Regulus 2021 March

The newsletter of The Royal Astronomical Society of Canada - Kingston Centre

Celebrating our 60th anniversary 1961-2021 kingston.rasc.ca

Orion- See David Levy's column in this issue

2020 Donations to The RASC Kingston Centre - Susan Gagnon, Treasurer.

In past years as Treasurer I have not publicly posted the names of donors as I was not sure that it would be universally popular. This has been an error on my part and I seek to rectify this situation now. I trust that in future, anyone who would prefer to remain anonymous will let the Treasurer know. If you have donated to the Society in general or have contributed to any of it's campaigns such as the remote telescope, the Kingston Centre executive is not notified of these contributions and therefore your name will not be listed here. Thank you to all who donate to astronomy in any capacity, financial or volunteer hours.

From the annual financial reports no doubt many of you have noted that year after year donations have surpassed membership income. This is not insignificant.

The names are presented in alphabetical order.

Hank Bartlett, Cathy Hall, Kim Hay, Stephen Hays, Brian Hunter, John Hurley, Judith Irwin, Kevin Kell, John Rossiter, Matti Suhonen, Elena Zanetti

MEETINGS

Wednesday Weekly Social
videoconference. 7pm Eastern all weeks except the 2nd Wednesday of the month. For members and their guests. Email list subscribers receive the link weekly 1 or 2 days beforehand.
Next:: Wed 2021Mar17

Regular Monthly Meeting -
2nd Wednesday of the month 7pm Eastern. Zoom for members and youtube live stream for the public. Members receive email registration link about 1 week beforehand. For youtube.com search for RASC Kingston.

Next: Wed 2021Mar10
Guest Speaker: Dave Lane on the Robotic Telescopes, Ralph (Burke-Gaffney Observatory), Little Ralph, and his own ARO (Abbey Ridge Observatory).

President's Tidbits - Kim Hay

What a month February was. It seemed we got all our winter in one two week stretch, with cold weather and snow. We also were treated with a front row seat to see Perseverance Land on Mars on February 18, 2021 at 3:55 est. The images have been released by NASA on the landing at Jezero crater and the sounds of Mars. If you missed it or want to watch again, go to YouTube NASA Channel to view our trip to Mars. Canada was involved with the Perseverance rover with Dr. Chris Herd, Professor of Earth and Atmospheric Sciences at the University of Alberta being on the Scientific team of collecting Mars soil samples to come back to Earth, of which Canada will receive a sample for exploration. More information at this site https://asc-csa.gc.ca/eng/astronomy/mars/missions/mars-2020.asp

We are rounding the corner of winter into spring, and in the early morning the spring/summer constellations are making an appearance. Scorpius in the SW and Cygnus in the NE. This means the summer Milky Way and the Messier Tour is also in sight. Use your Binoculars or telescope to view the 110 objects to work towards completing your Explore the Universe or Messier Certificates.

This means that the nights will take a little longer to get to astronomical dark, and the morning will be darker as we end up with less sunlight as the sun will rise later. This event known as Eastern Daylight Time takes place on March 14 2021. If you want to see how much sunlight you will be getting try suncalc.net This also works for gardeners and solar observers who like the light. Of course your favourite astronomical program will give you this information as well.

On March 10th, we will have Dave Lane RASC Halifax Centre and Director Burke-Gaffney Observatory who will be giving us a talk on "The Mini-Robotic Observatory (MRO): An inexpensive "doghouse" style fully robotic and LIVE web browser accessible observatory (that you or your club could build)".

April 14th we will have VP Laurie Graham speaking on" A Tale of Two Torqued Terrestrial Bodies" plus our local members special topics.

On the other Wednesday nights we have our ZOOM Social Nights from 7:00 pm. The link is sent out to those members on our chat list.

