Event Horizon

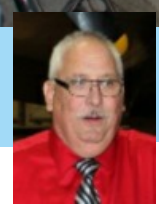
Volume 22, Number 7
May 2015

From The Editor

With warmer temperatures finally on the way, spring is a very busy time for our club, especially with all our outreach activities, as the many images and reports in this month's Event Horizon can attest.

Happy reading!

Bob Christmas,
Editor



Chair's Report by Jim Wamsley

This is the E-mail I received from Steve Garland, in thanks for the telescope he was awarded at our April meeting.

"Hi Jim,
It was good to meet you last night. Many thanks to you and the other members of the club for enabling me to attend my very first meeting. I am looking forward to cleaning and detailing (optics excluded of course), my very first telescope. I have been an avid Binocular observer for many years, so this is an exciting new opportunity for me.
I will see you at the next meeting in May when I will be bringing my membership application and payment.
Happy Observing & Clear Skies,
Steve Garland"
[See photo of Steve with his new scope on Page 9.]

I also want to thank, Brad Widerman, the gentleman that donated the scope to the club. I will be sending Brad a tax receipt and thank you card soon. I have had two more telescopes donated to the club in *(Continued on page 2)*

IN THIS ISSUE:

Chair's Report (continued)

the last couple of weeks. The first is similar to the one we just gave away, a Newtonian on a manual EQ mount. I think we will do the same thing with it, and make it a door prize for the September meeting. The second scope that was donated is also a Newtonian, but is on a computerized AltAz mount. I will be testing this scope in the next little while to see if it will be suitable to add to our loaner scope program.

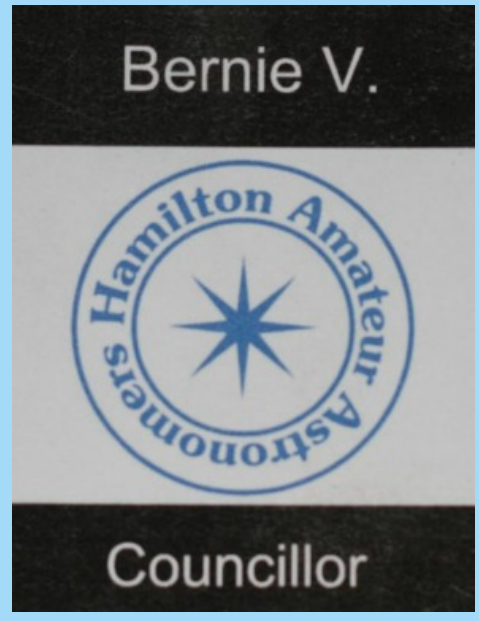
Besides running around to pick up scopes, I have been quite busy this month with 7 events to attend. Astro 101 had its final classroom lesson; the outdoor viewing night will take place soon. The Cosmology group meeting, although it took place on Easter weekend, was well attended. 14 club members enjoyed a fun night of conversation. Our April meeting was a great success with inspiring speakers, and lots of loot to be won. H.A.A. council meets monthly to plan events and look after necessary day to day business, (all members are welcome to attend, contact me for times). The spring Scope clinic took place the following Friday and there was lots of scopes to see, and several people received help with the equipment they brought. Astronomy Day on the 25th saw members out in the daylight public solar observing as well as the usual nighttime activities. In the afternoon there were about 7 scopes, (both white light and H Alpha), for the many members of the public to see views of our local star. There were also meteorites to see, and literature handed out. Lastly John Gauvreau, Matthew Mannering and I went to see the Ancaster Girl Guides to help them with their astronomy badges. That's the roundup of club activities for April, as you can see the H.A.A. is an active bunch.

Coming up for May, we start with the Astro photo Group meeting on May 2nd 7:30 pm in my rec-room. The monthly meeting will take place May 8th with Kerry-Ann Lecky Hepburn as our featured speaker. Her talk, entitled "Capturing the Stars", I'm sure will be interesting to all, and I know there will be many great photos to see. Council will be meeting May 13th 7:30 pm. in the rec-room. Please feel free to attend and see what your council does for you behind the scenes. Lastly we will be holding a public night at T.B.McQuesten Park, 1199 Upper Wentworth St, Hamilton. Come on out and share a view. May doesn't look quite as busy as April, but I sincerely hope we get to open Binbrook Park often, now that the weather is improving. See you out there. Clear skies.

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.
If you would like to help or have any questions about this initiative, please contact Jim Wamsley

Introducing our New Council Name Badges



Hey folks, if you see someone wearing a name badge like this one, that person is an HAA Council Member.

Feel free to ask any HAA Councillor any questions you may have about club business, club activities, or astronomy in general.

Masthead Photo: *Scene at Hamilton's Bayfront Park on Astronomy Day, by Don Pullen.*
Taken on April 25, 2015, right around dusk.
See more images from the H.A.A.'s public skygazing day and night at Bayfront Park on Page 14.

Letter to the Editor

Re. "Kepler 186-F: Earth 2.0 or Earth's Galactic Cousin?" by Derek Taylor, April 2015 Event Horizon, page 9:

I wish to congratulate Mr. Taylor on a very well researched and written article. It is quite obvious that he has taken great care to obtain much background material about his topic before committing himself to a point of view.
Years ago the great Italian physicist, Enrico Fermi asked that if there was so much evidence for life out in the universe, where is it? No one has had contact with little green men or any other form of living creature 'extraterrestrialis'. In 1972 Jacob Bronowski stated that there is much spectroscopic evidence for the chemicals for extraterrestrial life, but the conditions to create it might be a lot harder to come by; and even if we did come across it, would we recognize it? Would it recognize us? Our earthly chemical combinations and physical conditions might just be some of the most unique in the entire universe. Physical conditions and travel times to other parts of the universe may also just be insurmountable.

