



**ASTRONOMICAL SOCIETY OF SOUTHERN AFRICA**

# Durban 'nDaba

# Table of Contents

|  |    |
|--|----|
| Chairman's Chatter   | 3  |
| Astronomy Delights: ARA - A Flame rises from the Altar         | 4  |
| At the Eyepiece  | 11 |
| Two Fine Galaxies in the Sculptor Group                        | 12 |
| The Cover Image - The Swan Nebula                              | 15 |
| Meet Calypso, a Daredevil Mission Concept                      | 16 |
| Are Some Blackholes Wormholes in Disguise                      | 18 |
| Shadow of Blackhole in M87 Galaxy is Wobbling                  | 20 |
| Space News & Updates   | 22 |
| Comet Discovered to have its own Northern Lights               | 24 |
| Some Interesting Space Facts                                   | 26 |
| Minutes of the Previous Meeting                                | 29 |
| Notice Board   | 30 |
| Pieter Kotzé : Biography & Status of the Earths Magnetic Field | 31 |
| The Big 5 / Public Viewing Roster                              | 32 |



## Member Submissions Disclaimer

The views expressed in 'nDaba are solely those of the writer and are not necessarily the views of the ASSA Durban Centre, nor that of the Editor.

All content and images are the work of the respective copyright owners

# Chairman's Chatter

By Piet Strauss

Dear Members,

Our September meeting via Zoom was again well attended with 25 members and guests.

The talk by Dr Adriana Marais was extremely well received and we received much feedback commenting on her competence as well as bravery. We do not have a full copy of her presentation, but you will find a link on our website with a similar presentation done at a recent UKZN Zoom meeting.

The recent discovery of probable underground water on Mars will make future travel to and population of this planet more viable.

The cloudy weather and much needed rain in September did not help our astronomy fans much. Not many of us saw the moon on September 25<sup>th</sup>, the International "Observe the Moon" day. If you did manage to take a picture from anywhere, please send this to John.

Astronomy in South Africa is 200 years old, since the Royal Observatory was established in (Observatory) Cape Town. The SAAO will celebrate this by hosting a virtual symposium from 20 to 23 October 2020. You can find more details by searching for "SAAO 200" on your favourite search engine. More details will be on the ASSA website as it becomes available.

Our next general meeting is on Wednesday 14<sup>th</sup> October at 7:30 pm, via zoom. You are welcome to invite family and friends to join this meeting. The link will be sent to you soon.

Our main speaker will be Dr Pieter Kotze. Pieter is a senior Research Fellow at SANSA, based in Hermanus. He is also a member of the ASSA National Council. His talk will be on the current status of the earth's magnetic field and the impact of the changes. More information is included on page 31 of this newsletter.

We look forward to "see" you on the 14<sup>th</sup>.

Regards,

Piet Strauss

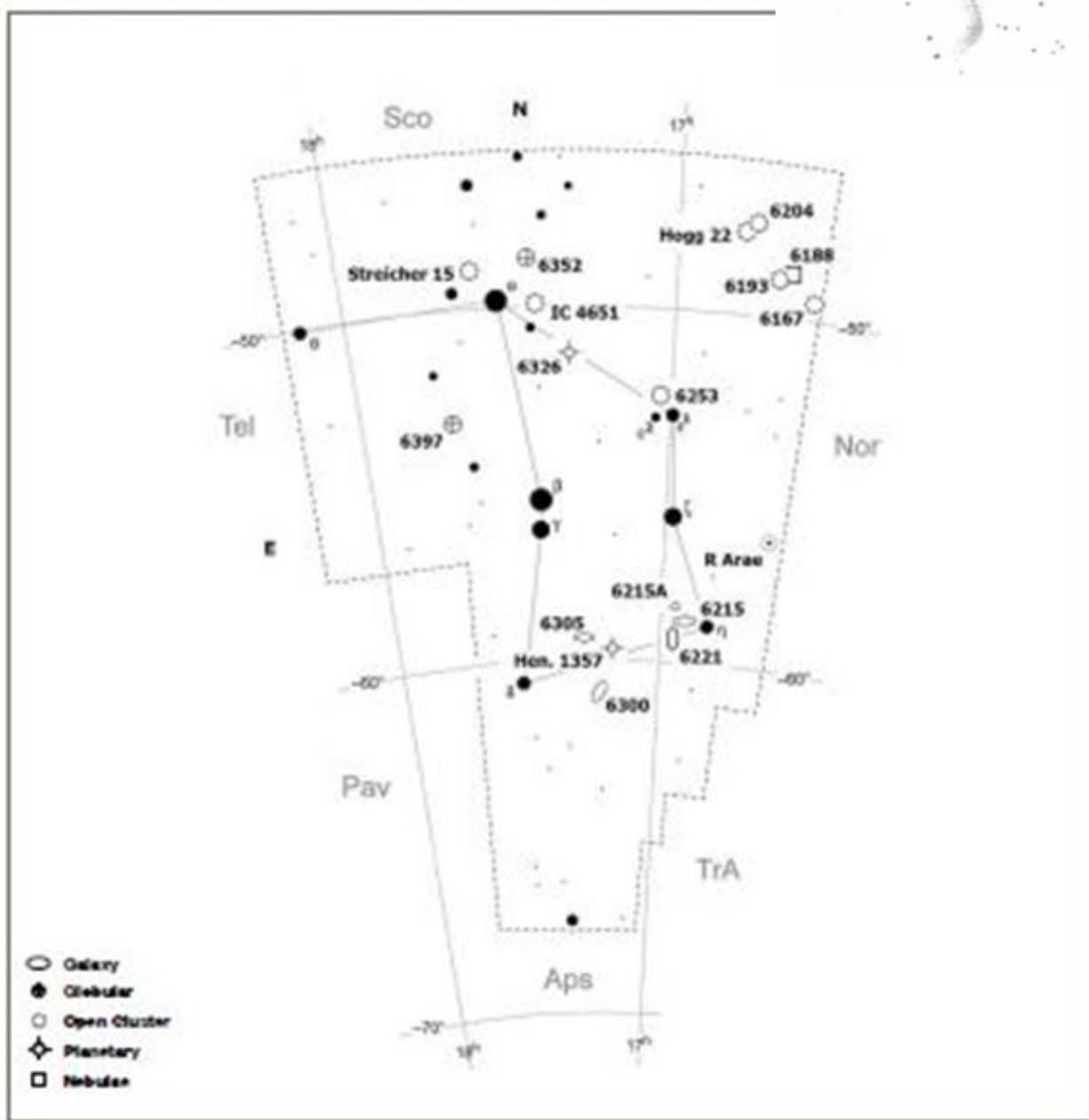


# Astronomy Delights

## ARA - A Flame rises from the Altar

By Magda Streicher

According to tradition Ara was the altar used by Centaurus the Centaur to offer sacrifices of animal origin. Fire is often seen as a symbol of destruction, yet it is difficult for us to grasp the anxiety and chaos that humans of antiquity must have experienced when a human or animal sacrifice was brought to the altar. The north-western area of Ara is the obvious place to start if one wants to get to know more about this constellation. This part of Ara, nestling on the outskirts of the Milky Way, is very dense in starlight, and ranked number 63 in terms of size, located between Norma to the west and Telescopium to the east.

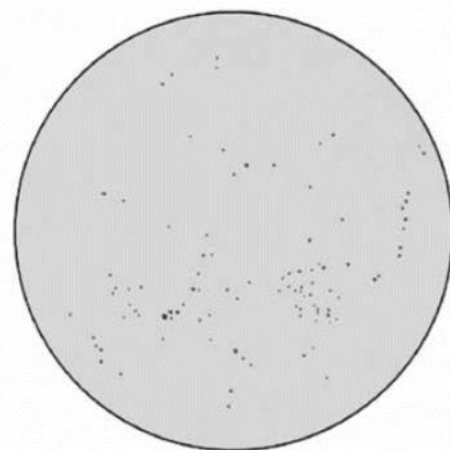


The constellation of Ara

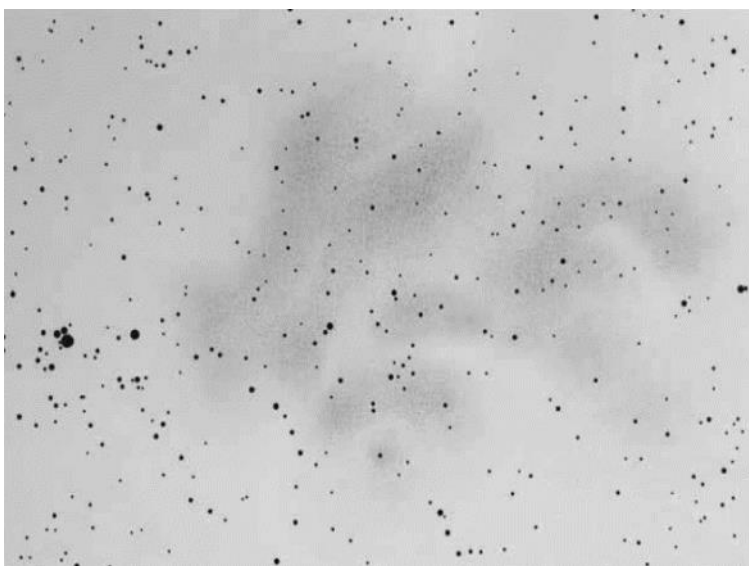
## ... ARA - A Flame rises from the Altar

Situated a mere 2 degrees from the boundary with Norma is the open cluster **NGC 6204**, one of the most outstanding compositions in combination with field stars. NGC 6204 is a well-balanced open cluster with about two dozen stars of mixed magnitudes.

The group **HOGG 22**, about 5' towards the east resembles a tight knot of stars towards the southern point of a long string, draped from north to south. If one continues along this extended line, the stars become increasingly fainter, with the faintest one marking the end of the line at the northern point. However, Mati Morel, an Australian astronomer, has determined that Hogg 22 is a separate physical cluster from NGC 6204, although some sources list the stars concerned all in the same cluster, namely NGC 6204. Two more Hogg clusters can be found just further south: Hogg 20, situated on the southern brink of the cluster NGC 6200, which lies only 20' south of NGC 6204, and Hogg 21, only 20' further south-east from NGC 6200.



**BELOW: Hogg 22 and NGC 6204 Open Clusters**

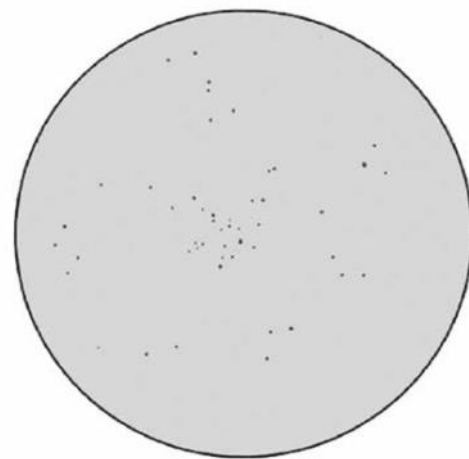


**LEFT; NGC 6193 and NGC 6188 Open Cluster and Diffuse Nebula**

Continue along the boundary between Ara and Norma southwards to find yet another interesting combination, with an open cluster and a diffuse nebula. **NGC 6188** displays a relatively large area covered in a smoke-like cloud of gas and dust with parts quite well defined against the very dense star field. The almost transparent nebulosity hangs on slightly darker pieces, that fade away in the field of view. Make every effort to search out very dark night sky conditions to fully appreciate this network of nebulosity.

