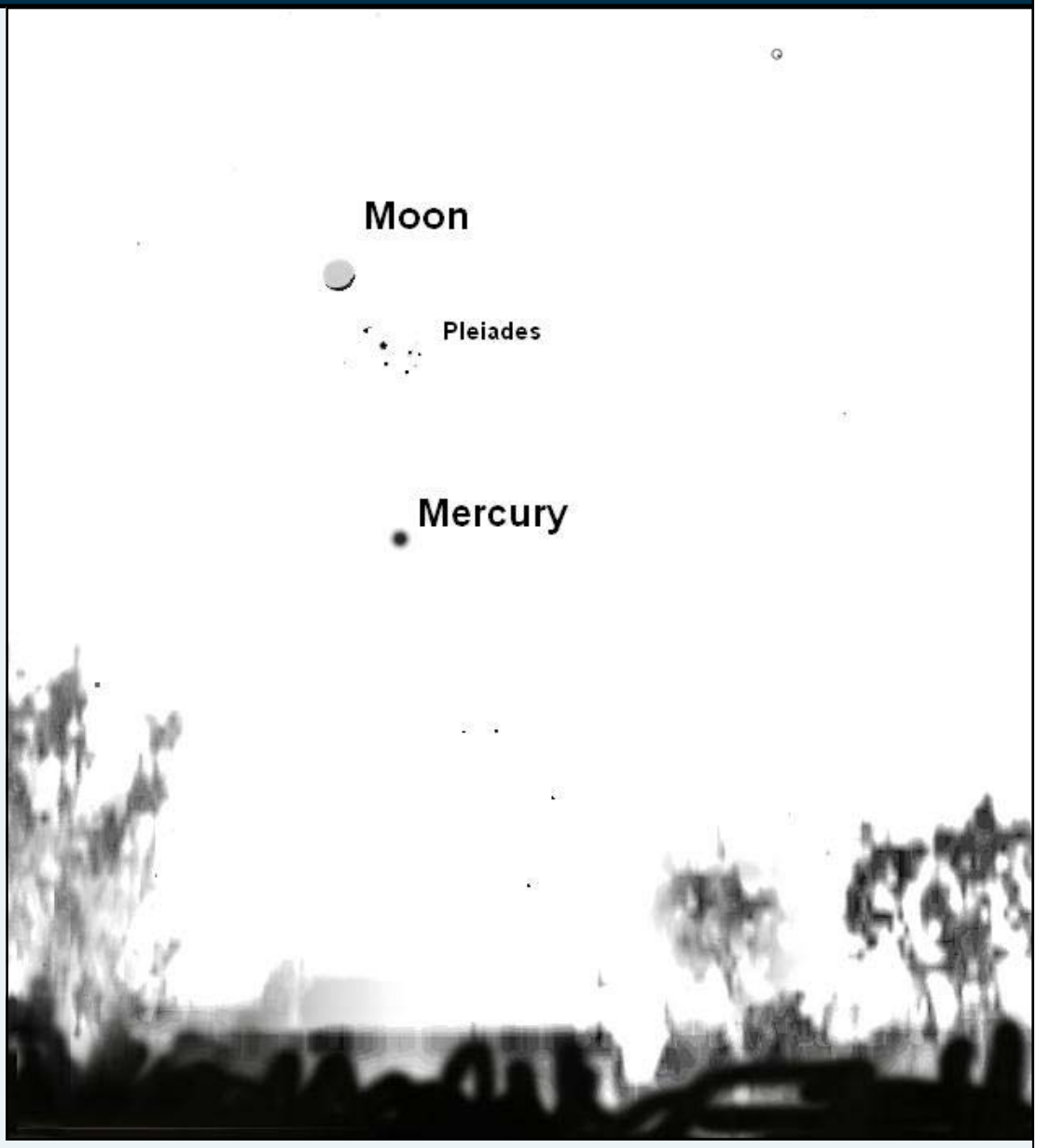


Don't forget that **Saturn** is still well up in the evening sky, and the **rings** have opened up to almost **4°**. Even at this low angle there is still detail to be seen through a good scope and a steady sky, and of course there is the banding on the **planet** to observe and plenty of **moons**.

