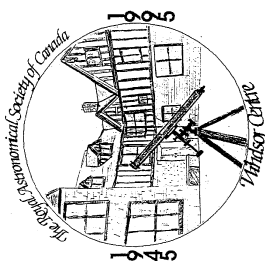




# AURORA



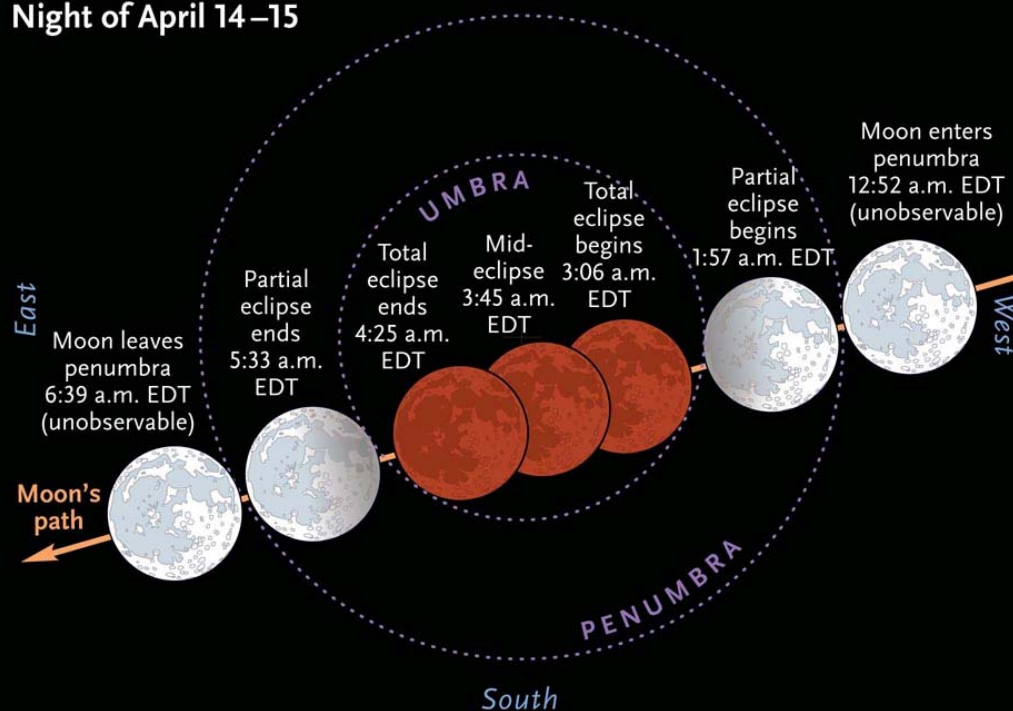
March 2014

The Royal Astronomical Society of Canada - Windsor Centre

Volume 39, No. 6

## April's Total Lunar Eclipse by Steve Mastellotto

### Total Eclipse of the Moon Night of April 14–15



A lunar eclipse occurs when the Sun, Earth, and the Moon line up. In early morning hours of Tuesday April 15th the full moon will pass through Earth's shadow for most of North America. Earth's shadow has two parts: a darker inner section called the umbra and a lighter outer region called the penumbra. When all of the Moon passes through the umbra we get a total lunar eclipse. That's what's happening on the 15th and Windsor is in a prime location so see the entire event. The early stage begins with the generally unobservable penumbral phase at 12:52 a.m.. The moon begins to enter the umbral portion of the shadow at 1:57 a.m. marking the beginning of the partial phase of the eclipse. At 3:06 a.m. the moon will be fully immersed in the Earth's shadow and totality begins. Since the Earth's shadow is almost 3 times as large as the moon it can take up to 90 minutes for the moon to travel through the Earth's umbra. Since this eclipse is not exactly centered in the Earth's shadow totality will last about 78 minutes. You should look for the changing colour of the moon during totality which can vary from light gray to a deep red. Most eclipses have an orange appearance. As noted since the moon will be passing through the lower half of the Earth's shadow the eclipse will look darkest on the top of the moon. The moon travels across our sky from West to East so the eclipse will begin on the Eastern (sky directions) side of the moon.

This will be a fun observing night (morning) for you and you family and our regular monthly meeting is that night so if you manage to observe the eclipse or take any images please be sure to come to the meeting ready to talk about what you observed or captured with your camera.

