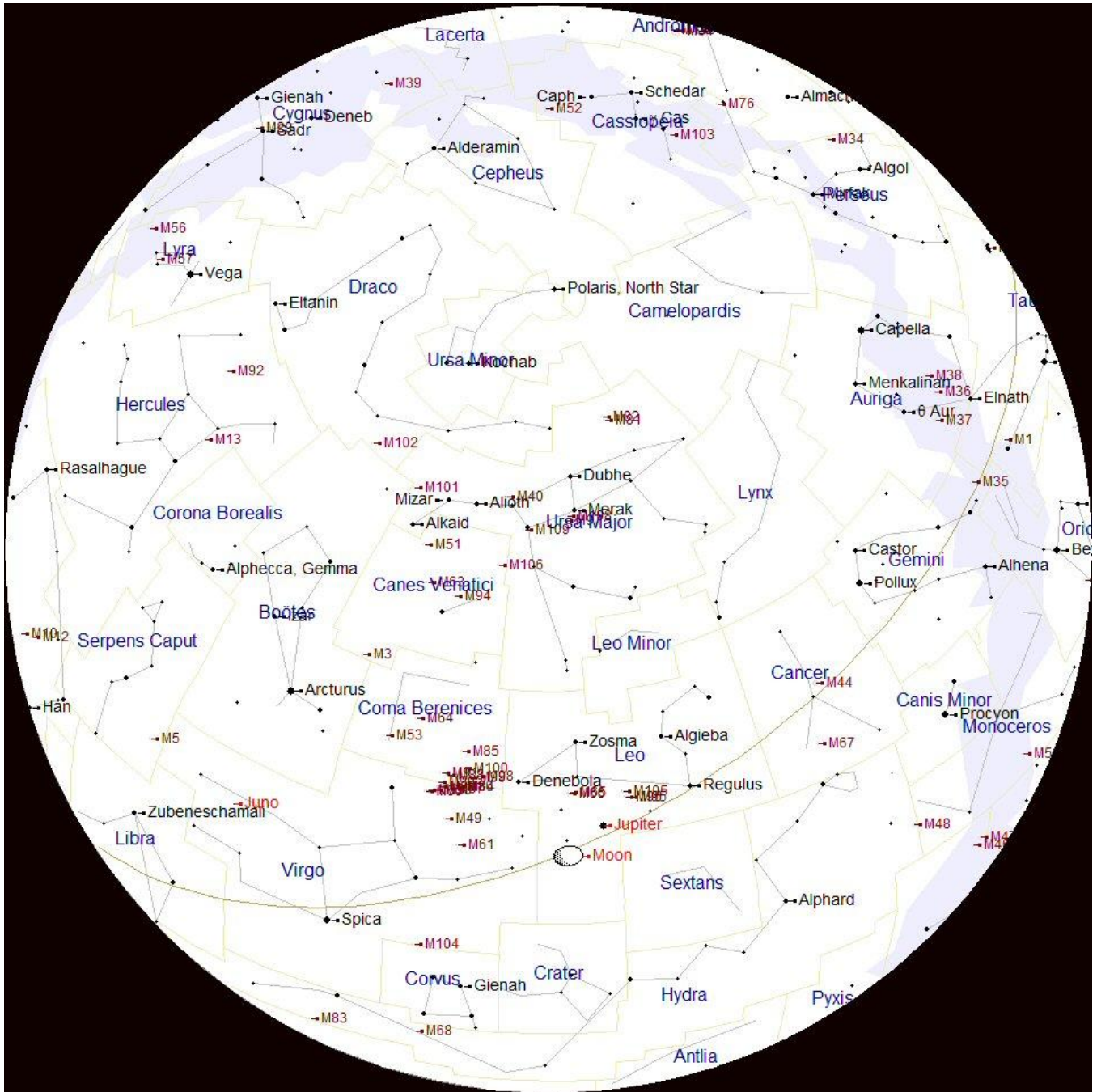


# WHAT'S UP THIS MONTH – MAY 2016

THESE PAGES ARE INTENDED TO HELP YOU FIND YOUR WAY AROUND THE SKY



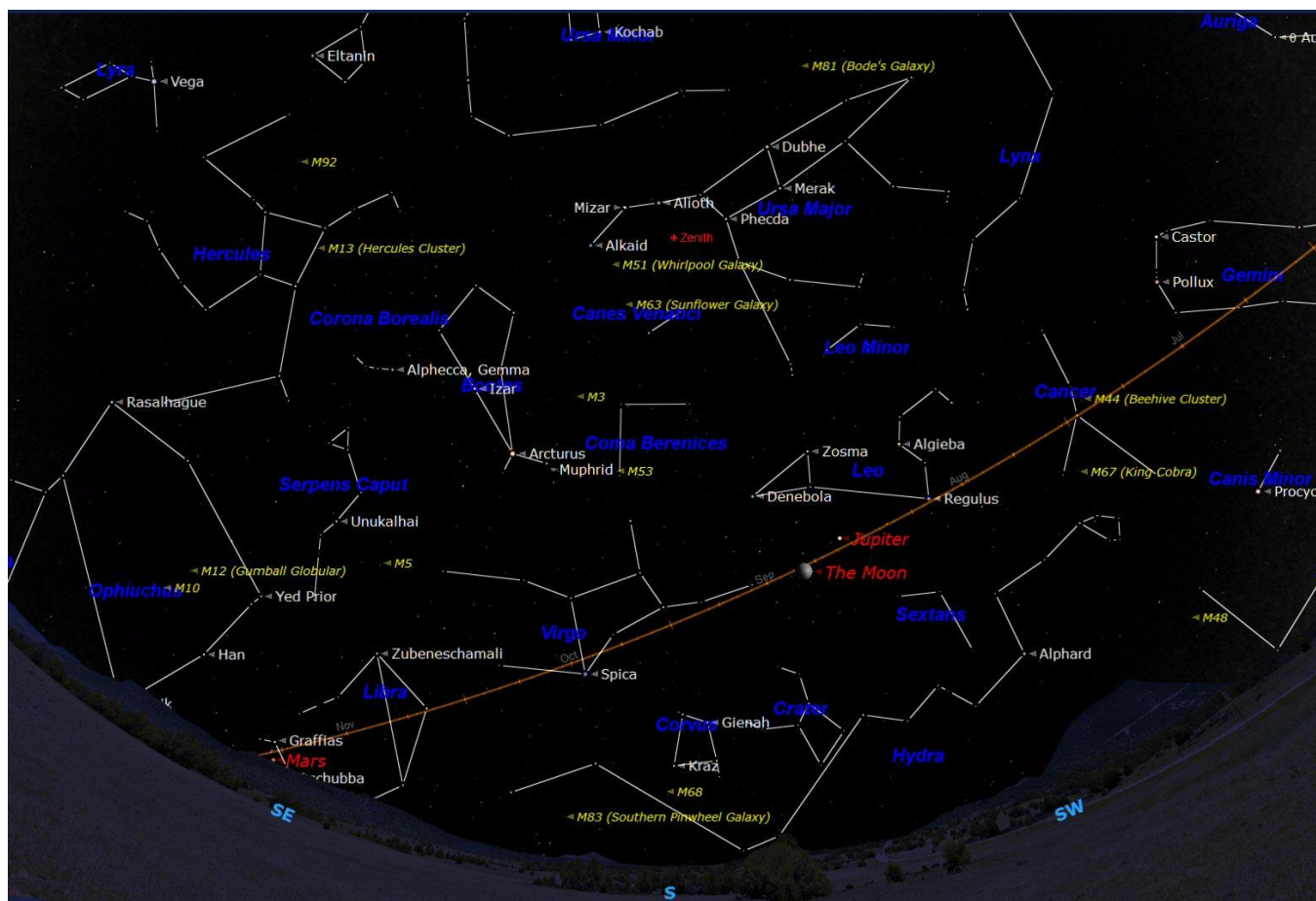
The chart above shows the night sky as it appears on 15<sup>th</sup> May at 21:00 (9 o'clock) in the evening British Summer Time (BST). As the Earth orbits the Sun and we look out into space each night the stars will appear to have moved across the sky by a small amount. Every month Earth moves one twelfth of its circuit around the Sun, this amounts to 30 degrees each month. There are about 30 days in each month so each night the stars appear to move about 1 degree. The sky will therefore appear the same as shown on the chart above at 10 o'clock BST at the beginning of the month and at 8 o'clock BST at the end of the month. The stars also appear to move 15° (360° divided by 24) each hour from east to west, due to the Earth rotating once every 24 hours.

