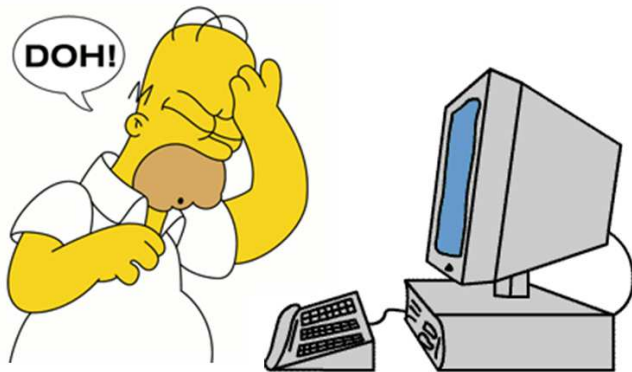


## March Meeting (Next Month!)



An oversight by the NPS&CA booking system means that the March Friday meeting has been double booked.

This is down to the change from a manual booking system to an online one and I guess was certain to happen at some time during the changeover.

Anyhow the result is that VAS will surrender to the local canine appreciation society's AGM as it seems they booked and paid for the date sometime last year.

Our monthly meeting will now be held on the Watery Lane observatory. This has restricted seating so it's a case of first come first served I'm afraid. If you are coming to our March meeting, please let Elaine Spear know as soon as you can (elainespear1@gmail.com).

## Data Protection

As I'm sure everyone knows, VAS keep a few details about its members on computer databases. It seems that to comply with upcoming Data Protection rules we have to ask you all if this is OK. We hope to have the full story by next month's NZ issue and will be including a form for you to complete. This will ask you give your "explicit permission" for us to use these details to continue as we have been for the past few years.

*Oh, it all makes work for the working volunteer to do....*

*Brian Curd  
Editor New Zenith*

## VAS Website: [wightastronomy.org](http://wightastronomy.org)

Submissions or letters to New Zenith are always welcome and should be sent to:

**The Editor, New Zenith  
Carpenter's Cottage  
Dennett Road  
Bembridge  
Isle of Wight PO35 5XF**

Tel: **01983 872875** or email: [editor@wightastronomy.org](mailto:editor@wightastronomy.org)

Material for the next issue by the 6th of the month please.

The Vectis Astronomical Society and the Editor of the New Zenith accept no responsibility for advice, information or opinion expressed by contributors.

**Registered Charity No 1046091**

## Observatory Diary

Monday, 19.30hrs	Members Only and by arrangement Telescope and night sky training. Please contact Martyn Weaver 07855 116490
Thursday	Members (19.30hrs) and Public (20.00hrs). Informal meeting and observing

## VAS Website: [wightastronomy.org](http://wightastronomy.org)

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## PLEASE NOTE

Monthly meetings are now held at the Newchurch Pavilion next to the Observatory. All meetings start at 19.30.

### 2018 Monthly Meetings

Date	Subject	Speaker
Check <a href="http://www.wightastronomy.org/meetings/">http://www.wightastronomy.org/meetings/</a> for the latest information		
23 Feb	Astronomical Observations on the Isle of Wight	Paul Bingham
23 Mar	Seven Moons: Some weird and wonderful satellites of the solar system	Bob Mizon
27 Apr	An Overview of the Development of the Universe to date	John Currihan
25 May	The Rise and Fall of the Herstmonceux Observatory	Keith Brakenborough
22 Jun		
27 Jul		
24 Aug	<b>AGM</b> The European Extremely Large Telescope	Dr Aprajita Verma
28 Sep		
26 Oct	Dark Skies Stargazing Night	
23 Nov		

### Observatory Visits Booked

26th Feb	Newchurch Scouts 17.30
28th Feb	Ryde Beaver Scouts 18.00
7th Mar	6th Newport Scouts 19.00
<b>Please phone me for the current situation (number on the front page)</b>	
It would be appreciated if members could avoid using the observatory at these times.	

### VAS Contacts 2017/18

<b>President</b>	Barry Bates president@wightastronomy.org
<b>Chairman</b>	Bryn Davis chairman@wightastronomy.org
<b>Secretary</b>	Richard Flux secretary@wightastronomy.org
<b>Treasurer</b>	Simon Plumley treasurer@wightastronomy.org
<b>Observatory Director</b>	Brian Curd director@wightastronomy.org
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<b>NZ Distribution</b>	Graham Osborne
<b>Others</b>	Mark Williams, Nigel Lee & Stewart Chambers