### In This Issue

April's Total Lunar Eclipse	Cover
Events; Housekeeping Items	Page 2
February Meeting Minutes	Page 3 and 5
At the Eyepiece	Page 4 and 6

## Calendar of Events

### Our next meeting...

Tuesday April 15, 2014

7:30 p.m.

at

Ojibway Park Nature Centre

5200 Matchette Road

### Main Speaker...

Dan Taylor will be giving a short talk

### Topic...

*An Introduction to DSLR Photometry*

### Activities...

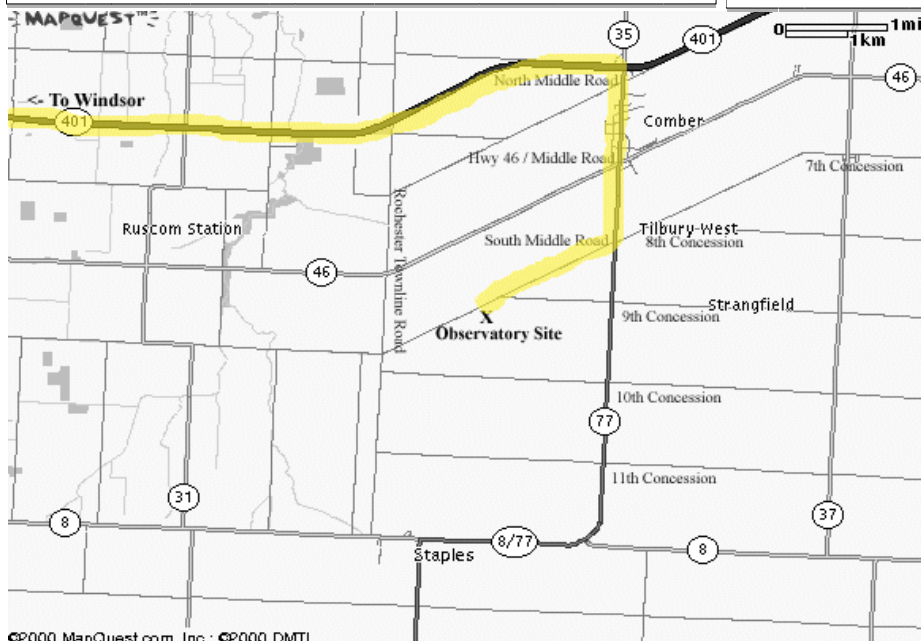
**Regulus Occultation:** On Wednesday **March 19th** asteroid 164 Erigone will block the light from Regulus for observers near Kingston Ontario.

**Vernal Equinox:** Spring officially begins in the Northern Hemisphere at 12:57 p.m. EDT on Thursday **March 20th**

**Moon and Hyades:** Waxing crescent moon will be in the Hyades star cluster on Thursday **April 3rd**

**Open House Night at Hallam:** The next open house night at Hallam is on Saturday **April 5th** at 8:30 p.m..

**Asteroid Oppositions:** **4 Vesta** will be at opposition on Sunday April 13 and **Dwarf Planet Ceres** is at opposition on Tuesday April 15 just 2.5 degrees from Vesta



### 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](mailto: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](http://www.rasc.ca) for current rates.

Contact Greg Mockler at (519) 326-7255 or visit our website at: <http://www.rascwindsor.com> for more information.

## February 2014 Meeting Minutes by Matt McCall

The monthly meeting of The Royal Astronomical Society of Canada - Windsor Centre was held at the Ojibway Park Nature Centre on February 18, 2014.

Windsor Centre **President Rick Marion** chaired the Meeting. Rick called the meeting to order at 7:38 p.m. and welcomed members and guests to the Ojibway Nature Centre.

A motion to accept the minutes of the January 21, 2014 members meeting was made by Greg Mockler, seconded by Art Rae. **MOTION CARRIED.**

Rick introduced the main speaker for the evening, **Steve Pelarin**, and his talk: *A Day and a Night at the Mauna Kea Observatory - Astronomy's Premier Portal to the Cosmos*. Steve began by explaining that one of the goals on his vacation to Hawaii was to get photographs of the observatory domes up on the top of the mountain. Slides were displayed showing the various telescopes such as the Keck, Subaru, Gemini North, and James Clerk telescopes. Others included the 2.2 metre University of Hawaii Telescope, the United Kingdom Infrared Telescope, NASA's Infrared scope as well as the Sub-Millimeter Array of telescopes owned by Caltech.