-Mike Jefferson, Ancaster ON

Letters From B.A.S.E.F. Winners

April 20th 2015

Dear Mr. Jim Wamsley

My name is Matthew McGuire and I'm in grade 12 at Ancaster High School in Ancaster. I participated in the 2015 Bay Area Science and Engineering Fair (BASEF) held at Mohawk College from March 25th to March 31st 2015.

I was the recipient of the James A Winger Award which was sponsored by the Hamilton Association of Astronomers this year. I would like to gratefully thank you for your support in the fair.

At the fair, I presented my project centered around hybrid rocket design and optimization. I experimented both with fuel type and burning style in order to achieve optimal performance which I measured in terms of theoretical specific impulse, total impulse and peak thrust. As a result of my experimentation, I was able to conclude that a PVC grain being burnt on a single side offered the highest efficiency and the greatest thrust. Compared to traditional hybrid rockets, my motor offers a cost reduction of 136% while offering a performance increase of 2%.

Again, thank you very much. Your support helped make BASEF a success and I sincerely hope that you continue to support youth science, and BASEF, in the future.

Sincerely,

Matthew Mcguire

Matthew McGuire

31 West 32nd Street
April 3, 2015

Hamilton Amateur Astronomers
Dundas ON L9C 6Y6

Dear Mr. Jim Wamsley

My name is Aniello Lombardi and I'm in Grade 8 at Regina Mundi School in Hamilton. I participated in the 2015 Bay Area Science and Engineering Fair held at Mohawk College from March 25 to March 31 2015.

I was the recipient of the Silver BASEF 2015 Merit Award. I would like to thank you for your support of the Fair this year.

My partner and I created an idea revolved around being able to use wastewater to create electricity. We created a small model with two prototypes, which would represent what would happen in a sewer in real life. In real life we would put hydroelectric turbines in the sewer, so that when the water hit the turbine it would create electricity. I learned that it is very much possible to create electricity using our method.

I very much enjoyed being able to share our ideas with the judges.

I enjoyed the fair and all it had to offer for us. It gave us the much-needed input from the judges. This fair gave me a push into engineering, which I would like to be as I move on in life. Having the experience of being there and talking to judges is a win in its self, being at the awards assembly and winning a special award, getting to go on stage was a whole adventure. We have BASEF to thank for that.

Again, thank you very much. Your support helped make BASEF a success and hope your continue supporting youth science in the future.

Sincerely,

Aniello Lombardi

The Sky This Month for May 2015 by Matthew Mannering

In April my wife and I spent a week camping at MacGregor Point Provincial Park on the shores of Lake Huron. On Tuesday April 14th, between the hours of 9pm and 12:30am, we spent a lot of time looking at Jupiter. I have to admit that I don't very often see the detail that others wax so poetically about. On a few occasions over the years I've had magnificent views of the smaller storms that surround the Great Red Spot along with dark barges in the brown equatorial bands. But generally I have particular trouble seeing the swirls and eddies that so many others claim to see. However, on this night I saw lots of detail. What stood out best was a series of pale grey feathery smears that crossed the central white equatorial band. One of these smears reached across the band almost to the leading edge of the Great Red Spot. I checked online the next day and found an image posted on Cloudy Nights which exactly matched what I saw. Using posted images is a great way to double check your observations. I use them whenever possible to make sure my observations are accurate.

My timing was accidentally perfect for watching the ingress of Ganymede's shadow at 9pm. At first, I thought my focus must have been slightly off as there was a notch in the edge of Jupiter's disc. However, after only a couple of minutes, it was obvious that it was a moon shadow starting its transit. I had the Great Red Spot, a shadow transit and lots of detail in the cloud bands visible at the same time. It doesn't get any better than that!

There is still a lot of time to observe Jupiter. Push the magnification up as high as you can while maintaining an acceptable image. Then be prepared to view for extended periods waiting for those brief moments when the image becomes absolutely sharp and detailed. These moments can last less than a second, but if you are watching carefully, you can start to see small objects within the clouds. Concentrate on one of these and wait for the next clear moment. Once you have seen the same object several times, you can write it down or sketch it for reference later on.

On Friday April 17th, we were treated to one of the best nights of observing we've had in a very long time. The sky was exceptionally clear and transparent. You know it's going to be a good session when you start seeing those dim targets in your finder scope. Usually I have to guess the target's exact position as I don't have a 'go-to' Dob. This night I was able to place the target right on the cross hairs of the finder scope. To give you an idea of how good it was, I used 250x magnification on M51, the Whirlpool galaxy, and could clearly see the spiral arms. The view of M51 and its neighbour NGC 5195 filled the eyepiece. What a sight!

For once I actually generated a list of targets ahead of time using 'Deep Sky Wonders' by Sue French and 'The Night Sky Observer's Guide (Vol 2 Spring and Summer)' by G. Kepple and G. Sanner. Sue French's book is a beautifully illustrated guide with plenty of targets for people who have progressed beyond the beginner lists found in many books. The Kepple-Sanner books go into great detail about lots of dim targets in each constellation. Sifting through the mound of information is easy as they grade each target for its appearance and interest. They also tell you the size of scope you will need to see it.

My list of targets concentrated on the constellation of **Coma Berenices** just to the east of **Leo**. I chose Coma Berenices because it is high in the sky and has a lot of targets packed into a relatively small area. I picked out twelve targets of which I've seen three on previous occasions. I found eight of those targets of which five were first timers. Things I saw included:

M98, **M99** and **M100** – 3 bright galaxies (all first time sightings).
M85 and **NGC 4394** – right beside each other (both first time sightings).
M64 the Black Eye Galaxy – Black eye seen easily as well as its spiral arms. (See image next page)
NGC 4565 – a must-see beautiful big edge on spiral with a distinct dust lane.
M53 – a fine globular cluster.

