

# Astro Flyer



**FEBRUARY 2024**

**Club News**

President's Report. Hello Everybody,

Come the AGM in July I am not going to stand for either the President or Treasurer positions. I will continue to take on, if elected, Public Officer. Please think about standing for these executive positions come 6 months down the line. I will certainly give the new Treasurer the procedures of how to do it. It is not hard and boils down to Collect the \$, write receipts, deposit the \$ in our IMB account, write all transactions down for reference.

The night weather continues to be a problem with using our Observatory at night. Overcast, rain and more overcast is putting a damper on observations. I have to give a big thank you to Harry Roberts for a small booklet he put together simply called "Lunar". In it he details items on the Moon worth photographing for use in future discussion/lectures. I will start using Harry's suggestions as soon as I can book a clear night at our OBS.

**Our next meeting will be at the Wollongong Uni, Shoalhaven Branch off George Evans Road, West Nowra (Mundamia) on February 16th, 2024 starting at 7:00 PM.** We will hope for good skies so we can use our new Observatory on the night.

President's Report continued over....

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### Viewing Nights

We are aiming, once day-light 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.

### MOON PHASES



**New Moon First Quarter Full Moon Last Quarter**  
**Mar 10th Feb 17th Feb 24th Mar 4th**  
Start here ^

## President' Report Continued

You can sign up for using the OBS (if you are a Shoalhaven Astronomer's member) using the club's website [www.shoalhavenastronomers.asn](http://www.shoalhavenastronomers.asn) If you have problems with booking please get in touch with Mark Town (ph 0474 859 788) and he will talk you through the sign up process.

The next meeting of the Shoalhaven Astronomeres, Inc. will be on Friday, February 16, 2024 starting at 7:30 PM.

Finally, at the next meeting the club will be offering many different astronomical books, a small National Geographic telescope, binoculars and other astronomical items at greatly reduced prices. These items were in a bequeathment by one of our members, Jas Strang, who passed away early 2023. Come to the meeting a little bit early and have a browse through everything.

Frank Gross

## Observatory Report Mark Town

### Current Status

The observatory is now operational and can be used for both basic and more advanced activities. Training in the use of the observatory is available and will be delivered to interested SA members on a demand basis. To use the observatory solo you need to do at least the first 3 training modules:

- Work Health & Safety
- Observatory Overview, and
- Manual Visual Observing.

Integration of the observatory systems into a cohesive whole is progressing with the system control program – called N.I.N.A. – able to exercise reliable control over the CEM120 mount, the dome/shutter and the cameras.

### Training

The training is easy to do and done in the observatory in small groups so each person gets some practical experience of using the systems. So far 19 members of SA have completed the training and are able to operate the observatory. If you have not yet done the training then there are 2 things you can do:

1. get the training so you can start to enjoy the observatory and what it can offer SA members.

Accompany an SA member who has done the training so you become familiar with the observatory equipment and how to operate it.

### Observatory Access

The observatory is locked and the key is now stored in a lock box at the door. You will need the current access code (available on the website) to open the lock box. Check the access code before going to the observatory! Time on the observatory can be booked via the Members Area / Observatory Activities page on our website. You will need a username and password to login so message or email myself for that information.

Thanks and  
**Best Regards,**  
**Mark Town**  
M: 0474 859 788 | [marktown@shoal.net.au](mailto:marktown@shoal.net.au)



## Observation Report Andrew Wood

### What's on in the Cosmos –February/March 2024

Our February 16 meeting occurs one day before First Quarter. The club's viewing night at the Shoalhaven Observatory on February 17 will be accompanied by the First Quarter Moon.

#### Moon Phases

First Quarter	17 <sup>th</sup> February	Dark after midnight
Full Moon	24 <sup>th</sup> February	Enjoy the Moon
Last Quarter	4 <sup>th</sup> March	Dark before midnight
New Moon	10 <sup>th</sup> March	Dark all night

#### Planets

Unless you are an early riser, not a lot of planetary action during this period. Mercury, Venus and Mars have a bit of a dance before dawn in the east. Saturn won't be visible again until the mornings of mid-March. Jupiter is setting too early during daylight saving time for any decent vies after dark. Uranus and Neptune are also out of action for a while, being too close to the Sun for observation.

#### Comets

**Comet 62P/Tsuchinshan 1** is predicted to fade from magnitude 7.7 to 9. It will start mid-Feb rising soon after dark, becoming higher during March. Still a bright telescopic object. It will be moving through the members of the Virgo/Coma Cluster of Galaxies. Potential for some great views.

There are other faint telescopic comets around. See *Astronomy 2024* or internet comet sites.

#### Meteor Showers

The **gamma-Normids** are active from Feb 25-Mar 28, with a maximum rate of six meteors per hour before dawn on Mar 15, after the Moon has set.

#### Beyond the Solar System

High in the northern sky after dark, east of Orion, is Sirius, the brightest star of the constellation Canis Major (the Big Dog – one of Orion the Hunter's mythical hunting dogs). Indeed, Sirius is the brightest apparent magnitude star beyond the Sun.

Sirius is a double star. It has a white-dwarf companion – sometimes referred to as “The Pup”. Although the companion star is bright enough, at magnitude 8.3, and has a separation from the primary star that would normally make an easy split in any telescope; the main star's magnitude of -1.5 causes “The Pup” to be very difficult to see in its glare.

