Orbit

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Roger Hill, Editor

Of course the Clear Sky Chart says it might be clear tonight….I'm putting Orbit together! Perhaps I should call this Editor's Curse: Putting an astronomy newsletter together stops you from doing Astronomy! Actually, this is often the curse of people who volunteer their time for the Board, too, but I think editors have it the worst, or at least, this one does. Perhaps my nasty habit of procrastination in leaving the entire thing for the last three or four days before a general meeting has more to do with it.

I mentioned last month that I was thinking of de-forking my 12" SCT and putting it on a new mount. Well, my main scope now sits on a large modified German Equatorial mount, which has caused some problems in my observatory. There are two main issues: The first is that the mount is set solidly on my 12" diameter concrete pier, but it sits lower than my old fork-mount. Add in the fact that the way a GEM moves, means that it is closest to the floor when pointing toward the meridian. I now have a lot less sky that I can "see".

The second issue is that the position of my little desk (an adjustable height table) and shelving will have to be moved to the south end of the observatory. In and of itself, this is not too bad, but I'll be crawling around when I do any visual work. I may also have to be careful when I put my 6" RC on top of the bigger 'scope as it may hit the walls of the observatory. I'll be making a paper, or cardboard, model to see what happens during a meridian flip.

First light for the new set up occurred last night, when it was not completely overcast, and the mount was rock solid. I could not get it polar aligned properly, but was able to do a shakedown and even though I suspect I'm a degree or so away from the pole, GOTO's were pretty good. Tapping the telescope tube results in motion being damped down in less than a second, which makes manual focussing so much easier.

Another thing I like is not just the feeling of solidity, but the sound of it, too. Gone is the characteristic "coffee-grinder" noise of the Meade mount—it's been replaced by the higher pitched hum of the big iOptron. Add in that there is (as measured by the manufacturer) less than 2 arc-seconds of periodic error, and you can see why I'm happy with this mount!

There are a number of things I still have to do: Put a new D style mounting plate and radius blocks on the 'scope; Install the guide scope and camera on the mount, rather than the 'scope; Connect the Meade zero-image shift electric focuser to some sort of USB controller; Get all the various pieces of software talking using new ASCOM drivers.

But isn't that part of the fun of new equipment?

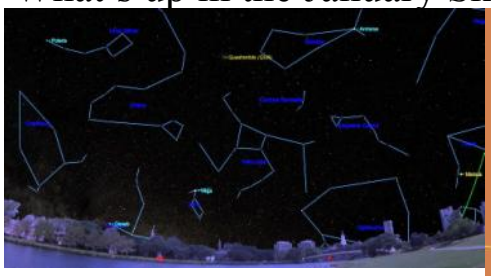
Anyway, I hope you enjoy this month's Orbit. I should mention that Abigail Hughes has contributed again...I'm beginning to wonder how I managed to produce these pages without her!

January is a busy month in the Centre: there will be TWO Observatory Nights with the first one on January 11th and the second on January 18th; there will also be a Sidewalk Astronomy event on Saturday the 12th at Spencer Smith Park in Burlington and an Armchair Astronomy meeting at the Observatory on Sunday the 13th; there is a Board meeting on the 16th, and a total eclipse of the Moon starting on the 20th and ending on the 21st.

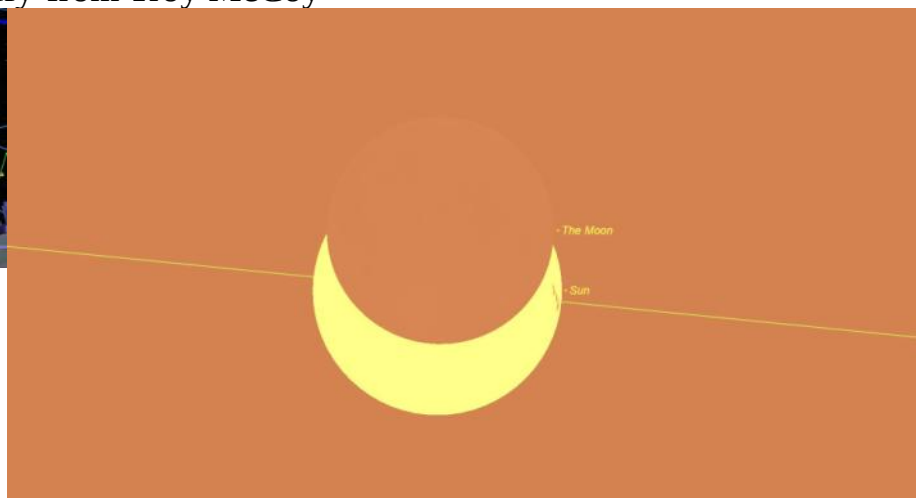
See you in the dark,

Roger

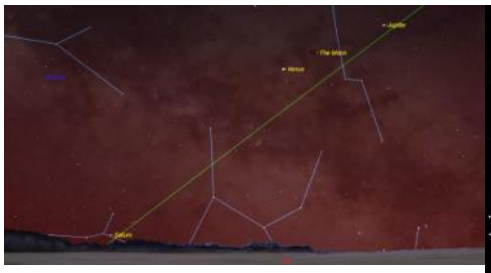
What's up in the January Sky from Troy McCoy



