Shoalhaven Astronomers Inc.
www.shoalhavenastronomers.asn.au

Volume 23
Issue 9

Astro Flyer

SEPTEMBER 2023

Club News

G'day all members.

The club is moving forward with the new Observatory and asking member (paid) to book the OBS for observing nights. You will need an accredited SA member with you to use the Obs.
Check the website at **shoalhavenastronomers.asn.au** or just ask at the meeting**.**

The Observatory is now ready for viewing but still needs some small bits of work. Don't let this hinder you from booking a night. I, Frank G intend to book a night soon to view and record our nearest neighbour, the Moon.

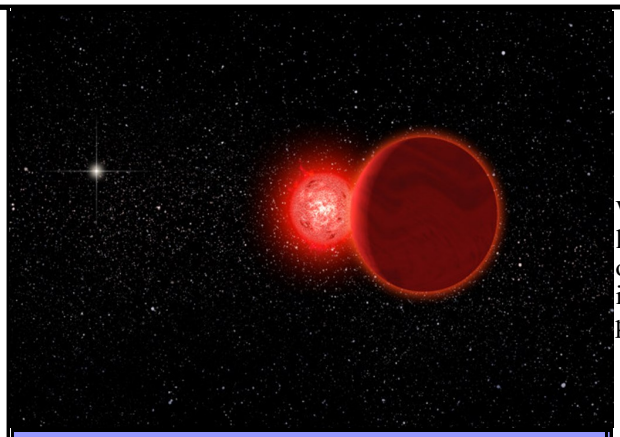
Our next meeting at the Uni of Wollongong, Shoalhaven Campus will be at 7 PM on September 15th.

I hope to see a lot of you there.

Frank Gross (2023)

Next Meeting September 15th 7 pm

Contents



MOON PHASES

New Moon	First Quarter	Full Moon	Last Quarter
Sep 15th	Sep 23rd	Sep 29th	Oct 6th

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.

Observation Report Andrew Wood

What's on in the Cosmos –September/Ocyober 2023

Our September 15 meeting occurs at New Moon; peak Deep Sky Observing time. The following New Moon will occur on October 15. Daylight Saving Time (DST) will come into effect on Sunday Oct 1.

Moon Phases

New Moon	15th September	Dark all night
First Quarter	23rd September	Dark after midnight
Full Moon	29th September	Enjoy the Moon – a Super Moon
Last Quarter	6th October	Dark before midnight
New Moon	15th October	Dark all night

Planets

Mercury is now a morning object. Its greatest elongation west of the Sun will be on September 22. During October it will be too close to the Sun for observation.

Venus shines brilliantly in the east before sunrise. Telescopically it will move from a crescent to being half-illuminated.

Mars is not presently visible.

Jupiter is nearing opposition and nearly 50 arcseconds in diameter. From mid-September to mid-October its rise time will move from 10PM to 8PM (9PM DST).

Saturn is still near its September opposition size and prominent after sunset, transiting about 9PM (10PM DST) mid-October.

Uranus is located within the constellation Aries and rising about 11PM late September, to 8:30PM (9:30 DST) mid-October.

Neptune at magnitude 8, a telescope is required to see the outermost of the planets. It is however visible most of the night, located in Pisces.

Comets

There has been a spate of comets around, all requiring a telescope and probably a moonless sky. Recently discovered **Comet Nishimura** (C/2023 P1), however, is a naked eye object at magnitude 4.3. As this edition of *Astro Flyer* reaches you, it will be in the constellation Leo above the north-west horizon before sunrise. It is unfortunately moving rapidly toward the Sun and will not be visible for long. It may, however, become visible the near the western horizon after a few days.

Meteor Showers

A consistently good shower, the **Orionids** are active from October 2 to November 7. Maximum is from late evening on October 22. With First Quarter Moon on October 22, after midnight when the Moon has set and into the morning of October 23 will be the best time to see the maximum of around 20 meteors per hour.

Beyond the Solar System

The map, copied from the *Herald-Bobroff Astroatlas*, shows the constellations of Piscis Austrinus, Capricornus, and Aquarius. They are currently north around 9PM. Apart from Fomalhaut, the brightest star in Piscis Austrinus, these constellations are faint; though for orientation, Saturn is currently in Aquarius.