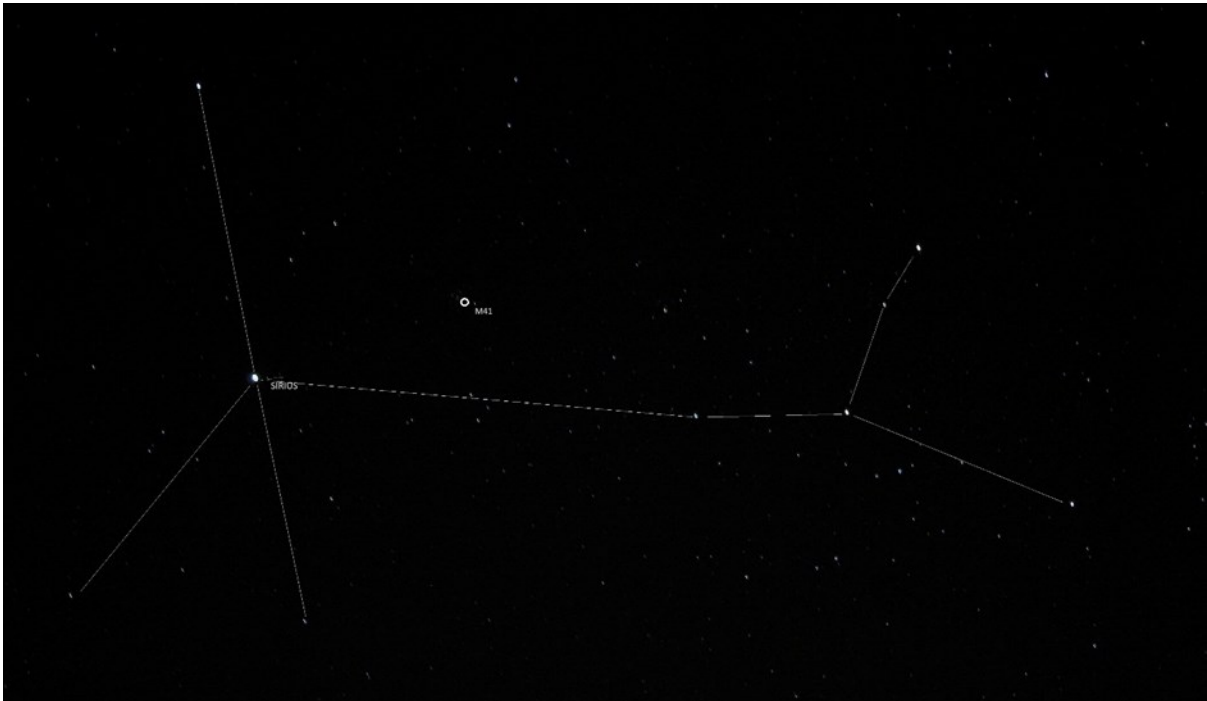
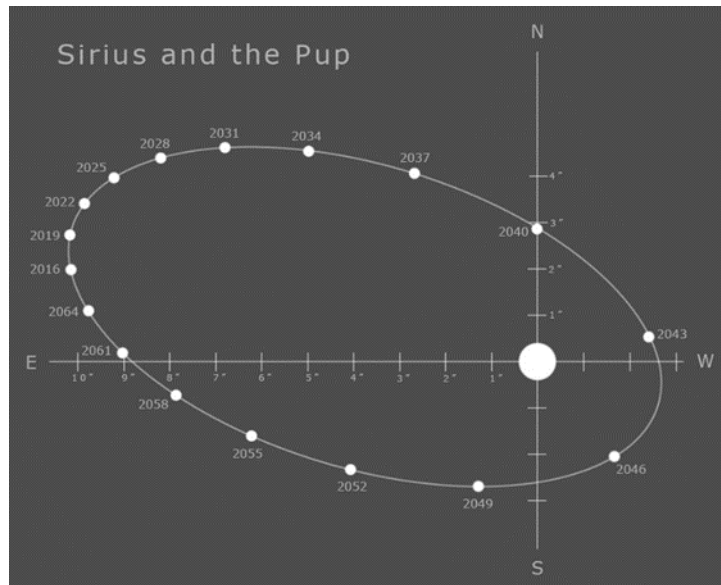
At our January 2024 meeting, member Brian Phelan reported seeing the faint companion through his 18-inch reflector. As the diagram below shows, the orbit of “The Pup” presently has it as far away from the primary star as it can be. If you would like to observe the white dwarf, now is the best time before the separation starts to narrow over the coming years. You'll need a decent-sized aperture and well-collimated reflector; or a smaller aperture apochromatic reflector. Good seeing conditions and low light pollution will also be very helpful.

Canis-major also has a very bright nice open cluster, M41 (NGC 2287). It can be seen naked eye under dark skies, is easy to see in binoculars and makes great viewing in all telescopes.

## Observation Report Andrew Wood

Cont...2

The constellation also has several galaxies for larger-aperture instruments that can be found in a good deep sky atlas.



The major stars of Canis Major showing Sirius and the open cluster M41

Clear skies and happy viewing.  
Andrew Wood.

