Shoalhaven Astronomers Inc.
www.shoalhavenastronomers.asn.au

Volume 22
Issue 10

Astro Flyer

OCTOBER 2022

Club News

From The President

The Observatory Project – The RFS has not raised any issues with our observatory project and I expect the DA to be approved by the end of October.. All of the players – us, the university, the council planning department and the contractors – are lined up. Hopefully we will commence construction soon.

John Bambury is managing outreach to Scots college in Kangaroo Valley and has called for assistance and involvement from the members. Please help him out by offering to assist with preparation and/or help on the day!

We are expanding our line-up of speakers for our meetings and again I call on the members to step up if you are able. The committee will be looking into the availability of guest speakers to increase our range of content. We will keep you posted as that activity progresses.

Keep on watching! **Next Meeting October 21st 6.30 for 7pm winter time.**

Best Regards,
Mark Town

Contents

MOON PHASES

New Moon	First Quarter	Full Moon	Last Quarter
Oct 25	Nov 1	Nov 8	start→Oct 18

Viewing Nights

VIEWING NIGHTS
Starting again

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.

Dates & Locations

Sat Oct 22 Uni
Sat Nov 26 WoncurRd

More Club Information Including viewing site Directions Page 13

OUT THERE BY BOB TURNBULL
OBSERVATION OFFICER

October – November

Hi all! Has the rain disabled us for further viewing?

Well all I can say is avoid trying to view the sky unless you are a persistent telescope member and slip a quick look at rare night peeks.

I suggest we keep focused on NASA outputs and bathe in the numerous brilliant pictures from the James Wood telescope.

October Planetary groups on pages 74-75 together with the Southern Taurids which are still active through to November 20th. (Southern Taurids are at their best on the 10th October slowly moving).

Predicted peak The South Taurids' predicted peak is November 5, 2022. The North Taurids' predicted peak is November 12, 2022. But the South and North Taurids don't have very definite peaks. They ramble along in October and November and are especially noticeable from late October into early November, when they overlap.

When to watch Best around midnight, and probably best from late October into early November.

Overall duration of shower The South Taurids run from about September 23 to November 12. North Taurids are active from about October 13 to December 2.

Radiant Rises in early evening, highest in the sky around midnight.

The Orionids
The best time to view the Orionid meteor shower is between midnight and dawn when the shower's radiant, the Orion constellation, is high in the sky.
The Orionids are active from Oct. 2 until Nov. 7 and will peak between Oct. 21 and Oct. 22.
The best time to view the Orionid meteor shower is between midnight and dawn when the shower's radiant, the Orion constellation, is high in the sky.
The Chinese observers recorded these in 288CE and it is associated with Halley's comet.

Jupiter's satellites for October are shown in the illustration on page 74.

Evening Sky October 12th – 15th also shown on that page is Pleiades in Taurus. Mars and Jupiter together 5th - 9th October in the evening sky.

I hope you will be able to get to see some of these heavenly bodies.

Good luck to all!

Bob Turnbull

Astro Events from Frank Gross

Astronomers Find One of The Rarest Galaxies in the Universe

Ivan Petricevic Posted on September 5, 2022

There have been more than 400 PRG candidates discovered to date, but only dozens have been spectroscopically confirmed as actual polar ring galaxies.

The Subaru Telescope has been used by Japanese astronomers as part of a global strategic program called the Hyper Suprime-Cam Subaru Strategic Program (HSC-SSP) to detect a new polar ring galaxy.

Polar-ring galaxies have an outer ring of gas and stars that rotate over their poles. Apparently, polar rings form due to gravitational interactions between galaxies. Polar-ring galaxies may be formed by tidal stripping of material from passing galaxies. It is also possible that a smaller galaxy collides orthogonally with the plane of rotation of the larger galaxy, which results in the formation of the polar ring. The polar ring galaxy is a rare type of galaxy with a major population of stars and gas orbiting in rings strongly tilted away from the galactic disk's plane.

Physically, polar-ring galaxies, including several elliptical galaxies, belong to a wider category of galaxies, including S0s (lenticular galaxies).