On the RASC front the new membership database will be coming online shortly, which will also handle all the RASC email lists. And the 2021 General Assembly will be held Virtually online June 25-27th with more information on the RASC GA Website https://www.rasc.ca/general-assembly

https://www.amsmeteors.org/meteor-showers/meteor-shower-calendar/

Lyrids Status: Active from April 16th to April 30th

Peak: Apr 21-22 2021 (Moon 68% full.)

Skyward for March 2021 By David H. Levy.
Orion in Winter.

Stars are people too.

In last month's Skyward, I included that four-word phrase, but the first time I used it was actually in an article about the life of the star Betelgeuse, for Astronomy magazine. When I met Richard Berry, the editor at the time, he began by reciting those words: "Stars are people too." He added that he accepted the article for publication in his magazine after he read those words. (It turns out that wasn't my only unusual experience with that magazine. A few years later David Eicher, the current editor, and I witnessed a construction crew blowing up a freeway overpass near the magazine's headquarters in Milwaukee.)

As I explained last month, stars live out their lives much as do. They are born in gaseous stellar nurseries, or diffuse nebulae. In our sky two of the most famous nebulae appear are in summer, the Lagoon Nebula in Sagittarius, and in winter, the Orion Nebula. The little stars within the nebula vary in brightness, usually by a few tenths of a magnitude, but they can change quite quickly. There are a few others in the Hyades star cluster in Taurus, the bull. I saw one star there change rapidly over a period of a few minutes. These stars mimic the behavior and misbehavior of human youth.

Also like us, stars settle down as they grow older. Our Sun is an example of a star in middle age. It has shone steadily for almost five billion years and will continue this way for another several billion. Except for a cycle of eleven years during which the numbers of sunspots, which are storms on the face of the Sun, rise and fall, the Sun behaves constantly and predictably. There are vague hints of a 12,000-year cycle dating back to biblical times but I have not found any evidence for this.

As our Sun enters old age it will begin to act erratically again. Its hydrogen supply will be almost exhausted. It will begin to fuse its helium. At some point during its red giant phase, it will suffer a helium flash. This event might feature only a few minutes of strong helium fusion, but during which the Sun briefly will emit an enormous amount of energy equivalent to that of our whole galaxy. As it continues its red giant phase it might vary in brightness by several magnitudes over many months. Mira, a star in Cetus the whale, is such a star. A Mira star's core begins to contract under the force of its own gravity and whatever hydrogen is left will ignite into a shell around the core. Mira, like other red giants, was once a Sun-like star that has used up its supply of hydrogen. Once the helium is exhausted, its core will be left with heavier elements like oxygen and carbon. The outer layers of these old stars will explode as novae every few hundreds or thousands of years. Eventually, with their outer layers gone, the core will become a white dwarf star.

If a star is much more massive than our Sun, it would end its life far more dramatically—as a supernova. Such an event is really catastrophic. There are two kinds. In the first, the smaller member of a two-star system will keep on attracting material from its larger companion. But instead of repeated nova explosions, the small star will get more and more massive. When that star's core reaches a certain limit, in less than a second, the star finally will collapse on itself and will blow itself apart.

The other kind involves a very massive star, say three or four times the mass of the Sun. Just like in the smaller star, its supply of hydrogen will be gone. With little helium left the still contracting core is left with carbon and oxygen. When the core reaches a certain temperature, the remaining carbon will ignite all at once tear the star apart.

If the star is very massive, say nine or ten times the mass of the Sun, its very hot core allows the carbon to ignite and burn as before, but gradually, not all at once. Heavier elements like phosphorus and sulfur will be formed in shorter and shorter intervals, until silicon is generated. After just one day, the silicon will fuse into iron. Iron cannot fuse to anything heavier. Instead, in less than a second the core will crash in on itself. In the resulting explosion, the star's outer layers will be blown away. The brightness rise is so dramatic that the single supernova will outshine its entire galaxy. What is left is either a very dense neutron star, where a cubic inch of matter would weigh as ton or more here on Earth, or in the most massive stars, a black hole from which even light cannot escape.