For the **deep sky** observer the spring season means **galaxies**. The spring **constellations** of **Leo**, **Virgo** and **Coma Berenices** are all well known for their rich fields of **galaxies** and **galaxy clusters**. We have spoken before of some of the highlights on Charles **Messier's** list, but how about an **NGC** object that is just as nice as any of the **Messier** objects? **NCG2903** is a spiral galaxy in **Leo** that **Messier** missed for some reason (odd, considering that he was a comet hunter and one of his comet discoveries passed only a little over a degree from this **galaxy**!). **Herschel** added it to his list as a magnitude 9 object located just in front of **Leo's sickle**. It should be visible even in small scopes and an eight inch scope might pull in some detail. Let me know if you are able to add this fine object to your list.

Send any reports, observations or images to observing@amateurastronomy.org and enjoy the warm spring skies.

February HAA Meeting Highlights
(Continued)

(Continued from page 7)

Marg could do bird-watching as well as astronomy, in addition to observing some of the other magnificent wildlife in this beautiful part of the world. Marg and Bruce had very specific astronomy targets in mind: the Large and Small Magellanic Clouds (satellite galaxies of our own Milky Way), the great globular clusters 47 Tucanae and Omega Centauri and last but not least the Eta Carinae Nebula, which rivals the northern hemisphere's Orion Nebula.

To find these objects Marg found using "Exploring the Night Sky with Binoculars" (probably Patrick Moore's book) and charts from Terrance Dickinson's "Night Watch" to be the most helpful at navigating her way around the Southern sky, as well as a southern planisphere. Marg used the "Southern Cross" to star-hop her way to her targets.

Marg showed one image that showed just how dark the sky is this region. There is very little if any light pollution. In the southern hemisphere even the moon had an unusual look: the crescent moon appears upside down, like a bowl. The group of people she traveled with was lucky to have Marg show them those deep-sky celestial sights. Thanks Marg for a terrific presentation.

At our meeting half-time break our door prizes were awarded: the Sun Observers Guide by Pam Spence; the RASC Handbook and the 5 Millennium Catalogue of Eclipses, the latter donated by Ray Badgerow. Also on view at half-time was Clyde Miller's impressive equatorial mount.

