

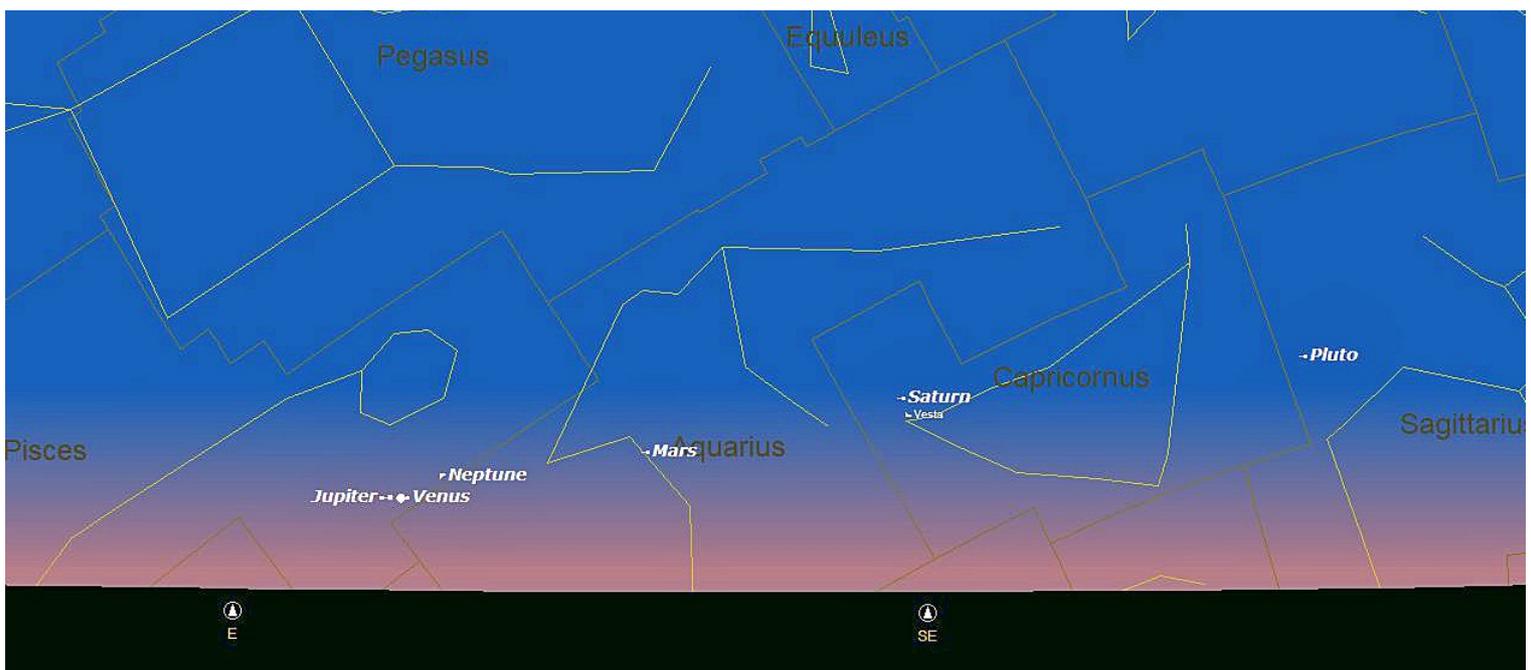
The Night Sky in April, 2022

The Sun and Moon

Welcome to Spring! I am sure that the sight of the daffodils, the blossom on the trees and the birds in the sky is uplifting for us all after a long winter particularly the one we have just endured with Covid and the war in Ukraine. April is not a bad month for observing since the nights are warmer but we still have a number of hours of darkness. We are now happily in British Summer Time which started on March 27th! In this newsletter, times will now be quoted in BST until October 30th when GMT begins. At the beginning of the month the **Sun** will rise at 06:44 and set at 19:45 BST. At the end of the month it will rise at 05:36 and set at 20:40 BST. There will be a **New Moon** on April 1st and again on April 30th and so the beginning and end of the months will be the best for stargazing. We will have the pleasure of seeing a thin crescent Moon for a few days before the New Moons and a few days after them. There will be a **Full Moon** on April 16th. Note that the second New Moon in a month is called a **Blue Moon**.

