Shoalhaven Astronomers Inc.
www.shoalhavenastronomers.asn.au

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Astro Flyer

AUGUST 2020

Club News

From the President

Comets LEMMON, F8 Swan 2020, Neowise, P/2019 W1 (PANSTARRS), 226P/Pigot-LINEAR-Kowalski. Who names these comets anyway???

There must be some (twisted!) logic behind it all. Hopefully those more knowledgeable than I can tell us? Meanwhile, Harry and Eugene continue to keep us updated on matters cometary – star charts, sketches and pictures …

The Covid19 nightmare continues. We will still be interacting virtually for another couple of months as the virus situation fluctuates. There has been no change for the better in the current guidance from the NSW government - indoor activities need to respect the 4 square metre rule and the university management is not accepting bookings from external groups until September… The Shoalhaven library is the same…

Currently the rules allow outdoor gatherings of up to 20 people. So that people can have the opportunity for some face to face conversation and remain safe we will setup a meet in one of the local parks – bring a chair, bring your thermos and have a chat. I will provide further information in due course.
In the meantime, viewing nights can proceed provided attendees practice physical distancing – shouldn't be a problem in the big outdoors!

Keep on watching! Best regards Mark Town

Monthly meetings cancelled until further notice

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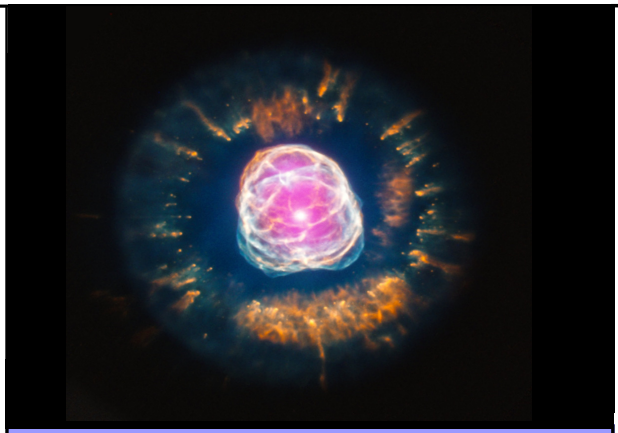


MOON PHASES

New Moon	First Quarter	Full Moon	Last Quarter
August 19	Aug 26	Sep 2	Sep 10

Viewing Nights

VIEWING NIGHTS SUSPENDED UNTIL FURTHER NOTICE

Club viewing nights are selected to provide viewers with the best possible conditions for good viewing. They are held on specific Saturdays at different locations around Nowra.

More Club Information Including viewing site Directions Page 18

OUT THERE by OBSERVATION OFFICER

August/ September

(I am stepping in for Bob Turnbull again as Bob is still receiving treatment)

Highlights

Jupiter and Saturn continue to dominate the eastern sky after dark. The baleful Mars if now joining the late evening sky show. Mars has grown brighter as our earth catches up with the red planet. Its brightness grows from mag-0.8 to -2.1 or roughly 3 times from July to September.

Mars Those with moderate size scopes should now study Mars on clear nights. The South Polar cap is now shrinking but should still be spotted as a striking Bluish White spot. In Martian summers, the polar caps retreat as they do on earth but without concern for the fate of the polar bears! I will detail close studies of Mars next month.

Mercury Mercury returns to our evening sky and a favourable ecliptic means a very prominent appearance from mid-September to mid-October. Some interesting conjunctions are listed below.

The Rich Winter Milky Way After dark in August and early September is the perfect time to observe the richness of the Milky Way as it stretches from Altair, The Eagle in the NE sky to the sinking Southern Cross in the SW. This encompasses the centre of our galaxy and countless Messier Objects, Nebulae, Globular Clusters and Deep Sky wonders, a rich tapestry of stars that flood the field of binoculars and small telescopes. Even the unaided eyes when adjusted to the dark is overwhelmed by the sheer spectacle of 180^0 of rich stellar fields. It is ironic that our best viewing of the heavens occurs when our nights are coldest, but it is in these clear dark nights when smog, humidity and dewing up of instruments disappear that the heavens are clearly revealed to astronomers who normally battle the elements to find what have been called, "The Faint Fuzzies."

Comets Great and Small

Speaking of *battling the elements to find the faint fuzzies* : comet hunting is the perfect example of this, as at the time of writing we say farewell to yet another comet that failed to live up to media expectations! I'm afraid in recent years we are dealing with tiny comets spotted as pixels on cosmic search charts, all of 2 or 3 kilometres in diameter, photographed by space telescopes and overhyped to capture the unwary. These promotions do little for the sky watcher who similarly does battle with Hubble images that in no way resemble the delicate objects spotted by amateurs in the eyepiece after careful years of observation. Also, a bright comet in the northern hemisphere can fizzle when it dips down for southern viewers.

Yes, although comets can be rewarding for the amateur observer at the eyepiece, a really worthwhile one comes around about every ten years. It is only the dedicated observer that can cut through the hype and catch a glimpse of smaller ones, about 15 of which cruise around the sun every year. Thus, ends the sermon! I promise in future to filter out all the Lemonns, Swanns and Neowises and wait for more promising candidates!

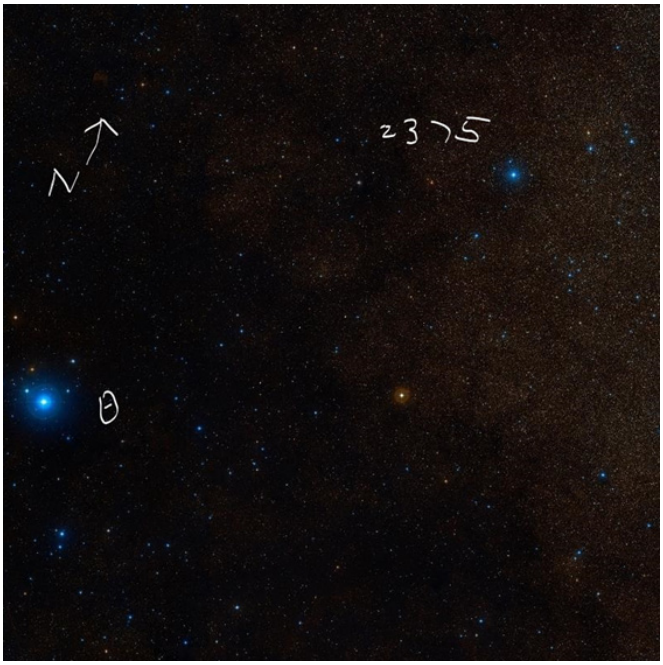
Camera Catches and Conjunctions

Your yearbook draws attention to these each month, but I will remind you of the follow by date:

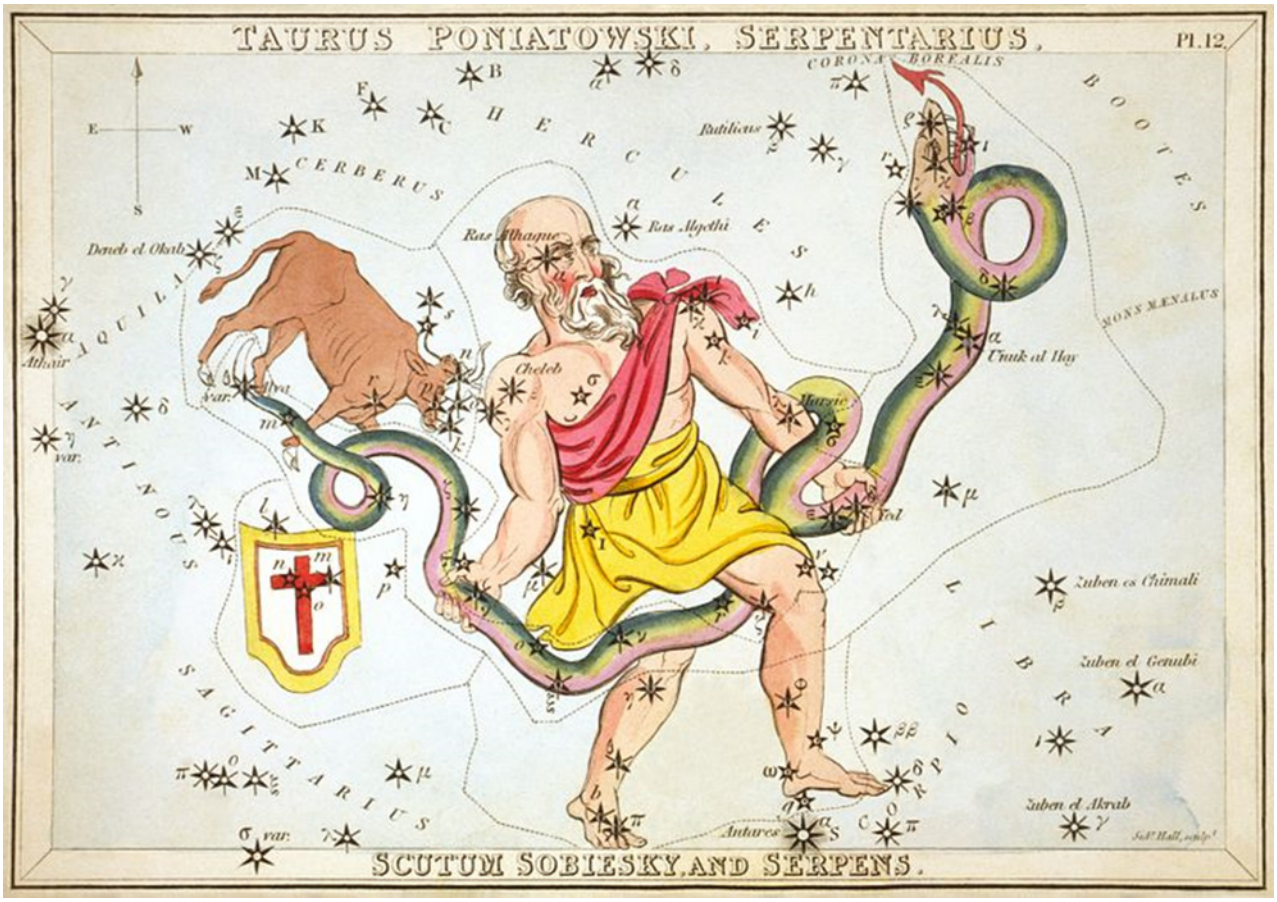
1 **August 15-16**. The thin waning Moon crescent lines up in the predawn sky with Venus.
2 **August 28-29** the waxing Moon just days off full is nicely placed in the eastern sky near Jupiter and Saturn.
3 **September 19th** The 2-day old Moon, low and with a thin crescent forms a neat triangle with the rising Mercury and 1st Mag star, Spica in the evening twilight sky.
4 **September 22nd**. The rising Mercury is only 1/3 degree North of Spica in the evening twilight sky. (Spica 0.95, Mercury -0.0 mag).

Don't be frustrated by the inconvenient Moon. View it.!

Hidden Doubles 8



Serpens Cauda: The Snake's Tail



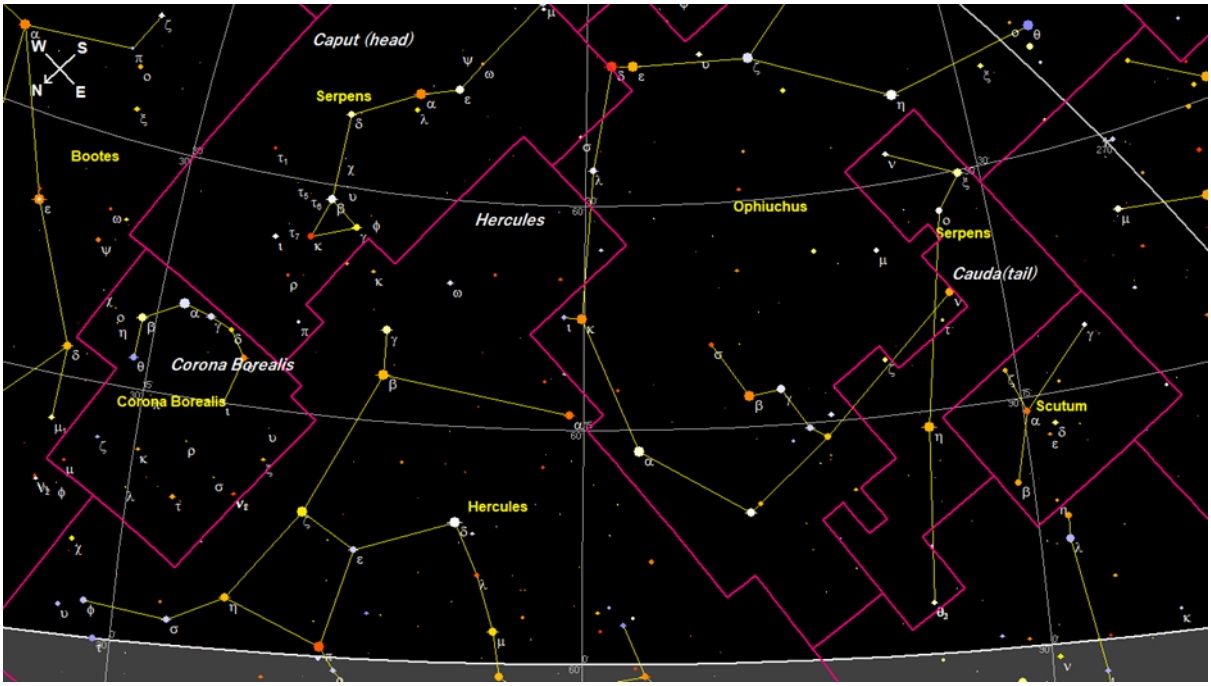
(Attributed to Peter Christoforou)

Sky Objects By Eugene O'Connor

Cont...2

Last month I explored some of the memorable doubles in that section of Serpens, called the Head of the Snake. This month I want to take you on a tour of the Snake's Tail or Serpens Cauda.
Getting There: The line of the Serpent's Tail resembles a straight line of stars jammed between Ophiuchus and Scutum and the 'sauce-pan' section of Sagittarius. You will know you have reached it when our first double (Theta Ser) pops into your finderscope as a wide double star(NE side of the map below).

(Map 1. Showing Serpens Cauda east of Ophiuchus. NE sky after dark)



1 θ Theta Ser. This mag 4.6 mag star denotes the tip of the Serpent's Tail. Its appearance as seen in WI ISKY, but without the true visual colours can be seen in the inset shot at the top of this article.