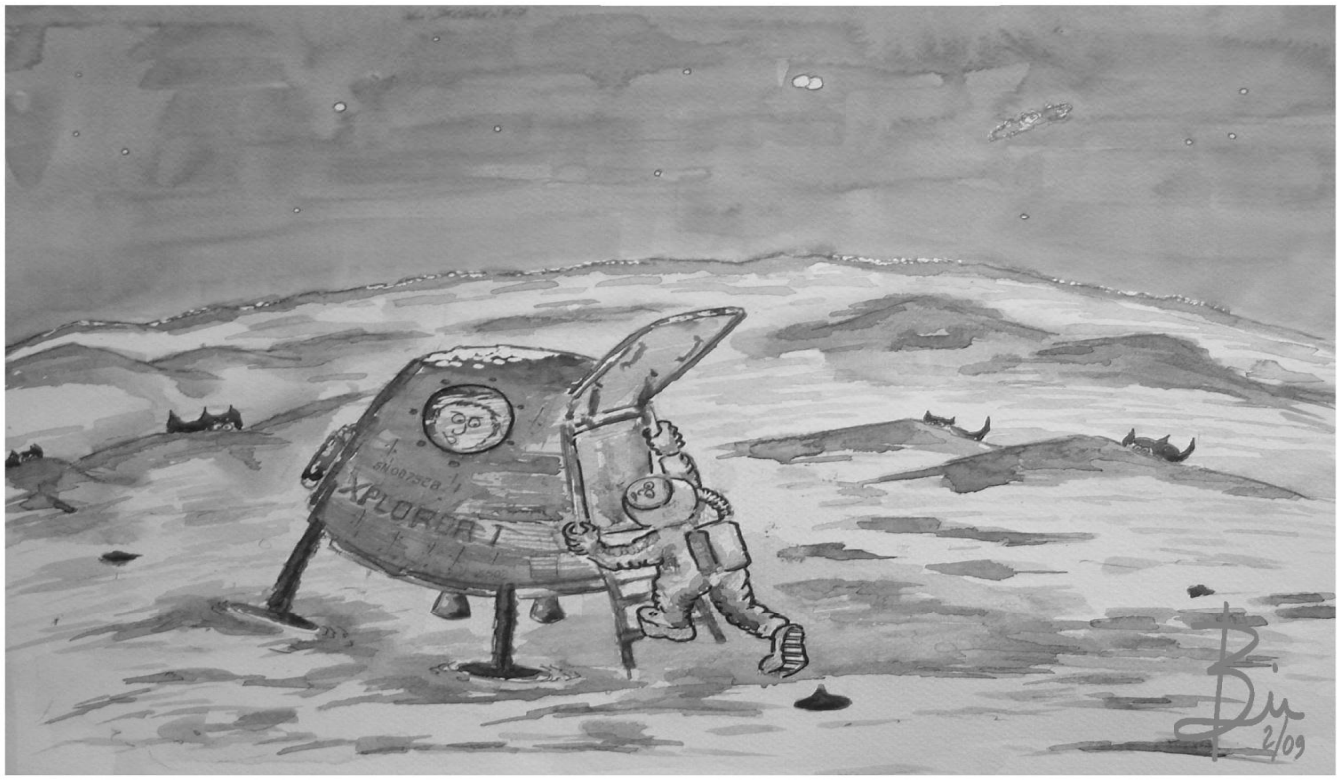
Ray Badgerow introduced our high-lighted speaker for the evening: Dave Makepeace, Solar Eclipse Chaser. In over 18 years of viewing total solar eclipses, independent filmmaker Dave Makepeace has seen several solar eclipses. His eclipse "chasing" has meant traveling to many far-flung places such as China, Libya, Australia, Mexico and even Antarctica. He showed several incredible images of eclipses he has taken, both still photographs and videos. When the moon blots out the light from the sun, solar prominences that are hidden by the sun's glare come into view. Dave showed an image that displayed the brief "diamond ring effect" just prior to "totality"(and just after totality) where the sun's light still shines brightly like a jewel and a very thin ring of light is all that can be seen just rimming the silhouette of the moon. In the video we can see that Dave and his fellow eclipse chasers get very "pumped" during totality. During a total solar eclipse Dave experiences a sense of wonder and awe that he says goes beyond observing the grand celestial mechanics.

A particularly impressive video from China in 2008 showed the whole eclipse site from the vantage point of the observer looking out over the countryside, as well as the actual eclipsed sun above the horizon. You could see the site get darker as the shadow or umbra fell over the area. At totality the sun is blotted out by the moon and looks like a black disk. Dave says he has seen Venus, Mercury, Mars and Jupiter appear during the darkness of totality. The temperature drops several degrees and animals get agitated. In 2009 a total solar eclipse with a 6 minute duration will occur in the Pacific region, and China again will have a front-row seat. I am sure Dave will be there to record this incredible event. Thanks Dave for letting us experience this grand spectacle, even if just vicariously.

After the meeting attendees retired to Kelsey's to combine some gastronomy with astronomy. Chalk up another enjoyable HAA meeting!

Galactic Moments

By Bill Mead



One small step for man, one giant...
...Hey Bob look out !

Tech Tip—Controlling Dew

by Tim Philp

While dew on flowers can make for a very pretty picture, it plays hell on astronomical equipment and can make observing very uncomfortable. While there is nothing that can be done to prevent dew in nature, it is important for amateur astronomers to learn to cope with its effects.

Perhaps the best thing to do is to keep your equipment covered when you are not actually observing. Being exposed under a clear sky causes the temperature of equipment to fall quickly. If the temperature falls below the dew point, condensation will form.

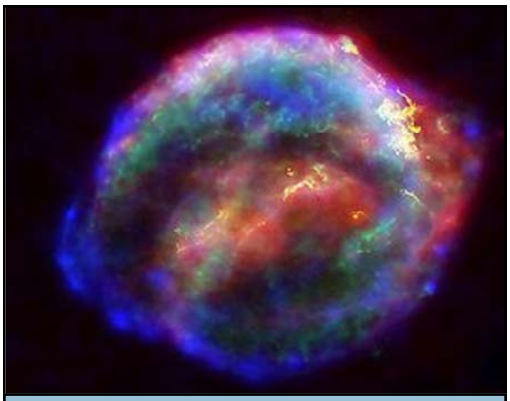
Of course, you have to expose your mirrors and lenses to the sky if you want to observe. Perhaps the easiest way to keep your optics clear is to use dew shields. Keeping your optics deep inside the recess of the dew shield will delay the onset of dew formation.

