The PRETORIA CENTRE
of the
Astronomical Society of Southern Africa
www.pretoria-astronomy.co.za

NEWSLETTER SEPTEMBER 2023

NEXT MEETING

Venue: Christian Brothers College (CBC), Mount Edmund, Pretoria Road, Silverton, Pretoria.
Date and time: Wednesday 27 September at 19h15.
Programme:

- "What's up in October?" by Bosman Olivier.
- Main talk: "Blue Moons" by Michael Poll. (Summary on page 3.)
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Johan Jordaan.

NEXT OBSERVING EVENING

Friday 22 Septembe from sunset onwards at the Pretoria Centre Observatory, which is also situated at CBC. Turn left immediately after entering the main gate. Carry straight on through the car park and proceed down the tarred road that drifts to the left out of the car park and then swerves to the right. About 50 to 100 metres after the last row of studs there is a cricket sight-screen on the right. Observing will be done on the cricket pitch just past the sight-screen.
Please note that we have been instructed that no one is to drive on to the sports fields because of possible damage to the irrigation systems there.

TABLE OF CONTENTS

Astronomy related articles on the Internet

There has been increased activity early in solar cycle number 25.
Solar Cycle 25 starting with a bang! (earthsky.org)

The Milky Way has been mapped in the optical, infrared and radio regions of the electromagnetic spectrum. The first map of the Milky Way in neutrinos was recently revealed.
A New Map of the Universe, Painted With Cosmic Neutrinos | Quanta Magazine

Astronomers have found a background 'hum' of exceptionally long wavelength gravitational waves pervading the Universe.
An Enormous Gravity 'Hum' Moves Through the Universe | Quanta Magazine

The unmanned Russian lunar lander Luna-25 has crashed into the moon.
1st Russia moon mission in 47 years crashes into moon (earthsky.org)

The Chandrayaan-3 mission of India successfully delivered a lander and rover near the south pole of the moon. India's successful moon landing follows recent failures by other countries (sciencenews.org)

A new type of extremely magnetic star may eventually collapse and become a magnetar (a highly magnetic neutron star), whose origins has been a mystery for decades.
Astronomers have found a strange new type of extremely magnetic star | New Scientist

Born less than 400 million years after the Big Bang, Maisie's galaxy is officially one of the four oldest galaxies ever discovered.
13 billion-year-old 'Maisie's galaxy' is one of the oldest objects in the universe, James Webb telescope reveals | Live Science

Prof Avi Loeb certainly thinks way, way out of the box. (I - your newsletter editor - have great respect for such people.) Someday, one of his imaginative, highly speculative theories about extraterrestrial life just might turn out to be spot-on.....
Harvard Professor Says Godlike Aliens May Be Creating Universes in Labs (futurism.com)

Astronomers have found the most distant star yet, thanks to a rare alignment with a lensing galaxy cluster. They've nicknamed the star Earendel. This star formed in the juvenile Universe just 900 million years after the Big Bang.
Most distant star yet seen spied by Hubble (earthsky.org)

This brown dwarf closely orbits a white dwarf star and is tidally locked to it. The side facing the white dwarf is hotter than the Sun.
Wait. How can this brown dwarf be hotter than our sun? (earthsky.org)

Astronomers have completed a detailed "forensic study" of a massive star destroyed by a giant black hole. The black hole ripped out the insides of the star.
Giant black hole rips out insides of massive star (earthsky.org)

If the James Webb Space Telescope was pointed at Earth from a distant star, it could detect the signatures of intelligent life in our planet's atmosphere.
JWST could detect life on Earth from across the galaxy | Space

The September equinox will be this weekend.
EarthSky | 2023 September equinox: All you need to know
Equinox sun rises due east and sets due west (earthsky.org)

Summary of Main Topic to be presented on September 27th 2023 - by Michael Poll

In August 2023 there were two Full Moons, and the second of these was called a “Blue Moon”. The second Full Moon in a month has been popularly called a Blue Moon since the 1980s, but the “Blue Moon” expression, with different meanings, has actually been around since the 1520s when it was written in a religious pamphlet at the time of the Protestant Reformation.

