

# BRIDGEND ASTRONOMICAL SOCIETY NEWSLETTER

**THE SOCIETY MEETS AT 7.30 pm ON THE SECOND FRIDAY OF EACH MONTH  
AT PYLE CHURCH HALL, PYLE**

## **FUTURE TALKS**

SEPT 8 “Mysteries of the Solar System” by Dr Chris North of Sky at Night

OCT 13<sup>th</sup> “The Antikythera Research Project” by Professor Mike Edmunds of Cardiff University.

NOV 10<sup>th</sup> “Evolution of life on a habitable planet, and possibility of transfer of complex life from Venus” by Dr Annabel Cartwright of Cardiff University

DEC 8<sup>th</sup> “Dark Galaxies” by Professor Mike Disney of Cardiff University.

JAN 12<sup>th</sup> “Astrophotography from City Skies” by Nick Hart from Cardiff AS

FEB 9<sup>th</sup> “Black Holes and Quantum Gravity” by Professor Prem Kumar of Swansea University.

MAR 9<sup>th</sup> TBA by Dr Bob Owens of The National Museum of Wales

APR 13<sup>th</sup> “Harvard's Lady Computers - the women who classified the stars” by Margaret Collins of Swansea AS

MAY 11<sup>th</sup> AGM

## **The Night Sky August 2017**

**Compiled by Ian Morison**

## Image of the Month



**Dwarf Galaxy**  
**Image HST, NASA, ESO, HST.**

**NGC**

**4449**

NGC 4449 is a dwarf irregular galaxy some 12 million light-years away in the constellation Canes Venatici. Less than 20,000 light-years across, it is often compared to the Large Magellanic Cloud. Some of its star forming regions are even larger than the Tarantula Nebula in the LMC.

## Highlights of the Month

**August - Find the globular cluster in Hercules and spot the 'Double-double' in Lyra**



Use binoculars to find the globular cluster M13 in Hercules and the "Double-double" in Lyra  
**Image: Stellarium/IM**

There are two very nice objects to spot with binoculars in the eastern sky well after dark this month. Two thirds of the way up the right hand side of the 4 stars that make up the 'keystone' in the constellation Hercules is M13, the best globular cluster visible in the northern sky. The 15 minute exposure image on right was taken by the author using a 127 mm APO refractor and SBIG 8.3 megapixel CCD camera.

Just to the left of the bright star Vega in Lyra is the multiple star system Epsilon Lyrae, often called the double-double. With binoculars a binary star is seen but, when observed with a telescope, each of these two stars is revealed to be a double star - hence the name!



M13 imaged by Ian Morison in May 2014

**August - A good month to observe Neptune with a small telescope.**



Neptune in Aquarius

**Image: Stellarium/IM**

Neptune comes into opposition - when it is nearest the Earth - on the 2nd of September, so will be well placed both this month and next. Its magnitude is +7.9 so Neptune, with a disk just 3.7 arc seconds across, is easily spotted in binoculars lying in the constellation Aquarius as shown on the chart. It rises to an elevation of ~27 degrees when due south. Given a telescope of 8 inches or greater aperture and a dark transparent night it should even be possible to spot its moon Triton. (This is my objective around the end of the month!)



Neptune Finder Chart  
**Image: Stellarium/IM**

## August 2nd - after sunset: The Moon and Saturn



The Moon and Saturn  
**Image: Stellarium/IM**

Late evening on the 2nd of August, the waxing Moon will be seen to the upper right of Saturn. Antares lies down to its lower right.

## The mornings of August 12th and 13th - midnight to dawn: look out for the Perseid meteor shower.



A Perseid meteor

If clear, these mornings should give us a chance of observing the Perseid meteor shower - produced by debris from the comet Swift-Tuttle. The early morning of the 12th August will give us the best chance, if clear, of viewing the shower, but the peak is quite broad and so it is well worth observing on the nights before and after. Most meteors are seen looking about 50 degrees from the "radiant" which lies between Perseus and Cassiopeia. This year, a gibbous Moon rises before midnight so will be low in the sky for some time the early hours of the 12th so it will be best to observe them as soon as it is really dark. Moonlight will hinder our view, but it should still be possible to spot many meteors. NB: As we need to view a very wide area of sky, normal binoculars would be of no use, but the Vixen SG 2.1 x 42 could be useful as they will darken skylight from the Moon somewhat and enable fainter meteors to be seen - albeit over a smaller field of view.