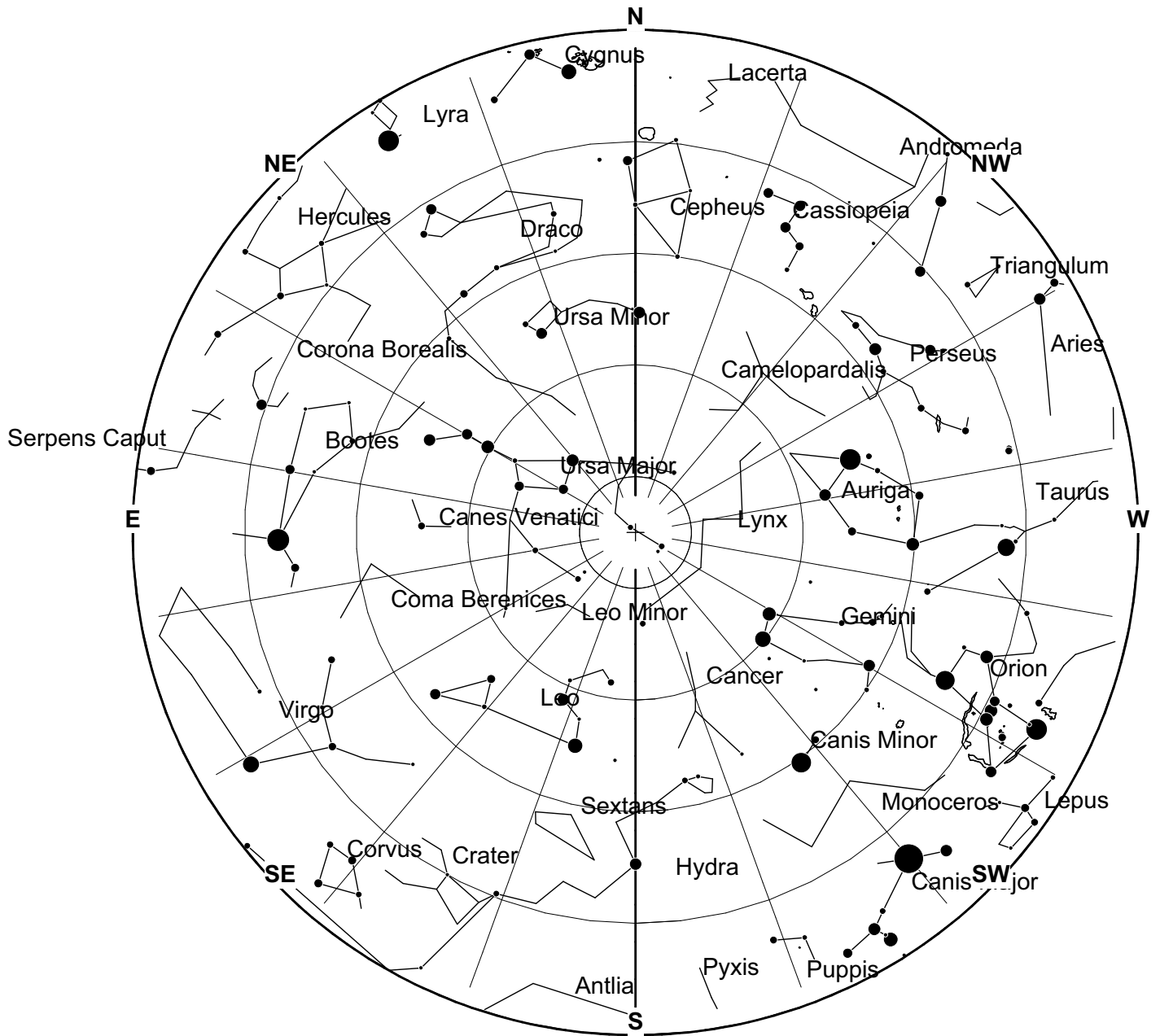
### Important

Members using the observatory **MUST** enter a line or two in the Observatory Log Book.

On several occasions, lights, heaters and the Meade LX200 have been left on!

When leaving, please ensure all is secure and all lights, heaters and telescopes are **TURNT OFF**.

# March 2018 Sky Map



*View from Newchurch Isle of Wight UK - 2200hrs - 15 March 2018*



**Messier 81** (also known as NGC 3031 or Bode's Galaxy) is a spiral galaxy about 12 million light-years away, in the constellation Ursa Major. Due to its proximity to Earth, large size, and active galactic nucleus (which harbours a 70 million Solar Mass supermassive black hole), Messier 81 has been studied extensively by professional astronomers. The galaxy's large size and relatively high brightness also make it a popular target for amateur astronomers.

Messier 81 was first discovered by Johann Elert Bode on December 31, 1774. Consequently, the galaxy is sometimes referred to as "Bode's Galaxy". In 1779, Pierre Méchain and Charles Messier reidentified Bode's object, which was subsequently listed in the Messier Catalogue.





*This article is licensed under the [GNU Free Documentation License](https://www.gnu.org/licenses/fdl.html).  
It uses material from the Wikipedia article "Messier 81".*

## March 2018 Night Sky

### Vernal Equinox

The vernal equinox, the moment that the Sun crosses the equator on its way north and day and night are of equal length occurs on March 20 at 04:14UT.

### Moon Phases

New	First Qtr	Full	Last Qtr
			
17th	24th	2nd/ 31st	9th

### Planets

#### Mercury

The evening apparition started last month continues with the Mercury setting about an hour after the Sun. During the first week use Venus as a guide Mercury slides up past the much brighter Venus starting about 4 moon diameters below and to the right, passing about a moon diameter to the right on the 4th. By the 14th it will be 4 degrees above Venus and getting more difficult to spot as sunset gets later.

#### Venus

Venus sets about an hour after the Sun. Look for it low in the west any time after sunset. If the sky is clear enough it can be seen even if the sky is still bright.

#### Mars

Mars is now starting to brighten as we start to rapidly close the distance between ourselves and the Red Planet. It rises at about 4am and is quite close to Saturn, both are about the same brightness and the brightest objects in that part of the sky. Mars is to the right of Saturn and has a distinctly ruddy colour compared to the more yellow Saturn.

#### Jupiter

From around midnight until dawn Jupiter is above our horizon, it is best placed for observation in the early morning passing due south at about 4am. Apart from the Moon it is the brightest object in the night time southern sky so is easily identified.

#### Saturn

Saturn rises in the southeast at about 4am and is still quite close to the horizon as dawn breaks making it rather difficult for observation this month.

### Uranus

For the first week of the month Uranus can be seen low down in the southwest for an hour or two after the sky darkens. It is not well placed for observation, either the sky is too bright or the planet is too close to the horizon. By the end of the month it is lost in the evening twilight.

### Neptune

On the 4th Neptune passes behind the Sun and so is unavailable for observation until its return to the morning sky later this year.

### Deep Sky

#### M81 Bodes Galaxy

**RA 9h 55m Dec 69° 2' mag 8.5**

One of the brightest galaxies in the Messier catalogue it can be seen against dark skies in binoculars. M81 is an almost face on spiral galaxy with two prominent arms, these along with traces of dark dust lanes can be seen in larger telescopes. Smaller 'scopes show an oval smudge with a hint of spiral arms and a bright core.

#### M82 Cigar Galaxy

**RA 9h 56m Dec 69° 41' mag 9.5**

Buy one, get one free! In the same field of view as M81 this is an edge on spiral, or maybe irregular galaxy that has suffering the effects of galactic interaction. The new star birth can easily be seen even in smaller telescopes as bright knots all along its length. The contrast between these two galaxies is quite striking, and made all the more so for being seen together. This galaxy pair is a sight not to be missed.