The Planets

The Sky At Night picks **Mercury** as the planet of the month which is unusual since it is quite small and often difficult to spot. At the beginning of the month it is on the opposite side of the Sun from the Earth which is known as **superior conjunction**. It will not be visible then but it will re-appear in the evening sky. As the month progress it will gradually move further away from the Sun until it reaches its greatest **eastern elongation** on April 29th when it is at its furthest away from the Sun. On that evening, it is best to see it about 30 minutes after sunset in the West-northwest in the constellation of **Taurus the Bull**. It will set 135 minutes after the Sun. **Venus** is a brilliant morning object throughout the month although it will be difficult to spot as it low on the eastern horizon. The best time to see it is on April 30th between 4 and 5am in the constellation of **Pisces**. Close to Venus will be the planets **Mars, Jupiter** and **Saturn** which will also be at their best between 4 and 5 am but low on the horizon. This can be seen in the starchart below which shows the sky in the East at 4am on April 30th.



Meteor Showers

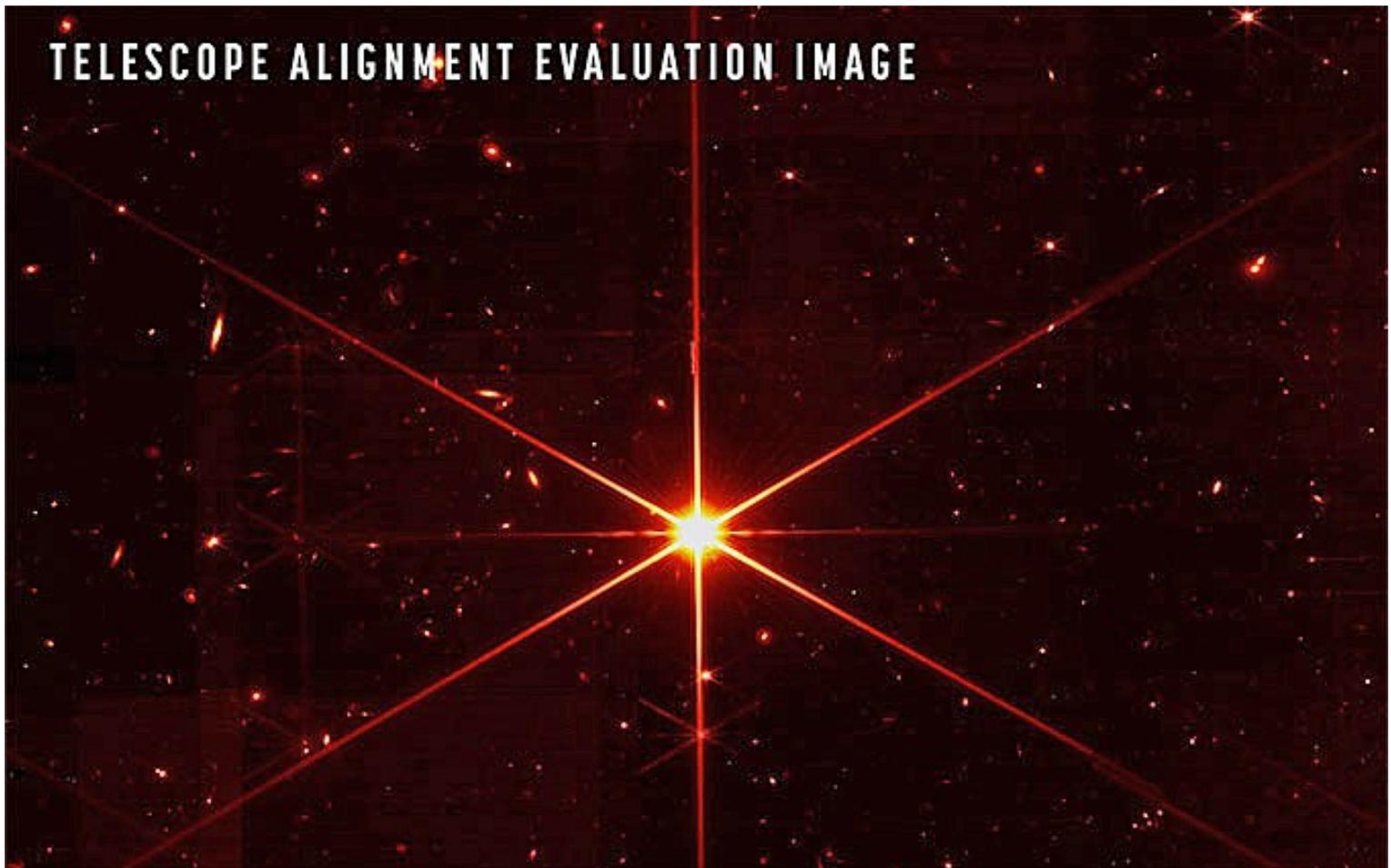
April is the month when we get to see the **Lyrids meteor shower** which is a different kind of “April shower” which may come your way!! The meteors can be observed between April 16th and April 25th but the shower will reach its peak at 20:00 on the night of April 22nd/ 23rd. Thankfully the Moon will not spoil the show this year. A **Zenith Hourly Rate (ZHR)** of 10 meteors per hour (as quoted in Astronomy Now) or 18meteors per hour (as quoted in the Sky At Night) is expected. The ZHR is misleading since it assumes perfect conditions and that the shower's **radiant** is directly overhead. It is likely therefore that there will be fewer meteors than quoted in the ZHR.