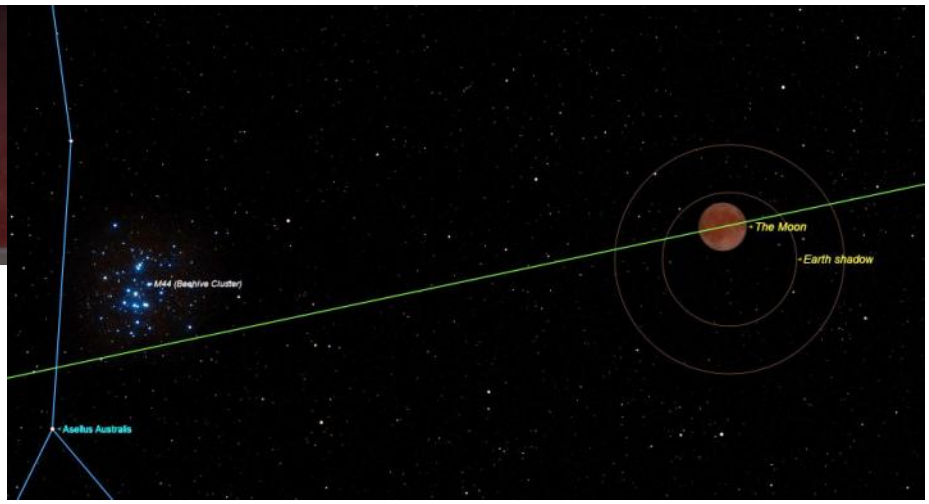
Thursday, January 3 overnight - Quadrantids Meteor Shower Peak. Named for a now defunct constellation near the north celestial pole called the Mural Quadrant, the annual Quadrantid meteor shower runs from December 30th to January 12th. This is one of the most reliable showers of the year, producing up to 100 meteors per hour at the peak. Many are bright fireballs owing to the shower's source, an asteroid designated 2003EH. The shower will peak on Thursday evening, while the Earth is traversing the thickest part of the debris field, but the best time for viewing will be before dawn on Friday morning, when the shower's radiant will be high in the northeastern sky. The moon will be out of the night sky at the shower's peak, greatly increasing the number of meteors one can see.



Saturday, January 5 at 8:41 p.m. EST - New Moon and Partial Solar Eclipse When at its new phase, the moon is travelling between Earth and the Sun. Since sunlight can only reach the side of the moon facing away from Earth, the moon will be completely hidden from view for about a day. This new moon will occur with the moon close to the ecliptic, creating a partial solar eclipse. The Moon's shadow will touchdown in Sichuan Province, China, sweeping north into eastern Siberia, then through the Aleutian Islands before leaving the North Pacific Ocean. First contact will occur at 0:27 UTC on January 6. Greatest eclipse will occur near Srednekolymsk at 01:41:28, with 71% of the Sun's diameter covered. Last contact will occur at 03:12. All times UTC. Subtract 5 hours for EST



Thursday, January 31 pre-dawn – Old Moon Visits Pre-dawn Planets
For the second time during January, the old moon will visit the pre-dawn planets Jupiter and Venus. This time, in the southeastern pre-dawn sky of Thursday, January 31, the old crescent moon will land between them - sitting 2.5 degrees to the upper right of bright Venus and 5.5 degrees to the lower left of Jupiter. And, just after 6 a.m. local time, Saturn will rise to sit 21 degrees (or two fist diameters) to the lower left of the moon. The pretty chain of objects along the ecliptic (green line) should remain visible in the growing twilight until approximately 7 a.m. local time. Later that morning, the moon's orbital motion will carry it closer to Venus, allowing skywatchers to find Venus in broad daylight. Observers in eastern Micronesia, Polynesia (except Hawaii), Galapagos Is., southern Central America, and northwestern South America will see the moon occult Venus in daylight.



Sunday, January 21 at 12:16 a.m. EST – A Full Wolf Supermoon and Total Lunar Eclipse
The January full moon, known as the Wolf Moon, Old Moon, or Moon after Yule, always shines in or near the stars of Gemini or Cancer. It rises at sunset and sets at sunrise, and the position of the ecliptic on winter nights causes January moons to culminate very high in the night sky. This full moon occurs fifteen hours before perigee, the point in the moon's orbit when it is closest to Earth, making it a supermoon, and generating high tides globally. This full moon will occur while the moon is on the ecliptic, producing a total lunar eclipse which will begin when the moon contacts the Earth's shadow at 10:34 p.m. EST on Saturday evening. The moon will pass deeply through the Earth's northern umbral shadow, extending totality to 1h02m in duration, and darkening the moon's southern half much more than its northern half. At greatest eclipse, which occurs at 12:13 a.m. EST, the moon will be 7 degrees west of Messier 44 (The Beehive Cluster). The partial phase of the eclipse will end at 1:51 a.m. EST. The entire eclipse will be visible from North and South America, the eastern Pacific Ocean, and westernmost Europe.