#### M97 The Owl Nebula

**RA 11h 15m Dec 54° 58' mag 12**

This faint planetary nebula can be found by following the line of the Big Dipper from Merak to Phecda for about 2 degrees then moving away from the dipper by about 3/4 of a degree. To become a planetary nebula is the fate that awaits our own star as it runs out of fuel, casts off its outer layers and contracts into a white dwarf. For a brief period the ultra violet radiation from the star causes the shell of gas to glow at it disperses into space and eventually fades away. A large telescope and dark skies are needed to see the owl's eyes, two dark voids in the gas.

*Peter Burgess*

## Galaxy Dynamics – the cutting edge

What makes the spiral arms in disk galaxies like our own Milky Way? How do the stars move over billions of years? How did our own Galaxy evolve, as the stars make heavier elements – the stardust from which we are all made? On Saturday 20<sup>th</sup> January this year I attended a series of lectures in Oxford which presented some of the current research into Galaxy Dynamics at the Rudolf Peierls Centre for Theoretical Physics. This was one of the thrice-yearly events and while the events are for alumni (and their guests), videos of the full lectures are available on the internet at <https://saturdaytheory.physics.ox.ac.uk/events/galaxy-dynamics>.

The speakers are current researchers and seasoned lecturers. They are theoretical astrophysicists rather observational astronomers, but their research – combined with the huge star surveys now underway – are yielding some fantastic insights into cosmology and astronomy.

The first lecture was by the eminent Prof James Binney, who looked at the physics of globular clusters (e.g. M13 with 300,000 stars – Fig. 1) and elliptical galaxies (with typically  $10^{11}$  stars), and showed that they do not obey the normal thermodynamics a physicist might expect. In fact there are properties sufficiently strange that he characterises them as a “new state of matter”! He showed how to construct models of the gravitational interactions between these large systems of stars and how these models predict the characteristic orbits of individual stars. These clusters are not static, and the stellar orbits within them are not something I would ever have imagined.

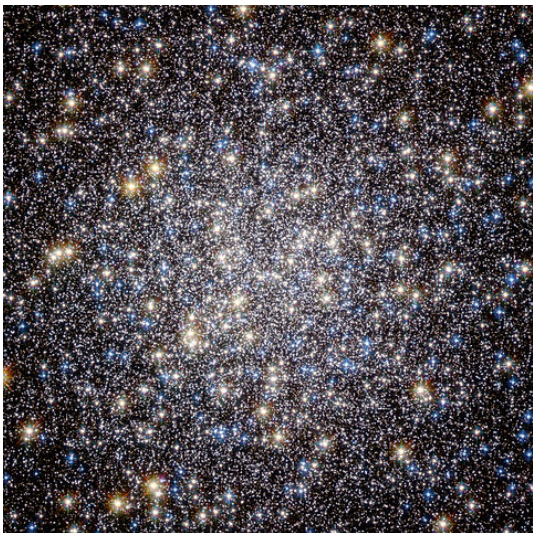


Figure 1: The Hercules Globular Cluster (M13) – By ESA/ Hubble and NASA - <http://www.spacetelescope.org/images/potw1011a/>, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=10825956>



Figure 2: The Whirlpool Galaxy (M51) – By NASA and European Space Agency – <http://www.spacetelescope.org/images/heic0506a/>, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=3863746>

Dr John Maggorian is a Scotsman with a dry sense of humour, and is the discoverer of the “Maggorian Relationship” which relates the size of a galaxy to the size of the massive black hole at its centre. His talk was not about black holes, but he explained the physics underlying the beautiful spiral arms of disc galaxies such as the Whirlpool Galaxy (M51) – Fig. 2. He spanned the millennia in more ways than one: he used ideas from ancient Greece as well as very recent research that characterises spiral arms as “density waves” that have a crucial role in re-distributing matter radially over the galaxy disk. The spiral arms are often where the stellar “nurseries” are sited – the nebulae in which young stars are born.

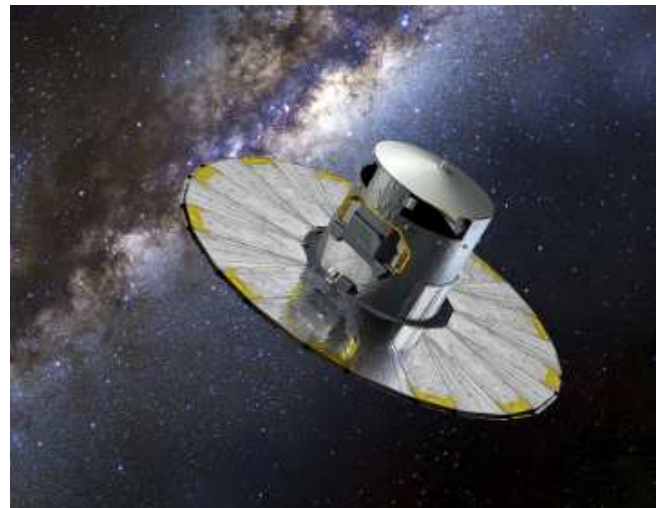


Figure 3: By Source (WP:NFCC#4), Fair use, <https://en.wikipedia.org/w/index.php?curid=39342811>

Dr Ralph Schoenrich, a younger German physicist, took up the story of how the density waves seen in the spiral arms evidently distributed matter through the evolution of our own Galaxy, using evidence from the huge 3D space catalogue of nearly a billion stars being

compiled by the GAIA spacecraft – Fig. 3. GAIA charts not only the positions, motions and luminosity of stars, but through spectrophotometric measurements is able to label each star with its chemical fingerprint – the abundance of different elements in the gas cloud from which it formed. His work reveals how these chemical abundances are crucial to understanding how stars move over billions of years, and how the evidence points to our own Sun having migrated a distance of about 2 kiloparsecs outwards from the centre of the Galaxy, during its 4.6 billion year lifetime.