In spite of the large number of PRG candidates discovered to date, astronomers have confirmed only dozens as real galaxies through follow-up spectroscopy.

A team of Japanese astronomers led by Minoru Nishimura has conducted a detailed study using the data from HSC-SSP on a sample of known PRGs in order to expand the short list of confirmed PRGs. As a result, they identified a new PRG candidate, SDSS J095351.58+012036.1.

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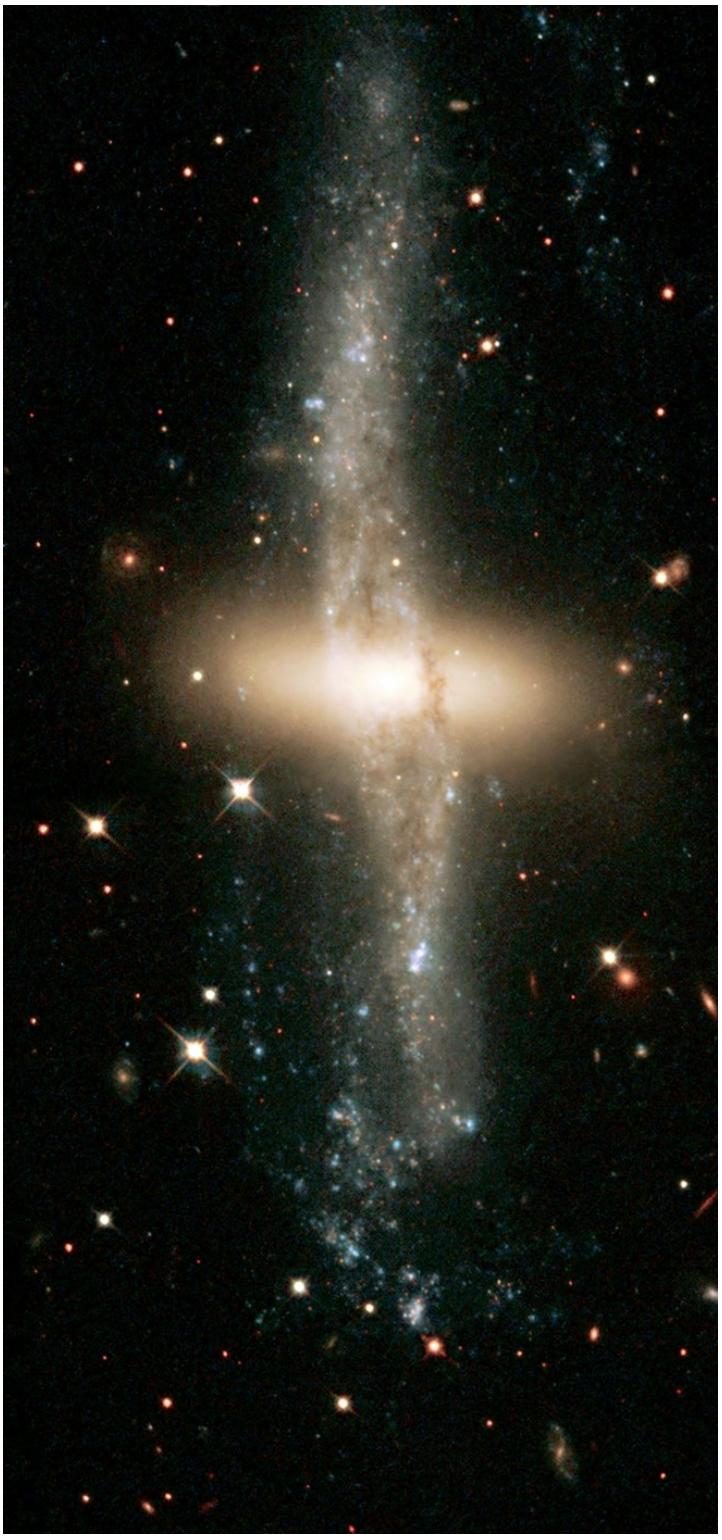

One of only 100 known galaxies with polar rings, NGC 4650A is located about 130 million light-years away.

