

Astro Flyer



JANUARY 2025

Club News

President's Report

Happy new year to all members,

A big start to the year coming up with our first meeting on the 17th of January followed by our Bunnings BBQ on Saturday the 18th. This is a huge opportunity for us to gather funds and interest more of the public to our association. We have planned topics for the next four meetings. The next meeting will involve a pub like trivia on astronomy topics. The committee has other events planned down the pipeline which will be announced in due time.

See you at the **next meeting on January 17th at 7PM** at the Uni of W'Gong, Shoalhaven Campus just off Yalwal Road on George Evans Road.

Upcoming meetings and the topics which will be presented:

17 January- Astro Trivia/ Show and Tell (Trivia followed by a show and tell of equipment members can bring to show others)

21 February- Navigation of the Night Sky (Talks about how to navigate the celestial sphere and artificial satellites)

21 March- Astronomy History

Lachlan

Contents

Observatory Report
Mark Town
Pages 2

Observation Report
Andrew Wood
Pages 3-5

Astro Quiz
Andrew Wood
Page 6

Astro Events
Frank Gross
Pages 7-8

Club Christmas Outing
Andrew Wood
Page 9

*Message from Andrew
re Tamworth Club*
Page 10



MOON PHASES



New Moon **First Quarter** **Full Moon** **Last Quarter**
Jan 28th **Feb 5th** **Jan 14th** **Jan 22nd**
Start here ^

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.

*More Information and
Club News*
Page 11

Observatory Report Mark Town

Current Status

The observatory is fully operational and can be used for both basic and more advanced activities.

Remote Access

Remote access to the observatory – so you can operate the observatory systems from the comfort of a warm room, either on campus or in your own home – has been tested successfully.

If this capability is of interest to you, please take the time to let me know either in person or via email to mark-town@shoal.net.au so your committee will know the level of interest within the association.

Assistance and training will be provided to get you setup and operational.

Training

If you want to do your initial training or are concerned that the training you have done has departed your brain since you completed it - don't worry! We run dedicated training sessions on demand – so you can have some practical experience to give you the confidence to operate the observatory.

If you want to get some training you need to let us know – email to mark-town@shoal.net.au or sms to 0474859788 – and we will arrange a mutually convenient date and time.

Observatory Access

Remember, to avoid disappointment, check the access code on the website before going to the observatory!

Time on the observatory can be booked via the Members Area / Observatory Activities page on our website.

Thanks and
Best regards,
Mark Town
M: 0474859788

Email: marktown@shoal.net.au



Observation Report Andrew Wood

What's on in the Cosmos –Jan/Feb 2025

Our January 17 meeting occurs three days after Full Moon. The club's viewing night at the Shoalhaven Observatory on January 18 will see sunset about 8PM with full darkness by 9:45. The waning gibbous Moon will rise an hour later.

Moon Phases – The Yolngu people of Northern Australia were able to accurately predict tides using the phases of the Moon: *As the moon rises through the ocean, it alternately fills and empties with water, making the sea level rise and fall. This explains why the tides are synchronised with the moon, and why tides are higher at full moon and new moon than at a quarter moon, because then the moon isn't filling up as much. If this idea seems a bit different from the modern scientific explanation involving the gravitational pull of the moon, bear in mind that, pragmatically, it works. It enables a Yolngu elder to predict the timing and height of the next tide.*

Ref: Australia's first astronomers | BBC Earth

Full Moon	14th January	Enjoy the Moon
Last Quarter	22nd January	Dark before midnight
New Moon	28th January	Dark all night
First Quarter	5th February	Dark after midnight
Full Moon	12th February	Enjoy the Moon

Planets

Mercury Starts this observing period low in the morning sky then moves into the evening sky. Very difficult to see.

Venus In contrast to Mercury, is very bright in the western sky after sunset though getting lower each day. With a phase half-full and magnitude -4.5, as it draws nearer to Earth the phase grows smaller though the closer proximity actually causes the planet to shine marginally brighter, as its angular size increases from 24" to 40".

Mars The red planet is now at opposition. Although a poor opposition at only 14", this will be large enough to see the polar caps and some surface detail through moderate to large aperture telescopes. At opposition the planet will be visible throughout the dark hours and at a magnitude of -1.4 and its strong red colour will be easy to identify in the northern sky.

