The PRETORIA CENTRE

of the

Astronomical Society of Southern Africa

www.pretoria-astronomy.co.za

NEWSLETTER JANUARY 2021

NEXT MEETING

Internet meeting. *

Date and time: Wednesday 27 January 2021 at 19h00.

Programme:

- "Haloes" by Michael Poll. See a summary on p. 6 of this newsletter.
- "Remote control of telescopes." by Bosman Olivier.

Chairman: Johan Smit.

*** You will receive an e-mail invite from Johan Smit around 18:30 to join the meeting. Please join as quickly as possible.**

NO OBSERVING EVENING THIS MONTH

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Astronomy-related articles on the Internet

Meet the hell planet with a magma ocean and rocky rain. Lava planet K2-141b is an extreme world with a magma ocean, a rock vapour atmosphere and supersonic winds. https://earthsky.org/space/k2-141b-lava-planet-with-magma-ocean-rocky-rain-supersonic-winds -super-earth?utm_source=EarthSky+News&utm_campaign=ba492b7af9-EMAIL_CAMPAIGN_2018_02_02_COPY_01&utm_medium=email&utm_term=0_c643945d79-ba492b7af9-394671529

Hubble sees the brightest kilonova yet. A kilonova has a peak brightness about 1 000 times as great as that of an ordinary classical nova.
Hubble sees the brightest kilonova yet | Space | EarthSkyHubble sees the brightest kilono

This asteroid just skimmed Earth's atmosphere. Another close shave! And it was only spotted after it had passed.....
This asteroid just skimmed Earth's atmosphere | Space | EarthSky

NSF says Arecibo telescope will be dismantled.
NSF says Arecibo telescope will be dismantled | Human World | EarthSky

China's Chang'e 5 mission is orbiting the moon! China's robotic Chang'e 5 will be the 1st sample-return from the moon mission since the 1970's. It has entered orbit around the moon. Read about the historic mission here

China's Chang'e 5 mission has landed on the moon! China's Chang'e 5 mission has landed on the moon | Space | EarthSky

China's Chang'e 5 mission brought back samples from the moon! China's Chang'e 5 capsule lands on Earth with the 1st new moon samples in 44 years (msn.com)

Astronomers reveal asteroid 2000 WO107 as a contact binary. Astronomers reveal asteroid 2000 WO107 as a contact binary | Space | EarthSky

Meet Au-Spot, the AI robot dog that's training to explore caves on Mars. Meet Au-Spot, the AI robot dog that's training to explore caves on Mars | Live Science

Venus was once more Earth-like, but climate change made it uninhabitable.
Venus was once more Earth-like, but climate change made it uninhabitable | Space | EarthSky

Feature of the month: UFOs: new developments – by Pierre Lourens

I hesitated to write about this topic, because UFOs (**U**nidentified **F**lying **O**bjects) are widely considered to be nothing but a lot of crap. Well, actually most of it **is** crap! But read on. We are not by nature very objective, and have a great ability to fabricate fantasies. The great majority of UFOs should rather be called IFOs (**I**dentified **F**lying **O**bjects). Here's a list of phenomena, either natural or man-made, that people often mistake for UFOs:

1. Rocket launches.
2. Used rocket bodies.
3. Atmospheric balloons.
4. Earth-orbiting satellites.
5. Contrails from jet aircraft.
6. Chinese lanterns. (Continued on next page.)

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7. Bright meteors.
8. “Moving stars”.
9. Planet Venus.

In this regard, see the website at
Is that a UFO?! There's probably an explanation | Human World | EarthSky

To this list can be added:

10. Lens-shaped clouds (aka orographic clouds) over mountains. These are mistaken for hovering flying saucers.
11. Hoaxes. Examples are:

a) A kite with bright lights flown at night.
b) Throwing the hub cap of a car into the air and then photographing it.
c) Building a cardboard model of a flying saucer, letting it dangle on a thin thread and then photographing it, with a nature scene in the background.

Far-fetched theories about UFOs abound. Some of these are:

- The Federal government of the USA has alien spacecraft in its possession. It is storing them in secret underground caverns where it has done reverse engineering on them in order to improve their own aircraft. It is covering this all up.
- Extraterrestrials (ETs) have been visiting Earth in their spacecraft for thousands of years. They have recorded our history and have built up a large data base about it, even in video format.
  - ETs in their spacecraft have been watching us because they are concerned that we will destroy ourselves in a global nuclear war.
- The crop circles in Britain were made by ETs, using advanced technology.