β-Piscis Austrinus is an easy binary star, with components of magnitudes of 4.3 and 7.1 separated by 30 arcseconds. The components show colour.
Within Capricornus, the only deep sky object of note is the bright globular cluster **M30 (NGC 7099)** at magnitude 7.5.
Aquarius has a brighter globular cluster, **M2 (NGC 7089)** at magnitude 6.5. This is a spectacular telescopic object.
Aquarius also has two showcase planetary nebulae. The **Helix Nebula (NGC 7293)** at magnitude 7.3 is very large at 12 arcminutes across and can be seen under dark skies with binoculars. It is a classic "smoke-ring" type planetary.

Observation Report Andrew Wood

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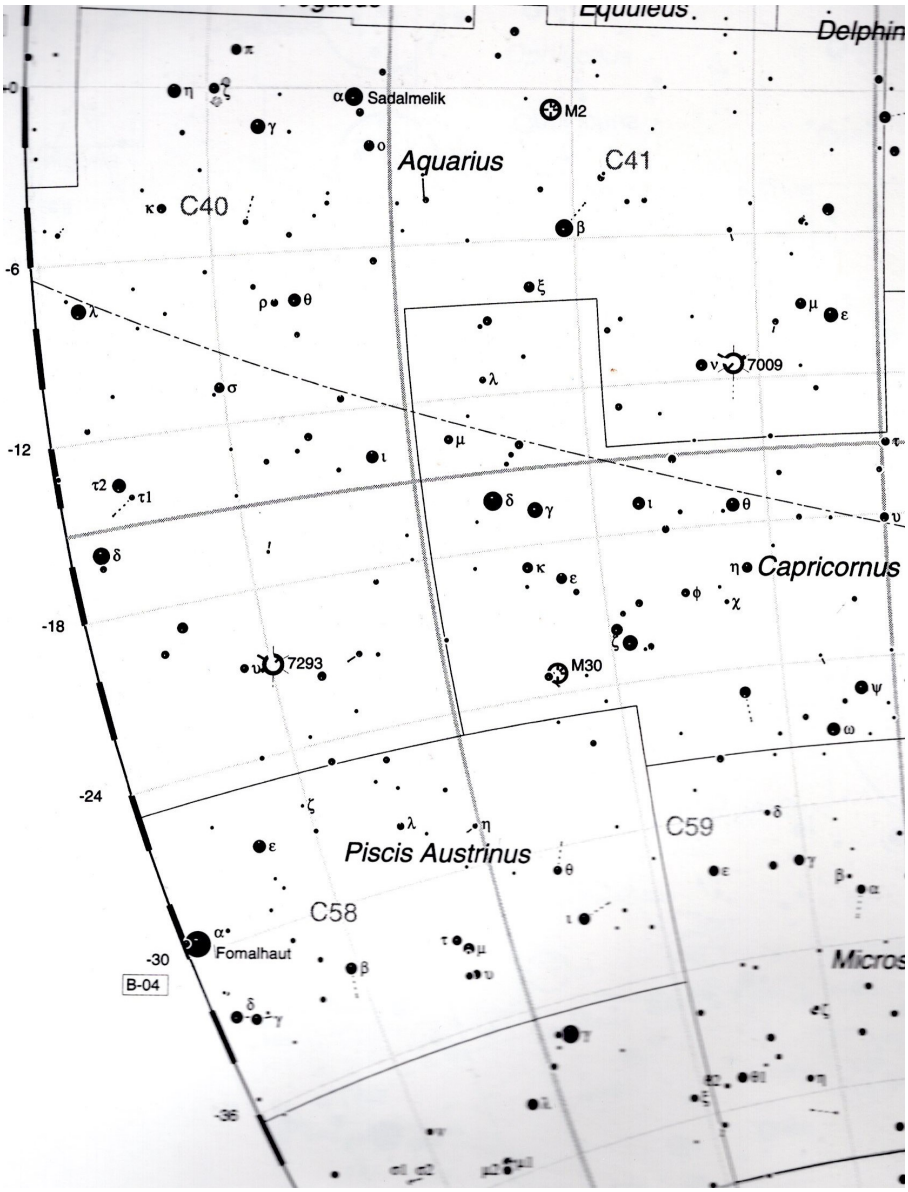
By contrast, the **Saturn Nebula (NGC 7009),** is also bright (mag 8.0) though much smaller at 25 arcseconds across. Its appearance is a solid planetary-disc-like structure.