It was a treat to get a view of some current research and growth in understanding our wonderful night sky. If you are intrigued by the ideas mentioned here, then follow the link to the talks or look up the references in the presentations. You may have to strap yourself in for some heavy duty mathematics (I can't claim to have followed it all!) but the ideas are truly amazing.

*Simon Gardner*

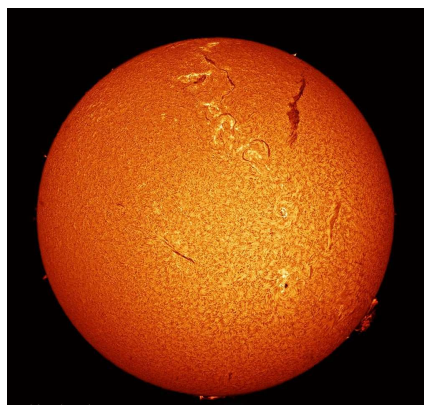
*simongardner344@gmail.com*

## FOR SALE



I have decided to sell my Coronado PST

Anyone in VAS having an interest in solar observation and acquiring a decent instrument please leave me a text message on **07443 034887** with offers



*John Langley*

## Solarsphere Astronomical and Music Festival

Dear Stargazers,

August might be a long way off, however!!!, Solarsphere Astronomical and Music Festival has a limited number of tickets which are already selling at double the speed of last year! This is why we are sending an email to you a little earlier than normal as we don't want you to miss out!

We have a fabulous line up of talks and music again this year, not to mention the other fun activities to keep you occupied including our traditional SCI-FI/MUSIC THEMED 'FANCY DRESS FRIDAY'! (optional of course)!

FOR DETAILS & UPDATES PLEASE VISIT:

[www.solarsphere.events](http://www.solarsphere.events)

Looking forward to seeing you and the Perseid Meteor Showers again!

With Kindest Regards

**Sarah,**

Solarsphere Organiser

## EasyFundRaising for VAS?

Did you know that whenever you buy anything online - from your weekly shop to your annual holiday - you could be collecting free donations for vectis astronomical society?

There are over 3,000 shops and sites on board ready to make a donation, including Amazon, John Lewis, Aviva, thetrainline and Sainsbury's - and it doesn't cost you a penny extra!

**It's as easy as 1, 2, 3...**

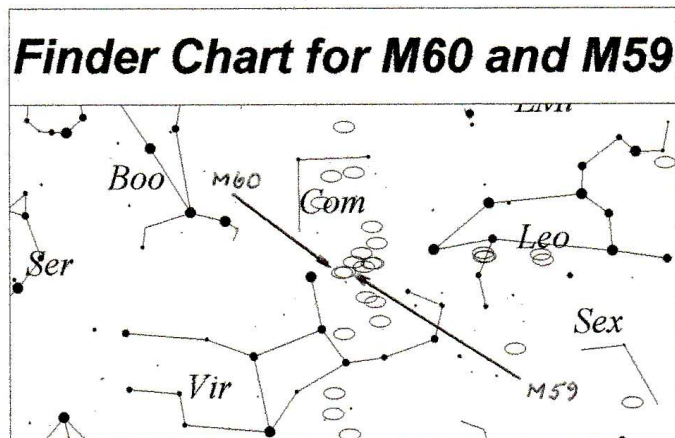
1. Head to <https://www.easyfundraising.org.uk/causes/vectisastromicalsociety/> and join for free.
2. Every time you shop online, go to easyfundraising first to find the site you want and start shopping.
3. After you've checked out, that retailer will make a donation to VAS at no cost to you!

**There are no catches or hidden charges and VAS will be really grateful for your donations.**

## My 100 Best Night Sky Sights

### Elliptical Galaxies

Coordinates: 12h 43m 42s, +11° 33"



Although earlier I said these objects don't generally figure in my top 100, I have to make one other exception. Whilst almost every elliptical galaxy looks like the same small patch of greyish light lacking any detail, here we have not one but three in the same field of view. **M60** in **Virgo** at 7 x 6 arc minutes in size, shining at mag 8.8 and brightening towards the centre is an easy target for almost any telescope. With a low power to give a wide field a second elliptical, **M59**, puts in an appearance  $\frac{1}{2}^\circ$  to the WNW and, though smaller at 5' x 3' and a magnitude dimmer, is still within the grasp of a 6" telescope. With larger instruments yet a third EG reveals itself. This is **NGC4647**, a dim mag 11.3 just 4' to the NW of M60 but only one-sixth its size and looking like a diminutive satellite of its near neighbour.

There are countless galaxies in the night sky, especially in the constellations of Virgo and Coma Berenices yet not so many opportunities to view more than two at a time through amateur telescopes. When you can do so, realisation of the immensity of the universe hits home with awesome effect - such a minute portion of the sky yet containing three galaxies. Its one thing to look at HST photographs of unending galaxies, but to observe a group for real through your own telescope is infinitely more stunning. Try these yourself in Spring.

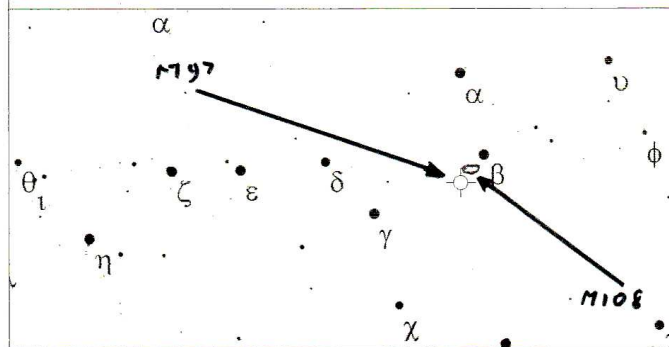
### Planetary Nebula/Spiral Galaxy

Coordinates: 11h 14m 48s, +55° 01"

**M97** in **Ursa Major** is known as the **Owl Nebula** due to two large, round, dark patches (the 'eyes') within the circle of dim light (the 'face'), but any owl with eyes this large would be able to see in absolute darkness! This isn't the easiest planetary to observe (at mag 12 its one of the dimmest of the Messier objects) needing very clean skies

but, once again there's a companion in the field which adds to the interest. To see M97 at all requires at least a 6" telescope; with an 8" it's still a challenge but when found may surprise you with its size. It's the second largest planetary directly visible through most amateur telescopes from our skies, being 3' across and surpassed only by the magnificent Dumbbell Nebula in Vulpecula.