All events for this month can be found on Facebook. Follow RASC Hamilton Centre - Amateur Astronomy Club.

Monthly Sky watching information is provided by Chris Vaughn of Starry Night Education. Chris is a member of the Toronto Centre of the RASC. Follow Starry Night on Twitter @starrynightedu and Chris at @astrogoeguy

NASA Night Sky Notes: **January's Evening Eclipse and Morning Conjunctions** By David Prosper

Observers in the Americas are treated to an evening **total lunar eclipse** this month. Early risers can spot some striking morning conjunctions between **Venus**, **Jupiter**, and the **Moon** late in January.

A **total lunar eclipse** will occur on **January 20th** and be visible from start to finish for observers located in North and South America. This eclipse might be a treat for folks with early bedtimes; western observers can even watch the whole event before midnight. Lunar eclipses takes several hours to complete and are at their most impressive during total eclipse, or totality, when the Moon is completely enveloped by the umbra, the darkest part of Earth's shadow. During totality the color of the Moon can change to a bright orange or red thanks to the sunlight bending through the Earth's atmosphere - the same reason we see pink sunsets. The eclipse begins at 10:34 pm Eastern Standard Time, with totality beginning at 11:41 pm. The total eclipse lasts for slightly over an hour, ending at 12:43 am. The eclipse finishes when the Moon fully emerges from Earth's shadow by 1:51 am. Convert these times to your own time zone to plan your own eclipse watching; for example, observers under Pacific Standard Time will see the eclipse start at 7:34 pm and end by 10:51 pm.

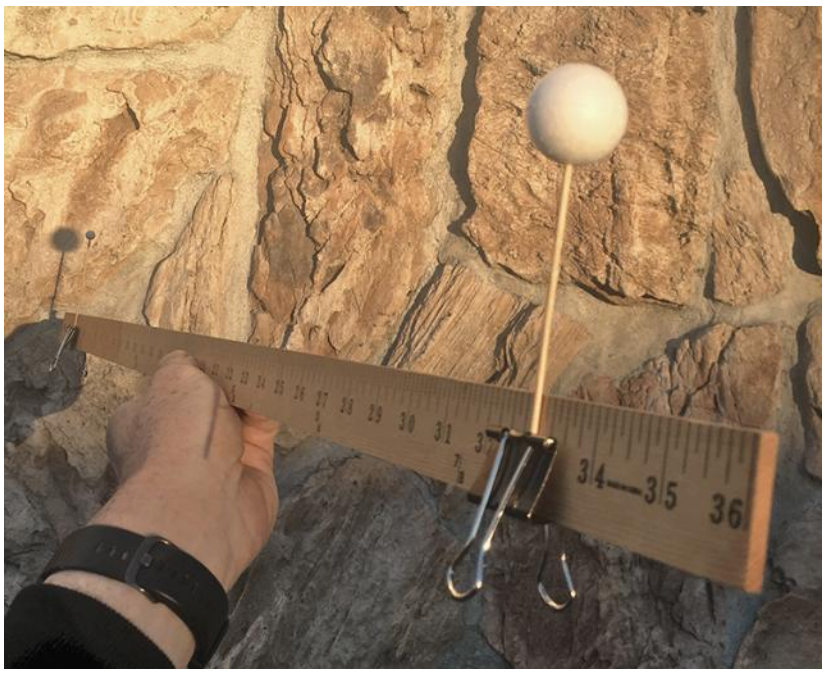
Lunar eclipses offer observers a unique opportunity to judge how much the Moon's glare can interfere with stargazing. On eclipse night the Moon will be in **Cancer**, a constellation made up of dim stars. How many stars you can see near the full Moon before or after the eclipse? How many stars can you see during the total eclipse? The difference may surprise you. During these observations, you may spot a fuzzy cloud of stars relatively close to the Moon; this is known as the "**Beehive Cluster**," **M44**, or **Praesepe**. It's an open cluster of stars thought to be about 600 million year old and a little under 600 light years distant. Praesepe looks fantastic through binoculars.

Mars is visible in the evening and sets before midnight. It is still bright but has faded considerably since its closest approach to Earth last summer. Watch the red planet travel through the constellation Pisces throughout January.

Venus makes notable early morning appearances beside both **Jupiter** and the **Moon** later this month; make sure to get up about an hour before sunrise for the best views of these events. First, Venus and Jupiter approach each other during the third full week of January. Watch their conjunction on the 22nd, when the planets appear to pass just under 2 ½ degrees of each other. The next week, observe Venus in a close conjunction with a crescent Moon the morning of the 31st. For many observers their closest pass - just over half a degree apart, or less than a thumb's width held at arm's length - will occur after sunrise. Since Venus and the Moon are so bright you may st1ill be able to spot them, even after sunrise. Have you ever seen Venus in the daytime?

If you have missed **Saturn** this winter, watch for the ringed planet's return by the end of the month, when it rises right before sunrise in Sagittarius. See if you can spot it after observing Venus' conjunctions!