The presentation will look at the circumstances that led to the expression first being used and altogether will describe 10 meanings that have evolved over the centuries. There will be a detailed look at an error in the March 1946 issue of **Sky and Telescope** which led to the fourth Full Moon in a quarter morphing into the current “two-full-moons-in-a-month” meaning.

The pattern of Full Moons in 2023 will repeat in 2042, a period of 19 years known as the Metonic Cycle. This Cycle will be explained and compared with the Saros Cycle.

This presentation was made some years ago, but it has been revised and updated with the incorporation of additional material. **Ω**

What’s up in October 2023 - by Bosman Olivier

In the Southern Hemisphere's October night sky, a captivating celestial panorama awaits sky watchers of all levels. The region showcases a remarkable trio of observation modes: naked-eye, binocular, and telescope.

Naked-eye enthusiasts can readily spot the Southern Cross (Crux), an iconic constellation with its distinctive cross-shaped pattern, along with the prominent Centaurus, home to the nearest star system, Alpha Centauri.

Binoculars, the stargazer's versatile tool, unlock the Milky Way's hidden treasures. Omega Centauri, a colossal globular cluster, gleams brightly, while the Jewel Box Cluster dazzles with its vivid, multicoloured stars. Nearby, the enigmatic Coal Sack Nebula stands out as a dark void against the backdrop of the Milky Way. In Sagittarius, binoculars reveal celestial gems like the Lagoon Nebula, an expansive emission nebula, and the Trifid Nebula, a fascinating blend of emission and reflection nebulae.

For telescope enthusiasts, more celestial marvels await. The Southern Pinwheel Galaxy (M83) showcases its spiral grandeur in Hydra, while the Sculptor Galaxy (NGC 253) boasts striking structure in the Sculptor constellation.

Finally, the Eta Carinae Nebula (NGC 3372) and the Tarantula Nebula (NGC 2070) in the Large Magellanic Cloud beckon telescope users with their intricate features and bustling stellar nurseries.

To enjoy these celestial delights fully, it's essential to venture to dark-sky locations, away from the glare of city lights, and to choose clear nights for optimal observation. **Ω**

NOTICE BOARD

Search for brown dwarfs, cool neighbours of our Sun. Brown dwarfs are neither planets nor stars, but something in between. They shine faintly in the far infrared. They have masses between 13M_J * and 80M_J (i.e., between 0.013$M_\odot$ ** and 0.08$M_\odot$). Because they are so dim, it's possible that there could be overlooked brown dwarfs closer to us than Proxima Centauri. You could discover a brown dwarf! Maybe there are some of them in the Oort cloud, or maybe planet 9 is one . . . . . .

- See on our website the short article in the newsletter of February 2013, page 10.
- Backyard Worlds: Cool Neighbors — Zooniverse
- Backyard Worlds – Wikipedia

* M_J = Mass of Jupiter.
** $M_\odot$ = Mass of the Sun.

UAP again. NASA's independent study team released its highly anticipated report on UFOs (or UAP for **U**nidentified **A**nomalous **P**henomena) on Sept. 14, 2023. The team found no evidence that reported UAP observations are extraterrestrial.
NASA report finds no evidence that UFOs are extraterrestrial (theconversation.com)

New book by Avi Loeb. Its title is "*Interstellar : The Search for Extraterrestrial Life and Our Future in the Stars*".
Interstellar, a new book by Avi Loeb (earthsky.org)

Old newsletters. All old newsletters from January 2004 onward are on our website. They contain a record of our Centre's activities as well as astronomical information.

Feature of the month: Are we living in a simulation?
- by Pierre Lourens

What exactly is simulation theory? It's the idea that all of reality is a computer simulation, one so advanced that we cannot detect it, and we are all living in a virtual world, and our reality and very existence are programmed by an Outside Entity.

With rapid advances in Virtual Reality (VR) technology, it's now possible for us to become absorbed in completely made up worlds. We might wonder how soon it will be till we reach a point where VR technology is so good that we can't tell it apart from reality. But what if we've already reached that point? How would we know if we were currently living in a simulated reality, or are there always tell-tale signs?

The recent movie named *The Matrix* and its sequels did a lot to push the simulation theory forward, but the notion of a simulated Universe isn't new. Scientists and philosophers alike have flirted with the idea for decades, and those of the present day who think out of the box, think that this is possible. It is controversial, and is rejected by some physicists.

