Shoalhaven Astronomers Inc.
www.shoalhavenastronomers.asn.au

Volume 23
Issue 7

Astro Flyer

JULY 2023

Club News

Report of the Vice President,

I write this report as the quasi-President for the last few months following the resignation of our President Mark. Firstly, I again thank Mark on behalf of the Association his Presidency of the Shoalhaven Astronomers (SA) for the last 10 months, which included the difficult task of bringing SA back to normal after disruptions from Covid lockdowns.

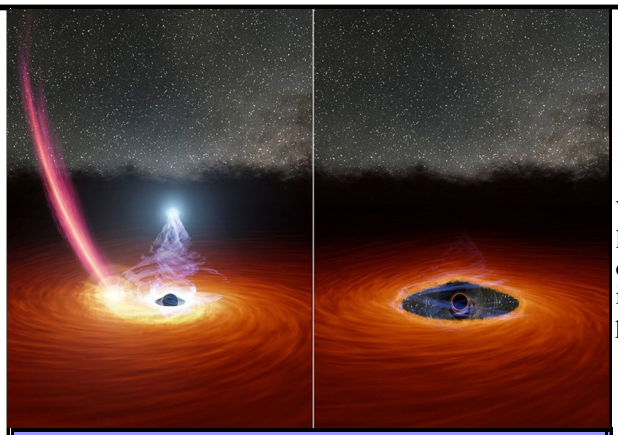
During the last financial year, SA saw increased activity by members back to our pre Covid days. We witnessed many informative videos thanks to Frank, and a continued list of interesting speakers at SA meetings. I would like to thanks those members for their time and presentations. We also participated in a number of outreach talks/demonstration lead by John Bambrey, all of which were very much appreciated by the community members and helped promote our Association and to meet the objectives of SA.

However, the main event undertaken by SA members was the development of our new observatory. Following the successful grant application, an enormous amount of work took the project to the purchase stage, only to find the manufacturer was unable to supply a new structure. As a result, a second-hand observatory was sourced near Newcastle, deconstructed and transported to Nowra by SA members.

(read more from Vice President over page.)

Next Meeting and AGM July 21st 7 pm

Contents



MOON PHASES

New Moon	First Quarter	Full Moon	Last Quarter
July 18th	July 26th	Aug 2nd	Aug 8th

Viewing Nights

We are aiming, once daylight saving is over, to make observing at Friday meetings a priority if the weather permits.

New and Last Quarter moon phases are good times for Dark Sky Observing.

… Message from the Vice President

Cont...2

This required an unexpected large amount work by SA members, seeing well attended working bees almost every Sunday for the last 6 months to bring the project to finalisation. The work and participation at these working sessions is unprecedented in the history of the SA. I would like to thanks all those members who have worked tirelessly to make the observatory a great success.

The SA is now strategically placed to provide enormous benefits and opportunities for SA members and the community. Our partnering with the University of Wollongong will also offer expanded opportunities in the interest of astronomy.

I would also like to thanks the Executive members for their continuous hard work throughout the year, and of course the committee members who have provided good management and judgement during the last year. A special mention and thank you to Kaye for the edit and production of our monthly newsletter, which she does so well. Also, thanks to Frank for providing refreshments at our monthly meetings

With our new observatory now functional, I would expect that we will be able to resume our visual observing nights. This should be enhanced by our ability to provide interesting learning sessions for our members and beam the astronomical images direct to a lecture theatre for members and the public to view in a comfortable and safe environment.

Next year is going to be an exciting and rewarding year for SA, and we will require an enthusiastic committee to maximize the benefits of this years hard work. I therefore urge all members to consider becoming part of the Executive/committee to guide the Association during this exciting time.

Keep looking towards the stars

John Gould
Vice President

Observation Report Andrew Wood

What's on in the Cosmos – July/August 2023

As we approach our July meeting on the 21st, we have a New Moon on the 18th; peak Deep Sky Observing time. It will be the same at the August meeting on the 18th.

Moon Phases

New Moon	18th July	Dark all night
First Quarter	26th July	Dark after midnight
Full Moon	2nd August	Enjoy the Moon
Last Quarter	8th August	Dark before midnight
New Moon	16th August	Dark all night

Planets

Mercury is becoming an early evening object in the western sky as we move from late July into August. It will be bright at around magnitude 0 and displaying waning in its phases telescopically.

Venus shining brilliantly at magnitude -4.5 in the western evening sky and showing a crescent phase telescopically. It is however becoming lower each evening and will be too low for viewing by mid-August.

Mars continues to be visible in the western evening sky, though at magnitude 2 and with an apparent disk very small compared to at opposition., making it disappointing telescopically. It moves from Leo into Virgo by mid-August.

Jupiter rises early in the morning during July though will be rising at midnight by mid-August.

Saturn is heading for opposition by the end of August and rising around 8PM toward the end of July and rising earlier, by 6:30PM, mid-August.