The shower is called the Lyrids because, although the meteors can be seen all over the sky, if you trace them back to their origin they all appear to come from same point in the sky called the **radiant** which for this shower is near to the constellation of **Lyra**. Hence their name. The star chart below shows the constellation of **Lyra (the Lyre)** in the bottom of the chart (courtesy of Astronomy Now). It can be found easily because of its bright star **Vega** which is the 5th brightest in the sky and the 3rd brightest in the northern hemisphere. In fact it is the brightest star in our sky in the Summer months and is a dazzling sight. Above Lyra and to the left of the chart is the constellation of **Cygnus the Swan** also known as the **Heavenly Twins**. It contains the bright stars **Castor** and **Pollux** which represent the heads of the twins (not shown in the chart). Above Cygnus you can see the constellation of **Draco the Dragon** which is a circumpolar constellation and so is quite close to the north pole and the pole star **Polaris**. Draco is not a particularly distinctive constellation apart from the four stars that form the head of the dragon. The brightest star in the head is **Eltanin** which is shown near the top of the chart. To the right of the chart is the constellation of **Andromeda** which contains the famous **Andromeda Galaxy**. The Lyrids are medium speed meteors and are produced when the Earth passes through the debris left by the comet **C/1861 G1 Thatcher** (nothing to do with Maggie!) and have been observed for more than 2,600 years.



Questions from Readers

One of my readers, Harry, has asked me if I am aware of any first images coming from the James Webb Space telescope yet? By a strange coincidence shortly after his email arrived, the image below arrived in my Inbox. It was introduced by the headline “ **Webb optics alignment achieves near perfect focus**”. The article goes on to say “A sharply-focused image of a nondescript star 100 times fainter than the human eye can see, served as a suitable target to demonstrate the near-perfect alignment of the James Webb Space Telescope’s optical system. Engineers have achieved nanometre (one billionth of a metre) precision, aligning the 18 hexagonal segments of the JWST’s 6.5-metre (21.3 ft) primary mirror, unveiling a razor-sharp image of a star using the observatory’s Near Infrared Camera, or NIRCam. Along with the sharply focused star, the infrared image shows a multitude of faint galaxies strewn across the field of view, highlighting the sensitivity of the \$10 billion space observatory. The nondescript star in question is, 2MASS J17554042+6551277. You can see more about this on the website “NASA/STSci”.



Harry goes on to say “I wanted to share a fascinating read about **Odd Radio Circles (ORC)** which I was reading this morning. In such a vast universe we live in, only five have ever been seen (so far). There are a few theories to their origin. Which one do you think is the likeliest? It's some sort of eliminating shockwave I think. Ripples from a pebble thrown into a still pond.”

