



Event Horizon

Volume 18, Number 6
April 2011



From The Editor

Travel - either space or earth-based is our theme this time. Over the past few months, we've been treated to reports from fellow members who have travelled far and wide. In this issue, our Through the Looking Glass columnist, Greg Emery, describes his family's recent trip to Arizona and his fast-developing thirst for astro-touring. I'm certain you'll enjoy his words & photos as much as I did.

Mike Jefferson offers a different perspective on space travel. You might want to read his viewpoint before you book a trip to the space station!

Don gives us the inside view of this year's Bay Area Science & Engineering Fair. The science fair's bright exhibitors are obviously well on their way to a bright future. And our intrepid Observing Director offers yet another glorious tour of the skies.

Happy trails & clear skies!

Ann Tekatch
Editor@amateurastronomy.org



Chair's Report by John Gauvreau

Elsewhere in the *Event Horizon* you can read about this year's Bay Area Science and Engineering Fair (BASEF) but I can't resist the opportunity to share a couple of my impressions of this inspiring event. I had the pleasure of visiting without any agenda or work to do, and was able to look at the projects and talk to the participants just for fun. Of course, while many projects of varying themes caught my eye, I did spend the most time with those projects that had an astronomical theme, including the winner of the James A. Winger Award, sponsored by the HAA. In talking to Sylvie Bronsard, of the creators of this project, I was struck not only by how well she answered my questions, but most especially by how she coped when she did not know the answer. As I asked why she used a specific constant in one of her calculations and what the significance of that constant was, her answer was honest; "I don't know. Do you?" Her wanting to know seemed genuine, and as the judging was over and marks determined at that point, there was no harm in giving her the answer. This led to more discussion and the next time she is asked that question, she will have the answer. For Sylvie, even teaching others about her project was a chance to learn something new. Those three words, 'I don't know', are always a great answer to a question, but those two

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Chair's Report (continued)

extra words, 'Do you?' showed the attitude that has made her a multiple award winner. Congratulations to Sylvie, her partner Matthew Chong and all the participants of BASEF. Finally, a great amount of thanks is owed to Jim Wamsley and Don Pullen who volunteered to judge and present the award on behalf of the HAA. It is a lot of work and long days that go into judging the fair, and they did a great job!

As the weather improves and we get back outside we will have the opportunity to meet the public and share our love of this science. Like the science fair participants, we have the chance to share some of the wonders of the universe with others. Whether it's at an HAA public event, a sidewalk astronomy event or even if it's talking to our co-workers or family, we are ambassadors for the universe, given the means to bring a little wonder into the lives of people who are often too busy to stop and look at the stars. Sometimes those moments come at one of our meetings, when a newcomer seeks the advice of a more experienced member. With meeting attendance consistently between 75 and 90 people, there are lots of beginners with lots of questions, and there is always time to visit with folks before and after the meeting. Inspired by recent talks about the nature of time, the human eye or the connection between science and science fiction, many will be armed with questions for this month's speaker, Don Pullen, who will address the more pressing questions facing beginners in astronomy. Combined with our Observing Director Steve Germann's monthly presentation on the Sky This Month, it's sure to be a great evening, so don't miss it!

This month will also see the completion of the Messier Marathon, and if you want to experience the great fun of marathon observing, come on out and join us at our dark sky observing site. There will be lots of telescopes and observers, but don't forget that binoculars are a great way to observe

the night sky too. If you're not ready to face the cold yet, you can participate by sponsoring one of our observers, inspiring them to greater observations, and helping to raise much needed funding for the club. This can be done at the April meeting.

And speaking of newcomers to observing, congratulations go out to Jean Craig, the first recipient of the newly revived Rising Star Observing Award. It is well deserved and I hope an inspiration for others in the club.

Also this month we have the annual HAA imaging clinic, a chance for members to learn more imaging skills from one of the best, our own Kerry-Ann Lecky Hepburn, whose images have appeared in magazines, museums, and been selected for NASA's Astronomy Picture of the Day multiple times.

One final trivia tidbit may help give you that ice-breaker when talking to your fiends or co-workers. This April 12th will mark the 50th anniversary of human space flight. On that date in 1961 cosmonaut Yuri Gagarin became the first person to leave the Earth.



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Masthead Photo Credits:

"Super" Perigee Moonrise on March 19, 2011 from Van Wagner's Beach in Hamilton. Photographed by Ann Tekatch with a Canon T1i DSLR and Canon zoom lens @ 200mm, f/11, ISO100, exposure of 8 seconds. The moon was visible at moonrise but as it climbed higher, it was obscured by a cloud bank situated just above the horizon.

Chair's Report (continued)

What a daring expedition, and how inspiring it must have been. In the decades since, we have visited the moon, created a permanently manned orbital station and sent hundreds of people from all over the world into space. I wasn't around yet to see Yuri's historic flight, but I was there exactly 20 years (to the day!) later on April 12, 1981 for the first launch of the space shuttle.

I was only kilometres



away, at the Kennedy Space Center (right next to the big countdown clock) when it launched. Now as the space shuttle program comes to an end, we can't help but wonder what lies in store for the future, and where that sense of daring will take us next. Perhaps some of those kids at the science fair know best how to answer that. They will be not just witnesses to that future, but the creators of it.

W. J. McCallion Planetarium



W.J. McCallion Planetarium Presentation

When: Thursday April 21st, 2011

Where: W.J. McCallion Planetarium
McMaster University

Cost: \$5 Per Show (Limited Seats Available)



7:00 pm "Cosmic Collisions"

Whether it is the formation of our moon by a violent collision involving a still-forming Earth, the massive asteroid impact which caused the extinction of the dinosaurs 65 million years ago, or the eventual merger of our nearest neighbouring galaxy with our own Milky Way Galaxy, cosmic collisions are happening everywhere throughout the Universe. Join us as we learn about collision theories and explore explosive events - both past and future. You will be amazed by the chaos in the early Universe and be left in awe of what beauty such destruction can hold.

8:15 pm "Astronomy in the Movies"

Explosions. Spaceships. Aliens. Evil Sith Lords. Explosions. These few words are usually all that is needed to describe Hollywood's view of astronomy and space science. Yet, there is a lot of interesting, and sometimes surprisingly accurate astronomy and physics that is evident when settling down onto your couch with popcorn and a good Science Fiction flick. Come along to the McCallion Planetarium to learn about astronomy through the eyes of some of our favourite movies. Could Dr. Arroway really have been contacted by alien species through a radio telescope? What is a radio telescope anyway? Would we really need to send a team of astronauts to drill into an asteroid? Are the odds of successfully navigating an asteroid field really 3720 to 1? How would we travel to alien worlds? And wasn't that press release by NASA regarding arsenic-based bacteria similar to the plot of that movie with David Duchovny and the guy from American Pie?

For Parking Info, visit: <http://parking.mcmaster.ca/>

Please note: tickets will be available for sale on a first come, first served basis from Don Pullen at the April 8th HAA General meeting. Price for tickets is \$5 each for each show (\$10 for both shows). There is a limit of only 35 tickets per show. Tickets will not be available on the night of the shows at the planetarium.