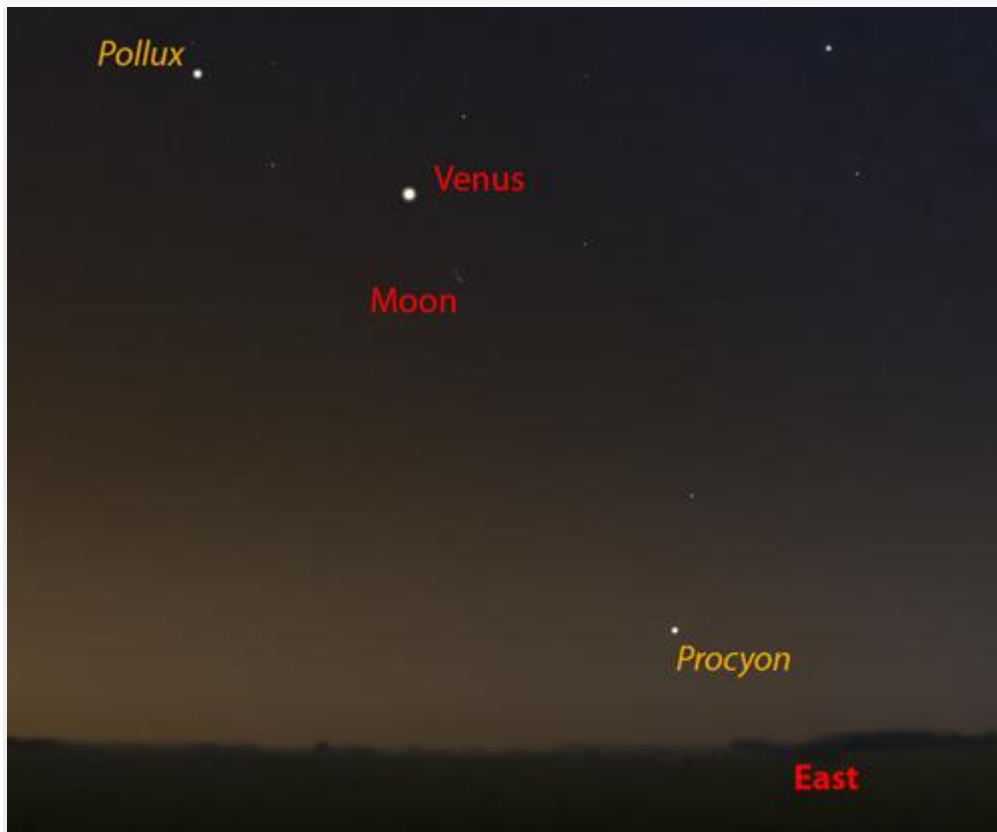
## 16th August 07:40 - 08:40 BST: A daylight Occultation of Aldebaran



Daylight Occultation of Aldebaran  
Image: Stellarium/IM

In the early morning of the 16th, Aldebaran will be occulted by the Moon - visible with a telescope (but keep it well away from the Sun). The times are for London and will vary somewhat across the country. In a line from Leverburgh on the Isle of Harris across to Wick, a grazing occultation will be seen at 8:01 BST.

## 19th August - before dawn: Venus and a thin crescent Moon



Venus and a crescent Moon.

**Image: Stellarium/IM**

Before dawn on the 19th, if clear, Venus will be seen just 2 degrees above a very thin waning crescent Moon.

## 25th August - after sunset: Jupiter below a thin crescent Moon





Jupiter and a crescent Moon.

**Image: Stellarium/IM**

After sunset on the 25th, if clear, Venus will be seen below a thin waxing crescent Moon.

**A Messier Object imaged with the Faulkes Telescope:  
galaxy NGC 1365.**



NGC1365  
**Image:Nik  
Faulkes Telescope.**

**Szymanik**

**Galaxy NGC 1365, imaged by Nik Szymanek.**  
This image was taken using the Faulkes Telescope by Nik Szymanek - one of the UK's leading astro-photographers. NGC1365 is also known as the **Great Barred Spiral Galaxy** and lies at a distance of 56 million light years. It is one of the most perfect

barred spirals with a straight bar and two very prominent spiral arms. Closer to the centre there is also a second spiral structure. The galaxy is an excellent "laboratory" for astronomers to study how galaxies form and evolve.

