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

NEWSLETTER FEBRUARY 2023

NEXT MEETING

Venue: Christian Brothers College (CBC), Mount Edmund, Pretoria Road, Silverton, Pretoria.

Date and time: Wednesday 22 February at 19h15.

Programme:

- **Main talk: "Encounters with Patrick Moore, and his TV programme 'The Sky at Night'" - by Michael Poll *.**
- Socializing over tea/coffee and biscuits.

The chairperson at the meeting will be Danie Barnardo.
***** See page 9 for a summary of this talk,

NEXT OBSERVING EVENING

Friday 17 February from sunset onwards at the Pretoria Centre Observatory, which is also situated at CBC. Turn left immediately after entering the main gate and follow the road.

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Astronomy related articles on the Internet

Mystery of Light-Years-Long Strands at Milky Way's Center - The Daily Galaxy
Travelling near the speed of light**:** an unprecedented new image of the Milky Way Galaxy's turbulent centre has revealed nearly 1000 mysterious magnetic filaments stretching up to 150 light years long.

EarthSky | A black hole jet aimed at Earth
Astronomers have detected the most powerful jet of material ever seen coming from a black hole, 8.5 billion light-years away. And it's pointed right toward Earth.

China unveils plans for the largest optical telescope in Asia | Space
The project aims to create an initial telescope with an aperture of 6 m by 2024; the mirror will be expanded to 8 m by 2030.

Gargantuan Flare -From Proxima Centauri Sun's Nearest Neighbor - The Daily Galaxy
Read text and see a 21-minute documentary.

EarthSky | How to find life on Enceladus? Look in the plumes

EarthSky | Ultracool dwarf binary stars break records
Cool red dwarfs are the most common sort of star in our galaxy. Astronomers have discovered the tightest ultra cool dwarf binary system ever observed. They are so close together that they take less than an Earth day to complete one orbit around one another.

EarthSky | When a black hole swallows a star

EarthSky | Meet the Crab Nebula, remnant of an exploding star

EarthSky | Ghostly light in galaxy clusters revealed by Webb
The JWST has revealed "intracluster light," the light of stars wandering in intergalactic space, ripped from galaxy clusters by enormous tidal forces.

EarthSky | Milky Way's farthest stars reach halfway to Andromeda
In the Milky Way, the thin disk and central bulge are surrounded by the inner halo, which is surrounded by the outer halo. The latter reaches about halfway to the Andromeda galaxy.

EarthSky | What is a variable star?
According to the AAVSO, astronomers have identified more than 1 million variable stars, of all types. It's not uncommon for amateur astronomers to make interesting and useful scientific discoveries about them.

Europa Clipper | NASA
NASA's Europa Clipper mission will investigate whether Jupiter's moon Europa could harbour conditions suitable for life. Launch will be in October 2024 and arrival at Jupiter in April 2030. It will perform 45 flybys of Europa with closest approach altitudes varying from 2700 km to just 25 km.

NASA, DARPA Will Test Nuclear Engine for Future Mars Missions | NASA
NASA is finally developing the right kind of propulsion system for crewed missions to Mars: a nuclear propulsion system. Once and for all, it will solve the twin problems of having to start off with a huge amount of fuel and the manufacturing of fuel on Mars.

Why Jupiter doesn't have rings like Saturn | News (ucr.edu)

EarthSky | Moon caves and pits are a comfy 63 degrees

Astronomy basics: Basics of Astrophysics series: all the 30 articles

Basics Of Astrophysics Series: All The 30 Articles | The Secrets Of The Universe (secretsofuniverse.in)

Astronomy related images, video clips and documentaries on the Internet

'A Universe From Nothing' by Lawrence Krauss, AAI 2009 – YouTube
This documentary is 1 hour and 5 minutes long.

The Whole History of the Earth and Life【Finished Edition】- YouTube
This documentary is 1 hour and 5 minutes long.

Alien Disequilibrium: The Unmistakable Signal of Biological Life - The Daily Galaxy
Life outside Earth is a hot topic nowadays. Read some text and see two documentaries.

How 'Alien' Should Aliens Look? - Bing video
Give your imagination free rein.

Virtual tour kitt peak observatory - Search (bing.com)

EarthSky | See Mars' Grand Canyon in stunning new photos

Report for the Observing Evening on January 20th 2023 - by Michael Poll and Johan Smit

We were seven people**:** Johan, Chris and Michael and 4 visitors**:** Charles, Michelle, Dané and Anna- Marie. The ladies had travelled from Mpumalanga.