In this regard, see the website at (268) Is There Alien Life Beyond Our Comprehension? | UFO Conclusion | Spark – YouTube

However, here is a small minority of UFO sightings that are utterly baffling and remain unexplained. These are the interesting ones that merit further investigation. But are extraterrestrial spacecraft with ETs inside them visiting our planet or have they done so in the past? Carl Sagan said, “Extraordinary claims require extraordinary evidence.” Such evidence will have to be actual possession of an extraterrestrial spacecraft or the body (dead or alive) of an ET. Until then, the answer will be no. See the essay at
The Aliens are Not Among Us by Les Johnson - Baen Books

See video clips of unexplained sightings at

Shocking NASA UFO Sightings - Official Footage - Bing video

(268) US Navy confirms UFO videos are the real deal – YouTube

Ufo News | Ufo sightings videos News | Ufo sightings In Argentina - Bing video

UFO SIGHTINGS In Argentina | New Video 2020 - Bing video

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UFO SIGHTINGS In Argentina | New Video 2020 - Bing video

UFO? Chilean Navy releases video of mysterious flying object - Bing video

See more at

Light ufo caught on tape in argentina one of the - Bing video

The Pentagon has been investigating UFOs, because some of them could just possibly be advanced aircraft of a rival like Iran, North Korea or China.

Lately, there have been new developments about UFOs:

- The CIA has declassified information about UFOs. A remarkable dossier filled with what the CIA claims is every single one of its files on Unidentified Aerial Phenomena (UAPs) - the USA government's official term for what are commonly called UFOs - was published on The Black Vault website.
- There is a June 2021 deadline for US intelligence agencies to reveal to the US Congress everything they know about UFOs. This has to be done under a clause slipped into the $2.3 trillion coronavirus relief bill signed into law by former US President Donald Trump in December 2020. **Ω**

Report of Monthly Meeting held on November 25th 2020 by Michael Poll

About 20 people attended this video conferenced meeting, including Doug Sharpe from the Blackburn Leisure Astronomical Society in the UK.
Louis Kloke was the first speaker, he discussed the commissioning of a new camera, the ZWO camera, including showing the software to run the camera, the latter “not very easy”.

Initial pictures were exposed for 10-15seconds but had a greenish tinge. The processing was done with PixInsight, which Louis considered not user friendly, and was hard work.

The steps in processing images were as follows:

- *Image calibration* – dark frames to indicate the files were calibrated.
- *Cosmetic calibration*
- *De-Bayering* – some imagers do this and some not to do it. Louis did the De-Bayering. Some chips decode in black and white, some decode in colour. Some GRB colour blocks need setting - one needs to know from the manufacturer to indicate which ones.
- Star alignment - one has to indicate which is the reference image.
- Integrating the pictures - but the image obtained is green, so the automatic background extractor is applied.
- Histogram Transformation Screen
- Background Neutralization – cleans up the white areas
- Colour calibration – select a dark part of the image.

The second speaker was Johan Smit who spoke about the testing of telescope optics and the problem with the Hubble Space Telescope.
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The purpose of telescope optics is to focus all the incoming light rays to one point. Even though this statement is true, practical considerations complicate the matter somewhat.

Depending on the intended use, which includes field width (distance off center from the optical axis), a shape for the optical surfaces must be found to achieve an image that is focused within predefined tolerances over the whole field. In the case of the Hubble space telescope, hyperbolic shapes for the primary and secondary mirrors were calculated to be optimal.

These non-spherical shapes cannot be tested mechanically to the needed tolerances. Optical tests have to be used. A spherical surface can be tested easily from the radius of curvature of the surface. Such a test is called a null test and is very easy to interpret—it is either good or not, and deviations are easily seen and interpreted.

Large non-spherical surfaces are tested by using extra devices called null-correctors. These are optical devices that make the surface look like a spherical surface under testing conditions.

There are two basic null corrector systems: refractive null correctors that use lenses, and reflective null correctors that use mirrors. Such devices are made specially to predefined tolerances for a particular mirror. Reflective null correctors do not suffer from chromatic aberration due to its use of mirrors, so in theory it would appear be the "better" test.

Both types of null corrector were used in testing the Hubble mirror. The refractive null corrector was used primarily to test the vertex radius of the main mirror (the focal distance in plain English). The reflective corrector was used to test the final shape of the main mirror. Because the reflective null corrector was seen as the "best" it was the only test that was "trusted" without reservation.

Both types of tester need to be manufactured to very close tolerances. The reflective null corrector used in the manufacture of the Hubble main mirror had an error in the critical spacing between two optical surfaces. Only after Hubble was up in space was it found that the main mirror did not perform as expected. After many tests it was discovered that the main mirror had exactly the wrong shape—perfect, but wrong. During the investigation when the manufacturing process was checked, a spacing error of 1.3mm was discovered in the reflective null corrector. A mirror figured using such a tester would have exactly the (wrong) shape that was seen in Hubble.