The cluster **NGC 6193** shines like an illuminated shopping centre on the eastern tip of NGC 6188. The group, with a few prominent bright blue stars and a mist of fainter light points, is clearly demarcated and could indicate a much larger group than anticipated. The beautiful double white-coloured star DUN 206 is situated on the western edge of the cluster and contains a magnitude 6 primary and a magnitude 7 companion with a separation of 10" in a position angle (PA) of 14°.

A special cluster can be found a further 1.5 degrees South along this boundary. **NGC 6167** is a pretty open cluster with an outstanding shape. The group also known as Bennett 79a displays an almost V-shape, which could also be seen as a sort of zigzag formation running in a north-south direction. Star clusters in different patterns and shapes can be very interesting and provide endless pleasure to the observer.



**ABOVE: NGC 6167 Open Cluster**

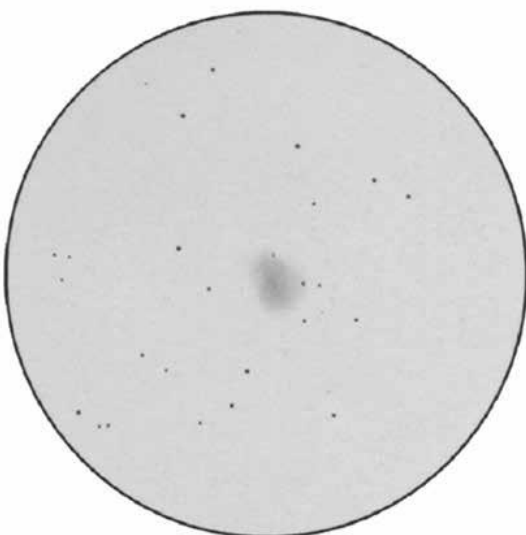
## ... ARA - A Flame rises from the Altar

More or less towards the centre of the constellation is epsilon Arae as the western supporting pillar of the altar. The open cluster **NGC 6253** is situated just 35' north from magnitude 4 epsilon Arae. The grouping, which is also known as Bennett 84, is a large, rich, swarming cluster of faint stars in an elongated cone shape spreading out from an easterly point towards the west. The northern part of the cluster displays a slightly bulgy shape with a more flattened southern part. With my wild imagination it is also possible for me to visualise it as the shape of an Australian kangaroo.

The star zeta Arae is situated 3 degrees south of epsilon and is like no other star in this constellation. Although this orange-coloured star proudly displays a magnitude of 3 and Represents the western part of the altar dish, it is also very distant.

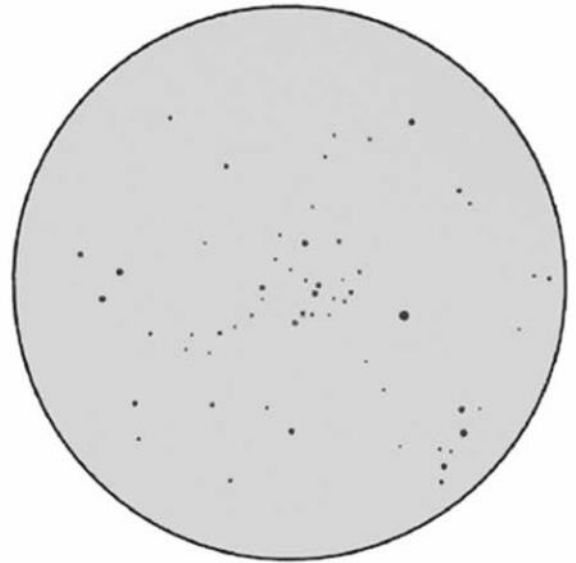
Halfway between zeta and eta Arae is the very interesting star R Arae the visual duplicity of which was discovered by John Herschel (h 4866) who called it "a beautiful star". The star is in fact an Algol-type system being an eclipsing binary with a magnitude varying between 6 and 6.9 over a period of exactly 4 days, 10 hours and 12 minutes. To make it more intriguing, there is also a magnitude 8 star, just 3.5" to the south-east. However, be particularly sharp in your observation, because the star field surrounding this star is packed with stars of various magnitudes. It would be best to make use of a star map.

The stars delta and eta Arae are in the firing line, as they represent the brim of the volcano-like cooking pot. The galaxy **NGC 6215** is situated barely 10' north-east of the magnitude 3.8 eta Arae, a lovely orange-coloured star. If you can obscure the star, the galaxy which displays a hazy oval shape and slightly brighter nucleus, will be easier to observe. What is not so easy to spot, is the companion galaxy **NGC 6215A**, which is a further 12' eastwards and visible only as a faint, hazy smear of light.



The third galaxy in the field and perhaps the easiest of the trio to spot, is **NGC 6221**, situated 25' south-east from eta Arae. The galaxy is fairly large, bright and appears to form a north-south oval. Careful observation brings to the fore an uneven surface with a patchy feeling to it, which hints at a spiral structure. The nucleus is relatively bright, and with high magnification, it brightens up to a stellar point. The galaxy is about 70 million lightyears away.

**LEFT: NGC 6221—Galaxy**



**ABOVE: NGC 6253  
Open Cluster**

## ... ARA - A Flame rises from the Altar

A very special planetary nebula is situated virtually in the midst of the flames, halfway between the two stars delta and eta Arae. This object is special, because it is one of Hubble's greatest images and bears the name Stingray Nebula, listed as **HENIZE 1357** or Hen. 1357 for short. It is still a proto-planetary nebula in which the gas had not yet become hot and ionized, one of the youngest known, formed possibly as recently as 200 years ago and lies about 18 000 light-years away. The central magnitude 8.4 star, has a companion at a position angle (PA) of 70°. The Hubble picture of Hen. 1357 shows a ring of gas slightly coloured light green towards the centre. Curved red lines represent gas heated by a shock wind interacting with the surrounding gas. The object is named after the astronomer Karl Henize who compiled a list of unusual objects in the 1950s.



The galaxy **NGC 6305** is situated only 25' towards the north-east and displays a soft, circular glow. However, two lovely yellow stars flank the galaxy on the south-eastern and north-western sides.

The barred spiral galaxy **NGC 6300** is situated 2.5 degrees south of magnitude 3.5 delta Arae. The galaxy displays a nice oval in a north-west to south-east direction. With higher magnification the surface hints at some structure with a relatively bright barlike nucleus.

**LEFT: NGC 6300 – Photograph: In-The-Sky**

Move away from this burning spot into the eastern part to detect Ara's showpiece. The globular cluster **NGC 6397**, situated towards the east of the two brightest stars alpha and beta Arae was discovered by Lacaille about 1751. This is an exceptional object with all the observing elements that one could find in a globular cluster, large, bright and round in shape. It has well-resolved star trails intermittently shaped like arms, and speckled dark sections in between. It appears slightly elongated in a north-west to south-east direction, which gives it a three-dimensional feeling. The globular cluster displays a mass of various magnitude stars with a few blue stragglers bunched together. The core impresses me most: it appears completely tight, but higher magnification reveals very faint pin-point stars which are barely visible. A smaller unresolved knot of faint stars can be seen towards the north-east edge. What a breath-taking naked-eye object, about 8700 light-years away!



**RIGHT: NGC 6397 – Globular Cluster  
Photograph: ESA/Hubble**

## ... ARA - A Flame rises from the Altar

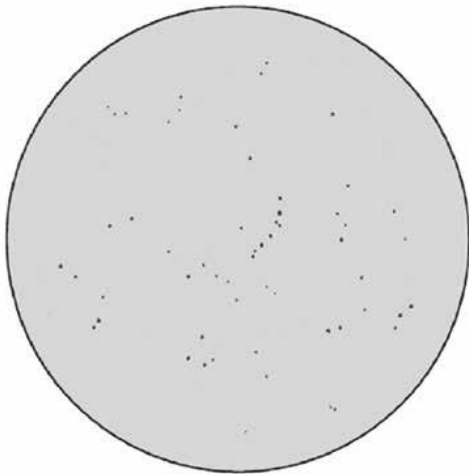
Well out of the fiery danger zone, situated between the pillars that hold the burning altar pot, is the planetary nebula **NGC 6326** about 2.5 degrees south of alpha Arae. The planetary nebula displays a soft misty disc in a slightly grey colour. Higher magnification brings out a more defined shape and it can be lifted out from the background star field with the help of an oxygen (O-III) filter. An uneven half-moon string of stars runs on the eastern side of the planetary nebula for almost 10' long.

The exceptional silver metallic coloured magnitude 3 alpha Arae is also a double star with a magnitude 11 companion, a separation of 55" and a position angle (PA) of 172°. **IC 4651**, an open cluster with a difference is situated only one degree west of alpha Arae.

The focus of the grouping is a very dense knot of stars. The northern part displays a handful of brighter stars that mingle well with fainter members. Obvious dark areas can be seen between cluster members. This is what I call a "patchy cluster!"



ABOVE: NGC 6326 – Planetary Nebula  
Photograph: Wikipedia



Situated 1.5 degrees north-east of alpha Arae is the asterism **STREICHER 15**, which contains a few stars, well defined against the star field. The brightest star magnitude 6.3 appears light yellow in colour and visible at the north-end of the string of stars snaking southwards. A magnitude 10 double star ends off the southern tip of the string. Star strings may resemble different shapes, and to me this grouping resembles swallows diving in flight. One could also imagine it as a Chinese hat.

LEFT: STREICHER 15 - Asterism

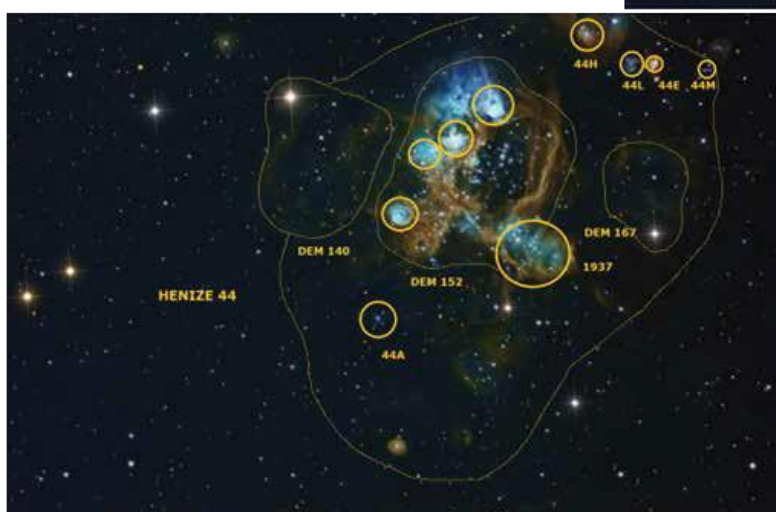
Another 2.5 degrees further west from the asterism, is the globular cluster **NGC 6352**, situated inside the diffuse emission nebula GN 17.24.4. The globular cluster, Approximately 25 000 light-years distant, appears as a soft round smear, unresolved and embedded among the faint field stars. With averted vision it appears somewhat granular. With real high magnification the twinkling stars give this globular a glitter-ball effect, with a faint hazy outer envelope. Dark spots and thin dark lanes are visible in the slightly more compact centre. James Dunlop discovered this globular cluster, and adds it as number 417 on his list.

