



# The sky this month

May 2020



By Joe Grida, Technical Information Officer, ASSA ([technical@assa.org.au](mailto:technical@assa.org.au))

**F**irst of all, an apology. Pressures of work now preclude me from producing this guide every week. So, from now on it will be monthly. It is designed to keep you looking up during these rather uncertain times. We can't get together for Members' Viewing Nights, so I thought I'd write this to give you some ideas of observing targets that you can chase on any clear night this coming month.

Stargazing is something that we all like to do. Cavemen did it many thousands of years ago, and we still do it. There's something rather special in looking into a dark sky and seeing all those stars. It's more meaningful now. We don't have to assign god-like powers to any of those stars for we now know what they really are, and I think that makes it even more awesome to look up at a star-studded sky. Keep looking up!

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## Naked eye star walk

Later in the evening on the night of May 7<sup>th</sup>, look high up the eastern sky. The Full Moon will be below and slightly right of a star with one of my very favourite star names - Zubenelgenubi.

The Arabic name "Zubenelgenubi" means the "the southern claw." Thousands of years ago, it and the star that stands above it and to the right; Zubeneshamali, the northern claw; were part of Scorpius, the scorpion. But later, they were stripped away and assigned to a new constellation: Libra, the balance scales.

If you have clear skies and good eyesight, you might notice that Zubenelgenubi consists of two stars that are quite close together. The stars are bound to each other by gravity, so they travel through the galaxy as a pair.

What you can't see, though, is that each of these stars is actually a pair on its own. So, the entire system consists of four stars. Three of them are bigger and hotter than the Sun, while the fourth is smaller and cooler. All four appear to be around 200 million years old. And, by astronomical standards, relatively close to us at a distance of 75 light years. The light from the star, arriving today, left when our planet was still engulfed in WWII.

By the way, if you think Zubenelgenubi is a long star name – you're wrong. The longest name for any star is "Shurnarkabtishashutu", the Arabic for "under the southern horn of the bull".

We'll stay within the confines of the Libra constellation for now. When you look at a star, you're looking back in time. As already mentioned, when we observe Zubenelgenubi, we are looking back 75 years. Another star in Libra, the star HD 140283, for example, is 190 light-years away, so we see the star as it looked 190 years ago. You will need at least a pair of binoculars and a star map to find this star.

But the star itself allows us to see much farther back in time; to the very early universe. That's because the star is one of the oldest ever seen.

Astronomers used several lines of evidence to determine that age. Hubble Space Telescope measured the star's

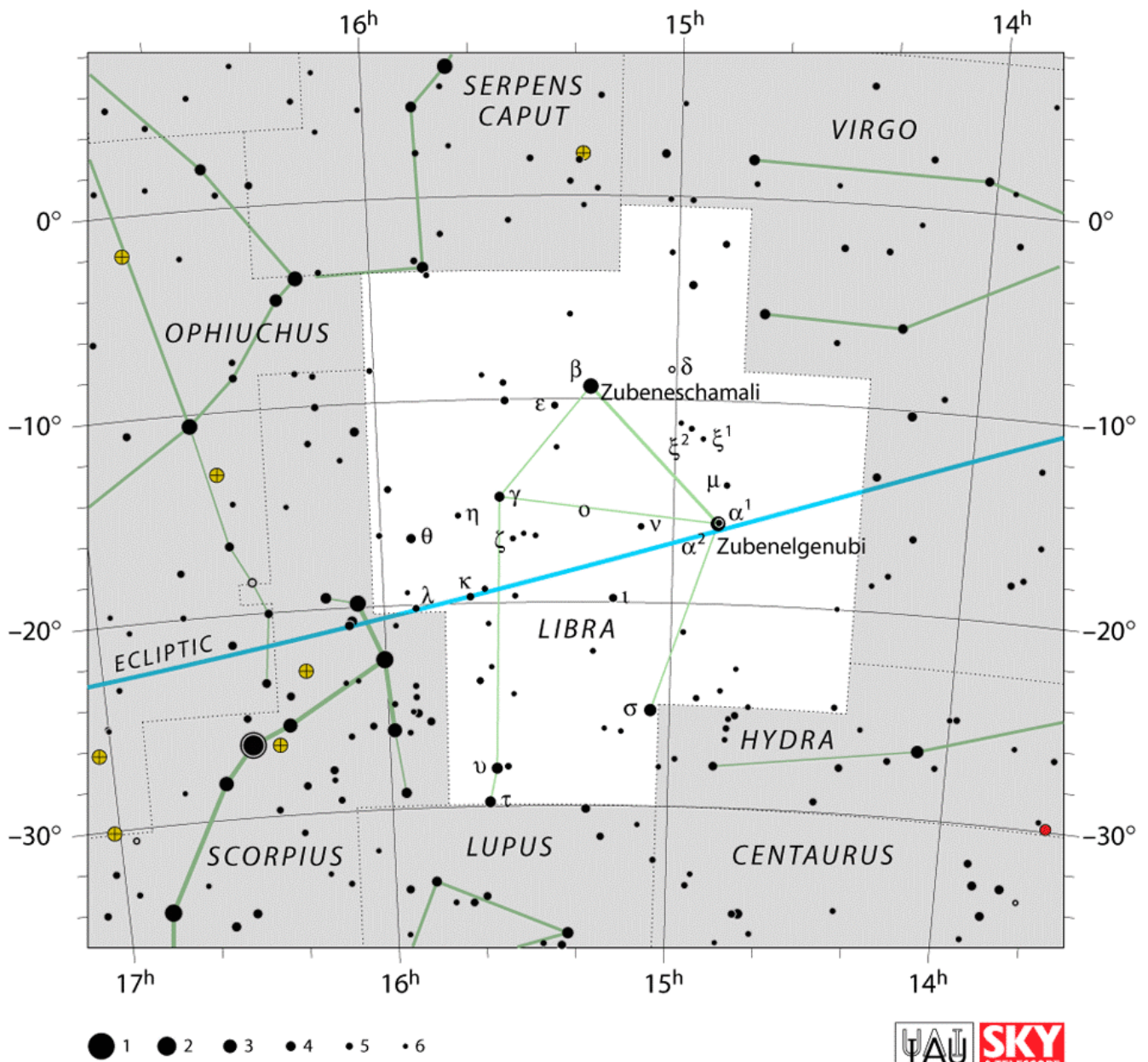
distance, which revealed its true brightness. That was combined with measurements of its temperature and composition. Plugging those numbers into models of how stars work yields an age of about 14.5 billion years.