Despite the other tests (mainly the refractive null corrector) clearly showing defects during the manufacturing stage, the results were brushed aside as being from an inferior test. The reasons for these oversights are too many to list but can be read in an official NASA report that Johan Smit found. If anyone is interested in reading it for themselves contact Johan to mail you a copy. In fact, if you are involved in project management this report will be very useful as a tool—how *not* to manage a project.

Even though Hubble sounds like a total disaster, it was still much better than ground-based observatories, even before it was eventually fixed. Many thousands of observations of hundreds of celestial targets were done, and a quarter of all papers submitted to the American Astronomical Society used results from Hubble before it was fixed.

So, even an imperfect Hubble was still good—or much better than the popular media would have you believe. **Ω**

Astronomy-related images, video clips and documentaries on the Internet

LIFE BEYOND II: The Museum of Alien Life. A 38-minute documentary. You have to give your imagination free rein when you watch this one.
https://www.youtube.com/watch?v=ThDYazipjSI&t=53s

New Discoveries from NASA's New Horizons Pluto Flyby | 4K | 5-year Update – YouTube
An 11-minute documentary.

Video shows Arecibo telescope crash | Human World | EarthSky

See the moon's shadow on Earth from the 2020 total solar eclipse in these stunning satellite views | Live Science

Jupiter and Saturn descend on world's tallest building in epic 'Great Conjunction' video | Live Science

Astronomy basics: The inner workings of the third planet from the Sun

https://documentaryheaven.com/richard-hammonds-journey-to-the-centre-of-the-planet/

On this website, there are links to four more related documentaries about the same planet:

- Volcanoes
- Atmosphere
- Ice
- Oceans

Summary of Presentation for Meeting of January 27th 2021: "Haloes" by Michael Poll

Haloes are bright, often colourful rings and arcs seen in cirrus clouds and ice fogs. They are formed by reflection and refraction of sunlight (and moonlight) through ice crystals, and they occur all over the world.

The ice crystals can be hexagonal plates or columns. The geometry of these crystals will be illustrated and the manner in which they refract light will be explained.

The formation of haloes with be discussed and explained, with details of the formation of the 22° halo, Sundogs and the 46° halo. **Ω**

Observing: A brand new cluster - by Magda Streicher

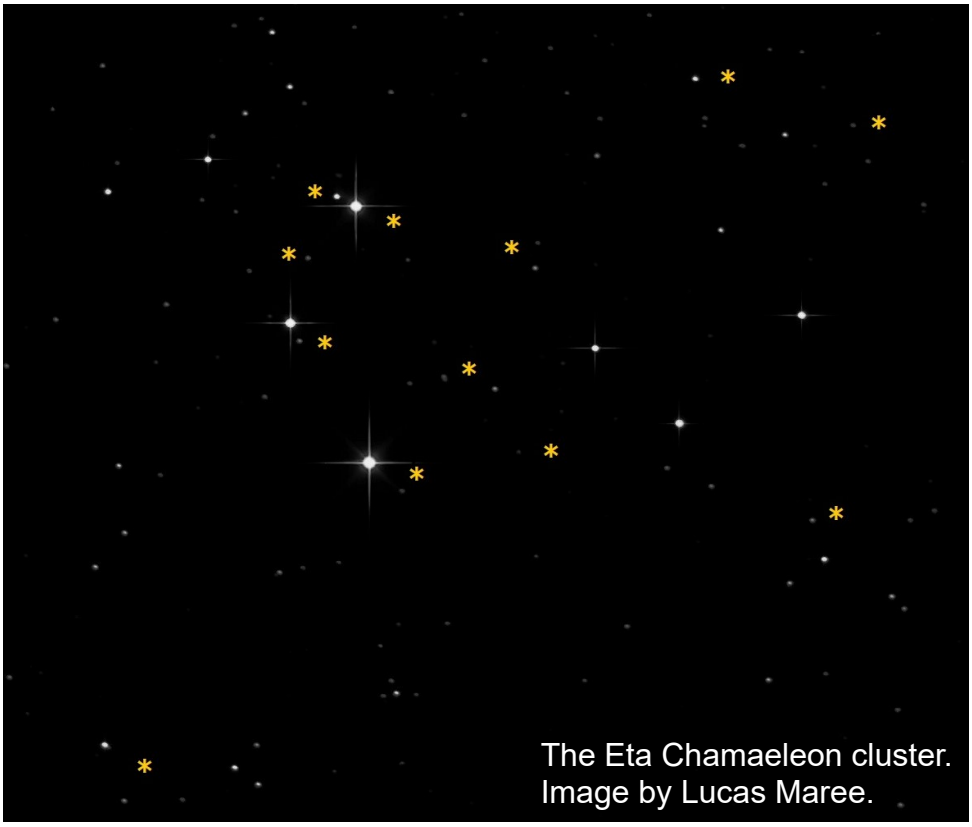
The constellation Chamaeleon is very special. Not only is its form quite distinctive, but the little land animal itself which it is named after is so special, with the chamaeleon's appearance transporting one's thoughts back into a little piece of ancient history. The constellation, published and figured by Bayer as a companion to the constellation Musca (The Fly), rightfully deserves its place among the stars.