(Continued on page 6)

The Sky This Month (continued)

M64, the Black Eye Galaxy, in Coma Berenices.

(photographer unknown)

Given enough time I'm sure I could have found three of the four remaining targets. But **NGC 5053** (a very faint and loose globular right beside M53) remained invisible even on this night of wonderful transparency. By 1am I was starting to see sheep jumping over the galaxies and decided it was time to pack up and to go to bed.

Earlier in the evening we had a look at several other constellations. In Leo we saw the two Trios of galaxies The **Leo Trio** that every one looks for first contains **M65**, **M66** and **NGC 3628**. Once you've seen that one look for **M95**, **M96** and **M105**. On this night we saw two new galaxies close to M105. They were **NGC 3384** and **NGC 3389**. *(Continued on page 7)*

"The Leo Trio", M65 below right, M66 below left, and NGC3628 above.

Photo Credit: Daniel Verschatse

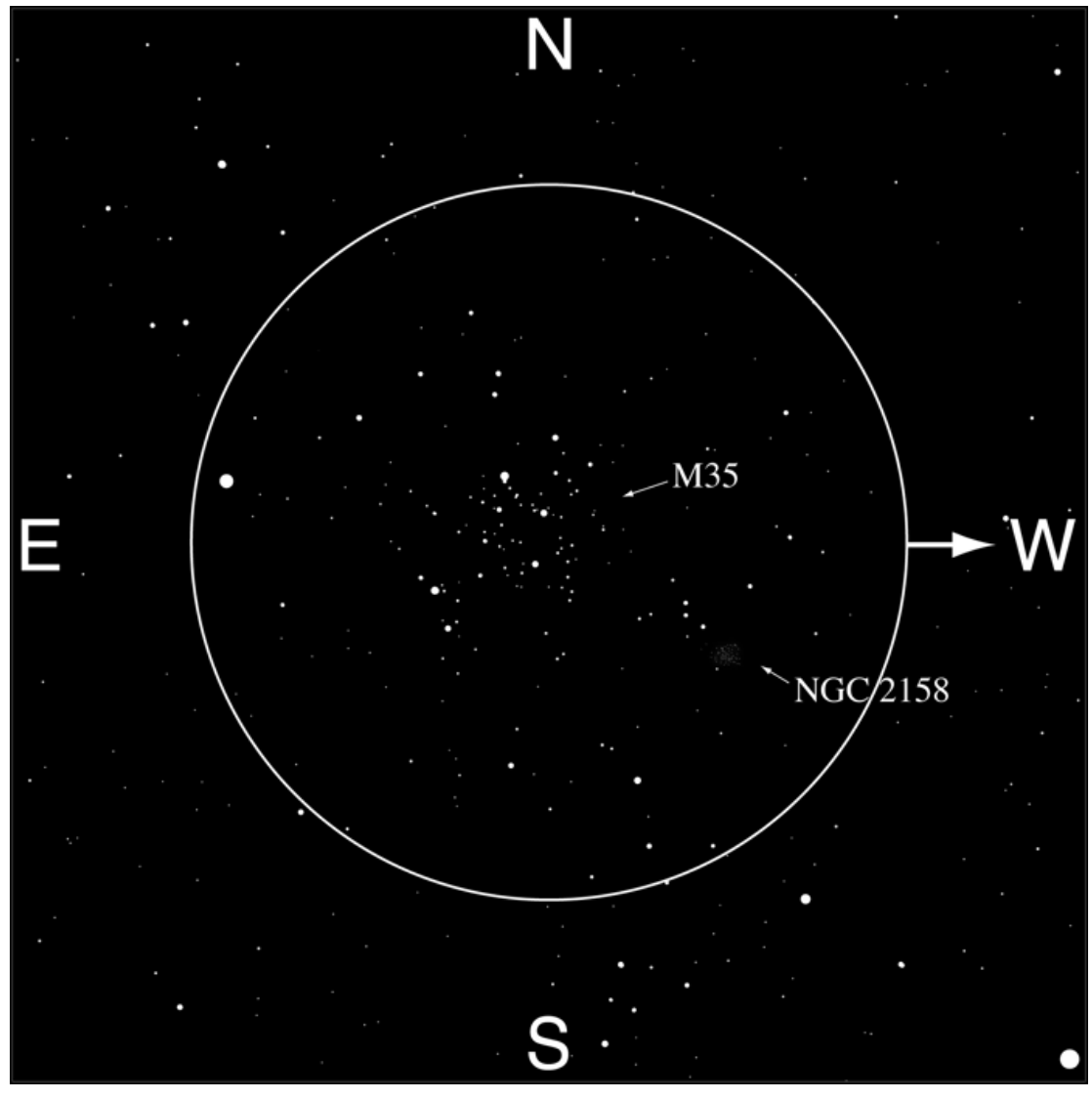
The Sky This Month (continued)

M95 left, M96 middle, M105 right NGC3384 far right.

Photo Credit: Dick Locke

In Hercules we spent time looking at three Globulars. We started with **M13** as does every one else and then moved on to **M92**, a densely packed globular about half the size of M13. In many ways M92 is just as fine a target as M13. Don't skip it. Lastly we found for the first time **NGC 6229**, a very small, compact and bright globular. At a distance of 99 thousand light years it remains a small target even with high magnification but still well worth a look.

With **Gemini** still high in the south west, I decided to look for one of my nemesis targets. **NGC 2158** is a very dim cluster next door to **M35** a very large and bright cluster. 2158 looks quite bright in photographs but has remained elusive for years in my scope. This particular night it finally made itself visible as a faint diffuse cloud of extremely tiny stars. I counted perhaps a dozen stars in the field. Success!



Telescopic field of view of M35 and NGC 2158.