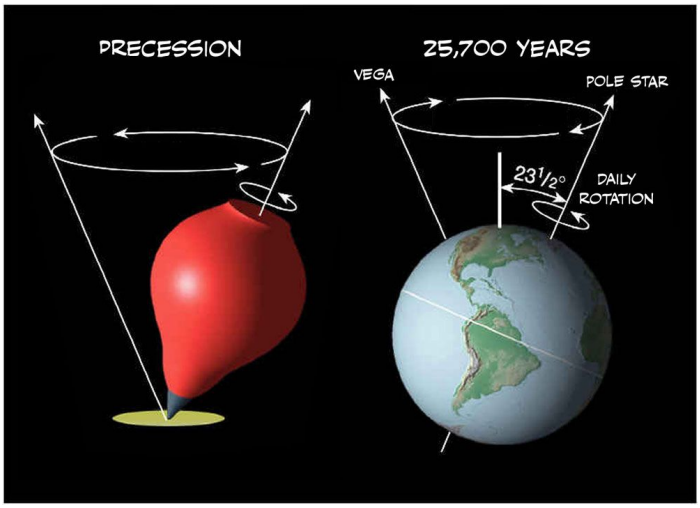
The heading of this article is a question. I cannot give the right answer. I once attended a popular lecture by a cosmologist named Christophe Galfard. At the end, I stood up and asked: *"There are people who think that the Universe is a simulation. What do you think of this idea?"* He replied: *"Those who think so must produce the evidence!"* I agree with him. My own belief (we all believe things) is that the great, wonderful and mysterious Universe that we observe, is real, and not a simulation. But if convincing evidence of some kind to the contrary is produced one day (which I think will not happen), I will have to change my belief..... **Ω**

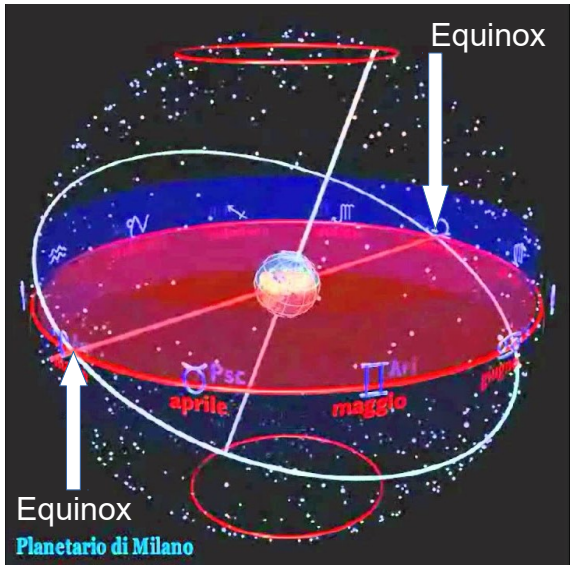
Astronomy basics: Earth's pole stars and precession of its axis - by Pierre Lourens

Earth's north pole star is Alpha Ursae Minoris, the brightest star in the constellation Ursa Minor (The Little Bear). It is also known as Polaris. Its distance is about 448 light-years. It is actually a triple star system with an apparent magnitude that fluctuates around 1.98. The primary is the closest Cepheid variable. Polaris – Wikipedia

Earth's south pole star is Sigma Octantis, a star in the constellation Octans (The Octant). It is also known as Polaris Australis and is about 294 light-years from Earth. It is slightly variable and is classified as a Delta Scuti variable. It has an apparent magnitude of 5.5. Sigma Octantis - Wikipedia

Earth's axis precesses, like that of a spinning top. Because of this precession, the present pole stars were not always the pole stars, and won't always be in the future. If you drew an arrow from the south pole through the north pole of Earth, the tip of the arrow would trace out a circle on the celestial sphere every 12 700 years. Because the equatorial plane of Earth (the plane inside the white circle at bottom right) also precesses accordingly, the two equinoxes in Earth's orbit also move (clockwise as you look from above Earth's north pole) around Earth's ecliptic (the red circle around the pink disk at bottom right). They complete a whole circle every 12 700 years. For this reason, the precession of Earth's axis is often referred to as the "precession of the equinoxes".