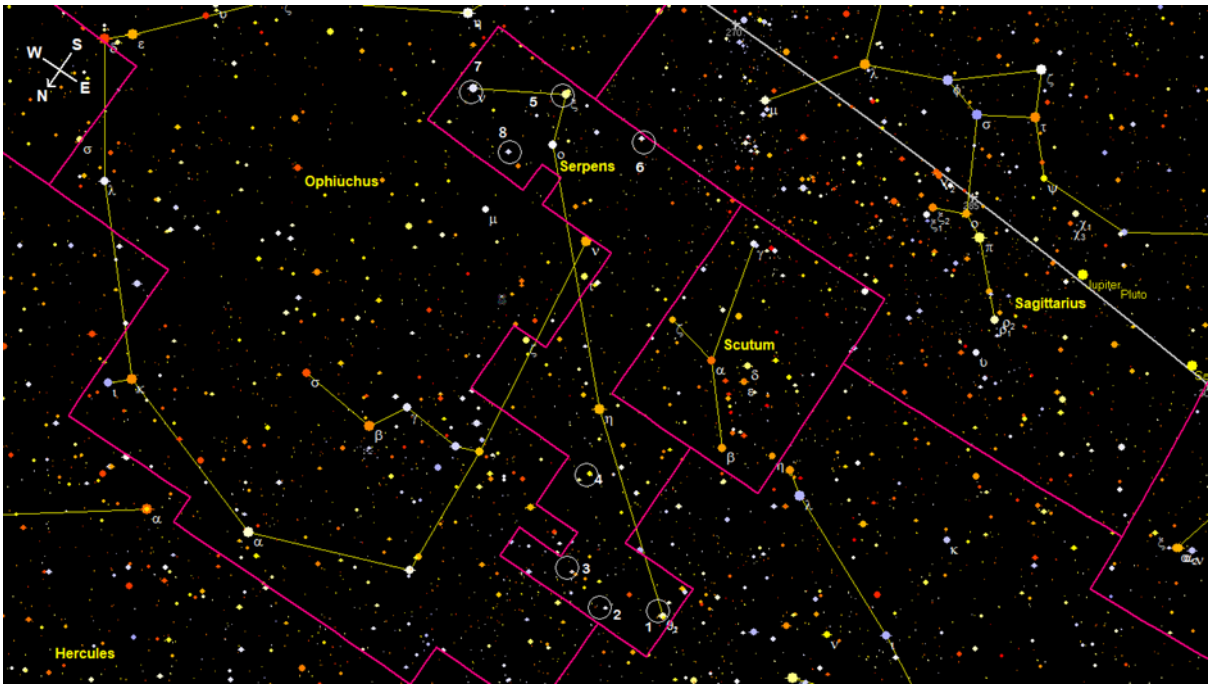
RA 18.56; Dec +4.12. Mag 4.6/4.9, Sep 22.3". As mentioned above, Theta is a wide double, but in the telescope, it is a dimmer and wider Alpha Centauri. As well as a stunning pair of white stars the low power field is strewn with fainter stars.

2 ∑ 2375 RA 18.44; Dec+4.12. Mag. 6.3/6.7, Sep2.6" This visual binary pair lie 3^0NW of Theta and requires a tight split at medium power and sharp seeing conditions. You will be rewarded with a fine equal pair of white and light yellow. This pair is known as Tweedle Dum and Tweedle Dee*

3 ∑ 2342 RA 18.35; Dec +4.56. Mag.9.5/9.6; Sep 33.3". This contrasting double stands out in a wide cluster of stars. (see Map 2, below). A wide white and yellow pair.

Cont...3

(Map 2. Detailed map showing double stars listed)

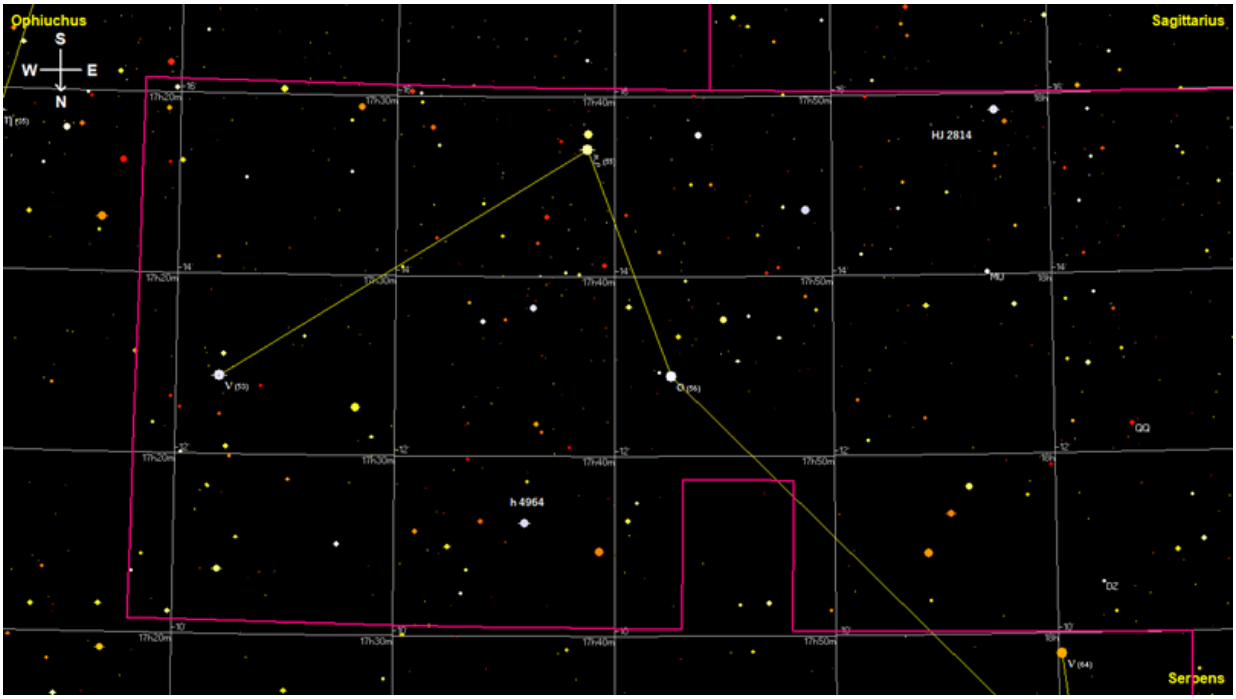


4 59 Ser; ∑2316. RA 18.27; Dec -00.12. mag 5.4/7.6; Sep. 3.9" Although this is both a triple star and a variable the A and C members are easily seen as white primary with a fainter reddish companion.

5 Xi Ser RA 17.38; Dec -16.24 mag, 3.54/ 13; Sep.24.9. Xi is a visual double star easily spotted in the finderscope (see map 3 below). The wide star at mag 5.95 lies 10' south and can be spotted with keen eyesight. The 13 mag. closer companion required big mirrors!

Cont...4

(Map 3. Showing the upper section of Caput Cauda and doubles 5,6,7 and 8)



6 ∑2814 RA 17.56; Dec -15.5; mag 5.9/9.4; Sep. 20.5" A wide pair of contrasting white and cream.

7 Nu or 53 Serp. RA 17.20, Dec-12.51; mag4.3/9.4; Sep. 45.9". This is a contrasting pair of Blue and light red stars.

8 H 4964 RA 17.34, Dec. -11.15; mag 5.5/9.9; Sep. 54.3". The primary is light blue, and the wide companion is reddish. Easy at low power.