Even dew shields will not stop dew under severe conditions. Under these circumstances you need to have some means of heating your optics. Special dew straps that wrap around the lens or mirrors will keep water from forming and help you make it through the night.

Through the Looking Glass

by Greg Emory

Spring is the time for renewal or rebirth. The snow melts and leaves behind remnants of the previous year's garden. From this emerges the new flowers for this year's garden. As stars age they eventually come to the end of their life and die in one of several ways. A relatively small star like our Sun will expand and increase it's energy output as it ages, until it exhausts its hydrogen fuel at which point it will collapse and blow off the outer layers to form a planetary nebula.

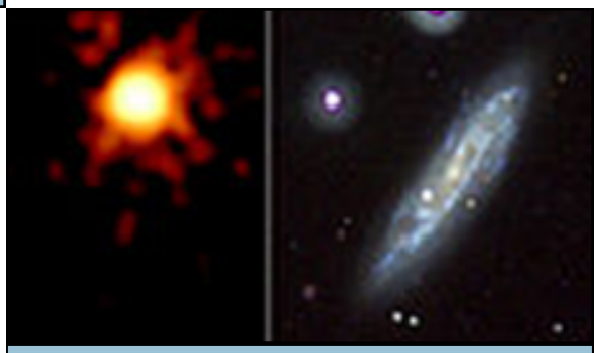


A planetary nebula is the result of a sun-like star ending its life as a main sequence star.

Through a series of steps our Sun and other stars like it will end up as a white dwarf. This slow fade out is nice for some. But just like people, not all stars go out quiet or passively.

One mechanism for star death is the Nova. The nova is a runaway or uncontrolled thermonuclear reaction at the surface of a star. This happens in star systems, where a white dwarf has been pulling material from the surface of its larger companion. The resulting nova causes the brightness of the star to dramatically increase by 8 to 18 magnitudes. The rate at which the brightness decreases is predictable and fairly reproducible which makes it possible for novae to be used as a standard candle, a tool for the determination of distances in the universe. Estimates, made by people who like to count things, are that there are about 30 to 60 novae in the Milky Way per year.

For those stars that are destined to be rock musicians we have the Supernova. The supernova is a cataclysmic explosion of unprecedented size and violence. A supernova can be classed as Type I or Type II, with each type having subclasses. In general a supernova can increase in brightness so dramatically that it can outshine the rest of the stars in the galaxy that it is in. The material that is ejected from the star can have multiple times the mass of our Sun.



Larger stars will die spectacular deaths as novae and supernovae. When this happens, a single star can outshine an entire galaxy.

A Type I supernovae are believed to occur in binary star systems where a white dwarf has been pulling material from its companion. As the white dwarf increases in mass to more than about 1.4 times the mass of our Sun, it will collapse. The collapse begins a mechanism that destroys the star, leaving behind a neutron star or a black hole.

A Type II supernova involves the death of a single star that has an initial mass much larger than that of our Sun. As the star ages the nuclear processes do not generate enough energy and the star can quickly collapse under it's own weight. This releases a huge pulse of energy and neutrinos.

The sub-classifications of Type I supernovae rely on the spectra of the light that is shed from the event. If the spectra lacks hydrogen absorption and has the presence of the ionized silicon, it is a Type 1a. A spectra with no silicon but with the absorption bands due to helium designate it as a class b. Type 1c lacks the helium and ionized silicon bands. For the classification of Type II supernovae, the shape and behavior of how the light fades with respect to time will designate the supernova as either Type IIL or Type IIP.

The supernovae throw the material out into space, which may eventually form accretion disks for new planets or solar systems. After the light dims, you can see the remnants of what was once the star. From these remnants new stars or planets will grow.