Learn more about the Faulkes Telescopes and how schools can use them: [Faulkes Telescope](#)"

## Observe the International Space Station



The International Space Station and Jules Verne passing behind the Lovell Telescope on April 1st 2008.

**Image by Andrew Greenwood**

Use the link below to find when the space station will be visible in the next few days. In general, the space station can be seen either in the hour or so before dawn or the hour or so after sunset - this is because it is dark and yet the Sun is not too far below the horizon so that it can light up the space station. As the orbit only just gets up the latitude of the UK it will usually be seen to the south, and is only visible for a minute or so at each sighting. Note that as it is in low-earth orbit the sighting details vary quite considerably across the UK. The NASA website linked to below gives details for several cities in the UK.

# The Moon

<b>new moon</b>	<b>first quarter</b>	<b>full moon</b>
August 21st	August 29th	August 7th

# The Planets

## Jupiter

**Jupiter.** Now four months after opposition, Jupiter can still be seen low in the southwestern sky after nightfall. It sets at about 11:30 BST as August begins. As the month progresses its brightness falls from -1.9 to -1.7 magnitudes as its angular size falls from 34 to 32 arc seconds. It lies in Virgo, initially some 8 degrees to the west of Spica, reducing to 4 degrees as the month progresses and will pass Spica on September 11th on its journey towards the lower parts of the ecliptic. Next year it will only reach an elevation of some 25 degrees when due south and, in the following two years, just 18 degrees before it moves back towards the more northerly parts of the ecliptic. Even so, with a small telescope one should easily be able to see the equatorial bands in the atmosphere, sometimes the Great Red Spot and up to four of the Gallilean moons as they weave their way around it.

## Saturn

**Saturn** came into opposition on June 11th and so will be at its highest elevation due south as darkness falls. It shines initially at magnitude +0.3 falling to +0.4 during the month and has an angular size of ~17 arc seconds. With an angle of 26.8 degrees inclination to the line of sight, the rings are virtually as open as they ever can be. Their maximum tilt, at 27 degrees, will come in October - the first time since 2002. Saturn ceases its westwards, retrograde, motion on August 25th. It is sad that Saturn, now lying in the southern part of Ophiuchus between Sagittarius and Scorpius, only reaches an elevation of ~17 degrees above the horizon when due south, so hindering our view of this most beautiful planet. If imaging Saturn (or Jupiter), Registax 6 has a tool to align the red, green and blue colour images to largely remove atmospheric dispersion from the image. At somewhat over £100 one can purchase the ZWO atmospheric dispersion corrector which uses two, contra rotating, prisms to carry out an even better correction - and which can also be used for visual observing.

## Mercury

**Mercury.** Given a very low western horizon, Mercury, showing an 8 arc second disk and shining at magnitude +0.4 might just be seen after sunset at the beginning of August. Binoculars may well be needed but please do not use them until after the Sun has set. It passes between the Earth and the Sun (inferior conjunction) on August 26th.

## Mars

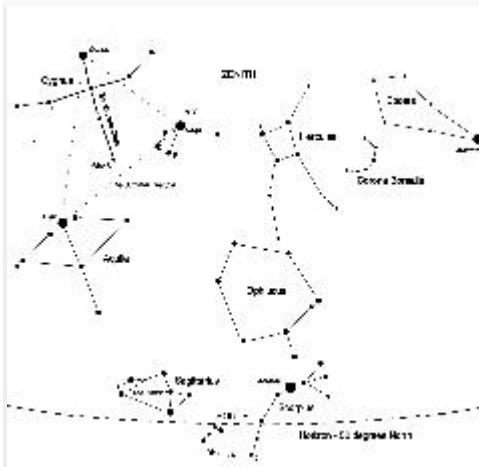
**Mars** passed behind the Sun in July, but will be hidden in the Sun's glare all month so cannot be observed.

## Venus

**Venus** is visible in the east before dawn this month, rising around 3 hours before sunrise. Its magnitude dims slightly during the month from -4 to -3.9 as its angular diameter shrinks from 14.5 to 12.5 arc seconds. However, at the same time, its illuminated phase increases from 74 to 83% - which explains why the magnitude does not drop too much. Its elevation before sunrise is greatest on August 2nd when Venus lies close to the open cluster M35 in Gemini.