Through the Looking Glass by Greg Emery

In February my wife, Joanna, and I took our two youngest to Arizona for a week. We toured the bulk of the state (1600 miles on a rental car)...stopping in a few instances for astronomical or similar reasons.

Initially we were supposed to tour Kitt Peak on the second night. The forecast predicted a storm front passing through that evening so I cancelled the tour before we left (it rained later in the evening of the planned tour - snow in the mountains).

Kitt Peak (<http://www.noao.edu/kpno/>) is located southwest of Tucson, Arizona and is home of 30+ telescopes (live camera shots are available of several of the domes from the website). The observatory has an active tourist/visitor program for both daylight and nighttime activities. But I didn't get to see that so....

Also to the south of Tucson, in Green Valley actually, is the Titan Missile Museum. The Museum has the obligatory gift shop, but more importantly it still has a missile in the silo and all the standard hardware/computer structure from when it was a full functioning site. The tour guide was a former watch commander (his job was to turn one of the launch keys, just like in the movies). It was moderately interesting to slightly boring for my kids - but if you remember being taught in grade school how to hide under the desk and look away from the bright light, then this will be of interest for you.



Titan II Missile: Sitting in its hole, ready to go

*Don't Press That Button!!
(All photos are courtesy of
Greg Emery - Ed.)*



Next on the agenda was to drive through the desert to Las Vegas. It was actually an amazing drive (through the Joshua Tree National Forest...) beautiful scenery and warm temperatures-a welcome relief from the ice and snow back home. Once we were in Vegas, we discovered that virtually all the hotels near the Strip (such as ours) charged for internet wi-fi. Being a budget-conscious family, we decided to drive to a nearby Starbucks and use our laptop there. As soon as we parked our car, my 13 year-old son said, "Hey, Dad, there's a telescope store here." Sure enough, we had stumbled across a gift shop I wasn't expecting: Scope City Las Vegas, NV...in the same strip mall as the Starbucks, mere moments from the famous Las Vegas "strip". Perhaps just another telescope shop, but it had 1 or 2 different items - including an all metal refractor (I believe it was 6 ") that has been refurbished where required. Historically, it had been removed from a private observatory in the Southwest. It is about 80 years old (actually I think it is similar to a modern day movie star - parts of the scope are 80, other parts are considerably younger). The price tag was nice; the one problem, however, was that it didn't meet the requirements as carry-on luggage.

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Through the Looking Glass (continued)



A bargain for only \$78,000 (USD)

Saguaro Cacti along the roadway (some of the larger ones are 25+ feet tall)



After Vegas, Hoover Dam and the Grand Canyon we slowly made our way to Flagstaff. To balance the Kitt Peak cancellation we planned to go to Lowell Observatory. During the day we first went to Winslow, Arizona. For all of you Eagles fans, yes we went to the corner and saw the flatbed Ford! Almost exactly between Winslow and Flagstaff is Meteor Crater.

My wife, Joanna in Winslow.



Meteor Crater (www.meteorcrater.com) was formed by a meteor impact some 50,000 years ago. The meteor was an iron-nickel meteor believed to be of the order of 45 m in diameter. The impact is estimated to have had the energy equivalent of 20 megatons of TNT. (The Titan II missile pictured on p.4 delivered a 9 megaton warhead). The crater, as we see it today is about 500 feet (150 m) deep. After the impact the crater was closer to 700 feet (200 m) deep. The crater has been (Continued on [page 6](#))

Through the Looking Glass (continued)

partially backfilled by wind and erosion processes. It is truly awe inspiring to see this huge hole and realized that it was caused by the impact of a meteor. OK, I am lying slightly, I was at the Grand Canyon for sunrise that morning (and sunset the evening before), so the crater at just over a kilometer wide and 4 kilometers in circumference is, well, not so grand.

The museum at the crater is nice, with some interactive exhibits. The size and scale of the crater is truly amazing - it makes the concept of the devastation from something in the kilometer diameter class incomprehensible.

The crater itself has man-made objects at the bottom and along one part of the rim. These provide a scale for the onlooker. Otherwise the true size is not appreciated.



Me, contemplating getting into the car with the kids or jumping.

Dawn at the South Rim of the Grand Canyon

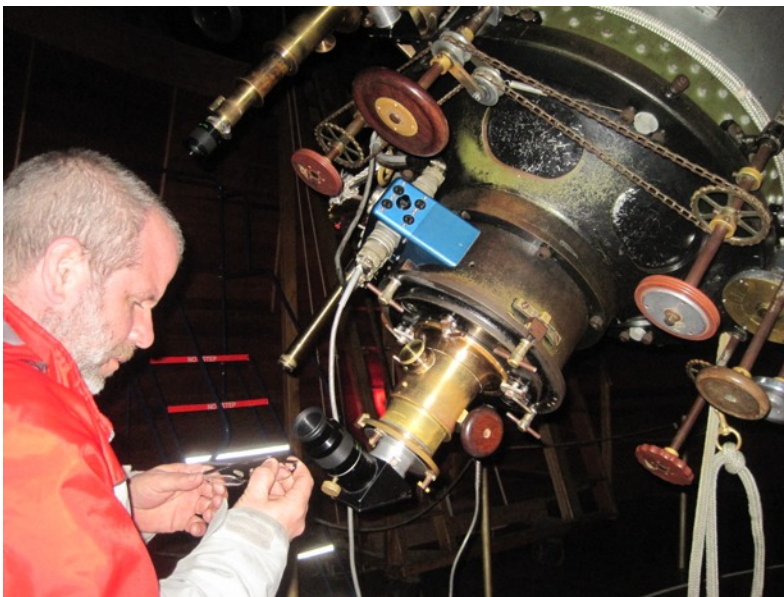


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Through the Looking Glass (continued)

After the crater we settled in to Flagstaff. The Lowell Observatory (www.lowell.edu), once located outside the city is now right within the city. It was a somewhat sad commentary when I could see my shadow on the buildings - the lights from the city were the source.

Flagstaff and Mars Hill, where the observatory is located, are about 7200 ft (2215 m) above sea level. The skies must have been truly amazing back around 1894 when the observatory was founded. The grounds have administration and functional buildings that are not open to public tours. Other buildings are open as are some telescopes. The Clark Refractor (24 in. objective & pictured on the right) was pointed at M42, the Orion Nebula - if I was going to see something through a historic 24 in. refractor, M42 was a good choice! The price of admission covers for both the day and night. Had time permitted, some of the other buildings and museums would have been wonderful to see.



I have become an astro -tourist. Well OK, my wife is a big time tourist, and with me carrying the luggage then I have the chance for side trips for astronomy. The question is where to go to next. The tentative plans are Chile (Atacama Valley) to see the Southern Skies. Easter Island is owned by Chile and relatively cheap flights can be made from Santiago to the Islands. The Easter Island Maoi statues are one of the few natural backdrops that make me look really good! But many other options exist - South Africa, Peru, and Australia. Seems I have a thing for the Southern Skies.