BASEF Judges Report

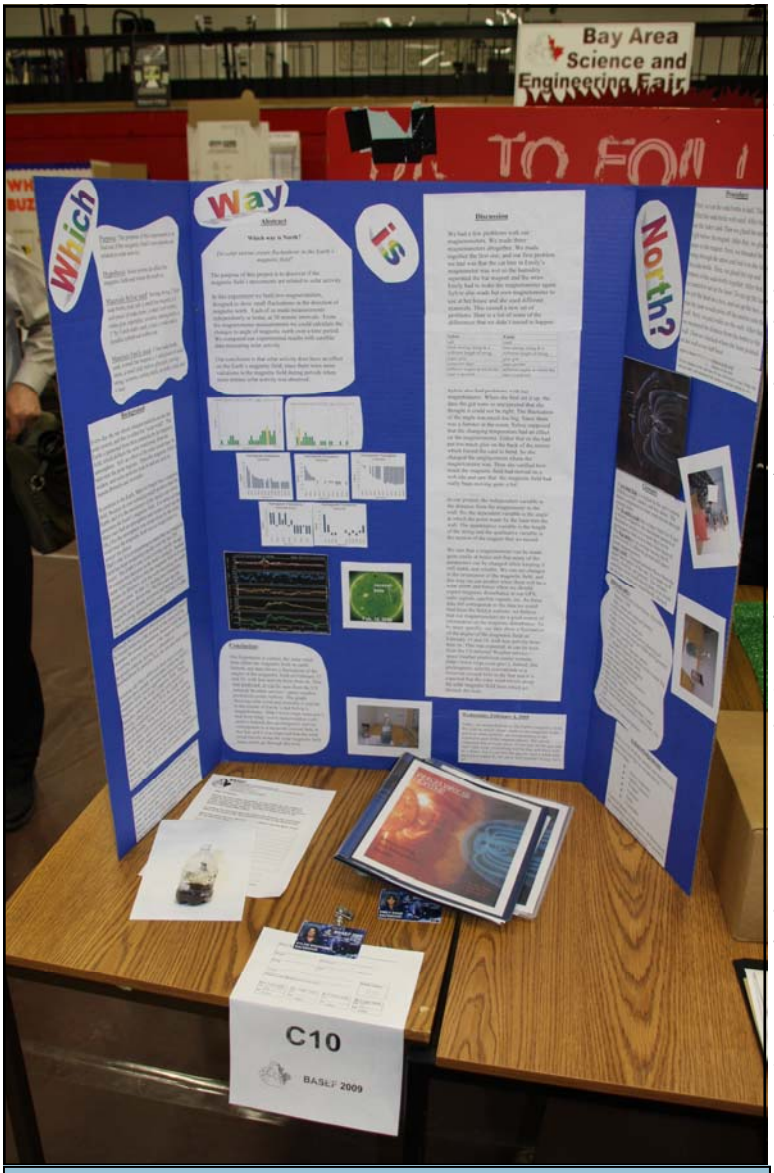
by Don Pullen

This year, BASEF (Bay Area Science and Engineering Fair) was held at the main campus of Mohawk College in Hamilton between March 25 to March 28. The fair rotates each year between Mohawk, Sheridan College and McMaster University. Since we had enjoyed last year's fair so much, Jim Wamsley and I agreed to be judges again for the James A Winger Award that the HAA sponsors.

Over 200 projects from various public, catholic and private schools in the Hamilton, Halton, Haldimand and Brant regions vied for over $100,000 in prizes, awards and scholarships. For top winners, there are paid trips to national science fairs in Canada and the US.

Like last year, most of the projects were submitted in the Junior category (Grades 7 and 8). There were a very limited number of entries from high school students which was disappointing.

Following the same format each year, we arrived early in the morning for our instructions from the volunteer organizers and took a look through the printed list of entered projects. Since our award is for the "best project demonstrating and understanding a topic related to astronomy or physics", we wanted to reduce the list of 200-plus down to something more manageable. We picked about a dozen that we thought might be suitable candidates, but we have found that you can't always tell from the brief description provided. Certainly none appeared to be astronomy related. So at around 9am, we set off for the gymnasium where the main event was being held and decided to take a quick look at each project, stopping when we found something that caught our eye.