Credit:
The Hubble Heritage Team (AURA/STScI/NASA/ESA).

The authors wrote in their paper, “We have discovered a new PRG candidate SDSS J095351.58+012036.1 (hereafter J0953), which is located near the edge of the COSMOS field (Scoville et al., 2007).

As part of the Sloan Digital Sky Survey (SDSS), J0953 was first spotted in 2000 as a galaxy. Despite its photometric redshift of approximately 0.2, there have been no spectroscopic observations of J0953 so far, so no spectroscopic redshift has been determined for this object.

In the study, J0953 is estimated to have a stellar mass of 38.5 billion solar masses and a star formation rate of approximately 2,66 solar masses per year. A stellar mass of 26.18 billion solar masses and a stellar mass of 4.23 billion solar masses were identified for the host galaxy and its polar structure, respectively. In addition to measuring the radius of the host galaxy, the polar structure was also found to have a radius of 2.12 arcseconds.

In J0953, the polar rings appear almost perpendicular to its host galaxy’s disk and appear to be free from disturbance. Their findings indicate that the polar structure is blue and probably younger than the galaxy in which it is located.

Sérsic index 2.94 was also determined for the host galaxy, which indicates an elliptical rather than exponential structure. There is also a possibility that the host galaxy is a disk galaxy, the researchers said.

According to the authors, more spectroscopic observations will be necessary to confirm the PRG nature of J0953 in the future. It is particularly important to investigate the kinematics of the host galaxy and the polar structure in more detail, experts concluded.

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The James Webb Space Telescope Observes a Cosmic Tarantula


Ivan Petricevic
Posted on September 6, 2022

The James Webb telescope has turned its cameras towards the Tarantula Nebula, located some 161,000 light-years away in the Large Magellanic Cloud.

We cannot have enough of what the James Webb Space Telescope has to offer. The rate at which the space telescope is exploring the universe is hard to keep up with, not that we are complaining. In fact, keep it coming because the mind-altering photographs produced by Webb are changing the way we study the universe. The ten-billion-dollar telescope has long paid off its costly price. With stunning images of some of the oldest galaxies and stars and direct observations of distant alien worlds, the James Webb Space Telescope has proven its worth to science.

Some of the photographs taken by Webb show galaxies in ways we have never imagined them before. Now, after studying a strange brown dwarf and directly observing a distant exoplanet, the space telescope has turned its equipment towards a galaxy that is often photographed by astrophotographers.

Webb Sees a Tarantula

An image taken by the NASA/ESA/CSA James Webb Space Telescope shows thousands of young stars that have never been seen before. This nebula has been called the Tarantula Nebula due to the dusty filaments that appear in previous telescope images, and astronomers have keenly studied its stars. Now, the JWST has revealed some never-before-seen details. Aside from young stars, Webb shows distant background galaxies and the nebula's detailed structure and composition.

Within the Local Group, the closest galaxies to the Milky Way, the Tarantula Nebula is only 161,000 light-years away in the Large Magellanic Cloud. The stars in this galaxy are among the hottest and most massive in the universe. Infrared instruments on Webb were focused on the Tarantula by astronomers in order to see what secrets they might hide.

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When viewed with Webb's Near-Infrared Camera (NIRCam), this region resembles the silky burrow of a burrowing tarantula. A cluster of massive young stars that sparkle pale blue in the image have hollowed out the nebula's cavity, shown in the NIRCam image. In the nebula, the densest parts are the only ones that remain intact despite stellar winds damaging the surrounding areas. Protostars are forming inside these pillars, which will emerge from dusty cocoons and take turns shaping the nebula as they form.

One very young star was captured doing just that by Webb's Near-Infrared Spectrograph (NIRSpec). Prior to this discovery, scientists believed that this star was a bit older and was clearing out a bubble around it. NIRSpec, however, revealed that the star was still surrounded by an insulating cloud of dust as it emerged from its pillar. These observations could not have been made without Webb's high-resolution infrared spectra.