That's older than the universe. But uncertainties in the numbers provide some wiggle room. So, the star probably formed just a few hundred million years after the Big Bang.

The key measurement is composition. The star contains only tiny amounts of elements heavier than hydrogen and helium, which were forged in the Big Bang. Almost everything else was created inside stars. As the stars died, the heavier elements were expelled into space, where they could be incorporated into new stars. Since HD 140283 has some of these elements, it's not from the first generation of stars. But it has so little of them that it's probably a member of the second generation of stars; born more than 13 billion years ago.

**Q:** Can you guess how many stars are born each year in the Milky Way Galaxy?

*Answer at the end of this document.*



## The Solar System

A couple of great planetary conjunctions occur this month, both involving the Moon.

The first one occurs in the late evening of May 12 low in the eastern sky. Jupiter and Saturn, separated by almost 5 degrees are joined by the 17-day old waning Moon. A pair of 7x50 binoculars will show all 3 objects in the same field of view. M75, an 8.6 magnitude globular cluster is just 44 arc-minutes away from the Moon. Not sure if you'll be able to glimpse the cluster in binoculars due to the sheer brilliance of the Moon. Let me know how you go.

The other interesting conjunction occurs on the early evening of May 24, just after sunset. See diagram below.

This will be your opportunity to not only glimpse the elusive diminutive planet Mercury, but also a very young 1.5 day old Moon. Make sure you have a very clear western horizon. The scene depicted below (created with Stellarium software) is for

5:30pm when Venus is only 5 degrees above the horizon, and the sun had only set 15 minutes earlier.

Again, all 3 objects will fit inside the 7 degree field of view of 7x50 binoculars. The Moon and Venus will show crescents, however Mercury with an illumination of 63% will resemble a 10 day old Moon. A telescope will be required to see Mercury's disk, although I'd like to hear from you if you can see the thin crescent of Venus in binoculars.



*Jupiter, Saturn and the waning 17-day old Moon on the evening of May 12 @ 11:00pm. Created with Cartes du Ciel software.*





# The Moon

Forget any deep sky observing this coming week, as we will have a very bright Moon in our skies.