This faint constellation contains no stars brighter than magnitude 4.9. But do not underestimate it in any way – the constellation houses several splendid deep sky objects, such as the exceptional magnitude 11 planetary nebula NGC 3195.

Eta Chamaeleontis, magnitude 4.9 in brilliance, is situated in the north-east of the constellation and slightly south-west of Musca. The stars around Eta Chamaeleontis have been identified as a brand new open cluster. The cluster contains around ten members which have the same proper motion through space. The stars marked with yellow asterisks on the image show the cluster members referred to, with Eta and RS Chamaeleontis the hottest and largest of the group. This now well-known cluster was discovered in 1999, and has proved to be situated just 329 light-years away from us. With its being the fourth closest cluster to us, as far as we know, three of its members are visible through binoculars.

What is more, there is an extremely faint galaxy PGC 24516/ESO 18-G13 within 2’ from Eta Chamaeleontis that shares this new cluster’s territory. Slowly but surely the constellation Chamaeleon has been making its mark, and is certainly a constellation not to be underestimated. **Ω**

OBJECT	TYPE	RA	DEC	MAG	SIZE
Eta Chamaeleontis	Open Cluster	08 h 41m 50s	-79° 00’ 20”	8’	5.4’



The Eta Chamaeleon cluster.
Image by Lucas Maree.

NOTICE BOARD

- **Astronomy on your PC.** Help to classify stellar explosions so that astronomers can better understand how elements are created in the Universe.
  https://www.zooniverse.org/projects/adamamiller/zwicky-chemical-factory
- **Astronomy on your PC.** Help to classify and study the population of faint objects (or Fluffy Faints) in the Fornax cluster.
  https://www.zooniverse.org/projects/sundial-itn/space-fluff
- **Newsletters of other astronomical societies and other Centres of the ASSA.**
  I have a list of members who want to receive some of these newsletters, but I want to compile new lists.

  I receive the following newsletters from other astronomical societies:

  - **Blackburn Leisure Astronomical Society News**, newsletter of BLAS (Blackburn Leisure Astronomical Society). This society is based in the small town Brough in East Yorkshire, Northern England.
  - **Southern Cross,** the journal of the Canberra Astronomical Society. This society is based In Canberra, the capital city of Australia in the extreme southeast of the country.

  I receive the following newsletters from other Centres of the ASSA:

  - **The Cape Observer,** newsletter of the Cape Centre.
  - **'n Daba,** newsletter of the Durban Centre.
  - **The Southern Cross,** newsletter of the Hermanus Centre.

  Members: please let me know which ones you would like to receive. Members who are on the present list must also let me know, because the present list will be scrapped.
- **EarthSky's 2021 meteor shower guide | Astronomy Essentials | EarthSky**
- **Free downloads from the Internet.**

  http://mos.futureplc.com/SpacecomCollectionVol1.pdf (2019 edition, 119 Mb)

  LifesLittleMysteries.pdf (futureplc.com) (34 Mb)

  ASTRONOMICAL CATALOGUE DESIGNATIONS. (Latest version, 280 Kb)
  Microsoft Word - AOI for Website Mch 2010.doc (theiet.org)
- **Beanies:** Beanies will be offered for sale @ R40.00 each at every monthly meeting, until they are sold out.
- **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.
- **Data base:** Members are reminded that a data base of the books in our library is to be found on our website.

Personalia

Louis Kloke, one of our committee members, had a heart attack on Saturday 23 January. He is in the intensive care unit of a hospital. You can try and contact him to wish him well at 083 393 3594. If you can't reach him, contact his son, Graig Kloke (also a committee member) at 083 404 2059. **Ω**