**Always great to read and hear reports of observations of Solar System and Deep Sky Objects made by members, either visual descriptions or via images. Write a report of your observations for the *Astroflyer* or request a spot to speak at meetings.**

## Astro Events from Frank Gross

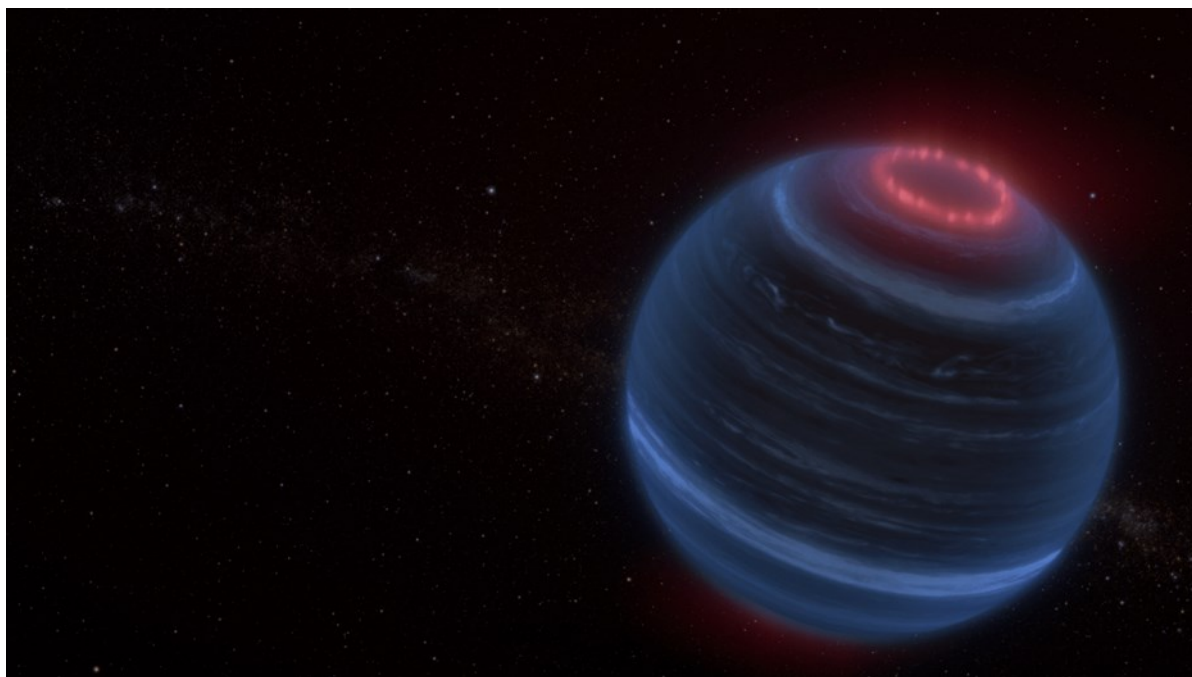
### **Infrared emission from methane suggests atmospheric heating by auroral processes.**

NASA Webb Telescope Team JAN 09, 2024

Astronomers using NASA's James Webb Space Telescope have found a brown dwarf (an object more massive than Jupiter but smaller than a star) with infrared emission from methane, likely due to energy in its upper atmosphere. This is an unexpected discovery because the brown dwarf, W1935, is cold and lacks a host star; therefore, there is no obvious source for the upper atmosphere energy. The team speculates that the methane emission may be due to processes generating aurorae.

These findings are being presented at the 243<sup>rd</sup> meeting of the American Astronomical Society in New Orleans. To help explain the mystery of the infrared emission from methane, the team turned to our solar system. Methane in emission is a common feature in gas giants like Jupiter and Saturn. The upper-atmosphere heating that powers this emission is linked to aurorae.

Image: Artist Concept Brown Dwarf W1935



This artist concept portrays the brown dwarf W1935, which is located 47 light-years from Earth. Astronomers using NASA's James Webb Space Telescope found infrared emission from methane coming from W1935. This is an unexpected discovery because the brown dwarf is cold and lacks a host star; therefore, there is no obvious source of energy to heat its upper atmosphere and make the methane glow. The team speculates that the methane emission may be due to processes generating aurorae, shown here in red.  
NASA, ESA, CSA, and L. Hustak (STScI)

On Earth, aurorae are created when energetic particles blown into space from the Sun are captured by Earth's magnetic field. They cascade down into our atmosphere along magnetic field lines near Earth's poles, colliding with gas molecules and creating eerie, dancing curtains of light. Jupiter and Saturn have similar auroral processes that involve interacting with the solar wind, but they also get auroral contributions from nearby active moons like Io (for Jupiter) and Enceladus (for Saturn).

For isolated brown dwarfs like W1935, the absence of a stellar wind to contribute to the auroral process and explain the extra energy in the upper atmosphere required for the methane emission is a mystery. The team surmises that either unaccounted internal processes like the atmospheric phenomena of Jupiter and Saturn, or external interactions with either interstellar plasma or a nearby active moon, may help account for the emission.