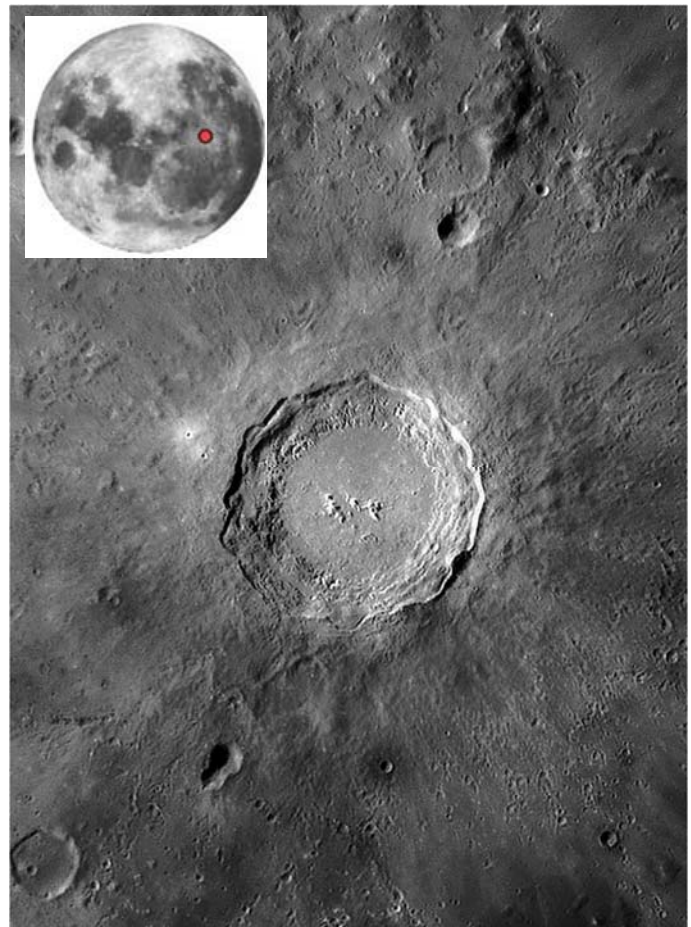
Evening observing can resume early next week. On the 12th, it rises at 9:48pm, giving you a couple of hours of darkness.

For all of you selenophiles\*, our lunar feature of the month is **Copernicus Crater**.

- Coordinates: 9°37'N 20°05'W Depth: 3.8 km Diameter: 93 km
- Impact that created Copernicus occurred some 800 million years ago.
- Out to about one crater radii from Copernicus' rim, the ground is rough, but there are no small craters. The field of hundreds of small secondary craters dug out by chunks thrown from Copernicus does not start until beyond the one radii distance. This is because the huge ground surge of material shoved outward by the Copernican impact has obliterated all details within one radii distance.
- The two small bright craters at about the 9:30 position within the ground surge are far more recent impacts.
- The Apollo 12 mission landed south of Copernicus on mare basalts of Oceanus Procellarum that were believed to have been in the path of one of the crater's rays, and scientists hoped cosmic ray exposure ages of soil samples would help constrain the crater age. The results were inconclusive, but not inconsistent with the estimated 800 million year age of crater formation. Copernicus itself was a possible landing site for the canceled Apollo 20 mission.
- Copernicus is named after the astronomer Nicolaus Copernicus. Like many of the craters on the Moon's near side, it was given its name by Giovanni Riccioli, whose 1651 nomenclature system has become standardized.<sup>[3]</sup> Riccioli awarded Copernicus a prominent crater despite the fact that, as an Italian Jesuit, he conformed with church doctrine in publicly opposing Copernicus's heliocentric system.

## May

Mon	Tue	Wed	Thu	Fri	Sat	Sun
				1 First Quarter 53%	2 Waxing Gibbous 64%	3 Waxing Gibbous 74%
4 Waxing Gibbous 84%	5 Waxing Gibbous 92%	6 Waxing Gibbous 97%	7 Full Moon 100%	8 Waning Gibbous 99%	9 Waning Gibbous 96%	10 Waning Gibbous 91%
11 Waning Gibbous 83%	12 Waning Gibbous 74%	13 Waning Gibbous 65%	14 Last Quarter 55%	15 Last Quarter 46%	16 Waning Crescent 36%	17 Waning Crescent 27%
18 Waning Crescent 19%	19 Waning Crescent 12%	20 Waning Crescent 7%	21 Waning Crescent 3%	22 New Moon 0%	23 New Moon 0%	24 Waxing Crescent 2%
25 Waxing Crescent 6%	26 Waxing Crescent 11%	27 Waxing Crescent 19%	28 Waxing Crescent 28%	29 Waxing Crescent 38%	30 First Quarter 49%	31 Waxing Gibbous 61%



**\*Did you know?...** Someone who loves the moon would be a selenophile or a philoselene. Someone who loves stars would be called an asterophile or a philoaster. Someone who loves both the moon and the stars would be called a Uranophile or philouran. (Personally, I prefer to be called an astronomer).