What's up in February 2021 – by Johan Smit

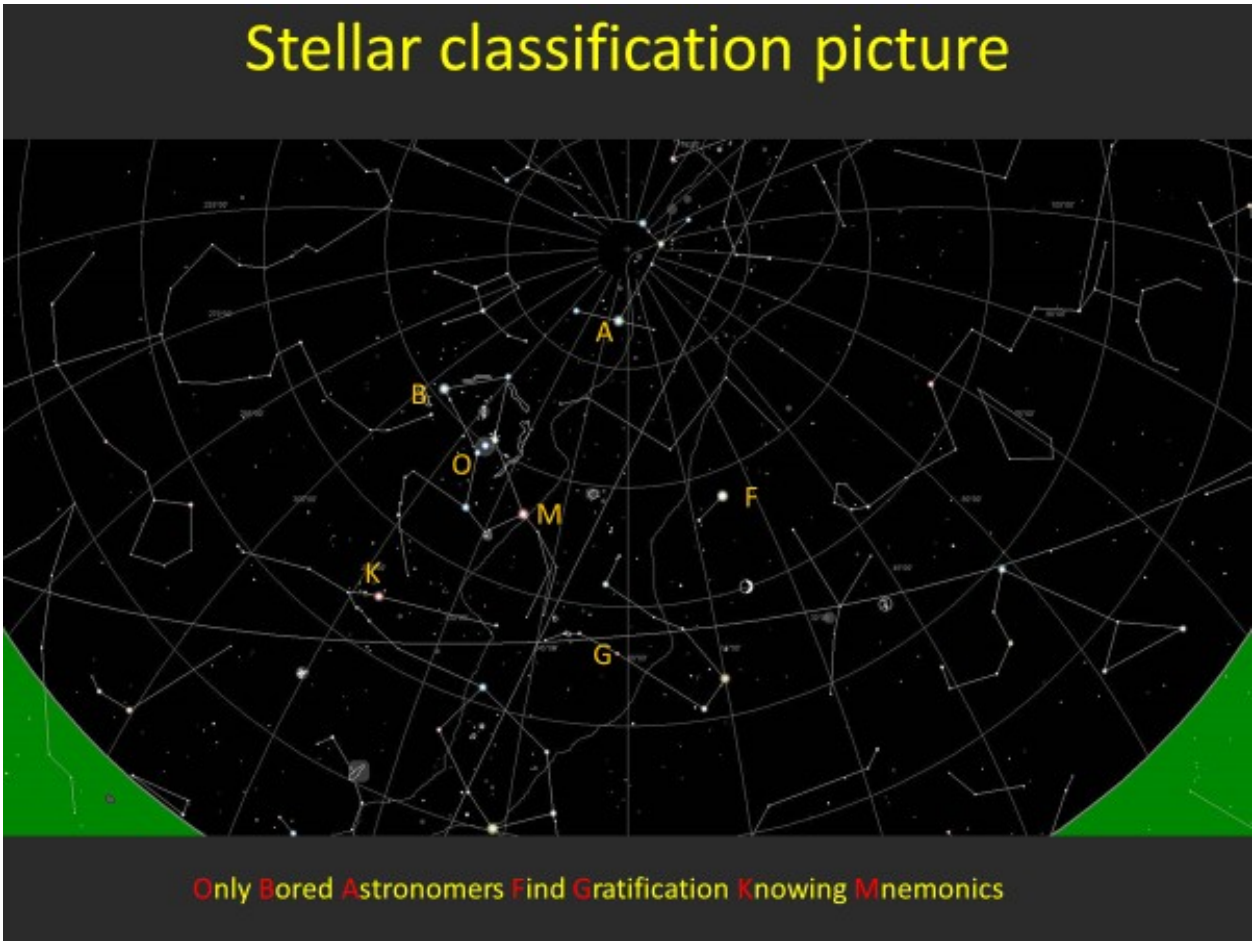
For the month of February 2021 (and before and after) we will have to do stargazing or observing alone. Lockdown does not want to unlock it seems.

While being locked in, we can learn, and see what we are learning, at our leisure. For this purpose, I prepared a few challenges. Some easy, some rather difficult. Enjoy.

Stellar life cycle and categorizing:

Over this period, we can see the whole process in action.
Stars are born in gas clouds (M42-Orion Nebula).
Many times, forming a cluster (Pleiades).
Spend most of their life on the main sequence.
On the main sequence stars are classified according to their spectral class.
After the main sequence red giant phase.
End points:
White dwarf (Sirius B)
Big Kaboom -- supernova (M1 Crab Nebula supernova remnant)
Planetary Nebula (NGC 2022)