Also shown was an empty space where another telescope is to be built in the future, which would end up being a 30 metre instrument. However, native groups are in the process of appealing the decision to have it built on the top of the mountain because the area is considered sacred to them. He also presented an image taken from the mountain in order to demonstrate just how isolated Hawaii is from the rest of the world, stating there is hardly anything around it at all that would produce much in the way of light.

At nineteen degrees North latitude, Arcturus is a zenith star, and you can easily view the Southern Cross, the Coal Sack, Eta Carina, and Alpha and Beta Centauri, with the Coal Sack being visible in both summer and winter skies.

More slides were shown indicating that Mauna Kea is, in fact, more than double the height of Mount Everest - at least, from the ocean floor to the summit, that is. Due to the cool water all around the island, the air is very stable that flows over the mountains, producing very fine seeing, and high magnification can be easily used for imaging, resulting in often excellent results. Anything near the top of Mauna Kea is above a decent portion of the Earth's atmosphere so there is less to look through. Infrared astronomers can also see a lot more with less interference being that high up.

More slides showed the road making its way up the mountain, with one of them showing the region at 9,000 feet high, with the paved road ending and then becoming lava stone, which could then make the remainder of your drive hazardous. There is a 'Friends of Mauna Kea Observatory' that has telescopes that are brought out from time to time for visitors to use. Other photos showed the residence buildings that house visiting astronomers for when they travel to Mauna Kea to carry out their research. This is where they need to stay for one day and night before

heading to the top in order that they may acclimatize themselves to the air changes that result from being at such a high altitude. Each and every night there is a star party held here at the visitor's centre, with large Dobsonian telescopes being pulled out by the tour guides for observing.

Up at the actual observatory site, Steve was allowed into the dome of the Caltech Submillimeter telescope to take photos. Behind the area of this telescope are the arrays, which aren't typical radio dishes, but instead are microwave reflectors picking up signals from space. They can actually be moved, spread out over 1,700 feet, and also operate independently. Also they can observe twenty-four hours per day, even receiving during the daylight hours.

The new empty site has already been prepped for construction of the Thirty Meter Telescope and a slide was shown of what it would look like completed if it were not tied up in the court appeal process. It is still planned to be an extremely large segmented mirror similar in design to the Keck telescope. It will be the largest in the world unless the European Extremely Large Telescope is built, which would end up being 30% larger. It is designed for observations from the near UV to mid-infrared. In addition, it will have new 'Super' adaptive optics system built in in order to correct for image blur caused by the atmosphere of the Earth.