### Finder Chart for M97 and 108



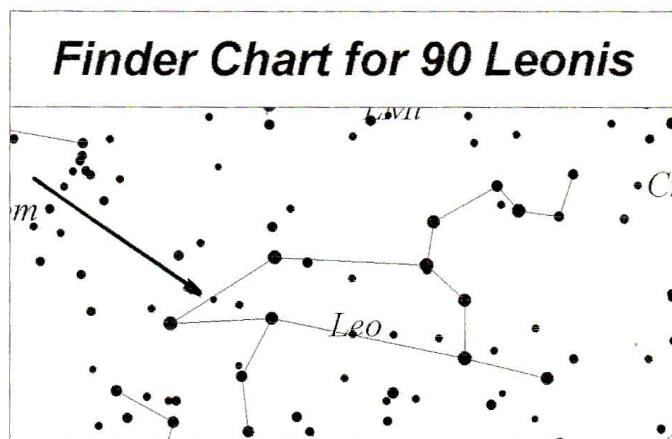
Now here's the odd part. Most sources state that the "eyes" are visible with apertures of 12" or more. I had the good fortune to observe the Owl under excellent skies in Portugal through a 20" and whilst one dark patch was conspicuous, the other was indistinct. Back home on my fourth attempt at the 'impossible' through my 10" with an OIII filter under our usual indifferent skies I discerned faint but nevertheless distinct indications of *both*. So keep trying - you never know.

Using a wide angle, low power eyepiece or a short focal length telescope the companion I mentioned shows itself in the same field some 48' NW of M97. This is the edge-on Spiral Galaxy M108 faintly glowing at mag 10.7, its spindle shape twice as long as the Owl's girth. Brightness at the centre appears to be the galaxy's nucleus - don't be deceived, it's just a foreground star but it looks nice all the same. I used the term 'companion' and that's how it looks but the Owl is 1300 light years distant whereas M108 is 30000 *times* further away! Both objects are best found in Spring just under the bowl of the Plough, one-quarter of the way from Beta, the right hand star to Gamma, the left-hand one.

### Multiple Star

Coordinates: 11h 34m 42s, +16° 48"

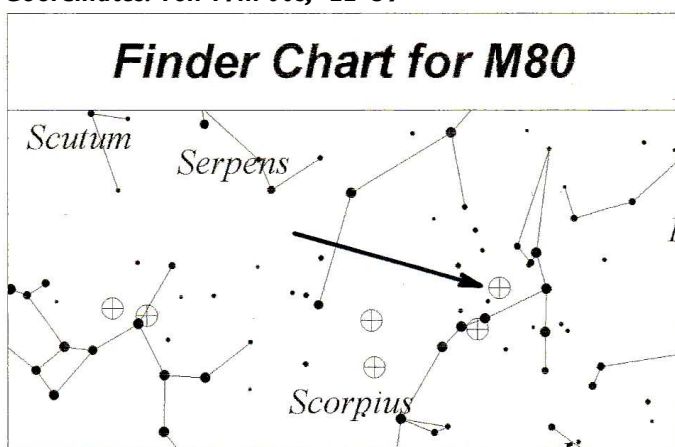
**90 Leonis** has the misfortune to be situated at that part of the Lion where his tail attaches to his rump. Despite this potentially embarrassing situation it manages to be quite presentable. Its three members are all blue and, at mags 6.0, 7.3 and 8.6 their brightness diminishes by the same 1.3 magnitudes. There are relatively few multiples whose colours are the same and which also show the same differences in brightness, so this trio provides an



opportunity to see just how rapidly the brightness of stars falls off with increasing magnitude number and to compare the equal stages. The secondary mag 7.3 star hugs its parent very closely to the SE (Position Angle  $207^\circ$ ) whilst the third member is rather less friendly, some distance away to the SW (PA  $140^\circ$ ), the three forming a very shallow, obtuse-angled triangle. A springtime target, any telescope at around 180x will provide a nice view although a 6" may struggle to separate the two close stars.

## Globular Cluster

Coordinates: 16h 17m 00s, -22' 59"



Most globular clusters studied by amateurs are grand affairs with thousands of stars crammed into a small 'circle' of space. **M80** in **Scorpius** is different. On first acquaintance it seems to have no stars at all, just a tiny, brightly glowing ball of nothing - much like the head of a comet - not so surprising when it's realised that none of its stars is brighter than mag 13.7 which means no telescope under 9" can hope to resolve them. But look at it anyway because the whole shines at an integrated magnitude of 7.4, an easy target for any telescope, and there's a bright star very close NE which adds interest to the scene. This is the blue-white, mag 8.7 star HD146457.

Several features of M80 make it a worthwhile object. Firstly, at only 7' across it's tiny (M4, also in Scorpius is 15 times bigger). Secondly it's rich but extremely compressed

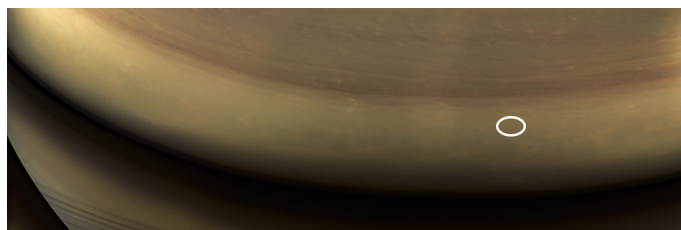
(another reason why it's hard to resolve individual stars). Thirdly, whilst it's bright, it's suddenly much brighter in the central 9" or so. Bev Ewen-Smith who runs COAA, where the 20" I mentioned above is installed, admits his favourite deep sky objects are Globular Clusters and his description to me of M80 was "...like a nipple in the sky."! Darn me if it doesn't look just like that.