You can read about these on the following website “https://www.nature.com/articles/d41586-022-00861-6?utm_source=Nature+Briefing&utm_campaign=1cf0c44cbc-briefing-dy-20220325&utm_medium=email&utm_term=0_c9dfd39373-1cf0c44cbc-46858546”

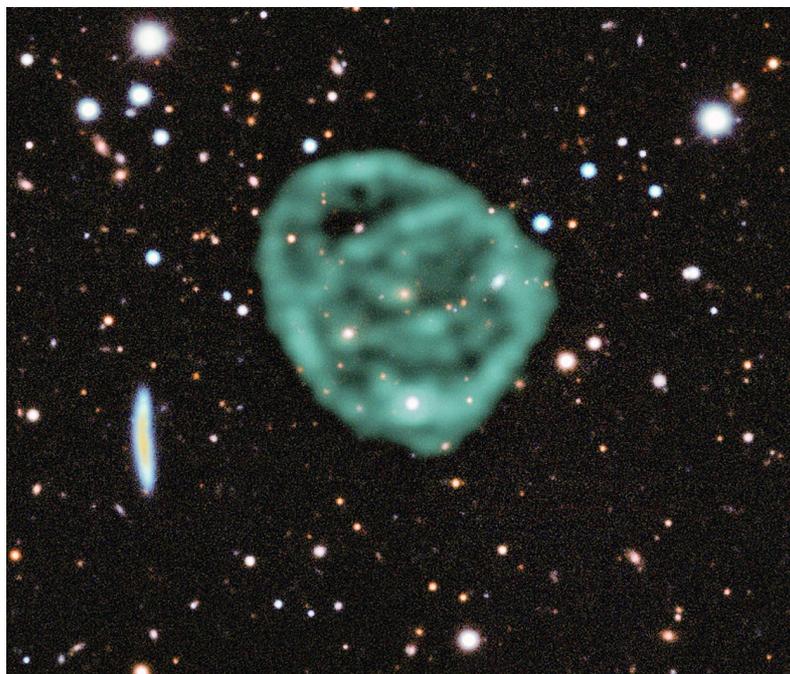
The image of ORC J2103-6200, also called ORC1, was captured by the high-resolution MeerKAT radio telescope in South Africa, which has given researchers unprecedented information about these rare phenomena. This image is shown below. The new MeerKAT radio data shows that the ORC's large outer circle is possibly more than a million light years across, ten times the diameter of the Milky Way, with a series of smaller rings inside.

The first three ORCs, including ORC1, were discovered using the Australian Square Kilometre Array Pathfinder (ASKAP) telescope in 2019. A fourth was identified in archival data from India's Giant MetreWave Radio Telescope in 2013, and a fifth was discovered in newer ASKAP data last year. Most of the ORCs have a galaxy at their centre, which astronomers suggest might have something to do with their creation. Also puzzling to scientists is the fact that ORCs have been spied only in radio wavelengths and have not been detected by optical or X-ray telescopes. Researchers have proposed three theories to explain the origin of ORCs as follows:

1. The first is that they are created from a shock wave from the centre of their galaxy, similar to what happens when two supermassive black holes merge.
2. The second theory is that they result from the activities of an active galactic nucleus, with radio jets spewing particles to create the ORC's shape.
3. The third theory is that ORCs are shells caused by starbursts in the centre of their galaxies.

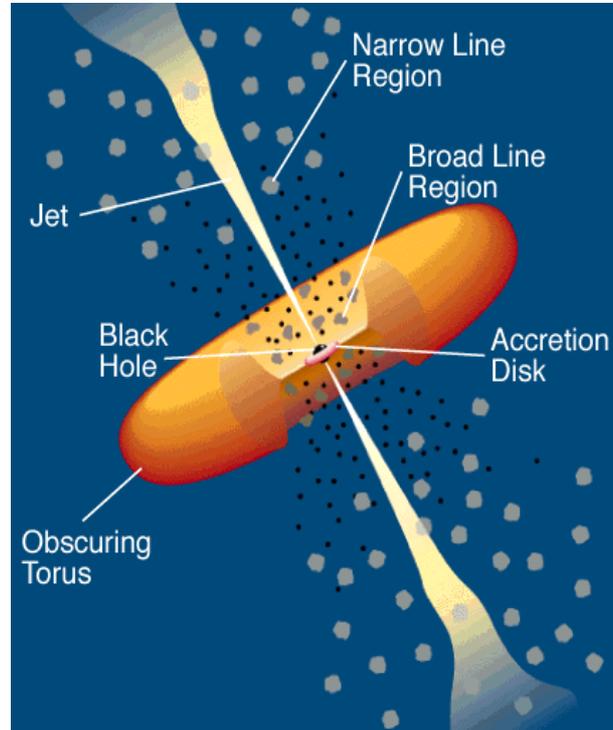
Harry goes on to asks which one of these do I think is the likeliest? Since I am not a specialist in this field, I can only draw on my knowledge of Astronomy and hazard a guess. The first and third theories are very similar in that many cataclysmic events occur inside galaxies and these are likely to send out shockwaves. The second theory is concerned with **Active Galactic Nuclei (AGNs)**. Many galaxies have AGNs and I will explain what these are in the next section. They do spew out radio jets which could cause ORCs. However many occurrences of both AGNs and Starbursts have been observed and if they they do cause ORCs I would expect that more than 5 of these would have been found. Therefore I tend to go for the first theory but please don't quote me!