The centre of the chart will be the position in the sky directly overhead, called the Zenith. First we need to find some familiar objects so we can get our bearings. The Pole Star **Polaris** can be easily found by first finding the familiar shape of the Great Bear 'Ursa Major' that is also sometimes called the Plough or even the Big Dipper by the Americans. Ursa Major is visible throughout the year from Britain and is always quite easy to find. This month it is directly overhead. Look for the distinctive saucepan shape, four stars forming the bowl and three stars forming the handle. Follow an imaginary line, up from the two stars in the

bowl furthest from the handle. These will point the way to Polaris which will be to the north of overhead at about  $50^\circ$  above the northern horizon. Polaris is the only moderately bright star in a fairly empty patch of sky. When you have found Polaris turn completely around and you will be facing south. To use this chart, position yourself looking south and hold the chart above your eyes.

Planets observable this month: Jupiter, Mars and Saturn (after midnight).

## EXPLORING THE NIGHT SKY THIS MONTH



The night sky looking south on 15th May at 22:00

The chart above shows the night sky looking south at about 22:00 BST on 15<sup>th</sup> May. West is to the right and east to the left. The point in the sky directly overhead is known as the Zenith or Nadir and is shown at the upper centre of the chart. The curved brown line across the sky is the Ecliptic or Zodiac. This is the imaginary line along which the Sun, Moon and planets appear to move across the sky. The constellations through which the ecliptic passes are known as the constellations of the 'Zodiac'.

Constellations through which the ecliptic passes this month are (west to east): Aries (the Ram, off the chart on the right), Taurus (the Bull, off the chart on the right), Gemini (the Twins), Cancer (the Crab), Leo (the Lion), Virgo (the virgin) and Libra (the Scales).

Taurus is easy to identify with the bright red star Aldebaran located at the centre of a cross shape of stars that defines Taurus. Up to the right is the beautiful Open Cluster M45 known as the Pleiades or the Seven Sisters. The cluster looks like a fuzzy patch of light at first glance with the 'naked eye' but after a good hard look, up to seven stars can be made out.

To the east (left) of Taurus is Gemini with the stars Pollux and Castor as the Twins. At the end of the line of stars leading from Castor is a lovely Open Cluster M35. It can be seen using binoculars as a small 'fuzzy' patch but a telescope will show it as a ball of stars.

There are another three open clusters known as M36, M37 and M38 in the neighbouring constellation of Auriga that appear to be almost in a line with M35.