*The stake and sacrificial practices long died out, but the constellation Ara is a quiet reminder of a practice that justified such phenomena. Fortunately, the constellation offers a wealth of splendid objects that will warm the heart on balmy southern summer evenings.*



## ... ARA - A Flame rises from the Altar

Karl Henize worked at the Bloemfontein Lamont-Hussey Observatory in South Africa, conducting an objective-prism survey of the southern sky for stars and nebulae showing hydrogen emission lines, and compiled a catalogue of the objects he discovered.



A complex Emission Nebulae (H II regions) labelled from Karl Henize 1956 Catalogue.

Some central cores indicated clusters with relatively high surface brightness.

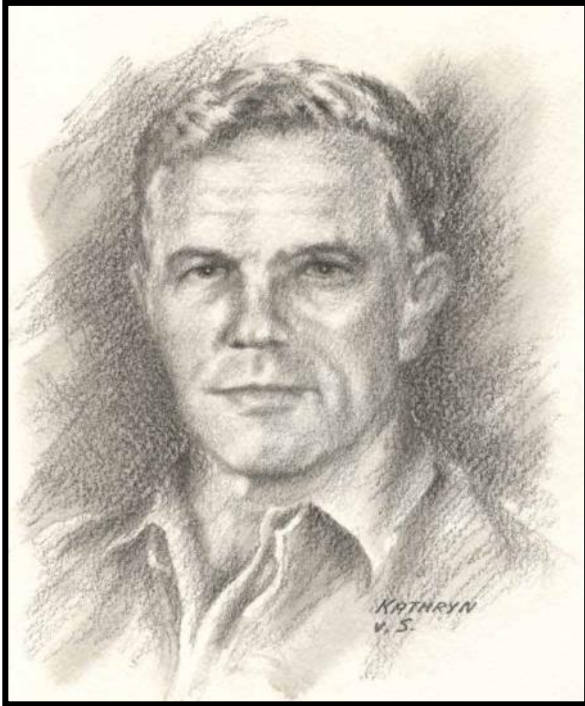
Photographs: Johan Moolman

**RIGHT:** The Lamont-Hussey Observatory  
Photograph: Tim Cooper



**LEFT:** The old and dilapidated observatory of Astronomer Karl Henize on Naval Hill in Bloemfontein, South Africa.  
Photograph: Tim Cooper

## ... ARA - A Flame rises from the Altar



Karl Gordon Henize was born on 17 October 1926 in Cincinnati, Ohio, and died on 5 October 1993 from high-altitude sickness on the slopes of Mount Everest while attempting to climb the peak. Henize was an astronomer, space scientist and Astronaut who had to wait 18 years for a flight. He was a crew member on Space Shuttle Challenger in July/August 1985. In accordance with his previously expressed wishes he was buried on Changste glacier, Mountain Ev-

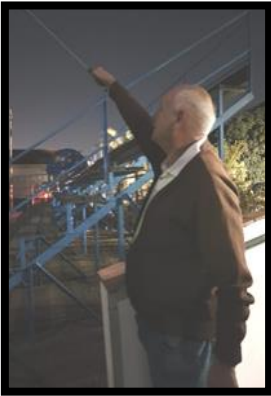


LEFT: Pencil Sketch: Kathryn van Schalkwyk, original photograph (RIGHT) NASA.

| OBJECT                              | TYPE             | RA       | DEC       | MAG  | SIZE      |
|-------------------------------------|------------------|----------|-----------|------|-----------|
| NGC 6167                            | Open Cluster     | 16h34m.4 | -49°36'.3 | 6.7  | 7'        |
| NGC 6188                            | Diffuse Nebula   | 16h40m.5 | -48°47'.0 | -    | 20'       |
| NGC 6193                            | Open Cluster     | 16h41m.3 | -48°45'.8 | 5.2  | 14'       |
| NGC 6204                            | Open Cluster     | 16h46m.5 | -47°01'.0 | 8.2  | 5'        |
| HOGG 22                             | Open Cluster     | 16h46m.6 | -47°04'.8 | 6.7  | 2'        |
| NGC 6215                            | Galaxy           | 16h51m.1 | -58°59'.0 | 10.9 | 2.7'×2.2' |
| NGC 6215A                           | Galaxy           | 16h52m.8 | -58°56'.0 | 13.4 | 1.9'×0.6' |
| NGC 6221                            | Galaxy           | 16h52m.8 | -59°13'.1 | 10.1 | 4.9'×3.2' |
| NGC 6253                            | Open Cluster     | 16h59m.1 | -52°43'.1 | 10.2 | 5'        |
| HENIZE 1357                         | Planetary Nebula | 17h16m.4 | -59°29'.4 | 10.7 | 90"       |
| NGC 6300                            | Galaxy           | 17h17m.0 | -62°49'.0 | 10.1 | 5.2'×3.3' |
| NGC 6305                            | Galaxy           | 17h18m.0 | -59°10'.3 | 13   | 1.8'×1.2' |
| NGC 6326                            | Planetary Nebula | 17h20m.8 | -51°45'.0 | 11   | 14"       |
| IC 4651                             | Open Cluster     | 17h24m.7 | -49°57'.0 | 6.9  | 12'       |
| NGC 6352                            | Globular Cluster | 17h25m.5 | -48°25'.3 | 8.1  | 7.1'      |
| STREICHER 15<br>DSH<br>J1734.6-4835 | Asterism         | 17h34m.6 | -48°35'.0 | 6    | 15'       |
| NGC 6397                            | Globular Cluster | 17h40m.7 | -53°40'.0 | 5.8  | 25.7'     |

# At the Eyepiece

October 2020 by Ray Field



The Moon is full on the 1<sup>st</sup>, last quarter on the 10<sup>th</sup>, new on the 16<sup>th</sup>, first quarter on the 23<sup>rd</sup> and full again on the 31<sup>st</sup> (Blue moon).

The Moon is near Mars on the 3<sup>rd</sup>, Uranus on the 4<sup>th</sup>, Aldebaran on the 7<sup>th</sup>, Pollux on the 10<sup>th</sup>, the Beehive Cluster (M44) on the 11<sup>th</sup>, Regulus on the 13<sup>th</sup>, Venus on the 14<sup>th</sup>, Antares on the 19<sup>th</sup>, Jupiter on the 22<sup>nd</sup>, Saturn and Pluto on the 23<sup>rd</sup>, Neptune on the 27<sup>th</sup> and Mars on the 29<sup>th</sup> again.

Mercury may be seen low on the East for a short while before sunrise at the start of the month for a few days, looking like a bright pinkish “star” and for a few days before the end of the month, low over the West after sunset.

Venus is prominent in the East at dawn. It rises about 2 hours before the Sun at the start of the month and by about one hour at the month’s end. The Moon is near Venus on the 14<sup>th</sup>.

Mars, in Pisces, above and to the right of the “Square” of Pegasus, is very bright this month, and is closest to the Earth on the 6<sup>th</sup> and at opposition on the 13<sup>th</sup>. It is visible nearly all night and is now brighter than Jupiter. Its orange-red colour makes it very distinctive. Weather permitting, this is the best month for looking at Mars through a telescope. The Moon is near Mars on the 3<sup>rd</sup> and again on the 29<sup>th</sup>.

Jupiter, near the “Teapot” asterism in Sagittarius, is a very bright object, visible in the evening sky this month. Jupiter is easy to find and even a small telescope will show its four brightest moons.

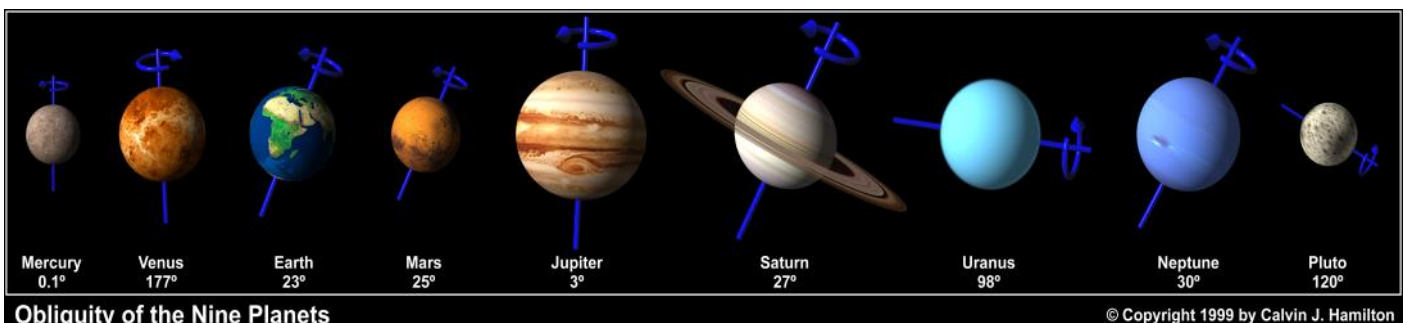
Saturn is near Jupiter all month in Sagittarius in the evening sky. A small telescope will show its biggest moon Titan, which has a diameter as big as the planet Mercury. The moon is near Saturn on the 23<sup>rd</sup>.

Meteor Showers: Only the Orionids are visible this month and their observing prospect is favourable. The time to watch is from midnight to 04:00. Their expected Zenithal Hourly Rate (ZHR) is 30. See page 87 of the ASSA Sky Guide 2020.

In the Starry Sky from Durban, during the early evening, the Southern Cross has almost set over the South. Scorpius is heading for the Western horizon, followed by Sagittarius. The “Southern birds”, Pavo, Grus, Phoenix and Tucanna are well placed rising over the South-east. The “Square of Pegasus” is low over the North-east and Cygnus, the Swan, is low over the North with its one bright star Deneb.

The beautifully coloured double star, Aberio has an orange and blue component. It is at the top of the slanting cross made up of Cygnus’s brightest stars. The very bright white star, Vega, in Lyra, the harp, is very low over the North-west. Hercules has set to the left of Vega. The bright star Fomalhaut, in Piscis Austrinus, is almost overhead from Durban.

References: Sky Guide Africa South 2020, Nortons Star Atlas, Stars of the Southern Sky by Mary Fitzgerald and Philips Planisphere for 35° S.