It would be fantastic 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.

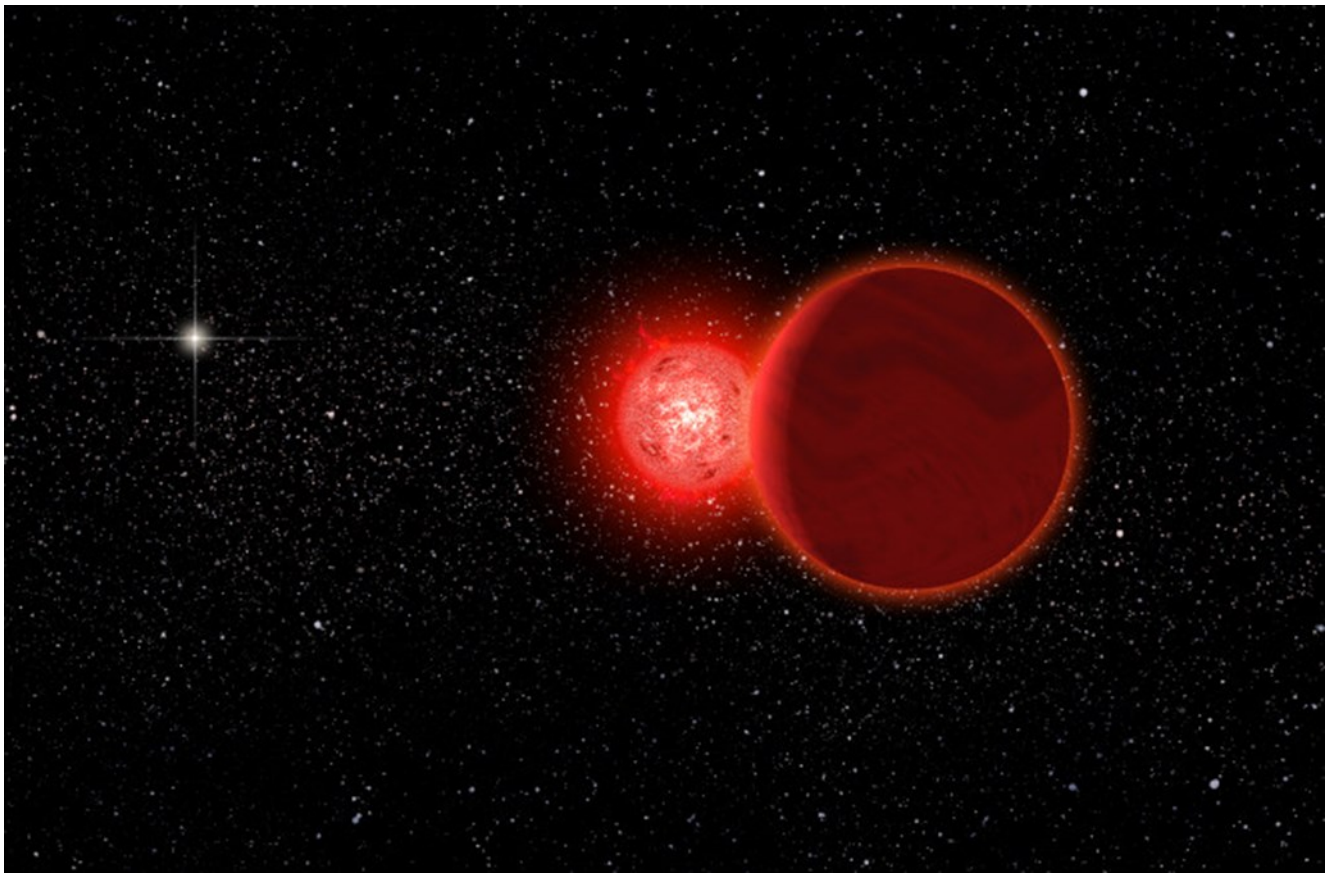


Astro Events from Frank Gross

Wandering Stars Pass Near Our Solar System Surprisingly Often

Our sun has had close encounters with other stars in the past, and it's due for a dangerously close one in the not-so-distant future.