Uranus an early morning object during this observing period.

Neptune is rising early in the night for anyone who wants to chase it down with a telescope.

Planetary and Lunar Conjunctions

If you have a clear western horizon, on **July 19,** Mercury and the one-day old Moon will be together just above the horizon after sunset. Very difficult to see.
On **July 20,** the crescent Moon, Venus and Mars form a triangle in the early evening western sky. The brightest star in Leo, Regulus, sits within this triangle. On the following evening, **July 21,** the waxing crescent Moon will be adjacent to Mars.

There are many faint **Comets** currently visible. From our perspective, *Comet C/2020 (Panstarrs)*, at magnitude 11, is located around the south celestial pole. July 21 finds it in the constellation Chamaelon. By the end of August it will be in Musca.

Meteor Showers

Southern-delta Aquarids: July 18-Aug 23. Maximum July30/31 – Moon will be a hindrance.
Alpha-Capricornids: July 3-Aug15. Maximum July 30 – Moon will be a hindrance.
Pisces Austrinids – July 15-Aug 10. Maximum July 29. Moon will be a hindrance.

Beyond the Solar System

The constellation Scorpius dominates our skies during winter. Beyond the tail of the scorpion two showcase open star clusters, M7 (NGC 6475, Ptolemy's Cluster) and M6 (NGC 6405, The Butterfly Cluster), are visible with the naked eye under a dark sky, and certainly visible in binoculars. They are both beautiful sights in any size telescope. The globular cluster M4 (NGC 6121) is located very near Antares – Scorpius' brightest star. M4 can also be seen easily in binoculars and easy to aim a scope at. Antares itself, glowing distinctly red, has a faint companion star very hard to see due to the brightness of Antares. Observing the faint companion requires good atmospheric seeing and a telescope with excellent optics.

The area within and around Scorpius has a multitude of other deep sky objects – clusters, nebulae and galaxies. Getting hold of a reference such as *Hartung's Astronomical Objects for Southern Telescopes* and a set of detailed star charts will keep an observer busy all winter.

Observation Report Andrew Wood

Cont...2

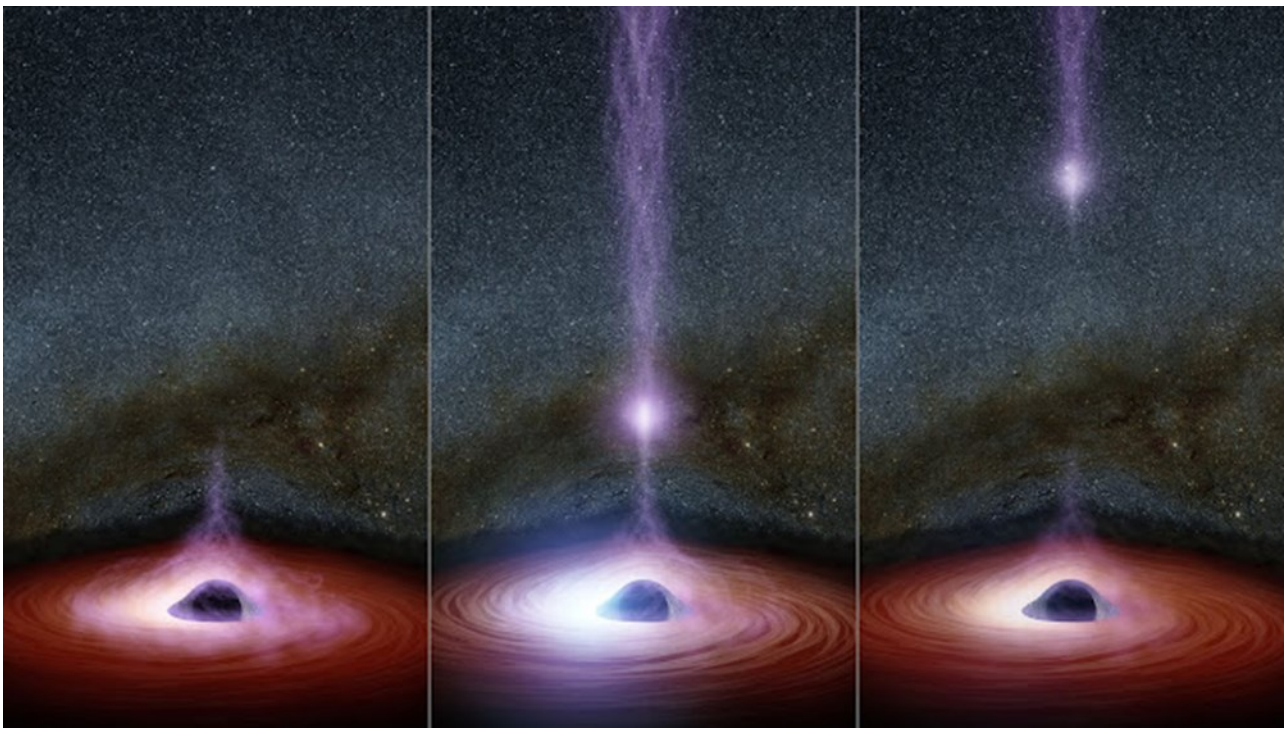
The constellation Scorpius showing the positions of Antares, M4, M6 and M7