April Treasurer's Report by Don Pullen

(Unaudited)

Cash opening Balance (1 Mar 2011)	\$ 5989.97
Expenses	\$ 150.71
Revenue	\$ 306.00
Closing Balance(31 Mar 2011)	\$ 6145.26

Notes:

1. Major revenue sources included: 50/50 (\$46), Memberships (\$110), Planetarium Show (\$50), Messier Marathon (\$100)
2. Major expenses included: BASEF cash award and book prize (\$146.10), Welcome booklet printing (\$4.61)



March 11, 2011 Meeting Summary by Bob Christmas

HAA Chair John Gauvreau got the March HAA Meeting going by welcoming the 80 of us, or so, in the Hamilton Spectator Auditorium this night.

Then HAA Secretary Jim Wamsley took the floor to show off HAA's "new" loaner telescope, a Skywatcher Dobsonian graciously donated to the club by Don Pfeffer.

Our main speaker of the night was Robert Godwin, founder of Apogee Books of Burlington, and an author and publisher of many books about space flight, including the Apollo missions to the Moon. Asteroid 4252 Godwin is named after him by the way.

Robert's talk was entitled "Science Fiction, Space Flight and Energy".

He showed the audience a composite image of the Apollo 14 landing site taken by astronaut Alan Shepard, as well as a recent image of the Apollo 14 landing site taken by the Lunar Reconnaissance Orbiter, showing very clearly the base of the lunar lander, the various equipment around the site, and the footprints and rover tracks running around the area. If there is an appropriate rebuttal of conspiracy theories that say we've never been to the Moon, this image is it!

Robert mentioned that Apogee Books has collaborated with NASA, IMAX, etc., and his assistant had a huge selection of interesting and fascinating books and publications from Apogee Books at the back table. Every attendee got a complimentary copy of the book *New Moon Rising*, by Frank Sietzen Jr. and Keith L. Cowing.

Robert gave an outline of the history of human understanding of physics, space and space flight. He started by mentioning Persian astronomer Mo-

hamed Al-Beruni who, around AD 1000, determined that the Earth has an elliptical orbit around the Sun, not a circular one, a determination he made centuries before Johannes Kepler!

It was Mohamed Al-Beruni's research that made it onto Nicolas Copernicus' desk centuries later! Subsequently, Tycho Brahe, Kepler, whom I've already mentioned, and Isaac Newton greatly expanded upon in great detail, the nature of our solar system's planets' orbits around our Sun. The advancement of astronomy and physics grew by leaps and bounds with Newton's *Principia Mathematica*, followed by the many works and findings of Francois-Marie Arouet (Voltaire), Emilie de Chatelet, Pierre Simon de Laplace and Rene Descartes.

Robert also mentioned the likes of Ignacy Lukasiewicz, Father Pietro Secchi, Richard Proctor, Jules Verne, Percival Lowell, H. G. Wells, Thomas Edison, Hermann Oberth, Robert

Goddard and Werner von Braun, and the advent of liquid fuel rocketry that eventually led, not only to the Apollo missions to the Moon, but also, the Viking missions to Mars, and other similar missions.

He also talked about what the future may hold for space flight, including the possibility of going back to the Moon, and, maybe, manned missions to Mars, and possible future propulsion systems, including the Polywell Wiffleball Fusion Reactor project. Robert also talked about Robert Hirsch's book *The Impending World Energy Crisis: What It Is and What It Means to You*, which basically says we better get our act together in terms of finding an alternative "propulsion system" other than oil, because we may very well have passed "peak oil".

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*Jim Wamsley introduces the membership to the "Pfefferscope", the club's 8" loaner telescope, at the March general meeting.
Photo courtesy of Steve Germann.*

March 11, 2011 Meeting Summary Meeting Summary (continued)

Oh, yes, the moon-landing tie Robert was wearing was given to him by Buzz Aldrin. Thank you Robert for this fascinating talk!



Members took advantage of the intermission to browse through the many books offered by Apogee Books. Photo courtesy of Steve Germann.

After the usual intermission, John had a couple of announcements about the HAA Cosmology Discussion night for March, and HAA's upcoming trip to McMaster University's McCallion Planetarium. Veteran HAA prize-draw scrutineer, Alex Tekatch, then picked the winning tickets for the door prizes and the 50-50. Mike Jefferson updated everyone about the LOFAR II antenna, and said it was picking up more and more solar flares.

Then Steve Germann exercised his duty as HAA Observing Director by talking about The Sky This Month for March 2011.

Before Steve got started, he presented an HAA Rising Star certificate to Jean Craig, who made first-time observations of many deep-sky objects.

Steve mentioned that it was the anniversary of a meteor strike in West Virginia, which, on March 11, 1897, reportedly killed a horse and injured a man.

He then showed new images taken by Ann Tekatch and Bob Christmas (yours truly) of light trails made by the International Space Station and the Space Shuttle Discovery during their flyby over Hamilton and Burlington in the early evening of March 7, shortly after the shuttle undocked. Also, we saw an amazing image taken by Andrew Bruce with his digital SLR camera, which shows the shape of the ISS and its solar panels in surprising detail!

Saturn is now in Virgo, close to that constellation's brightest star, Spica, and is rising earlier in the evening, as it approaches opposition.

Steve's constellation of focus for March 2011 was Leo, which contains five Messier deep sky objects, all galaxies, M65, M66, M95, M96 and M105. He also mentioned that M44, the Beehive Cluster, in neighbouring Cancer, is also very high up in the sky this time of year. M44 is visible to the naked eye as a hazy circular patch under a sufficiently dark sky.

With that, Steve mentioned the HAA's Messier Marathon, tentatively scheduled for April 1, 2011 at Binbrook.

HAA Helps Hamilton

To support our community, we will be collecting non-perishable food items and cash for local food banks at our general meetings. Please bring a non-perishable food item to the meeting or a donation of cash and help us help others in these tough economic times.

If you would like to help or have any questions about this new initiative, please contact Jim Wamsley at 905-627-4323.



2011 BASEF Science Fair By Don Pullen

Jim Wamsley and I represented the HAA at the 2011 BASEF (Bay Area Science and Engineering Fair) which was held at Mohawk College this year. We were there to judge the James A. Winger Award that we sponsor for the best project in astronomy or physics.

There were over 260 projects submitted to this year's fair from students in grades 7 through 12 from the Hamilton-Wentworth, Halton, Brant, Haldimand, and Norfolk regions. Once again, most of the projects were from students in grades 7 and 8, with a small number of intermediate and senior projects from the high school level. It's a shame that we don't see more high school participation, especially when one considers how important science and math is to our future and the impressive prizes available. These included cash prizes, and partial scholarships to McMaster, Mohawk and Sheridan. Top awards include all expense paid trips to either the national science fair or to the Intel International Competition in the USA (the latter only for high school students).