(Continued on page 8)

The Sky This Month (continued)

We ended up seeing nine objects for the first time. One open cluster, one globular and seven galaxies. We also had great views of many old favourites including **M82** in Ursa Major. The dark rift that cuts through the center of the galaxy was clearly visible. All in all it was a great night to be out under the stars.

Targets for May:

This month I want you to get out *your* charts, find the objects I've talked about and then see them for yourself. Start with the Messier objects and then go for the NGCs.

The Moon:

Libration this month is as follows: The Northern limb will be most exposed on the 21st and the Southern limb on the 8th. The Eastern limb will be most exposed on the 26th and the Western limb on the 6th.

The Planets:

- ***Mercury*** gives us its best appearance for the year. It starts the month beside the Pleiades on the 1st. Start looking for it at 8:30pm just north of west. It will set at about 10pm. On the 6th/7th Mercury will be as high as it gets in our sky. It's can be viewed between 8:45 and 10pm. By the 20th of May it will be past its best. Look for it between 9:10pm and 10pm. On May 30th Mercury will be at inferior conjunction directly between us and the Sun.
- ***Venus*** shines very brightly high in the western sky all through the month and doesn't set until midnight. Look for Venus to pass less than 2 degrees from M35 on May 8th.
- ***Mars*** has passed from sight on its way to Superior conjunction on the far side of the Sun.
- ***Jupiter*** graces us with two double shadow *transits* this month on the 21st and 27th. Both events include a pass of the **Great Red Spot (GRS)** at the same time.
  The ***first*** transpires on May 21st as follows:
  — *Ganymede*'s shadow begins transit at 4:57pm
  — *Callisto* body begins transit at 5:39pm
  — *Io* body begins transit at 6:52pm
  — *Io* shadow transit begins @ 8:06pm (double-shadow transit begins @ appearance of GRS).
  — *Ganymede* shadow ends transit at 8:35pm (end of the double shadow transit).
  — *Io* body ends transit at 9:09pm
  — *Io* shadow ends transit at 10:23pm
  — *Callisto* body ends transit at 10:26pm
  — The *GRS* ends its appearance at 11:40pm
  The ***second*** double transit on May 27th transpires as follows:
  — Io body begins transit at 8:49pm along with the GRS.
  — Ganymedes shadow begins transit at 8:57pm.
  — Io shadow begins transit at 10:01pm (double shadow transit begins).
  — Io body ends transit at 11:07pm
  — Both shadows merge for a few minutes at 11:45pm
  — Io shadow ends transit at 12:18am (double shadow transit ends).
  — Ganymede shadow and the GRS both ends transit at 12:33am.

- ***Saturn*** is going to be great this spring and summer. The northern side of the ring plane is tilted at 24 degrees from us which means that the gap between the rings and planet is wide open and the Cassini gap should be easy. Saturn and its rings have a diameter of 42 arc seconds which is very close to the diameter of Jupiter. How many moons can you spot and identify? Look for Saturn to rise by 10:15pm on May 1st and before dark by month end.
- ***Uranus*** is lost in the glare of the rising Sun.
- ***Neptune*** is hanging out in Aquarius about ten degrees above the south east horizon just before dawn.

(Continued on page 9)

The Sky This Month (continued)

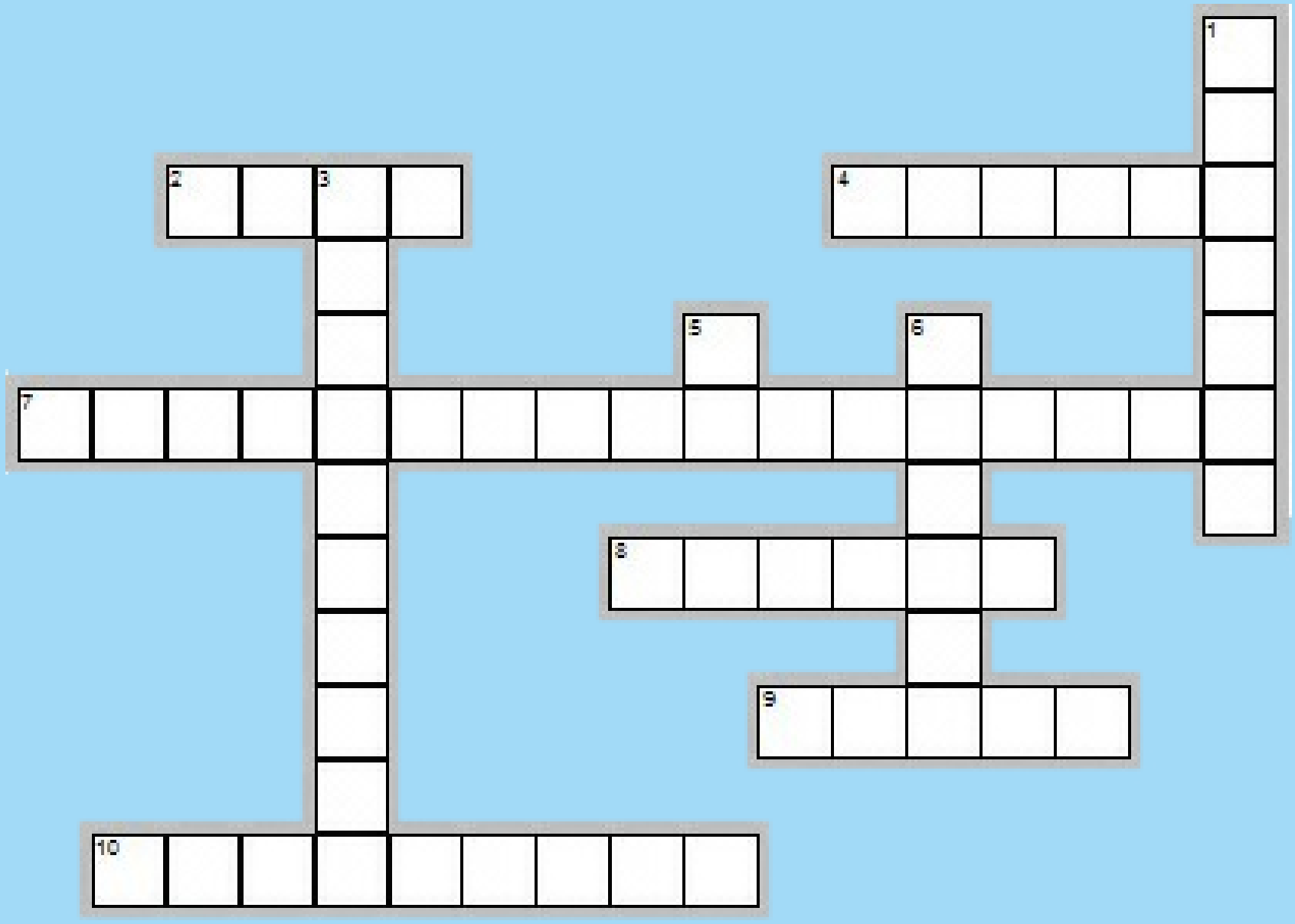
Other Events:

-May 3rd:	Full Moon.
-May 5th:	Saturn only 3 degrees from the Moon.
-May 6th:	Mercury at its highest elevation in the sky over Ontario.
-May 8th:	Venus passes <2 deg from M35.
-May 11th:	Last quarter Moon.
-May 18th:	New Moon on Victoria Day.
-May 21st:	Jupiter double shadow transit starts 8:06pm, ends 8:35pm.
-May 22nd:	Saturn at opposition.
-May 25th:	First quarter Moon.
-May 27th:	Jupiter double shadow transit starts at 10:01pm, ends 12:19am.
-May 30th:	Mercury at inferior conjunction.

Steve Garland, winner of the raffle telescope at our monthly meeting on April 10, 2015.

Photo Credit: Janice Mannering

Astronomy Crossword by Mario Carr



Across

2. On May 19, this thin crescent object is close to Mercury, low in the evening sky.
4. What is the name of the Full Moon in May?
7. May's Hamilton Amateur Astronomers speaker is an award-winning…
8. This planet and Neptune are in the eastern morning sky.
9. On May 21, this planet is close to the Moon in the evening sky.
10. On May 5 the Eta Aquarid Meteor Shower peaks, unfortunately, under what kind of sky?

Down

1. On May 6, this planet is at its greatest angle away from the glare of the Sun making it the best time of the year to see the planet.
3. On May 22, you can see Saturn all night rising in the east at sunset and setting in the west at sunrise because it is at what?
5. On May 27, if you have a telescope, you can see a double-shadow transit on Jupiter starting at 10:01 p.m. Which moon and Ganymede cast their dark shadows on the planet?
6. On May 4, this planet is close to the Moon in the late evening sky.

Answers can be found on page 18. (No peeking!)

A Trip Down Memory Lane by Mike Jefferson

I knew that Saturday, April 25 was Astronomy Day and Astronomy Night. A group of amateur observers and some public gathered at Westfield Pioneer Village on the Friday night and the HAA was to be in Bayfront Park, Hamilton on Saturday. However, I couldn't wait for either – not the drive to Westfield, nor the wait for Astronomy Day at Bayfront.

All week long it had been cold, snowy, rainy and cloudy. Weather forecasts for the next two weeks were less than optimistic. But Friday night of the 24th was excellent. So, I checked my email for a Binbrook Park announcement. Nothing was forthcoming by the early evening, so I decided to work from my own property. Its benefits are that if I forget something, it is easy to go inside and retrieve it; I don't have to burn gas, pack a car and drive for ½ hour; if I'm cold, I can go inside and warm up.

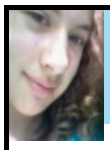
I have a binocular that is 104+ years old and I wanted a great sky on which to test it. First, a little bit about the instrument. It belonged to my maternal grandfather who used it for birdwatching and some astronomy (along with a Whittakers Planisphere). As an infantry officer during World War I, he had been equipped with a similar binocular for military observation. In 1918 all officers were required to turn in their equipment before being demobilized. Later, they were reissued with binoculars for personal, civilian use. The instrument that he was given was a Ross (made in London, Eng. before 1911) 8X18 mm, prism (probably an early generation porro prism) binocular and very heavy for its small size. It is inscribed “W. V. Carey 1911”, “prism binocular, power = 8” and “Ross, London No. 27082”. Mr. Carey obviously owned it before it saw military service. Mr. Carey may have used it during WWI, before it was reissued to my grandfather. I have often wondered whose binocular Mr. Carey got after 1918.

I had used this instrument years ago when I was quite young and my interests in astronomy and space were budding. It showed me my first views of M-31 and other celestial delights from the shores of Georgian Bay. In the following years someone in the family dropped it and one of the eyecups was broken. In the years after 1983, after getting back into astronomy, someone (I do not remember who) machined and attached a brand new eyecup for me. The optical train is not out of alignment, and never was, despite the fall. The instrument is black painted, leather-covered brass. The turned fastenings are precision-set. The whole is industrial grade throughout. It comes with a wine-velvet lined, brown leather case that is looking pretty shabby these days, but would be a fine accessory in a display with this binocular. The binocular is, instead, stored in a plastic bag with a dessicant and not in the case, to avoid patina, mold and mildew.