The photo by Andrew Woods

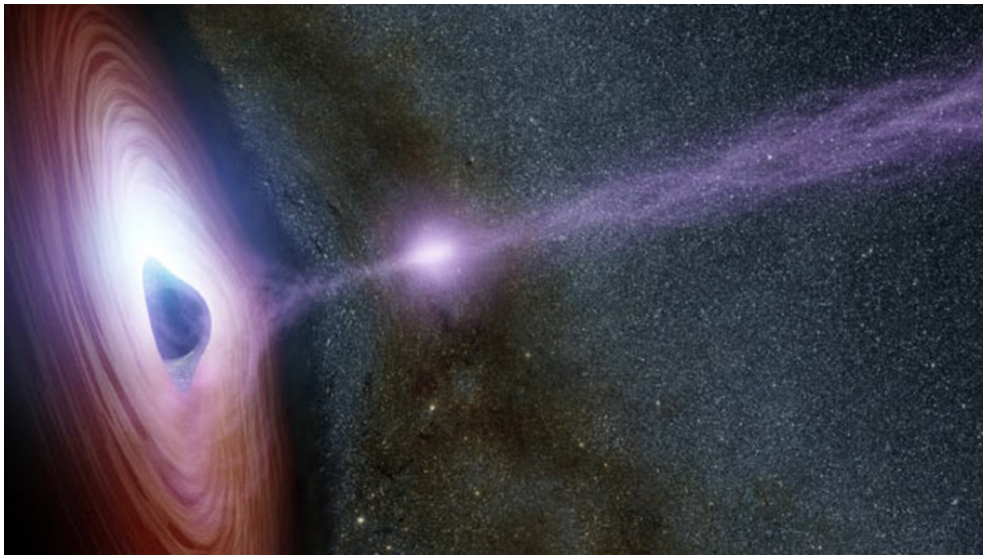
Astro Events from Frank Gross

NASA Saw Something Come Out Of A Black Hole For The First Time Ever

by Admin October 31, 2022



You don't have to be a science expert to know that black holes usually pull things in instead of spitting them out. But NASA has just found something very strange near the Markarian 335 supermassive black hole.

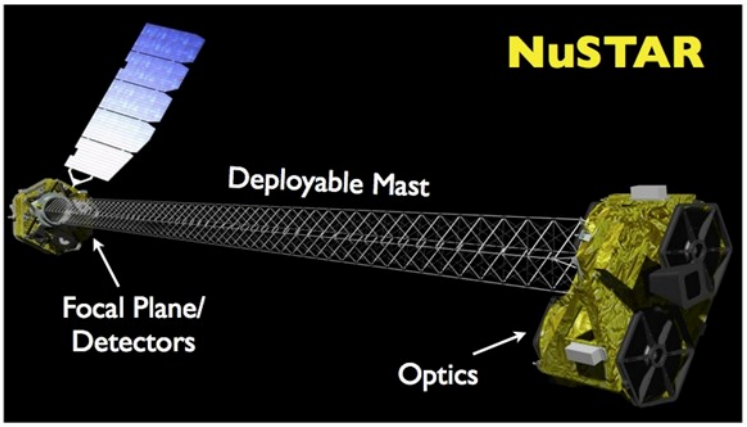


The Nuclear Spectroscopic Telescope Array (NuSTAR) and another NASA satellite telescope saw the corona of a supermassive black hole being "launched" away from the hole.

Then there was a huge burst of X-ray energy. So, what exactly did happen? This is what scientists are trying to figure out right now.