Thank you Harry for these stimulating questions and I hope these will encourage more of you to send questions in. These help me to decide what to write about.

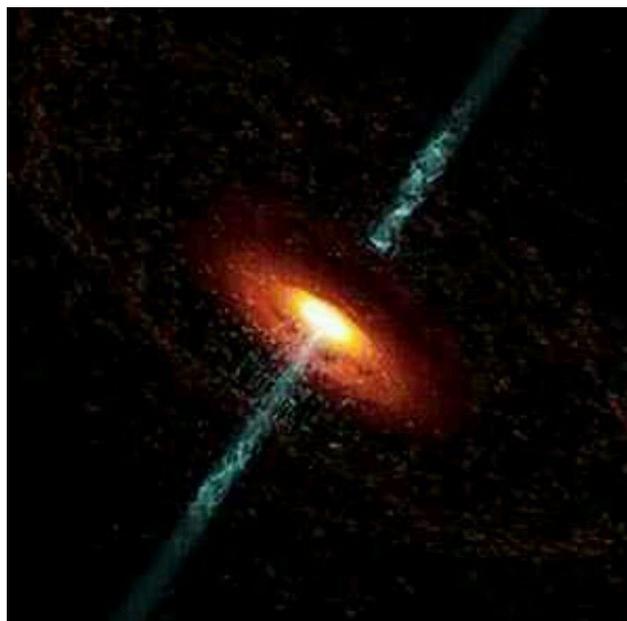


Astronomy for Dummies

So what is **anactive galactic nucleus (AGN)**? It is a region at the centre of some galaxies which has an exceptionally high brightness which cannot be produced just by stars. Thus exceptionally bright radiation has been observed in the **radio**, microwave, optical, infrared, ultra-violet, X-ray and gamma ray wavelengths. A galaxy which has an AGN at its centre is alled and **active galaxy**. It is thought that an AGN is a supermassive black hole which accretes matter around it. Below is a model of an AGN courtesy of NASA.



Numerous types of AGNs have been observed. The most powerful is a **Quasar** (Quasi-stellar object) which can have masses from millions to tens of billions times the mass of the Sun. A **Blazar** is an AGN with a jet of radiation pointed towards the Earth. Below is an image of a Quasar courtesy of NASA.