# Two Fine Galaxies in the Sculptor Group

By Brian Ventrudo

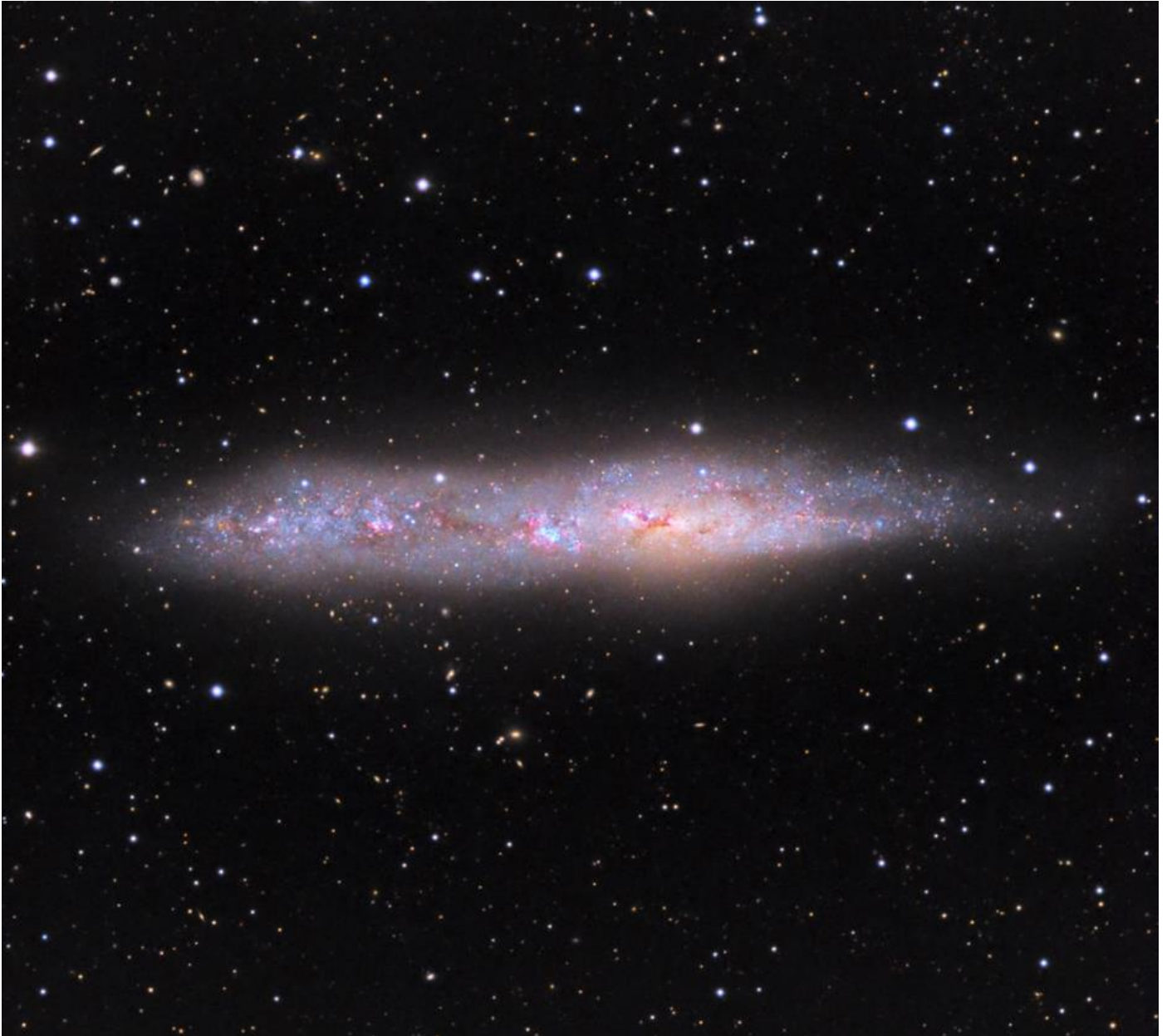
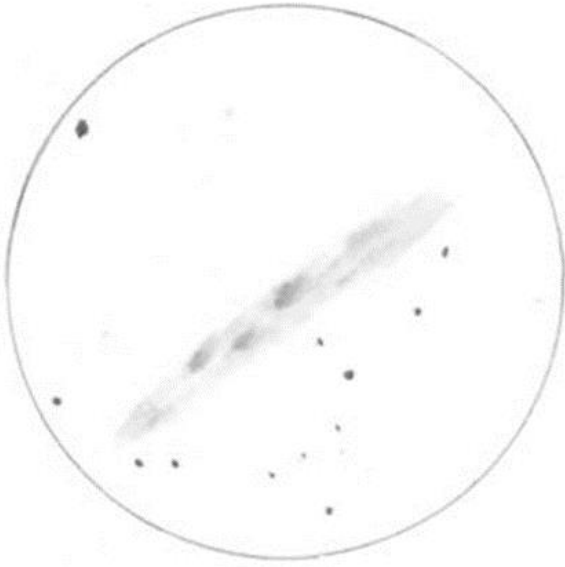


Image of galaxy NGC 55 acquired by Brett Soames of NSW, Australia and processed by Warren Keller at [www.billionsandbillions.com](http://www.billionsandbillions.com).

One of the closest congregations of galaxies to our own, the Sculptor Group consists of a series of relatively bright and shapely galaxies clustered in the barren sky near the south galactic pole. The group is anchored by the majestic NGC 253, the Silver Coin Galaxy, one of the most beautiful galaxies for a small telescope. But a little farther south lie two more gems, NGC 55, also called the 'String of Pearls', and NGC 300, one of a handful of galaxies known as the 'Southern Pinwheel'. For northern observers, this pair is low in the thick air over the southern horizon in the late months of the year. Southern-hemisphere observers, however, see these galaxies nearly overhead where it's much easier to see their distinctive shape and features in a small telescope.

First to NGC 55. The galaxy is located near the southern edge of the constellation Sculptor near its border with the constellation Phoenix. The galaxy is about  $3.7^\circ$  northwest of the star Ankaa or  $\alpha$  Phoenicis in Phoenix, and  $2^\circ$  west of a 5th magnitude orange star and a string of three 7th-magnitude stars that point right to the galaxy.

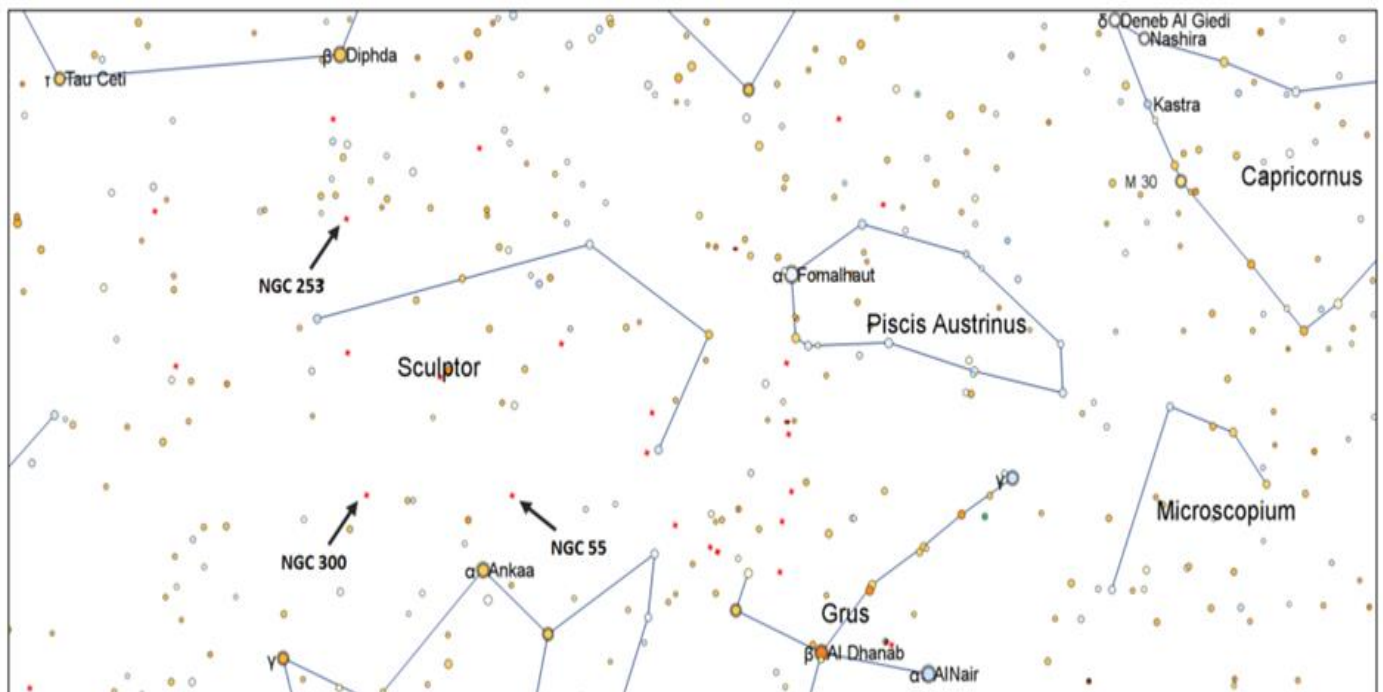
## ... Two Fine Galaxies



ABOVE: A rough sketch of NGC 55 made with a 10" f/4.7 Newtonian reflector at 65x.

While smaller and fainter than the more famous Silver Coin Galaxy, NGC 55 is in many ways a far more impressive sight in a small telescope. At lowest power in a 4-inch or larger scope, the galaxy looks like a long graceful comet with a tail and anti-tail thrusting off a brighter and well-structured nucleus. The long axis of the galaxy stretches nearly half a degree from the east-southeast to the west-northwest. With your telescope, use averted vision to help the core of the galaxy snap into definition, and look carefully for the delicate lacework of dark dust lanes and brighter patches of stars.

NGC 55 has a modest surface brightness, but its core takes magnification well. Try 60x to 80x to bring out more detail. And look especially for the dark rift that cuts from the core and out through the eastern section of the galaxy. Truly stunning.

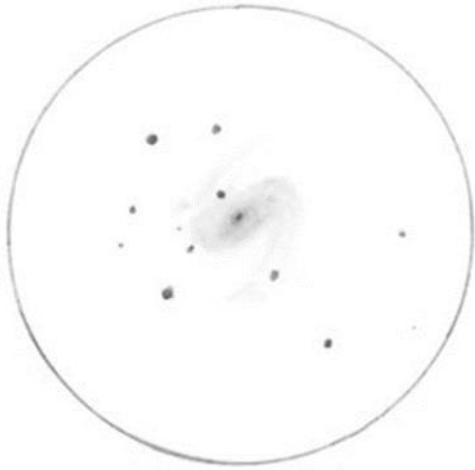


ABOVE: Location of galaxies NGC 55 and NGC 300 in the southern constellation Sculptor. North is up and east is to the left.

NGC 55 is about 7 million light years away, which makes it one of the nearest of all galaxies. At magnitude 8.1, it's one of the dozen brightest galaxies in the heavens, and perhaps one of the four or five most detailed galaxies for observers with a small telescope, especially for observers in the southern hemisphere.

NGC 300 lies at about the same distance as NGC 55 and shines with the same brightness. But its light is spread over a larger apparent surface, so it looks fainter and is harder to find in a small telescope. Look for it about  $1.8^\circ$  northwest of the star xi ( $\xi$ ) Sculptoris.

## ... Two Fine Galaxies



LEFT: A rough sketch of NGC 300 made with a 10" f/4.7 Newtonian reflector at 65x.

While not as striking as NGC 55, NGC 300 is still a compelling sight in a 4-inch or larger scope at low power. There are traces of two spiral arms visible in very dark sky. The overall view brightens in an 8-inch or larger scope, but lower power usually gives a better view. The galaxy grows apparently larger but dims appreciably at higher magnification. Look also for a number of foreground stars superimposed on the galaxy. These stars often tantalize supernova hunters who mistake them for exploding stars.

Astronomers have long considered NGC 55 and NGC 300 to be members of the Sculptor Group. But they are sufficiently far away from NGC 253 and other Sculptor galaxies that some doubt they are truly members. They may be only foreground objects.



**NGC 55 - The Whale Galaxy**

Image by John Gill

**NGC 300** - Image by Robert Broaz,



**NGC 253 - The Sculptor Galaxy**  
Image by John Gill



# The Cover Image - The Swan Nebula

By John Gill

The Omega Nebula, also known as the Swan Nebula, Checkmark Nebula, and the Horseshoe Nebula is an H II region in the constellation Sagittarius. It was discovered by Philippe Loys de Chéseaux in 1745. Charles Messier catalogued it in 1764. It is located in the rich starfields of the Sagittarius area of the Milky Way.