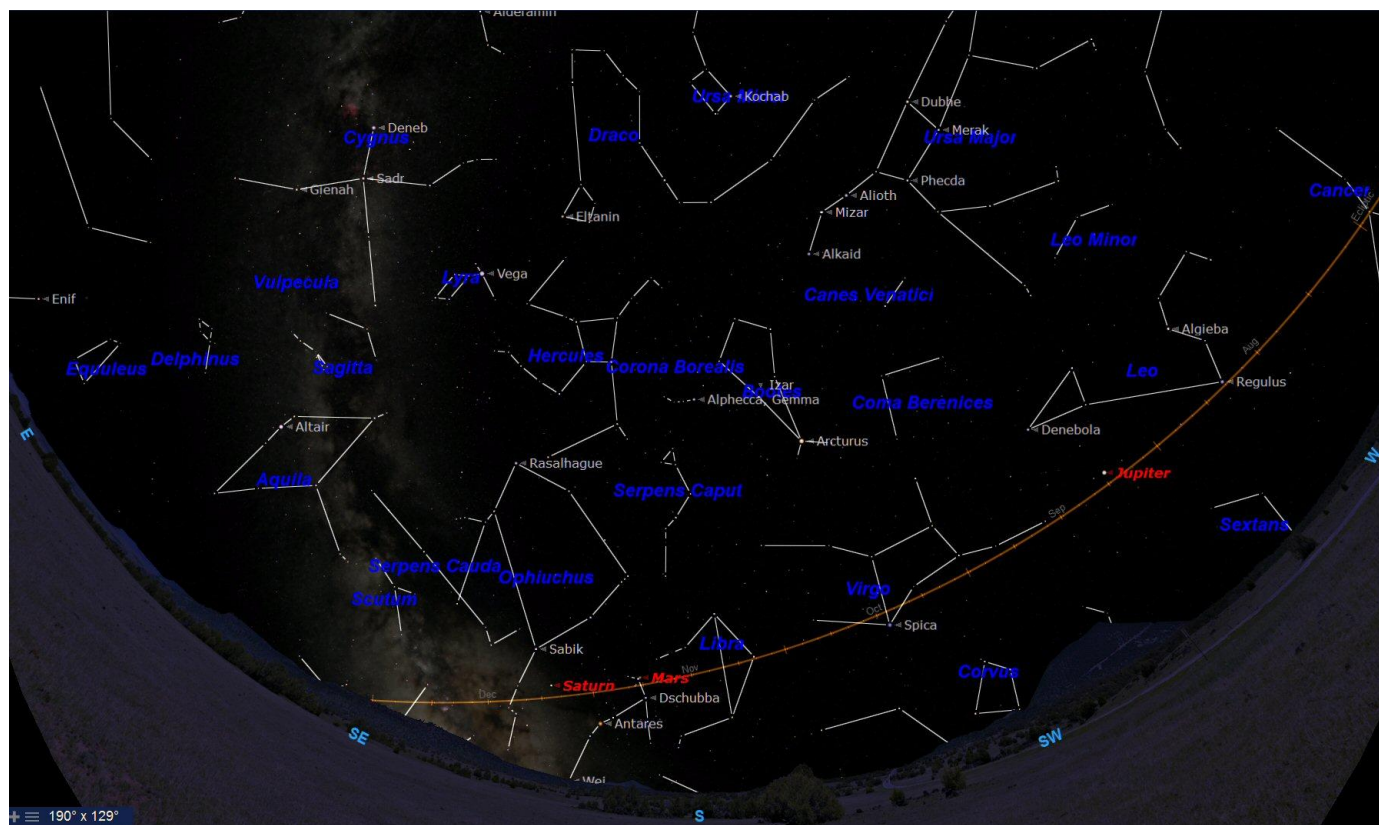
To the east of Taurus along the Ecliptic is the faint and visually rather uninteresting constellation of Cancer the Crab. On a clear night and when seen from a dark location a hazy patch can be made out in the centre of Cancer. This is the beautiful open cluster M44 that is better known as Praesepe or the Beehive Cluster. Using binoculars it does actually look a little like an old fashioned straw beehive surrounded by a swarm of bees.

To the east of Cancer is the magnificent constellation of Leo the Lion. It is one of the few constellations that do look like what it is supposed to represent. Leo has five bright galaxies of its own, these are known as: M65, M66, M95, M96 and NGC 3628. A medium to large sized telescope and a dark sky will be required to see even the brightest of the galaxies. Jupiter the King of the Planets is located just below the figure of Leo and is in the perfect position for observing this month. See the chart above.