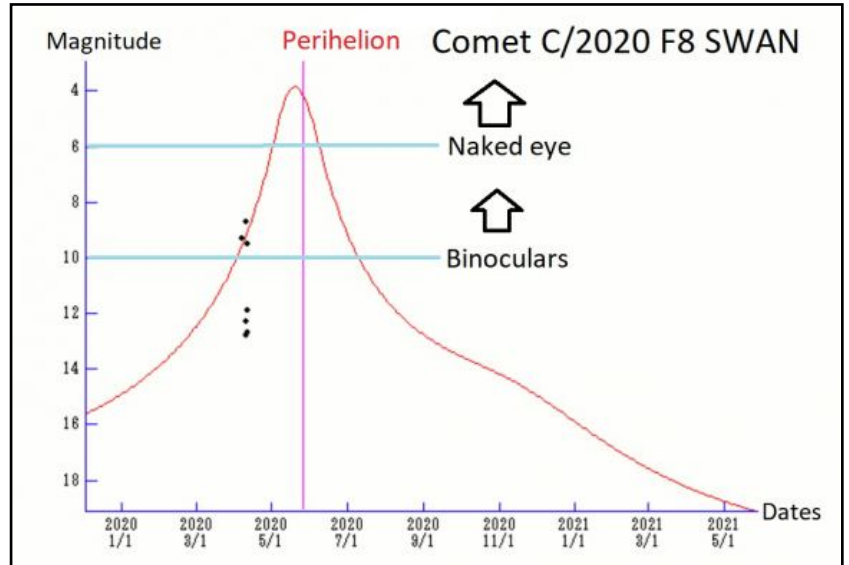
# Comet C/2020 F8 SWAN - a naked eye comet for May?

Your last opportunity to see this comet comes early in the month.

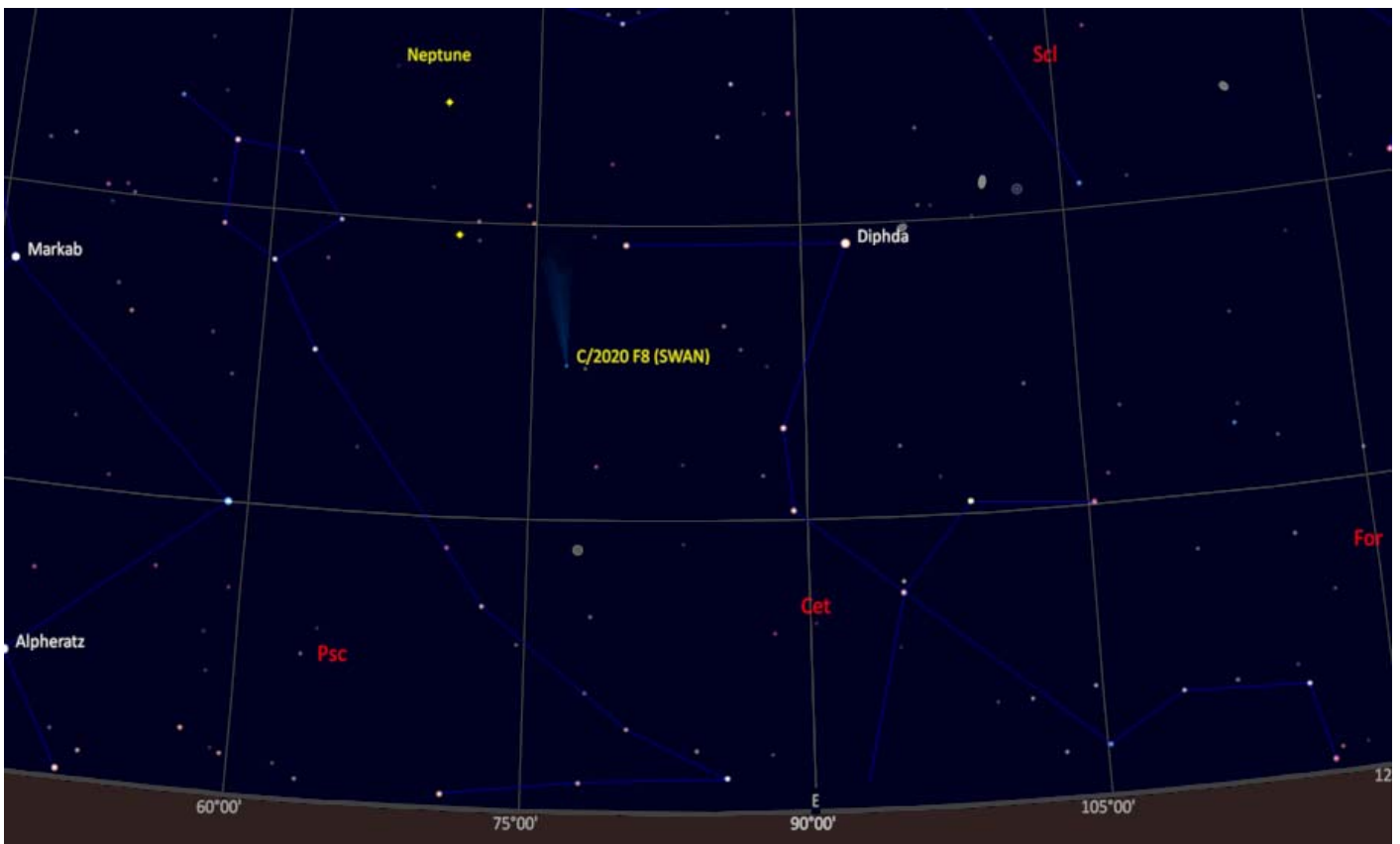
By May 10th, it will be too low in the morning sky for observation. After that it heads north, and will be lost to observers from our southern latitudes.

