

AURORA



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The Royal Astronomical Society of Canada - Windsor Centre

January 2019

Mars - The Red Planet by Juliana Grigorescu

Mars orbits the Sun at an average distance of 1.5 astronomical units, in an elliptical orbit of eccentricity 0.093. It was this high eccentricity of its orbit (third after Pluto and Mercury), that allowed Kepler to discover his first two laws. On Aug 27, 2003 Mars was at its closest in 60,000 years; a mere 56 million km. Mars can be as far away as 400 million km. Every two years Mars gets closer to Earth, at a time called "opposition".

Having a radius of $1/2 R_E$, a mass of $1/10 M_E$ we deduce a density $D = 3.94 \text{ g/cm}^3$. It means that Mars has a small amount of iron in its core. It also appears to have a significant amount of sulfur, in the form of sulfate salts.

Mars has a tilt of 24° , similar to Earth, meaning it has 4 seasons that are twice as long as the ones on our planet. It rotates in 24.6 hours, with days and nights like the days and nights we have! There are about 669 Martian days in a Martian year.

Prominent Features:

- Northern hemisphere - volcanic, Southern hemisphere - cratered
- 1 large highland called Tharsis with the highest volcano in the Solar system (25 km high!)
- 1 deep Canyon – Vales Marineris (4000 km long, 120 km wide and 7 km deep)
- Polar caps that grow and shrink, covered with frozen carbon dioxide + ice. Permafrost could melt to cover the planet in a 10 m thick layer of water
- Strong winds, sand dunes and sand storms that can cover the whole planet
- Features that witness the presence of water/liquid water: smooth crater floors, ripple marks, islands showing flow of water around them, river channels. At present (2019) however, there is no evidence of liquid water on the Martian surface.

There is no magnetic field for reasons that are not entirely understood! The average temperature on Mars is -60°C .

The atmosphere is made of 95 % carbon dioxide, with clouds of frozen water. The pressure is low, 1% the pressure on our planet. The Greenhouse Effect is inhibited and Mars is therefore very cold (a Runaway refrigerator). The atmosphere was once more like Earth's atmosphere, but the lower temperature froze the water in the atmosphere. The ice fell on the ground forming layers of ice. Carbon could not be flushed down by rain, so it stayed in the atmosphere and formed the carbon dioxide that we detect today.

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Calendar of Events

Our next meeting...

Tuesday February 19, 2019

7:30 p.m.

at

Ojibway Park Nature Centre

5200 Matchette Road

Main Speaker...

To Be Determined

Topic...

To Be Announced

Activities...

Total Lunar Eclipse: On Sunday January 20 the Full Moon slips into the Earth's shadow and totality will begin at 11:42 p.m. EST and ends a little over an hour later at 12:45 a.m. EST.

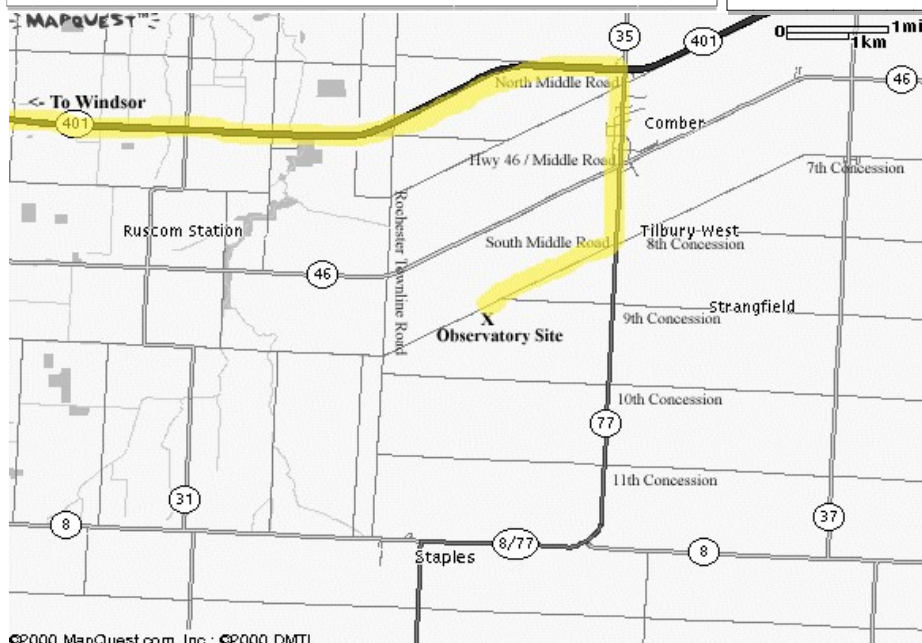
Venus and Jupiter: Will be in conjunction in the predawn sky on Tuesday January 22 with Jupiter 2 1/2 degrees below and slightly to the right of Venus.