Jupiter Is now past opposition though still bright and large at magnitude -2.7 and 45". It is close to the very large Hyades star cluster with nearby bright red supergiant star Aldebaran – don't mis-identify this star as Mars!

Saturn is sinking into the western horizon still visible in January though will be very close to the horizon after sunset in February. During mid-January Venus and Saturn appear close.

Uranus Visible in the north in Aries as darkness sets in, becoming harder to observe in the north-west into February. Diameter 4" magnitude 5.7.

Neptune Sets about 11PM mid-January, in Pisces. Too close to the horizon and the Sun to observe by mid-February. Diameter 2.3" magnitude 7.9.

Beyond the Solar System

Here's a challenge for us all.

On the cusp of January becoming February, at 10PM (Daylight Saving Time), look south. Very high, about 70° above the horizon, is Canopus, the star with the second brightest apparent magnitude, after Sirius (which will also be prominent behind you to the northwest). A little to the right (west) of Canopus, is a non-descript area of sky occupied by the constellation Pictor, the painter's Easel – those who named the constellations did have good imaginations.

There are 88 officially recognised constellations. Over many decades I have observed deep sky objects – clusters, nebulae and galaxies [also binary stars]. I have kept a record of observations. Pictor is one constellation for which I have no observation.

E.J. Hartung, a Melbourne scientist and academic who retired to country Victoria in the 1960s to observe the southern sky, culminating in his seminal work: "Hartung's Astronomical Objects for Southern Telescopes", only recorded a few double stars in Pictor.

Observation Report Andrew Wood

Cont...2

Another volume I possess, “The Night Sky Observer’s Guide Volume 3 the Southern Skies”, lists many galaxies in Pictor, but they are all very faint. Still, under a moonless rural sky away from light pollution and the large aperture telescopes available these days (and possibly even modern imaging equipment with smaller telescopes) an observer should have some success.

The 14-inch instrument in our own observatory may even pick up a few – worth a try.

Humans have a habit of collecting things. I’d like to “collect” at least one observation of a deep sky object from every constellation. For some of them this will require going to the northern hemisphere. This won’t be necessary for Pictor. So get ye to a dark sky with a big telescope – and hopefully the rainy weather which has set in while I’ve been writing this will clear soon!

The image on the following page, copied from a star atlas called “Uranometria 2000.0”, shows how sparse an area of sky Pictor is, with only a few galaxies shown. An online list of some of the constellation’s deep sky objects in Pictor can be found at:

<https://theskylive.com/sky/constellations/pictor-deepsky-objects>

The nearby constellation of Dorado (the Goldfish), on the other hand, which contains part of the Large Magellanic Cloud, is chock full of deep sky objects, many of which I have observed. You won’t even need a really dark sky for some of them. the most famous object, The Tarantula Nebula, will show in binoculars.