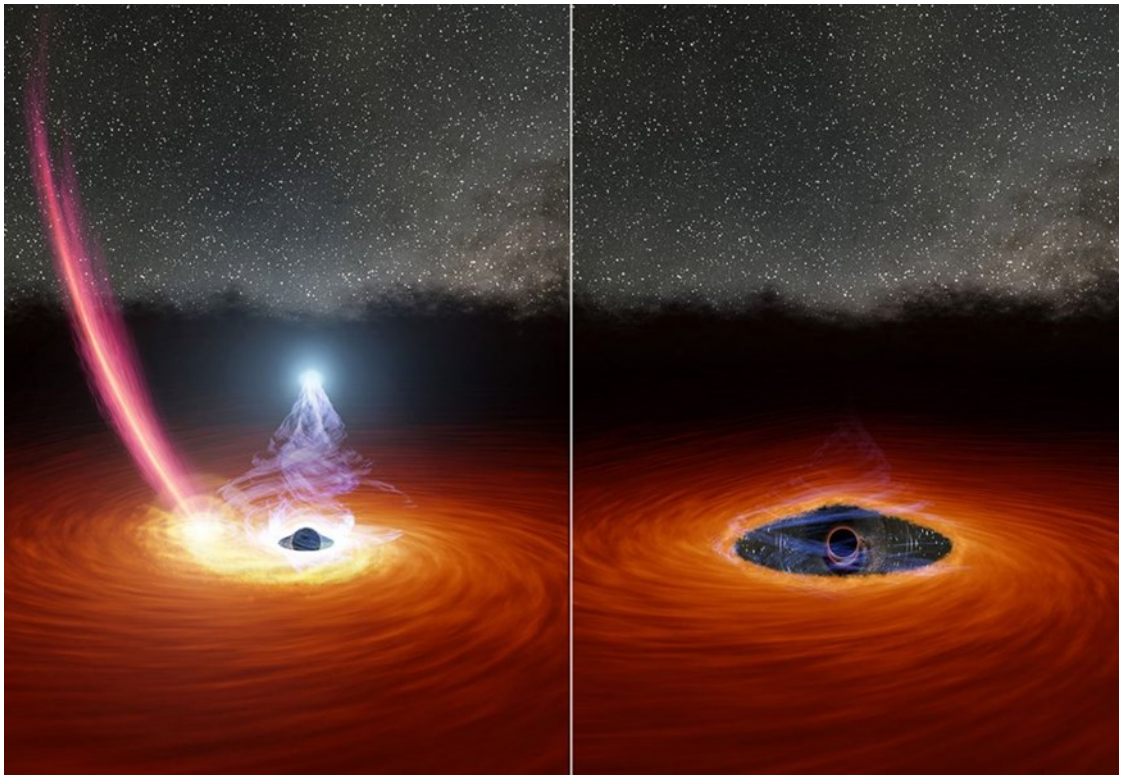
Astro Events from Frank Gross

Cont...2



Dan Wilkins of Saint Mary's University said, "This is the first time we've been able to link the launch of the corona to a flare." "This will help us figure out how some of the brightest things in the universe are powered by supermassive black holes."

Cont...3

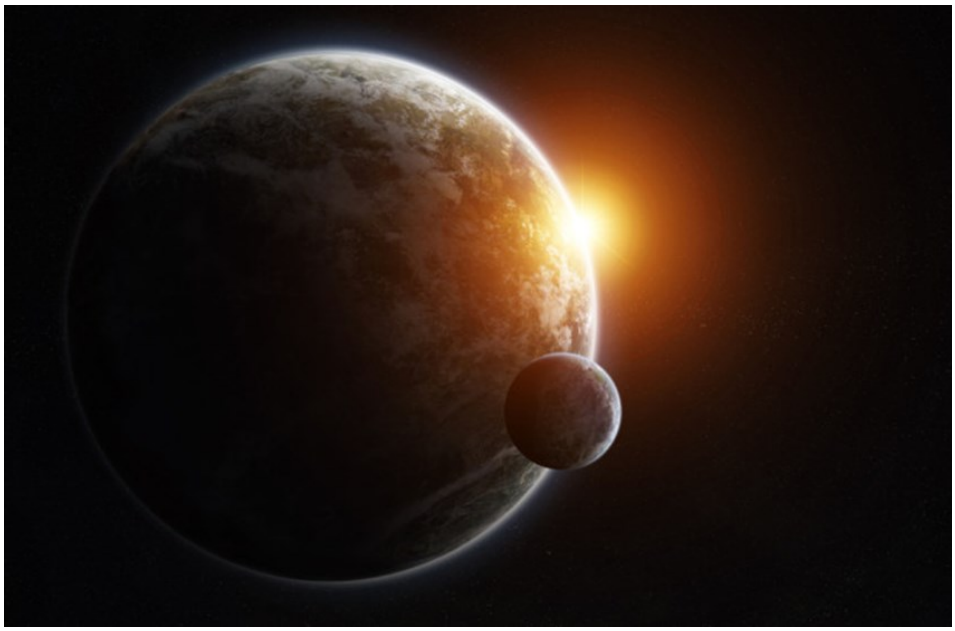


Fiona Harrison, who is in charge of NuSTAR, said that the energy source is a “mystery,” but that being able to record the event should give some clues about the size and shape of the black hole and (hopefully) new information about how black holes work. We’re lucky that this black hole is still 324 million light-years away. So, no matter what weird things it does, they shouldn’t affect our little part of the universe.

Our Radio Signals Have Now Reached 75 Star Systems That Can See Us Too

We have been broadcasting for over 100 years. Now a new 3D map of the galaxy reveals the stars these signals have reached that can also see Earth.