Further east along the ecliptic is the large but not very well defined constellation of Virgo the Virgin. Located between Leo and Virgo is a cluster of galaxies that are part of a larger cluster containing our own galaxy that we call the 'Milky Way'.

Just appearing over the eastern horizon is the faint and indistinct constellation of Libra the Scales. The fairly bright planet Mars is located in Libra which makes Libra easier to find.

Directly overhead this month, is the beautiful and very obvious constellation of Ursa Major the Great Bear. It is often called the Plough in the UK but is also known as the Big Dipper. It looks most like a saucepan, with four bright stars representing the pan and three the handle.



The planets Saturn, Mars and Jupiter in the morning before sunrise

For those early rising observers most of the planets can be found in the southern sky before sunrise. Mercury is in conjunction with the Sun and will not be visible. Venus is just visible but is very close to the Sun. Uranus and Neptune are close to the Sun and not observable. Jupiter is visible all night and Saturn is visible from midnight until dawn.

## THE PLANETS THIS MONTH

MERCURY is located very close to the Sun and is not observable this month. It will be directly in front of the Sun in a transit on 9<sup>th</sup> May. For more details about the transit of Mercury see pages 7 and 8.. The chart below shows the position of Mercury at 15:00 on 9<sup>th</sup> May with the daylight sky darkened.

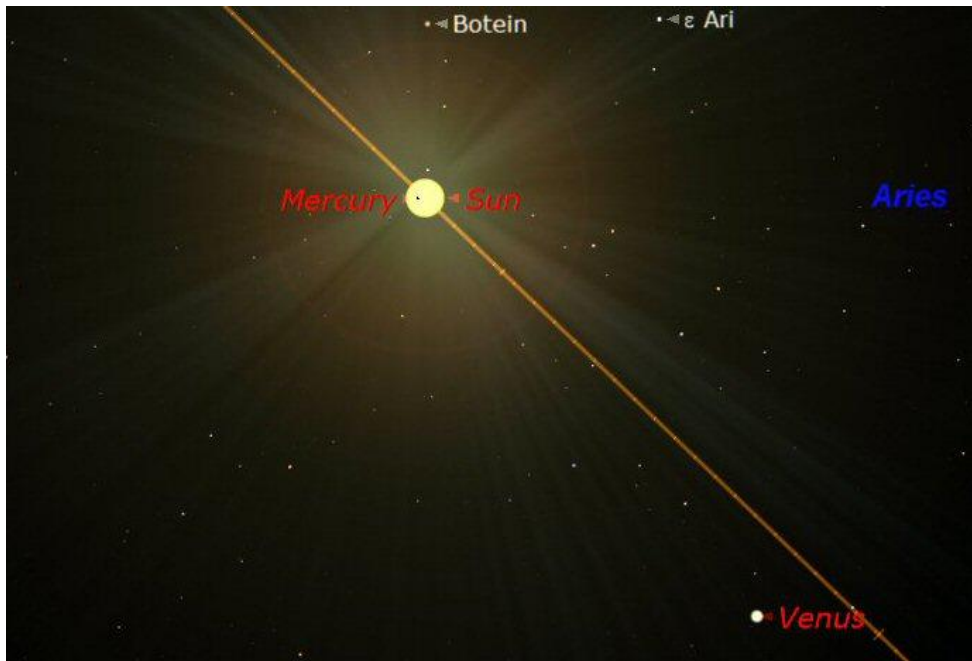


Chart showing Mercury and Venus at 15:00 on 9<sup>th</sup> May

VENUS is just west of the Sun and very close to the eastern horizon as the Sun rises. It will be very difficult to see even though it is very bright at magnitude -3.8.