## Astro Events from Frank Gross

Cont...2

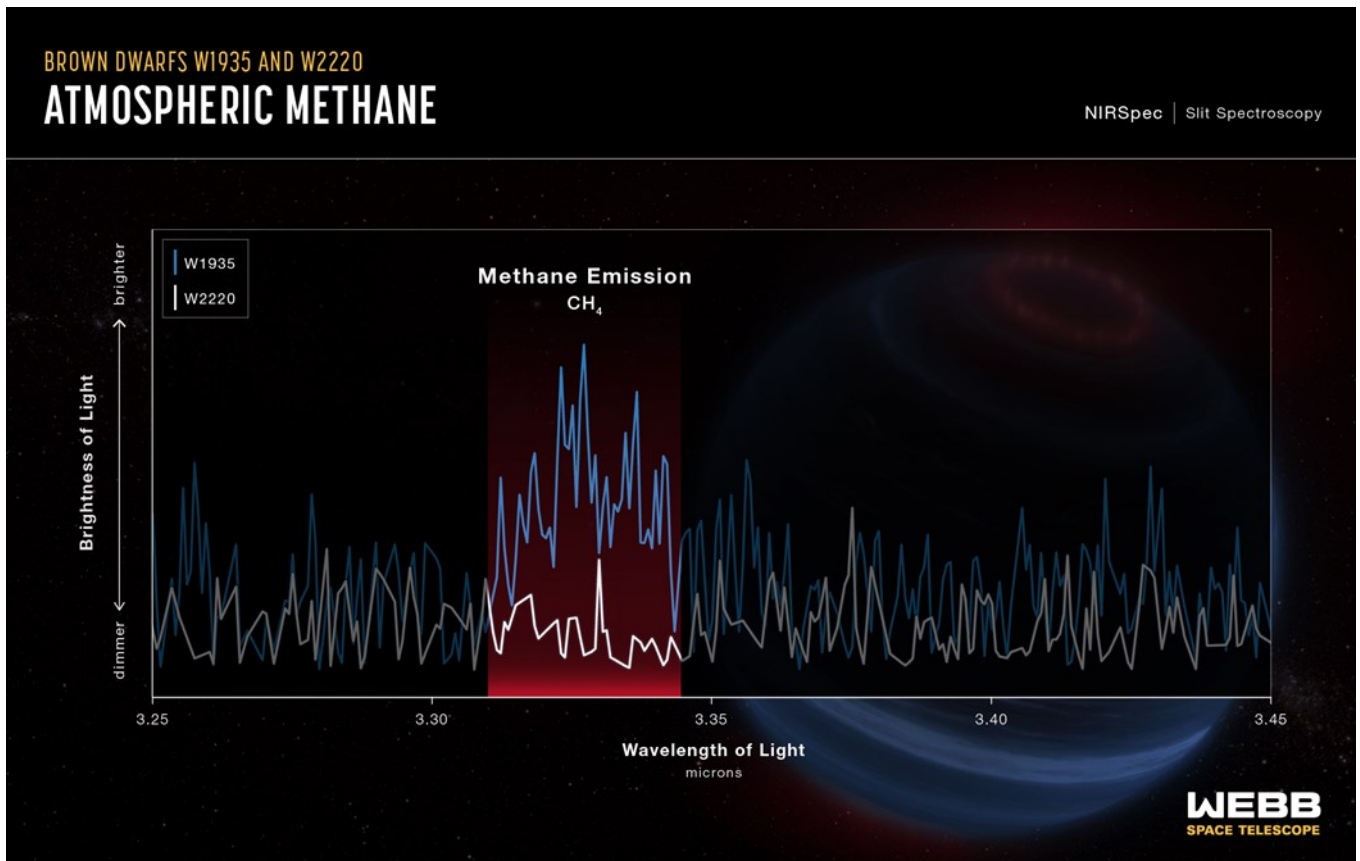
### A Detective Story

The aurorae's discovery played out like a detective story. A team led by Jackie Faherty, an astronomer at the American Museum of Natural History in New York, was awarded time with the Webb telescope to investigate 12 cold brown dwarfs. Among those were W1935 – an object that was discovered by citizen scientist Dan Caselden, who worked with the Backyard Worlds zooniverse project – and W2220, an object that was discovered using NASA's Wide Field Infrared Survey Explorer. Webb revealed in exquisite detail that W1935 and W2220 appeared to be near clones of each other in composition. They also shared similar brightness, temperatures, and spectral features of water, ammonia, carbon monoxide, and carbon dioxide. The striking exception was that W1935 showed emission from methane, as opposed to the anticipated absorption feature that was observed toward W2220. This was seen at a distinct infrared wavelength to which Webb is uniquely sensitive.

“We expected to see methane because methane is all over these brown dwarfs. But instead of absorbing light, we saw just the opposite: The methane was glowing. My first thought was, what the heck? Why is methane emission coming out of this object?” said Faherty.

The team used computer models to infer what might be behind the emission. The modeling work showed that W2220 had an expected distribution of energy throughout the atmosphere, getting cooler with increasing altitude. W1935, on the other hand, had a surprising result. The best model favored a temperature inversion, where the atmosphere got warmer with increasing altitude. “This temperature inversion is really puzzling,” said Ben Burningham, a co-author from the University of Hertfordshire in England and lead modeler on the work. “We have seen this kind of phenomenon in planets with a nearby star that can heat the stratosphere, but seeing it in an object with no obvious external heat source is wild.”

Image: Spectra W1935 vs W2220



## Astro Events from Frank Gross

Cont...3

Astronomers used NASA's James Webb Space Telescope to study 12 cold brown dwarfs. Two of them – W1935 and W2220 – appeared to be near twins of each other in composition, brightness, and temperature. However, W1935 showed emission from methane, as opposed to the anticipated absorption feature that was observed toward W2220. The team speculates that the methane emission may be due to processes generating aurorae.  
NASA, ESA, CSA, and L. Hustak (STScI).