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We found 1 or 2 projects that dealt with rockets, but found them rather too basic and with little physics or understanding behind them. There were about 20 or so exhibits that were clearly physics related so we gave these a bit more of a thorough examination. We found some of them quite well done, and others – well, not quite as good.

From our first review of the projects, we found 10 worthy enough to make some notes about and give them more than a cursory glance. However, after looking at these in a bit more detail, there were only 2 which really stood out above the others. These became our finalists.

After a short break to review our notes and ensure we hadn't missed any other suitable candidates, we returned to the floor to look at our finalist projects in greater detail.

The first project was titled "Race to Mars". It originally was listed with a different title and the students must have changed it in the last few days before the competition. Their project dealt with ballistics, since they had been inspired by rockets. They did quite an extensive analysis of various factors which can affect the trajectory of launched objects, considering factors such as mass, its distribution, air resistance and magnetism – individually and matched against each other. Their methodology was pretty good for their grade level and was well documented. They had run exhaustive tests with various objects

(Continued on page 17)

BASEF Judges Report (continued)

and shapes. And they applied a respectable amount of math in their calculations.

In short, we felt it was a well-done physics project – with one caveat. For some reason, after they had summarized their findings and conclusions, they decided to throw some information in about how their results could find application in rocket building. But instead of covering what they experimented with, they started talking about quantum dots, buckyballs, aero-gel and ion-thrust engines. It appeared that they had come across some interesting "buzz-words" and felt that if they included these, it might give their project an extra boost. Regrettably it didn't – However, we decided to ignore this last part to concentrate on the good physics they did.

Our second finalist was titled "Which Way is North". (The titles of every project are rather fanciful and often not a clear indication of what the project covers.) When we first saw this in the list, we didn't expect it would be one we would spend much time on. However once we got to their exhibit, we were quite pleasantly surprised. Their project wanted to see if solar activity could have an affect on Earth's magnetic field. Here was a bona-fide astronomy related project. Granted it didn't deal with cosmology or deep space objects, but it did deal with the local space environment.

They built a simplistic, but effective magnetometer using a green laser pointer, and a mirror attached to a bar magnet suspended inside a clear pop bottle to eliminate stray air currents. They would take readings at various times of the day and over several days and recorded where the reflection ended up on a marked wall. This elegant solution would amplify small deviations of the direction that the bar magnet pointed. They used a moderate amount of math to calculate the deviations, and they did a pretty good job of documenting their results. Then they referenced some external sources like NOAA to get official solar activity readings and compared them against their results. As astronomers we know strong solar emissions can cause Earth's magnetic fields to fluctuate somewhat which would have a small effect on the direction of north.

Emily Agar and Sylvie Bronsard, winners of the HAA prize of $100 and a copy of Nightwatch. Good Work girls!

Not enough to see on a compass, but detectable to a magnetometer if it's sensitive enough. And since they did their experiment correctly, they did see a match in the amount of deviation with the intensity of the solar activity over the same time period.

In their report, it was clear that they had done some real research about why the sun could affect the magnetic field of Earth. They had found information about various solar particles, learned about planetary science (how Earth's and Mar's cores are different and why Earth has a magnetic field and Mars doesn't), learned about CME's and coronal holes, and found many of the same internet resources we astronomers use regularly such as SpaceWeather.com and NOAA's website. Everything in their log book and in their final report made it quite clear to both of us that they had understood what they had done and why it worked. And that is the real purpose of these science fairs.

The amount of physics and math was lighter than the first finalist, but what they had was sound and relevant. And since it was the strongest with both an astronomy and physics component, we felt we had to choose this project as the winner of the James A Winger Award.

On Saturday during the awards ceremony, I presented Sylvie Bronsard and Emily Agar from Dalewood Public School in Hamilton with the cash prize of $100 and gave each of them a copy of Night-Watch. It turned out that we weren't the only one who thought they had a great project. In addition to winning our award, they also won a number of top prizes. A Gold Medal, the Susan Joyce Memorial Award for the best junior project in Physical and Mathematical Sciences, and won 2 of 11 seats to the Canada-Wide Science Fair in Winnipeg this year. After the ceremony I had a chance to meet with them and their parents. Obviously everyone was quite excited about their success. It turns out that Sylvie is quite interested in astronomy and I invited both families to join us at a future meeting is the HAA where they can further their interest in astronomy.