Although stars do not have consciousness like we do, they lead extraordinary lives that are well worth our appreciation and study. Don't forget: Stars are people too.

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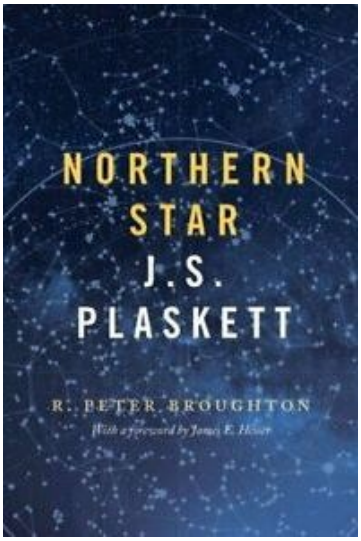


Book Review of "Northern Star J.S. Plaskett," by S. Gagnon

Author, R. Peter Broughton, University of Toronto Press

This is the only book I've read about John Stanley Plaskett (JSP). However, I feel that 131 pages of appendices and notes suggest that Peter Broughton has done some research and this book would provide a fine starting reference to anyone wishing to follow up on any aspect of Plaskett's career.

There is as much human interest as science in this account. It is a winding road from his beginnings on a farm in southwestern Ontario to a prominent place in the history of Astronomy in the early 20th Century.

Comments on his exposure to Astronomy in youth are purely speculative. However being a voracious reader with an inquisitive mind, it is not much of a stretch that he might well have read news of recent developments in Observational Astronomy.

An early fascination with 'how to' articles found in Boy's Own Annual and engaging in much tinkering with electricity, no doubt set the stage for training as a machinist and an ability to inovate, creating instruments as the need arose.

Correspondence and conference notes record the names of other Astronomy luminaries of the day such as Eddington, Hale and Hubble. JSP's experience in establishing the Dominion Astrophysical Observatory (DAO) made him the go-to man for others planning their own observatories at a time when aperature fever took on new dimensions as refractors gave way to reflectors.

An ego of some proportion may be required to take on the development of a project the size of the DAO with its 1.83 m telescope. Politics and a world war were just two items that threatened to stall the undertaking. Ego aside, Plaskett's time as Director records his research as meticulous and his mentoring of young astronomers, generous.

There are many other threads woven through the book such as family life and professional associations that I've not included. I enjoyed it immensely and recommend it unreservedly.

In the Sky This Month - March 2021 - Rick Wagner

01 Mar - bright Mars passes several degrees south of the Pleiades star cluster. Mars makes a very photogenic pass between the Pleiades and the Hyades clusters over the ~10 days. Perfect chance to sketch the motion for the Orbital Motion requirement of the Explore the Universe certificate.

01-15 Mar - Zodiacal light is visible in the west towards the end of evening twilight as a faint and hazy triangular pillar of light extending upwards from the western horizon towards the Pleiades.

04 Mar - asteroid 4 Vesta at opposition in the hind-quarters of Leo the lion. At magnitude 6.0 it might be barely visible to the naked eye for the more eagle-eyed of us. Vesta is the only minor planet which is ever visible to the naked eye for most people.

04 Mar - Algol at minimum about 20:10

05 Mar - Mercury (mag 0) is less than a degree north of Jupiter (mag -2) very low in the ESE sky starting about 45 minutes before sunrise. At the same time all 4 Galilean moons of Jupiter will be in a line on the west side of the planet - visible in carefully held binoculars and small telescopes. Saturn (mag 1) is 9 degrees to the upper right of Jupiter.

06 Mar - Last quarter Moon

06 Mar - Mercury at greatest elongation west low in the eastern sky in morning twilight

09-11 Mar - crescent Moon passes about 4d south of Saturn then Jupiter and then Mercury low in the eastern sky in morning twilight

13 Mar - New Moon

13 Mar - William Herschel discovered Uranus 240 yrs ago today - take your binoculars or telescope out to look at it after evening twilight and celebrate the anniversary!