### Clues from our Solar System

For clues, the team looked in our own backyard, to the planets of our solar system. The gas giant planets can serve as proxies for what is seen going on more than 40 light-years away in the atmosphere of W1935. The team realized that temperature inversions are prominent in planets like Jupiter and Saturn. There is still ongoing work to understand the causes of their stratospheric heating, but leading theories for the solar system involve external heating by aurorae and internal energy transport from deeper in the atmosphere (with the former a leading explanation).

### Brown Dwarf Aurora Candidates in Context

This is not the first time an aurora has been used to explain a brown dwarf observation. Astronomers have detected radio emission coming from several warmer brown dwarfs and invoked aurorae as the most likely explanation. Searches were conducted with ground-based telescopes like the Keck Observatory for infrared signatures from these radio-emitting brown dwarfs to further characterize the phenomenon, but were inconclusive.

W1935 is the first auroral candidate outside the solar system with the signature of methane emission. It's also the coldest auroral candidate outside our solar system, with an effective temperature of about 400 degrees Fahrenheit (200 degrees Celsius), about 600 degrees Fahrenheit warmer than Jupiter.

In our solar system the solar wind is a primary contributor to auroral processes, with active moons like Io and Enceladus playing a role for planets like Jupiter and Saturn, respectively. W1935 lacks a companion star entirely, so a stellar wind cannot contribute to the phenomenon. It is yet to be seen whether an active moon might play a role in the methane emission on W1935.

“With W1935, we now have a spectacular extension of a solar system phenomenon without any stellar irradiation to help in the explanation.” Faherty noted. “With Webb, we can really ‘open the hood’ on the chemistry and unpack how similar or different the auroral process may be beyond our solar system,” she added.

*The James Webb Space Telescope is the world's premier space science observatory. Webb is solving mysteries in our solar system, looking beyond to distant worlds around other stars, and probing the mysterious structures and origins of our universe and our place in it. Webb is an international program led by NASA with its partners, ESA (European Space Agency) and the Canadian Space Agency.*



## Astro Events from Frank Gross

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**The comet that fascinates humanity will make its next pass by Earth on July 29th, 2061.**

**Halley's comet is on its way back towards Earth**

The comet that fascinates humanity will make its next pass by Earth on July 29th, 2061.

By Briley Lewis Published Jan 3



Comet P/Halley as taken March 8, 1986 by W. Liller, Easter Island, part of the International Halley Watch (IHW) Large Scale Phenomena Network. *NSSDCA NASASHARE*

One of the most famous comets is heading back in the direction of Earth. On December 9, 2023, Halley's comet reached aphelion—its furthest point from the sun—made its turn towards our planet for its next appearance in the 2060s. But don't worry about Halley's return. It's not even close to a collision course with Earth. Like all the comets we know of, it's made of dusty ice, some of which burns off to create a majestic tail as the body approaches the sun.

Currently, the comet is further out than Neptune, a bit over three billion miles from the sun—so far that it's out of sight for even our largest telescopes and has been since 2003. Halley's comet will make its next swing by our planet on July 29th, 2061, right on time with its 76 year cycle.

So why is this one space rock, out of the millions in the solar system, so widely talked about, and why has it fascinated humans so intensely throughout history?

## Astro Events from Frank Gross

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In 1986, the European spacecraft Giotto became one of the first spacecraft to encounter and photograph the nucleus of a comet, passing and imaging Halley's nucleus as it receded from the Sun. *Halley Multicolor Camera Team, Giotto Project, ESA*

People have actually been watching it for generations, with recorded sightings as old as 240 BCE. For most of human history, we didn't know what to call this mysterious visitor from outer space. Somewhat unsurprisingly, something so unknown and (at that time) unpredictable was widely feared and seen as a bad omen or harbinger of disruptive change. The comet supposedly heralded the defeat of Attila the Hun in 451 and the Ottoman Empire's widespread conquest in 1456. Genghis Khan even took the comet as a sign for where to lead his armies in 1222, drastically expanding his territory and fathering many kids along the way—so many, in fact, that 1 in 200 men may be his descendants.

“Naturally no one knew these appearances were all the same comet until Halley made his discovery,” explains Richard Goodrich, author of the book *Comet Madness: How the 1910 Return of Halley's Comet (Almost) Destroyed Civilization*. Around 1705, British scientist Edmond Halley noticed three comets with strikingly similar orbits, seen in 1531, 1607, and 1682. He concluded that they were actually the same comet, passing by every 76 years, and he predicted it would appear in 1758. Although he didn't live to see it, his prediction came true, changing our perspective of the cosmos. “The reappearance of Comet Halley, as predicted, did much to replace a world of superstition with a world of science,” says Valdosta State astronomer Kenneth Rumstay. Our solar system was rapidly expanding, with Uranus discovered soon after in 1781 and the first asteroid, Ceres, spotted in 1801.

Despite the identification and explanation of the comet as a regular part of the cosmos, Halley's 1910 showing caused widespread panic. One astronomer pointed out that Earth would encounter the comet's gaseous tail, filled with toxic cyanogen gas. “Peddlers sold anti-comet pills and gas-masks,” says astronomer Ramesh Kapoor from the Indian Institute of Astrophysics.