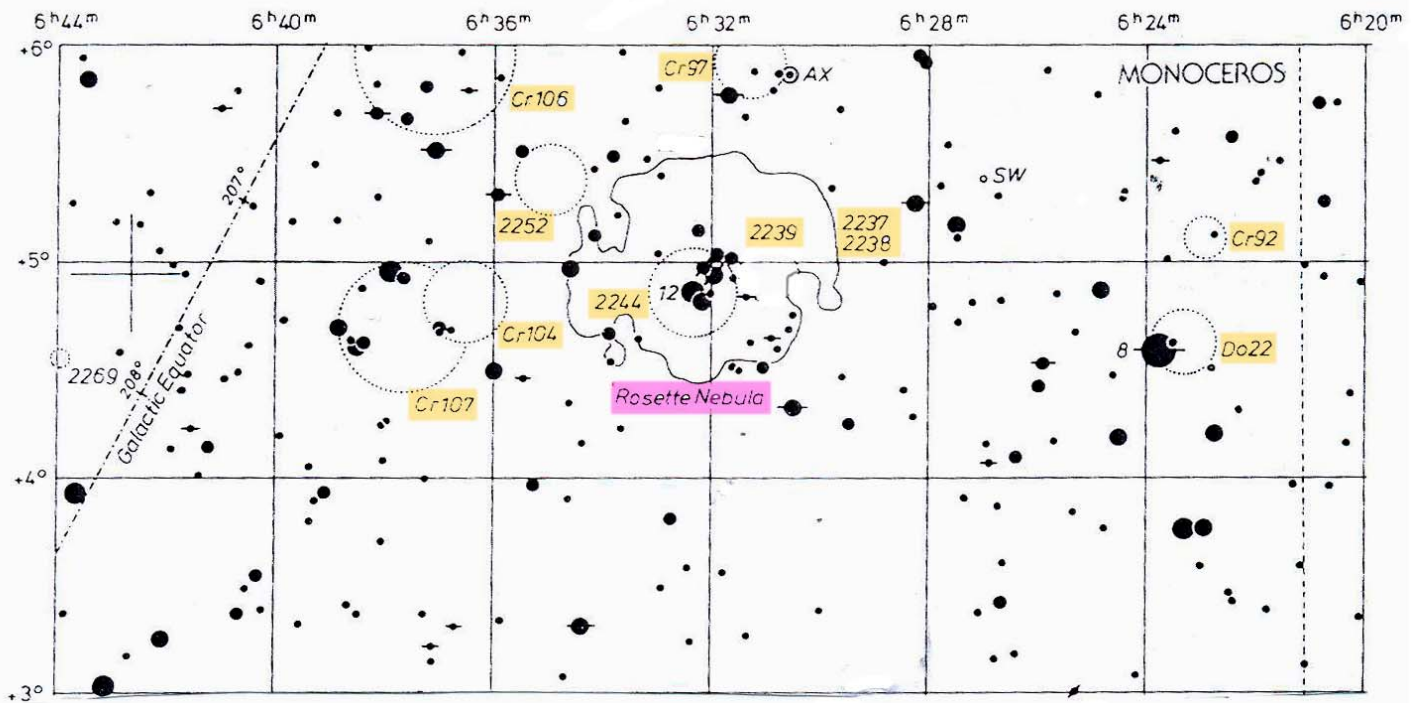
The Subaru telescope is the flagship telescope of the National Astronomical Observatory of Japan. Designed to be used at prime focus, a very wide viewing angle can be used with it, and it was the largest one-piece mirror in use for visual observing until 2005. This is one of the only telescopes of this size in the world that can even be used visually with an eyepiece. The dedication ceremony was attended by the princess of Japan's Royal Family, and she was able to observe with a wide angle eyepiece.

It has experienced numerous glitches and problems ever since construction, with four workers having been killed during the building of it. One notable issue was in 2011, when a coolant leak that dripped onto the mirror, requiring it to be shut down and the entire mirror carefully cleaned off. It could not be used until it was properly fixed. There have been other problems in the past as well.

After describing much of the remaining telescope observatories and his difficulties in adapting to the high altitude's thin air, Steve asked the audience if any of them had any questions they would like answered. Art Rae spoke up and inquired about the drive down from the mountaintop - what was it like? It was described as euphoric despite lack of sleep, due to having a bit of an adrenaline rush being so excited visiting such an amazing place. He was gripping the wheel quite hard due to the treacherous road though. His rental car had to be returned to the rental place by 8:30 the next morning, so everything he did was rushed the evening before. Art also asked if there was any kind of control room for the entire observatory down at 9,000 feet, but Steve mentioned it was kept much lower - down in the valley.

(Continued on page 5)

## At The Eyepiece: Monoceros Close-Up by Mike Ethier



I still remember my first view of open cluster NGC 2244 and the **Rosette Nebula**\*. It was late winter 1971, and I lived in Sudbury, Ontario. Sudbury is a very cold place in the winter, and observing usually did not resume until March. I was using a 40 mm refractor from K-Mart, with a table top tripod sitting on a TV table in my front yard, beneath a street light. At 15x I was blown away by what I saw! It was my first major object of the season, and my first ever in Monoceros (The Unicorn). The cluster was surrounded by faint nebula and I could count several stars, recognizing the now-familiar rectangular pattern of the main cluster body. It was so cold that night I had difficulty focussing, but finally managed to get a superb view, one that has stayed with me all these years. Armed only with the tiny star maps included with Olcott's guide to the heavens, there was nothing else immediately nearby to see and I soon moved north to open cluster NGC 2264.

Readers of this column know by now that I like to begin near a pre-selected object and explore the immediate vicinity for other objects of interest. After I have completed work on the main object, I enjoy sweeping the area immediately surrounding it. However, even careful sweeping with a 12" scope, which is usually undertaken at low power, can easily miss other less conspicuous gems. This article will search out other deep sky objects within very easy reach of NGC 2244.