## The Stars

### The mid evening August Sky



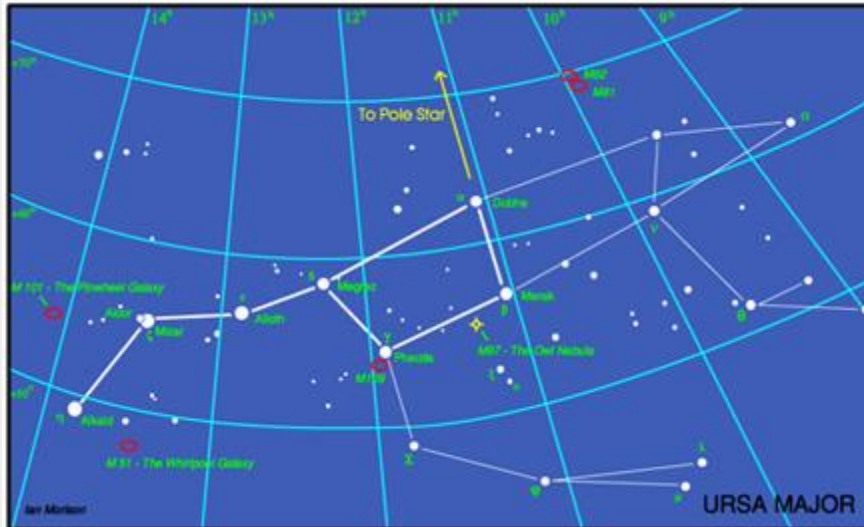
The August Sky in the south - mid evening.

Now that the evenings are drawing in, the night sky gets darker earlier so encouraging one to go out to observe.

This map shows the constellations seen towards the south at about 10pm BST in mid August. High overhead towards the north (not shown on the chart) lies Ursa Major. As one moves southwards one first crosses the constellation Hercules with its magnificent globular cluster, M13, and then across the large but not prominent constellation Ophiuchus until, low above the southern horizon lie Sagittarius and Scorpio. To the right of Hercules lie the arc of stars making up Corona Borealis and then Boötes with its bright star Arcturus. Rising in the east is the beautiful region of the Milky Way containing both

Cygnus and Lyra. Below is the constellation of Aquila, the Eagle. The three bright stars Deneb (in Cygnus), Vega (in Lyra) and Altair (in Aquila) make up the "Summer Triangle".

## The constellation Ursa Major



### Ursa Major

The stars of the **Plough**, shown linked by the thicker lines in the chart above, form one of the most recognised star patterns in the sky. Also called the **Big Dipper**, after the soup ladles used by farmer's wives in America to serve soup to the farm workers at lunchtime, it forms part of the **Great Bear** constellation - not quite so easy to make out! The stars Merak and Dubhe form the pointers which will lead you to the Pole Star, and hence find North. The stars Alcor and Mizar form a naked eye double which repays observation in a small telescope as Mizar is then shown to be an easily resolved double star. A fainter reddish star forms a triangle with Alcor and Mizar.

Ursa Major contains many interesting "deep sky" objects. The brightest, listed in Messier's Catalogue, are shown on the chart, but there are many fainter galaxies in the region too. In the upper right of the constellation are a pair of interacting galaxies **M81** and **M82** shown in the image below. M82 is undergoing a major burst of star formation and hence called a "starburst galaxy". They can be seen together using a low power eyepiece on a small telescope.



**M81 and M82**

Another, and very beautiful, galaxy is M101 which looks rather like a pinwheel firework, hence its other name the **Pinwheel Galaxy**. It was discovered in 1781 and was a late entry to Messier's catalogue of nebulous objects. It is a type Sc spiral galaxy seen face on which is at a distance of about 24 million light years. Type Sc galaxies have a relatively small nucleus and open spiral arms. With an overall diameter of 170,000 light years it is one of the largest spirals known (the Milky Way has a diameter of  $\sim 130,000$  light years).