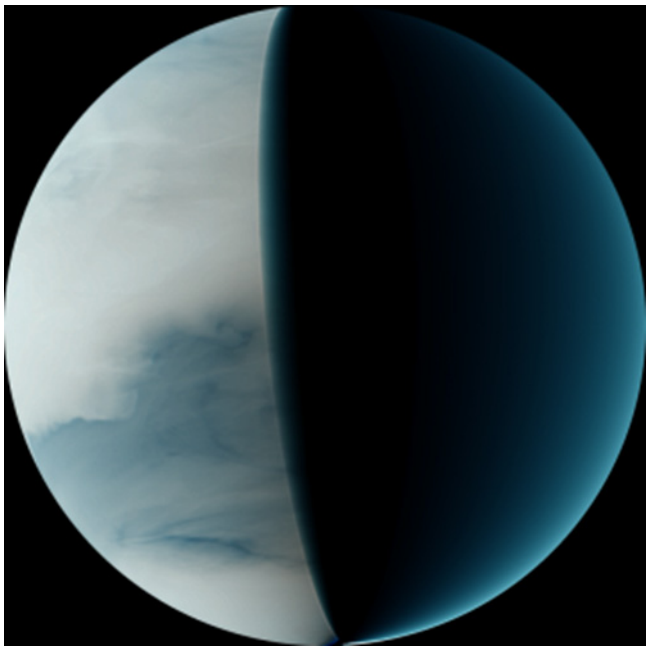
***[Tweedledum and Tweedledee. So named by an early observer after the well-known twins from "Alice Through the Looking Glass"**

By Lewis Carrol. The story has it that this binary, discovered in 1825 by William Struve appeared to orbit at amazing slowness (12^0 in 185 years, or a staggering orbit of 5,500 years!) Enter Dr. William Finsen in 1952 with a newly constructed Interferometer (which discovers spectroscopic binaries by diffraction) and using a 26.5" refractor in Johannesburg, discovered an unseen close companion of the 'A' star at a fixed distance and position angle to the 'A' star. Imagine his shock when examining the companion 'B' star to discover a similar diffraction image IN EXACTLY THE SAME POSITION AND PA to the 'A' star! He immediately named the cosmic twins and their exact same babies Tweedle Dum and Tweedle Dee! This caused confusion and scepticism for several years until it was discovered over time that the newly discovered close companions of A and B stars finally changed positions and distant from the parent stars! A's companion has a period of 27 years and B's of 38 years. Separations respectively are 0".13/ 0".06]

Astro Events from Frank Gross

A super speedy acid cloud has been hiding on Venus for decades

By Elizabeth Howell



An image taken by Japan's Akatsuki spacecraft shows the night side of Venus in infrared (the dark side of the image is the day side of the planet, which is too bright to study in infrared).
(Image: © JAXA/PLANET-C Project Team)

Lurking just below the atmosphere of Venus is a wall of acid clouds that whip around the planet at speeds close to that of a commercial air jet on Earth.
The newly discovered atmospheric "feature" looms about 31 miles (50 kilometers) below the thick cloud tops of Venus and is extensive, sometimes stretching as far as 4,660 miles (7,500 km) across the equator and mid-latitudes of Venus. And it's been there for at least three decades.

It may seem odd that such a huge feature went undiscovered for so long, given that spacecraft have visited Venus sporadically since 1962, and high-resolution telescopes have been gazing at the planet for years before that. And the first hint that something strange was happening

It took a new survey of archival footage, however, to determine the cloud wall has been there since at least 1983. "We needed access to a large, growing and scattered collection of images of Venus gathered in recent decades with different telescopes," study co-author Pedro Machado, a researcher with Portugal's Institute of Astrophysics and Space Sciences, said in a statement.

The archival footage came from observatories including the Galileo National Telescope in the Canary Islands and the NASA Infrared Telescope Facility in Hawaii.

Enormous cloud patterns in the upper atmosphere are already well-known at Venus, including a bizarre "Y" shape that may arise from centrifugal forces, and a bow wave that could arise from air flow over static ground features like mountains. The newly discovered cloud wall, however, is at a lower altitude and in a region of Venus' atmosphere where the greenhouse effect is quite pronounced, keeping the surface at lead-melting temperatures of 870 degrees Fahrenheit (465 degrees Celsius).

Researchers suggest the cloud wall could be linked to the mysterious and long-observed fast rotation in Venus' upper atmosphere. The newly found feature could potentially dump enough momentum and energy to fuel the fast winds further up, lead author Javier Peralta, an astrophysicist at the Japanese Aerospace Exploration

Agency (JAXA, which runs the Akatsuki mission), said in the same statement. That's because the cloud wall zooms above the surface at jet-like speeds of 203 miles (328 km) an hour.

What causes the cloud wall is still unknown and will require further research, the team said. However, the researchers added, the feature could be an atmospheric "Kelvin" wave, a class of atmospheric gravity waves that has already been observed at Venus. Gravity waves in a planet's atmosphere (not to be confused with gravitational waves) happen when winds move at high speed over static geological features like a crater wall or a mountain; the updraft rises and sinks in a layer of stable air just above the feature.

From a study based on the research was published on May 27 in the journal Geophysical Research Letters.

Cont...2

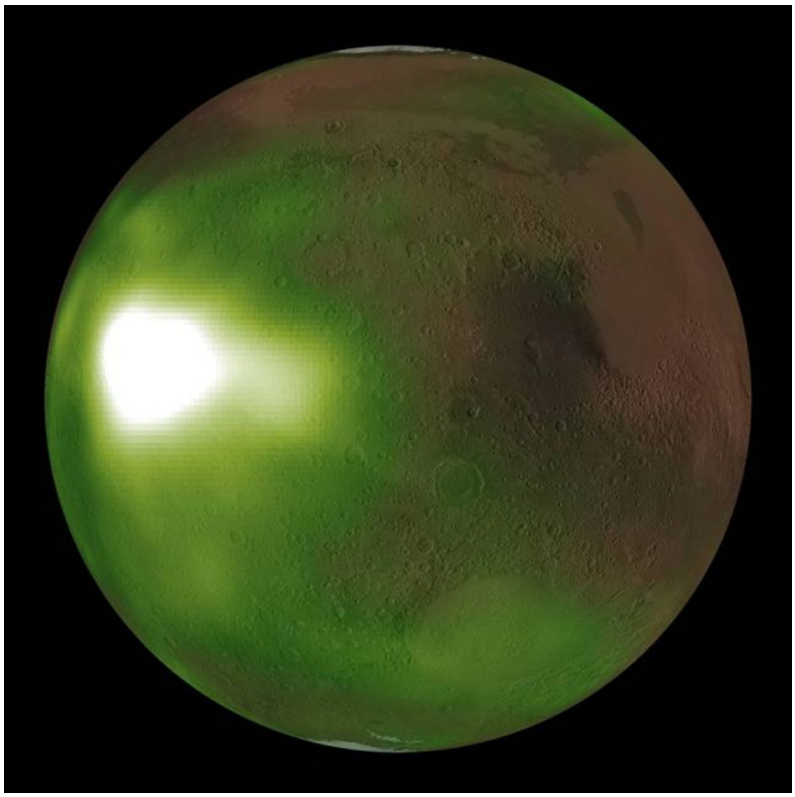
The eerie green 'nightglow' of Mars pulses in ultraviolet light in new NASA views

By Chelsea Gohd

New images of green, pulsing ultraviolet flashes of Mars' "nightglow" are illuminating circulation patterns in the Martian atmosphere.