As M80 is low in the southern sky and for the best view choose a night in June/July when the sky is clean down to the horizon - stars clearly visible with little or no twinkling. If you have the use of a 10" or larger telescope crank up the power to 250x and the cluster will take on a grainy appearance with a hint of resolution - and look even more like a nipple!

*Bert Paice*

*Originally published in NZ - September 1998*

## Final Frontier



This view of Saturn looks toward the planet's night side, lit by sunlight reflected from the rings. A mosaic of some of the very last images captured by Cassini's cameras, it shows the location where the spacecraft would enter the planet's atmosphere hours later. The oval marks the entry site. While this area was on the night side of the planet at the time, it would rotate into daylight by the time Cassini made its final dive into Saturn's upper atmosphere, ending its remarkable 13-year exploration of Saturn.

Images taken using red, green and blue spectral filters were combined to show the scene in near natural color. The images were taken with Cassini's wide-angle camera on Sept. 14, 2017, at a distance of approximately 394,000 miles (634,000 kilometers) from Saturn.

The Cassini spacecraft ended its mission on Sept. 15, 2017.

The Cassini mission is a cooperative project of NASA, ESA (the European Space Agency) and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the mission for NASA's Science Mission Directorate, Washington. The Cassini orbiter and its two onboard cameras were designed, developed and assembled at JPL. The imaging operations center is based at the Space Science Institute in Boulder, Colorado.

More at: <https://www.nasa.gov>



## Jupiter's Great Red Spot Could Disappear Within 20 Years



The iconic Great Red Spot of Jupiter may disappear in the next 20 years, according to a researcher at NASA's Jet Propulsion Laboratory (JPL) in California.

The massive storm — larger than Earth itself — was first spotted in 1830, and observations from the 1600s also revealed a giant spot on Jupiter's surface that may have been the same storm system. This suggests Jupiter's Great Red Spot (GRS) has been raging for centuries.

In a recent story, Business Insider spoke with Glenn Orton, a lead Juno mission team member and planetary scientist at NASA Jet Propulsion Laboratory (JPL), about the giant storm's fate.

According to Orton, the storm's vortex has maintained strength because of Jupiter's 300-400 mph (483-640 km/h) jetstreams, but like any storm, it won't go on forever. "In truth, the GRS has been shrinking for a long time," Orton told Business Insider.

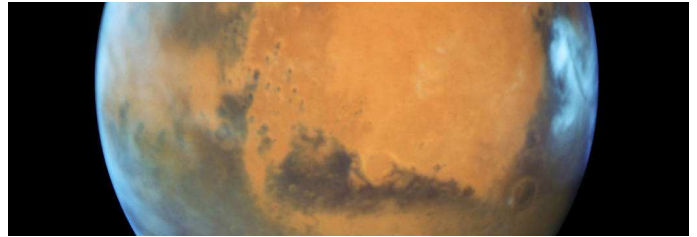
"The GRS will in a decade or two become the GRC (Great Red Circle)," Orton said. "Maybe sometime after that the GRM," by which he means the "Great Red Memory."

In the late 1800s, the storm was perhaps as wide as 30 degrees longitude, Orton said. That works out to more than 35,000 miles — four times the diameter of Earth. When the nuclear-powered spacecraft Voyager 2 flew by Jupiter in 1979, however, the storm had shrunk to a bit more twice the width of our own planet.

Data on Jupiter's crimson-colored spot reveals that this shrinking is still occurring. As of April 3, 2017, the GRS spanned the width of 10,159 miles (16,350 kilometers), less than 1.3 times Earth's diameter. The longest storm on Earth lasted 31 days, but Jupiter can sustain longer storms because the gas planet has tens of thousands of miles of atmosphere, and spins much faster than Earth.

*Links and videos at: <https://www.space.com/>*

## NASA's James Webb Space Telescope to Reveal Secrets of the Red Planet



The planet Mars has fascinated scientists for over a century. Today, it is a frigid desert world with a carbon dioxide atmosphere 100 times thinner than Earth's. But evidence suggests that in the early history of our solar system, Mars had an ocean's worth of water. NASA's James Webb Space Telescope will study Mars to learn more about the planet's transition from wet to dry, and what that means about its past and present habitability.

Mars will be targeted as part of a Guaranteed Time Observation (GTO) project led by Heidi Hammel, a planetary astronomer and executive vice president of the Association of Universities for Research in Astronomy (AURA) in Washington, D.C. The GTO program provides dedicated time to the scientists who have worked with NASA to craft the science capabilities of Webb throughout its development. Hammel was selected by NASA as a JWST Interdisciplinary Scientist in 2003. Mars will be visible to Webb from May to September 2020 during its first year of operations, known as Cycle 1.

"Webb will return extremely interesting measurements of chemistry in the Martian atmosphere," noted Hammel. "And most importantly, these Mars data will be immediately available to the planetary community to enable them to plan even more detailed Mars observations with Webb in future cycles."

"We are all looking forward to Webb's observations of Mars. I just know they will be fantastic, with the potential for immediate scientific discoveries," said Jim Green, director of NASA's Planetary Science Division, NASA Headquarters, Washington, D.C.

### Webb's advantages and challenges

Mars has been visited by more missions than any other planet in our solar system. It is currently orbited by six active spacecraft, while two rovers trundle across its surface. Webb offers several capabilities that complement these up-close missions.

One key asset is Webb's ability to take a snapshot of the entire disk of Mars at once. Orbiters, in contrast, take time to make a full map and therefore can be affected by day-to-

day variability, while rovers can only measure one location. Webb also benefits from excellent spectral resolution (the ability to measure small differences in wavelengths of light) and a lack of interfering atmosphere that plagues ground-based measurements from Earth.