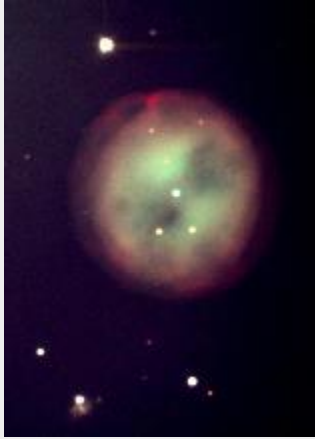
**M101 - The Ursa Major Pinwheel Galaxy**

Though just outside the constellation boundary, M51 lies close to Alkaid, the leftmost star of the Plough. Also called the **Whirlpool Galaxy** it is being deformed by the passage of the smaller galaxy on the left. This is now gravitationally captured by M51 and the two will eventually merge. M51 lies at a distance of about 37 million light years and was the first galaxy in which spiral arms were seen. It was discovered by Charles Messier in 1773 and the spiral structure was observed by Lord Rosse in 1845 using the 72" reflector at Birr Castle in Ireland - for many years the largest telescope in the world.



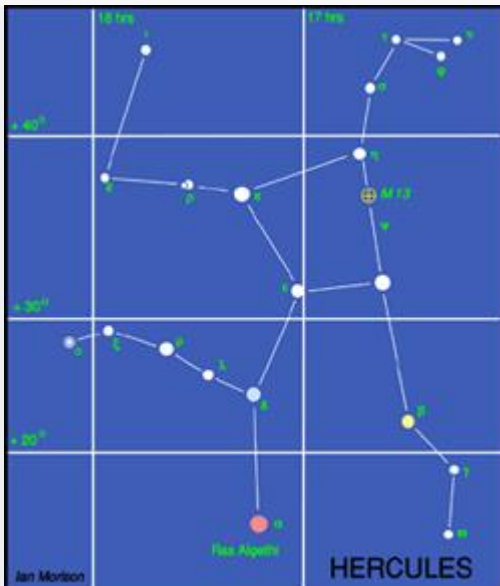
**M51 - The Whirlpool Galaxy**

Lying close to Merak is the planetary nebula M97 which is usually called the Owl Nebula due to its resemblance to an owl's face with two large eyes. It was first called this by Lord Rosse who drew it in 1848 - as shown in the image below right. Planetary nebulae are the remnants of stars similar in size to our Sun. When all possible nuclear fusion processes are complete, the central core collapses down into a "white dwarf" star and the the outer parts of the star are blown off to form the surrounding nebula.



**M97 - The Owl Planetary Nebula Lord Rosse's 1848 drawing of the Owl Nebula**

## The constellation Hercules



**Hercules**

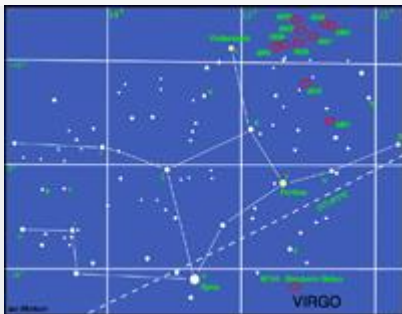
Between the constellation Bootes and the bright star Vega in Lyra lies the constellation Hercules. The Red Giant star Alpha Herculis or Ras Algethi, its Arabic name, is one of the largest stars known, with a diameter of around 500 times that of our Sun. In common with most giant stars it varies its size, changing in brightness as it does so from 3rd to 4th magnitude. Lying along one side of the "keystone" lies one of the wonders of the skies, the great globular cluster, M13. Just visible to the unaided eye on a dark clear night, it is easily seen through binoculars as a small ball of cotton wool about 1/3 the diameter of the full Moon. The brightness increases towards the centre where the concentration of stars is greatest. It is a most beautiful sight in a small telescope. It contains around 300,000 stars in a region of space 100 light years across, and is the brightest globular cluster that can be seen in the northern hemisphere.





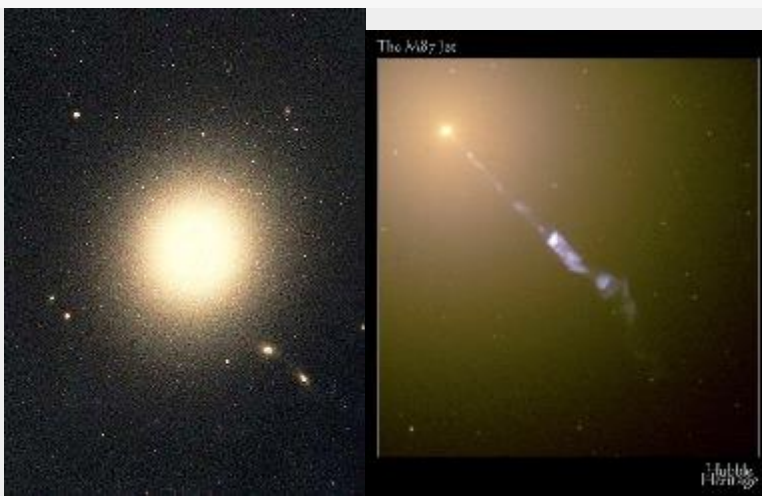
**The Globular Cluster M13 in Hercules. Image by Yuugi Kitahara**