14 Mar - 0200 Daylight saving time begins, clocks spring ahead

18 Mar - Mars and the Moon are near the Hyades and Pleiades star clusters.

20 Mar - 13:37EDT vernal equinox - the Sun is overhead at the equator and we get (roughly) equal hours of daytime and nighttime.

21 Mar - First quarter Moon

23 Mar - Mars is 7d north of Aldebaran - compare their colours and brightnesses!

27 Mar - 20:30-21:30 Earth Hour - turn off your lights and devices and get out to look at the sky!

28 Mar - Full Moon

Algol minima?

Blast from the Past: 1979 April Regulus

Get this: The GA registration fee was $10! Banquet $9! And the banquet speaker: Dr. Gerald K O'Neill !!!!

THE ROYAL ASTRONOMICAL SOCIETY OF CANADA - LONDON CENTRE
PROGRAM FOR THE 1979 GENERAL ASSEMBLY- May 18th to May 21st

University of Western Ontario. Accomodation - Delaware Hall
$12.50 per person per night Double occupancy
$16.50 per person per night Single "
both include breakfast
Transportation provided to and from London Airport and CN Station.
Registration and Display Room- Delaware Hall, U.W.O.
Registration form available from: G.A. '79
P.O. Box 842, Station B
London , Ontario, Canada N6A 4Z3
or February issue NATIONAL NEWSLETTER, R.A.S.C.
By phone contact Peter Jedicke (519) 433-2992 for any further info.

Friday May 18

1200 hrs Registration commences- Delaware Hall (Perth Dr. and University)
1300 hrs Astronomical Films shown
1430 hrs NATIONAL COUNCIL MEETING
1900 hrs Wine and Cheese Social Gathering- Delaware Hall
2000 hrs M147 Session. Film and Slide presentations by RASC members- Medical Sci. Bldg. Followed by tour of Hume Cronyn Memorial Observatory.

Saturday May 19

0900 hrs Special Invited Paper- Dr. William Wehlau, UWO, "C.F.H.T."
1030 hrs Break
1045 hrs PAPERS I. 8 papers. Engineering Bldg.
1230 hrs Society Group Photo.
1300 hrs Lunch. Delegates may wish to visit Canada Wide Science Fair at this time. Some transportation will be provided.
1600 hrs Buses depart for Elginfield Assembly Tour.
1830 hrs Outdoor Dinner- Weldon Park, Arva Ontario. Observing, etc. Trip to some local observatories.
0000 hrs Judging of the G.A. Song Contest- Delaware Hall. Pub Night.

Sunday May 20

0900 hrs PAPERS II.. 13 papers. Middlesex College Theatre.
1400 hrs ANNUAL MEETING R.A.S.C. - Middlesex Theatre. Followed by National Council Meeting, same room.
1830 hrs Cocktail Hour. Great Hall, U.W.O.
1930 hrs SOCIETY DINNER. The Ruth Northcott Lecture. Address by Dr. Gerard K. O'Neill, Princeton University. Awards of Society and G.A. Competition. Informal discussions continue back at residence.

Monday May 21

0845 hrs Bus departs for tour of Bruce Nuclear Power Development and Douglas Point Power Station. 7 hr trip. Lunch provided on route.
1600 hrs Arrival in London. Shuttle service provided to all departure points.

Basic registration $10. Saturday Dinner $9. Society Dinner $3.
Bruce Trip $10. Photo $1.

Astrotips - Visual

From https://skyandtelescope.org/observing/secrets-of-deep-sky-observing/

Sky Brightness

The single most important factor in observing deep-sky objects is light pollution. Its worst effect is on dim, extended objects of just the sort we're considering. A dark sky matters even more than telescope size; a small instrument in the country will show faint nebulae and galaxies better than a large telescope in a city.