But, as we know, the world didn't end then. Halley's comet returned once again in 1986, now an object of scientific curiosity in the space age that was visited by multiple spacecraft to take up-close-and-personal photos. Little pieces of the comet even fall to Earth each year as the Eta Aquariid meteor shower. Halley's is obviously one of the best studied comets, and has followed humanity throughout history with fascinating consequences—but part of what makes it so special is exactly how often it returns.

## Astro Events from Frank Gross

Cont...6

Human lifespans are around 70 to 90 years, and Halley's 76 year orbit almost eerily resembles that timescale. "You really can mark out a human life with Halley's orbit, and I think this shared time loop ties us closer with this particular comet," says Ashley Benham-Yazdani, author of the children's book *Cosmic Wonder: Halley's Comet and Human-kind*. Humanity uses this comet "to mark the passage of time, transforming it into a cultural touchstone," she adds. "It has sparked in us the extremes of human emotion, inspiring awe in some and paranoid frenzy in others."

In the 2060s, it's probably unlikely that anyone will panic over this one comet. The 1986 appearance was already "a damp fizzle, which may not bode well for future appearances," says Goodrich. Even if it's not a totally spectacular show to the naked eye, planetary scientists are definitely interested. They're keen to track the comet's decline, monitoring how fast it loses material, and perhaps send more spacecraft for a detailed close-up, perhaps even a "sample-return mission sent to land and scoop up a piece of the Halley's nucleus fuming its sooty smoke," as Kapoor describes.

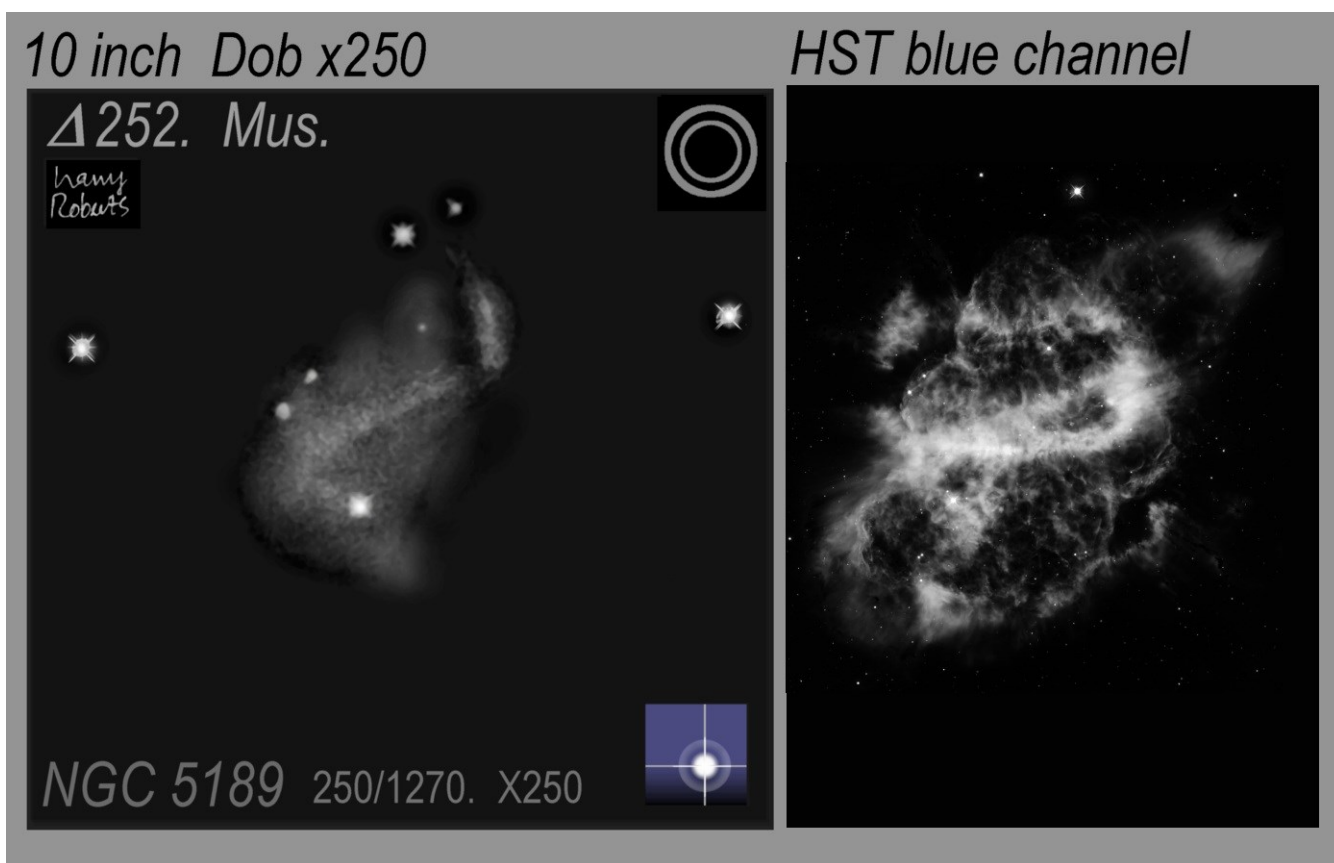
For most of us, it will certainly be a once-in-a-lifetime (or twice, if you're lucky) cosmic event worth appreciating. "Those that were there for the 1986 visit will share their memories. And then, when it finally appears, we will likely take a moment to step outside, maybe with friends or family, to participate in the ancient act of observing the sky," muses Benham-Yazdani. "This communion with the cosmos is rare for most people these days, but I hope that when it comes, it inspires a sense of wonder."