## The constellation Virgo



**Virgo**

Virgo, in the south-east after sunset this month, is not one of the most prominent constellations, containing only one bright star, Spica, but is one of the largest and is very rewarding for those with "rich field" telescopes capable of seeing the many galaxies that lie within its boundaries. Spica is, in fact, an exceedingly close double star with the two B type stars orbiting each other every 4 days. Their total luminosity is 2000 times that of our Sun. In the upper right hand quadrant of Virgo lies the centre of the Virgo Cluster of galaxies. There are 13 galaxies in the Messier catalogue in this region, all of which can be seen with a small telescope. The brightest is the giant elliptical galaxy, M87, with a jet extending from its centre where there is almost certainly a massive black hole into which dust and gas are falling. This releases great amounts of energy which powers particles to reach speeds close to the speed of light forming the jet we see. M87 is also called VIRGO A as it is a very strong radio source.



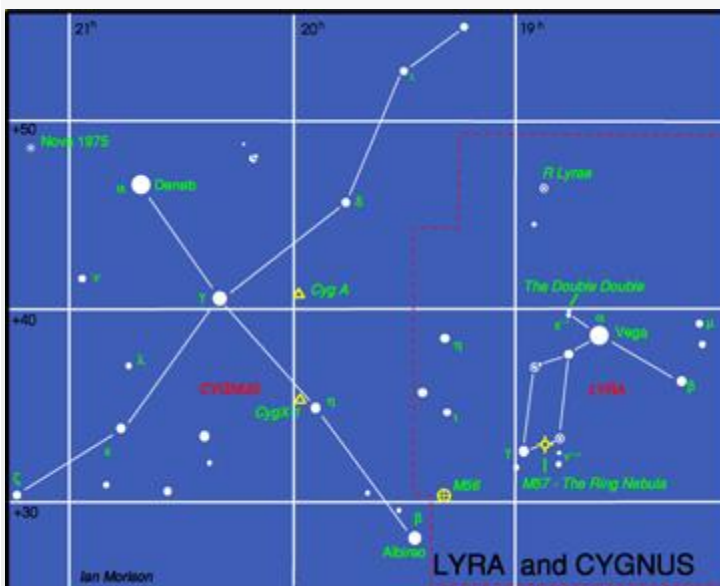
**The Giant Elliptical Galaxy M87 HST image showing the jet**

Below Porphyrion and to the right of Spica lies M104, an 8th magnitude spiral galaxy about 30 million light years away from us. Its spiral arms are edge on to us so in a small telescope it appears as an elliptical galaxy. It is also known as the Sombrero Galaxy as it looks like a wide brimmed hat in long exposure photographs.



**M104 - The Sombrero Galaxy**

## The constellations Lyra and Cygnus



Lyra and Cygnus

This month the constellations Lyra and Cygnus are rising in the East as darkness falls with their bright stars Vega, in Lyra, and Deneb, in Cygnus, making up the "summer triangle" of bright stars with Altair in the constellation Aquila below. (see sky chart above)

### Lyra

Lyra is dominated by its brightest star **Vega**, the fifth brightest star in the sky. It is a blue-white star having a magnitude of 0.03, and lies 26 light years away. It weighs three times more than the Sun and is about 50 times brighter. It is thus burning up its nuclear fuel at a greater rate than the Sun and so will shine for a correspondingly shorter time. Vega is much younger than the Sun, perhaps only a few hundred million years old, and is surrounded by a cold, dark disc of dust in which an embryonic solar system is being formed!

There is a lovely double star called **Epsilon Lyrae** up and to the left of Vega. A pair of binoculars will show them up easily - you might even see them both with your unaided eye. In fact a telescope, provided the atmosphere is calm, shows that each of the two stars that you can see is a double star as well so it is called the double double!