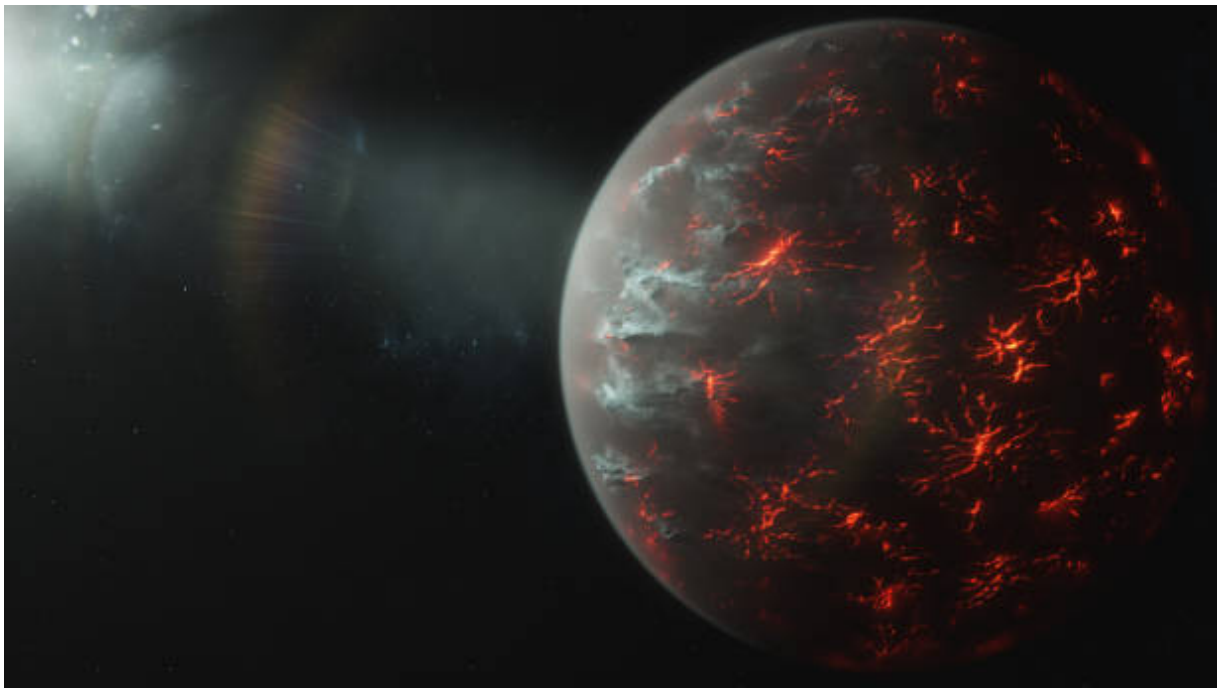
There was intermittent cloud, but clear spaces for long periods – but Oh! the light pollution is much worse than when we were there last time – for example the Pleiades and Gamma Arietis (magnitude 3.9) were hardly visible, and there was not even a Moon. Jupiter and Mars were well up, but the close approach of Venus and Saturn was lost in clouds and trees. At some stage we spotted all the bright stars on the Skymaps list for January that are "easily visible with the naked eye" and discussed colours (for example Rigel vs Betelgeuse) and brightness (intrinsic vs apparent – for example Sirius vs Canopus and Rigel vs Betelgeuse).

We managed to tease some deep sky objects out of the sky glow including IC 2602, M41, NGC 2547, NGC 2516, and looked at the double stars Gamma Arietis and Castor. Gamma has two equal white components - Michael calls them the "Owl's Eyes". Gamma Arietis was discovered as double by Robert Hooke in 1664. It is said that there is no portrait of Robert Hooke because he was disliked by Isaac Newton for claiming priority about gravitation, so Newton burned the only portrait that there was.

Michelle said she had a telescope with a mounting much like Michael's, so the visitors were most interested in Johan's homemade 6" telescope combined with the tracking table which attracted a lot of attention. This led to an explanation of how it works and we trust that there is now a good understanding of the RA-DEC coordinates and what is required to follow the movement of the sky.

The light pollution was made worse by a very bright floodlight on the kiosk. The light illuminated the field, but Johan notes that on a positive note, when load shedding kicked in at 20:00 the conditions improved quite a bit. For once he was glad that the power went off. Johan notes that he was not convinced that poor seeing was not completely the result of the light pollution, because it had been hot for a few days (and still was), and the sky was not as stable or transparent as it could be. He suggests that we could do experiments at our next observing evenings, by working out what to use to measure the sky conditions, and try and relate that to other factors, such as weather and lighting. **Ω**

Immediately below: An artist's concept of a young Earth-size exoplanet.



Below: An artist's depiction of a scene on an Earth-like exoplanet in the habitable zone of its star. The liquid water, the appearance of the rocks and the two moons are all imaginary.