MARS rises over the eastern horizon at about 21:30 and will be observable until the sky begins to brighten at dawn. The Red Planet will be at opposition at 01:00 BST (midnight) on 22<sup>nd</sup> May when it will be at its closest approach to Earth. However it still appears small at just 18 arc-seconds in diameter but is quite bright at magnitude -2. A medium sized telescope will show the darker areas and one of the polar ice caps. The moon will be close by at opposition. See the chart below.

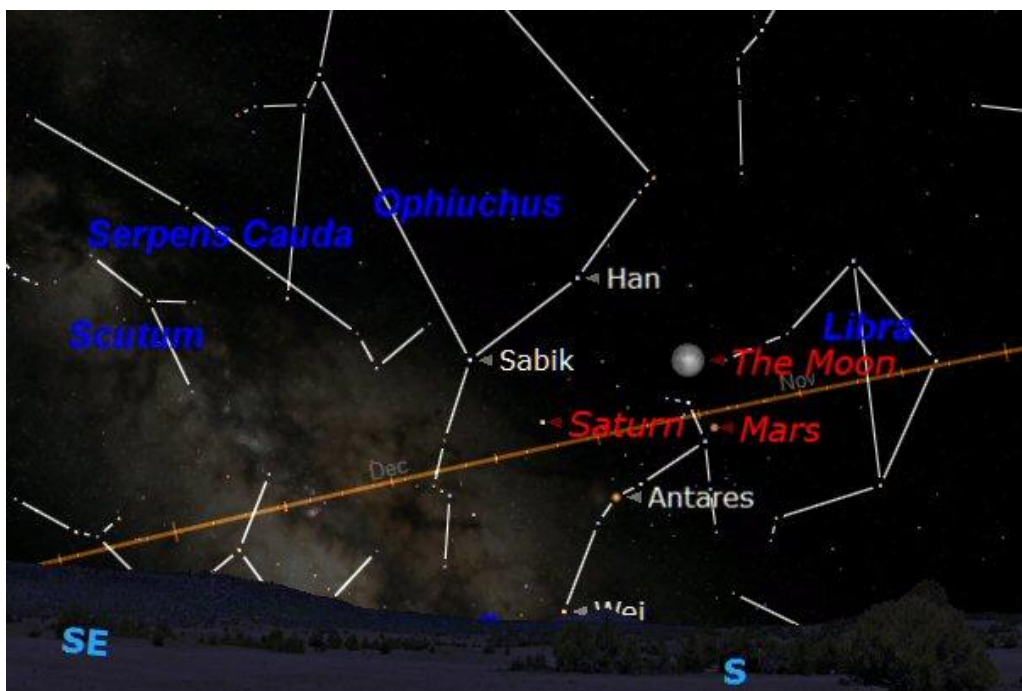
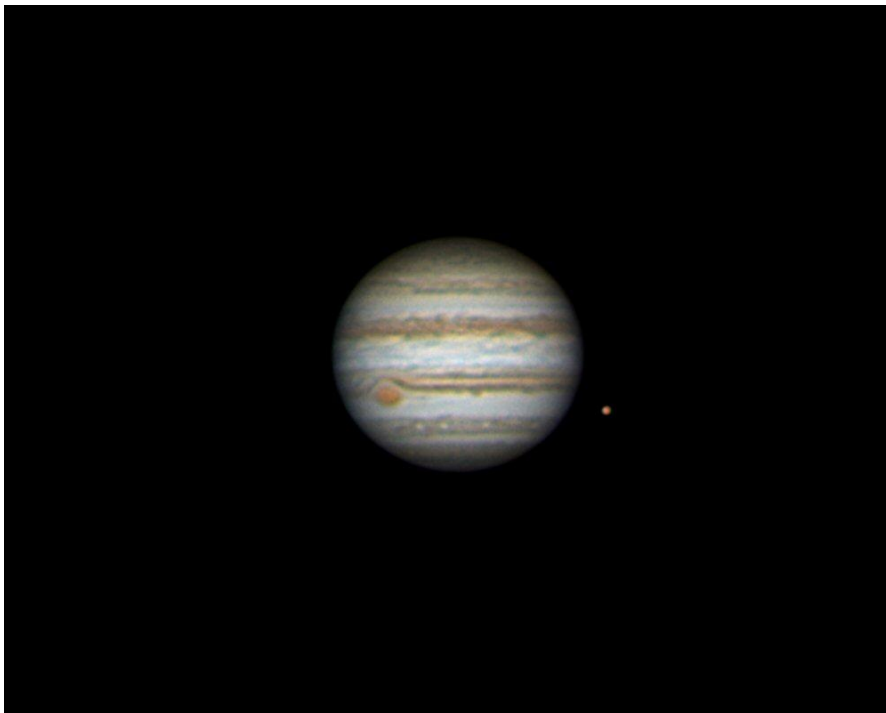