View of the project area. Photo courtesy of Don Pullen

The event was to run from Wed Mar 23 for project set up, to Sat Mar 26 when the awards are presented. Unfortunately we had a rather nasty snow storm blow through the area on Wed which prevented many students from getting to the college on the expected day. So when Jim and I arrived Thu morning for judging, there were still many students setting up their projects, and sadly some who never arrived.

We were fortunate this year that there were a few projects that had a strong astronomy or cosmology flavor to them. This was quite a nice change from previous years when we saw little if any in these categories. But we still spent some time looking at many of the physics projects since this is also part of our judging category.

The morning portion is normally done without students and allows the judges to do a preliminary assessment of the projects and narrow the list down to a few contenders. This year with the students being around for set up, we needed to be careful about our comments to prevent overhearing.

Once the morning round was completed, we were able to quickly shorten our list down to 4 projects. These included projects covering the expansion of the universe, measuring the speed of light using a microwave oven, determining if solar activity can affect GPS positioning results, and trying to prove the existence of parallel universes.

After a brief lunch, we went back to interview the students who were now at their projects. During the interviews, we try to find out how they came up with their project ideas and explore how much they learned. All of the students we spoke to were very polite and obviously had a lot of enthusiasm for their ideas, done research in the libraries and on the internet.

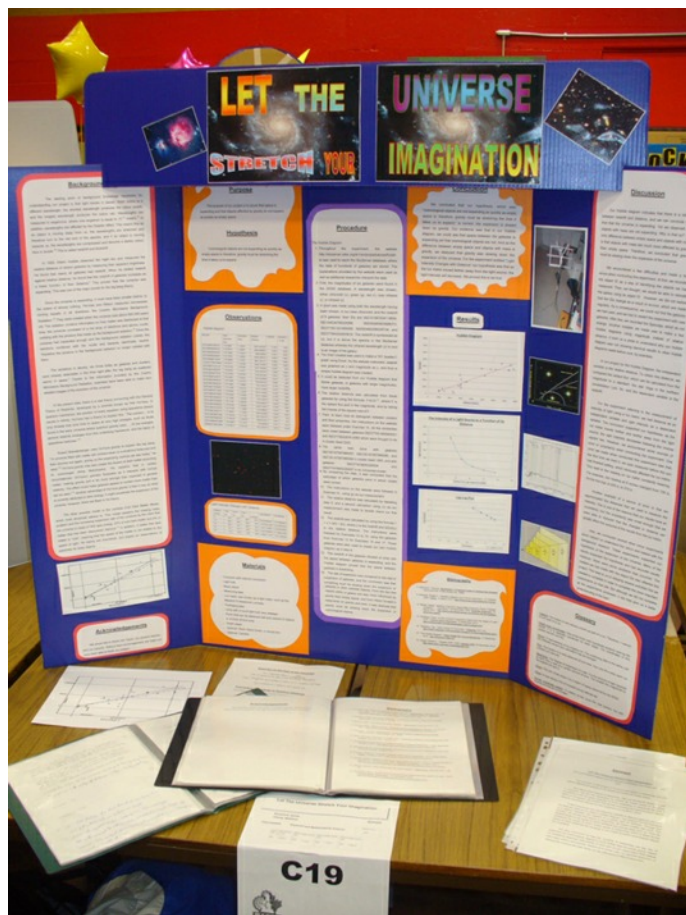
The students who had tried to prove the existence of parallel universes had not gone very far in their research. They had been influenced by some sci-fi shows and didn't delve very far into reality. The measurement of speed of light was interesting in that they used a chocolate bar in a microwave and measured the hot and cold spots. They used this along with the oven's operating frequency to come up with a fairly accurate figure for the speed of light. However it was also apparent that her research had not really extended very far beyond finding the project on the internet. The students trying to determine the effects of solar activity on GPS positioning accuracy had a good idea, but unfortunately they didn't do a very good job of implementing it or correlating their data, most of which they admitted was flawed, to meaningful results.

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2011 BASEF Science Fair (continued)

I think they learned quite a bit and did give them credit in this area.

However the project which talked about the expansion of the universe was quite an extensively researched project. The only flaw we saw was that they were trying to correlate the expansion of the universe to smaller objects such as galaxies which didn't expand at the same rate - they failed to explicitly show or state that these objects didn't expand. It appeared that they had considered this a self-evident known. They did a lot of research and some calculations into the Hubble constant, they found a good sample set of light images and red-shift data to plot. They had also done their own macro level testing of how light intensity drops as distance increases, similar to what Edwin Hubble and others have done. Overall it was a good project and it was a good fit for our award's astronomy mandate. So this is the project we chose as the winner.



The winning astronomy project. Photo courtesy of Don Pullen.

So Jim and I were pleased to announce that Sylvie Bronsard and Matthew Chong from Westdale High School are the winners of the James A. Winger award for this year.

Regrettably I was unable to attend the award ceremonies on Saturday afternoon. However Jim attended on our behalf and did his usual excellent job of representing the club. He presented the students with a \$100 cheque and each a copy of Night-Watch.