What's up in March 2023 – by Bosman Olivier

Usual suspects:

Moon: Full Moon -> 7 March, Last Quarter -> 15 March, New Moon ->21 March, First Quarter -> 29 March.
Full Moon in March in USA is called the Worm Moon because earth worms start popping out of the ground at the soils starts to thaw in Spring. This name was given by Southern Native tribes in America – the Northern tribes did not experience earth worms popping out of the ground because there were no earth worms in the northern part of the continent. Indigenous earth worms were wiped out during the previous ice age. All earth worms in northern America are invasive species, brought in by the colonists to fertilize the soil, or with plants or as part of the soil ballast used in ships. (https://www.moongiant.com/moonphases/march/2023)
The Northern Native tribes called the march full moon the Sap Moon because it was associated with the tapping of Maple syrup from the Maple trees.
In South Africa the full moon in March is called the Harvest Moon, for obvious reasons. This name was given by the Centre for Astronomical Heritage in Cape Town. (https://www.cfah.org.za/fullmoon/).

Planets: A bright **Venus** will pass within 0.5 degrees from **Jupiter** at dusk on 1 March. Jupiter will still be visible at dusk until 29 March.
Mars transits at 83 degrees high, going from Taurus to Gemini. It still has a diameter of 11 arc seconds and a study of its surface features in a telescope can be done. By the end of March its diameter will be only six arc seconds and its magnitude decrease from 0 to 1.
Uranus transits at 70 degrees altitude in Aries and sets earlier and earlier in the month. (http://tucsonastronomy.org/planets-of-the-month-february-march-2023/)

Autumn Equinox in South Africa falls on 20 March, one day before New Moon. The sun then moves north over the celestial equator, thus marking the start of autumn in the Southern Hemisphere.

Constellations: The **Pegasus** Constellation with its trademark great square is visible in the north, together with **Andromeda,** home to the **Andromeda Galaxy,** the Milky Way's closest neighbour.
Looking East from Pretoria/Centurion at about midnight, one will locate the **Southern Cross**, while lower down on the horizon **Antares**, the "eye of the **Scorpion**" is rising in its eternal pursuit of **Orion** which is setting in the West.
Toward the north **Regulus** in **Leo** is visible on top of a curve of stars known as the "Sickle of Leo". Above the north-eastern horizon a bright star **Arcturus** is rising in **Bootes** aka "the Herdsman". Higher up in the eastern sky one will find the bright star **Spica** in the constellation **Virgo.**
Looking south, the Southern Cross (Crux) is prominent and high. To its right is the False Cross asterism. The stars of the real cross are closer together and two bright stars, the Pointers point toward Crux. By extending the line formed by the long axis of Crux toward the bright star Achenar, one will locate the Small Magellanic Cloud (SMC). About halfway along this line is the Southern Celestial Pole (SCP). High in the south-west is the star **Canopus.** Look roughly along the line from Canopus to the SCP to find the **Large Magellanic Cloud (LMC).** A line from Canopus through the LMC and extended will bring one to the SMC. The globular cluster **TUC 47** is situated near the SMC.
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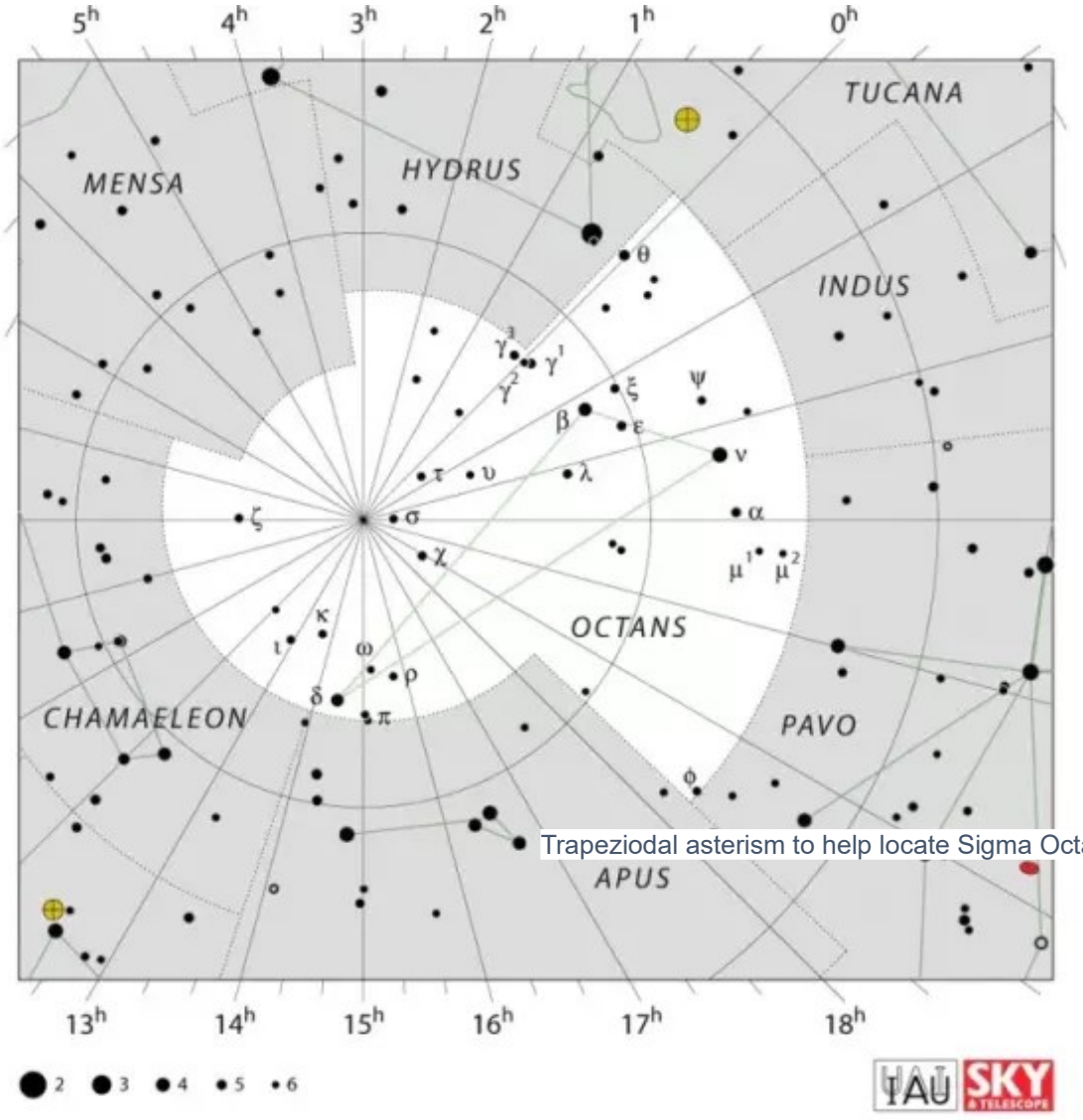
Octans