Venus and the Moon: Will be in conjunction in the morning sky on Thursday January 31 with the moon just 2 degrees to the right of Venus.

Mars and Uranus: Are slightly more than a degree apart in the early evening sky on Tuesday February 12th.

Council Meeting: The RASC Windsor Centre Council will be meeting on Tuesday February 12th at 7:30 p.m. at the home of Steve Mastellotto.

Venus and Saturn: Are a degree apart in the morning sky on Monday February 18th.



Hallam Observatory Site

Directions: The map at left shows the Comber area and it includes the major highways (401, 77, 8 and 46) that are in the area of the observatory.

The most direct route from Windsor is "highlighted" on the map which is to take Highway 401 East to Highway 77 South to South Middle Road. Turn right onto South Middle Road and go about 1 kilometer and just after the point where Concession 9 joins it (it is hard to see this intersection) you will find the observatory site on the South side (left) of the road. 3989 South Middle Road.

If you hit the Rochester Townline Road (you come to a stop sign) you have gone too far.

Submissions

Aurora is published monthly except for July, August and December. The September, October, January, March and May issues are full newsletters (usually 6 pages) with a number of member submitted articles. The November, February, April and June issues are short flyers (2 pages).

Submitted articles can be of any length from a paragraph to multiple pages. I can scan pictures and/or diagrams (both prints and film) to support your article and the originals will be returned to you.

Submission deadline is the 1st of the month.

Editor: Steve Mastellotto Email: mmastellotto@cogeco.ca

Membership

The Windsor Centre of The Royal Astronomical Society of Canada meets on the 3rd Tuesday of every month (except July and August) at the Ojibway Park Nature Centre. In addition to regular meetings the centre hosts a number of observing nights, a picnic and a December social. Members receive a copy of the Observer's Handbook, a subscription to SkyNews magazine and access to the Centre's library and telescopes. Optionally the RASC Journal is available in print form—online version free.

Annual Membership Fees: Please see the RASC website at www.rasc.ca for current rates.

Contact Nancy Ng (mysticdog2012@gmail.com) or visit our website at: <http://www.rascwindsor.com> for more information.

November 2018 Meeting Minutes by Nancy Ng

The monthly meeting of the **Royal Astronomical Society of Canada - Windsor Center** was held at the Ojibway Park Nature Centre on **Tuesday November 20, 2018**.

Windsor Centre **President, Mike Mastronardi** chaired the meeting and **called the meeting to order at 7:40 p.m.** and welcomed members and guests to the Ojibway Park Nature Centre.

Mike invited members to review **the minutes of the October 16th, 2018** meeting which were printed in the November Flyer. A **motion to accept the minutes** was made by **Dr. Susan Sawyer-Beaulieu**, seconded by **Rick Marion**. **MOTION CARRIED.**

Announcements

Mike asked anyone in **attendance for the first time** to stand and introduce themselves. He then reminded everyone of the pot-luck **December Social** on Friday Dec. 7th at 5:30 p.m.. Mike also mentioned that a flower arrangement from RASC-Windsor Centre was delivered to Families First Funeral Home for the recent loss of Randy Groundwater's beloved wife Anita.