It began brightening in late April, and on May 4 it displayed a magnitude of 5.

The chart below gives the comet's position at 5:30am on May 7.



The projected light curve for Comet F8 SWAN. Credit: Adapted from Seiichi Yoshida's *Weekly Information About Bright Comets*.



## Double Star of the Month - Antares - Alpha Scorpii

Name	Const	RA	Dec	Mag1	Mag2	Sep	Comments
Antares	Sco	16:29.4	-26:26	0.9	5.4	2.9"	Orange & Green

The red heart of the constellation of Scorpius, the scorpion.

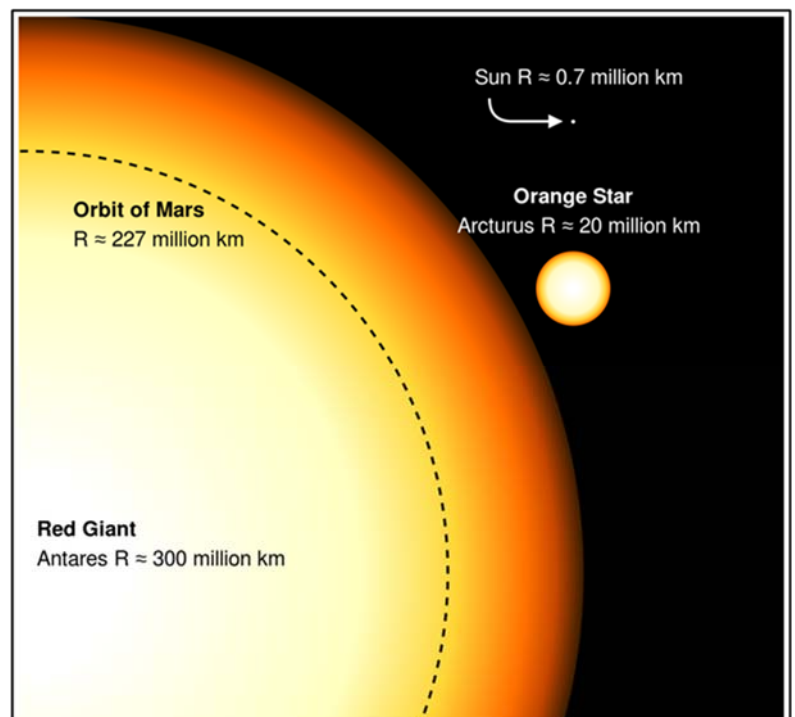
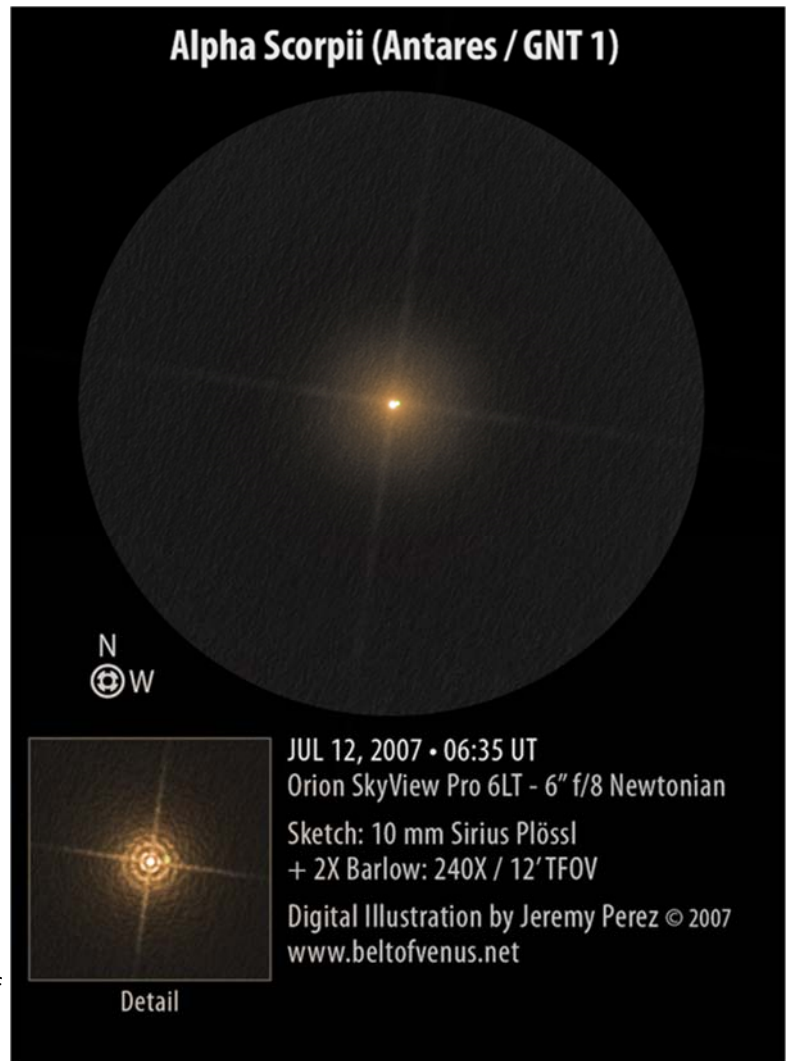
- 15<sup>th</sup> brightest star in the sky, and 604 light years distant from the Sun.
- The primary component in the system is an orange supergiant star of enormous proportions, with the stellar classification of M1. It has an apparent magnitude of 0.9v.
- The companion is hot blue star with the spectral class of B4 and has an apparent magnitude of 5.4. The two stars have an orbital period of 853 years.
- The companion's colour has been described as "vivid green, blue, purple".
- Dawes observed the star emerging from the dark limb of the Moon during an occultation in 1856, and noted the tint as "green".
- Needs good seeing and at least a 30cm telescope, 200x mag