Unlike the Northern Hemisphere, the Southern Hemisphere's pole star is not easily visible with the naked eye. At a magnitude of only 5.42, ***Sigma Octantis*** aka **Polaris Australis** is about one degree from the SCP. This star is 25 times fainter than the North Star, which is the reason the Southern Cross is more often used for navigation. As its name indicates, ***Sigma Octantis*** is in the constellation **Octans**, the constellation which is furthest south. Octans is neighboured by constellations such as **Apus, Chamaeleon, Hydrus, Indus, Mensa, Pavo and Tucana**. (Notice how many constellations are named after animals!)

Octans belongs to the Lacaille family of constellations along with **Antila, Caelum, Fronax, Horologium, Mensa, Microscopium, Norma, Pictor, Reticulum, Sculptor and Telescopium.**

Apart from its position in the sky, Octans does not have much going for it. It does not contain any Messier objects, but it does have two stars with known planets. Its brightest star is Nu Octantis, with an apparent magnitude of 3.76. The only named star in Octans is Polaris Australis.



Trapeziodal asterism to help locate Sigma Octantis

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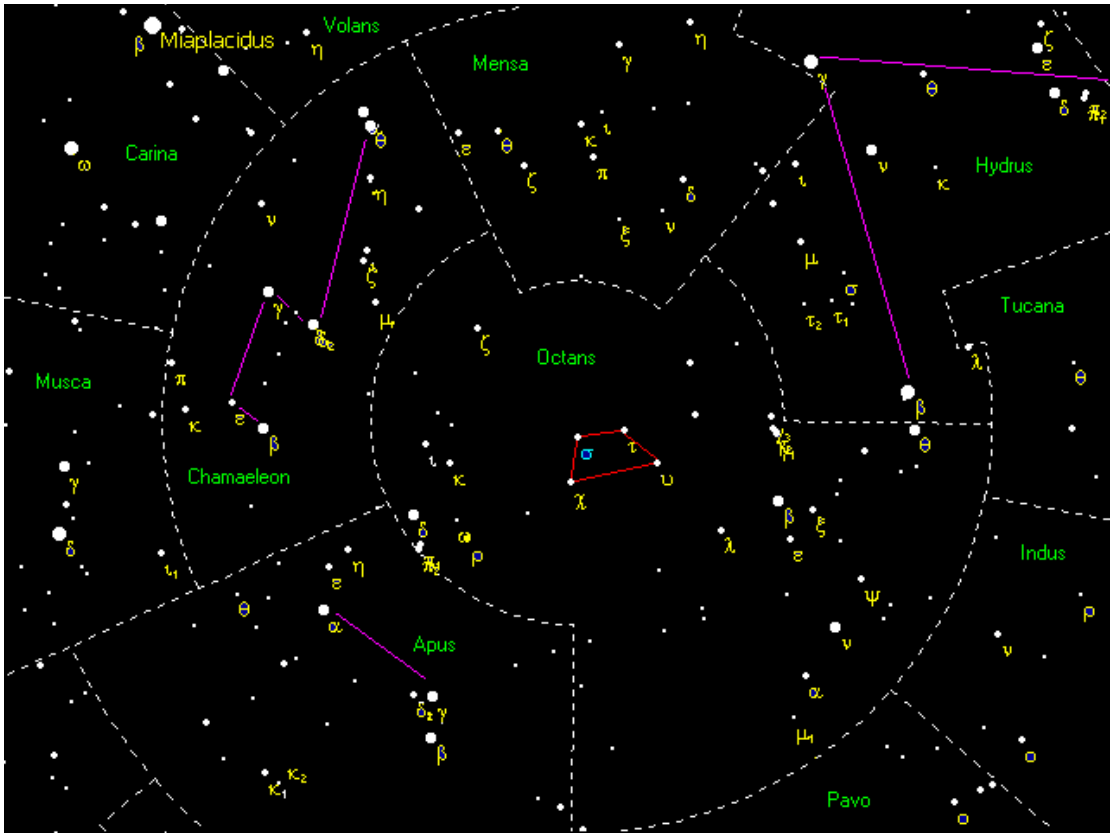