Elections

Rick Marion was up next to handle the election of our **2019 Executive and Council**. New Executive and Council Members were voted in by the membership. Executive members are as follows:

President	Mike Mastronardi
1st Vice-President	Rick Marion
2nd Vice-President	Open Position
Secretary	Open Position
Treasurer	Greg Mockler
National Council Rep.	Tom Sobocan
Past-President	Randy Groundwater

Rick asked if anyone would like to join Council and **Sandy van Gaalen** was added to the list of nominees. For a complete list see page 5 of this newsletter or visit our website at www.rascwindsor.com/pages/council.

Presentation

Michael Mastronardi gave a presentation on the **General Assembly meeting in Calgary** which he attended. Some entertainment was provided by some of the Indigenous groups in Calgary. The official unveiling of the **astronomical stamps** from Canada Post was performed. The **150th Anniversary RASC poster** contains many photos of our centre involved in various community activities. The next General Assemble will be in **Toronto, June 14-26, 2019**.

Tom Sobocan presented **photos of various activities** and members.

Coffee break. **Al DesRosier** won the **50/50** and donated his winnings to be put towards the flowers.

Director of Observing

Steve Mastellotto presented the Director of Observing Report. He called on **members to share** their astronomy related activities and displayed some **member photographs**.

He then presented some astronomy related slides from his recent trip to the U.K. with views of the prehistoric monument **Stonehenge** in Wiltshire, England. We were treated to photos of the **Herschel Museum** in Bath, England along with **the prime meridian** at the Royal Observatory, Greenwich in London England. Here, atop the building was a falling 'new year' type time ball which aided sailors out at sea in **keeping accurate time**. The observatory museum is also the home of **John Harrison's** portable clocks H1 through H4 which solved the **longitude problem** in navigation.

Steve's image of the **Lagoon Nebula** was shown which he produced from a remote telescope in NSW, Australia.

The skies will feature the following...

- **Venus** growing in magnitude in the early morning sky
Dec. 6-7 **Mars is 1/2 degree from Neptune** which is in Aquarius all night
- **Jupiter** is gone and **Saturn** is only visible for a short time after sunset.
- Look for comet **46P/Wirtanen** on Dec. 12th when it will be positioned below the **Pleiades** cluster in Taurus all night.
- The **Geminid meteor shower** peaks Friday Dec. 14th.
- **Winter Solstice** is Dec. 21st.

Steve also covered the constellations available to view now and for the next 2 months.

Reminders: Astro Luncheon at **Skippy's Restaurant** every second Wednesday of the month, at noon. Located at 954 University Ave West, Windsor.

Mike thanked everyone for coming out to the meeting and reminded everyone that the **next regular membership meeting** would take place on **January 15, 2019 at 7:30 p.m.** and the **December Social** will take place **Friday December 7th**.

Meeting **adjourned at 10:10 p.m.** November 20th, 2018.

At The Eyepiece: Using a Star Atlas by Mike Ethier

Last time I talked about a way of getting to know unfamiliar parts of the sky by using a bright deep sky object as a jumping off point for telescope users. Exploring slowly and carefully in different directions has always been a worthwhile way to spend time with the night sky.

This time I would like to talk about a second method of preparing for a night's observing. However, a star atlas is now required, and perhaps some books describing deep sky objects, variable stars, and double stars. I like the books put out by the Webb Society, but I still often use the 3-volume *Burnham's Celestial Handbook*. As to sky atlases, the only one to even consider for advanced amateurs is the *Uranometria All-Sky Edition*, 2nd Ed, revised. For the price of a cheap eyepiece (\$60), this will be the best investment you ever made. Cloudy nights suddenly become fun with this atlas. And it comes with free shipping.

<http://www.willbell.com/atlas/index.htm>

If you are among those who purchased the first edition way back when, as I did, then realized the maps were backwards and difficult to use in the field, have no fear. Things are corrected and much improved now! And an all-in-one edition means only one volume is now needed to study Orion in depth! Before the 2nd edition of *Uranometria* came about, I used to do the following for my 2nd Method of preparing for a session. Afterwards I will tell you a new, improved way, thanks to the revised atlas format.