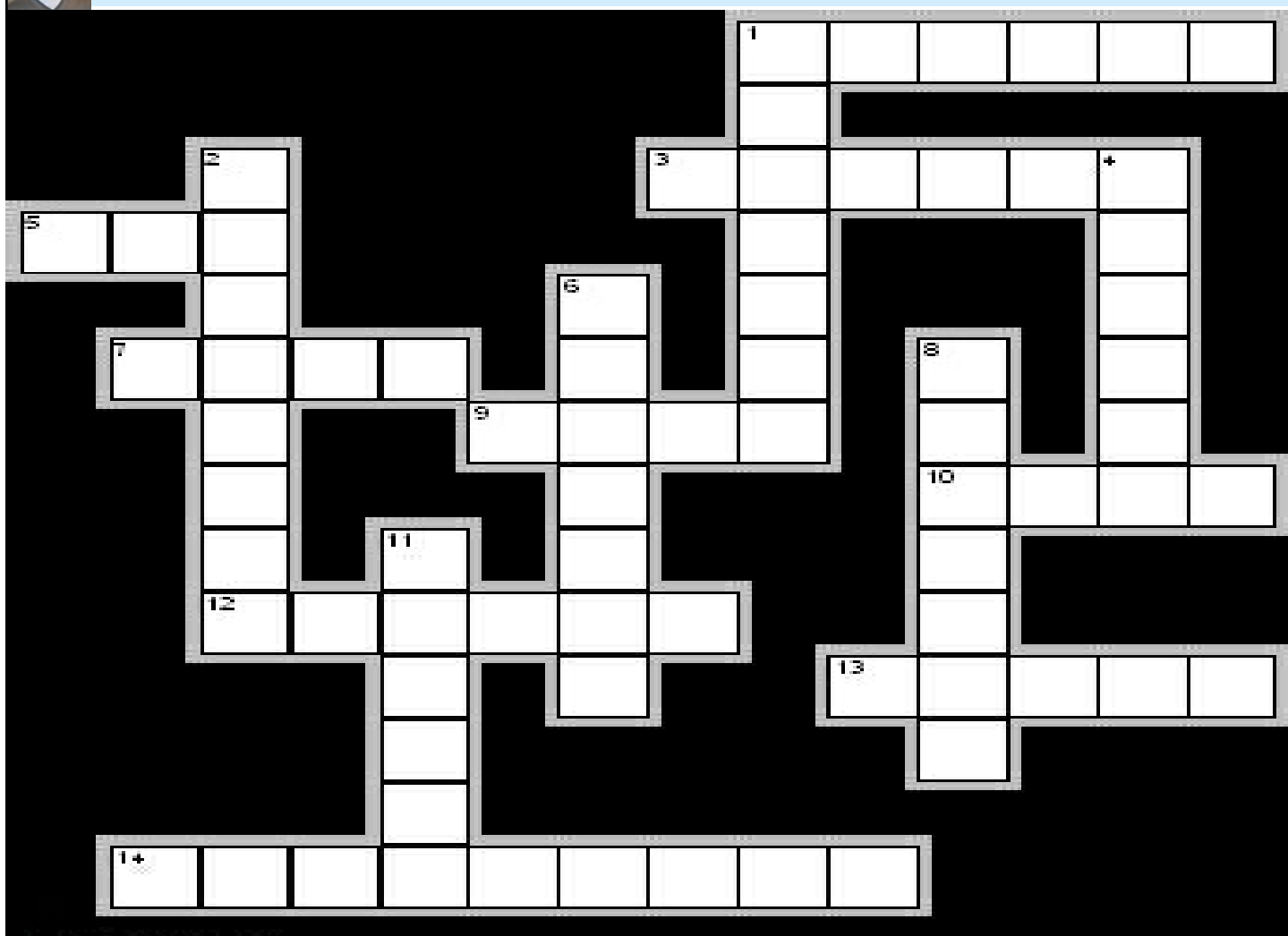


Jim Wamsley presents the James A. Winger Award to Sylvie Bronsard and Matthew Chong. Photo courtesy of Jim Wamsley.

A thoroughly enjoyable day and well organized by the BASEF people and the various sponsors. We were impressed by the interested students and have high hopes that many will pursue futures in one of the sciences. We still believe this is a great project for the club to be sponsoring. And while we may not be growing our membership extensively through this endeavor, we are helping to support local students and encouraging futures in science. They are all truly winners in this respect.



Astronomy Crossword by Mario Carr



Mario's monthly crossword is now a "fillable" form - editor

Across

1. Deployed by Discovery on April 25, 1990
3. April's meteor shower
5. Roaring high in the sky
7. First human in space 50 years ago
9. On April 30 this planet is very close to Jupiter
10. On April 17 this is the name of the full moon
12. On April 2 the moon will be furthest from the Earth this year or at
13. Low in the east during April's morning twilight
14. Born April 28, 1928

Down

1. Born April 14, 1629
2. First launched April 12, 1981
4. On April 3 this planet is at opposition
6. Moon phase on April 24
8. Difficult to see before month's end
11. Some Brown Dwarfs could be as warm as a cup of

Answers can be found on p.18

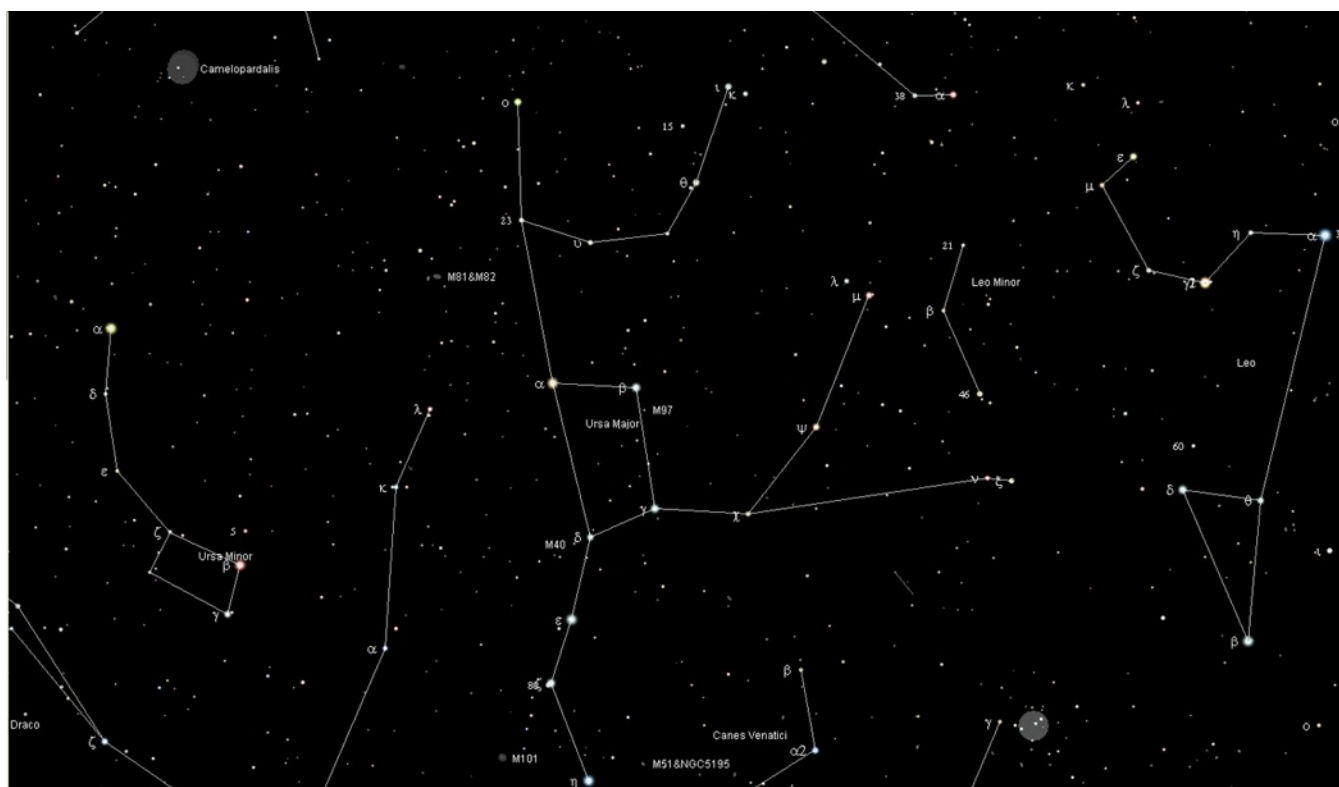


The Sky For April 2011 by Steve Germann

I hope you had a chance to at least peek at last month's 'Perigee Moon' with its stately rise over Lake Ontario viewed by an expedition of keen HAA members and friends. The Moon will be full again, and we will await its rise again, on April 17th, conveniently just a few days after our Imaging Clinic. (That's not a coincidence. We always aim to have indoor events close to the Full Moon so that darker skies have more availability to our members at other times). A Full Moon expedition is easy, as astronomy goes, because it rises conveniently in the early evening, and it's bright enough to see from anywhere. Can you snap a photo of the rising moon? You will need a tripod and a fairly short exposure, since the moon is bright. Better yet, watch the blog and join me and others as we again watch the moon rise.