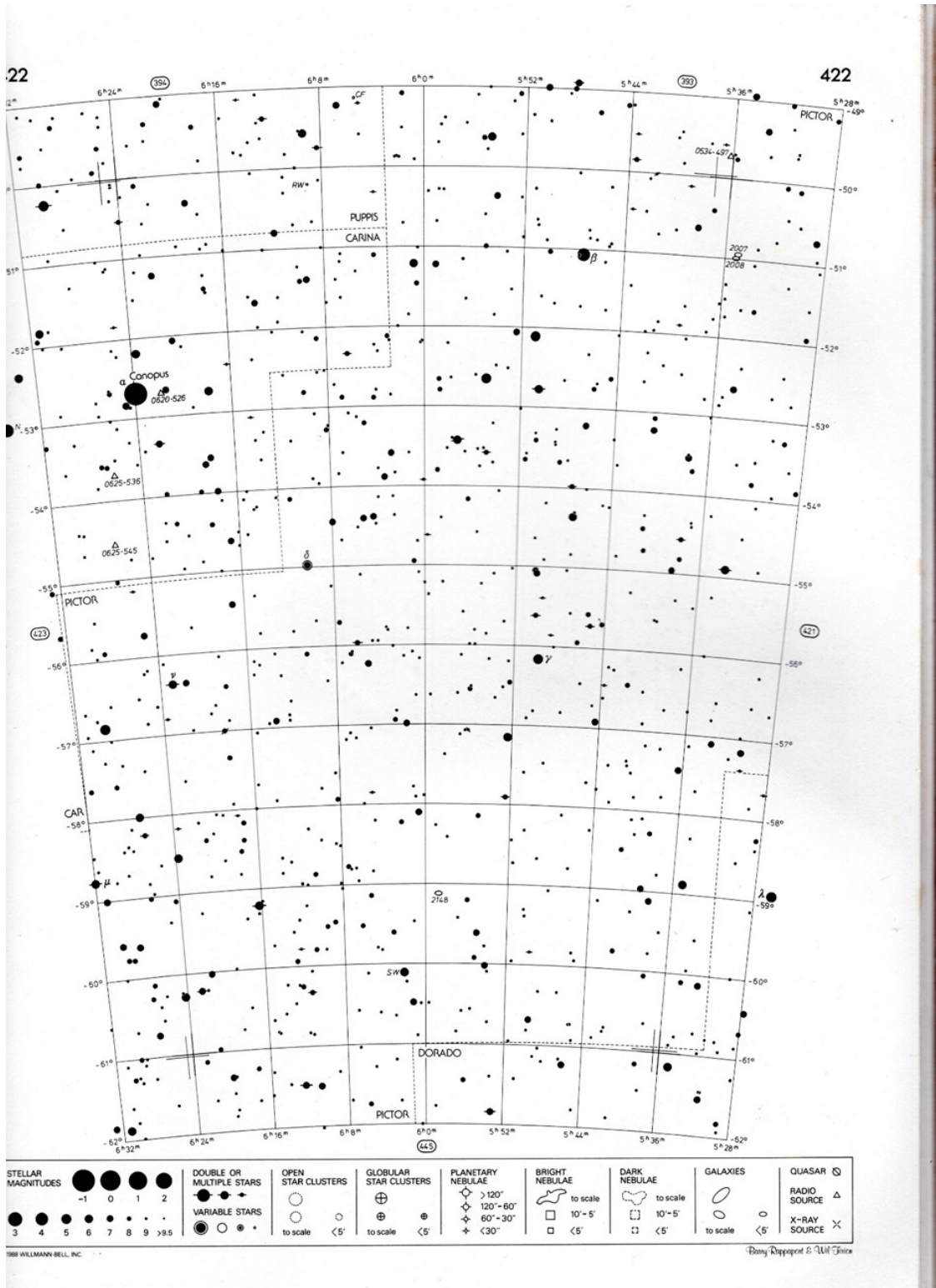
Right: Wikipedia image of the Large Magellanic Cloud with the Tarantula Nebula prominent at the upper left.



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 *Astro Flyer* or request a spot to speak at meetings.

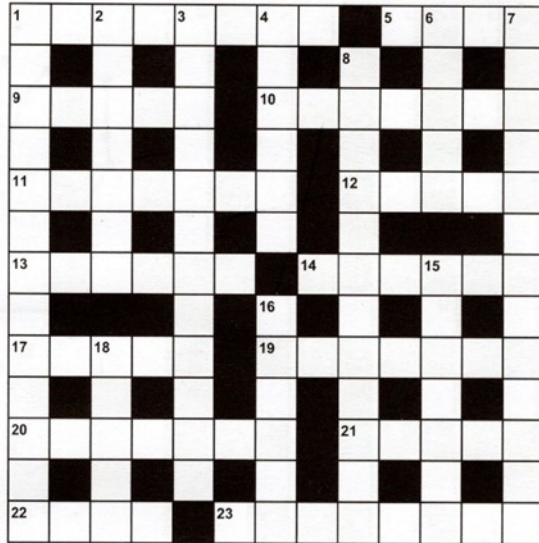
Observation Report Andrew Wood

Cont...3



Astro Quiz Andrew Wood

Crossword January 2025



Across

- 1 Listen to again (4,4)
- 5 Not new (4)
- 9 Church instrument (5)
- 10 Brightest star in Scorpius (7)
- 11 Make bigger (7)
- 12 Extreme displeasure (5)
- 13 Push forcefully (6)
- 14 Small drums (6)
- 17 Bludgeons (5)
- 19 Expression of blame (7)
- 20 Release someone from duty (7)
- 21 Laud (5)
- 22 Hardens (4)
- 23 Elastic (8)