The Physics ar Xiv Blog Jul 31, 2021 3:12 AM



(Credit: sdecoret/ Shutterstock)

Astro Events from Frank Gross

Cont...4

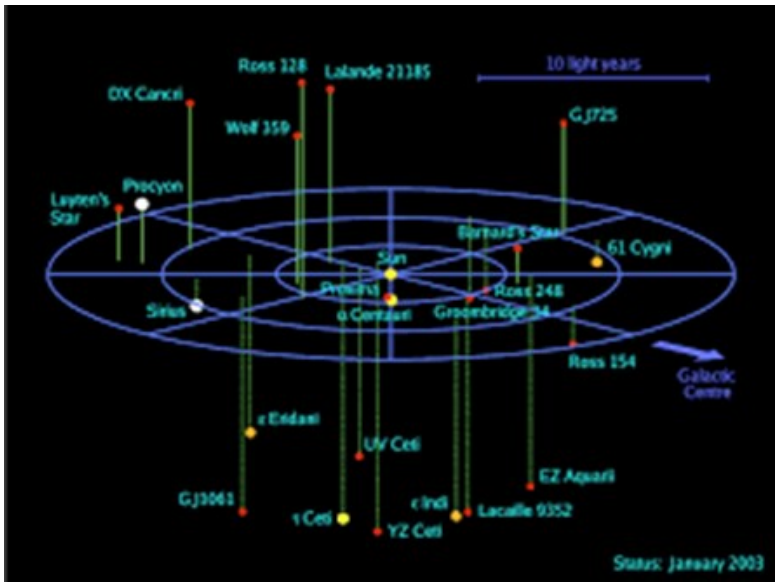
When Guglielmo Marconi made the first "long-distance" radio broadcasts in 1895, his assistant tuned into from a less than a kilometer away. Marconi went on to develop the world's first commercial radio system and, by the time of his death in 1937, radio signals were routinely used to communicate across the world.

These broadcasts have also travelled into space, signaling to all who care to tune in, that humanity has emerged as a technologically advanced species. The first signals have now been travelling for over hundred years, reaching distances that would have been unimaginable to Marconi.

That raises some interesting questions about the stars these signals have already reached. What kind of stars are they, do they host exoplanets and if so, are any potentially Earth-like and in the habitable zone? How many of these exoplanets might also be able to see us?

Now we get an answer thanks to the work of Lisa Kaltenegger at Cornell University in Ithaca and Jackie Faherty at the American Museum of Natural History in New York City. These astronomers have calculated the size of the sphere that our radio signals have covered since they left Earth, counted the stars that sit inside it and worked out which of them should also be able to see Earth transiting the Sun.

3D Star Map



All this is made possible by the Gaia Catalogue, a new 3D map of our galaxy showing the distance and motion of more than 100 million stars. The data comes from the European Space Agency's Gaia spacecraft that was launched in 2013 and is mapping the position and motion of some 1 billion astronomical objects.

The resulting map is giving astronomers an entirely new way to study our galactic environment. Kaltenegger and Faherty's project is a good example. Since Gaia measures how these stars are moving relative to one another, the researchers can work out for how long we have been visible to them and for how much longer.

Kaltenegger and Faherty say 75 stars systems that can see us, or soon will, sit within this 100 light year sphere. Astronomers have already observed exoplanets orbiting four of them.
These systems are generally well studied. The researchers say, for example, that the Ross128 star system is the 13th closest to the Sun and the second closest with a transiting Earth-size exoplanet. Then there is Teegarden's Star, with at least two Earth-mass exoplanets and the Trappist-1 star system with seven Earth-sized planets, of which four are in the habitable zone.

Our signals continue to radiate away from us. So Kaltenegger and Faherty also pick out at the star systems set to receive our signals in the next 200 years or so and will also be able to see us. "1,715 stars within 326 light-years are in the right position to have spotted life on a transiting Earth since early human civilization, with an additional 319 stars entering this special vantage point in the next 5,000 years," they say.

Cont...5

Rocky Exoplanets

Exoplanet statistics suggest that at least 25 per cent of these stars will have rocky exoplanets. So there should be at least 508 rocky planets in this population with a good view of earth. “Restricting the selection to the distance radio waves from Earth have traveled- about 100 light-years - leads to an estimated 29 potentially habitable worlds that could have seen Earth transit and also detect radio waves from our planet,” say Kaltenegger and Faherty.

Of course, the possibility of life on these worlds is entirely unknown. The next generation of space telescopes should allow astronomers to study these worlds in more detail, to determine their atmospheric make up and perhaps see continents and oceans.

To similarly equipped alien eyes, Earth will have long looked an interesting target. Life first emerged here some 4 billion years ago, ultimately giving our atmosphere its rich oxygen content and its other biomarkers, such as methane. If astronomers find similar conditions elsewhere, that will pique their interest.