That said, observing Mars with Webb will not be easy. “Webb is designed to be able to detect extremely faint and distant targets, but Mars is bright and close,” explained Geronimo Villanueva of NASA’s Goddard Space Flight Center, Mars lead on the GTO project. As a result, the observations will be carefully designed to avoid swamping Webb’s delicate instruments with light.

“Very importantly, observations of Mars will also test Webb’s capabilities in tracking moving objects across the sky, which is of key importance when investigating our solar system,” said Stefanie Milam at NASA’s Goddard Space Flight Center, Greenbelt, Md. who is coordinating the solar system program with Webb.

## Water and methane

Much of the water Mars once held was lost over time due to ultraviolet light from the Sun breaking apart water molecules. Researchers can estimate how much water vanished by measuring the abundance of two slightly different forms of water in Mars’ atmosphere – normal water (H<sub>2</sub>O) and heavy water (HDO), in which one hydrogen atom is replaced by naturally occurring deuterium. The preferential escape of lighter hydrogen over time would then lead to a skewed ratio of H<sub>2</sub>O to HDO on Mars, indicative of how much water has escaped into space. Webb will be able to measure this ratio at different times, seasons and locations.

“With Webb, we can obtain a real and accurate measurement of the ratio of H<sub>2</sub>O to HDO across Mars, permitting us to determine how much water was truly lost. We also can determine how water is exchanged between polar ice, the atmosphere, and the soil,” said Villanueva.

Although most of the water on Mars is locked up in ice, the possibility remains that some liquid water could exist in underground aquifers. These potential reservoirs could even host life. This intriguing idea received a boost in 2003, when astronomers detected methane in the Martian atmosphere. Methane could be generated by bacteria, although it could also come from geological processes. Data from Webb could provide new clues to the origin of these methane plumes.

*Videos and links at: <https://www.nasa.gov/>*

## King Tut's Knife Was Made From A Meteorite

Scientists say an iron knife buried with King Tut is truly out of this world.

The knife was made with iron that came from a meteorite, according to an article in the journal *Meteoritics and Planetary Science* published online last month.

The dagger in question was one of two found in the wrapping of King Tutankhamun's mummified body in 1925 by archaeologist Howard Carter. The first knife has a blade of gold, while the iron dagger has a gold handle, rock crystal pommel and jackal-decorated sheath.



The iron knife has puzzled researchers for 91 years, partially because ironwork was rare in ancient Egypt. Despite being more than 3,300 years old, the iron dagger shows no signs of rust, according to *The Guardian*.

Researchers from Milan Polytechnic, Pisa University, and the Egyptian Museum in Cairo studied the metal makeup of the iron knife using non-invasive, portable X-ray fluorescence spectrometry.

“Meteoric iron is clearly indicated by the presence of a high percentages of nickel,” lead researcher Daniela Comelli of Milan Polytechnic told *The Telegraph*. “The nickel and cobalt ratio in the dagger blade is consistent with that of iron meteorites that have preserved the primitive chondritic ratio during planetary differentiation in the early solar system.”

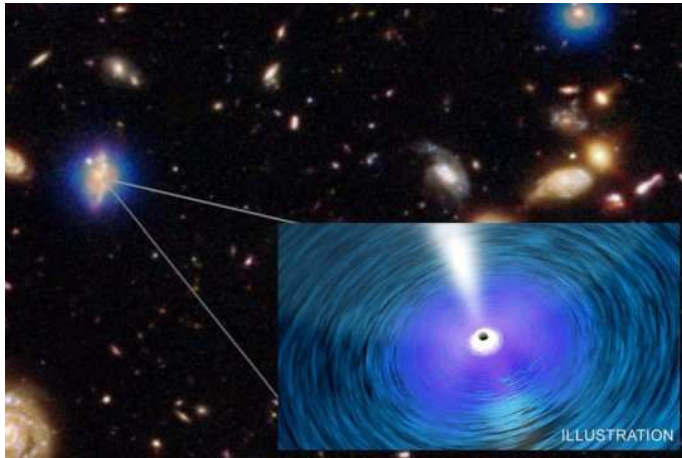
The researchers said they identified the exact meteorite that was the source of metal for the blade.

Comeli said her team examined all meteorites found within a radius of 2,000 kilometers from the Red Sea. That narrowed the possibilities to 20 iron meteorites. Only one of those had levels of nickel and cobalt similar to Tut’s blade: a meteorite found near Mersa Matruh, Egypt, 16 years ago.

The finding suggests that the ancient Egyptians were aware in the 13th century B.C., about 2,000 years before Western culture, that rare chunks of iron fell from the sky

*More links etc: <http://www.huffingtonpost.co.uk/>*

## 'Ultramassive' black holes discovered in far-off galaxies



*Illustration of an “ultramassive” black hole detected by the team of astrophysicists. Credit: NASA*

Thanks to data collected by NASA's Chandra X-ray telescope on galaxies up to 3.5 billion light years away from Earth, an international team of astrophysicists was able to detect what is likely to be the most massive black holes ever discovered in the universe. The team's calculations showed that these “ultramassive” black holes are growing faster than the stars in their respective galaxies.

In their search for black holes, the two lead authors of the article published in *Monthly Notices of the Royal Astronomical Society* -- Julie Hlavacek-Larrondo, professor in the Department of Physics at Université de Montréal, and Mar Mezcua, postdoctoral fellow at the Institute of Space Sciences in Spain -- studied 72 galaxies located at the centre of the universe's brightest and most massive galaxy clusters.

“A black hole is an invisible celestial object whose gravitational pull is so strong that neither matter nor light can escape it, it swallows everything in its path like a bottomless vortex,” explained Professor Hlavacek-Larrondo, who also holds the Canada Research Chair in Observational Astrophysics of Black Holes. “A black hole is most often created when a massive star dies and collapses on itself. The most fascinating thing about black holes is how they distort time around them. According to Einstein's theory of relativity, time flows more slowly in strong gravitational fields, like those of these gargantuan celestial objects.”