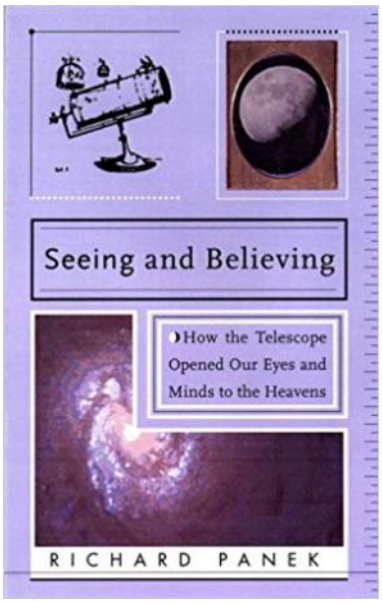
You can catch up on all of NASA's current and future missions at nasa.gov



Caption: This finder chart shows the path of the asteroid 3 Juno as it glides past 32 Eridani in November 2018. The asteroid's position is highlighted for selected dates, including its opposition on the 17th. Image created in Stellarium for NASA Night Sky Network.

Credit: Bill Anders/NASA

A Book Review of Seeing and Believing by Richard Panek from **Abigail Hughes**



Seeing and Believing. Pages 198. New York, Viking., 1998. ISBN0-670-87628-3. Available at the observatory library.

For this review, I started by reading another book titled Entering Space, which turned out to be too technical and detailed for me to complete in time. As a result, I ended up reading this delightful book, chosen mainly on its apparent size. Being a small book, less than 200 pages, I expected little in the way of detail and depth (in part due to my experience in reading another small book, Astrophysics for People in a Hurry). In the end, I was pleasantly surprised by the quality of the content retained in the modestly sized book.

The prologue of the book is about the Hubble Deep Field image which was only two years old at the time of publication. The poetic brilliance of introducing the book with what can be considered the greatest feat of observational astronomy and telescopic power became clear once I had read through the majority of the book and reflected back on the first couple of pages. Despite the fact that I was reading the book 20 years after publication, 22 years after the Hubble Deep Field was compiled, the majesty and wonder of the image still resonates to this day. Even with the James Webb telescope currently in line to take over the throne as the most powerful telescope, I still have a deep appreciation and respect for what the Hubble Telescope has accomplished. Arguably, being alive to see the development and hopefully, the successful launch of the James Webb telescope has engrained a better appreciation and understanding of the events which take place in the book.

Divided into three parts: Seeing, Believing, and Beyond Belief, the book focuses on the history of astronomy as told through the invention and use of the telescope as well as the social, moral, and religious upheavals that resulted. A unique perspective which narrows down the viewing area, bringing in focus a sharper image of the subject's history. I enjoyed the retelling of famous history through the new lens, bringing focus and depth to the development of the telescope. I know that I, for one, forget about how awe-inspiring the current technology truly is. I often forget to put into perspective how astronomers such as Galileo, Gassendi, Kepler, were able to make ground-breaking observations with telescopes that were worse than terrible by today's standards. The fact that the cheapest telescope available today is still better than the best telescope made by Galileo. That up until 1656, after Huygens refined the pendulum weight used for timekeeping, there was no set coordinate system for the night sky and that locations of objects had to be approximated based off of the "fixed stars". How incredible it must have been when Uranus was first observed, a discovery that shook human knowledge of planets, a fact which had gone basically unaltered for thousands of years (with the exception of the Sun and the Moon which were recategorized).

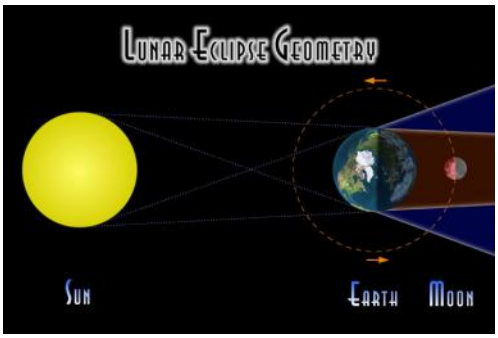
From today's perspective, it can be hard to understand that there was a time when knowledge limited the universe to our galaxy, or even to just our solar system. The fact that there was a time where other star systems seemed absurd and contradicted the accepted view of the universe. It is for these reasons that I thoroughly enjoyed reading Seeing and Believing. It is not enough for an author to just present facts, it is the art of presenting common facts in a new light which can then resonate with the reader which makes a book worth reading. I stand by that this book is proof of the validity of the old idiom: good things come in small packages. I would highly recommend this book to all astronomers, especially observational so that they can better appreciate the time in which we live and the technology at their disposal.

To all the readers,

All though I am far from short of reading materials to cover for the monthly reviews, some help in narrowing down the selection would be appreciated. I would love to receive feedback regarding what books or specific topics you would like to see reviewed. Club members are also welcomed to write their own reviews and submit them for publication in Orbit and on the club's website. All comments, questions, concerns, or submissions can be sent to library@hamiltonrasc.ca.