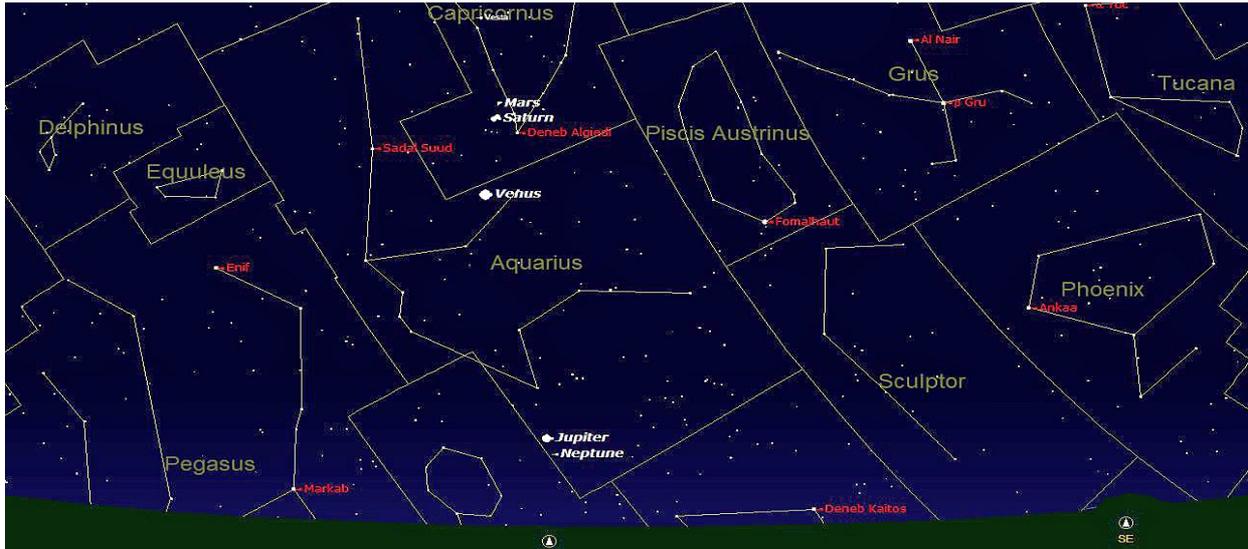


Please contact me if there is any aspect of Astronomy you would like me to explain.

What's Up in the Southern Hemisphere?

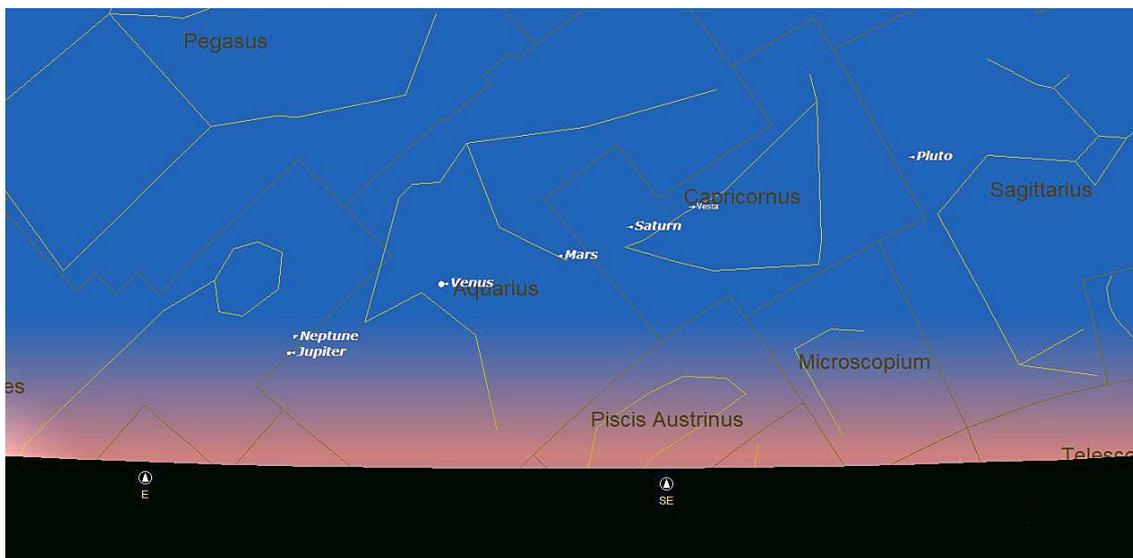
Sao Paulo, Brazil and Sydney, Australia

The planets for you this month: **Mercury** is poorly placed; **Venus** is a dazzling sight in the morning and is at a reasonable altitude; **Mars** is well placed in the hours before dawn and starts the month close to **Venus** and **Saturn**; there is a close conjunction of **Jupiter** and **Venus** at the beginning of the month; **Saturn** is well placed and only 0.5° from **Mars** on April 5th; **Uranus** is lost in the twilight after sunset; **Neptune** can be seen in the pre-dawn sky by late April and is close to **Jupiter**. This can all be seen in the star chart below which shows the sky in the East over Sydney at 0800 on April 5th. There you can see 5 planets and the constellations around them.



What's Up in Dalian, China?

Greetings to my friends in Dalian. As I mentioned before you will see a very similar sky to us except that you can observe more of the southern sky than we can. Since you are much further East, you will see things long before we do but at the same local time. The star chart below shows the sky in the East over Dalian at 05:00 on April 5th.



That's all for now! Until we meet again, happy stargazing and dark skies!

Valerie Calderbank FRAS