By Eric BetzMay 22, 2020 8:00 AM



Scholz's Star and its binary brown dwarf fly by our solar system some 70,000 years ago in this artist's illustration. Our sun shines bright in the background. (Credit: Michael Osadciw/University of Rochester)

Every 50,000 years or so, a nomadic star passes near our solar system. Most brush by without incident. But, every once in a while, one comes so close that it gains a prominent place in Earth's night sky, as well as knocks distant comets loose from their orbits.

The most famous of these stellar interlopers is called Scholz's Star. This small binary star system was discovered in 2013. Its orbital path indicated that, about 70,000 years ago, it passed through the Oort Cloud, the extended sphere of icy bodies that surrounds the fringes of our solar system. Some astronomers even think **Scholz's Star could have sent some of these objects tumbling** into the inner solar system when it passed.

However, Scholz's Star is relatively small and rapidly moving, which should have minimized its effect on the solar system. But in recent years, scientists have been finding that these kinds of encounters happen far more often than once expected. Scholz's Star wasn't the first flyby, and it won't be the last. In fact, we're on track for a much more dramatic close encounter in the not-too-distant future.

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"[Scholz's Star] probably didn't have a huge impact, but there should be many more stars that have passed through that are more massive," astronomer Eric Mamajek of NASA's Jet Propulsion Laboratory, whose 2015 paper in ***Astrophysical Journal Letters*** put Scholz's Star on the map, tell *Astronomy*.

The Discovery of 'Scholz's Star'

Around Christmas 2013, Mamajek was visiting a friend and fellow astronomer, Valentin Ivanov, at the offices of the European Southern Observatory in Santiago, Chile. While the two chatted, Ivanov was looking at recent observations of a star cataloged as WISE J072003.20–084651.2. The star caught Mamajek's interest because it was just about 20 light-years away, but astronomers hadn't noticed it thanks to its dim nature and tiny apparent movement (or proper motion) across our night sky.

To him, those two things were a clue. Since it didn't appear to be moving much side to side, the star was likely moving toward us or away from us at a breathtaking pace. As the astronomers continued talking, Ivanov measured the star's radial velocity to learn how quickly it was moving toward or away from our sun. Soon, they had their answer. "Within five or 10 minutes, we had the initial results that this thing came within a parsec [3.26 light-years] of the sun," Mamajek says. "It was screaming through the solar neighborhood."

The two astronomers and their colleagues would eventually show that it passed even closer than that. In fact, it passed closer to our sun than any other known star. This status prompted them to name the cosmic trespasser after its initial discoverer, an astronomer named Ralf-Dieter Scholz, who's devoted significant time to finding nearby stars.

All the Other Passing Suns

Mamajek has since moved on from studying Scholz's Star. But in the meantime, other astronomers have also taken up the work. And, thanks to a European Space Agency satellite called Gaia, which is built to map the precise locations and movements of over a billion stars, we now know about other close encounters.

In 2018, a team of researchers led by Coryn Bailer-Jones of the Max Planck Institute for Astronomy in Germany, used Gaia data to plot our **sun's future meet-ups with other stars**. They discovered nearly 700 stars that will pass within 15 light-years of our solar system over just the next 15 million years. However, the vast majority of close encounters have yet to be discovered, the team suggests. But they suspect roughly 20 stars should pass within just a couple light-years of us every million years.

However, "space is big," Mamajek points out. "Statistically, most of those stars would pass the outer edge of our solar system." That means encounters like the one with Scholz's Star are common, but only a few are close enough to actually dislodge a significant number of comets, potentially leading to a cosmic bombardment of Earth.
Nonetheless, a few stars should still come surprisingly close. And if a large, slow-moving star did pass through the edge of the Oort Cloud, it could really shake up the solar system.

The 'Strongest Disrupting Encounter' in History

A massive star steamrolling through the outer solar system is exactly what Gaia data show will happen 1.4 million years from now, according to a 2016 study. A star called Gliese 710 will pass within 10,000 astronomical units — 1 AU is equal to the average Earth-sun distance of 93 million miles. That's well within the outer edge of the Oort Cloud.
And at half the mass of the sun, Gliese 710 is much larger than Scholz's Star, which is just 15 percent the mass of the sun. This means Gliese 710's hulking gravity could potentially wreak havoc on the orbits of icy bodies in the Oort Cloud.