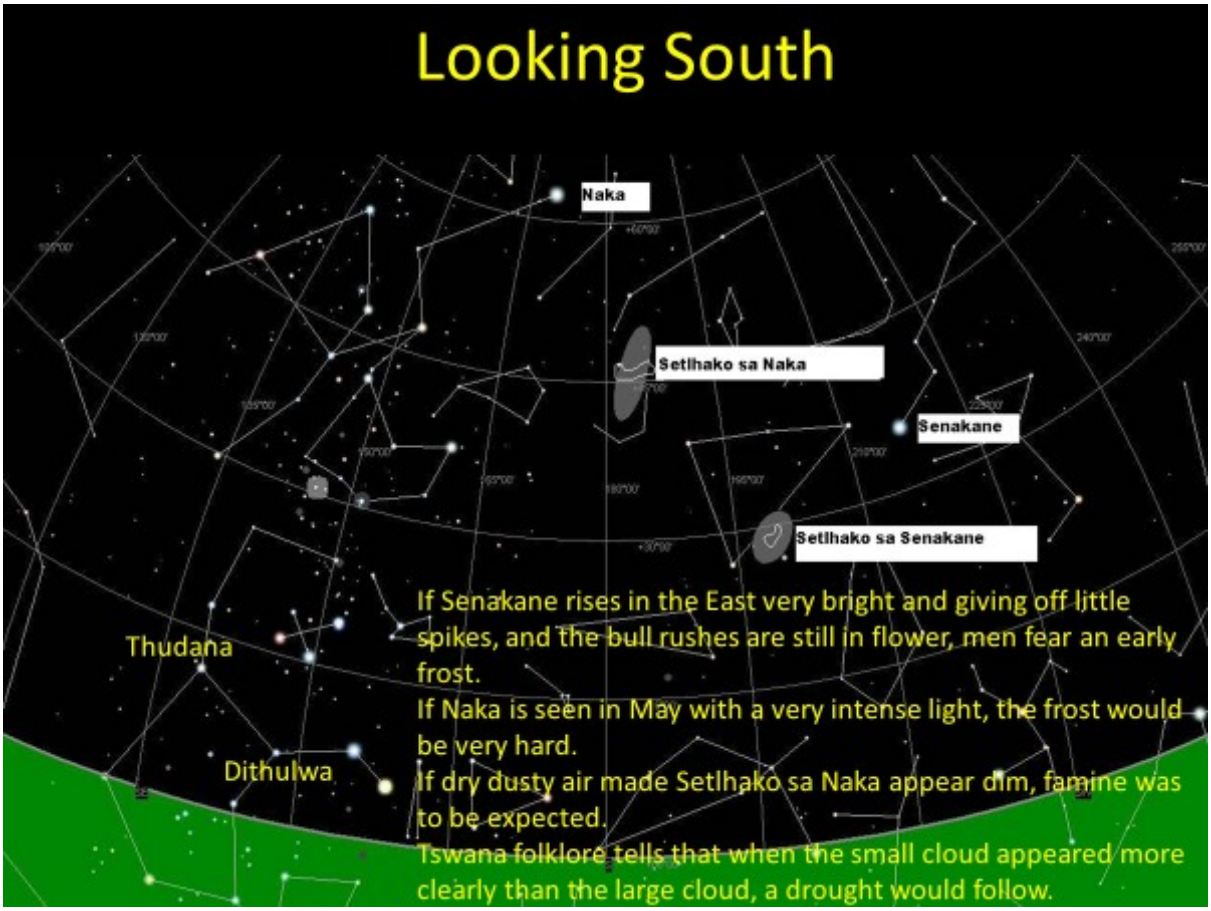
Anyone up for some real challenges?
First, the stellar spectral classes. They can be seen with naked eye and see if you can notice differences between them, like colour for instance.



And learn our new politically correct mnemonic in the process.
The real challenges. If you can just find where they are in the sky you are doing good.
Find out where is:
T Tauri. Not yet stable on the main sequence. 9 to 14 Mag.
R Leporis. Hinds crimson star. 5.5 to 11.7 Mag.
M1, Crab nebula, supernova remnant.
NGC 2022, planetary nebula. 12th Mag.
Hint—they are all in this scene.

Make a sketch showing where they can be found. Submit that to Louis Kloke and Percy Jacobs.
Maybe we can kick off our observing challenge this way again.
While we look around we can just as well learn some African star lore names of well know objects, and how they were used.

South:



Note that the pointers and Southern Cross is know as the Giraffes in San folklore. I think that we should refer to them as the Giraffes in future as that suits our location. Enjoy getting to know some real African star traditions.