Nikon guide on How to Photograph a Lunar Eclipse Featuring Fred Espenak

A lunar eclipse occurs whenever the moon passes through the Earth's dark shadow, which can only happen during a full moon. There are two or more lunar eclipses a year.



Types of Lunar Eclipses

Penumbral Lunar Eclipse. This occurs when the moon passes through the Earth's penumbral shadow. These eclipses are subtle and hard to observe.

Partial Lunar Eclipse. This occurs when a portion of the moon passes through the Earth's umbral shadow. These eclipses are easy to see with the unaided eye.

Total Lunar Eclipse. This occurs when the entire moon passes through the Earth's umbral shadow. During the total phase (totality), the moon turns a vibrant red color. These are easy to see as well, with the unaided eye.

A lunar eclipse begins as a small notch slowly appears along one edge of the moon. During the next hour, the moon gradually dips deeper into Earth's dark umbral shadow. If the eclipse is a total one, the last remaining minutes of the partial phases can be quite dramatic. The crescent of the moon grows thinner as darkness propagates through a night sky now deprived of moonlight. If you're away from city lights, the Milky Way becomes bright and beautiful as the total phase begins.

No matter what kind of camera you own, there are a variety of techniques that you can use to photograph a lunar eclipse: wide-angle, telephoto, multiple exposure and star trail. While you can also use film cameras to photograph eclipses, this article specifically discusses digital camera use.

Wide-Angle

The wide-angle technique offers the simplest way to photograph a lunar eclipse. You can use any camera that is capable of long exposures, of five seconds or more. Because you're going to be using long exposures, it is ideal to place the camera on a sturdy tripod. If your camera can utilize a cable release, using one is the best way to ensure that you won't cause vibrations when you trip the shutter. If you don't have access to a cable release, use the camera's self-timer to trip the shutter to begin the exposure.

For COOLPIX digital cameras, set it to the widest focal length. For photographers using a Nikon DX format D-SLR, use a focal length range of 18-35mm. For photographers using a Nikon FX format D-SLR, you can use a focal length range of 28-35mm. For photographers using the Nikon 1 system cameras, use a focal length range of 10-30mm. Shooting a lunar eclipse with a wide-angle view lets you incorporate an interesting foreground into your image.

Starting Exposure: As a starting exposure, set the camera to ISO 400, and open the lens to the widest aperture. Try a variety of exposures adjusting the shutter speed in 5-second increments. The slowest shutter speed that you should use is 40-seconds. Any longer than that and you're going to begin to see star trails or streaks, caused by the earth's rotation.

Star Trails

When you photograph the night sky using very long exposures of several minutes or more, you will end up with an effect known as Star Trails. Because of the Earth's rotation, you are capturing a trail of the light from the stars (or moon in this case). Photographing a lunar eclipse this way will allow the moon to slowly drift across the frame. To photograph Star Trails, you will definitely need to use a cable release.

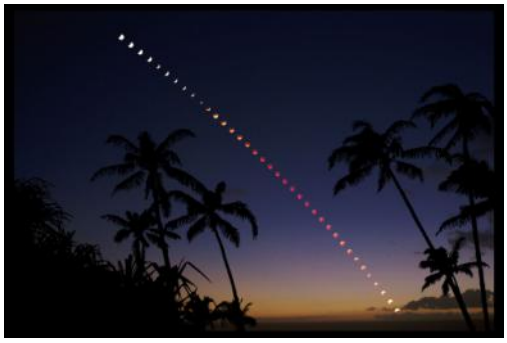
Starting Exposure: Begin by setting the ISO to 400, using an f/stop of f/8 or f/11 and set the shutter speed to Bulb. As the eclipse begins, place the moon's image in one corner of the camera's viewfinder. Make sure that you compose the image so that the moon will move across the camera's field of view during the exposure. Turn Autofocus OFF and focus manually on infinity. Also, turn ON the camera's Long Exposure Noise Reduction feature. Make sure you have a fully charged or fresh battery for the camera and an empty memory card. When you're ready to make the exposure, lock the shutter open with the cable release and enjoy the eclipse.

You can figure out the approximate orientation by practicing one or two nights before the eclipse. The moon rises about 50 minutes later each night, so if the eclipse is set to occur at 10pm on a specific day, run the test the evening before at 9:10pm.

The moon appears to move across the sky at a rate of 15 degrees per hour. It should take the moon about three hours to traverse the field of view of a 35mm lens on a Nikon DX format D-SLR or a 50mm lens on an FX format D-SLR.

If the eclipse occurs in the early evening, the moon will be rising and its motion will bring it up and to the right as you face the moon. If the eclipse occurs during the middle of the night, the moon's motion will be from left to right. If the eclipse occurs during the early morning hours, the moon will be setting, and its motion will take it down and to the right. These directions are for the Northern Hemisphere. If you are in the Southern Hemisphere, the motions in the left and right directions will be opposite.

Multiple Exposures



When photographing a lunar eclipse using the wide-angle technique, you're capturing one instant of the eclipse. When using the Star Trails technique, you're capturing several hours of the eclipse in one frame. The Multiple Exposure technique combines the best of both, by capturing a sequence of individual images that show the eclipse throughout its different stages.