A view of the region taken with Webb's Mid-infrared Instrument (MIRI) reveals a different appearance. Glow emanates from the cooler gas and dust while the hot stars fade. Points of light are visible within the stellar nursery clouds, indicating embedded protostars that are still growing. A longer mid-infrared wavelength penetrates the dust grains to reveal a previously unseen cosmic environment, while shorter wavelengths are absorbed or scattered by the dust grains.

Among the reasons why astronomers are interested in the Tarantula Nebula is the fact that it resembles giant star-forming regions observed during the universe's "cosmic noon," when star formation was at its peak, and the universe was only a few billion years old, as per the European Space Agency. Different chemical compositions and different star-forming rates characterize the Milky Way galaxy's star-forming regions. Since the Tarantula can be seen in detail, it is the closest example of what the universe had been experiencing as it reached its brilliant high noon. As astronomers examine the Tarantula Nebula and distant galaxies from the era of cosmic noon with Webb, they will be able to compare and contrast observations of star formation.

Our inability to see behind the thick clouds of stellar nurseries has resulted in many mysteries regarding the star formation process, despite thousands of years of stargazing. In just a short period of time, Webb has revealed a universe that has never been seen before and is just beginning to rewrite the story of stellar formation. The James Webb Space Telescope is one of the world's most advanced observatories for space science. Using Webb, we will be able to solve mysteries in our Solar System, probe distant worlds around other stars, and gain an understanding of why our Universe exists and our place within it.

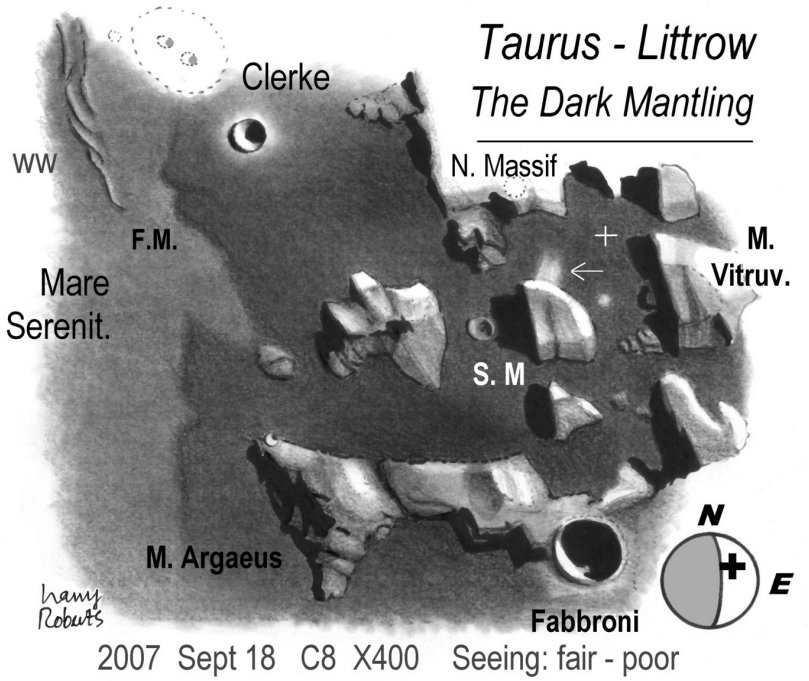
Apollo 17 and the Taurus-Littrow Dark Mantling by Harry Roberts

Apollo 17 and the Taurus-Littrow Dark Mantling

A recent glimpse of this region, through cloud (of course) prompted a revisit of this piece on Taurus-Littrow, perhaps the easiest of the landing sites to find.

Apollo 17 was the last of the moon landings and unique in several ways. It was the only landing to include a planetary scientist as crew (geologist Harrison Schmitt). The landing was targeted to collect samples of paradoxical dark soils located between very high mountains that needed some fancy flying by pilot Gene Cernan. Evans in the command module would take some incredible images with the vehicle's cameras. The voyage was a huge success, and returned with 110 kg of samples collected during 21 hours of surface exploration, over a three day stay.