Did you know that despite its size, the overall density of Antares is less than one-millionth that of the Sun.

Antares is also relatively cool as stars go, only about 3,593° Celsius compared to 5,500° C for the photosphere of the sun. The star's low temperature accounts for its ruddy colour.

And it's that ruddy colour that earned the star its name.

The word "Antares" means "anti-Ares" or "anti-Mars," likely because astronomers in ancient times thought the reddish star looked similar to the red planet. The planet, in fact, can sometimes get close to Antares in the Red Planet's travels across the night sky.

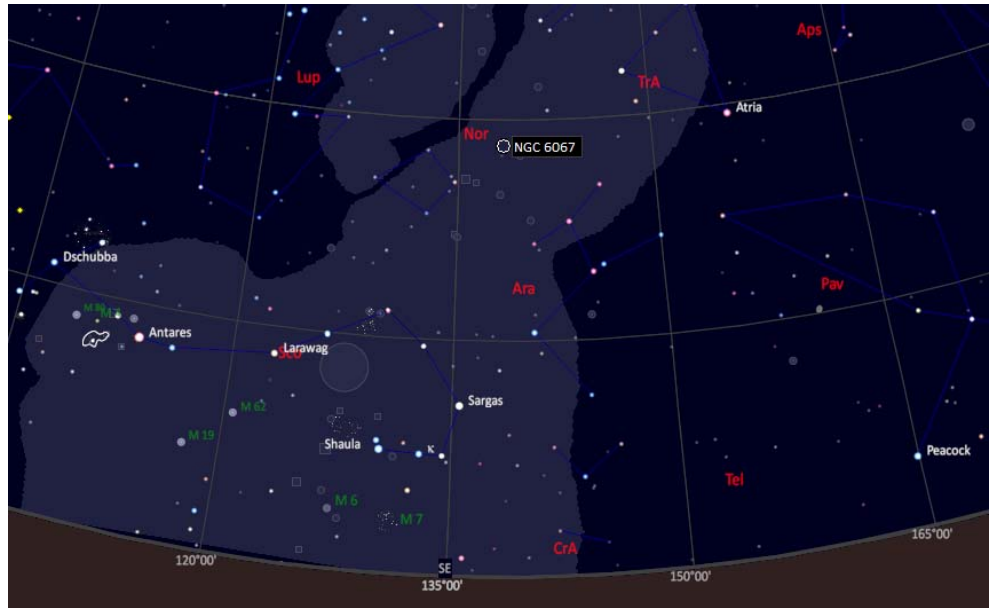




## Easy telescopic targets (suggested by ASSA Member Phil Stephen)

**NGC 6067** is an open cluster in the constellation Norma. It is located to the north of Kappa Normae, at a distance of 4621 light years, with an angular diameter of 12'. Visible to the naked eye in dark skies, it is best observed with binoculars or a small telescope, and a 12-inch aperture telescope will reveal about 250 stars. Discovered by James Dunlop in 1826, it has been described by John Herschel as "a most superbly rich and large cluster" and by Stephen James O'Meara as "one of the sky's most stunning open star clusters". Its brightest stars have an apparent magnitude of around 8. There are 84 member stars with an apparent magnitude brighter than 12.