That being said, even if you live in a badly light-polluted area you can take pleasure in what can be seen through the skyglow. New York City observer Jenny Worsnopp has examined nearly the entire Messier catalog from her Manhattan rooftop. Cambridge, Massachusetts, amateur Tony Flanders did the same from a city park. Just remember not to blame yourself or your telescope for what may seem like mediocre results. Rather, make a note to bring your telescope along on country getaways.

The higher in the sky you look, the darker the sky will be. Plan your deep-sky observing projects accordingly. Also, light pollution tends to improve a bit after 11 or midnight as some outdoor lights get turned off.

Keep an eye on the daytime sky. The deeper and cleaner the blue is in the afternoon, the cleaner and darker the air will be at night.

Moonlight, of course, is nature's own light pollution. When moonlight is in the sky, plan on sticking to bright targets.

Astrotips - Imaging

From https://astrobackyard.com/7-astrophotography-tips/

The 500 Rule

You may have heard the phrase "the 500 rule" before. This is a calculation that is used to give you a useful exposure length to avoid star trails. The focal length (magnification) of your lens and the camera you use (crop-sensor, full-frame, etc.) will decide the length of time you can expose the shot before stars begin to trail.

This is a useful calculation to consider if you are not using an equatorial mount that tracks the apparent movement of the night sky. The 500 rule can be very handy when photographing the Milky Way, or any wide-angle nightscape shot that includes the stars above.

The 500 Rule:

500 Divided By the Focal Length of Your Lens = The Longest Exposure (in Seconds) Before Stars Start to Trail

For example, if you are using a 50mm lens on a full-frame camera, the longest exposure you can shoot without star trailing would be 10-seconds. If you are using a crop-sensor DSLR camera, you'll need to multiply the focal length by that value. In the case of my Canon EOS Rebel series DSLR's, this is a value of 1.6. Experiment with your camera under the night sky and use what works best for you, but this is a great benchmark to follow.

Roger Hill - Full Moon

I was out last Friday night, and had the 6"Ritchey-Chretien on top of my 12"SCT. I'd carefully checked in the afternoon to make sure that nothing would collide with the side of the observatory.

I'd also recently installed an IR filter in the filter wheel, so I could have a good play with ZWO's ASI462 (their planetary camera).

However, I used the 1600mm Pro, a monochrome 4/3"sensor and cooled. I also had an Astrophysics focal reducer, so I was running about 950mm of focal length, and the Moon fit nicely on the chip.

I'd also recently replaced my French made USB_FOC.US device with the Electronic Auto Focuser (EAF) from ZWO, and since Astrophotography Tool (APT) now has a very nice beta version of their software that does autofocusing, I decided to give it a try.

Once I knew I had a pretty good focus (thanks to Malcolm's demonstration a couple of months ago) on a starfield near Regulus, I swung around to the nearby Moon and captured some .SER video files (16 bits). 180 frames of InfraRed, Red and Green.

I used Registax to stack and sharpen (via wavelets) each of the three monochrome images, and then used the technique found at https://lco.global/education/activities/how-make-color-astronomical-images-photoshop/ to create a colour version, using the IR image for Red, the Red image for Green and the Green image for Blue.

The final step was then to create a "mineral Moon" effect (see https://www.star-gazing.co.uk/WebPage/guides/mineral-moon/) and then re-sized the final image to 1080p .

RASCKC Equipment Loan Program Spotlight

A section where we spotlight one of the pieces of Equipment Loan Program equipment that the RASCKC owns.