Geologically, the interest lay in the almost black soil, the Dark Mantling (DM) that covered part of the Taurus-Littrow area, and was thought to be of recent volcanic origin. A second area of interest was a huge landslide on the north side of the isolated mountain called South Massif (white arrow in Fig 1).



In an earlier piece on crater Clerke we touched on the DM region, and on Sept. 18th fair seeing and lighting permitted a sketch of the A17 landing site and the formations that lured the astronauts there.

While the dark mantling is obvious enough, the landslide on the South Massif (SM in Fig 1) is more of a challenge for Earth-based 'scopes, being only 4 km square, and seeing conditions make a big difference. Look for a small spot of white that stands out against the dark background. The astronauts drove the "buggy" to the landslide about six km from the landing site (white cross on Fig 1), and collected samples of the bright material. Wood in "Modern Moon" tells us that when later analysed some of it proved to be 109 million years old, and dated from the Tycho impact, that occurred about 1500 km away! So long-range Tycho ejecta was responsible for the landslide.

On the opposite North Massif the astronauts imaged tracks on the steep slopes where a boulder had slowly slid downhill over millennia. Their photos showed how the slopes slowly degraded, or wasted, as material migrated downwards, leaving them bright and largely free of craters.

Apollo 17 and the Taurus-Littrow Dark Mantling by Harry Roberts

Cont...2

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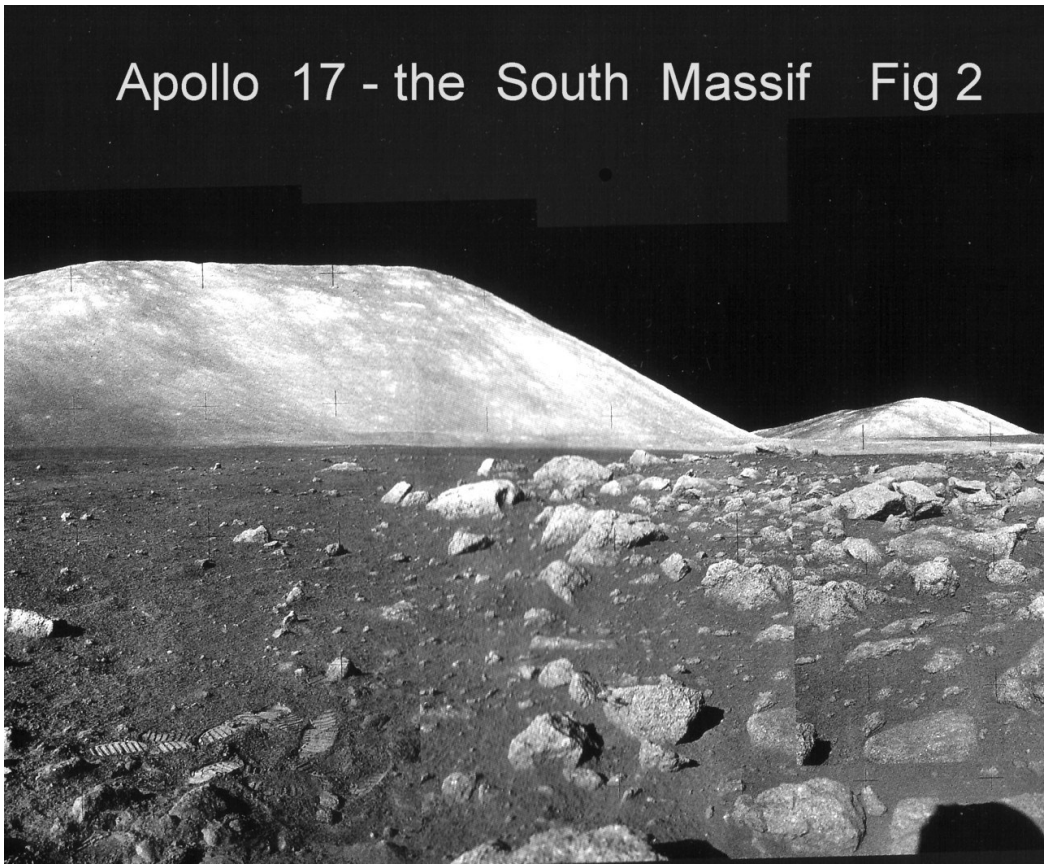


When analysed the DM material proved to be ancient and filled with glass "beads" that were interpreted as being "sprayed into the lunar sky from a nearby lava fountain" (Wood, P78). Where the DM material spreads across Mare Serenitatis it forms impressive cliffs as well as the unusual formation I've dubbed the "Fishes Mouth" (FM) just below Clerke.