Apart from the precession, there is also a small nutation (or nodding) of Earth's axis. See the Pretoria Centre newsletter for August 2010, page 10. **Ω**

Observing: NGC 6559, a lovely combination - by Magda Streicher

Nebulae are and remain interesting objects and a pleasure to behold. NGC 6559 is yet another beautiful nebula in the Sagittarius constellation. In the rich part of our Milky Way, the nebula NGC 6559 is situated only one degree east of Messier 8, the famous Lagoon nebula.

The area around NGC 6559 is probably one of the most intense areas of interstellar dust and gas providing a very good example of emission nebulosity containing a lot of visible detail. Only in a very dark sky with a large telescope could one glimpse some of the nebulosity involved in this area. But fortunately, observed through the lens of a good CCD camera, it strikes one as an area of great splendour. The rich, oblong north-south part displays prominently against the background silhouette. Dark, cold gas trails and patches form against the western edge of the outstanding nebula, which combines well with a double star slightly further west, which, together with neighbouring stars, form the open star cluster IC 4685 which is enveloped in a diffuse nebula.

The most outstanding interwoven dark, curled trails in the eastern star field appear well rounded off against the hazy background with a few bright stars visible. The reasonably large part is known as IC 1274.

The surprise is the small patch situated just south of NGC 6559, listed as the planetary nebula Pk 6-2.1.But it was found not to be one. It is now known as a galactic nebula.

The excellent mix and merging of nebulous gases is a scene of magnificence to observe and revel in.

The image of NGC 6559 above was made by the Danish 1.54 metre telescope located at ESO's La Silla Observatory in Chile. **Ω**

(Magda Streicher's e-mail address: magdalena@mweb.co.za)

OBJECT	TYPE	RA	DEC	MAG	SIZE
NGC 6559	Nebular complex	18 h 10.0 m	- 24º 06'	8	5'
IC 1274	Diffuse Nebula	18 h 09.5 m	- 23º 44'	-	20'
IC 4685	Open Cluster	18 h 09.3 m	- 23º 59'	-	15'
Pk 6-2.1	Galactic Nebula	18 h 09.5 m	- 24º 00'		20"

Observing evening report August 18th 2023 – by Michael Poll and Johan Smit

What a jolly evening! Michael and Johan entertained 19 very enthusiastic and appreciative guests. The sky could have been better – very hazy high cloud (which did clear a little later on) and the attendant light pollution meant that with the naked eye we could only see 1st magnitude stars (and one planet). However, for the night and for future reference, Mark Yon kindly showed Johan where and how to switch off the cricket field floodlights, which helped a lot.

The bright stars were Arcturus, Vega, Altair, Alpha and Beta Centauri, the Southern Cross (well most of it) and Spica, with Antares high overhead. Fomalhaut came up in the south east later. Saturn was the planet on view - Mars and Mercury were competing with the cloud and the trees. We did a have a sliver of a 2½ day old Moon early on, but it was soon lost in the haze. Saturn was high enough in the south east for good viewing later, and the sight of the planet was very much appreciated. The rings are closing up now and are looking quite narrow. (They will be edge on in March 2025)

Michael discussed and explained the Skymap to various people for most of the evening – but also showed Saturn and Alpha Centauri, and later on some double stars in Lyra. The Lyra stars were Epsilon Lyrae, the “double-double”; Zeta Lyrae, the components are magnitudes 4.4 and 5.7; Delta Lyrae – Delta B is magnitude 4.2, and is red, Delta A at magnitude 5.6, is blue-white; and Beta Lyrae which is easily resolved. The companion is magnitude 7.0

I (Johan Smit) also concentrated on the bright targets starting with the Moon, and while waiting for Saturn to rise I took the visitors on a tour of some of my favourites that were available (and visible). I started with the Jewel Box, which looked good, despite being washed out by the sky conditions. And some visitors actually asked to see it.

While in the area we looked at Mimosa, trying to see Ruby Crucis nearby. And that was only just visible, but did amaze the visitors with its deep red colour. While discussing star colours I did jump between Arcturus and Vega to show some more examples of coloured stars.