The Omega Nebula is between 5,000 and 6,000 light-years from Earth and it spans some 15 light-years in diameter. The cloud of interstellar matter of which this nebula is a part is roughly 40 light-years in diameter and has a mass of 30,000 solar masses. The total mass of the Omega Nebula is an estimated 800 solar masses.

It is considered one of the brightest and most massive star-forming regions of our galaxy. Its local geometry is similar to the Orion Nebula except that it is viewed edge-on rather than face-on.

The open cluster NGC 6618 lies embedded in the nebulosity and causes the gases of the nebula to shine due to radiation from these hot, young stars; however, the actual number of stars in the nebula is much higher - up to 800, 100 of spectral type earlier than B9, and 9 of spectral type O, plus over a thousand stars in formation on its outer regions. It is also one of the youngest clusters known, with an age of just 1 million years.

The luminous blue variable HD 168607, located in the south-east part of the Omega nebula, is generally assumed to be associated with it; its close neighbor, the blue hypergiant HD 168625, may be too.

The Swan portion of M17, the Omega Nebula in the Sagittarius nebulosity is said to resemble a barber's pole.

## TECH SPECS:

APM 107/700 apo telescope on CGX mount  
ZWO1600mm camera 6hr 45min integration time  
43 x Ha, 23 x Sii, 24 x Oiii  
80 Darks & 120 Flats per filter  
Processed in PixInsight

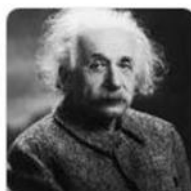
Can you name the famous five astronomers?



Last months famous five astronomers were:



Christiaan Huygens



Albert Einstein



Giovanni Cassini



Maria Mitchell



Hipparchus of Nicaea

# Meet Calypso, a daredevil mission concept to explore the surface of Venus

By Paul Sutter

Just because it's hard doesn't mean we shouldn't do it.



ABOVE: A computer-simulated view of the northern hemisphere of Venus.

Of all the rocky, inner worlds of the solar system, Venus is the most challenging to explore.

With surface temperatures reaching a bewildering 867 degrees Fahrenheit (464° Celsius), even the most hardened landers can't survive for long. But a new idea, called the Calypso Venus Scout, calls for a bold new mission design: a science probe dangling 20 miles (32 kilometers) below a cloud-borne balloon.

## Welcome to hell

Because Venus is only slightly smaller than our own planet, it's taken up the nickname of the "Earth's twin." But if Venus really is a twin of the Earth, it's the evil kind. Despite their similar sizes, the two worlds couldn't be more different. While Earth maintains a balmy climate, with a decent atmosphere keeping the lid on vast expanses of liquid water oceans, Venus is a nightmare world.

Its atmosphere is almost completely carbon dioxide and reaches pressures 92 times that found at Earth's sea level. The noxious atmosphere is so thick that the planet's surface temperatures are the hottest in the inner solar system — warmer even than Mercury, despite sitting 50% farther away from our sun.

Of all the missions of Venus, only the Soviets attempted any landings, with the Venera program. Brutalized by the extreme conditions, most of those landers failed, but a few managed to survive long enough to send back a few quick exposures before succumbing.

No lander has reached the Venusian surface since Venera 14 in 1982. To date, our only records of the surface come from those few Soviet probes and the occasional orbiter. Even though Venus may be our twin, we know far too little about it.

## The winds of Venus

Even nearly 40 years after the last Venera mission, we do not have the technology to build a reliable, long-term probe to survey the terrain of Venus like we do on Mars. What's more, with all the interest in Mars exploration, including possible human visits, nobody really wants to spend the money on developing the technologies needed for a still-risky Venus venture.

But there could be another way to do it, and it's called the Calypso Venus Scout, as outlined in a white paper recently posted to the preprint site arXiv.org. Calypso isn't under NASA consideration right now; the paper's author wrote about it to give the decadal survey, the government's long-term planning process for planetary science, a broader sense of current options.



## ... Meet Calypso

The mission tries to balance the twin challenges of Venus: The surface of Venus is just too dang hot, but orbital missions trying to study the surface are hampered by the miles and miles of thick, hazy cloud layers, making precise measurements incredibly difficult.

So Calypso would go in between.

At an altitude of about 20 miles, the thick clouds of Venus clear away. If you can get a probe below that level, then you should have a clear, unobstructed view of the ground. And while it's still ridiculously hot at that altitude, it's not nearly as hot as the surface: a relatively balmy 260° F (130° C).

Upon Calypso's arrival at Venus, a massive balloon would deploy in the atmosphere, right at the top of the cloud layers, keeping steady at an altitude of about 30 miles (50 km). At that height, the temperature and pressure don't require any ingenious new technology and solar panels can provide ample power to the probe.

From that balloon, a descent module would trail down, held to the balloon by a tether 10-20 miles (15-30 km) long. The descent module would poke beneath the clouds and take some pictures, surveying the terrain as the high-altitude winds blow the balloon around. Then, once the temperatures inside the descent module get too hot to handle, the module would reel back up above the clouds, relaying the data back to Earth while the module cools off for another round.

### The better to see you

On its way up and down, the probe would slowly scan the surface of Venus in visible and infrared wavelengths to a potential resolution of just a few inches or centimeters. One of the most powerful aspects of Calypso is that it wouldn't be limited to studying just a single landing site, but would be able to survey wide swaths of the Venusian landscape.

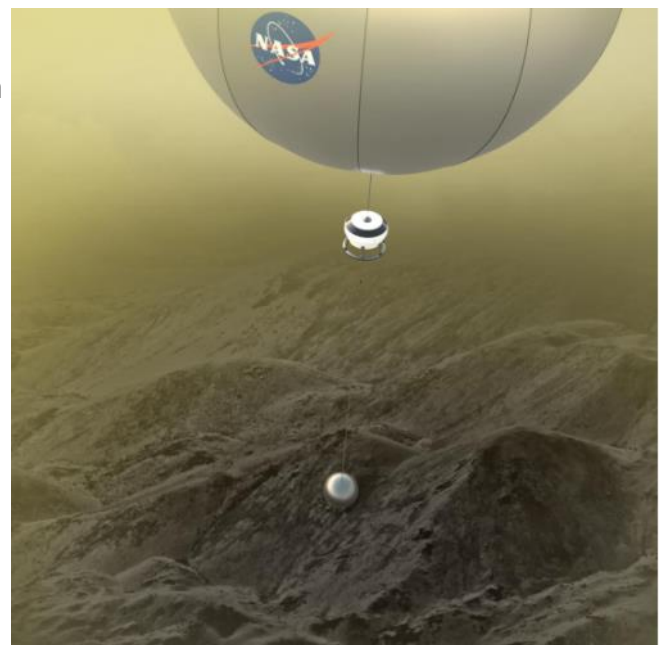
Understanding Venus is critical for learning about our own planet. Billions of years ago, Venus really was a twin of Earth, with liquid water oceans and a pleasant atmosphere. But a runaway greenhouse event on Venus evaporated the oceans, allowed carbon dioxide to vent into the atmosphere unchecked, and left the place a ruin. Venus became so dry that plate tectonics completely shut down, locking its surface in place for at least hundreds of millions of years.

Venus is both a time capsule, providing a glimpse into what an Earth-size planet was up to long ago, and a cautionary tale. By studying Venus more, with daring missions like Calypso, we can better learn what our own fate might be.

Further information can be found on the published RIGHT: Conceptual representation of the Calypso mission (Image: Reproduction / Sam Zaref / arXiv)

white paper :

<https://arxiv.org/ftp/arxiv/papers/2008/2008.08620.pdf>



# Are some Blackholes Wormholes in Disguise? Gamma-ray blasts may shed clues.

By Charles Q. Choi

Brilliant flashes could be a clue.



ABOVE: Artist impression of a Wormhole. Image © Shutterstock

Unusual flashes of gamma rays could reveal that what appear to be giant black holes are actually huge wormholes, a new study finds.

Wormholes are tunnels in space-time that can theoretically allow travel anywhere in space and time, or even into another universe. Einstein's theory of general relativity suggests wormholes are possible, although whether they really exist is another matter.

In many ways, wormholes resemble black holes. Both kinds of objects are extremely dense and possess extraordinarily strong gravitational pulls for bodies their size. The main difference is that no object can theoretically come back out after crossing a black hole's event horizon — the threshold where the speed needed to escape the black hole's gravitational pull exceeds the speed of light — whereas any body entering a wormhole could theoretically reverse course.

Assuming wormholes might exist, researchers investigated ways that one might distinguish a wormhole from a black hole. They focused on supermassive black holes with masses millions to billions of times that of the sun, which are thought to dwell at the hearts of most, if not all, galaxies. For example, at the center of our Milky Way galaxy lies Sagittarius A\*, a monster black hole that is about 4.5 million solar masses in size.

Anything entering one mouth of a wormhole would exit out its other mouth. The scientists reasoned that meant that matter entering one mouth of a wormhole could potentially slam into matter entering the other mouth of the wormhole at the same time, a kind of event that would never happen with a black hole.

## ... Blackholes Wormholes in Disguise?

Any matter falling into a mouth of a supermassive wormhole would likely travel at extraordinarily high speeds due to its powerful gravitational fields. The scientists modeled the consequences of matter flowing through both mouths of a wormhole to where these mouths meet, the wormhole's "throat." The result of such collisions are spheres of plasma expanding out both mouths of the wormhole at nearly the speed of light, the researchers said.

"What surprises me most of all is that no one has proposed this idea before, because it is rather simple," study lead author Mikhail Piotrovich, an astrophysicist at the Central Astronomical Observatory in Saint Petersburg, Russia, told Space.com.

The researchers compared the outbursts from such wormholes with those from a kind of supermassive black hole known as an active galactic nucleus (AGN), which can spew out more radiation than our entire galaxy does as they devour matter around them, and do so from a patch of space no larger than our solar system. AGNs are typically surrounded by rings of plasma known as accretion disks and can emit powerful jets of radiation from their poles.

The spheres of plasma from wormholes can reach temperatures of about 18 trillion degrees Fahrenheit (10 trillion degrees Celsius). At such heat, the plasma would produce gamma rays with energies of 68 million electronvolts.

In contrast, "accretion disks of AGNs don't emit gamma radiation, because their temperature is too low for that," Piotrovich said. Moreover, although jets from AGNs can emit gamma rays, these would mostly travel in the same direction as the jets — any traveling out in a sphere might suggest they came from a wormhole, he noted.

In addition, if an AGN resided in a kind of galaxy known as a Type I Seyfert — one in which hot gas was expanding rapidly — prior work suggested it would likely not generate many gamma rays with energies of 68 million electronvolts. If astronomers did see an AGN in a Type I Seyfert galaxy with a significant peak of such rays, that could mean that seeming AGN was actually a wormhole, the researchers said.

The scientists detailed their findings online Aug. 21 in a study accepted for publication in the journal Monthly Notices of the Royal Astronomical Society.



# Shadow of blackhole in M87 galaxy is wobbling and has been for a while



Analysis of previously unpublished data from observations of M87\* between 2009 and 2013 by scientists at the Event Horizon Telescope (EHT) has revealed that the crescent shadow of the black hole is wobbling, and has rotated significantly over the past ten years of observation. Published on September 25th, 2020 in *The Astrophysical Journal*, and led by scientists from the Center for Astrophysics | Harvard & Smithsonian (CfA), the study focused on the morphology of the black hole over time, and was made possible by advances in analysis and understanding achieved as a result of EHT's groundbreaking black hole photo in 2019.