1. Pick an area of sky of interest to you. I will pick oc 2232 in Monoceros, for reasons that should become apparent if you glance at the atlas (it's a simple enough area to start with). However, any area will do, as long as you begin somewhere you will recognize.
2. Without looking at any photos of objects to be observed (wait until after you have actually searched for them at the eyepiece), write down some info about the main object from one of your resources. (oc 2232: 29'; stars mag 6 - 8, about a dozen). I use the companion volume to the *Uranometria* atlas (see the link, above).
3. Search on the map (chart #116 in *Uranometria*) for neighbouring points of interest. Write down any info about these objects you may have. You should notice oc 2219 preceding, oc 2250 following, and oc Cz 26 north following. These clusters are within easy star-hop range of oc 2232. Their relative obscurity may or may not be deserved. You can decide for yourself. The size of your mirror and the darkness of your sky will help you determine this, along with your experience as an observer. A few unnamed doubles are also indicated nearby, as well as a handful of variables, including GL, V723, and IM. Don't ignore the brightest star within oc 2232, which is labeled as a double star.

What we have just done is prepare our session more in depth than with the previous method, where we only needed the location of one bright object (and no atlas) to get started. This time we have gone target hunting, looking for specific objects near our bright starting point. One of the reasons I chose 2232 is that despite a good star-hop search using Method 1, those three other open clusters still may not have been found. They are faint, and at low power may be missed (if you found them using Method 1, then congratulations!). Using Method 2, we are now searching in an exact location for specific objects, hopefully with some success. Use neighbouring stars leading from 2232 and marked on the atlas to guide you directly. This is called guided star hopping, and with practice can be a very quick and efficient method of getting around. Thus Method 2 works similarly to Method 1, but it is now required to choose an area of sky with a few other objects of interest near the main object. If you have the right atlas, this will pose no difficulty. Choose your area based on your sky

conditions, horizon, and season. This is how I prepare for a session using Method 2. As mentioned at the beginning of this article, however, I will sometimes do things differently now. Since the publication of the 2nd edition of *Uranometria* it includes, in addition to 220 star maps that show every NGC and IC object down to Mag. 15, 24 close-up maps at the back of the atlas. These highlight and enlarge x2 or x3 things like galaxy clusters (Virgo, Coma, Hercules and others), extra rich areas of the Milky Way (Cygnus, Sagittarius, Scorpius, etc) and the Magellanic

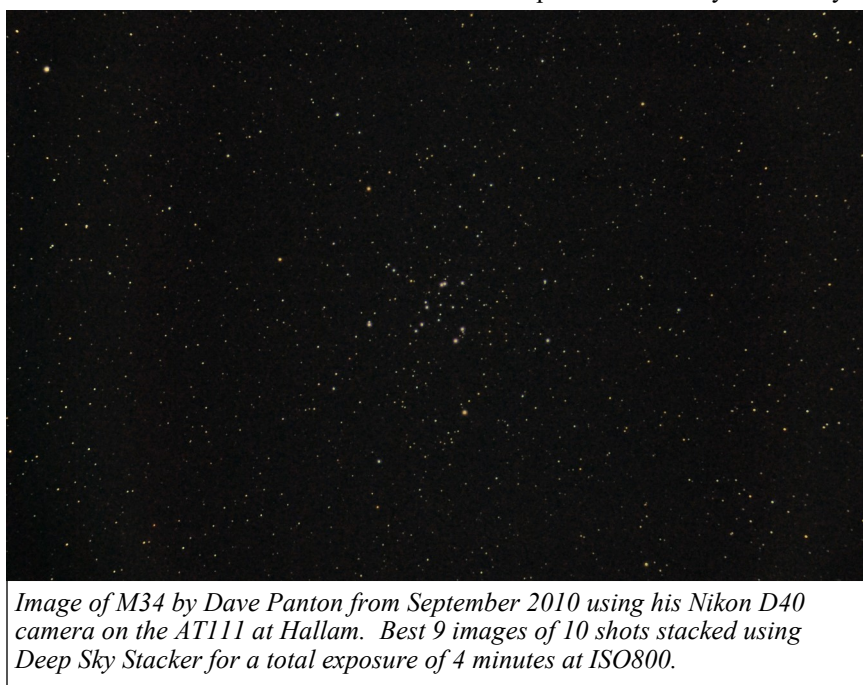


Image of M34 by Dave Panton from September 2010 using his Nikon D40 camera on the AT111 at Hallam. Best 9 images of 10 shots stacked using Deep Sky Stacker for a total exposure of 4 minutes at ISO800.