The New Moon will be on April 3, near the time that HAA members will be at the Binbrook Conservation Area for our annual Messier Marathon evening. Watch your email for the decision on the best night to go. Bring your telescope and set up early. You will be able to pick the 'Flowers of the Sky' more completely than at any other time of the year. Don't forget to attract a few sponsors... their questions about why you try, will possibly inspire them to look up too!

This month the Big Dipper (an asterism part of Ursa Major, the Great Bear) is rising high up in the evening, and it's high time we paid more attention to it.



When I refer to the Big Dipper, especially the stars in it noted by Greek letters, I am really also referring to Ursa Major, since the brightest stars of Ursa Major are the 7 in the Big Dipper. The Big Dipper is the most recognizable constellation. It has bright stars and not many confounding dim stars nearby to clutter the sky.

The stars of the Big Dipper can be used to point to many other objects in the sky. For instance, the most famous pair are the 'pointer stars' which guide you to the North Celestial Pole, and thus, a reference to North, whenever you need it.

There are a few excellent galaxies in Ursa Major that we can find using pointer stars. Using the end stars of the Big Dipper's handle, Eta and Zeta, and forming a slightly flattened equilateral triangle, will get you to M101. It's a breathtaking spiral galaxy, imaged by Kerry-Ann, and shown on the next page.

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The Sky For April 2011 (continued)

Using the same 2 stars, but this time heading in the opposite direction, (towards the bowl side of the handle), go from Zeta to Eta, turn left 90 degrees, and then go about half the distance between Eta and Zeta, you can hop to M51 & NGC5195, where one galaxy looks like it's being sucked down a drain into the other one. It's a trick of perspective though. The spiral arm is a half million light years in front of smaller NGC5195, but it is interesting to think of what happens when galaxies do collide.

As you might know, when a small object, such as a space probe approaches a planet, it speeds up, since it is falling into the planet's gravity. It then slows down on

leaving, by the same amount. The space probe goes away with almost the same speed as it arrived with. The Sling-Shot Effect takes advantage of the fact that these changes in speed are relative to the planet's own motion, so by arranging for the craft's exit path to be in line with the planet's orbit, you get a gain in speed relative to your destination.

It's not the same with stars. As galaxies pass each other, even though the stars do not collide, they lose energy due to "dynamical friction". What happens is, a fast star heads through a clump of other stars. They all feel attractions due to gravity. The stars of the clump are pulled slightly toward the path of the fast star. As a result, when the fast star comes out the other side, the stars it passed among are slightly closer to being behind it, whereas on the way in they were equally distributed, (statistically speaking). As a result, the star feels a little bit of pull that averages to directly behind it, and tends to slow it down. A few times through a galaxy core will slow the fast stars enough to mix galaxies together.

There are a lot of signposts in the bright stars of Ursa Major. Here are a few that I use regularly when star-hopping:

- Using Beta through Alpha, and continuing 5x, you can go north to Polaris, near the North Celestial Pole.
- Using Gamma and Alpha, you can extend a line of equal distance to their spacing to find M81&M82, which are prominent galaxies with clearly different shapes. M81 is face-on and M82 is edge-on.
- Starting at Delta, through Gamma, and continuing 7x the distance, takes you to Regulus in Leo.
- Delta through Zeta, extending 3x the distance, will get you to the southeast star of the keystone in Hercules.
- Delta through Eta, and continuing to arc, allows you to 'arc to Arcturus' which is an excellent way to get to the base of Bootes, and the treasures there.
- Gamma through Delta, and continuing 15x, will get you to Deneb, the tail of Cygnus the Swan.

It's great to use Ursa Major as a signpost because it's circumpolar from our latitude. That means you can quickly determine where in the sky these other constellations are, even when they are below the horizon, and get an idea about when they will rise, and where.

There are a few other Messier Objects near the Big Dipper, not so easy for star hopping. M97, M106, M40 are the others.

This month's featured double star is 4th magnitude Alcor and Mizar, magnitude 2.2, sometimes referred to as the horse and rider. These 2 form a widely separated binary in the handle of the Big Dipper. Also together referred to as Zeta Ursa Majoris. With your good vision, you should be able to distinguish the 2 stars of the double, and be able to tell someone which way the dimmer one is compared to the axis of the handle, and

(Continued on [page 15](#))



M101 - photo by Kerry Lecky-Hepburn.

The Sky For April 2011 (continued)

which star on the handle of the Big Dipper is the double star. It is fabled to be a test for perfect vision, but in fact, imperfect vision can split the double, too. Without my glasses on, I can't see much there at all, so it's a kind of a test for (adequate) vision, even now.

Bring your telescope to bear on Mizar and Alcor and you get a treat. The brighter of the pair is actually a double, with two balanced stars orbiting each other about as far as the Sun is from Pluto. This makes it a great star to use when aligning your finderscope(s) with your main scope. You will be sure you have the right star in your sight. Did I mention it's circumpolar too? Each of the stars is a binary, but only one of them is 'splittable' with a telescope.

Here's an excellent page of trivia about Mizar and Alcor. [http://en.wikipedia.org/wiki/Mizar_\(star\)](http://en.wikipedia.org/wiki/Mizar_(star))

At our last monthly meeting, I had the happy privilege to dispense a 'Rising Star' certificate to Jean Craig. Here's a link to the blog posting I made, listing the various components of that accomplishment. I invite all of you to print a copy of it and keep track of your own progress as a 'rising star'. Once you have made it, I will be delighted to present you with a similar certificate, inscribed with your name and accomplishments.

http://www.amateurastronomy.org/blogs/index.php?blog=5&title=web_resources&more=1&c=1&tb=1&pb=1#c7288

And, now, what's a 6-syllable word for FUN? Astronomicity. That characteristic of an amateur astronomer which makes him or her shine as a fountain of enthusiasm and knowledge. How can it be quantified? Well, really it can't, but it can be approximated by milestones. Here's the first of a set of steps to hands-on astronomy outreach, which I call Astronomicity. Try to keep up with these challenges, which will gradually increase. While the Rising Star certificate is all about observing the sky, Astronomicity is about helping others observe it.

This first challenge is in the 'Asteroid' category:

1. Show a young(er) person how to find the north star using the Big Dipper; Ready, (is it dark yet?) set, astronomize!

Having explored the Big Dipper and the rest of Ursa Major, let's now review some of the other categories of wonders of the sky for April. Again, this month, the brightest Minor Planet, Vesta, is a mere magnitude 7.7. I will keep watching for something brighter. Jupiter has been lost in the evening twilight, but Saturn is with us. By 9 PM Saturn has risen to 10 degrees in the evening sky. That means you will be amply rewarded for viewing Saturn, well before Midnight. I hope you got a glimpse of Mercury, in a rare spell of clear skies. It was cloudy every time I tried, but I'll get it eventually.