"EHT can detect changes in the M87 morphology on timescales as short as a few days, but its general geometry should be constant on long timescales," said Maciek Wielgus, an astronomer at CfA, Black Hole Initiative (BHI) Fellow, and lead author on the paper. "In 2019, we saw the shadow of a black hole for the first time, but we only saw images observed during a one-week window, which is too short to see a lot of changes."

Combining previous data from 2009-2013 with data leading up to 2019 revealed that M87\* adheres to theoretical predictions. The shape of the black hole's shadow has remained consistent, and its diameter remains in agreement with Einstein's theory of general relativity for a black hole of 6.5-billion solar masses. "In this study, we show that the general morphology, or presence of an asymmetric ring, most likely persists on timescales of several years," said Kazu Akiyama, a scientist at the MIT Haystack Observatory, and a participant on the project. "This is an important confirmation of theoretical expectations as the consistency throughout multiple observational epochs gives us more confidence than ever about the nature of M87\* and the origin of the shadow."

While the crescent diameter remained consistent, new data also proves it was hiding a surprise: the ring is wobbling, and that means big news for scientists. For the first time, scientists will be able to catch a glimpse of the dynamical structure of the black hole's accretion flow; studying this region holds the key to understanding phenomena like launching relativistic jets. "The morphology of a relativistic jet -- low density outflow of tremendously energetic particles and fields -- for example, is key to understanding the interactions with the surrounding medium in a black hole's host galaxy," said Richard Anantua, a postdoc at the Center for Astrophysics | Harvard & Smithsonian and BHI Fellow, adding that studying morphology weaves an important story about black holes and their hosts.

The gas falling onto a black hole heats up to billions of degrees, ionizes and becomes turbulent in the presence of magnetic fields. This turbulence causes the appearance of the black hole to vary over time. "Because the flow of matter falling onto a black hole is turbulent, we can see that the ring wobbles with time," said Wielgus. "The dynamics of this wobbling will allow us to constrain the accretion flow." Anantua added that it is important to constrain accretion flows because, "The accretion flow contains matter that gets close enough to the black hole to allow us to observe the effects of strong gravity, and in some circumstances, allows us to test predictions from general relativity, like we've done in this study."

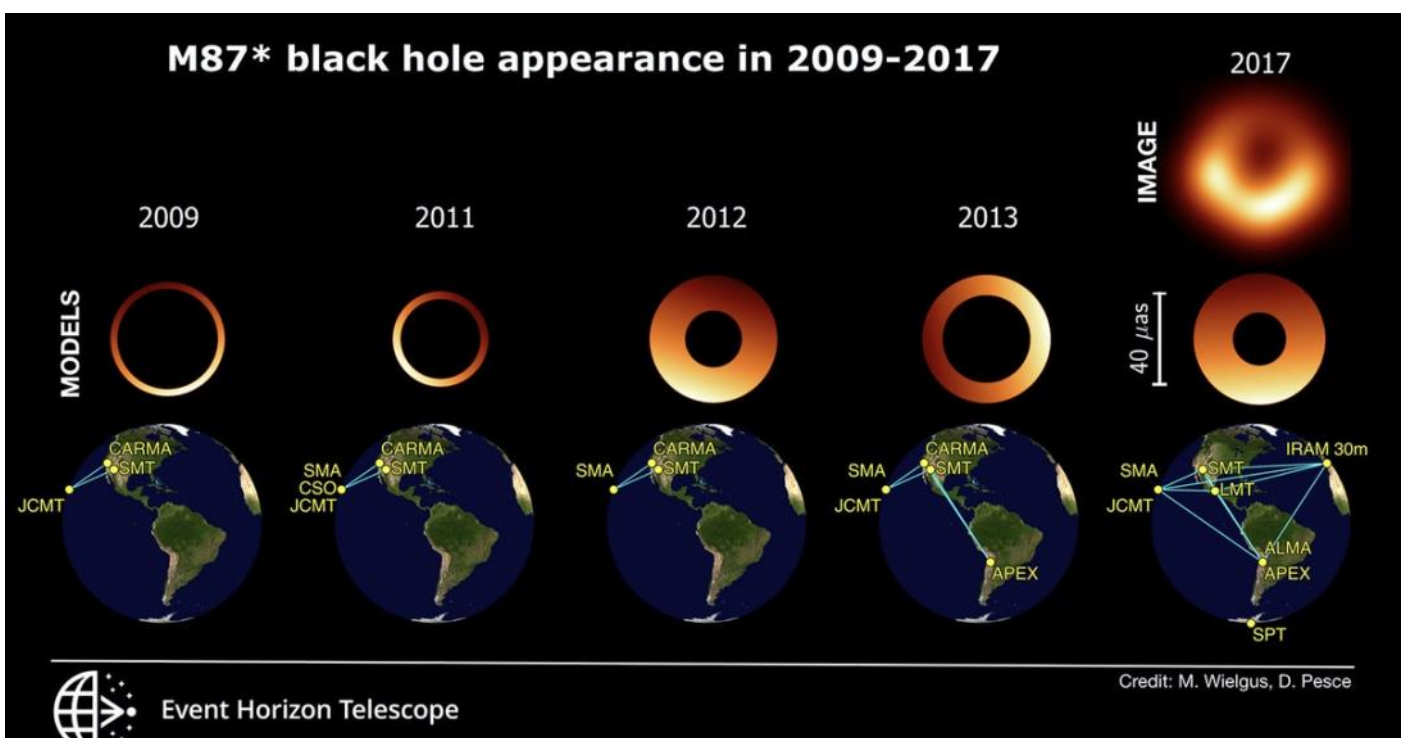
## ... Shadow of Blackhole

Early data in the EHT collaboration were taken by just a few telescopes and a few dozen people. The CfA's Submillimeter Array (SMA) -- a radio telescope located on Mauna Kea, Hawai'i -- was among the small group that started the collaboration and captured the early data used for the current study. Simon Radford, Operations Director at the SMA said, "Hawai'i telescopes pioneered this technique over the past decade and were crucial to the success of early EHT experiments," adding that the combination of the technology, telescopes, and location are what made the early data useful and meaningful.

Ten years later the data has become an invaluable tool to understanding not only M87, but all black holes. "These early EHT experiments provide us with a treasure trove of long-term observations that the current EHT, even with its remarkable imaging capability, cannot match," said Shep Doeleman, Founding Director, EHT. "When we first measured the size of M87 in 2009, we couldn't have foreseen that it would give us the first glimpse of black hole dynamics. If you want to see a black hole evolve over a decade, there is no substitute for having a decade of data." Wielgus added that the continued analysis of past observations, along with new observations "will lead to a better understanding of the dynamical properties of M87, and black holes in general."

The EHT and many of its key scientists are supported with funding from public entities, including the National Science Foundation and the Smithsonian Institution and from private entities including the John Templeton Foundation and the Gordon and Betty Moore Foundation.

For a simulation of the movement of the black hole's wobble , watch the simulation on :



[https://youtu.be/v\\_Bk2997YMA](https://youtu.be/v_Bk2997YMA)

# Space News & Updates

## Estée Lauder paying NASA for skincare photoshoot on the ISS

By Robert Z. Pearlman

A simulated view of the type that Estée Lauder is paying NASA to produce aboard the International Space Station. Ten bottles of the cosmetics company's Advanced Night Repair serum will be photographed in Earth orbit.

Image: © NASA/Estée Lauder/collectSPACE.com



High-profile cosmetics company is providing a new look for NASA by using the International Space Station to market its products.

Estée Lauder is paying NASA to launch bottles of its nighttime skincare serum so they can be photographed aboard the International Space Station. The company is using the flight of its Advanced Night Repair Synchronized Multi-Recovery Complex to create content for its social media channels, as well as deliver back a unique flown-in-space artifact that Estée Lauder intends to auction for charity.

The bottles are launching on board Northrop Grumman's NG-14 Cygnus cargo spacecraft, the S.S. Kalpana Chawla, which is scheduled to lift off from NASA's Wallops Flight Facility in Virginia on Sept. 29. If the launch proceeds to plan, the un-crewed spacecraft will arrive at the space station four days later on Oct. 3.

"We chose this iconic product because of its long history of firsts in the beauty industry," Stéphane de La Faverie, group president of Estée Lauder Companies and global brand president of Estée Lauder, said during a call with reporters on Thursday (Sept. 24). "When it launched in 1982 as Night Repair, it was the first nighttime repair serum in the beauty industry and the first-ever beauty product to use hyaluronic acid."

"Now, 30 years later, we are adding another first to its legacies as the first serum to launch into space," de La Faverie said.

The ten 1.7 oz (50 ml) bottles of Advanced Night Repair serum are flying under a new NASA program that devotes five percent of its space station activities to commercial and marketing-focused projects. The space agency is promoting and enabling the commercialization of the space station so it can eventually redirect the money it spends in low Earth orbit to future deep space exploration missions.

"We are really proud to be part of this opportunity, which I believe reflects Estée Lauder's commitment to innovation and science and for thinking outside of the box. This type of commercial opportunity helps NASA to continue their deep space exploration, and we're proud to support this initiative. They push the boundaries of innovation and exploration every day," de La Faverie.

## ...Space News & Updates

"We really believe this type of activity can help catalyze and expand space exploration markets for many businesses by demonstrating the value of conducting commercial activities in space," said Phil McAlister, director of commercial spaceflight development at NASA Headquarters in Washington, D.C. "We also think there is value from a large, well-known company, such as Estée Lauder, being among the first companies to take advantage of our commercial use policy. We really hope that this will increase awareness of these opportunities among the commercial community.

Per a fee schedule announced by NASA in June 2019, Estée Lauder will pay NASA \$17,500 per hour for the time it takes an astronaut to photograph and film the bottles floating in front of the Earth-facing windows in the station's cupola. The company, working under an agreement brokered by Space Commerce Matters, a Boston-based space commercialization firm, will also be responsible for the cost of launching the bottles and returning them to Earth at a rate of \$3,000 per kilogram up and \$6,000 per kilogram down.

Per the federal restrictions that apply to all civil servants, no astronauts will appear with the Night Repair bottles. Station crew members did not receive any type of special training for this activity and the photographer has yet to be selected ("an astronaut will be assigned based on availability when the activity gets added to the timeline," a NASA representative said).

Estée Lauder will not be able to use the imagery to imply endorsement or approval by NASA or its astronauts, and once the bottles are back on Earth, Estée Lauder plans to offer one to the public. "One of the other exciting things is that when the Advanced Night Repair bottles return to Earth next spring, we're looking forward to auctioning one of the bottles for charity," de La Faverie said.

Commercial, off-the-shelf products have flown on NASA missions since the first Mercury spaceflights in the early 1960s. Under educational outreach agreements and research-based partnerships, branded products — including LEGO toys and Coca-Cola soda cans — have been photographed on U.S. spacecraft. Astronauts have also flown and used cosmetic and skincare products as part of their personal hygiene kits.

Other countries' crew members, including Russian cosmonauts, have filmed products aboard previous orbital outposts and on the ISS. Estée Lauder is the second company to do so with NASA, following a less-publicized activity with Adidas.

### **Vanity knows no boundaries - they think!**

1978 was the year NASA engineers devised a makeup set for their top female astronauts containing mascara, lip gloss and blusher. Here is an archive image of the cosmetics kit alongside a quote from astronaut Sally Ride, reports on the Daily News. It read: "The engineers at NASA, in their infinite wisdom, decided that women astronauts would want makeup - so they designed a makeup kit . You can imagine the discussions amongst the predominately male engineers about what should go in a make up kit.