And while Scholz's Star was so tiny it would have been barely visible in the night sky — if at all — Gliese 710 is larger than our current closest neighbor, Proxima Centauri. So when Gliese 710 reaches its closest point to Earth, it will burn as a brilliant orange orb that will outshine every other star in our night sky.
This event could be "the strongest disrupting encounter in the future and history of the solar system," the authors wrote in their paper, published in the journal ***Astronomy & Astrophysics***.

Astro Events from Frank Gross

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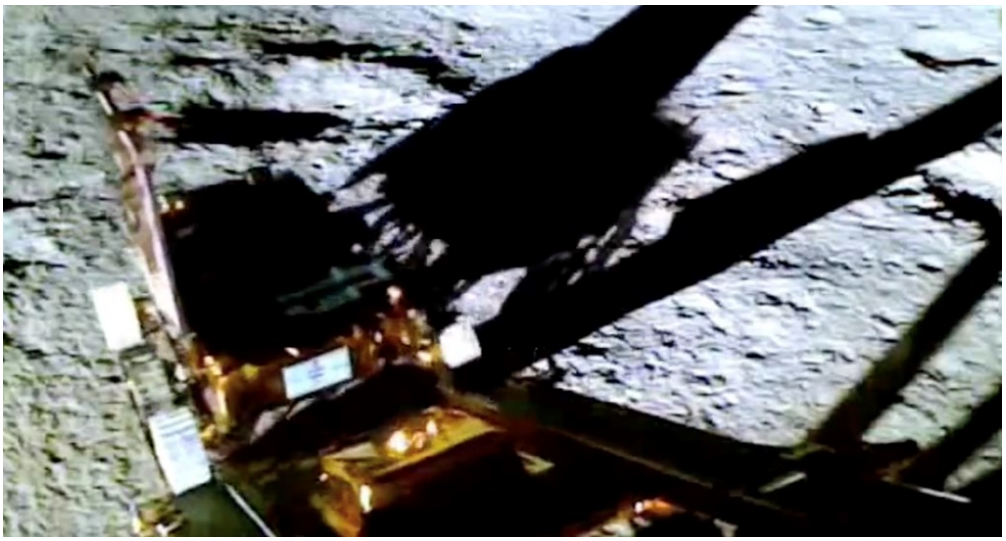
Fortunately, the inner solar system is a relatively tiny target, and even if Gliese 710 does send comets flying our way, it would take millions of additional years for these icy bodies to reach us. That should give any surviving future humans plenty of time to take action.

And in the meantime, they can enjoy watching what may be one of the closest stellar flybys in the history of our solar system.

Chandrayaan-3's Pragyan Rover Discovers Sulfur on the Moon's South Pole

Ivan Petricevic
Posted on August 29, 2023



The Pragyan rover of the Indian lunar mission Chandrayaan-3 has made the first in situ measurements of the elemental composition of the lunar surface near the south pole.

India's Chandrayaan-3 mission, with its Pragyan rover, has taken a significant leap in lunar exploration by making pioneering in situ measurements of the elemental composition at the moon's south pole. This has led to a monumental discovery – the detection of sulfur, as confirmed through the sophisticated Laser-Induced Decay Spectroscopy (LIBS) tool. This is a revelation that earlier orbiting instruments couldn't decipher, as highlighted in a recent announcement by the Indian space agency.

Why is this discovery significant?

Tracing back to prior scientific observations, sulfur detected in lunar volcanic rocks can be seen as an indication of iron sulfide nestled within the moon's rocky core. This is suggestive of the locations where precious metals might have been deposited during the formation of lunar lavas on the moon's terrestrial surfaces.
LIBS stands out as a quintessential scientific methodology that discerns the material composition via the emission of intense laser beams. The procedure involves concentrating high-energy laser pulses onto a specific material surface, like rock or soil. This induces a superheated, localized plasma state. The subsequent emission of light from this plasma is captured, spectrally processed, and detected with tools like charge-coupled devices.