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Mensa

This constellation was created by Nicolas Louis de Lacaille in 1756 while he was working the Cape Town. He created a whole family of 13 constellations, two of which are **Octans** (the Octant) and **Mensa** (the Table).

Nicolas Louis Lacaille

Mensa is the furthest South of all 88 constellation, bar Octans. It was first named **Mons Mensae** meaning Table Mountain after the Mountain from which Lacaille made his observations of the constellations of the southern skies.

None of the stars in Mensa have a magnitude of more than 5 and it does not have any notable deep sky objects, apart from a section of the Large Magellenic Cloud. It is bordered by the constellations **Chameleon, Dorado, Hydrus, Octans,** and **Volans.**

The constellation contains two stars with known planets and no Messier objects. Its brightest star is **alpha Mensae** with an apparent magnitude of 5.09.

The only formally named star in Mensa is Bubup (HD 38283).

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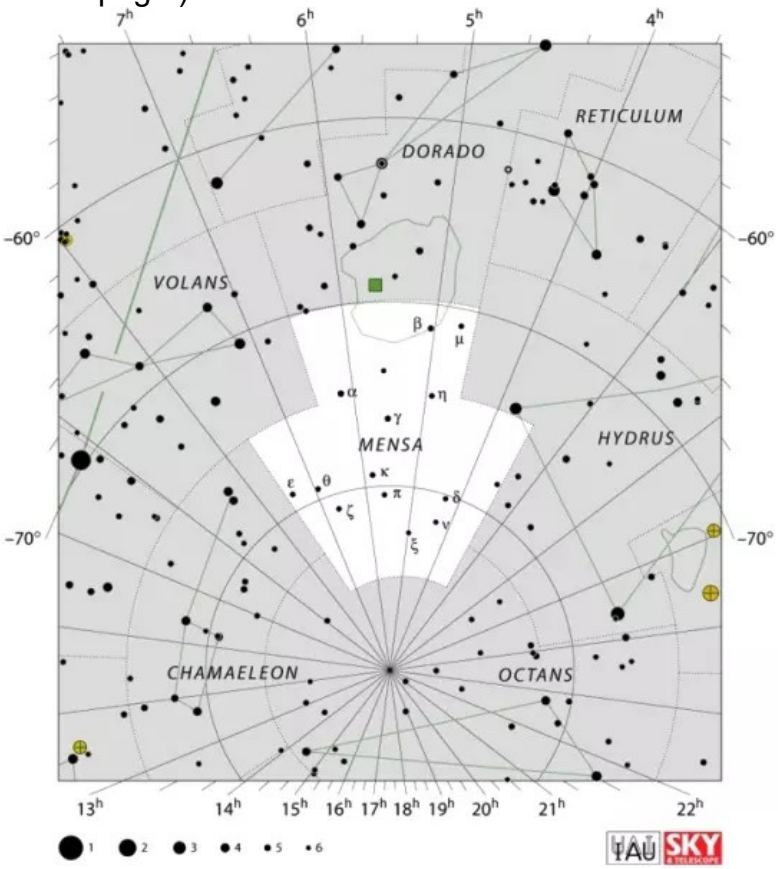

There are no myths attached to Mensa. Lacaille created it from dim stars to commemorate Table Mountain from where he observed and catalogued southern stars in 1751 and 1752. Mensa contains part of the LMC which makes it appear as if it were capped by a white cloud, like the clouds cap Table Mountain.

Alpha Mensae has an apparent magnitude of 5.09 and is 33.1 light years from Earth. It is the dimmest of all lucidae (constellations' brightest stars).

It is a yellow main sequence dwarf with the stellar classification of G5 V. It has approximately the same mass and radius as our Sun and has 83 percent of the Sun's luminosity. Alpha Mensae has a red dwarf companion at a separation of 3.05 arcseconds.