## NGC5189: Planetary Nebula in Musca by Harry Roberts

### NGC5189: Planetary Nebula in Musca

History. NGC5189 is a strange object, first logged in 1826 by ‘Aussie’<sup>1</sup> James Dunlop at his Parramatta home ‘observatory’ with a 9 inch reflector; he was in a big hurry! His ‘boss’, Rumker, having clashed with Gov. Brisbane, had quit to live in Camden and Brisbane was busy governing. So Dunlop set out to record the entire southern deep sky from his own backyard and had about a year in which to do it! His Catalogue is a remarkable feat.

He viewed Dunlop object 252, NGC5189, only twice and wrote: “A very faint nebula about 25” (arc sec) diameter” noting some nearby stars. Clearly, he thought it a nebula of some sort, but not a planetary nebula (PN). It is now recognized as a type of planetary, gaining the Perek Kohoutek designation PK 307 -3.1. His position for D252 (when pre-processed) is very close to the modern site.



What do we see? In an 8 or 10 inch scope we see an irregular ‘branched’ object that is fairly bright for a PN, with a wide central bar and ‘arms’ at each end –like a barred spiral galaxy (Fig, left). I’ve not been able to see any colour, just a neutral grey. OIII filters help a little. Several stars are involved though the central star, the source of the nebula, is invisible. While ‘Jamie’ had it 25 arc sec in size, the modern value is 150 arc sec.

Modern images (Hubble etc.) show the object’s size is about twice what we can see, mainly due to its outer ‘streamers’ being red H-alpha emitters. Our eyes don’t see H-alpha unless the source is very bright, so our view is mostly of the inner blue-green OIII and H-beta parts. If we take the blue channel of a Hubble image (Fig, right) and compare it with what we see in a ten inch ‘scope we find the major parts of the planetary are visible in our ‘scopes – but the outer red ‘bits’ are not.

## NGC5189: Planetary Nebula in Musca by Harry Roberts

Cont...2

While at first 5189 was classed as an emission nebula, it is now confirmed to be a planetary nebula PN (Wiki) with streamers or 'jets' of ejecta from a central star that has recurrent outbursts and is "a rare low mass WR primary with a white dwarf companion". As the main star rotates the jets form an abstract shape rather than the familiar spherical shell of most planetaries. N5189 is sited just 2600ly away, presumably in the Carina arm of our Galaxy.

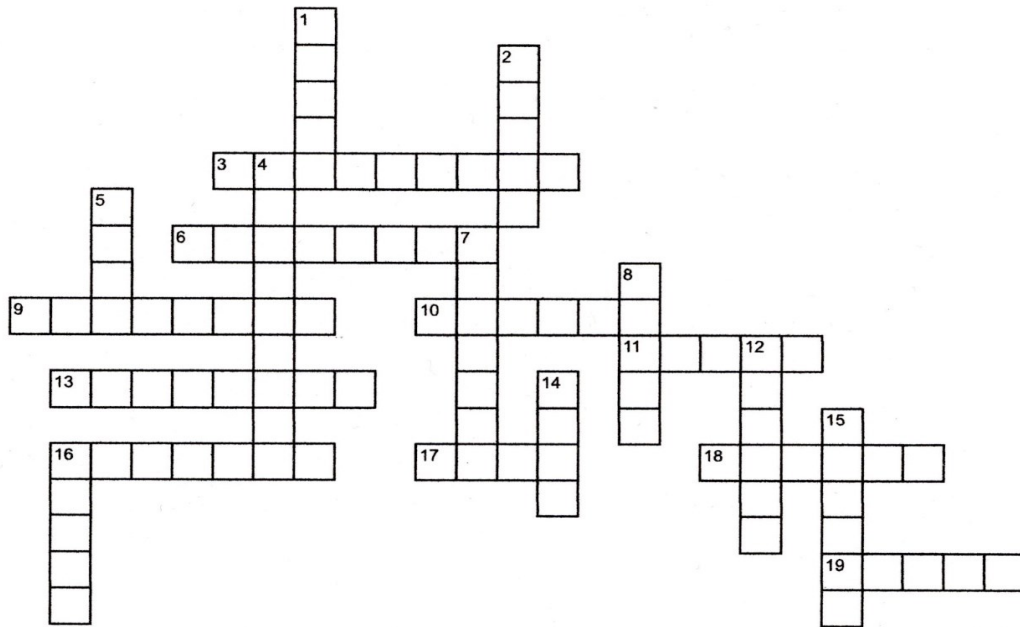
Yet N5189 can be hard to find. It is just SE of the "Coal Sack" dark nebula (see "Astronomy 2021" Map1). It is well worth finding as this type of PN is rare. While at times called the "Spiral Planetary" it is not a widely known object despite its central location in our sky. were it a northern hemisphere object it would have a common name and be very well known. With high magnification the "Spiral Planetary" is an impressive sight – take a look.

Clear skies!

1 I've dubbed Dunlop an 'Aussie' since, like some early arrivals, he returned to live in Australia after his 'stint' and is buried at Kincumber on the central coast, where his lathe and parts of the 9inch 'scope are held in a small museum.