Down

- 1 Theoretical design study aimed at creating an unmanned interstellar space probe (7,6)
- 2 Having sharp corners (7)
- 3 Group of two stars that orbit their common centre of mass (6,6)
- 4 Large hole in the ground caused by an asteroid impact (6)
- 6 Show indifference with the shoulders (5)
- 7 Suspiciously (13)
- 8 Layer of the Earth's atmosphere (12)
- 15 Costing (anag) (7)
- 16 Imperative (6)
- 18 Not illuminated (5)

REFERENCE: *Astronomy Crosswords*, Clarity Media, UK

Solution November 2024



Astro Events from Frank Gross

James Webb Space Telescope deciphers the origins of Pluto's icy moon Charon

By [Robert Lea](#) published December 2024

"The detection of carbon dioxide was a satisfying confirmation of our expectations."



Pluto's moon Charon as seen by the New Horizon's telescope (Image credit: NASA/JPL-Caltech)

Using the James Webb Space Telescope (JWST), astronomers have detected carbon dioxide and hydrogen peroxide on the frozen surface of Pluto's largest moon, Charon. Detecting these molecules could tell scientists how Charon and other icy bodies at the solar system's edge were born.

Since its discovery in 1978, [Charon](#) has been extensively studied — but previous research has been limited in terms of what wavelengths of light could be explored during these analyses. That left gaps in our understanding of the surface composition of this moon of [Pluto](#). As a result, though scientists have detected water ice, ammonia-bearing species and organic compounds on Charon, carbon dioxide and hydrogen peroxide have evaded detection. Until now, that is.

The team, led by Silvia Protopapa of the Southwest Research Institute (SwRI), filled in these gaps by studying Charon with the [JWST](#)'s Near-Infrared Spectrograph (NIRSpec) instrument. "Our research reveals that Charon's surface preserves evidence of its formation through the presence of carbon dioxide, as well as signs of irradiation processes, indicated by the presence of hydrogen peroxide," Protopapa told Space.com. "These discoveries expand Charon's known compositional inventory, which includes [water ice](#),"

Charon is a midsized body roughly 750 miles (1,207 kilometers) wide and located in the [Kuiper Belt](#), a ring of icy debris, comets and [dwarf planets](#), also referred to as [trans-Neptunian objects](#) (TNOs), at the solar system's edge.

Unlike many of the larger objects in the Kuiper Belt, Charon's surface is not obscured by volatile ices like methane, meaning it offers scientists valuable insights into the effects of sunlight exposure and cratering on these distant bodies. Additionally, Charon is the only mid-sized TNO for which geologic mapping is available. This is thanks to data gathered by [NASA's New Horizons spacecraft](#), which visited the Pluto system around a decade ago. "Overall, these factors make Charon an invaluable target from which we can learn extensively," Protopapa said. "Our findings provide valuable insights into how processes such as sunlight exposure and cratering shape the surface of Charon and, by extension, other mid-sized icy bodies beyond [Neptune's](#) orbit."

Astro Events from Frank Gross

Cont...2

Cool surprises on Charon

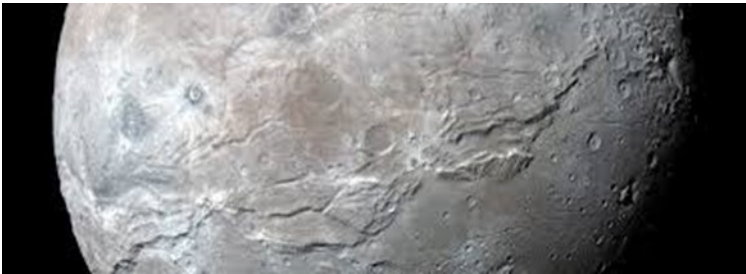
The composition of stars, planets and moons can be determined from the light they emit or reflect from their surface. This is possible because elements absorb and emit light at specific wavelengths. Thus, looking at a celestial body's spectra via a technique called "spectroscopy" reveals the "fingerprints" of elements and chemical compounds. Protopapa and colleagues reached their findings by comparing JWST spectroscopic observations with lab-based measurements and detailed spectral models of the surface of Charon. This led them to conclude that carbon dioxide is primarily present as a surface veneer on a water-ice-rich subsurface.