Once again Jim and I enjoyed ourselves. This fair is well organized by the BASEF people and their sponsors. The variety of projects was impressive, and many were well done indicating that the students took these experiments seriously to both learn and hopefully win some of the prizes. This is a great community project for the HAA to be sponsoring. It is helping to encourage students to explore a future in science which is truly the best reward of all.

Liquid Water on Mars

By Tim Philp

Anyone who has ever visited a desert here on Earth knows the importance of water. Without water of any kind, life as we know it cannot exist. Certainly there is little water in a desert, but there is usually some water there, perhaps underground. Life can exist there because it has become very efficient in using the scant water available and also in preserving it inside living tissue.

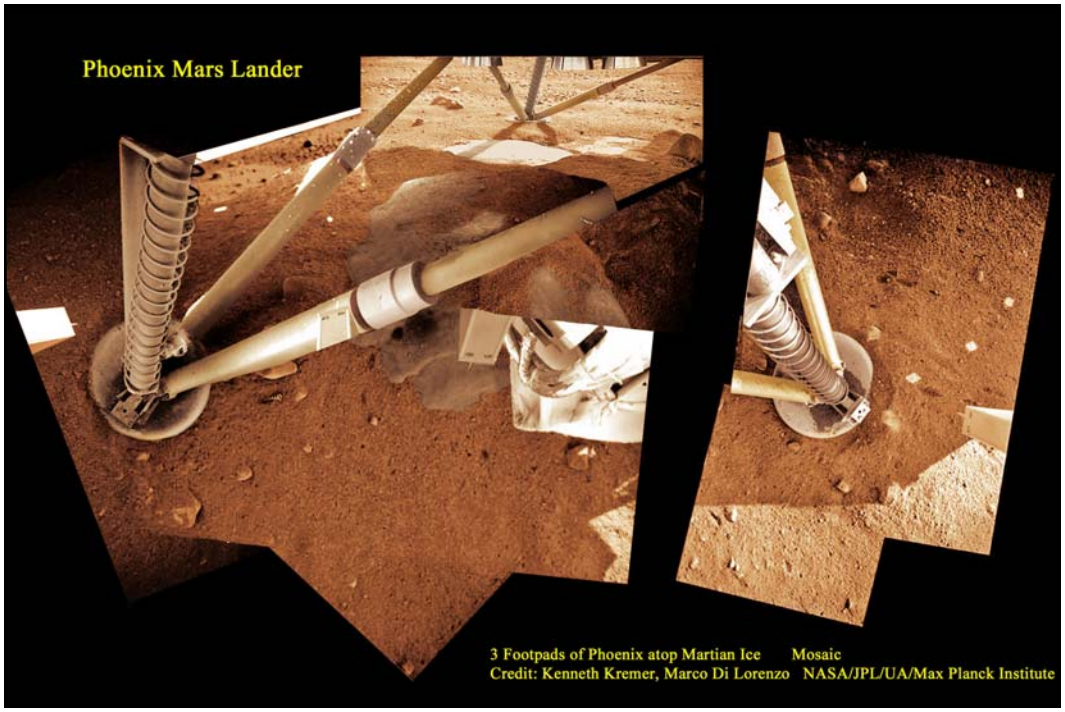
It is for this reason that the search for life on other worlds has concentrated on finding water. If a planetary environment contains water in sufficient quantity, there is the possibility for life to exist.

Here on the Earth, we find that everywhere there is water, life has taken hold. From the coldest environments where almost all the water is frozen to places deep within the Earth where water is under very high pressure and temperature, life exists.

Most of the recent missions to Mars have focused on finding water and the red planet has left tantalizing clues about a watery past, but no actual water was found until recently.

What scientists had found were geological formations that suggested that Mars had liquid water on the surface eons ago, but no proof. This evidence included what looked exactly like dry river courses on Earth and many other geological artifacts that could be interpreted as being caused by water. Certainly such structures on the Earth are caused by water, but scientists could not be sure as there were other possible, if unlikely, processes that could cause something similar.

Even layered strata in rocks investigated by the two Mars rovers, Spirit and Opportunity could have had multiple interpretations. Mineral evidence also pointed to water, but none could be found.