While looking north we found Albireo aka Beta Cygni, which as always put up a good show with the different colours of the component stars. Then we looked at M6 (Butterfly) and M7 (Ptolemy’s cluster). Because it was just about at the zenith, both did look quite good considering the sky conditions. Using the finder at that angle did not do my neck any good and I did have stiff, sore neck muscles the next day or two. But the views and appreciation of the visitors made the discomfort worthwhile.

While looking at these fainter targets I demonstrated my method of averted vision to the visitors and using that, all of them saw more than what they saw normally.
The method is as follows:

- When looking with your right eye, place the target at the centre of the eyepiece, and look up and towards the right of the target with your eye, about half an eyepiece field away.
- Concentrate to not look at the centre of the field, while still seeing the centre (target) away from the centre of your eye’s field of view.

Doing it like this ensures that one does not accidentally place the target on one’s retinal blind spot. It also places the target on the highest density area of rods (low light sensitive receptors) on your retina. When you use your left eye, look up and to the left of the target, also about half an eyepiece away. The rest is the same as for the right eye.

Everyone did report an improved viewing experience when they employed this averted vision technique. (Continued on next page.)

(Continued from previous page.)
While we were trying to improve the viewing experience we also tried opening the unused eye and everyone reported an improved ability to focus on the target. Having both eyes open does make focusing the eye at the eyepiece much more relaxed. And one quickly learns to ignore the information from the unused eye. To assist with that I sometimes cup my hand over the unused eye while it is open. Both methods take some practice, but everyone was able to improve the vision in the eyepiece very quickly.

While demonstrating these techniques we also tried Omega Centauri. While it was not a good target in the conditions, most people were able to distinguish it from the background sky glow using the just learnt techniques.

At the start of the evening I asked the visitors to look for a brighter “star” (Saturn) rising in the east and tell me when they see it. I am glad to report that one of the visitors, Karen Meyer and her daughters, was the first to see it.

And then we looked at Saturn. As always it did put up a splendid display and was much appreciated. As it rose higher in the sky we kept going back to it and tried higher magnifications. Saturn did not disappoint, and we closed off the evening at about 120X magnification which was about the highest we could go in the conditions on that night. I did notice the Cassini division every now and then in moments of good seeing, mainly because I know what to look for. I am nearly sure some visitors did too, as I heard them mention seeing a “gap”.

In between looking at selected targets I demonstrated the use of my planisphere, showing the movement of the sky as the hours tick by. And obviously described the working principles of my tracking table to anyone that asked how it “tracked” the sky. I must say that the tracking table is my most useful invention to add value to the use of my Dobsonian telescopes, and its operation never ceases to amaze people.

My next invention will be to make using the finder at uncomfortable telescope angles more comfortable. I previously thought about it, but the neck pain afterwards made me think about this problem harder. Soon I might have a bright moment and solve this problem too. **Ω**