"The surface of Charon, as revealed by the New Horizons mission, features numerous craters surrounded by bright ejecta blankets that are rich in water ice and ammonia-bearing compounds," Protopapa explained. "These geologic features suggest that materials from beneath the surface have been exposed by impact events, providing a window into the moon's subsurface composition.

"Our preferred interpretation is that the upper layer of carbon dioxide originates from the interior and has been exposed to the surface through cratering events."

She added that carbon dioxide was also expected because the compound is known to be present in regions of the protoplanetary disk from which the Pluto system formed. The fact that carbon dioxide wasn't spotted by NASA's New Horizons spacecraft when it visited Pluto and captured images of Charon in 2015 has been troubling scientists for some time.

"The detection of carbon dioxide was a satisfying confirmation of our expectations," Protopapa continued.



An image of the cracked and cratered surface of Pluto's moon Charon as seen by the New Horizons mission in 2015 (Image credit: NASA/JPL-Caltech)

What was not expected by the team was the detection of hydrogen peroxide.

"The detection of hydrogen peroxide on Charon came as a surprise. I honestly did not expect to find evidence of it on the surface," Protopapa said. "Hydrogen peroxide has been known to be present on Jupiter's moon Europa's surface since the 2000s. I never imagined I would be writing a paper comparing these icy satellites, Charon and Europa, given how different their environments are."

The surprise presence of hydrogen peroxide on Charon suggested to the team that the water-ice-rich surface of Pluto's largest moon is being actively altered by ultraviolet light from the sun, energetic particles from the solar wind, and streams of charged particles from beyond the solar system called "galactic cosmic rays."

"Hydrogen peroxide forms from the combination of neighboring hydroxide ion radicals, which originate from the breakup of water molecules due to incoming ions, electrons, or photons," Protopapa continued. "Our team conducted new laboratory measurements to confirm that it is possible to generate hydrogen peroxide even when carbon dioxide is present."

The team hasn't finished with Pluto's largest moon yet. The JWST will continue to study Charon, and scientists will use the resulting data to better understand icy TNOs as a whole.

"Future JWST observations targeting the spectral gaps, not covered in the current data, could lead to new Charon discoveries and further expand its chemical inventory, possibly revealing other mechanisms at play," Protopapa said..

Club Christmas Outing

Christmas Dinner 2024

On December 20, 2024, about a dozen or so Shoalhaven Astronomers gathered for our annual Christmas dinner. The venue was Nowra Bowling Club. The dinner was accompanied by a warm and welcoming atmosphere, with general chat and discussing the year ahead for the club. The Nowra Bowling Club's Rinks Restaurant was a great venue.

Photos by Andrew Wood



From Andrew

Message From Andrew Wood

Dear Shoalhaven Astronomers

Happy New Year!

To get things rolling, attached is a copy of the newsletter of the Tamworth Regional Astronomy Club that was sent to our email address. Something to read and possibly somewhere to visit. They have great facilities.

Our own Observatory is a facility that all members can learn to use. Maintaining the Observatory also requires significant annual costs. To that effect, we are holding a **Fundraising BBQ at Bunnings South Nowra on Saturday January 18.**

These BBQs are a great way for clubs like ours to raise funds, but they require organisation and effort from members; so if you **are able to volunteer a couple of hours on the day to help**, contact our chief organiser Paul Gwynne: paul.gwynne@unsw.edu.au, or reply to this email.

Our first meeting of the year will be Friday January 17 at 7PM. There are already presentations organised. If we have clear weather perhaps we can use the Observatory too.

I'll send a reminder a few days before the meeting.

Regards
Andrew Wood
Secretary

Club News

The AGM was held at the July 2024 monthly meeting. Elected officials for 2024- 2025

Executive

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

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 Members:

Andrew Wood
Mark Town
John Gould
Ian Scott
Paul Gwynne

Welcome to Lachlan Mabbutt as our new President and to Dr Paul Gwynne as a new committee member.

Club Notices

Dear Members of Shoalhaven Astronomers

This is a reminder to members who paid last year, and have not yet paid membership for 2024-5, 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

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

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

Editor Kaye Johnston