So, how did it do on Friday night of the 24th? Very well, actually! The glass is uncoated and the field of view is around 3.5 degrees - ~7 full Moons. The eyepieces are flat on the exit pupil side and the objectives are 18 mm. in diameter. There are 10 light baffles on the eyepiece cups and 15 on the objective cups. The prisms are, doubtless, mechanically fastened, to have survived the fall they did. The construction, in short, is 'bullet-proof'. A top-quality, modern 8X20 roof prism mini would beat it, hands down, in a comparison. However, the mini has over 100 years of evolution! The 8X18 showed the Moon with clarity and sharpness not found in any inferior binocular. Craters and mountains on the terminator were sharp, highly resolved and very contrasty. Space around the Moon was black. Ghosting was minimal or non-existent. Venus and Jupiter both showed as orbs. Stars like Pollux, Procyon, the Beehive Cluster and Castor showed their colours and were very pin-pointy. The field of view was flat and stars kept their shape almost from side to side of it – no 'seagulls', even if it is narrow by modern standards.

Ross is a very old and honorable British optical company which, prior to WWI, also constructed prisms and other optical pieces for the venerable Carl Zeiss Optical Company of Germany. Over the many years since, it has undergone many changes and has passed through

(Continued on page 12)



Cartoon Corner by Alexandra Tekatch

The Joys of Spring Observing

A Trip Down Memory Lane (continued)

different hands and names. Today it consists of several different related companies and the name Ross is no longer around.

The sky from my own yard is mediocre at best, plagued with ugly, old-fashioned street-lights and poorly designed driveway and porch lighting. My own are efficient 'pots', but are off during observing sessions and most other times. My garage exhibits only a small red light for illumination during these times. Doubtless the 8X18 would perform extremely well under a much darker sky situation as it has done for me in bygone years from the shores of Georgian Bay.

Scenes From The Spring Scope Clinic April 17, 2015

Image Credits:

Top Left & Top Right: Ann Tekatch

Above: Jim Wamsley

Bottom Left: Ann Tekatch

Scenes From Astronomy Day April 25, 2015

Image Credits:
Left & Left Center: Jim Wamsley
Bottom Left: Don Pullen

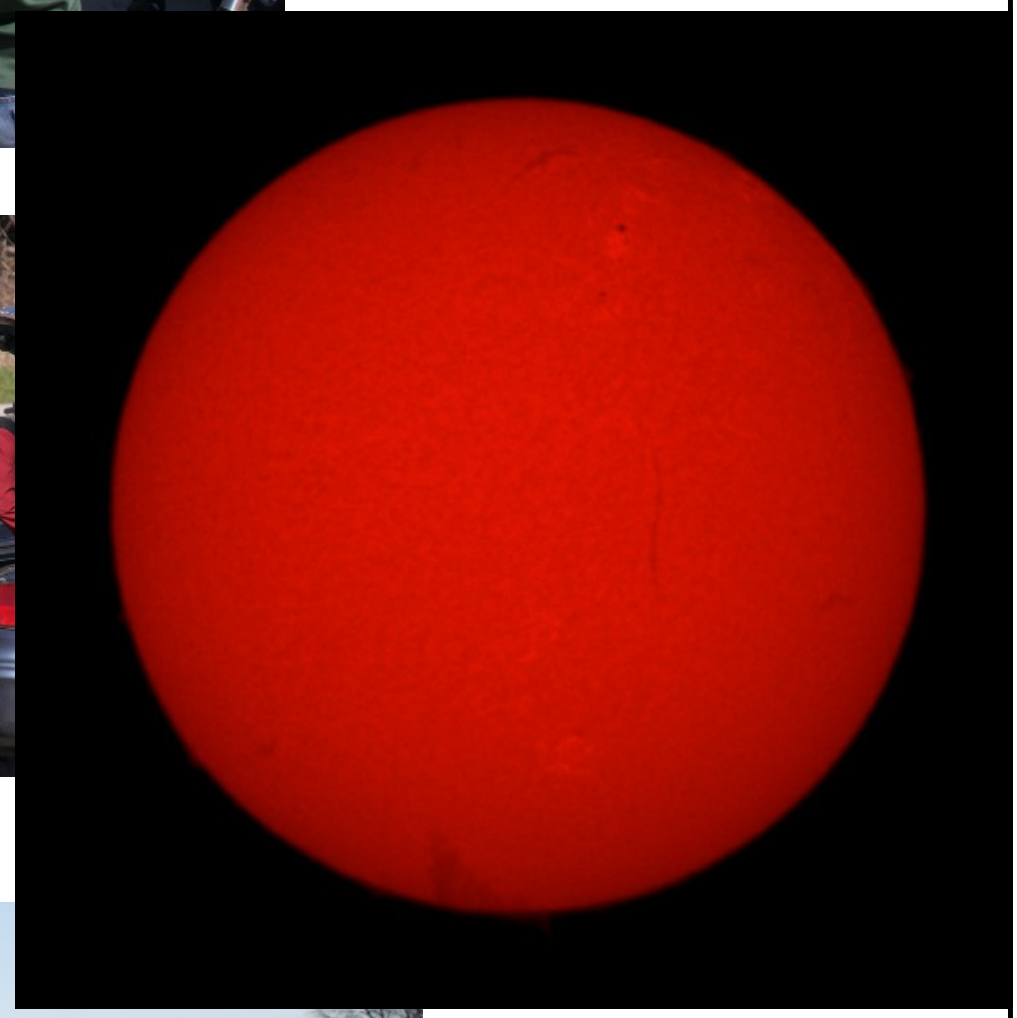


Image of Sun taken by Don Pullen through Hans Gokhruwala's 90mm Coronado Solar Max II.