# Comet discovered to have its own northern lights



LEFT: This composite a mosaic comprising four individual NAVCAM images taken from 19 miles (31 kilometers) from the center of comet 67P/Churyumov-Gerasimenko on Nov. 20, 2014. The image resolution is 3m per pixel - *Credit: ESA/Rosetta/NAVCAM*

Dated September 21, 2020; an atmospheric light show previously relegated to planets and Jupiter moons is found on comet using data from ESA's Rosetta spacecraft

Comet 67P/Churyumov-Gerasimenko has its own far-ultraviolet aurora, data reveal. It is the first time such electromagnetic emissions in the far-ultraviolet have been documented on a celestial object other than a planet or moon. A paper on the findings was released on September 25th, 2020 in the journal *Nature Astronomy*

On Earth, aurora (also known as the northern or southern lights) are generated when electrically charged particles speeding from the Sun hit the upper atmosphere to create colorful shimmers of green, white, and red. Elsewhere in the solar system, Jupiter and some of its moons -- as well as Saturn, Uranus, Neptune, and even Mars -- have all exhibited their own version of northern lights. But the phenomena had yet to be documented in comets.

Rosetta is space exploration's most traveled and accomplished comet hunter. Launched in 2004, it orbited comet 67P/Churyumov-Gerasimenko (67P/C-G) from Aug. 2014 until its dramatic end-of-mission comet landing in Sept. 2016. The data for this most recent study is on what mission scientists initially interpreted as "dayglow," a process caused by photons of light interacting with the envelope of gas -- known as the coma -- that radiates from, and surrounds, the comet's nucleus. But new analysis of the data paints a very different picture.



"The glow surrounding 67P/C-G is one of a kind," said Marina Galand of Imperial College London and lead author of the study. "By linking data from numerous Rosetta instruments, we were able to get a better picture of what was going on. This enabled us to unambiguously identify how 67P/C-G's ultraviolet atomic emissions form."

The data indicate 67P/C-G's emissions are actually auroral in nature. Electrons streaming out in the solar wind -- the stream of charged particles flowing out from the Sun -- interact with the gas in the comet's coma, breaking apart water and other molecules. The resulting atoms give off a distinctive far-ultraviolet light. Invisible to the naked eye, far-ultraviolet has the shortest wavelengths of radiation in the ultraviolet spectrum.

Exploring the emission of 67P/C-G will enable scientists to learn how the particles in the solar wind change over time, something that is crucial for understanding space weather throughout the solar system. By providing better information on how the Sun's radiation affects the space environment they must travel through, such information could ultimately help protect satellites and spacecraft, as well as astronauts traveling to the Moon and Mars.



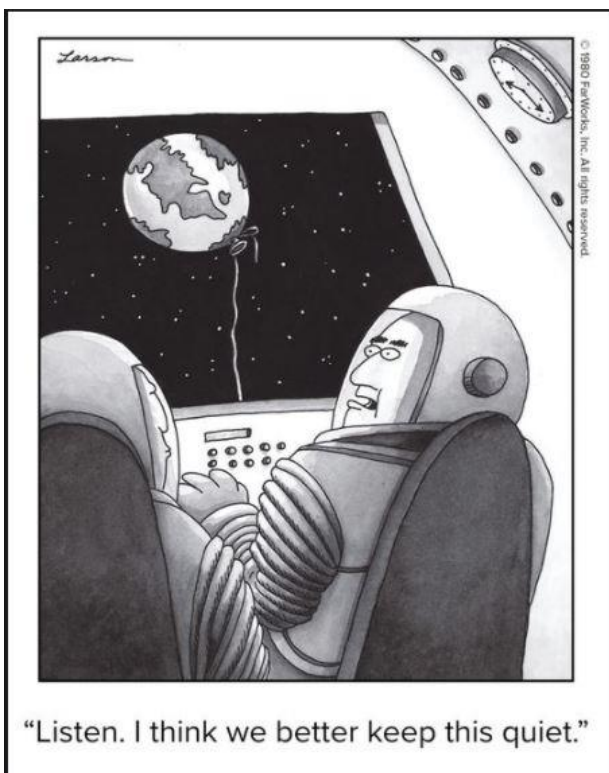
## ...Comet

Rosetta is the gift that keeps on giving," said Paul Feldman, an investigator on Alice at the Johns Hopkins University in Baltimore and a co-author of the paper. "The treasure trove of data it returned over its two-year visit to the comet have allowed us to rewrite the book on these most exotic inhabitants of our solar system -- and by all accounts there is much more to come."

### NASA Instruments Aboard ESA's Rosetta

NASA-supplied instruments contributed to this investigation. The Ion and Electron Sensor (IES) instrument detected the amount and energy of electrons near the spacecraft, the Alice instrument measured the ultraviolet light emitted by the aurora, and the Microwave Instrument for the Rosetta Orbiter (MIRO) measured the amount of water molecules around the comet (the MIRO instrument includes contributions from France, Germany, and Taiwan). Other instruments aboard the spacecraft used in the research were the Italian Space Agency's Visible and InfraRed Thermal Imaging Spectrometer (VIRTIS), the Langmuir Probe (LAP) provided by Sweden, and the Rosetta Orbiter Spectrometer for Ion and Neutral Analysis (ROSINA) provided by Switzerland.

Rosetta was an ESA mission with contributions from its member states and NASA. Rosetta's Philae lander, which successfully landed on the comet in November 2014, was provided by a consortium led by the German Aerospace Center in Cologne; Max Planck Institute for Solar System Research in Gottingen, Germany; the French National Space Agency in, Paris; and the Italian Space Agency in Rome. A division of Caltech, NASA's Jet Propulsion Laboratory in Southern California managed the U.S. contribution of the Rosetta mission for NASA's Science Mission Directorate in Washington. JPL also built the MIRO and hosts its principal investigator, Mark Hofstadter. The Southwest Research Institute (San Antonio and Boulder, Colorado), developed the Rosetta orbiter's IES and Alice instruments and hosts their principal investigators, James Burch (IES) and Joel Parker (Alice).



# Some Interesting Space Facts 1-20

1. Mercury & Venus are the only 2 planets in our solar system that have no moons



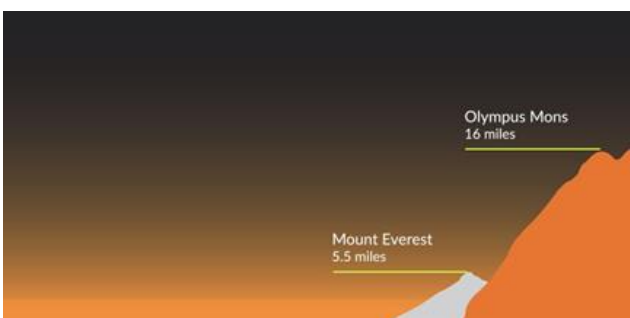
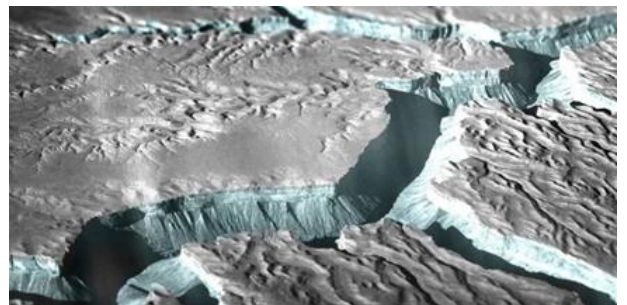
2. If a star passes too close to a black hole, it can be torn apart.

3. The hottest planet in our solar system is Venus.



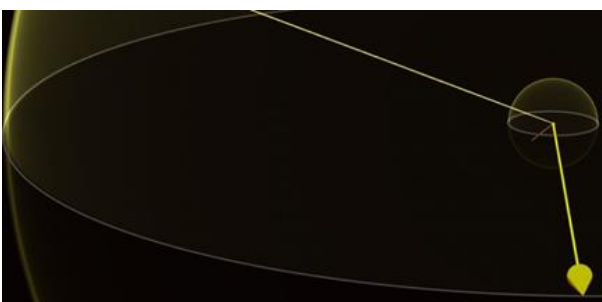
4. Our solar system is 4.57 billion years old. Accurately, 4.571 billion years old.

5. Enceladus, one of Saturn's smaller moons, reflects 90% of the Sun's light.



6. The highest mountain discovered is the Olympus Mons, which is located on Mars 25 km high

7. The Whirlpool Galaxy (M51) was the first celestial object identified as being spiral.



8. A light-year is the distance covered by light in a single year.

# ...Space Facts

9. The Milky Way galaxy is 105,700 light-years wide.



10. The Sun weighs about 330,000 times more than Earth.

11. Footprints left on the Moon won't disappear as there is no wind.



12. Because of lower gravity, a person who weighs 220 lbs on Earth would weigh 84 lbs on Mars.

13. There are 79 known moons orbiting Jupiter



14. The Martian day is 24 hours 39 minutes and 35 seconds long.

15. NASA's Crater Observation and Sensing Satellite (LCROSS) found evidence of water on the Earth's Moon.



# ...Space Facts



16. The Sun makes a full rotation once every 25 – 35 days.

17. Earth is the only planet not named after a God.



18. Due to the Sun and Moon's gravitational pull, we have tides.

19. Pluto is smaller than the United States



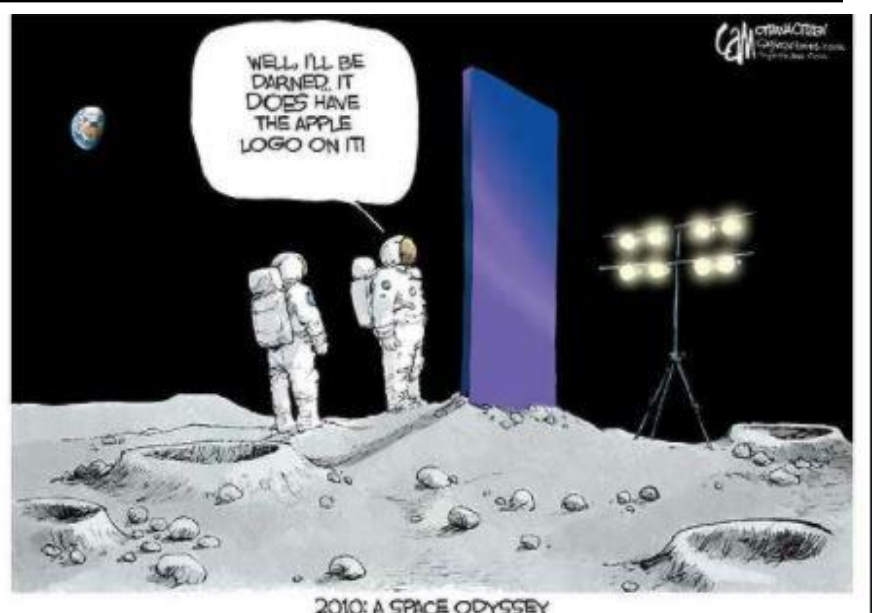
20. According to mathematics, white holes are possible, although as of yet we have found none.