NASA's Mars Atmosphere and Volatile Evolution mission (MAVEN for short), has been studying Mars since it launched to orbit and study the Red Planet in 2013. Now, new images from MAVEN have revealed the weird and unexpected inner workings of the planet's atmosphere.

"MAVEN's images offer our first global insights into atmospheric motions in Mars' middle atmosphere, a critical region where air currents carry gases between the lowest and highest layers," Nick Schneider, a professor of astrophysical and planetary sciences at the University of Colorado's Laboratory for Atmospheric and Space Physics (LASP) in Boulder, Colorado, said in a NASA statement. Schneider is also the instrument lead for the MAVEN Imaging Ultraviolet Spectrograph (IUVS) instrument that made these observations and lead author on the new study describing this work.

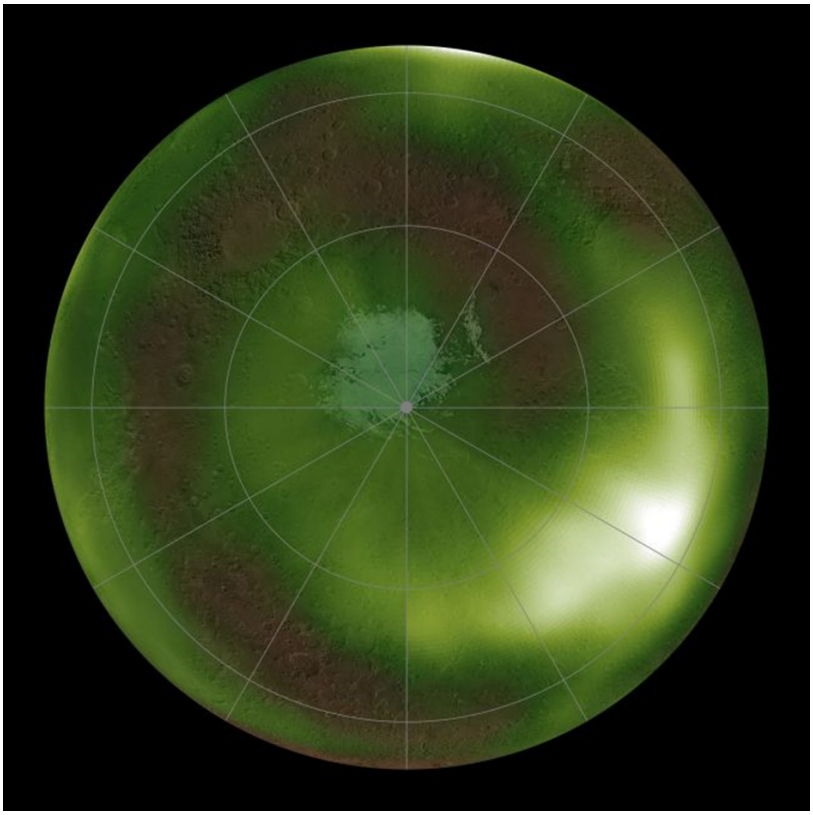


This image shows the ultraviolet "nightglow" in Mars' atmosphere with green and white false colors to represent the ultraviolet light. (Image credit: NASA/MAVEN/Goddard Space Flight Center/CU/LASP)

These images revealed that Mars' atmosphere pulses exactly three times every night during spring and fall on the planet. The new observations also showed waves and spirals over the planet's winter polar regions. The MAVEN work also verified something the European Space Agency's (ESA) Mars Express spacecraft, which first found that "nightglow," or the planet's ultraviolet nighttime glow, is brightest over Mars' cold poles.

This bright glow is created when winds carry gases down to denser regions of the atmosphere. This movement speeds up a reaction that creates the nitric oxide responsible for the glow, which is only visible in ultraviolet light.

Cont...3



This NASA image shows the ultraviolet "nightglow" in the atmosphere of Mars over the south pole. Green and white false colors represent the intensity of ultraviolet light, with white being the brightest. (Image credit: NASA/MAVEN/Goddard Space Flight Center/CU/LASP)

This ultraviolet glow "is as bright in the ultraviolet as Earth's northern lights," Zac Milby, a student researcher at LASP, said in the same statement. "Unfortunately, the composition of Mars' atmosphere means that these bright spots emit no light at visible wavelengths that would allow them to be seen by future Mars astronauts."

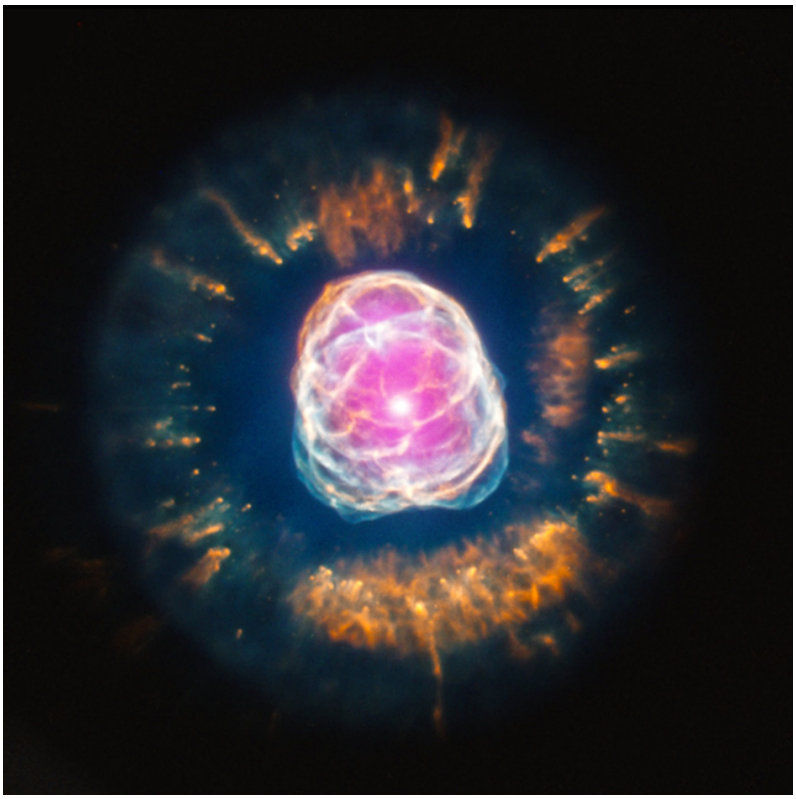
The seasonal pulses that the team discovered additionally revealed that the number and speed of waves in the atmosphere are influenced by daily solar heating and volcanic activity on Mars. The pulses spotted by MAVEN show clearly how the waves in Mars' middle atmosphere match those in the other layers of the planet's atmosphere, according to the same statement.

"MAVEN's main discoveries of atmosphere loss and climate change show the importance of these vast circulation patterns that transport atmospheric gases around the globe and from the surface to the edge of space." Sonal Jain, a research associate at LASP, said in the statement.

This work was published on Aug. 6 in the Journal of Geophysical Research, Space Physics.

Astro Events from Frank Gross

Cont...4



NASA to Re-examine Nicknames for Cosmic Objects Aug. 5, 2020

Distant cosmic objects such as planets, galaxies, and nebulae are sometimes referred to by the scientific community with unofficial nicknames. As the scientific community works to identify and address systemic discrimination and inequality in all aspects of the field, it has become clear that certain cosmic nicknames are not only insensitive, but can be actively harmful. NASA is examining its use of unofficial terminology for cosmic objects as part of its commitment to diversity, equity, and inclusion.