Using a digital camera, you will be making a series of exposures, which will each be saved as individual files in the camera. In post-production, using software such as Adobe Photoshop, you can combine or "stack" the image files into one image that shows the series of small moon images each illustrating a different phase of the eclipse.

Starting Exposure: To make multiple exposures during a lunar eclipse, camera set up and orientation is identical to the Star Trail method. But instead of taking one long exposure, you're going to be taking a series of short exposures during the various stages of the eclipse. It is essential that the camera be on a sturdy tripod and not move throughout the eclipse.

Make the first exposure as the partial eclipse begins and then shoot additional exposures every 5 to 10 minutes. Be consistent and use the same time interval between shots so your final image will have the moon evenly spaced as the eclipse progresses.

Since the moon's brightness varies during an eclipse, you will need to change the exposure throughout. Click here for Mr. Eclipse's Lunar Eclipse Exposure Guide, which will help you determine the correct exposures for each phase of the eclipse, based on the ISO and f/stop you have selected.

For example, let's say you're using ISO 400 at f/8. The guide recommends a shutter speed of 1/1000 second as the partial eclipse begins. The shutter speeds for eclipse magnitudes (brightness) 0.3, 0.6, 0.8 and 0.9 would then be 1/500, 1/250, 1/125 and 1/60 second, respectively. Whatever exposures you use, it's best to bracket one full f/stop around the recommended value. This is easy to do if you set the camera for bracketing before the eclipse begins.

Telephoto

To capture large images of the moon during a lunar eclipse, you will need to use a long telephoto lens or a telescope. You can also use a COOLPIX P&S digital camera with a superzoom. With a D-SLR, you can also combine a super telephoto lens with a Teleconverter to increase the focal length. You can also increase the relative size of the moon's image in an FX format camera by selecting DX Crop Mode.

There are many telescopes that will allow you to connect a camera, using an adapter. Using a telescope that has an equatorial mount and electric clock drive that counteracts the Earth's rotation allows you to automatically track the sun, moon and stars for long exposure Astrophotography.

Starting Exposure: The Lunar Eclipse Exposure Guide is a good starting point for photographing the moon during a lunar eclipse using a telephoto or super telephoto lens or telescope. Bracket your exposures by under- and over-exposing by one or two f/stops to ensure that you get a perfect exposure. To capture a good sequence of photos, you'll probably want to take the bracketed series of exposures every 10 minutes.

During a total eclipse, the moon's color and brightness can vary enormously, taking on hues ranging from bright orange, to deep red, dark brown or grey. The color is due to the indirect sunlight that is refracted through and filtered by the Earth's atmosphere before reaching the moon. You can also use your camera's Spot Meter to take an actual meter reading of the moon and bracket your exposures from that point.

Hamilton Centre plans:

On Friday, January 18, come on out to the Observatory for an Observatory night. There will be other things to see or photograph that evening, but the main focus will be on preparing people to watch, or capture, the eclipse. As always, the start time is 8pm, and the gates will open at 7:30.

On Eclipse Night, the same schedule holds. The gates will be open at 7:30pm, and you can start setting up anytime after that. Lunar eclipses are slow, stately events, so dress very warmly, bring a thermos of coffee or hot chocolate, and a comfortable camping style chair.

9:36 pm Sun, Jan 20	Penumbral Eclipse begins as Earth's penumbra starts touching the Moon's face.
10:33 pm Sun, Jan 20	Partial eclipse starts - moon is getting red.
11:41 pm Sun, Jan 20	Total eclipse starts - completely red moon.
12:12 am Mon, Jan 21	Maximum Eclipse as the Moon is closest to the center of the shadow.
12:43 am Mon, Jan 21	Total eclipse ends.
1:50 am Mon, Jan 21	Partial Eclipse ends
2:48 am Mon, Jan 21	Penumbral Eclipse ends

Observatory Night—Friday, December 14, 2018

Our last Observatory Night was a surprising amount of fun. I arrived at the observatory just before 6pm, to pick up my new mount, which I put together and tested. Les Nagy arrived about 7pm, and we chatted for a while. Gavin Hill, Fiona O'Sullivan, Bob Speck and Bill Shandik arrived a bit later. One of the latter arrived about 8pm and said that it was starting to clear up.

The roof on the Chilton Building was opened up, the mount turned on, the computer fired up and off we went for a couple of hours of observing.

First up was the Moon, where the Lunar V was easily seen, along with the remnants of the Lunar X.

One of the pitfalls of winter observing was noted when the big Celestron eyepiece fogged over. I noted that this happens a lot if you accidentally breathe on it, and that many years ago, a slide was shown at a meeting showing (I think) Mark Kaye using a snorkel to breathe through.

Next, we started a tour of three planets. The first stop was Mars. The Red Planet was a lot dimmer and smaller than it was in the Summer.

The scope was then pointed at Uranus, but I (sneakily) did not tell Les what the scope was pointing at. He knew what he was looking at instantly, though. Les and I trotted out our favourite jokes about the planet, along with lots of information.