The team of astronomers calculated the masses of black holes detected in these galaxy clusters by analyzing their radio wave and X-ray emissions. The results showed that the masses of ultramassive black holes are roughly 10 times greater than those originally projected calculated using a different method which assumes that black holes

grow in tandem with their galaxies. Furthermore, almost half of the sample's black holes are estimated to be at least 10 billion times more massive than our sun. This puts them in a class of extreme heavyweights that certain astronomers call “ultramassive black holes.”

“We have discovered black holes that are far larger and way more massive than anticipated,” Mezcua pointed out. “Are they so big because they had a head start or because certain ideal conditions allowed them to grow more rapidly over billions of years? For the moment, there is no way for us to know.”

“We do know that black holes are extraordinary phenomena,” Hlavacek-Larrondo added, “so it's no surprise that the most extreme specimens defy the rules that we have established up until now.”

### The destructive force of ultramassive black holes

Galaxies are not necessarily safe from these celestial behemoths lurking at their centres. The higher a black hole's mass, the greater its power. “It sucks up little matter and probably wouldn't be able to produce destructive high-energy jets for some time powerful enough to destroy much of its host galaxy. “It would be like a mini, galaxy-sized Big Bang,” said Hlavacek-Larrondo.

“But there's no need to worry about our own galaxy,” she continued. “Sagittarius A, the Milky Way's supermassive black hole, is a bit boring. It's not very active, much like a dormant volcano. It sucks up little matter and probably wouldn't be able to produce destructive high-energy jets.”

### Why study black holes billions of light years away?

Professor Hlavacek-Larrondo focuses her work on black holes in distant galaxy clusters to show that such objects have been significantly impacting their galactic neighbourhoods and the entire universe for billions of years.

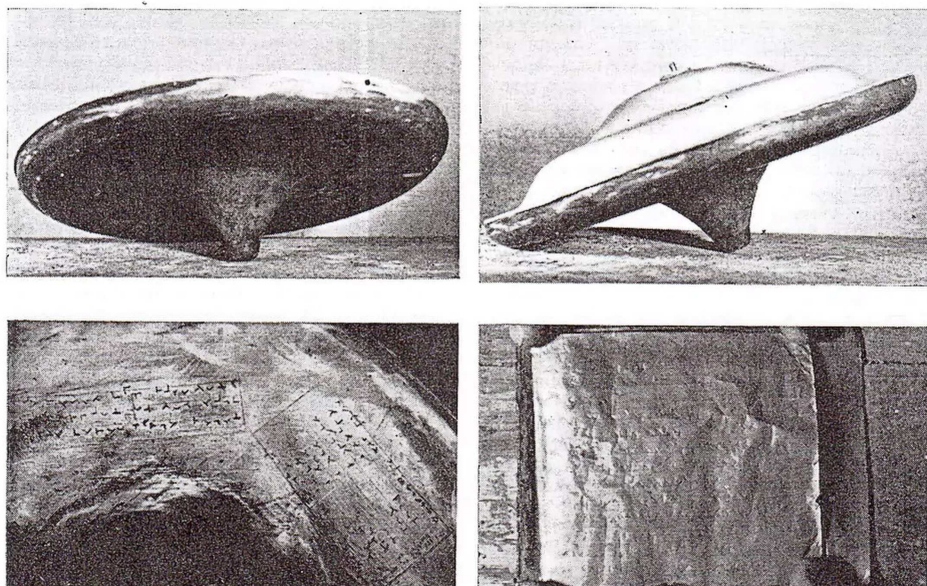
“They are the most powerful objects in the universe, and they are anything but quiet,” she said. “Galaxies are the building blocks of our universe, and to understand their formation and evolution, we must first understand these black holes.”

*Links etc at: <https://www.sciencedaily.com/>*

## THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

### Pieces of a 50-year-old English “flying saucer” have turned up in the London Science Museum archive



*The “flying saucer” captivated the U.K. press in 1957.  
Credit: Dr. David Clarke*

As the BBC reported Feb. 9, David Clarke, a journalism lecturer at Sheffield Hallam University, examined the metal shards and determined that they came from a famous 18-inch (45 centimeters) metal saucer. The object captivated the U.K. press in 1957 after it turned up in Silpho Moor near Scarborough, Yorkshire, England. Then, after being chopped up into bits for examination, it gradually disappeared in the intervening decades.

Three men originally discovered the object in the moor, the Yorkshire Post reported Feb. 8, just three weeks after Russia launched Sputnik — the first satellite of the Earth created by humans. As the Post reported, its copper bottom was covered in hieroglyphics, very much like the saucer discovered in Roswell, New Mexico a decade earlier. [7 Huge Misconceptions About Aliens]

The Silpho Moor saucer also contained a small book, the Post reported, covered in more hieroglyphics, which a Scarborough café owner claimed to decipher as a warning from an alien named Ullo about atomic war: “You will improve or disappear.”

Metallurgists and other experts who studied the Silpho Moor object determined that it had no special properties and had never been to outer space, the Post reported, a journey that leaves telltale signatures in metal.

Still, now that Science Museum archivists have learned the “cultural significance” of the rediscovered shards, the BBC reported, they might put them on display as a record of that strange moment in British history.

*Links and more at: <https://www.livescience.com/>*

### Observatory

When visiting the VAS observatory, for your own safety, please bring a torch. Also, please make sure you close and lock the car park gate if you are the last to leave - if you need the combination to the lock, please contact a member of the committee.

### Articles Needed

NZ needs letters, articles, reviews or pictures related to astronomy. Send to the Editor, contact details on the front page.

*“The Universe was opaque until 380,000 years after the Big Bang”  
Neil deGrasse Tyson*

*“I think astronomy is a bad study for you. It makes you feel human insignificance too plainly”  
Thomas Hardy*

*“A time will come when men will stretch out their eyes. They should see planets like our Earth”  
Christopher Wren*

*“Pluto is currently designated a ‘plutoid’, and if you think that sounds ok, try adding ‘oid’ to your name. It’s demoralising”  
Ruth Spencer*