Last month: 20cm Fitzgerald Dobsonian

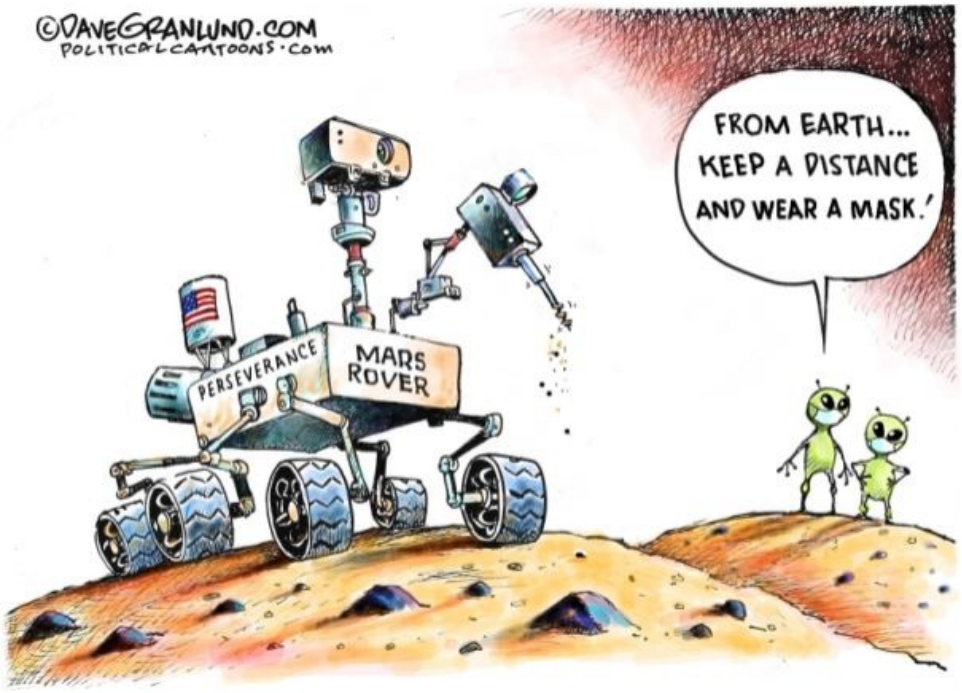
Item #14 - 20cm Barney Dobsonian telescope. Accessories: 18mm B&L plossl eyepiece, 30mm B&L plossl eyepiece. Orion finder, purple case.

This was our 2nd ATM project of the late 1990's starting with the Fitzgerald 20cm scope and ending with a dozen of personal member scopes based on 18cm mirror blanks. Our first nontube designed, this was an open truss. The base leg design turned out to be a mistake and is currently being rebuilt.

RASC Astroimaging Widefield Certificate

https://rascastroimaging.zenfolio.com/widefield

CONGRATS! To Malcolm Park https://rascastroimaging.zenfolio.com/p773105299 and Rick Wagner https://rascastroimaging.zenfolio.com/p506219152 for completing their widefield astroimaging certificates! We (RASC-KC) are on a roll! Three certificates in the last few months! Rumour has it there are at least a couple of more members working on the “Widefield”, Kevin Kell is working on the “Solar System”, and Malcolm and Rick are now working on the “Deep Sky”



Mars Rover survives terrifying reentry and succesfully lands on Mars.

From https://www.nasa.gov/press-release/touchdown-nasas-mars-perseverance-rover-safely-lands-on-red-planet

The largest, most advanced rover NASA has sent to another world touched down on Mars Thursday 2021 Feb 18th, after a 203-day journey traversing 293 million miles (472 million kilometers). Confirmation of the successful touchdown was announced in mission control at NASA's Jet Propulsion Laboratory in Southern California at 3:55 p.m. EST (12:55 p.m. PST).

Packed with groundbreaking technology, the Mars 2020 mission launched July 30, 2020, from Cape Canaveral Space Force Station in Florida. The Perseverance rover mission marks an ambitious first step in the effort to collect Mars samples and return them to Earth.