It could even prompt searches for radio signals that may already be reaching us from these places. Marconi would surely have been amazed.

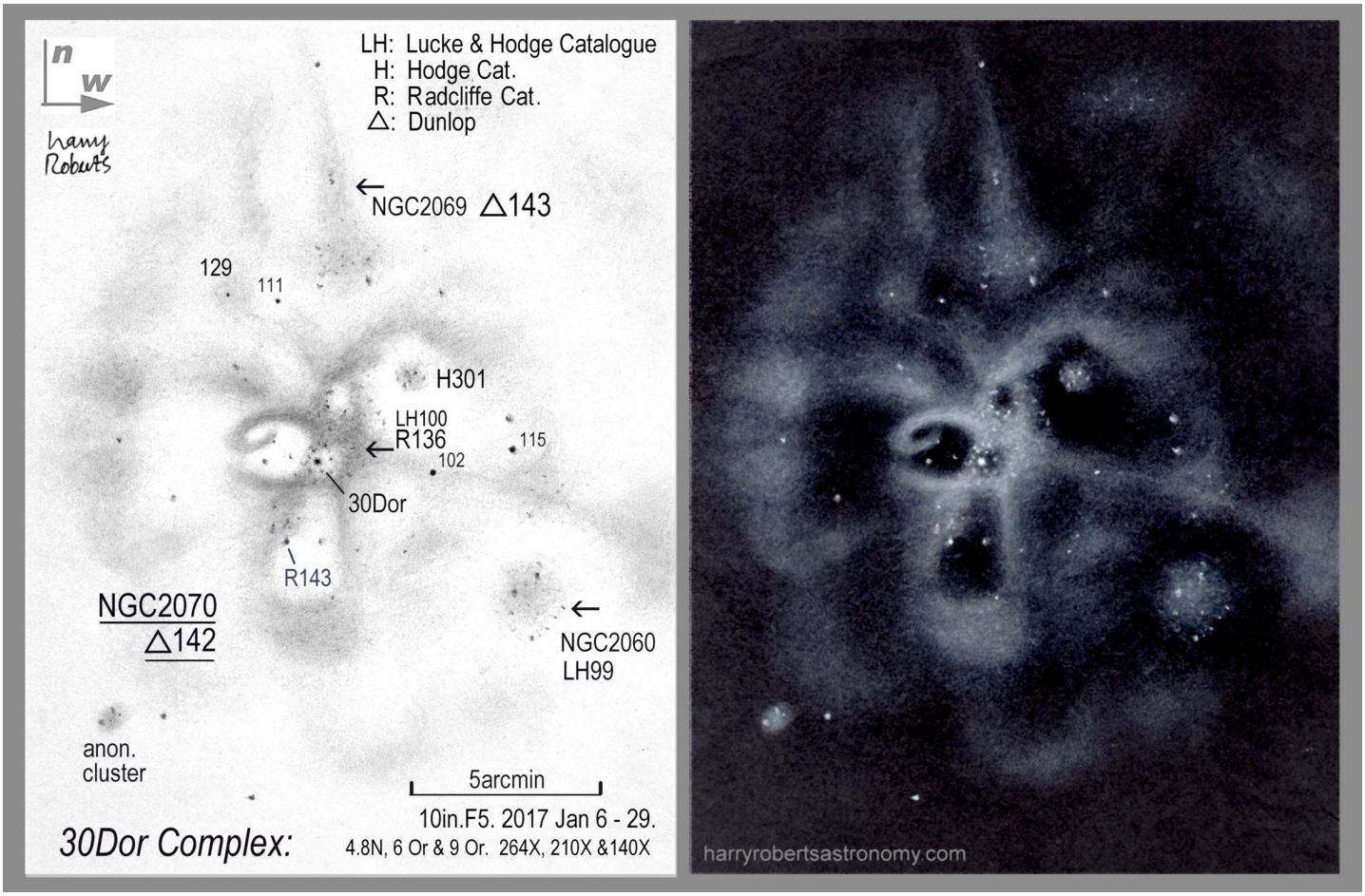
30 Doradus Nebulaby Harry Roberts

30 Doradus Nebula: Going Deeper!

The writer first viewed this nebula in the Large Magellanic Cloud in 1963: a tantalising glimpse in a four-inch 'scope - then better views with an eight-inch in 1965. It was a bewildering object! A first try at photography was made in Sep 1967; all the while hoping to soon sketch its multi-foil contortions. And fifty years later, a sketch was begun on Jan. 6th, 2017. This initial pastel was reworked over several nights until, on the 29th, it was done!

Is the 30 Dorado Nebula, or 'Tarantula', the most complex object in the whole sky? Nothing with more detail packed into the one field-of-view comes to mind. Why is this so? 30 Dor. is an enormous object, some 1000ly in diameter (160Kly distant), comprising multiple looping nebulous 'clouds', twined around four or five star clusters or stellar associations. Here and there are compact dark voids, darker even than the surrounding LMC background. At its centre, bright 'trunk-like' structures writhe, as if tied in knots. This is the largest known HII region and nothing in our Galaxy approaches its size.