SOU **Physics** (30/08/2020)  
term of the Day

**Casimir Effect**  
PARTICLE PHYSICS

@/the\_secrets\_of\_the\_universe

Casimir effect basically refers to the small attractive force that acts between the two uncharged conducting plates placed close and parallel to each other. It mostly occurs due to quantum vacuum fluctuations of the electromagnetic field. This quantum effect was first predicted Hendrik Casimir in 1948. Bosons produce an attractive Casimir effect where as Fermions produce repulsive effect.





# ASSA Durban - Minutes of the Meeting

09 September 2020 - 19:30-21:00 via Zoom

## Attendees:

|                 |                         |                     |                  |
|-----------------|-------------------------|---------------------|------------------|
| <b>Speaker:</b> | Dr. Adriana Marais      |                     |                  |
| <b>Members:</b> | Avril Soobramoney       | Brian Finch         | Claire Odhav     |
|                 | Carol and Bill Cuthbert | Corinne & John Gill | Debbie Abel      |
|                 | Don Orsmond             | Gerald de Beer      | Graham Alston    |
|                 | Maryanne Jackson        | Mike Hadlow         | Moya O'Donahue   |
|                 | Ooma Rambilass          | Piet Strauss        | Rinus Wiersma    |
|                 | Robert Suberg           | Roger Bond          | Sheryl Venter    |
|                 | Yesen Govender          |                     |                  |
| <b>Guests:</b>  | Charles                 | Craig               | Kirsten McLuckie |
|                 | Judy Stephenson         | Riyadh Gany         |                  |

Welcome: The Chairman, Piet Strauss, welcomed all attendees and introduced the guest Speaker Dr. Adriana Marais who was born and raised in Pietermaritzburg, KwaZulu Natal. Dr Marais is a South African theoretical physicist and technologist who studied at the University of Cape Town and returned to the University of KwaZulu Natal in Durban to complete her MSc summa cum laude in quantum cryptography

2. Presentation: Dr. Adriana Marais presented her work on her known phrase "Proudly Human", discussing life on Earth and Mars. "We are living in a unique point in the history of life on Earth, We have reached the point where our activities are having an effect on a global scale, and food, clean water and fresh air are fast becoming luxuries to which not all of us have access. In order to sustain our existence on this planet, each one of us needs think carefully about how we can contribute to the solution of the many problems and global issues that exist today." Dr Marais is also currently driving an off-world simulation experiment in Antarctica.

*There's a beautiful future in the universe, with or without us. The legacy we leave on earth is more important than what we leave on Mars".*

4. Thanks to:

- Dr. Adriana Marais for her interesting presentation
- Gerald Dr Beer for hosting the zoom meeting
- Cheryl Venter for co-ordinating the guest speaker

5. Finance:

Corinne Gill reported on the finances; which balances were:

- Investment account R 58 368.60
- Current account R 13 665.62
- Petty Cash R 936.00

6. General - Ideas for the International Observe the Moon Night were requested, subject to the lockdown level, weather, and school regulations, and the possibility of holding another astrophotography course .

7. Meeting Closed: 21:05

# Notice Board

## MEETINGS:

- **All meetings, star parties, out-reach and public viewing are on hold due to Covid 19 lockdown.**

## MNASSA:

- Monthly Notes of the Astronomical Society of Southern Africa.
- Available at [www.mnassa.org.za](http://www.mnassa.org.za) to download your free monthly copy.

## NIGHTFALL:

- Fantastic astronomy magazine, go check it out.
- Available from the ASSA website [assa.saa.ac.za/sections/deep-sky/nightfall/](http://assa.saa.ac.za/sections/deep-sky/nightfall/)

## MEMBERSHIP FEES & BANKING:

- Members : **R 170**
- Family Membership: **R 200** Maximum 2 members
- Cheques: **Please note NO cheques will be accepted - Please pay by EFT**
- EFT: **ASSA Natal Centre**
- Bank: **Nedbank**
- Account No. **1352 027 674**
- Branch: **Nedbank Durban North**
- Code **135 226**
- Reference: **Please use your surname and name**
- Proof of Payment: **treasurer@astronomydurban.co.za**



**RESIGNATIONS from ASSA - Please send an email immediately notifying the Secretary.**

## CONTACTS:

- |                                      |                 |                   |
|--------------------------------------|-----------------|-------------------|
| • Chairman                           | Piet Strauss    | (+27) 83 703 1626 |
| • Vice Chair                         | Debbie Abel     | (+27) 83 326 4084 |
| • Secretary                          | Clair Odhav     | (+27) 83 395 5160 |
| • Treasurer                          | Corinne Gill    | (+27) 84 777 0208 |
| • Observatory & Equipment            | Mike Hadlow     | (+27) 83 326 4085 |
| • Publicity & Librarian              | Clair Odhav     | (+27) 83 395 5160 |
| • Out-Reach - Public                 | Sheryl Venter   | (+27) 82 202 2874 |
| • Out-Reach - Schools                | Sihle Kunene    | (+27) 83 278 8485 |
| • Special Projects                   | Corinne Gill    | (+27) 84 777 0208 |
| • St. Henry's Marist College Liaison | Moya O'Donoghue | (+27) 82 678 1103 |
| • 'nDaba Editor, Website & Facebook  | John Gill       | (+27) 83 378 8797 |

## ELECTRONIC DETAILS:

- Website: [www.astronomydurban.co.za](http://www.astronomydurban.co.za)
- Emails : [AstronomyDurban@gmail.com](mailto:AstronomyDurban@gmail.com)
- Instagram: [astronomydurban](https://www.instagram.com/astronomydurban)
- Facebook: [Astronomical Society of Southern Africa, Durban Centre](https://www.facebook.com/AstronomicalSocietyofSouthernAfricaDurbanCentre)

# Pieter Kotzé : Biography

Pieter Kotzé grew up on a wine farm near Vredendal in the Western Cape and obtained a PhD in physics from the University of Stellenbosch. He started his research career as a scientist at the Atomic Energy Corporation at Pelindaba and joined the Hermanus Magnetic Observatory in 1989 as a research physicist. For the past 31 years his research activities focused on the field of solar-terrestrial interactions and variations in the Earth's magnetic field.

Pieter is currently a Senior Research Fellow at the South African National Space Agency in Hermanus. In addition he is also appointed as an extraordinary professor in the Department of Physics at the University of Stellenbosch as well as the Centre for Space Research at the North-West University in Potchefstroom.

## Current Status of the Earth's Magnetic Field: Is it disappearing?

Speaker: Dr Pieter Kotzé, SANSA Space Science, Hermanus

### Summary:

Geomagnetism is one of the oldest scientific disciplines and has fascinated the minds of people like Edmund Halley and Albert Einstein. The requirements of navigation, rather than any scientific interest in geomagnetism, prompted the first recording of data of magnetic field components at the Cape of Good Hope even before 1600. Over the past few hundred years the Earth's magnetic field strength has been diminishing at a very fast rate, particularly in Southern Africa. In this presentation the current status of the Earth's magnetic field and particularly the South Atlantic Anomaly, as observed by ground-based observatories as well as low-Earth orbit satellites will be highlighted. Polar reversals and the implications for life on Earth will also be briefly discussed.



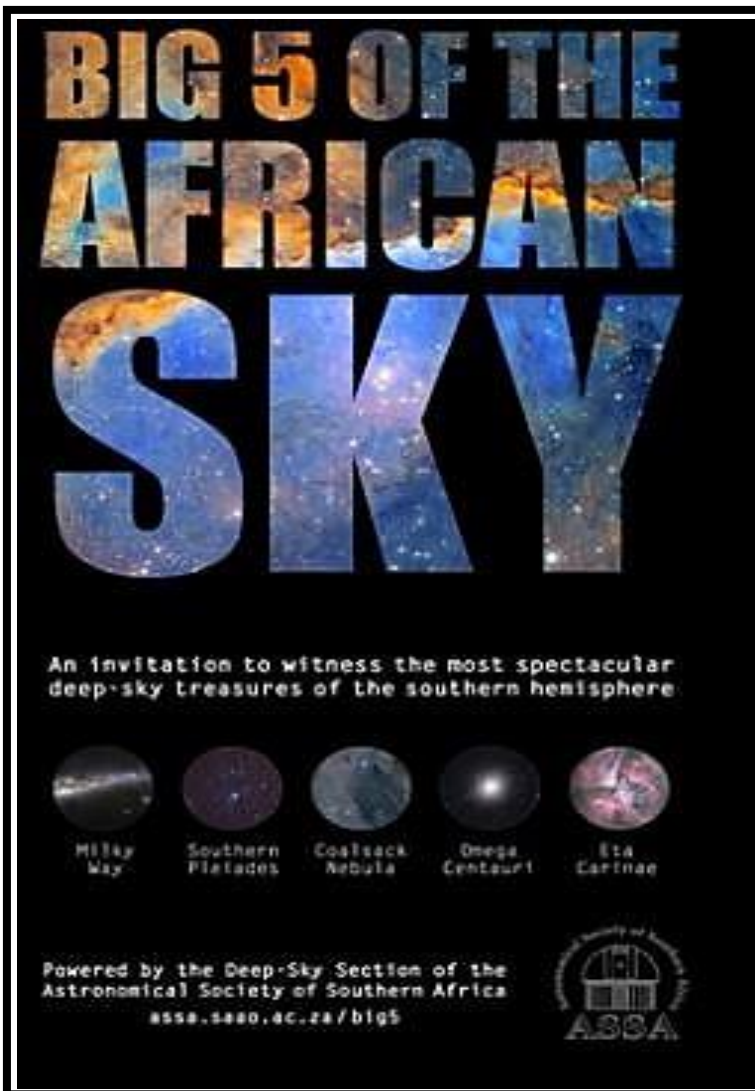
## THE BIG 5 OF THE AFRICAN SKY

The magnificent southern sky is a starry realm richly sown with a treasury of deep-sky objects: star clusters, bright and dark gas clouds, and galaxies.

From this (sometimes bewildering) array five specimens of each class of object have been selected by a special Deep-Sky Task Force and are presented here as the celestial Big Five.

The representative of open star clusters is the **Southern Pleiades**. First amongst the globular star clusters is the overwhelming **Omega Centauri**. Bright nebulae are represented by the majestic **Eta Carinae Nebula**. The mysterious dark nebulae are represented by the **Coal Sack**. And the most splendid galaxy of them all is our own **Milky Way Galaxy**.

Your mission is to observe each of these beautiful objects and report back on what you have witnessed.



All submitted observations will be carefully evaluated and feedback will be given.

The names of all participants will be acknowledged on the ASSA website. Observing certificates will be awarded only on merit and issued by the Deep-Sky Section of the Astronomical Society. Have fun, and keep looking up! <http://assa.saao.ac.za/sections/deep-sky/big5/honour-roll/>

Image and text from ASSA <http://assa.saao.ac.za/sections/deep-sky/big5/>



## Public Viewing Roster ASSA Durban



| Name             | Phone        | Name         | Phone        | New Moon      | Public Viewing |
|------------------|--------------|--------------|--------------|---------------|----------------|
| John Gill        | 083 378 8797 | Navi Naidoo  | 084 466 0001 | 24 Mar 2020   | 27 March 2020  |
| Mike Harrow      | 082 336 4084 | Debbie Abe   | 082 26 4084  | 23 April 2020 | 24 April 2020  |
| Maryanne Jackson | 082 882 7200 | Cheryl Meyer | 082 20 2874  | 2 May 2020    | 2 May 2020     |
| John Gill        | 083 378 8797 | Corinne Gill | 084 777 0208 | 21 June 2020  | 19 June 2020   |