Apart from the scientific interest of the DM site, the area is particularly beautiful in the eye-piece, with the large isolated massifs looking like jagged ice burgs floating in an inky sea. The A17 photo (Fig 2) shows South Massif in the distance with debris from fresh crater Camelot in the foreground.

Other features seen in Fig 1 are Mons Argaeus that projects into Mare Serenitatis a bit like the Barrenjoey headland. Like the two massifs it is probably about 2 km high. East (right) of the A17 landing site is Mons Vitruvius, also 2 km high. Crater Fabbroni to the south roughly marks one edge of the DM material, while Clerke marks the northern extent.

Crater Littrow that gives its name to this area is about 20 km north (up, not shown) from the landing site, and the Taurus mountain range is over 100 km north. Littrow was Johann von L., 1781 – 1840, an Austrian astronomer. Giovanni Fabbroni, 1752 – 1822 was an Italian chemist, and Agnes Clerke has been covered in an earlier piece on the area.

Take a closer look and see if you can detect the landslide that drew the astronauts to this complex region.

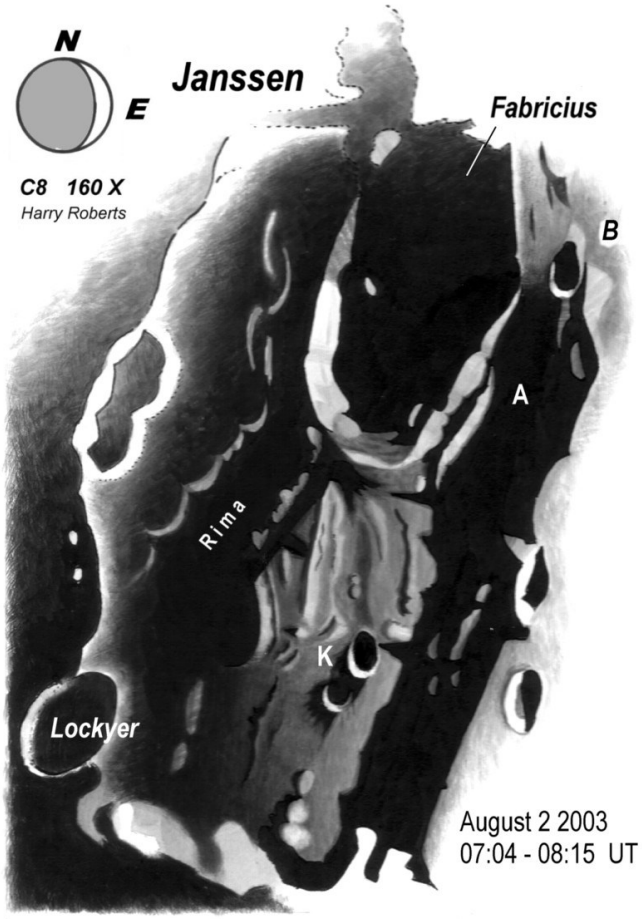
Clear skies! (As if!)

Lunar Sketchbook by Harry Roberts

Lunar Sketchbook: Sunrise on the floor of Janssen.

Vast and complex, the hexagonal mass of Janssen squats amid the confusion of craters forming the lunar south-eastern highlands. It looks to me like a Mediaeval fortification that has been severely battered by an invading army. I have often considered making a drawing of this feature, but have been discouraged by its overwhelming complexity; on this occasion, though, the rising Sun was just beginning to cross the curved floor, and most of the details were hidden in deep shadow. It was a cold august night, and the seeing rated moderately good (7/10). Strong libration had taken Janssen closer to the eastern limb and had compressed the crater's E-W dimension.