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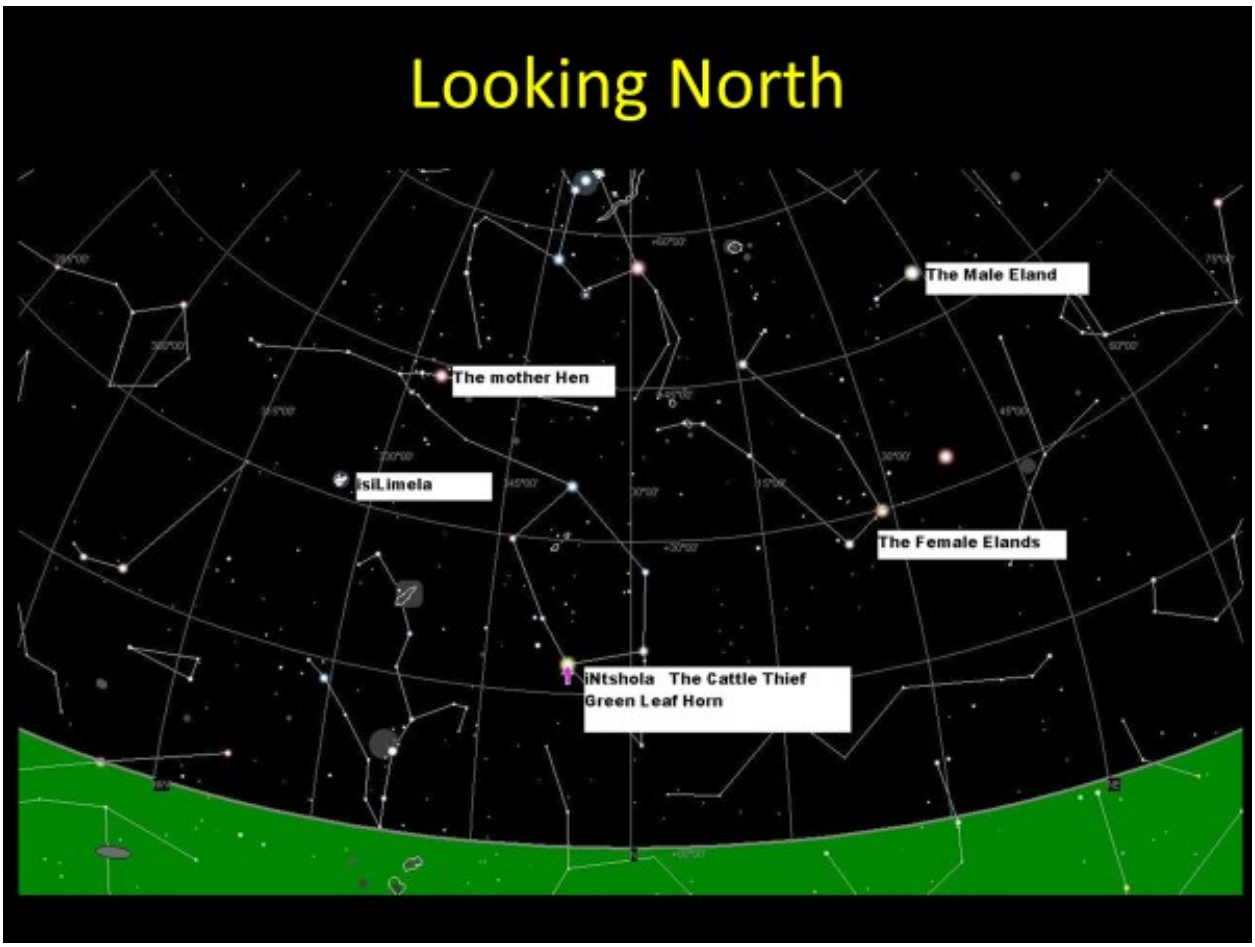
Looking North:



Because Cappella (the cattle thief) is only visible for a short while (hence the name) you need to plan to see it. Enjoy catching the cattle thief.

If you prefer something more modern, and wish to see a red dwarf and white dwarf, and enjoy some science fiction have a look here:

Dharma Planet Survey, an international team of scientists recently discovered a super-Earth orbiting a star (HD 26965) just 16 light-years away.

Star Trek fans may know the star HD 26965 by its alternative moniker, 40 Eridani A. 40 Eridani A is orbited by a binary pair, consisting of a white dwarf and a red dwarf.

Vulcan was connected to 40 Eridani A in the publication “Star Trek 2” by James Blish (Bantam, 1968) and “Star Trek Maps” by Jeff Maynard (Bantam, 1980).

This is confirmed in a letter written by Gene Roddenberry (the creator of Star Trek) along with Sallie Baliunas, Robert Donahue, and George Nassiopoulos of the Harvard-Smithsonian Center for Astrophysics (CfA).

Published in July 1991 by Sky and Telescope, the letter stated that 40 Eridani A was home to planet Vulcan.

As they wrote, Vulcan orbits the primary star while the two companion stars would shine brilliantly in the Vulcan sky and rise, move across its sky, and set.

They are easier to see with a reasonable telescope, than for instance the pup (the white dwarf orbiting Sirius). Try and find that and imagine you are star trekking through the Universe. (Continued on next page.)