A photo of Charles Messier to remind everyone that the club's Messier Marathon is to take place sometime over the weekend immediately following the issue of this newsletter (April 1-3). Check our website and watch your email for details. - Ed





THE DIFFICULTY WITH HUMAN SPACEFLIGHT: a follow-on to a similar article in EVENT HORIZON of November, 2009 by Mike Jefferson

It seems that the populations of all the spacefaring nations of today still see the achievement of human space flight as the ultimate accomplishment in our exploration of the universe. Much of this is happening at the time of the mothballing of the shuttle fleet (decidedly a potential deathtrap if ever there was one) and concerns over the future of the ISS.

I think we fail, totally, to comprehend the achievements of robotic spacecraft in modern times. Astronauts are a relic of the 1950's - times when Wernher von Braun, Arthur C. Clarke and their peers saw human flight into the cosmos as the logical extension of land, sea and air travel. Today, however, the picture has changed completely. Any one of us can be an 'astronaut' by getting on to one of the space websites on the internet. This requires no spacesuit, no months-long and boring ride in a spaceship and no physical discomfort in a craft on a planetary voyage of discovery. One's computer and the control rooms of JPL and ESA become the command and reconnaissance centres of such expeditions. The 'observers' go on with their daily lives on Earth while the robotic craft make their ways to their destinations or the radio and infrared waves from far Centaurus are being collected and processed by computers in Earth-based laboratories. Call this the astronautical version of warm-room observing!

In those early periods, the 1930's, 1940's and 1950's, we had achieved vacuum tubes, radios and early television transmission. Printed circuit boards and transistors were only newly developed or still on the horizon of achievement. Any visualization of probing into the universe demanded a human space crew (all male of course), and a chemical-fueled rocket, large enough to take them to their destination **and bring them back alive**. Any notion of self-controlled, robotic craft was the stuff of science fiction - and even

this was accompanied by the red-blooded American space hero!

The Colliers Magazine articles and the Walt Disney Tomorrow Land features attempted to lend such an approach, an air of scientific legitimacy, as educational and informative as these media were. A whole generation of kids grew up with the idea that we had to beat the Russians to the Moon now, and tomorrow to the planets. Could the asteroids, space colonies and the stars be far behind? In the newly developed field of space medicine the greatest fear was the possibility of being struck by meteors. Today we know that such a possibility is very remote. Yet the space medicine experts only paid lip service to the possible dangers of radiation in all its myriad forms in the solar system and the cosmos beyond - x-rays, cosmic rays, gamma rays and high-speed particles like heavy iron nuclei. Because astronauts wouldn't feel this energy, maybe it wasn't too dangerous!??

If one is remaining in low-Earth orbit such as in the Soyuz spacecraft or the International Space Station, one is protected by the Earth's magnetic field to a very large extent. During a quick trip to the Moon and back, one could always cross his/her fingers and hope there would only be **no dose** or a **low dose** of **cosmic radiation** and that there would be no **solar storms** to really complicate the issue.

Anything beyond these two is fraught with huge radiation dangers from the Sun, other stars, the galaxy and the cosmic background. Such long-term astronauts are very likely to return (if they return) with illnesses of cancers of all types.

Beyond this, we have not begun to look at the projected costs of such flights (of fantasy, perhaps??), the problems of months-long voyages, the nausea of spaceflight, the boredom, the depression and the psycho-

logical factors involved, even just to the nearest planets in the Solar System.

'Outer space research does not diminish the importance of science on Earth - some universal secrets will be found in terrestrial laboratories, too.' The 'Killian Report' under Dwight D. Eisenhower's presidency and the soon-to-follow 'Wiesner Report' emphasized that the cost of sending and returning humans would be high and the cost of sending information would be comparatively low - this was known in the 1950's.

Two recent scholarly articles place some real caveats on the advisability of sending humans into the cosmos - to any distance. Both came to me from NASA over the internet. The first was titled "Was Einstein Wrong About Space Travel?" It discusses the concept that if one of two 35 year-old twins went on a speed-of-light trip to a star 17.5 light years distant and then returned at the speed of light, that he would be 35 years younger than his sibling (because of time dilation - the Twin Paradox), who would now be 70 years of age. The article goes on to say that this is true in theory and probably only for inanimate objects because of one thing that has been totally ignored by space travel devotees for decades - radiation! In the 1950's, everyone worried about meteor impacts with spacecraft. Radiation was left on the 'backburner', and radiation is one of the biggest barriers to any human space activity! Heavy iron nuclei and cosmic rays (of which there are abundances out in the cosmic realms) shorten the telomeres, the molecular caps on the ends of the DNA and promote cell breakdown, wrinkly skin, failing organs, weaker immune systems, etc., all signs of normal aging! So, one twin would arrive home, the same age as his brother. Radiation would have put both twins 'on a level playing field', so to speak! And this is not to say that the traveling twin would not have suf- *(Continued on [page 17](#))*

THE DIFFICULTY WITH HUMAN SPACEFLIGHT (continued)

ferred worse radiation effects, than his stay-at-home sibling, beyond simple aging, from more powerful and unknown radiation sources!

The above article also uses another paper, "Chromosomes Lacking Telomeres are Present in the Progeny of Human Lymphocytes Exposed to Heavy Ions" by M. Durante, K. George and F. A. Cucinotta, as a source of validation. This paper claims, via its research, that "...high charge and energy (HZE) nuclei represent one of the main health risks for human space exploration, yet little is known about the mechanisms responsible for the high biological effectiveness of these particles." It discusses also, the possible accelerated-aging and delayed effects in irradiated organisms. The paper ends with serious concerns about humans being out in space beyond the Earth's magnetic field for extended periods.

Perhaps an answer would be to equip every human-carrying craft with a magnetic shield. And the costs escalate yet higher! Back in 2004, Professor Steven Weinberg expressed concerns with the cost of human space flight and how it was robbing astrophysical research of necessary funding. He opined "The Wrong Stuff" in which he asked "What is the value of sending humans into space? There is a serious conflict here. Astronomers and other scientists are generally skeptical of the value of manned space flight, and often resent the way it interferes with scientific research (which, in truth, is what this 'adventure' should be all about - not flags, engineering mega-projects and footprints- *my words*)."

I'm afraid that adventures on long space voyages, with anthropomor-

phic-style aliens and on the surfaces of other planets, whether solar or extrasolar, will forever remain the stuff of science fiction, fantasy and all of their adherents. "Harry Potter" has made for some very fanciful reading for many fantasy lovers. However, no one believes that any of it could possibly be true. It is a flight of the imagination and human space flight falls into the same category!

And so the terms 'human-carrying space vessel', 'astronaut', 'space station' and 'space colony' move further and further away from the concept of 'achievable spaceship' while 'robot', 'probe', 'rocket', 'satellite', 'antenna', 'waveform', 'computer', telescope and 'internet' become the instruments of space exploration of the future - the real space adventurers.