Alpha Mensae

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Pi Mensae

Pi Mensae is a Yellow subgiant in the stellar class G1IV, with a visual magnitude of 5.67 and it is 59.7 light years from Earth. This star has 1.1 times the Sun's mass, 2.1 times its radius and is 4.73 times more luminous.

An extrasolar planet was discovered in 2001. It is massive, with a mass of at least 10.27 times that of Jupiter, making it one of the most massive known. The planet orbits the star every 2 151 days (5,89 years). Its eccentric orbit passes through the habitable zone of the star. One can assume that if there were Earth-like planets this planet would have disrupted their orbits and maybe thrown them into the star or out of the system.

Challenge

Let's challenge ourselves to see if we, using binoculars or small telescopes can find and draw either Octans or Mensa whenever the clouds dissipate. Both should be findable and depending of the time of night one should be able to make a drawing of the constellation in the orientation at the time of the drawing. Remember, they do not rise or set, they are circumpolar.

Send us your drawings to bosman.olivier@gmail.com.

Source: https://www.constellation-guide.com/ **Ω**

ASSA Pretoria Centre Meeting : February 22nd 2023
Summary of Main Topic to be presented - by Michael Poll

"Encounters with Patrick Moore, and his TV programme "The Sky at Night".

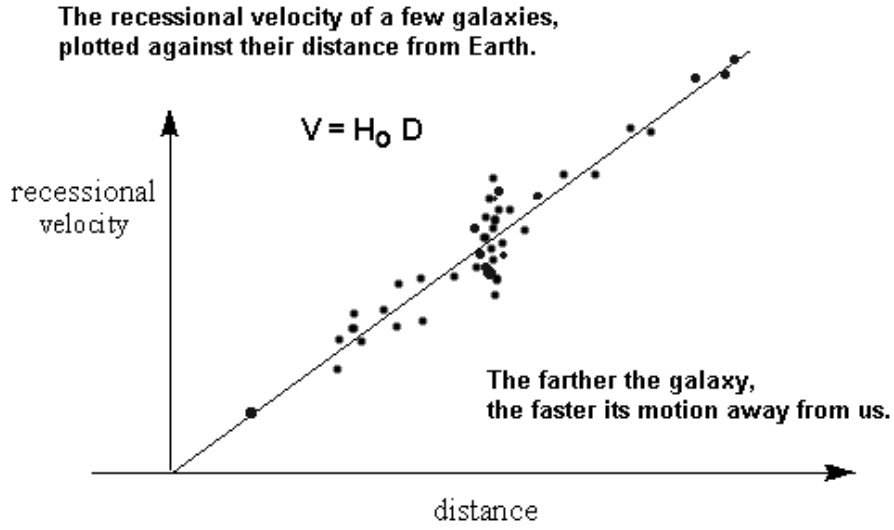
This talk is **Subtitled** *A personal journey from South Devon to South Africa via Zimbabwe: From seeing Patrick Moore in Devon to shaking his hand on the steps of UNISA and taking in on the way seeing Jack Bennett's comet in England and finding myself in South Africa living three kilometres away from him..*

I have seen Patrick Moore and heard and attended his talks several times over the last X number of years, the first time was around 1960. I also watched some early transmissions of his TV programme "The Sky at Night". This talk is a sort of travelogue with pictures from my archives (!) about people and places with astronomy connections seen on the way and includes a mention of some of the "Sky at Night" programmes that I saw live.

The presentation will include a video clip of Patrick Moore interviewing Jack Bennett at Bennett's home and will feature the 50th Episode of "The Sky at Night", presented by Patrick Moore and broadcast by the BBC in the UK in September 1961. In the 1961 episode Moore attempted to be the first to broadcast a live, direct, telescopic view of a planet – both Jupiter and Saturn were in the sky at the time. The programme was broadcast live and, as will be seen, astronomy in the 1960s and our observing evenings do have things in common! The introduction to the video will include a retro look at some space-related and other events of 1961. **Ω**