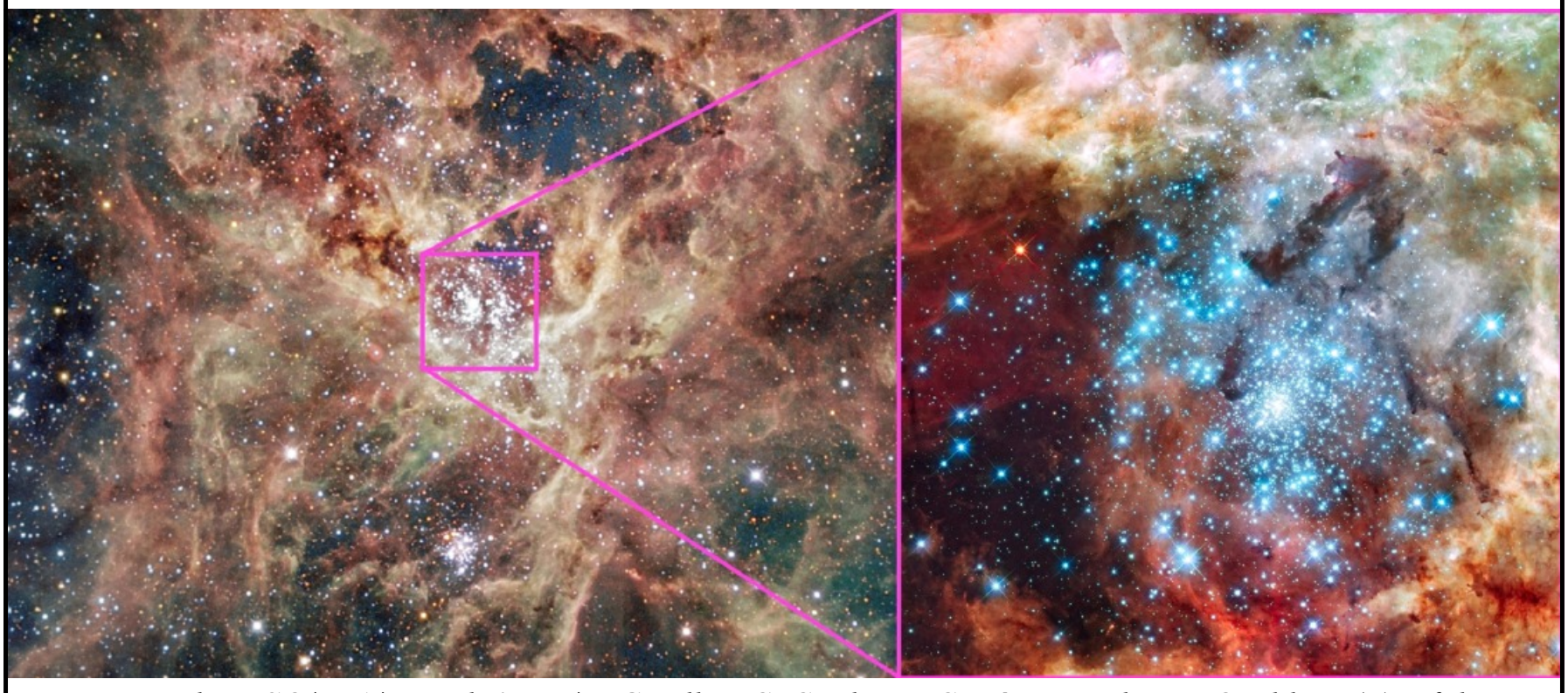
Is the Most Massive Star Still Alive?

By Ethan Siegel

The brilliant specks of light twinkling in the night sky, with more and more visible under darker skies and with larger telescope apertures, each have their own story to tell. In general, a star's color correlates very well with its mass and its total lifetime, with the bluest stars representing the hottest, most massive and *shortest-lived* stars in the universe. Even though they contain the most fuel overall, their cores achieve incredibly high temperatures, meaning they burn through their fuel the fastest, in only a few million years instead of roughly ten billion like our sun.

Because of this, it's only the youngest of all star clusters that contain the hottest, bluest stars, and so if we want to find the most massive stars in the universe, we have to look to the largest regions of space

(Continued on page 16)



Images credit: ESO/IDA/Danish 1.5 m/R. Gendler, C. C. Thöne, C. Féron, and J.-E. Ovaldsen (L), of the giant star-forming Tarantula Nebula in the Large Magellanic Cloud; NASA, ESA, and E. Sabbi (ESA/STScI), with acknowledgment to R. O'Connell (University of Virginia) and the Wide Field Camera 3 Science Oversight Committee (R), of the central merging star cluster NGC 2070, containing the enormous R136a1 at the center.

NASA's Space Place (continued)

that are actively forming them right now. In our local group of galaxies, that region doesn't belong to the giants, the Milky Way or Andromeda, but to the Large Magellanic Cloud (LMC), a small, satellite galaxy (and fourth-largest in the local group) located 170,000 light years distant.

Despite containing only one percent of the mass of our galaxy, the LMC contains the Tarantula Nebula (30 Doradus), a star-forming nebula approximately 1,000 light years in size, or roughly seven percent of the galaxy itself. You'll have to be south of the Tropic of Cancer to observe it, but if you can locate it, its center contains the super star cluster NGC 2070, holding more than 500,000 unique stars, including many hundreds of spectacular, bright blue ones. With a maximum age of two million years, the stars in this cluster are some of the youngest and most massive ever found.

At the center of NGC 2070 is a very compact concentration of stars known as R136, which is responsible for most of the light illuminating the entire Tarantula Nebula. Consisting of no less than 72 O-class and Wolf-Rayet stars within just 20 arc seconds of one another, the most massive is R136a1, with 260 times the sun's mass and a luminosity that outshines us by a factor of *seven million*. Since the light has to travel 170,000 light years to reach us, it's quite possible that this star has already died in a spectacular supernova, and might not even exist any longer! The next time you get a good glimpse of the southern skies, look for the most massive star in the universe, and ponder that it might not even still be alive.

Treasurer's Report by Steve Germann

Treasurer's report for April 2015 (Unaudited)

Opening balance:	$7,957.50
Revenue:	$214.00
Expenses:	$95.80
Closing Balance:	$8,075.70

Revenue included $140 for memberships, and $74 for the 50/50 at the April Meeting.
Expenses included telescope parts, $28, and $67.80 for shipping of the SkyNews magazines.