Astronomy related images, video clips and documentaries on the Internet

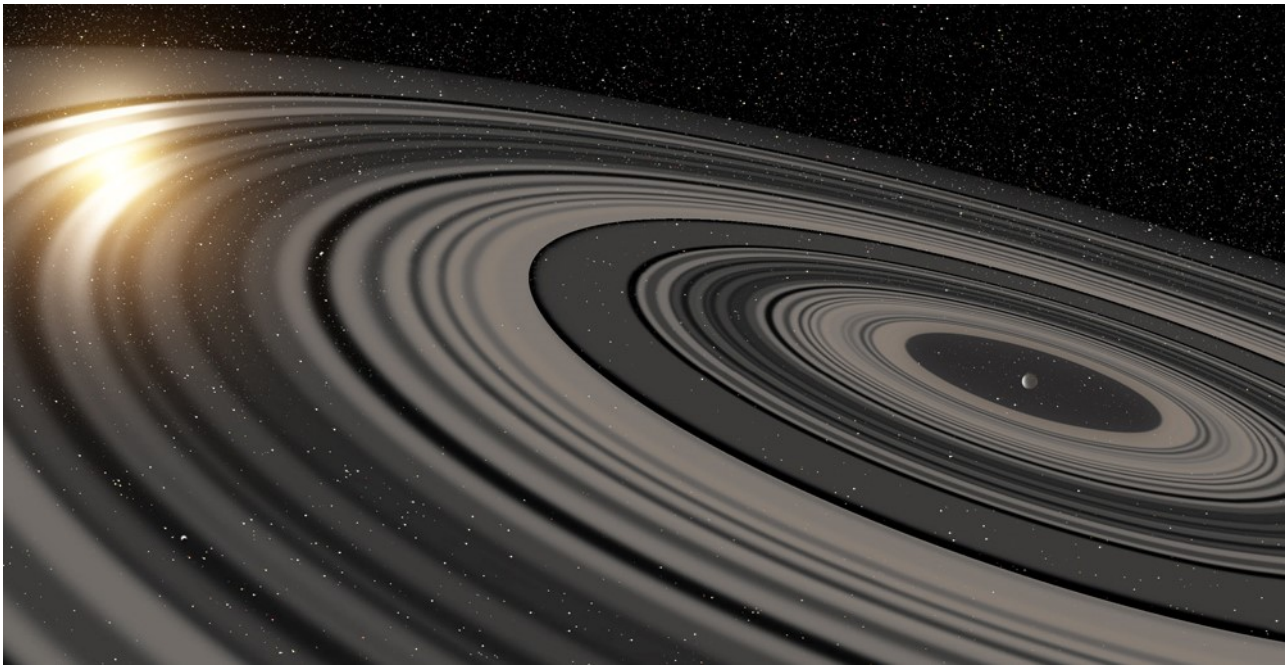
Zoom into the centre of our galaxy. If you lived on a planet around a star in the centre of the Milky Way, you would look up at a sky thick with stars, up to 1 million times more densely packed than we’re used to seeing from Earth.
What Is the Center of Our Galaxy Like? (webbtelescope.org)

Supermoon photographs. 2023's Brightest Supermoon – YouTube

The zodiacal light. See a video clip. Zodiacal Light False Dawn in Autumn – YouTube

Night sky in Tunisia. An astrophotographer journeyed to the desert of Tunisia to capture the night sky as seen from a movie set for Star Wars. Enjoy his incredible images here. Night sky of Star Wars’ Tatooine, in Tunisia (earthsky.org)

Immediately below is an artist's depiction of the ring system around exoplanet J1407b. The parent star of the planet is seen on the upper left through the rings. This planet is much larger than Saturn and even Jupiter, and its ring system is roughly 200 times * as large as Saturn's rings. The ring system is the first of its kind to be found outside our solar system.
* Some sources give a larger figure.



Below is an artist's depiction of how the ring system of exoplanet J1407b would look like in Earth's daytime sky, if it were in the position of Saturn. It would appear many times larger than the crescent moon at the upper left.

Web links for the astronomy enthusiast

- **The website for all information about the ASSA and the ASSA Centres:**
  https://assa.saao.ac.za/
- **ASSA Specialist Sections:**
  ASSA has various areas of interest. Join and participate!
  https://assa.saao.ac.za/sections/
- **ASSA Publications to download and enjoy:**
  MNASSA: https://www.mnassa.org.za/
  Nightfall: http://assa.saao.ac.za/sections/deep-sky/nightfall/
  To receive as part of ASSA membership benefits - *Sky Guide Southern Africa,* the astronomical handbook for Southern Africa:
  http://assa.saao.ac.za/about/publications/sky-guide/
- **Mail Groups to join:**
  For general ASSA related information: https://groups.io/g/ASSA-announce
  For posting general items and discussion: https://groups.io/g/ASSA-discussion
- **Social Media to join and share:**
  Facebook: https://www.facebook.com/Astrosocsa/?_rdc=1&_rdr
  Youtube: https://www.youtube.com/channel/UCJ4b1fhmPvYTOsy15YP-_JA
  Twitter: https://twitter.com/AstroSocSA
- **Planetaria:**
  WITS Planetarium (Johannesburg): Welcome to Wits Planetarium
  Naval Hill Planetarium (Bloemfontein): Planetarium Home (ufs.ac.za)
  Iziko Planetarium (Cape Town): Planetarium and Digital Dome - Iziko Museums
  Sutherland Planetarium (Sutherland): Sutherland Planetarium
- **More web links can be found on page 118 of "2023 SKY GUIDE Southern Africa". Ω**

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