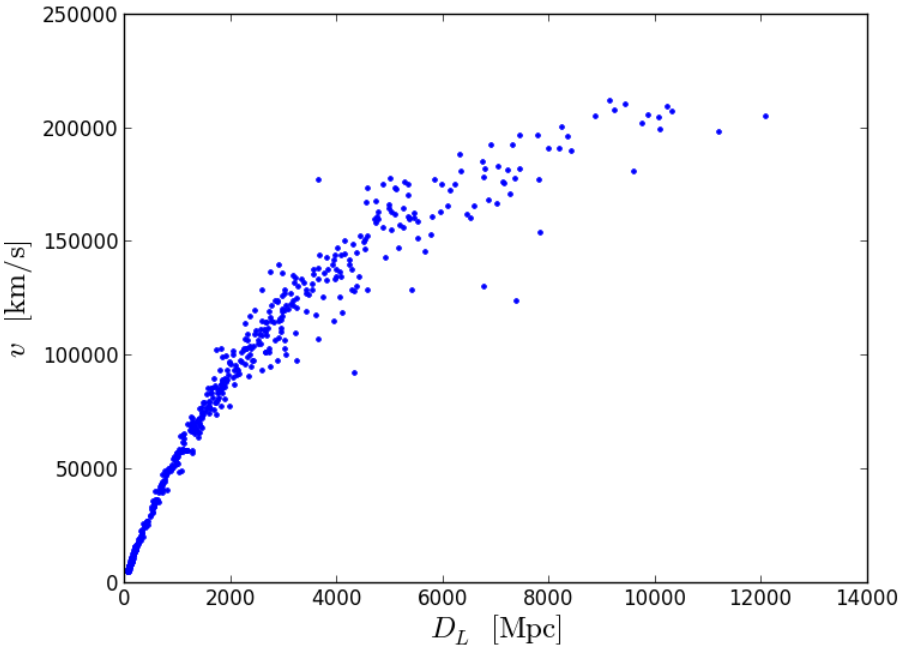
Feature of the month: Expansion of the Universe – by Pierre Lourens

Hubble's law is the observation that galaxies are moving away from us with a speed that is proportional to their distance from us. In other words, further galaxies recede faster than closer galaxies. Astronomer Edwin Hubble published this in a famous research article in 1929. This relation is shown in the following graph. **H_0** is known as the Hubble constant.



On this graph, the slope of the line is equal to Hubble's Constant (H_0)

In more recent times, astronomers have extended this graph to much greater distances. They expected that, much further out, the graph would curve upwards. A major discovery was that **much further out, the graph curves downwards.** See the scatter diagram below. (Continued on next page.)



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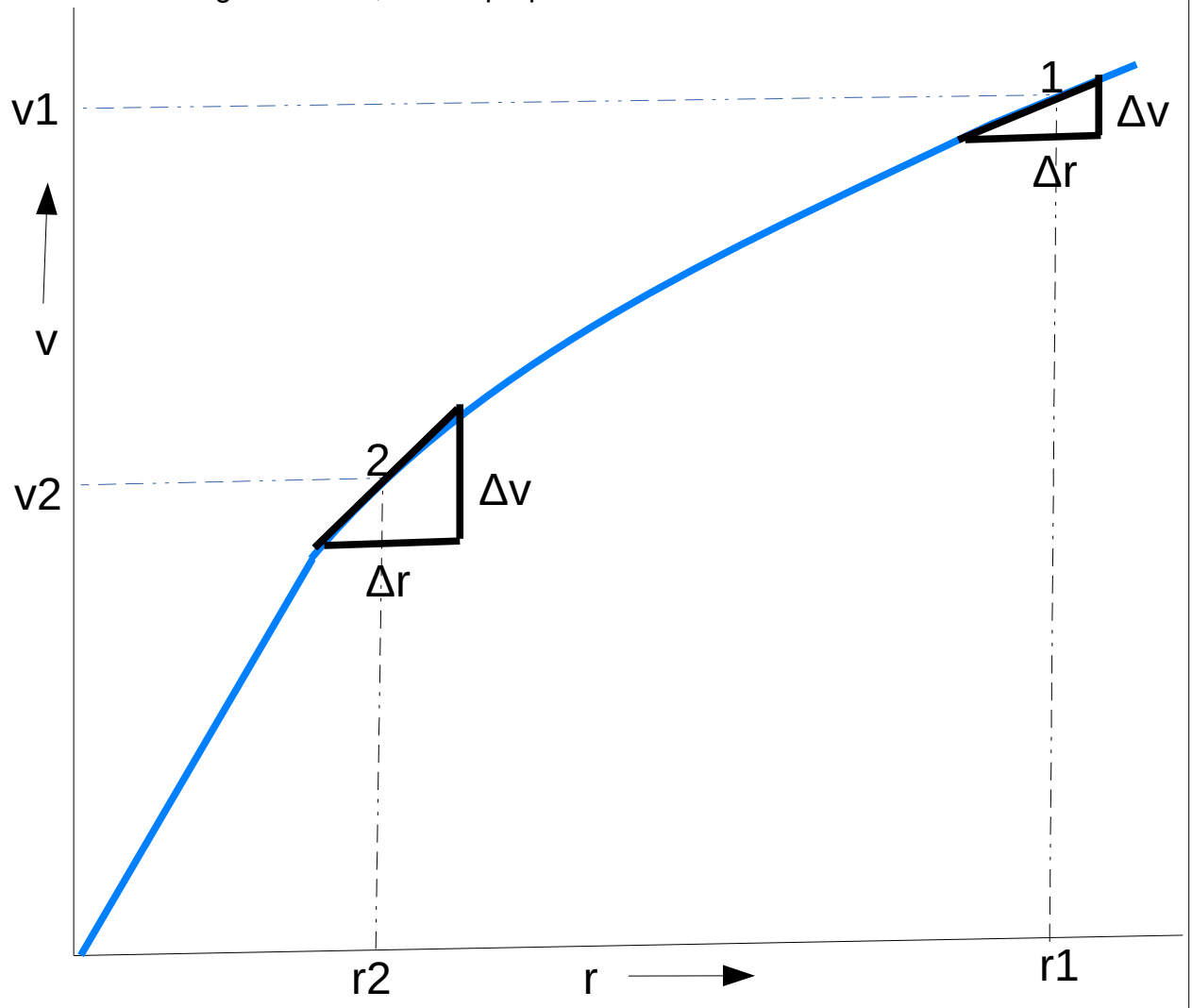
Two research groups found this result independent of one another. It is loosely called “the accelerating expansion of the Universe”. Let us first see what is meant by this. Remember that the further out in the Universe you observe something, the further back in time you observe it. Look at the following graph, just hand drawn through the points on the diagram above, for the purpose of illustration..