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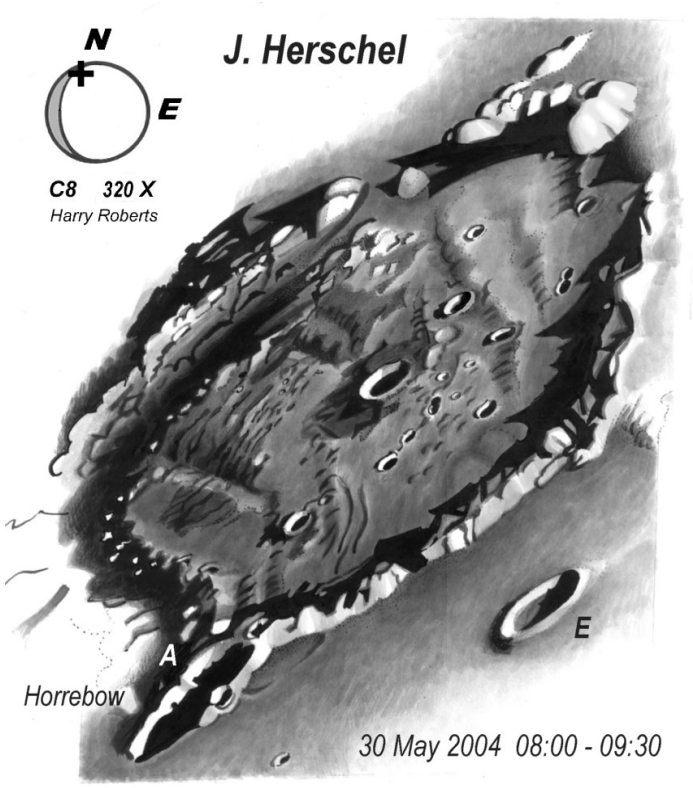
What Else?

Given that each chemical element radiates a distinct wavelength spectrum in its plasma form, the elemental composition of the test material gets ascertained. Preliminary graphical representations from the Chandrayaan-3's measurements have unveiled the existence of several elements on the lunar terrain, including aluminum (Al), sulfur (S), calcium (Ca), iron (Fe), chromium (Cr), and titanium (Ti).

Further investigations have also identified manganese (Mn), silicon (Si), and oxygen (O) in the samples. There's an ongoing, detailed analysis targeting the detection of hydrogen. The genius behind the LIBS tool? It was meticulously crafted at the Laboratory of Electro-Optical Systems (LEOS).

The Chandrayaan-3 mission, through its Pragyan rover, has not only strengthened India's footprint in space exploration but has also unearthed significant details about our closest celestial neighbor. The discovery of sulfur and other elements on the moon's south pole paves the way for more profound insights into the moon's formation and its elemental abundance.

J. Herschel: a crater too far by Harry Roberts



As the May night wore on, and I struggled to capture the details of the floor of J. Herschel, I began to realize that this is one crater that requires several drawings for accurate portrayal. Harold Hill warns of "the *bad practice* of depicting too great an area, instead of concentrating on a limited portion only – as such, a typical *beginners effort*!" (My italics.) Yet: the problem was, where to stop? And so I worked on, in spite of Hills caution.

I pause here to warn readers that Hill's superb book "A Portfolio of Lunar Drawings" has been reprinted, in a form that would have saddened Hill. The hardcover original (still available through ABE or AMAZON,) reproduces Hill's sublime drawings in excellent black and white half tone. *But* the paperback reprint is an overpriced shocker! Hill's pictures look like they've been reproduced on a 1960's copier; not worth the asking price of A$90.00.

Back to J. Herschel. Hill's book does not have any drawings of this crater, so I can't tell where *he* would have stopped. This crater is in the Moon's north west polar region, on the NE edge of Mare Frigoris, the crescent shaped mare concentric with Mare Imbrium. Charles Wood regards Frigoris as a "shallow part of (the) Imbrium (Basin) that is separated by ejecta from the basin's deeper interior." He goes on to say "that the cratered land north of Frigoris should be covered with Imbrium ejecta and secondary craters. And it is." Most lunar craters and basins (on the visible side of the Moon) have smooth floors flooded with basalt lava, but this is mainly an Earth-side phenomenon, resulting from the Moon's thinner crust on the Earth side,

1 Hill, H. "A Portfolio of Lunar Drawings" Cambridge Uni. Press. (Hard cover) P 230.
2 Wood. C. "The Modern Moon – A Personal View." Sky Publishing. 2003. P 67.
3 Ibid. P 67