Clouds. There is a lifetime of observing just within these supplemental maps! I can't wait to get at Cygnus this summer with Charts A1 and A2, and in the spring with the Leo galaxy charts (A10, 11). And once you see the Large Magellanic Cloud Chart and how many NGC objects reside there (a 2-page spread), you will want to book an astronomy B & B in Australia or Chile for a month!

Next time I will detail Planning Method 3. May you have clear skies and successful star hunting until then!

Messier Object of the Month

Perseus is home to some of the finest clusters in the sky. Messier 34 is only one the showpieces in this constellation sitting atop the Milky Way, and in January the cluster is ideally suited for observation, being almost overhead in the early evening. I have had the good fortune to observe this bright open cluster with three different scopes, including Space Eye, my 2" refractor. M 34 is a fine object for very small scopes, and is seen well at 30x. It is a large group filled with bright stars, and the eye is kept busy. The central area resolves well, and there are also several bright stars in

At The Eyepiece (continued)

the outskirts. That observation was done in October of 2015.

Back in October of 2002 I viewed it from Comber with my Edmund 8" reflector. At 36x it appeared as a very loose, medium-rich cluster. There are numerous bright stars, some in pairs. The cluster is best viewed at low power. 56X resolves the entire group, though views were also lovely at 72x.

In January of this year I finally got to look at it with the 12" scope. It fits in the field of view at 60x, its many bright stars becoming almost blindingly white. The cluster includes some fine doubles, and the overall large and loose structure invites the eye to search all around for interesting pairings and other details. One aspect that struck me was a fascinating string of faint stars on the south end, intersecting with another line coming through the center of the cluster. There are about 12 stars in the first line, some with very faint companions. 100X shows the central area in good detail, though at this range the full cluster size is lost. Since M 34 is right in the Milky Way, it is fun to sweep the area surrounding the cluster. A rich knot of faint stars can be seen just south following, and I also came across a wide U of stars not far away.

It's often too cold in January to do much more than a brief observation. This time is usually reserved for a look at the Orion Nebula. However, M 34 can be appreciated on a quick visit, and will also reward those with time for a closer view.

M 34 (NGC 1039): Size 25'; overall mag. 5.2; about 60 stars; brightest star mag. 9.

Calendars



Mike Ethier Winter Observing
By Randy Groundwater

2019 RASC Windsor Centre Calendar
Member Astrophotos

2019 RASC Windsor Centre Calendars Still Available!

For the third year we have produced a calendar featuring the astrophotography of Windsor Centre members. Please see our Treasurer, Greg Mockler at the members meeting if you are interested in purchasing the 2019 calendar. We have taken delivery of a bulk order to help keep the price down which **will be \$20.00** (same as last year) which includes all postage, handling and taxes.

2019 Council of the RASC - Windsor Centre

Executive

President	Mike Mastronardi
1st Vice-President	Rick Marion
2nd Vice-President	<i>Open Position</i>
Secretary	<i>Open Position</i>
Treasurer	Greg Mockler
National Council Rep.	Tom Sobocan

Councilors

Steve Mastellotto	Nancy Ng
Steve Pellerin	Paul Pratt
Paul Preney	Dr. Susan Sawyer-Beaulieu
Tom Sobocan	C. Joady Ulrich
Mahayarrahh Starr-Livingstone	Sandy van Gaalen