NGC 6067 is located in the Norma Star Cloud in the Norma Arm of the Milky Way and is 15 to 20 times as rich as the Pleiades and about the same age. It is thought to be around 102 million years old, and contain 893 solar masses.



**NGC 3766 - The Pearl Cluster** - is an open star cluster in the southern constellation Centaurus. It is located in the vast star-forming region known as the Carina molecular cloud, and was discovered by Nicolas Louis de Lacaille during his astrometric survey in 1751–1752 from South Africa. At a distance of about 5500 light years, the cluster subtends a diameter of about 12 minutes of arc. It is also a good binocular target even for light polluted skies. NGC 3766 is a very dense open cluster and shimmers like a pearl, which is how its got the nickname.

*Images below by Sergio Equivar, Buenos Aires, Argentina*



## Deep Sky Challenge - Markarian's Chain of Galaxies in Virgo

Autumn is galaxy hunting season! And, there's no better place to find them, than the Virgo Cluster of Galaxies. Containing over 2000 galaxies, an observer with an 8" telescope or larger can very quickly get lost. Good charts are a must. The sky is filled with glowing spheres and spirals; this is the Realm of The Nebulae that Edwin Hubble wrote about in 1936.

At a distance of roughly 53 million light years, the Virgo Cluster is the nearest rich aggregation of galaxies in the sky. It thins out as it stretches north into Coma Berenices, Canes Venatici and Ursa Major. A southern arm heads down into Hydra and Centaurus. The combined "cluster of clusters" is dubbed the Local Supercluster and probably includes our own local group of galaxies on the outskirts.

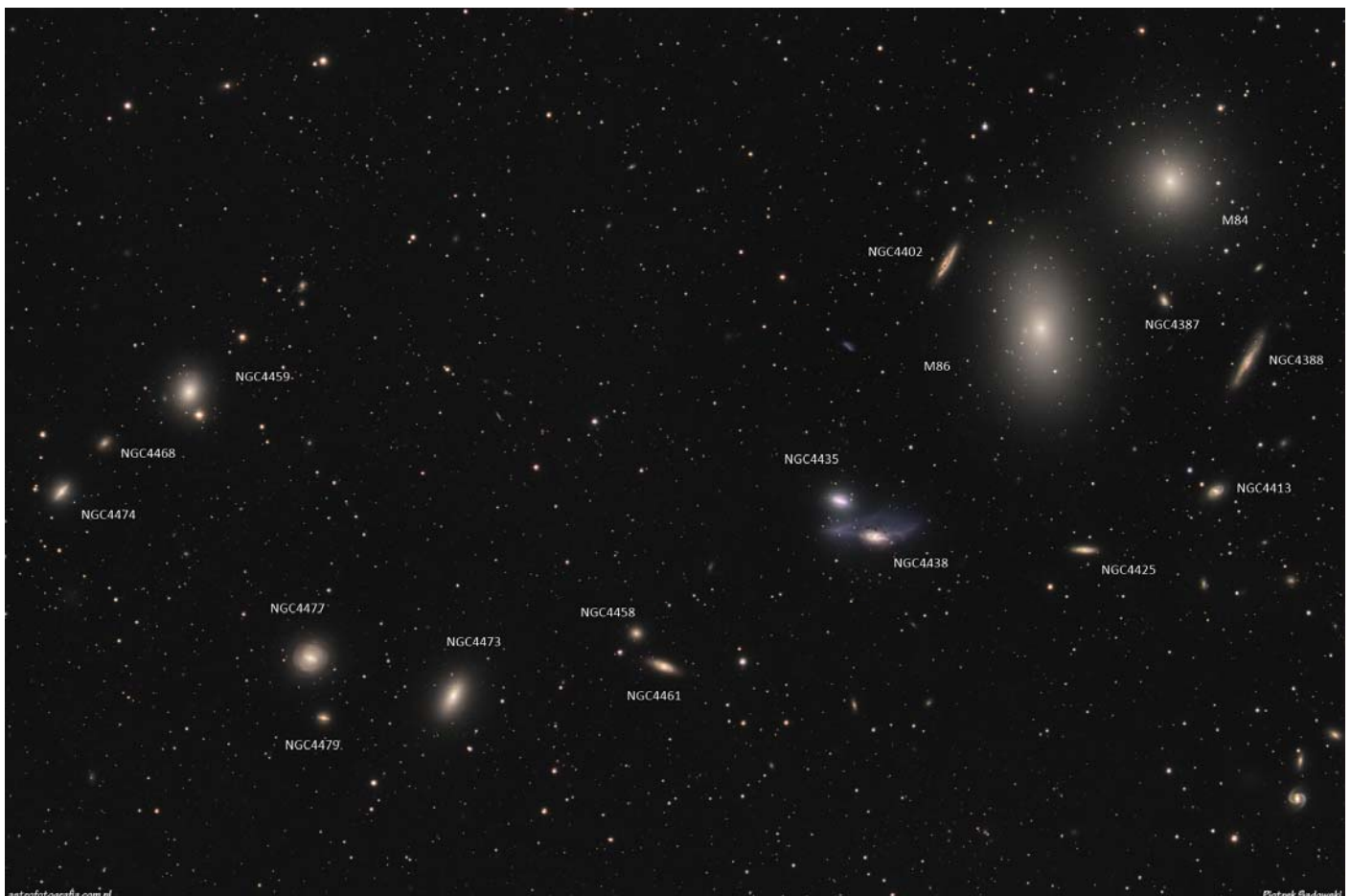
Steve Gottlieb advises: *"For amateur observers the task of attacking the Virgo cluster is daunting. Where do you begin and how do you avoid getting lost in the hundreds of galaxies visible in an 8" scope and the thousands of galaxies visible in a 17.5" scope? Probably the best place*