J. Herschel: a crater too far by Harry Roberts

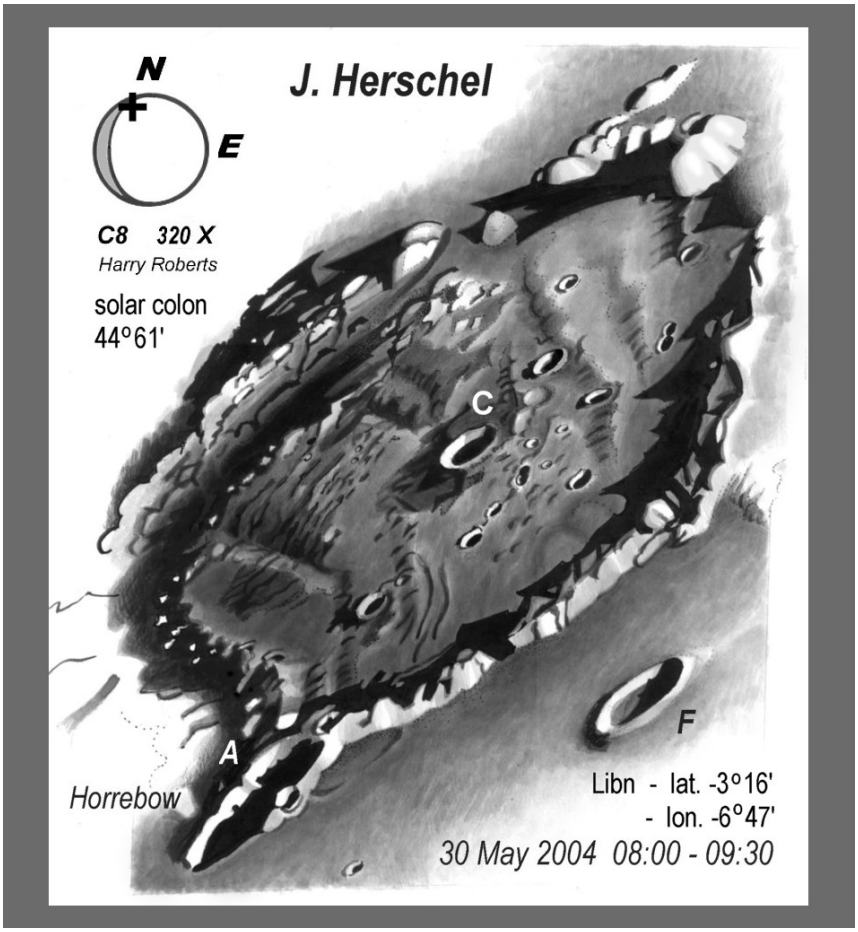
Cont...2

compared to the thicker crust of the "backside". Because of this uneven crustal thickness craters nearer the poles generally lack lava flooding and J. Herschel in the far north, (like Bailly in the south, see this writer's earlier article), missed out on the flooding process, and so retains its original crater floor. J. Herschel is, therefore, a fine example of a large Nectarian period crater, older than 3.75 billion years (b. y.) It already existed when the impact that formed the multi-ringed Imbrium Basin occurred, and J. Herschel was "scoured and partially filled by Imbrium ejecta."

Accordingly when observing J. Herschel we see a kind of lunar "Stonehenge" with parts of the crater wall missing or collapsed, and the floor strewn with uneven debris rather than smooth lava –so the floor is rough and striated. The ejecta from Imbrium not only raked grooves through the old crater floor, but also deposited an irregular blanket of debris inside the crater. The ejecta also partly toppled and remodelled the crater's original walls.

Lets look at the crater in detail. The near-central secondary crater is J. Herschel C. To the north and south curving shallow valleys cross the crater floor, generally radial with the Imbrium Basin impact site. Also the ejecta striated and pock-marked the newly covered floor, and the whole area is scattered with secondary craters. Close study of the floor in "morning" light will reveal many shallow parallel grooves that are partly "Imbrium sculpture" and partly dense crater chains. Such crater chains are caused by the impact of irregular "blobs' of ejecta splashed out of the Imbrium site. The uneven blanketing of the floor has left low-lying areas on the left (s) and far (w) sides. These areas, shadow filled at the time of observation, show numerous high points catching the early light. The shallow parallel grooves in the lower-left corner near J. Herschel A and Horrowbow, are seen (in Orbiter images) to be tightly overlapping crater chains, radial with Imbrium, as discussed above.