Neptune was the next target. Appreciably dimmer and smaller than it's closer cousin, it's still a lovely colour.

We also had a look at Comet Wirtanen (46P), to round out our voyage through the solar system The comet was really too dim and diffuse to get a good look at it. Binoculars would have been a much better choice.

The Pleiades (the 45th entry on Messier's list of "not comets") and the Orion Nebula (the 42nd entry) were looked at as well.

Also, a couple of people used their phones to take images of the Moon, either using their phones directly, or by using one of the Centre's iOptron cell phone adapters.

It started getting cloudy again around 9:30pm, and 30 minutes later it was overcast.

All in all, it was a fun evening.

Picture at right by Gavin Hill, taken using his phone and telescope.

Indigenous Astronomy: The Anishinabe of Central North America

"Anishinabe" means "the people" in the Algonquin language. The Ojibway people of Canada who live in northwestern Ontario, Manitoba (east of Lake Winnipeg, the interlake area, and parts of the northern prairie region), and Saskatchewan use the word to refer to themselves.

Sky stories of the Anishinabe are part of a complex system of spiritual beliefs. Knowledge of the stars is found in many aspects of culture including storytelling, symbolism and religious traditions.

Some spiritual leaders have special knowledge of the stars and the planets. In ancient times, these indigenous astronomers used this knowledge to help guide the day-to-day affairs of their communities.

The Anishinabe have been given ways of communicating with the powerful heavenly forces. The oral teachings and stories which flow out of this communication between mortals and the spiritual world have been passed down from generation to generation since the beginning of time. For example, one of the most powerful symbols for the life force is the Sun. The need for its presence for survival is stressed in the ancient story called "Snaring the Sun."

To this day, the stories of the Anishinabe of Central North America featured in this project are remembered and told by respected storytellers. With the coming of the first snow, families gather around their elders during the long winter evenings, and the time for storytelling begins. In the summertime, when the plants are awakened and the animals are roaming about, these stories are not told, as the plant and animal "beings" might hear and be offended. The storytellers speak of these things only in the winter when the spirits are resting.

In our Anishinabe culture, only our "stargazers", some of whom are known as the Wabeno-innin, the "Morning star Men" or "The Men of the Dawn", are privileged to have a full knowledge of the Sky world. Much of their knowledge is sacred in nature and is used only under special circumstances associated with religious matters.

The Seven Daughters of the Moon and Sun - The Pleiades

Seven sisters ignore their father's instructions and descend to Earth in a basket. The Seven sisters ignored their father's (the Moon's) instructions and descended to Earth in a basket to dance and sing when their father was "low in the sky." On one of their visits, one of the young women was captured by a human being and fell in love with him. The couple was taken to the Sky world in a basket lowered to Earth by the bride's sisters. While Grandfather Sun disapproved of the marriage, out of his love for his daughter he permitted the couple to visit on Earth from time to time. As for the remaining sisters, Grandfather Sun sent them to live further from the Earth, and to this day, they can hardly be seen.

One storyteller from the Fort Alexander Reserve in Manitoba, Canada, has explained the seasonal appearance and disappearance of the Pleiades with the story of seven children who loved to dance and play.

According to the Anishinabe of Central North America, seven children loved to dance and play, rather than help their parents in camp. The children's mother went to seek advice on this problem and was told to place stones on their food. It was hoped that the children would appreciate the value of hard work if they were forced to remove the stones from their food before they could eat it. Unfortunately, this plan did not work. One day, the children danced so hard, they danced up into the sky where they can be seen to this day. Although you can clearly see them in the winter, they cannot be seen in the summer. It is believed that during the summer months, when ceremonies and dances are being celebrated by humans, the children join them, returning to the heavens with the onset of winter.

The Pleiades is also known as the "Hole in the Sky" and is closely connected with religious beliefs.

Monthly Meeting – December 6, 2018 by Abigail Hughes

At 8:05 pm the December club meeting was officially started by Muhammad Ahmed. Approximately **25** people attended the meeting, most of which were existing members. Once again, I would like to thank Muhammad for bringing snacks and refreshments for the attendees to enjoy. The meeting was introduced with the agenda, starting with Bob Prociuk with the membership update. The new membership certificates were revealed

Following the membership update, Muhammad heralded the 150th birthday of RASC which took place December 1, 2018. After, he mentioned that the RASC calendars were available for purchase at the meeting, which was sold out by the end of the night.