Compare familiar Milky Way HII regions, like Orion's M42 for example, and we see just one O-type star (Theta1Orionis) illuminating the whole nebula; or M8, the 'Lagoon', where 5 or 6 O-types light-up that nebula. In 30 Doradus hundreds of O-types are involved (along with myriad B supergiants and WR types).
The LMC galaxy is much smaller than our Galaxy: why then does it contain such a huge HII assembly? Clearly, something happened 'recently' to remodel the two Magellanic Clouds – and it triggered a burst of HII and 'blue-knot' star formation, in a dynamic process involving both clouds. By 'recent' we mean between 1 to 10Myr.



30 Doradus Nebula by Harry Roberts

Cont...2

Sketch. The 'old-era' ten-inch f5 was used, with a dark head cover and observing seat. During the six sessions a variety of eyepieces were needed; old narrow-field orthoscopics gave the best contrast for the faintest nebulae and the faintest stars: most star clusters or associations were partly resolved. At least fifty stars pepper the fov (Fig) with maybe 100 resolvable. As usual, the sketch got bigger as outer loops or streamers were seen, until it overflowed the A4 page; attractive features often 'swam' into view beyond the fov! Clearly the 'Tarantula' is only the brightest part of a fainter field, very much larger than the sketch. Some star positions are approximate only. At completion, about ten hours had been spent at the scope.

Catalogues. The 'Tarantula' is so large and complex that historic attempts at labels give some confusion. The 'whole' central nebula is NGC2070, while the stellar association and nebula streamers 5arcmin to the north is NGC2069. A large cluster with nebulosity 8mins to the SW is NGC2060, yet it lies within the outer 'clouds' of 2070, as does 2069! 'Jamie' Dunlop has two 'objects' attributed to him: NGC2069 is D143 and 2070 is D142, it seems. More recently smaller features, particularly clusters, have gained 'tags'. The cluster that holds 30Dor is R136 (Radcliffe) but also LH100 (Lucke and Hodge) as well as SL633! Which 'tag' has primacy? As 'scopes get better at recording details the need for catalogue numbers increases. Clusters are important for work on stellar spectral types and luminosity classes that yield ages and masses etc. for their members.

A negative of the sketch (Fig) has been captioned with (I hope) the correct labels. Current papers show, for example, that tiny cluster H301 (Hodge) is ten times older (10Myr) than the dense OB swarm of supergiants that comprise R136, including 30Dor, due mainly to a burst of 'second-generation' giant stars therein. Despite this, a tiny but 'pretty' cluster with 2 or 3 stars resolved, 9arcmin SE of 30Dor is, it seems, anonymous. Some star magnitudes are shown (Fig) for reference purposes. The fov centre is ~05h39m,-69°07'.

NGC2060. Most of the 'Tarantula's' components are intriguing objects in their own right, albeit distant. For example, the NGC2060 cluster of supergiant stars (LH99) has within it a supernova remnant including a compact X-ray source and a pulsar much like the 'Crab Nebula' M1.

Dark voids. Some parts of the 'Tarantula' appear darker even than the surrounding LMC background. Why? Most notable is the one on the E side of star 30 Dor. It is surrounded by twisted bright 'trunks' and may be, in part, a contrast effect. Yet Hubble images show it is an 'empty' void – presumably blown by extreme stellar winds from 30 Dor and its 'friends'. Two or three others are also not dark dusty regions, but true voids blown by supergiants – as seen elsewhere in the LMC, such as in the N11 Nebula (i.e. NGC1760, 61, 63 and 69).

Filters. These were little used on this object – but an H-beta filter strongly enhanced the nebula, as well as many others outside the fov – including the curious 'blue-filaments' 1.5 to 2deg N of the 'Tarantula', that maybe the subject for a future sketch. H-beta response is not often strong on Milky Way objects, but may be better with LMC objects.
Sketching the unique 'Tarantula' was a rewarding, if challenging, project –too long delayed. But it was made easier by the somewhat darker skies of the writer's backyard.