The original crater wall, presumably round, is now a crude pentagon shape, with evidence of infilling particularly on the south (left hand) side. A large detached block guards the far north side. The shadow filled gap on the Imbrium (nearer) side has not allowed any Frigoris lava to enter the crater. Collapse features, terraces and blocks, are well seen, particularly at the nearer and farther walls. A curious irregular cluster of bright "peaks" guards an opening in the crater wall at the top (NW) side of the crater. Perhaps this cluster is a remnant of the earlier crater wall before the Imbrium Basin event.



Rukl (now available again as a superb Sky Pub. reprint, a must have for all lunar observers) gives the following details:

J. Herschel [62.1 °N, 41.2°W] John Herschel, 1792-1871. English astronomer, son of William Herschel. Disintegrated walled plain (156 km).

Horrebow [58.7°N, 40.8°W] Peder Horrebow, 1679- 1764. Danish mathematician and physicist.
Crater (24 km).

4 Ibid.
5 Rulk, A "Atlas of the Moon" Sky Publishing Corp. 2004.

Observatory Report Mark Town

The RC-14A , the Esprit 100 and the Evostar 72 are now all mounted on the CEM120 mount (see picture). There is still more to do and the Sunday morning sessions are continuing– Big vote of thanks to those who have assisted! - however the observatory can now be used for some basic operations.

Training in the use of the observatory is now available and will be delivered to interested SA members on a demand basis. To use the observatory you need to do at least the first 3 training modules:

- Work Health & Safety
- Observatory Overview, and

Manual Visual Observing.

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. The current list of accredited users is provided elsewhere in the AstroFlyer. I encourage all of you to get the training so you can start to enjoy the observatory and what it can offer SA members.

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.

Cheers,

Best Regards,
Mark Town

See PDF Attachment of Accreditation summary

Observatory Report by Mark Town

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Fully assembled system

Some Astro Photography by Ronald Jones

Recently I installed motors on my 16 inch dobsonian telescope. Over the years I made a number of equatorial platforms for tracking but found it hard to lift the telescope on to the platform. Adjusting the platform to point to the South Celestial Pole was tricky as well - imagine trying to shift a telescope by a centermetre this way or that to point to the pole! So, I decided to install two servor motors and link it in with the SciTech controller available from the US.

I have a couple of photos showing the gear and rack arrangement installed on the altitude bearing and circular ground board. It took a long time to get here but I am pretty happy with it now. I can now use my Smart phone with a planetarium software (SkySafari) to GoTo and track objects. The tracking is good enough to use for astrophotography and I attach some recent examples of what is currently in the night sky. I use SharpCap to capture short exposures of less than 5 seconds, and stack many times to remove noise in the images. I think pretty good results considering my (lack of) expertise.

The camera is one of the new very sensitive CMOS cameras (a ZWO) and that with SharpCap allow for some pretty decent backyard astrophotography. Good enough to impress my wife, anyway :)

Ronald Jones

Centaurus A

Some Astro Photography by Ronald Jones

Cont...2

Lagoon Nebula

NGC 4945

Some Astro Photography by Ronald Jones

Cont...3

Southern Pinwheel

Club News

Social observing nights

Andrew Wood Secretary

With the opening of the Shoalhaven Observatory, we are going to hold **social observing nights**, using the observatory and the area around it. These events will be held on the Saturday following the Friday of each monthly club meeting.

By holding the events at the same time each month, there will be nights of different moon phases. We're not aiming for serious 'dark sky' nights: rather social gatherings where you can bring along your own scope if you like and we observe and discuss whatever is in the sky.

Of course, the weather will always be a factor. As such we will set up a mobile phone group so that participants can be informed if the night is going ahead, or not due to the weather.

We would like to set up this group via **WhatsApp**. This app is easy to download if you don't have it already on your phone.

For those who wish to take part, your mobile phone number will be required. In the past we have only recorded members email, but we will need your phone number if you wish to be informed whether the observing night is on or not.

If you'd like to be a part of this group, please send me your mobile number.
The first of these nights is planned for **Saturday Sep 16**, following the meeting of Sep 15.

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. The next is Fri Sep 15 at 7PM

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

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

Editor Kaye Johnston