As an initial step, NASA will no longer refer to planetary nebula NGC 2392, the glowing remains of a Sun-like star that is blowing off its outer layers at the end of its life, as the “Eskimo Nebula.” “Eskimo” is widely viewed as a colonial term with a racist history, imposed on the indigenous people of Arctic regions. Most official documents have moved away from its use. NASA will also no longer use the term “Siamese Twins Galaxy” to refer to NGC 4567 and NGC 4568, a pair of spiral galaxies found in the Virgo Galaxy Cluster. Moving forward, NASA will use only the official, International Astronomical Union designations in cases where nicknames are inappropriate.

“I support our ongoing reevaluation of the names by which we refer to astronomical objects,” said Thomas Zurbuchen, associate administrator of NASA’s Science Mission Directorate at Headquarters, Washington. “Our goal is that all names are aligned with our values of diversity and inclusion, and we’ll proactively work with the scientific community to help ensure that. Science is for everyone, and every facet of our work needs to reflect that value.”

Nicknames are often more approachable and public-friendly than official names for cosmic objects, such as Barnard 33, whose nickname "the Horsehead Nebula" invokes its appearance. But often seemingly innocuous nicknames can be harmful and detract from the science.
The Agency will be working with diversity, inclusion, and equity experts in the astronomical and physical sciences to provide guidance and recommendations for other nicknames and terms for review.

Astro Events from Frank Gross

Cont...5

"These nicknames and terms may have historical or culture connotations that are objectionable or unwelcoming, and NASA is strongly committed to addressing them," said Stephen T. Shih, Associate Administrator for Diversity and Equal Opportunity at NASA Headquarters. "Science depends on diverse contributions, and benefits everyone, so this means we must make it inclusive."

And Finally…….

Recommended by NASA

Spot the Station

https://spotthestation.nasa.gov

Receive alerts when the International Space **Station** will be visible passing over your area.

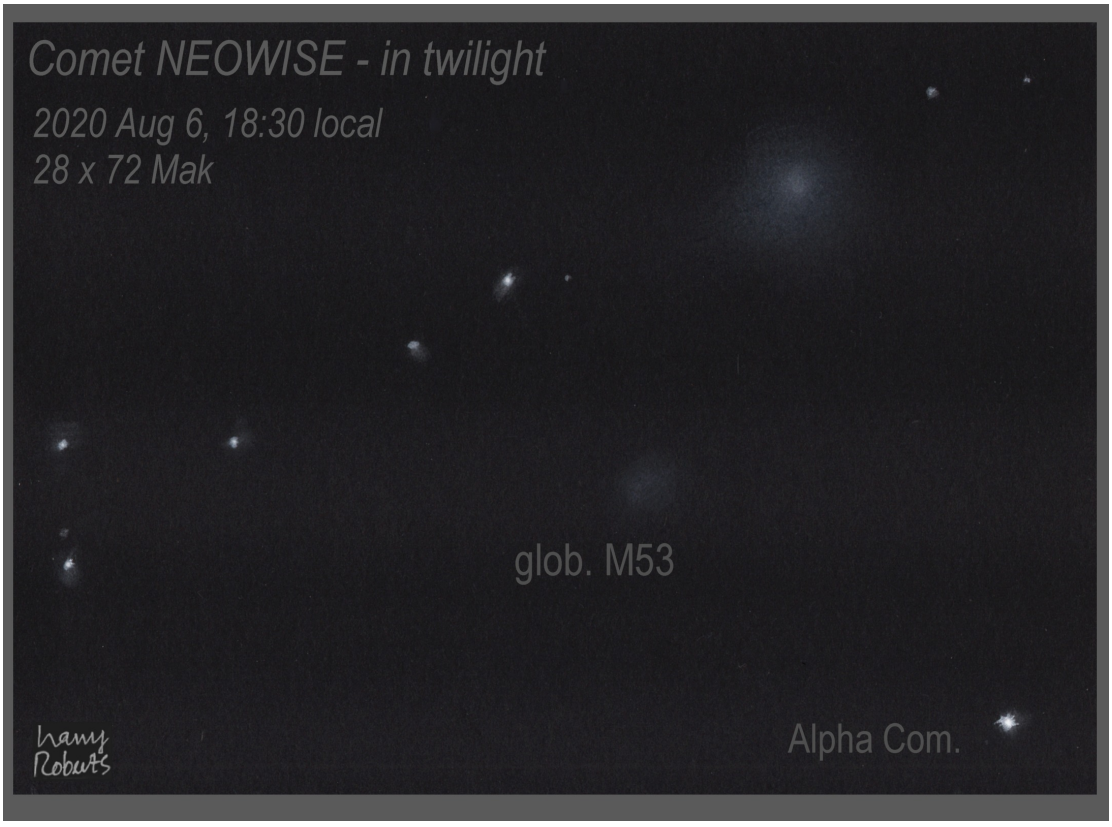
Comet Watching by Harry Roberts

Comets are a mix of frozen volatiles and dust that abound in our solar system, most within the Oort Cloud of comets that surround us a vast distance. At times they are drawn out of their Cloud, by perturbations of some kind, and "fall" towards the Sun in mostly an elliptical orbit. Some hit the Sun while others may be flung out of our system. Some impact on planets that orbit the Sun! May this not happen to Earth! We recently reviewed evidence that this had occurred in our region resulting in a lethal tsunami wave some 500yr ago.

For most of history comets were discovered only when they were at their brightest in the night or dawn skies. When the telescope was invented it was soon used to search for comets still too faint to be seen, mostly in those twilight zones. Caroline Herschel discovered eight; Maria Mitchell discovered just one, but it was to win her a Gold Medal and confirm her career in astronomy. Both are memorialised by craters on the Moon. So a certain amount of 'fame' was attached to folk who discovered comets!

In 2020 this is now almost entirely done by a variety of 'robot' systems that monitor the skies. Yet a few comets are still manually found by astronomers: we recall sensational comet McNaught 2006 and Loveyjoy 2011. The first will likely remain the brightest comet of the 21C! Both astronomers used photographic search methods I believe. Both comets were 'sun-grazers' –and passing through the Sun's lower atmosphere, became dazzling comets. Whatever the reasons, these Australians were not using 'robots' and were eligible for naming rights. In the end, however, the robots 'won'. They detect comets at 17th and 18th magnitudes which no human can, which now means most comets have search system acronyms and can detect comets by the hundreds. It also means more fainter comets are detected than before. We have just watched comets SWAN, LEMMON and NEOWISE. Without the 'systems' these were likely to have been missed by human workers or only noticed once they became very bright, like NEOWISE.

The latter is now ~mag 6 and is detectable in 8X40 binos, yet in the 72Mak in twilight it is pretty faint. Surprisingly it was a lot brighter than globular M53 in the same field. An unnamed star 'chain' pointed like a 'finger' towards the comet. The fov made for a pleasing picture on a cold night. Remember, eventually we will get another 'sun-grazer'!



Nu Carinae: 'Southern Gem by Harry Roberts

Nu Car is a superb double: a bright close pair with contrasting colours. It is double star number 11 from Karl Rumker's catalogue of 1852. In SkyCat2000 the double is : "relfix; fine object, cpm, spect F0, A9, Mags 3 and 6, sep 5arc",PA is 127deg.