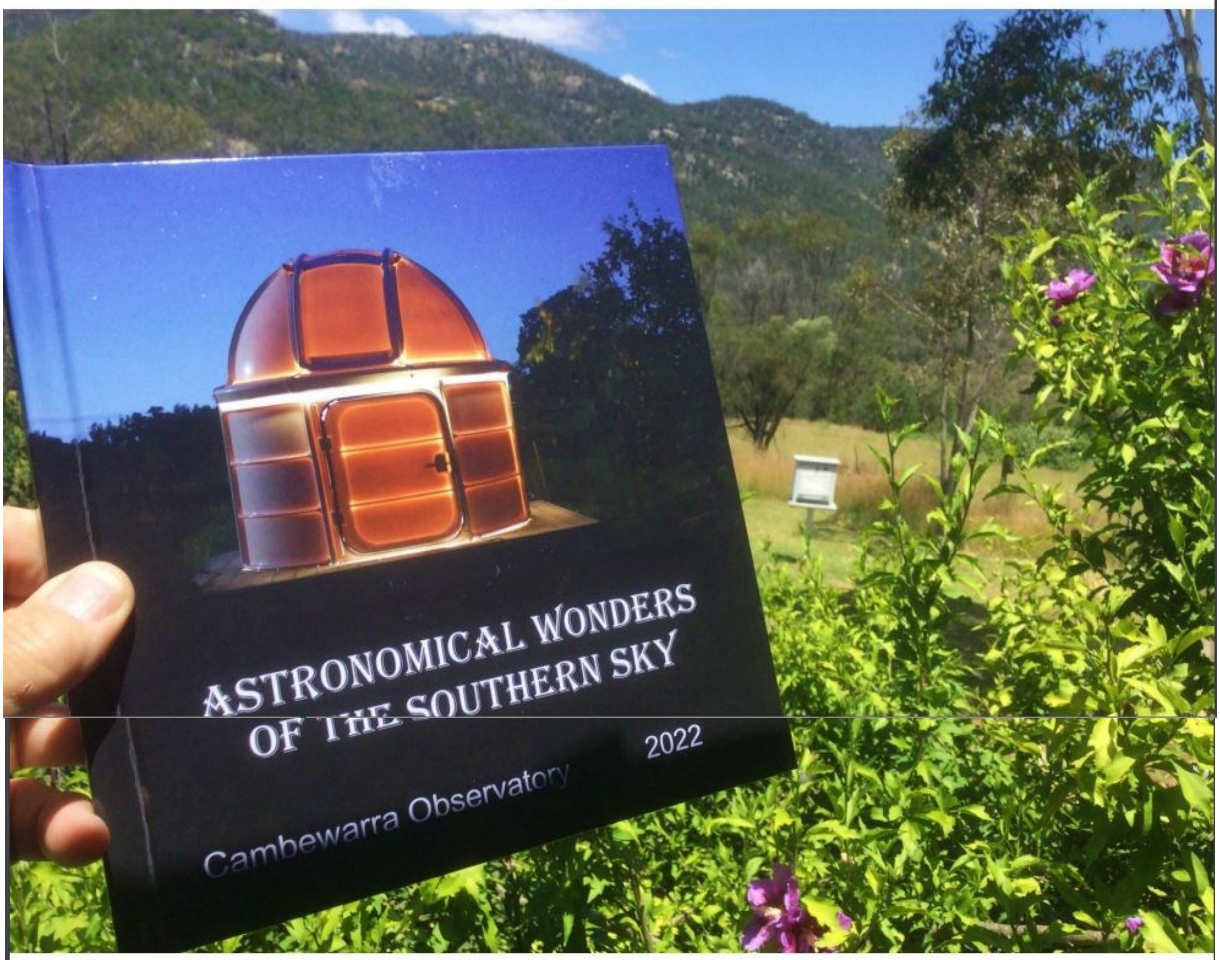
Clear skies!

Book Review

Astronomical Wonders of the Southern Sky

by John and Jenny GOULD,
Cambewarra Village Observatory, 2022
24 pp. glossy, hard cover.

REVIEWED BY TRAC LIFE MEMBER WARWICK SCHOFIELD



TRAC WAS recently donated this nice book during the Tamworth Astronomy Experience.

At twenty two pages long, and all astrophotos, it is easy reading!

Eight nebulae, one star, one star cluster and one galaxy.

All are very nice single shot photos with his 100mm skywatcher ED telescope onto his Canon 70 D camera. The shoot used: PHD 2 for guiding, SharpCap for polar aligning and Photoshop for processing.

The part I enjoyed was John's 200 word commentary which comes with each picture. The book was privately published but John has five copies left at $15 each plus postage.

Our copy now graces the TRAC Library. Thanks John and Jenny!☆

The back story to the book review is that I found it in the monthly journal of the Tamworth Astronomical Club last month. Thought it was interesting. John Gould

More Club News

The AGM was held at the May 2022 monthly meeting. Elected officials for 2022- 2023
The 2021 AGM has been postponed due to Covid.

Executive
President: Mark Town
Vice President: John Gould
Secretary : Andrew Wood
Treasurer: Frank Gross
Public Officer; Frank Gross

Operation Positions
Website Manager: Mark Town
Observation Officer: Robert Turnbull
Editor: Kaye Johnston
Librarian: Chris O'Hanlon
Equipment Officer:Vacant

Committee General Members:
Freya Bates,
Larry Wakelin,
Chris O'Hanlon,

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**