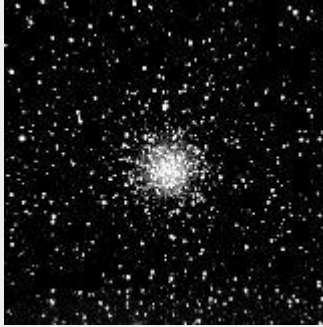
Epsilon Lyra - The Double Double

Between Beta and Gamma Lyra lies a beautiful object called the **Ring Nebula**. It is the 57th object in the Messier Catalogue and so is also called **M57**. Such objects are called planetary nebulae as in a telescope they show a disc, rather like a planet. But in fact they are the remnants of stars, similar to our Sun, that have come to the end of their life and have blown off a shell of dust and gas around them. The Ring Nebula looks like a greenish smoke ring in a small telescope, but is not as impressive as it is shown in photographs in which you can also see the faint central "white dwarf" star which is the core of the original star which has collapsed down to about the size of the Earth. Still very hot this shines with a blue-white colour, but is cooling down and will eventually become dark and invisible - a "black dwarf"! Do click on the image below to see the large version - it's wonderful!



M57 - the Ring Nebula  
Image: Hubble Space telescope

M56 is an 8th magnitude Globular Cluster visible in binoculars roughly half way between Albireo (the head of the Swan) and Gamma Lyrae. It is 33,000 light years away and has a diameter of about 60 light years. It was first seen by Charles Messier in 1779 and became the 56th entry into his catalogue.

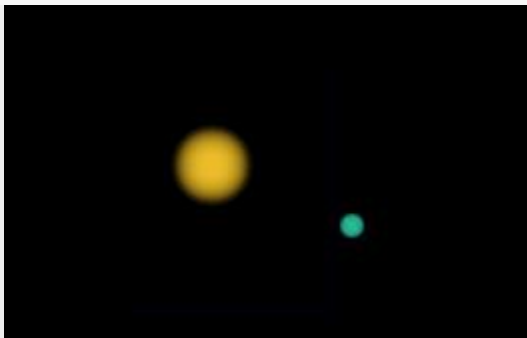


M56 - Globular Cluster

## Cygnus

Cygnus, the Swan, is sometimes called the "Northern Cross" as it has a distinctive cross shape, but we normally think of it as a flying Swan. Deneb, the Arabic word for "tail", is a 1.3 magnitude star which marks the tail of the swan. It is nearly 2000 light years away and appears so bright only because it gives out around 80,000 times as much light as our Sun. In fact if Deneb were as close as the brightest star in the northern sky, Sirius, it would appear as brilliant as the half moon and the sky would never be really dark when it was above the horizon!

The star, **Albireo**, which marks the head of the Swan is much fainter, but a beautiful sight in a small telescope. This shows that Albireo is made of two stars, amber and blue-green, which provide a wonderful colour contrast. With magnitudes 3.1 and 5.1 they are regarded as the most beautiful double star that can be seen in the sky.



Albireo: Diagram showing the colours and relative brightnesses

Cygnus lies along the line of the Milky Way, the disk of our own Galaxy, and provides a wealth of stars and clusters to observe. Just to the left of the line joining Deneb and Sadr, the star at the centre of the outstretched wings, you may, under very clear dark skies, see a region which is darker than the surroundings. This is called the Cygnus Rift and is caused by the obscuration of light from distant stars by a lane of dust in our local spiral arm. The dust comes from elements such as carbon which have been built up in stars and ejected into space in explosions that give rise to objects such as the planetary nebula M57 described above.

There is a beautiful region of nebulosity up and to the left of Deneb which is visible with binoculars in a very dark and clear sky. Photographs show an outline that looks like North America - hence its name the **North America Nebula**. Just to its right is a less bright region that looks like a Pelican, with a long beak and dark eye, so not surprisingly this is called the **Pelican Nebula**. The photograph below shows them well.



The North American Nebula

**Brocchi's Cluster** An easy object to spot with binoculars in Cygnus is "Brocchi's Cluster", often called "The Coathanger", although it appears upside down in the sky! Follow down the neck of the swan to the star Albireo, then sweep down and to its lower left. You should easily spot it against the dark dust lane behind.



Brocchi's Cluster - The Coathanger