Hartung adds: "Since the measures of John Herschel in 1836 there has been no real change in this very fine pair (ie they have fixed positions and common proper motion)...an admirable object for small apertures."
Nu Car A, the primary, is spectral Type F from the famous list: "O,B ,A, F,G, K and M". F stars are white to yellow, fairly low mass, Sun-like and 'well mannered', while A Types are bigger, more active and bluish as the eyepiece shows.

Rumker is maybe the most 'colourful' figure in Australian astronomy (sorry Fred!) A German midshipman on an East India Co. ship he was "pressed" into the Royal Navy during the Napoleonic Wars and fought actions in the 'Med'.

His Captain recommended him to Governor Brisbane and he served as assistant astronomer to Brisbane at Parramatta Observatory, later becoming first 'Government Astronomer' of Australia.

His 1852 Catalogue of Fixed Stars was a major work, in which Nu Car is listed as double Rmk11. He was a fine astronomer apparently. Yet it also seems Rumker was "somewhat irascible!"

It's hardly surprising that a naval man would clash with the 'soldier' Brisbane. This involved land that was 'promised him' but didn't appear; though Rumker had quite a bit at Picton already it seems. In protest he went 'absent' from Parramatta – leaving assistant James Dunlop to his own projects.

This likely helped the latter to complete his own catalogue of both doubles and "nebulae"! For which we are very grateful – as neither Rumker nor Brisbane worked on "deep sky" objects.

Nu Carinae is a fine double with an 'interesting' Colonial history; a Southern Gem! Clear skies!

All The Stars Aligned! By John Gould

Lock down due to Corvid 19 has been a pain for many, prohibiting activities which we would normally take for granted and restricting the social interaction we are all accustomed. However, for some it has allowed time to slow down and spend time doing activities which have lower priorities in life, and never quite finished. Many may remember the talk I gave when first embarking on the astrophotography journey, when a blurred 2 second photo of a star was considered a triumph by me.

A case in point is my recent time spent perfecting imaging deep sky objects. After a few years of experimenting, reading and Youtubing about the processes involved in taking photos of deep sky objects, recent months has allowed more time to explore the complex and nebulous world of astrophotography. It is a daunting and complex process requiring the gaining of skills in photography, polar aligning, computer programs communication, auto guiding, capturing and post processing. Many of the computer programs are free, however, a tripod/ mount must have tracking capability, and a good post processing photo editor is essential. The telescope does not need to be large and the camera should be a digital SLR, or a CMOS video for planetary objects. I only use a 100 mm (550 mm focal length) refractor telescope for big deep sky nebular, and the old C8 SC for the planets.

This set-up was selected after talking with Harry Roberts and has proved a great combination. The smaller telescope allows for longer exposure times and a wider field of view for those large nebular, many much larger than can be seen with a normal telescope. Mark Town was also an invaluable help, and sorted out computer networks and systems communication, a task which stopped me for a year, and one I would never have been able to figure out confidently. I use the following computer programs:

- Stellarium and/or Cartes du Cieles/ SkyMap (kindly donated by Eugene) to assist in locating targets
- SynCam- the software which came with the tracking mount
- ASCOM- a free program which allows all the programs to talk with each other
- SharpCap- came with a small WZO CMOC video camera and used to polar align and capture video
- PHD 2- a free program used for talking to the mount, fixing on a star and auto guides the mount
- Backyard EOS- used to focus and capture photos with a Cannon camera
- Deep Sky Stacker- a free program used to stack the photos from RAW images, although all photos shown here are single shots, as I have yet to master DSS
- Photoshop- a photo editing program, and if purchased can be expensive if used only for astrophotography.

There are many other programs which are more or less expensive than those shown above, but these are all easy to learn and use. My set up includes a SkyWatcher 100 ED refractor telescope, EQ 6 Sky Watcher mount, a 40mm guide scope and WZO ASI 290MC CMOS video, and Cannon 70D DSLR camera. With this combination I have taken 600 seconds exposures without a blur (without guiding) which is a great advancement on the early **2 second** exposed photos achievements. So with the time available during the last few months to get it together, and a few good viewing nights I have some success (and failures) with astrophotography, the results are shown below.

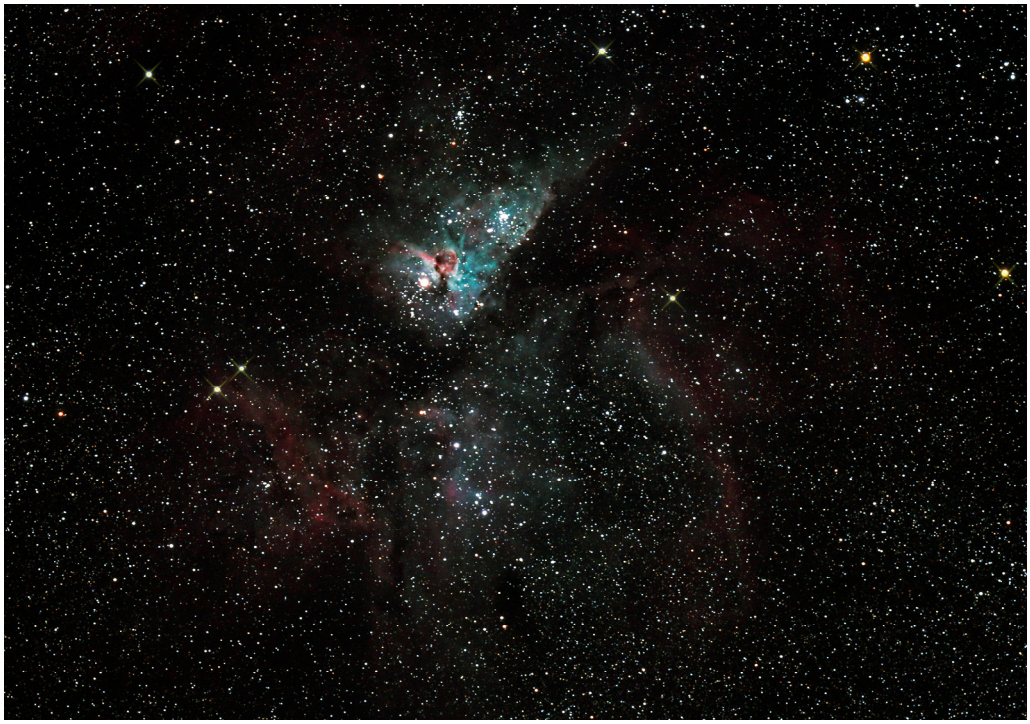
If anyone would like to know a bit more about starting out in astrophotography, I would be only to glad have a talk and pass on the any advice, knowledge and mistakes.