## Astro Quiz by Andrew Wood

### Astronomy Crossword February 2024



#### Across

- 3 horizontal lines across Earth's surface used for location
- 6 vertical angle an object makes with the horizon
- 9 lighter, outer part of a shadow
- 10 natural phenomenon that creates colorful light displays in the sky
- 11 relating to the Moon
- 13 farthest point from the Sun in Earth's orbit
- 16 moment the upper edge of the Sun becomes visible
- 17 imaginary line that a planet rotates around
- 18 also known as a shooting star
- 19 changes in ocean water levels caused by the Sun and Moon

#### Down

- 1 path of an object around another object in space
- 2 a dusty, icy celestial body
- 4 rocky objects that orbit the Sun
- 5 the transition from night to day
- 7 occurs when the Sun is directly over the equator
- 8 atmospheric phenomena created by ice crystals reflecting light
- 12 the brightness of an object in space
- 14 the transition from day to night
- 15 the location straight above you
- 16 relating to the Sun

### Answers to Astro Quiz January 2024

1. The Sun; 2. Isaac Newton; 3. Aquila the Eagle, Columba the Dove, Corvus the Crow, Cygnus the Swan, Grus the Crane, Pavo the Peacock, Phoenix the Firebird and Tucana the Toucan; 4. Asteroid; 5. Uranus- Greek god of the sky; 6. Arcturus – Sirius, Canopus and Alpha-Centauri are all brighter and south of the celestial equator; 7. Parsec; 8. Kepler – 3 laws of planetary motion; 9. Ganymede; 10. Mercury

:

**The Tarantula Nebula**



The Tarantula Nebula is located in the Southern Hemisphere in the constellation of Dorado. But the information on this cosmic spider size is far more interesting.

For perspective it looks the same size as the Orion Nebula in the sky, but the Tarantula Nebula is 100 times closer which means the Tarantula Nebula 100 times bigger. Not only that its 1000 times brighter. If we were as close to the Tarantula Nebula as we are to the Orion Nebula it would be so bright it would cast shadows.

The Tarantula Nebula contains some of the heaviest stars ever found. For example the sun is 300,000 times heavier than the earth yet one star called "a1" in the Tarantula Nebula is 300 times heavier than the sun. For all intents and purpose this star is 100 million times heavier than our earth.

Taken with a ZWO 2600MM Pro, AskarFRA500 using Oiii Sii Ha filters 5.5 h intergration.

Cont...2

**The Helix Nebula**



The Helix Nebula (also known as The Helix, NGC 7293, or Caldwell 63) is a large planetary nebula located in the constellation Aquarius. Discovered by Karl Ludwig Harding, probably before 1824, this object is one of the closest to the Earth of all the bright planetary nebulae. The estimated distance is about 700 light-years. It is similar in appearance to the Ring Nebula, whose size, age, and physical characteristics are similar to the Dumbbell Nebula, varying only in its relative proximity and the appearance from the equatorial viewing angle.

The Helix Nebula has sometimes been referred to as the "Eye of God" in pop culture.

Taken with a ZWO 2600MM Pro, AskarFRA500 using Oiii and Ha filters 8.5 h intergration.

More of Steve's wonderful images March issue of Astro Flyer. (Ed)



## Club News

### The AGM was held at the July 2023 monthly meeting. Elected officials for 2023- 2024

#### Executive

President: Frank Gross  
Vice President: Laurence Wakelin  
Secretary : Andrew Wood  
Treasurer: Frank Gross  
Public Officer; Frank Gross

Andrew Wood  
Mark Town  
John Gould  
Ian Scott

#### Operation Positions

Website Manager: Steve Holloway  
Observation Officers: Andrew Wood, Mark Town and John Gould  
Editor: Kaye Johnston  
Librarian: Chris O'Hanlon  
Equipment Officer: Andrew Wood

#### Committee General Members:

Laurence Wakelin  
Frank Gross  
Andrew Wood  
Mark Town  
John Gould  
Ian Scott

### Club Notices

#### Astronomy yearbook and calendar

This year, we will not be ordering these publications to sell to members. For anyone wanting to purchase them, the details are as follows:

**Astronomy 2024** can be purchased through Quasar Publishing <https://quasarastronomy.com.au/> . This publication, once it becomes available, can also be found in bookshops and newsagents.

**Astronomy Calendar 2024** can be purchased through Astrovisuals <https://astrovisuals.com/> .

National Australian Convention of Amateur Astronomers (NACAA)

NACAA will be held in Parkes over the Easter weekend of 2024. See <https://nacaa.org.au/2024/programme> .

#### Dear Members of Shoalhaven Astronomers

**This is a reminder** to members who paid last year, and have not yet paid membership for 2023-4, that fees are due. My apologies if there has been a mistake. If you have paid let me know and I will check with our treasurer Frank Gross. I know that in some cases illness may be a factor at the present time.

**Payment (\$30) can be made at club meetings.**

**Or Pay by direct deposit into the club IMB account – Please ensure your name is in the reference section. BSB 641800 Account 009135475**

Hoping for your continuing membership – the Shoalhaven Observatory is now open and functional!

Kind Regards Andrew Wood Secretary

Check out the Astro Flyer on the web site: [www.shoalhavenastronomers.asn.au](http://www.shoalhavenastronomers.asn.au)

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**The deadline for Articles for the Astro Flyer is  
The First Friday of the Month.**

**Editor Kaye Johnston**