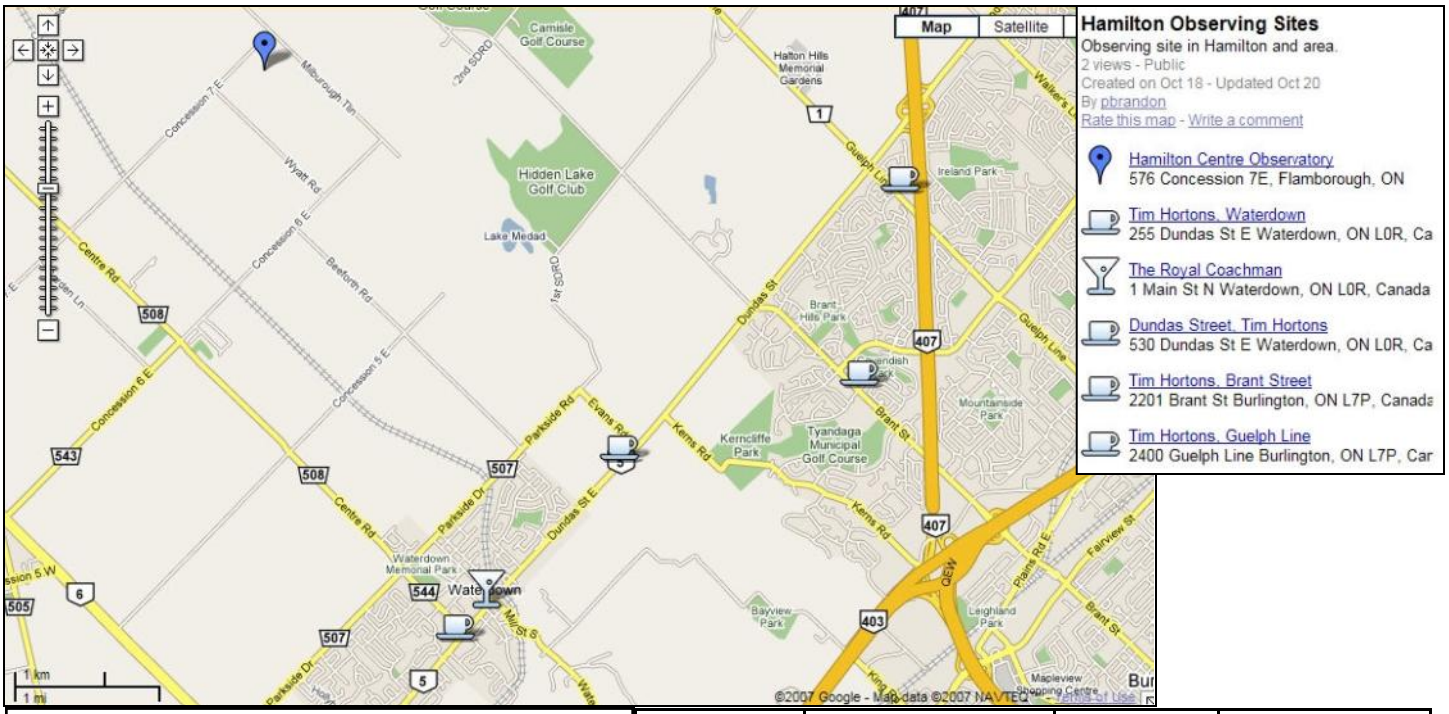
Then I provided a brief update about December outreach activities. After, I brought up the idea of reintroducing Armchair Astronomy in the new year. Attendees appeared intrigued and a few people voted that they would be interested in attending. Updates regarding Armchair Astronomy can be found on the forum. Subsequently, I formally announced the new library catalogue system, explaining the new lending and request process that has been implemented. More information on the library can be found on the forum and the December 2018 issue of Orbit.

Roger Hill then talked about Heavy METUL and the December observing night. He talked about the Lunar X and Lunar V, and Comet Wirtanen which were expected to be visible the evening of the following observing night, December 14th. Roger explained the three different certificates that can be earned during the Heavy METUL nights and welcomed all members to visit the observatory December 14th.

Afterwards, Muhammad talked about the new Astrophotography Contest, inviting members to upload their images and participate. All members are encouraged to submit their astrophotography images by emailing them to **contest@hamiltonrasc.ca** along with information about how the image was taken, the equipment used, and if there was an image processing software used to create the final image. Submissions will be shown at future meetings anonymously and voted on, monthly and yearly winners will win prizes.

The first half of the meeting was then concluded by Muhammad after talking about the upcoming meetings in the new year.

After a 10-minute break, the meeting resumed at 8:40 pm with Muhammad introducing the guest speaker: Tom Vassos. Those who attended the October 2018 meeting would be familiar with the speaker as he presented his talk titled "A Fascinating Tour of the Universe". For the December meeting, Tom offered a similar presentation to the October one, amended and updated to include some new information such as the new current and upcoming events in astronomy taking place around the world. Tom re-explored and added to previous topics such as top reasons to become an astronaut. He also added a new segment he titled "Name that Nebula" in which audience members were encouraged to shout out the name of the astronomical objects being shown. The game was an excellent way to challenge club members, particularly those who partake in deep sky imaging. The meeting officially concluded at 9:50 pm.



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I saw this a few days ago, and had to chuckle. There's more than a grain of truth about the assertion, though.

It's one thing to sit at your desk, sifting through the gathered photons that were turned into electrons and tweaking the very last little bit of detail from the data, painstakingly gathered over hours.

It's quite another to gaze in slack-jawed wonder at the sight of the Milky way, stretching from horizon to horizon, in a truly dark, moonless, cloudless night.

It is the latter such times where you feed your mind, and ease your soul.

And I'd like to wish every one of you reading this, at least one such transcendental moment this year.