Appointed Positions

Honorary President	Dr. William Baylis
Past-President	Randy Groundwater
Alt. National Council Rep	<i>Open Position</i>
Librarian	Miklos Galata
Recording Secretary	<i>Open Position</i>
Public Education Director	Mahayarrahh Starr-Livingstone
Public Relations Director	<i>Open Position/2nd-VP</i>
Directors of Observing	Juliana Grigorescu
	Steve Mastellotto
	Nancy Ng
	Jessie Passa
	Dr. Susan Sawyer-Beaulieu
Light Pollution Abatement	Mahayarrahh Starr-Livingstone
Hallam Observatory Director	John Marn
Aurora Editor	Steve Mastellotto
Web Master	Steve Mastellotto

Comet 46P Wirtanen
Dec 16 2018 8:58 PM EST
Hallam Observatory



Comet 46P Wirtanen from Hallam Observatory by Mahayarrahh Starr-Livingstone.

Mars - The Red Planet (continued)

There are 2 moons in orbit about Mars: Phobos (at 3 Mars radii) and Deimos (at 7 Mars radii). These moons were discovered in 1877 by Asaph Hall and are believed to be captured asteroids, because of their irregular shapes. Not everybody agrees with this theory. Being so close to the planet, Phobos is supposed to crush into Mars within 30 to 50 million years.

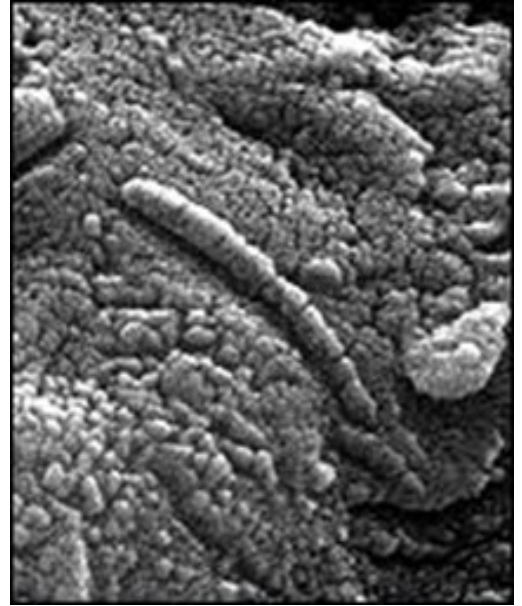
Is there life on Mars? In 1877 channels were observed on Mars by the Italian astronomer, Schiaparelli. The translation in English was canals, which implied the existence of Martians. The obsession with the little green men peaked with the famous novel "The War of the Worlds" by H.G. Wells. But false alarm, there are no little green men! In 1996 a worm like structure was discovered in a meteorite that was of Martian origin. Again, it was a false alarm. The many missions to Mars discovered no life. We still do not know for sure!

But how many missions were there to Mars? It all started in 1960 with Russian missions, but NASA Mariner 4 was the first successful mission (flyby) followed by Mariner 6, 7 and then Mariner 9 which was put in orbit around Mars, sending back amazing pictures. Mars 2 was the first successful mission of the Soviet Union in 1971.

A new era began with the Viking 1 and 2 which landed on Mars in 1975 and again sent back amazing pictures of the "Martian world".

The Mars Global Surveyor orbiter was followed by the Mars Pathfinder lander and the Sojourner rover all in 1996. Then two more orbiters,

Mars Odyssey and Mars Express started a vigorous scanning of the surface. The reason?



To prepare two extraordinary missions for rovers Spirit and Opportunity, that were going to reach Mars in 2004. Both went beyond everybody's expectations. Opportunity ceased communication on June 10, 2018, although it was expected to last one year, at most! Chances are it might come back to life in 2019. Russia, ESA and India managed to send orbiters and landers, and all of these missions are trying hard to discover liquid water on Mars, the source of life. Is that going to happen? Good Luck!



*Image of The Crab Nebula (M1)
by Brian Simpson from his
Lasalle backyard using narrow-
band filters and the Hubble Pal-
lette. Exposure times:
Halpha - 26 frames @ 4 minutes/
frame = 104 minutes (1x binning)
OIII - 38 frames @ 3 minutes/
frame = 114 minutes (2x binning)
SII - 25 frames @ 3 minutes/
frame = 75 minutes (2x binning)*

*Total exposure time = 4 hours
and 53 minutes*