Let me go astray for a moment and talk briefly about travelling. Some people like to try and see all of Europe in ten days, and book their trip of a lifetime accordingly. My own taste in travel is somewhat opposite to this. I would rather center myself for ten days in a great city, such as London, Madrid, Copenhagen or Barcelona, exploring a much smaller area in detail and making short excursions out of the city to nearby sites of interest. Not surprisingly, this is also a preferred method of mine of observing the sky. Find a major deep sky site or object, enjoy its richness with various eyepieces, filters, etc., and then see what else is nearby. Have you ever observed the Leo Triplet of galaxies? This is a stupendous site in a scope 8" or higher, worthy of many revisits. However, there is more of interest than those three galaxies if the neighbourhood is explored in a little more detail.

And now back to NGC 2244 and the Rosette Nebula. The cluster itself is wonderful even in a very small refractor. In a really dark sky the cluster is visible to the naked eye! The emission nebula surrounding the cluster is visible in good binoculars (I am told) as well as small telescopes. In the 12" it is seen best with a nebula filter (not the cluster, which lies at the dark center). I see something that reminds me of high cirrus clouds, a mottled haze that deepens and thins as one sweeps the large circle surrounding the star cluster itself. The nebula is given several NGC numbers, including 2237, 2238, 2239, and 2246, each representing a different area of brightness, and the whole nebula takes up a vast area of sky (80' x 60', or over 1 degree). To me the brightest part is in the north, around 1 o'clock to the cluster.

(Continued on page 6)

\* The Rosette Nebula can be located just south of, and one-third the distance along, a line connecting Betelgeuse (Orion) and Procyon (Canis Minor).



## February Meeting Minutes (continued)

(Continued from page 3)

Rick thanked Steve for the presentation, and announced the break.

**Break and Fifty-fifty draw:** Rick Marion won and donated the winnings back to the centre.

### Announcements:

- Point Pelee Dark Sky Night to be held Saturday, March 1st.
- Hallam Open House is March 8th at 7:00 p.m.
- Next meeting is March 18th at 7:30 p.m.

Dan Taylor was called up to speak about the **Lauzon Parkway Improvements Environmental Study Report**. Dan indicated he still needs the assistance of the membership to write letters to the two lead engineers in charge of the project as well as the MPP for their respective areas. The letters will show that our centre is interested in preserving our night sky and having full cut-off lighting fixtures implemented in the design of the Lauzon Parkway extension beyond Highway 401 to Highway 3 in Essex.

**Director of Observing Report, Steve Mastellotto:** The activity in the night sky since our last meeting...

- Jupiter is very prominent high above - readily visible and easy to locate
- Venus is very bright magnitude, having reached mag.-4.7 in mid-February
- M82 galaxy in the Big Dipper had a supernova occurrence (SN2014) that was imaged by several members of the centre, staying rather bright for many weeks
- Sunspots have just recently become very prominent, with large enough ones having actually been visible on the Sun with the naked eye when it is low on the horizon and also dimmer than usual at the same time. Very rare occurrence that was sighted by various members.

Images taken by Dave Williamson and Mike Mastronardi of the Moon and Venus conjunction were shown, as well as the huge

sunspots by Mitch Arsenault.

Upcoming events include Jupiter continuing on its path through the sky, crossing constellation boundaries, as well as Mars and Saturn rising earlier and earlier during the night, both easily spotted and bright. Steve mentioned the Zodiacal Light being visible for several weeks, be sure to try to go out to have a look at it. Conjunctions involving the Moon occur on February 21 when it is near Saturn. February 26 - Moon and Venus. February 27 - Moon and Mercury. An evening skychart was displayed of all the winter constellations that will be moving away to make room for the early spring ones. As well as a chart showing the morning sky around 5 a.m. with Venus, Mars and Saturn visible close together.

Deep sky observing in the general area of Canis Major should provide some decent targets such as open clusters M41, 46 & 47. M41 is known as the Little Beehive - positioned somewhat around what could be considered the heart of the hunting dog, some ways below Sirius. A good pair of binoculars will show these as good objects to view.