Finally, the Mars Phoenix lander found traces of what looked and behaved like ice in shallow trenches that were dug by the lander. However, the lander had more surprises in store for the science team. An analysis of photographs taken by the lander of itself showed what looked like liquid water on the landing legs. As scientists watched, these droplets grew, merged, and sometimes dripped off the landing legs.

This stuff behaved just like water droplets that were similar to dew here on Earth. The suspicion is that the lander's rocket motors disturbed salty water just under the surface that then splashed on the lander. The droplets grew as water was precipitated from the thin atmosphere as dew.

In order to stay liquid at the temperatures experienced by the Phoenix Lander, the water had to be very salty. As more water came out of the atmosphere, the drops grew and finally reached a point where they could not stay liquid any longer because the salt was diluted.

This discovery is very important for the future manned space missions that are planned over the next couple of decades. Having liquid water on Mars will save a great deal of weight by not having to bring all the water needed by astronauts visiting Mars.

Further, it raises the possibility that there might be life on Mars. On Earth, everywhere there is water, there is life. It appears that at one time, Mars may have had extensive river and ocean systems that could have developed life. If most of the water is underground, we might find that, like the Earth, Mars has microbial life hiding just beneath the surface. The possibility of extra-terrestrial life is very exciting and could bring us a lot closer to understanding how life evolves.

One thing is certain, this is not the last time that we will be visiting Mars with our robotic servants as we tentatively take our first steps beyond our own planet. Looking for water will be a big part of those missions.

Space Place
Where Did All These Gadgets Come From?!

The Chariot Lunar Truck is one idea for a vehicle equal to the lunar terrain. Each of the six wheels pivot in any direction, and two turrets allow the astronauts to rotate 360°.

The flight computer onboard the Lunar Excursion Module, which landed on the Moon during the Apollo program, had a whopping 4 kilobytes of RAM and a 74-kilobyte "hard drive." In places, the craft's outer skin was as thin as two sheets of aluminum foil.

It worked well enough for Apollo. Back then, astronauts needed to stay on the Moon for only a few days at a time. But when NASA once again sends people to the Moon starting around 2020, the plan will be much more ambitious—and the hardware is going to need a major upgrade.

"Doing all the things we want to do using systems from Apollo would be very risky and perhaps not even possible," says Frank Peri, director of NASA's Exploration Technology Development Program.

So the program is designing new, more capable hardware and software to meet the demands of NASA's plan to return humans to the moon. Instead of staying for just a few days, astronauts will be living on the Moon's surface for months on end. Protecting astronauts from harsh radiation at the Moon's surface for such a long time will require much better radiation shielding than just a few layers of foil. And rather than relying on food and water brought from Earth and jettisoning urine and other wastes, new life support systems will be needed that can recycle as much water as possible, scrub carbon dioxide from the air without depending on disposable filters, and perhaps grow a steady supply of food—far more than Apollo life-support systems could handle.

Next-generation lunar explorers will perform a much wider variety of scientific research, so they'll need vehicles that can carry them farther across the lunar surface. ETDP is building a new lunar rover that outclasses the Apollo-era moon buggy by carrying two astronauts in a pressurized cabin. "This vehicle is like our SUV for the Moon," Peri says.

The Exploration Technology Development Program is also designing robots to help astronauts maintain their lunar outpost and perform science reconnaissance. Making the robots smart enough to take simple verbal orders from the astronauts and carry out their tasks semi-autonomously requires vastly more powerful computer brains than those on Apollo; four kilobytes of RAM just won't cut it.

The list goes on: New rockets to carry a larger lunar lander, spacesuits that can cope with abrasive moon dust, techniques for converting lunar soil into building materials or breathable oxygen. NASA's ambitions for the Moon have been upgraded. By tapping into 21st century technology, this program will ensure that astronauts have the tools they need to turn those ambitions into reality.

Learn more about the Exploration Technology Development Program at www.nasa.gov/directorates/esmd/aboutesmd/acd/technology_ dev.html. Kids can build their own Moon habitat at spaceplace.nasa.gov/en/kids/exploration/habitat.

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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, May 8th, 2009

7:30 PM @ The Spectator

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