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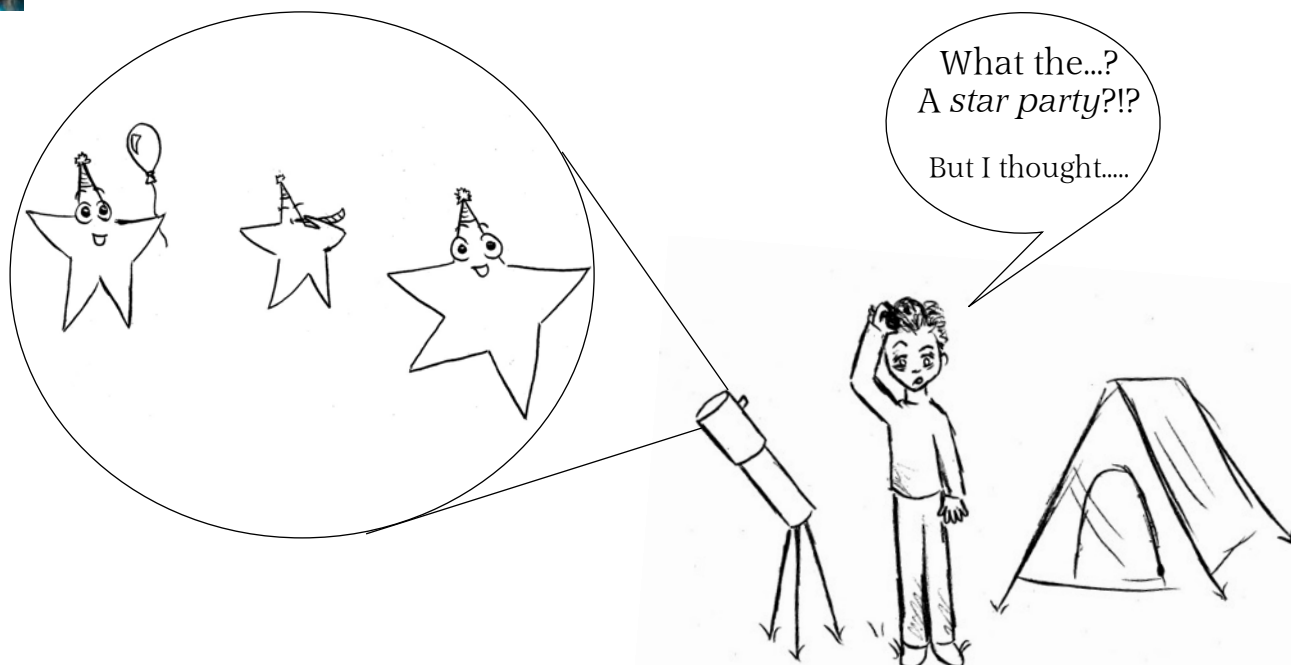
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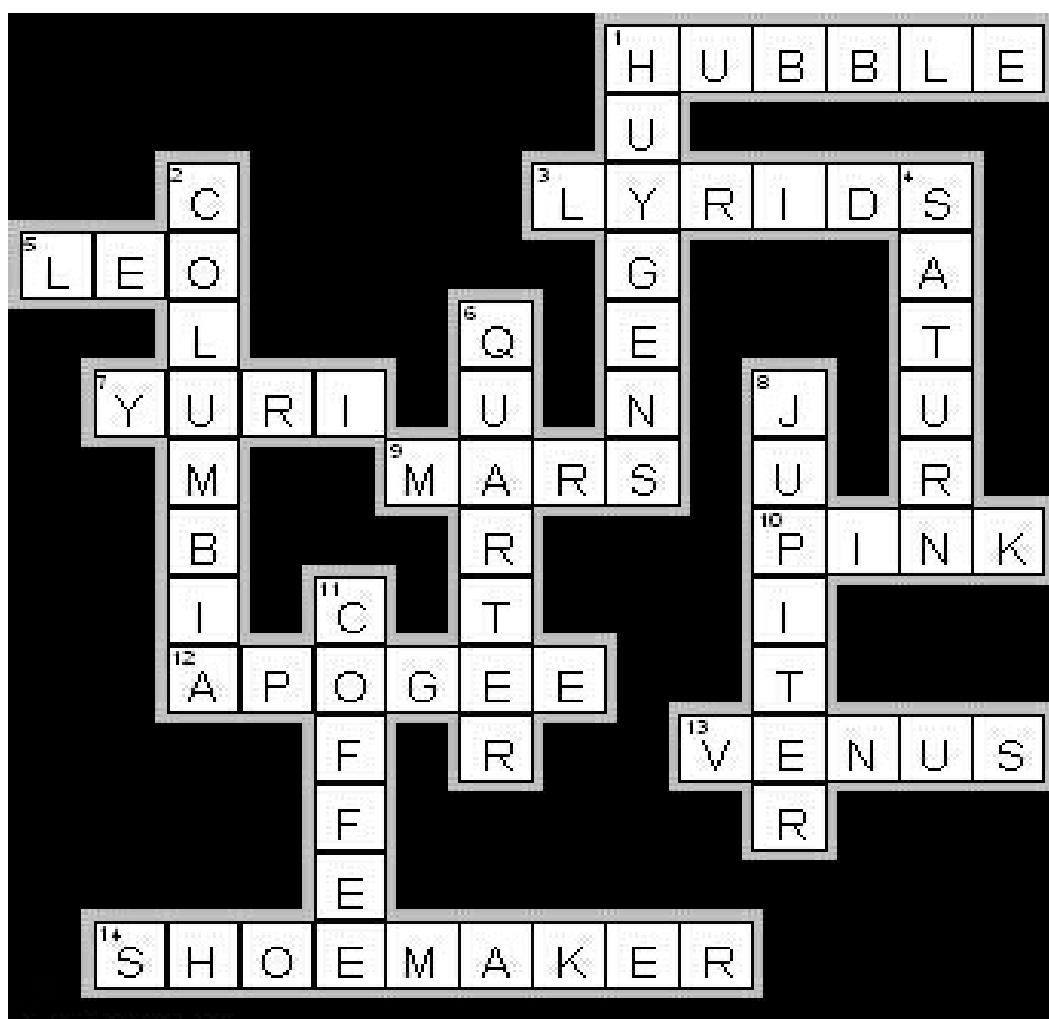
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Answers to Astronomy Crossword on Page 12



UPCOMING EVENTS

April 1-3, 2011 - tentative dates for Messier Marathon. Watch our website for updates:
www.amateurastronomy.org

April 8, 2011 - 7:30 p.m. General Meeting at the Hamilton Spectator Building. Don Pullen will be our main speaker.

April 15, 2011 - 7:30 p.m. Imaging Clinic at the Hamilton Spectator Building. Join fellow HAA members at this informal workshop and learn about astro-imaging and processing.

April 21, 2011 - McCallion Planetarium shows @ 7:00pm and 8:15pm. Limited seating - advance registration required. See notice on page 3 of this newsletter.

April 30, 2011 - 7:30 p.m. Astronomy Book Discussion Group meeting. All are welcome. The book for this month is *2001: A Space Odyssey*. If you would like to join us, please contact Mario Carr mariocarr@cogeco.ca.

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