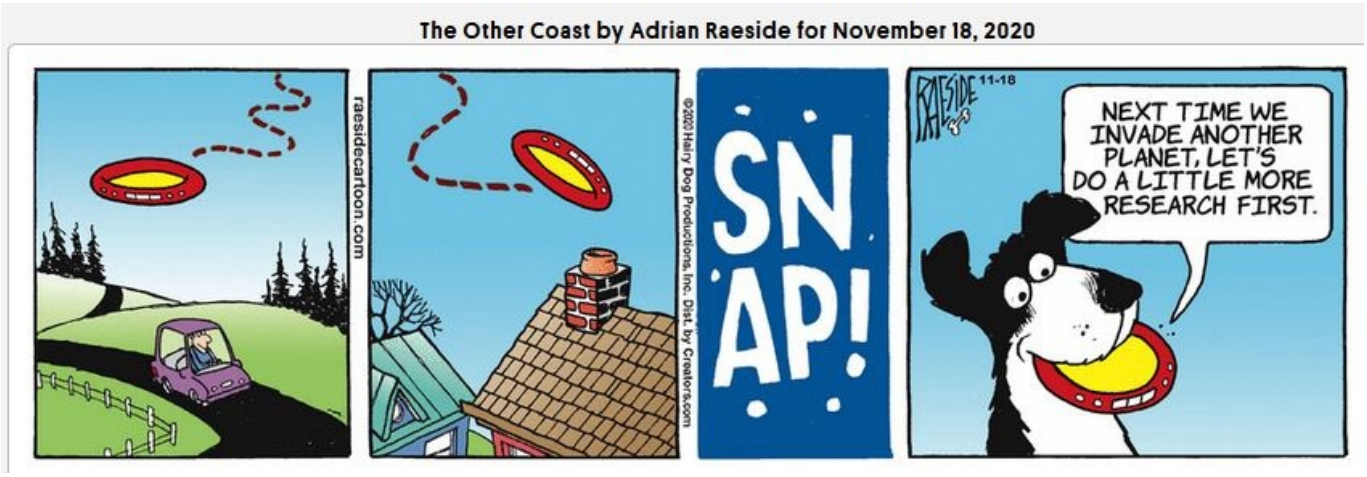
About the size of a car, the 2,263-pound (1,026-kilogram) robotic geologist and astrobiologist will undergo several weeks of testing before it begins its two-year science investigation of Mars' Jezero Crater. While the rover will investigate the rock and sediment of Jezero's ancient lakebed and river delta to characterize the region's geology and past climate, a fundamental part of its mission is astrobiology, including the search for signs of ancient microbial life. To that end, the Mars Sample Return campaign, being planned by NASA and ESA (European Space Agency), will allow scientists on Earth to study samples collected by Perseverance to search for definitive signs of past life using instruments too large and complex to send to the Red Planet.

For Sale

3.2 m Sirius Observatories motorized fibreglass dome observatory on a stone building.

Built 2012 on 3 acres

Includes: Paramount MyT mount Celestron C-14 SBIG ST-4000XCM with AO8 Robofocus focuser motorized scope shutter MaxDome dome controller Security cameras (internal and external) Hydro One electricity (approx. $ 167 every 3 months) Bell internet (approx. $85/mon) PC with appropriate software (Robofocus, The Sky, Ascom dome control, Alnitak shutter control, Maxim DL, MaxDome and a variety of diagnostic astronomy applications). Controllable on-site or across the internet (I use TeamViewer on my iPhone or from my PC) Annual property tax $124.68 The land is suitable to build a house (that was my plan). It is located 20 minutes west of Perth (south of Hwy 7). Asking $75,000 Contact: Bob Hillier bobhillier@sympatico.ca



Attention Young Astronomers!

Are you thinking of entering the

FLASF 2021 Science Fair?

(March 22nd-26th)

The Kingston Astronomy Club is offering the

Leo Enright Award

for the best project in

Astronomy and related sciences

The awardee will receive **$100**

and an *Explore the Universe Guide*

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For starter ideas
please check out the next pages!

The RASC* Kingston Centre
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***Royal Astronomical Society of Canada**

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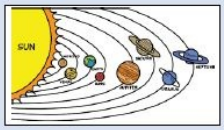
Facebook: RASC Kingston Centre
Twitter: @AstroKingston

Some Suggestions To Get You Started!