All The Stars Aligned! By John Gould

The photos are:

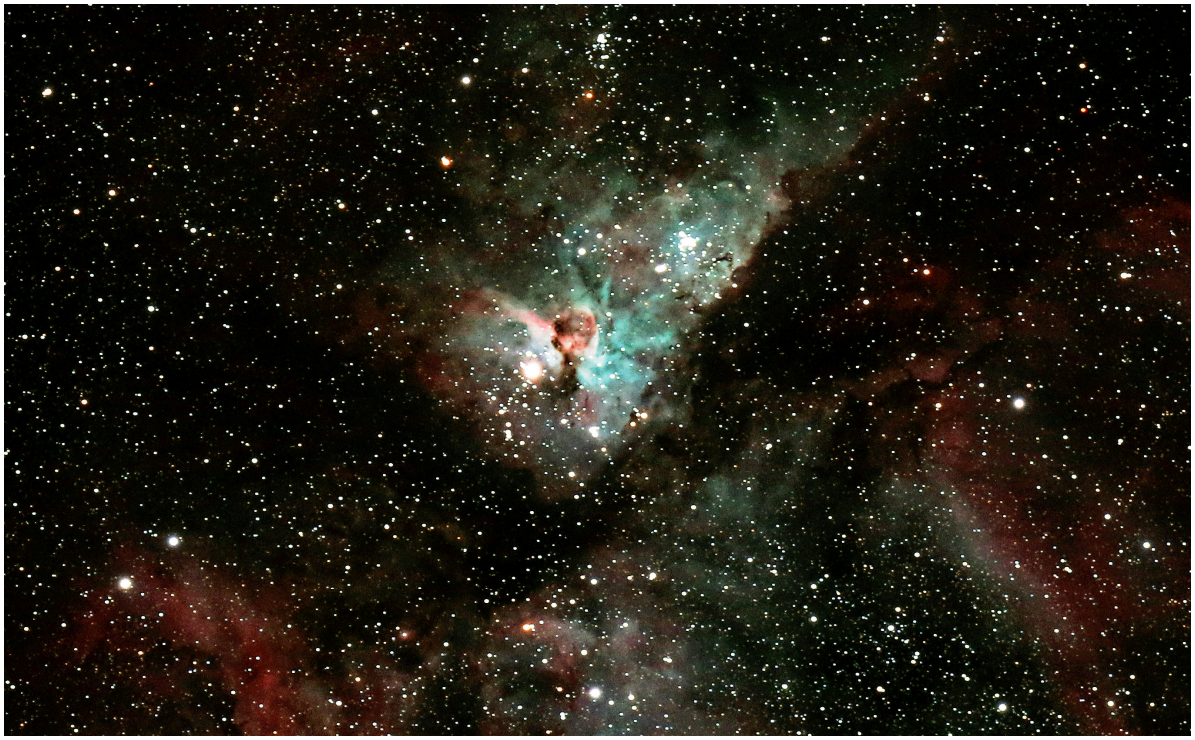
1 Orion Nebula- Apparent size= 65x60 arcminutes, 1,344 light years away

2 Eta Carina- Apparent size=120v120 arcminutes ,7500 light years away (230 light years across)



All The Stars Aligned! By John Gould

3 Zoomed in eta carina

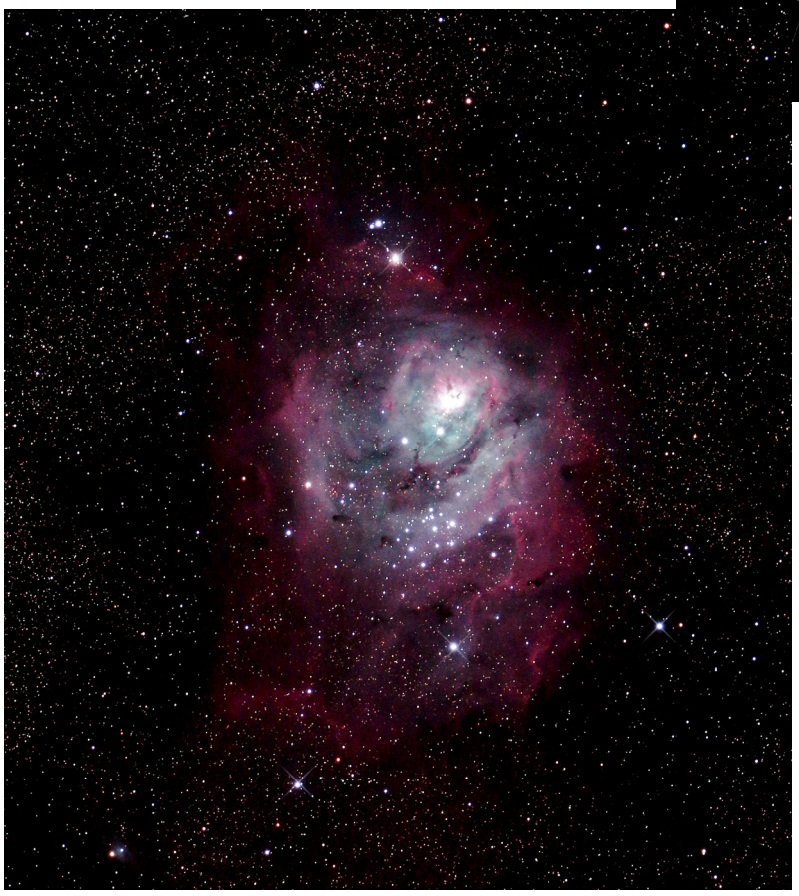


4 Moon- Apparent size= 30 arcminutes
5 Prawn Nebula- Apparent size= 90 arcminutes, 6,000 light years away
6 Trifid Nebula- Apparent size= 28 arcminutes, 5200 light years away

7 Omega Centauri- Apparent size= 36 arcminutes, 15,800 light years away

All The Stars Aligned! By John Gould

8 M 83- Apparent size= 11 arcminutes, 15,000,000 light years away. Not the satellite transiting straight through the middle



9 Lagoon Nebula- Apparent size= 90x40 arcminutes, 4,100 light years away

All of the photos are single exposures and the next step will be to stack all the images taken to sharpen the detail, and with the impending lock-down I may find time to learn this technique and advance the skills. Obviously still a long way to go but the early photos are encouraging. Trust you enjoy.

John Gould

More Club News continued from page 1

Club/Social Viewing Nights

Club/Social Viewing Nights are on Saturday evenings "just" Before Sunset. Viewing nights are for members and invited guests. The contingency plan for poor weather on the proposed viewing night is to meet the next night (a Sunday night) .

Woncur Road, South Nowra (Head South down The Princes Highway, turn right at BTU Road, Woncur Road is the street first on the left).

University Viewing site. On the way to the university on George Evans Road go straight ahead through the second turning circle to the new viewing site.

Bring your scopes and or binoculars and a small folding chair, a decision on the day planned, depending on viewing conditions, by the club president and his deputy.

Email information if details are changed, to all, or contact Frank for changes.

Solar viewing BBQ lunches (BYO) may be held and these will be advised ahead of these events. Special events such as Comets, eclipses etc. may also warrant members night viewings.

The AGM was held at the July 2019 monthly meeting. Elected officials for 2018 - 2019

President: Mark Town
Vice President: John Gould
Secretary/Treasurer: Frank Gross
Public Officer; Frank Gross
Observation Officer: Robert Turnbull
Editor: Kaye Johnston
Librarian: Chris O'Hanlon

The Committee: Robert Turnbull, Rudolf Henssen, Robert Spruyt, Chris O'Hanlon, John Gould, Ernest Royston, Anthony Peters

Check out the Astro Flyer on the web site: www.shoalhavenastronomers.asn.au

Shoalhaven Astronomers PO BOX 1053 Nowra NSW 2541	The deadline for Articles for the Astro Flyer is The First Friday of the Month. Editor Kaye Johnston

Club Video Projector Rental

The Video Projector is available for club members for a small rental fee. If a club member would like to project a football game, cricket game onto a wall for a party this is the way to go. You will get up to a 100 inch diagonal picture on a light coloured wall with the Epson video projector. The projector has an inbuilt speaker but you can add your own speaker units if necessary. The unit s very easy to use and instruction would be given before the borrowing (2 days) occurs. The rental price is set at present at $15 for two days.