Our charity filing took place this month, in time. It was in accordance with the financial reports presented at the October annual general meeting.
I thank all the members for their continued financial support of the Hamilton Amateur Astronomers.

William J. McCallion Planetarium

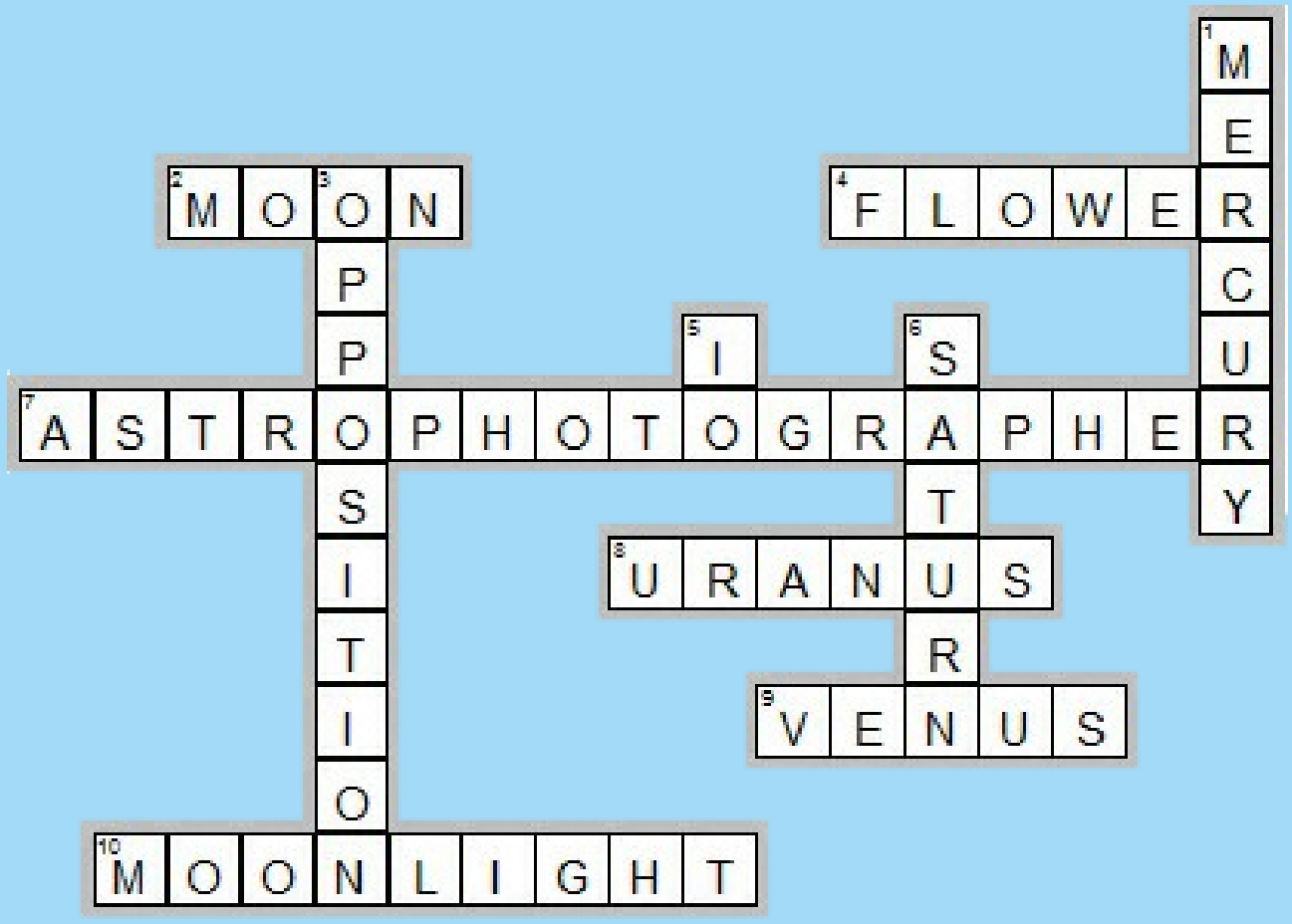
McMASTER UNIVERSITY, HAMILTON, ONTARIO

- **Public shows every Wednesday (7:00pm)**
- **Public transit available directly to McMaster campus**
- **Tickets $7 per person; private group bookings $150**
- **Different shows every week**
- **Upcoming shows include:**
  - **May 6: Introductory Astronomy for Kids (1st Wed of every month)**
  - **May 13: A History of Cosmic Perspectives**
  - **May 20: Astronomy in Shakespeare**
  - **May 27: Doctor Who Astronomy**

For more details, visit

www.physics.mcmaster.ca/planetarium

Answers to Astronomy Crossword on Page 10



UPCOMING EVENTS

May 2, 2015 - 7:30 pm — *Astrophotography Group Meeting*. Contact chair for meeting location.

May 8, 2015 - 7:30 pm — *General Meeting* at the Hamilton Spectator Auditorium. Our main speaker will be **Kerry-Ann Lecky Hepburn**, and her talk will be entitled, "Capturing the Stars". Kerry-Ann will be talking about her journey in the intense hobby of astrophotography from 2007 up to 2015 and sharing some of the stories behind the many objects that were captured along with her more recent projects and goals.

May 23, 2015 - 8:00 pm - 11:00 pm — *Public Stargazing Night* at McQuesten Park, Hamilton.

June 19, 2015 - 7:30 pm — *General Meeting* at the Hamilton Spectator Auditorium. This will be a question-and-answer night for our audience. NOTE that this will be the 3rd Friday in June.

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Check out the newly-redesigned Hamilton Amateur Astronomers **Website**
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