According to Wood Janssen "sits on top of an unnamed ancient ring that is about the same size." Perhaps this partly explains the strongly curved floor of Janssen. Crater Fabricius has plunged into the north side of Janssen and perhaps caused the complex of parallel ridges and valleys which showed well in the oblique lighting.



Wood suggests that a portion of the wall of Janssen was displaced by Fabricius and caused the mounded central part of the Janssen crater floor. Secondary crater Janssen K sits at the base of one of these valleys; adjoining it to the south is Janssen H. South of K and H the crater floor is crossed by two wrinkle ridges that cast shadows westwards. East of K and H, almost hidden in the shadows cast by Janssen's eastern walls, is crater Janssen L, showing as a pale crescent, along with several terraces.

To the right of Fabricius, crater Fabricius B marks the edge of Janssen's rim. Fabricius A, a substantially ruined crater, sits on the right side of Fabricius, filled with deep shadow, except for two dimly lit terraces. Fabricius has curious linear ridges and central peaks that cross the crater's floor; of which only a single peak caught the light during my observation, together with a terrace of the eastern wall

Lunar Sketchbook by Harry Roberts

Cont...2

The steep curvature of Janssen's floor hides the famous large rille or valley Rima Janssen, in deep shadow. However, where the Rima joins the rim of Fabricius, the early light illuminates portion of the western wall of the Rima. The eastern edge cuts an abrupt, shadow-filled, slash through the complex of ridges and valleys adjacent to Fabricius.

My observation does not record any fine detail of the western wall of Janssen, except to record the general line of the rim, the location of crater Lockyer, and some of the ridges that fill the floor between the rim and Fabricius. I hope to sketch this part of Janssen in a future observing session. Pierre Janssen was a late 19th century astronomer, and director of Paris Observatory at Meudon. Fabricius was the Latin name of amateur astronomer David Goldschmidt (1564-1617); and Sir Norman Lockyer was the British astrophysicist who discovered Helium in the Sun. The big ruined crater is 190Km diam. and overlaid by Fabricius in the north.Investigate Janssen in early light, a great setting for a remake of "Lord of the Rings"!

Clear skies! (As if!)

My Shed Observatory by Andrew Wood

With the impending construction of our club observatory, and with several members having built their own backyard observatories, my version is a bit less sophisticated; while still providing the convenience of not having to set up and pack away instruments each time I observe.

The shed in my backyard looks like it would typically contain garden implements. In fact, it contains telescopes. The largest, a 250mm Dobsonian, is on a trolley. In order to roll it onto the concrete slab outside the shed, a piece of the floor trimming has been cut away so it can be removed. The other scopes, an equatorially mounted refractor and a small alt-az mounted refractor that I've put together from spare parts, can be lifted onto the slab when needed. Inside are shelves and drawers holding eyepieces and other accessories.

This system has been in place for 11 years. Nothing has ever suffered damage, even after bouts of heavy rain when it's been closed for extended periods. All equipment is covered and put away after use. Occasionally, I bring all the large equipment out onto the slab and give the shed a good sweeping out.

Some observers have built their own classic domes. Then there is the "roll-off-shed" typical of many amateur observatories. Mine is a "roll-out-lift-out" system. At least it's eliminated the old carry it up from the garage and carry it back down again method.

New Moon Observing Nights

Monthly observing nights are planned alternately at two dark sky sites close to Nowra, on the Saturday closest to New Moon. If Saturday is clouded out, then the following Sunday is a possible alternative, weather permitting.

The alternate sites are:
University of Wollongong, Shoalhaven Campus, West Nowra
Woncor Avenue, Nowra Hill

Upcoming Observing Nights

August 27 Shoalhaven Campus
September 24 Woncur Avenue
October 22 Shoalhaven Campus
November 26 Woncur Avenue

Enquiries Andrew Wood (0401907012), Freya Bates (0415483656)

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 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,

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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