1) Try observing by naked eye at night:



The Solar system:

- Check out the sun, moon and planets rising and setting times in your area. Saturn, Jupiter, Mars, Venus and Mercury will be visible by naked eye.
  https://www.timeanddate.com/astronomy/night/canada/kingston

- Identify the **planets** visible each night or at dawn. Note that some appear to come very closely together - called a conjunction. For example: Jupiter, Saturn and Mercury at dusk in January; Jupiter and Venus at dawn in February; and Mars and the Pleiades cluster in early March. Check out the Internet to see what's visible each night: *https://earthsky.org/tonight*.

- Explore the **Moon**: Observe and record the phases of the Moon. Do you know why they occur? Here's a video to show you: *https://www.youtube.com/watch?v=wz01pTvuMa0*
  Can you see and draw the shaded areas on the Moon? They are called **Mares**. How were they formed? -Which is the largest? – Can we tell their age? Here's a link to an observer's guide for the **Moon**: *https://www.rasc.ca/sites/default/files/EtM_Binoculars_V3.pdf*

Constellations and Bright stars:

- Learn to use a sky chart to help you look for constellations. Well-known examples are Ursa Major and Minor, Cassiopeia, Taurus (Hyades), Pleiades, Orion and more!
  Here is a link to one that you can print, cut out, and glue onto thin cardboard:
  https://www.uaf.edu/museum/education/educators/heliophysics-aurora-outre/activities/pdfs/Create-A-Star-Wheel-Activity.pdf

- Find out what ***double stars*** are, and whether any of your constellations have them:
  https://www.astropix.com/html/observing/20_fun_naked_eye_doubles.html
  What colours are they? – Why are they different colours? – Why are they different sizes? – How do they differ using binoculars*?

**Choosing binoculars: Any simple pair of binoculars (e.g. 7x or larger) would be fine.*

2) Try observing "Deep Sky" objects using binoculars:

Some "Deep sky" objects are visible through binoculars on a dark clear night, such as the "Nebula" in Orion's dagger, or Andromeda (closest galaxy to us). Using the internet and a sky chart, can you locate these favorite targets, and research further what they are, and how they were formed? Here is a sky chart including the location of some Deep Sky objects during the month of January 2021: *http://www.skymaps.com/skymaps/tesmn2101.pdf*.
Charts for following months will appear at similar links (...2102.pdf or ...2103.pdf, etc.).

3) Explore the moons of Jupiter with a small telescope:

There are four moons visible on Jupiter using a small telescope. Each day they change their position and sometimes go behind or in front of the planet. Try observing each night over several days/weeks and record their movement. Check the internet to confirm what you see:
https://skyandtelescope.org/wp-content/plugins/observing-tools/jupiter_moons/jupiter.html

4) Track the International Space Station (ISS)!

Here is a link how to find when and from where the ISS can be seen:
https://spotthestation.nasa.gov/sightings/index.cfm
Can you name any Canadian astronauts who have served on the ISS? What are some of the experiments that have been done and what have they discovered? How may times doe the ISS orbit the earth per day, and how high is it? Draw a star map of where you saw it and what planets or constellations it passed.

5) Additional Resources:

- **Observer's Work sheets**: *https://www.rasc.ca/sites/default/files/LogBookPageRight_3.pdf*
- **Explore the Universe program:**
  https://rasc.ca/sites/default/files/ExploreTheUniverse6a.pdf
- ***Stellarium***: A software planetarium that generates an interactive display of the night sky:
  https://stellarium-web.org/

- **The Cosmic Club**: An online series on the latest Astro News for space-loving youth in grades 8-12. Organized by the **Institute for Research on Exoplanets** and **Plateau Astro** (Saturdays 11am starting January 23rd). YouTube link:
  https://www.youtube.com/watch?v=6HNBuq_G50Y&pbjreload=101