It means that the slope of the graph (i.e. Δv / Δr) * at the later time t2 is greater than the slope at earlier time t1, i.e. that the speed of expansion increases more for every megaparsec of outward movement at later time t2 than at earlier time t1. And - what is hard to grasp – it is space itself that expands.

What is also loosely called “rate of expansion” is not the speed of expansion, but **Δv / Δr.**

Here are some numerical values:

New measurements from the Hubble Space Telescope and the Gaia Space Telescope together showed that the “rate of expansion” nearby in the Universe (at point 2 on the graph) is (73.5 km/s) / megaparsec. This means that for every megaparsec (= 3.3 million light-years) a galaxy moves farther away from Earth, it appears to move 73.5 km/s faster.

* The symbol **Δ** indicates a change in what follows it. (Continued on next page.)

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But further out and at an earlier time in the Universe (at point 1 on the graph), according to measurements from the Planck Telescope, the "rate of expansion" is somewhat less, namely (67 km/s) / megaparsec. This means that for every megaparsec (= 3.3 million light-years) a galaxy moves farther away from Earth, it appears to move 67 km/s faster.

If the graph had curved upwards, the slope of the graph (i.e. **Δv / Δr**) at the later time t2 would have been **less than** the slope at earlier time t1. This would have meant that the "rate of expansion" at the later time t2 would have been **less than** that at earlier time t1. This is what cosmologists expected, because they thought that the force of gravity would slow down the expanding Universe.

Why was "the accelerating expansion of the Universe" such a major discovery? Because it meant that some (utterly unknown) factor is causing the Universe to increase its speed of expansion per unit distance of expansion. Cosmologists don't have the faintest idea what that factor is. By want of a better name, they call it **"Dark Energy"**. They could just as well have called it "Purple X" or "Green Y".

The greatest question in cosmology is: How did the Big Bang originate? Apart from that question, the nature of **"Dark Energy"** and how it causes "the accelerating expansion of the Universe", stands as one of two other major questions in cosmology today.

The other one is the nature of **"Dark matter"**. It is matter that makes itself known by its gravitational influence, but is invisible. **Ω**

NOTICE BOARD

Help astronomers to classify objects of which the Gaia satellite gathered data, using your PC.
Gaia Vari — Zooniverse

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.

Observing: The Sombrero galaxy - by Magda Streicher

The constellation Virgo was known as the Virgin Mary, mother of the child Jesus. Nevertheless, whichever name or myth you prefer, she holds in her lap a very rich harvest of galaxies that will keep you busy for quite some time. The Sombrero galaxy, NGC 4594 (Messier 104), was discovered in May 1781 by the Frenchman Pierre Méchain. M104 is possibly one of the brightest, biggest and versatile galaxies in the Virgo-Coma Supercluster of Galaxies and is situated virtually on the boundary between constellations Virgo and Corvus. This bright east-west edge-on galaxy with a slight tilt of six degrees towards our line of sight displays a prominent dark dust lane running through the major axis with an outstanding bulge and pointed ends, it can easily be picked up with a medium size telescope. It is approximately 65 million light-years away and 135 000 light-years in diameter. **Ω**

(Magda has now become settled in the townhouse in Pietersburg she had moved to from her house in the same town. Her 16 inch Meade telescope, which had always stood in a little observatory at her house, is now standing in a bigger observatory she built on her farm, situated 20 km west of the town. She enjoys a dark night sky there. Magda Streicher's e-mail address: magdalena@mweb.co.za)

OBJECT	TYPE	RA	DEC	MAG	SIZE
NGC 4594 Messier 104	Galaxy	12 h 39.8 m	-11° 37.4'	9.2	7.1' x 4.4'

The Sombrero galaxy. Image made by the HST.

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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