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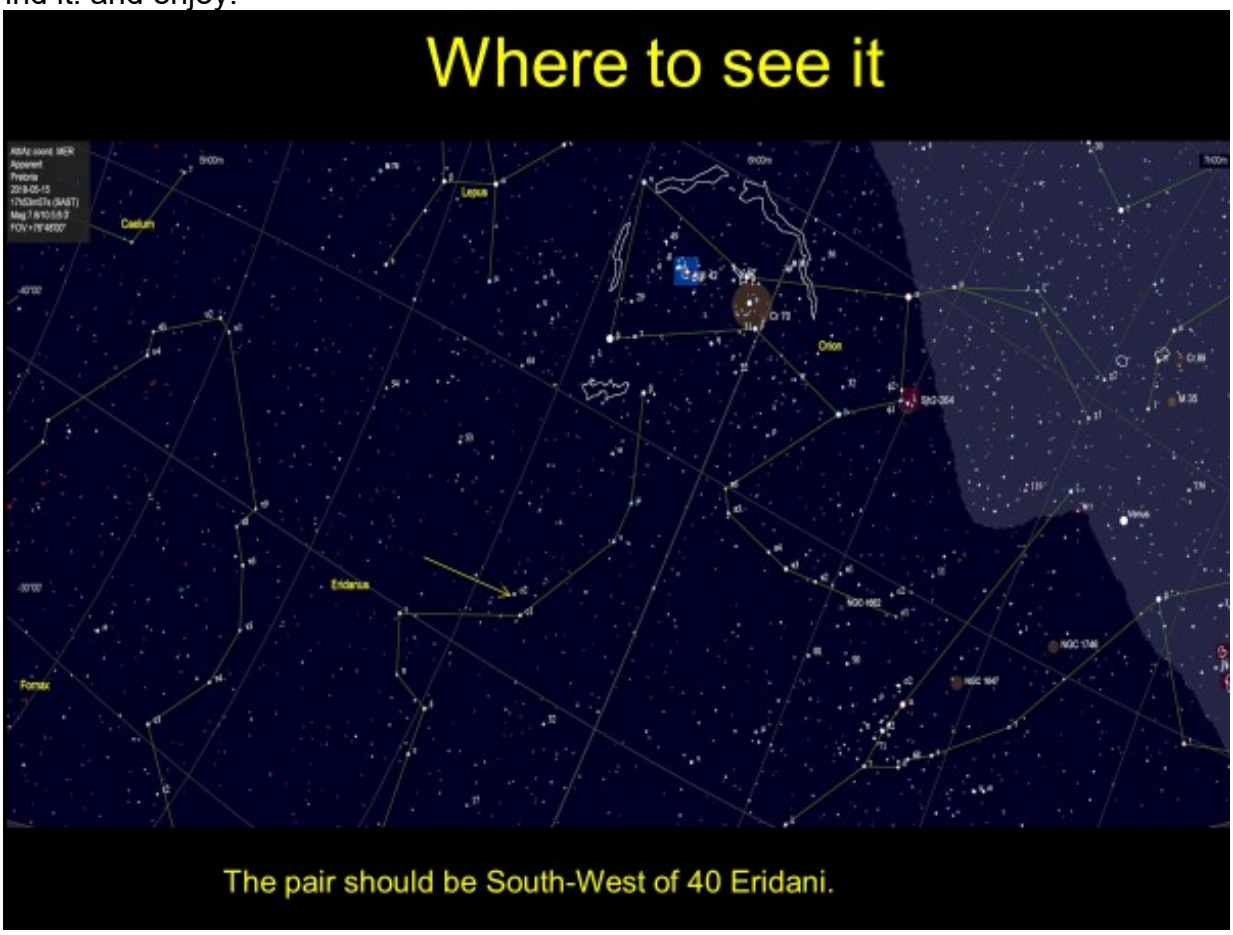
In Star Trek lore, Vulcan is the home of logic, learning and the deeply beloved first officer Mr. Spock.
While Vulcan is fictional, the recently discovered planet that orbits 40 Eridani A is very real.
40 Eridani A is located only 16.5 light-years away from Earth and can be spotted with the naked eye, but the two stars in the binary pair orbiting it cannot.
Omicron 2 Eridani, also called 40 Eridani. Also named Keid.
Triple star system.
83” away will be seen Omicron 2B.
First white dwarf identified in 1910.
Mag. 9.8.
7.5” distance from Omicron 2B.
Red dwarf.
Mag 10.8.
Variable (Flare Star) DY Eridani.

Find it: and enjoy:



I trust that this will make your lonely time under the stars a little bit more interesting.
While you are at it, find NGC 2547, an open cluster generally known in Pretoria as Johan’s heart cluster. Make a point to show that to your partner on Valentine’s day and be sure to score some good points.

Enjoy! Ω

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,* 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
- **More web links can be found on page 118 of "2020 Sky Guide Africa South". Ω**

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