*to start is at the core of the cluster, roughly midway between 3rd magnitude Epsilon Virginis (Vindemiatrix) and 2nd magnitude Beta Leonis (Denebola). Sweeping this area should quickly bring up the bright pair of ellipticals M84 and M86. Heading east and north is a remarkable curving chain of galaxies known as **Markarian's Chain** which ends over the Coma border at M88".*

The chain, pictured below, is highlighted on the right with two large but featureless lenticular galaxies, M84 and M86. Prominent to their left is a pair of interacting galaxies known as The Eyes (NGC 4435 and NGC 4438).

You'll find this pair 20' north of M86. NGC 4435 is a bright oval and is sharply concentrated with a bright core and a stellar nucleus. NGC 4438 lies just 4.5' SSE. This spiral is elongated north-south and although quite bright, its core is not as prominent as NGC 4435.

I'm sure you will agree that it's a superb grouping of galaxies for visual observers, and one of the clear highlights of the autumn sky. How many can you find?



Above: Markarian's Chain in Virgo, imaged by Piotrek Sadowski, as it appeared on Astronomy Picture of the Day on 9 June 2009.



## Next Month - June 2020

Mars and Neptune get close. Whilst Jupiter reaches opposition and it's brightest for the year.

Planetary nebulae are interesting objects to observe in a telescope. We'll look at the best winter targets.

Please let me know if there's anything that you would like me to cover for you.

Happy observing, and stay safe.

Joe Grida

**Q:** Can you guess how many stars are born each year in the Milky Way Galaxy?

**A:** Stellar nurseries can be found in giant clouds of molecular gas and dust scattered throughout our galaxy. The Great Nebula in Orion is one of those stellar nurseries.

**On average, 7 new stars are born somewhere in our Milky Way galaxy per year, astronomers estimate.**

More info here: [https://www.nasa.gov/centers/goddard/news/topstory/2006/milkyway\\_seven.html](https://www.nasa.gov/centers/goddard/news/topstory/2006/milkyway_seven.html)

## Useful links:

This section is designed to give you access to further items of interest. I'll add or delete items as the season changes.

***Get your star chart for the month***

<http://skymaps.com/downloads.html>

***Astronomy Picture of the Day (APOD) - Each day a different image or photograph of our fascinating universe is featured, along with a brief explanation written by a professional astronomer***

<https://apod.nasa.gov/apod/astropix.html>

***Taki's Magnitude 8.5 star atlas***

<http://www.astronomie.cz/data/2009/04/00-atlas-85.pdf>

***Stellarium - free open source planetarium for your computer. It shows a realistic sky in 3D, just like what you see with the naked eye, binoculars or a telescope***

<http://www.stellarium.org>

***Observe the planets in daytime. Use your smartphone to polar align your equatorial mount***

<https://skyandtelescope.org/observing/daylight-polar-alignment/>