Omega Centauri can be viewed at this time of year. Right ascension: 13h 27.94m Declination: - 47 Degrees. 33.122m At magnitude 3.7, it is still a real challenge to observe and even image from mainland Canada. However, what is very nice is that Spica is essentially at the same right ascension as this southern globular cluster, so to find where Omega Centauri is located, you can simply find Spica high in Virgo, and the deep sky object should be just above the horizon far below. He finished his presentation by showing different locations where this can be observed such as Point Pelee as well as the John R. Park Homestead - which is where members are free to enter the grounds during the early mornings of March 8-10 to attempt to catch it at such a lower latitude in southwestern Ontario.

Rick thanked everyone for coming and **adjourned the meeting at 10:30p.m.**



*Image of IC 443 - The Jellyfish Nebula, a supernova remnant just NE of Eta Geminorum (bright star to the right), Castor's left foot.*

*Image by Brian Thomas using his Canon 5D on the AT111 f/7 at Hallam with an AT 2" field flattener, 110 minute total exposure at ISO 400. Cropped enlargement from original image.*

## At The Eyepiece: Monoceros Close-Up (continued)

*(Continued from page 4)*

Immediately surrounding the main cluster and nebula are no less than seven other open clusters, providing enough challenge and entertainment for an hour or more of star hop observing. On a cold March night it is a welcome project to see so much and not move the telescope all over the sky. The map accompanying this article is from the first edition of *Uranometria 2000*, and includes all seven clusters. Five are from the Collinder catalogue, one is from Dolidze, and one is from the NGC list. I will briefly discuss each one, moving clockwise on the map.

Immediately north and just slightly preceding NGC 2244 is open cluster Cr 97. This large (30'), scattered cluster has few but bright members, highlighted by yellow variable star AX and double star Struve 926 (magnitude 7.7 and 8.5, separated by 12"), which I see as bluish white and reddish.

Slightly north from NGC 2244 and just over two degrees preceding is open cluster Cr. 92. About one third the size of Cr 97, it still appears fairly large and scattered. However, this one has a denser knot of fainter stars that surround a star of 8.5 magnitude. As magnification increases more stars come out to play. The cluster seems medium rich but has only because of the mostly faint members.

South from Cr 92 is open cluster Do 22. Nearly erased by the bright star 8, look north preceding that star. The cluster lies between it and a tiny group of stars that resembles a mini-Lyra configuration. The area in and around Do 22 is rich in stars and fun to sweep. Getting back to star 8 for a moment, it is a lovely double star all on its own (4.5-6.5/13"), which I see as ivory and lilac. A 12.5 magnitude star can be seen 94" away.

Moving to the 8 o'clock position from, and much closer to NGC 2244 are a pair of Collinder objects that share a border. Open cluster Cr 104 is the smaller of the two, though it is not small. A large field of relatively bright stars are interspersed with dense pockets of fainter ones. Sweep back and forth from it to NGC 2244 for lovely star fields that are part of no cluster but sometimes just as lovely. Immediately south following Cr 104, and overlapping it on one side is open cluster Cr 107. At 35' in size, it is larger than NGC 2244! It contains two named variable stars (V731 and V 732), and the official star count of 30 only considers the brightest members. There are many more faint ones. I used several eyepieces here, from 43x up to 120x.

Moving to the 11 o'clock position from NGC 2244 we come to open cluster NGC 2252, one of my favourite groups in this cluster-rich constellation. I have nicknamed this one the "Star Trek" cluster, as to me it roughly outlines the insignia worn by Star Fleet members; at least it seems so at lower power. There are about a dozen brighter members, and too many fainter ones to sketch well. The central area looks like a little cloud puff at 60x in the 12", but resolves nicely as magnification increases. 100x and 150x gave fine views. Watch for two distinct lines of stars that meet at the apex.

Our final cluster is north following NGC 2252, and is the largest of the entire group (45'). Open cluster Cr 106 and the area surrounding it are wonderful for casual sweeping and getting lost among the stars. The cluster itself has many widely scattered bright stars, along with two areas of fairly intense fainter patches. The following end has one of these faint groups, and the north preceding end has another, near a brighter star (cut off on the map). Also contained in the cluster is V640, called "Plaskett's Star." It is a binary system consisting of two giant stars, and is one of the most massive systems in the galaxy.

Monoceros is a rich constellation for telescope users. We briefly examined eight neighbouring clusters, a very large nebula, and some exceptionally fine areas for casual sweeping at low power. This project makes for a rich visual experience. I hope you enjoy your visit to one small part of this amazing late winter constellation!



*Rosette Nebula by Brian Thomas*