Chart showing Mars at opposition on 22<sup>nd</sup> May at 01:00

JUPITER is now at its best after passing through opposition with the Sun on 8<sup>th</sup> March. That means it was due south and at its highest point in the sky at midnight. It rises in the east at 13:30 at the beginning of the month and at 12:00 by the end of the month. It will be in a good position for observing as the sky darkens and will still be around as the Sun rises. The 'King of the Planets' will appear quite large at 42 arc-seconds in diameter and bright at magnitude -2.4.



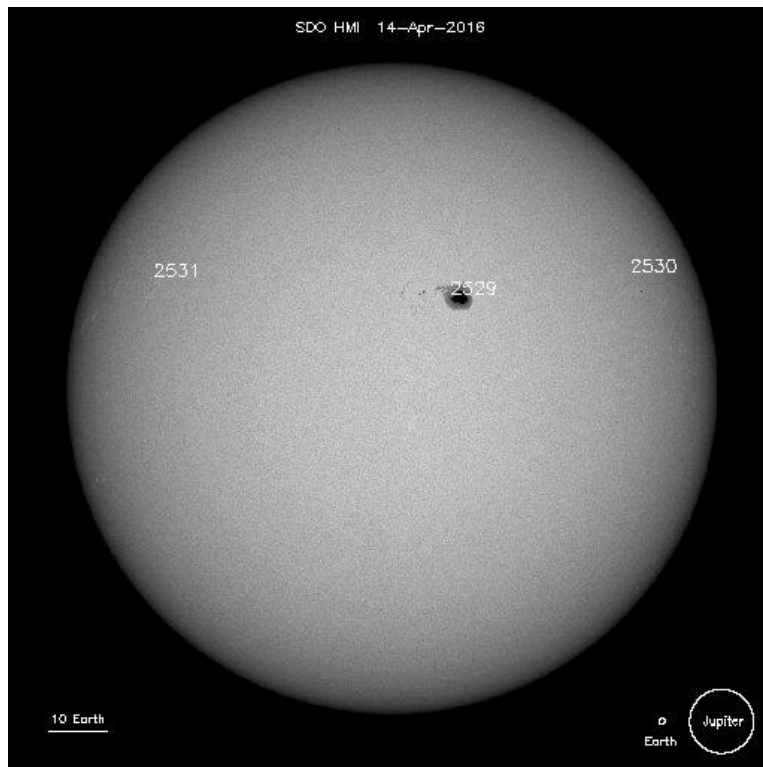
Jupiter and its moon Ganymede imaged by John Napper on 6<sup>th</sup> March 2016

SATURN rises at midnight at the beginning of the month and at 20:30 by the end of the month. It will be in its best position for observing at about 01:30. Unfortunately it will only rise to about 17° above the horizon so will be low and in quite turbulent air. It is 18 arc-seconds in diameter and the rings are just starting to close up now.

URANUS was in conjunction with the Sun on 10<sup>th</sup> April and is not observable this month.

NEPTUNE rises at 02:00 and is just about visible until the sky begins to brighten at dawn. It will be close to the horizon and very difficult to find.

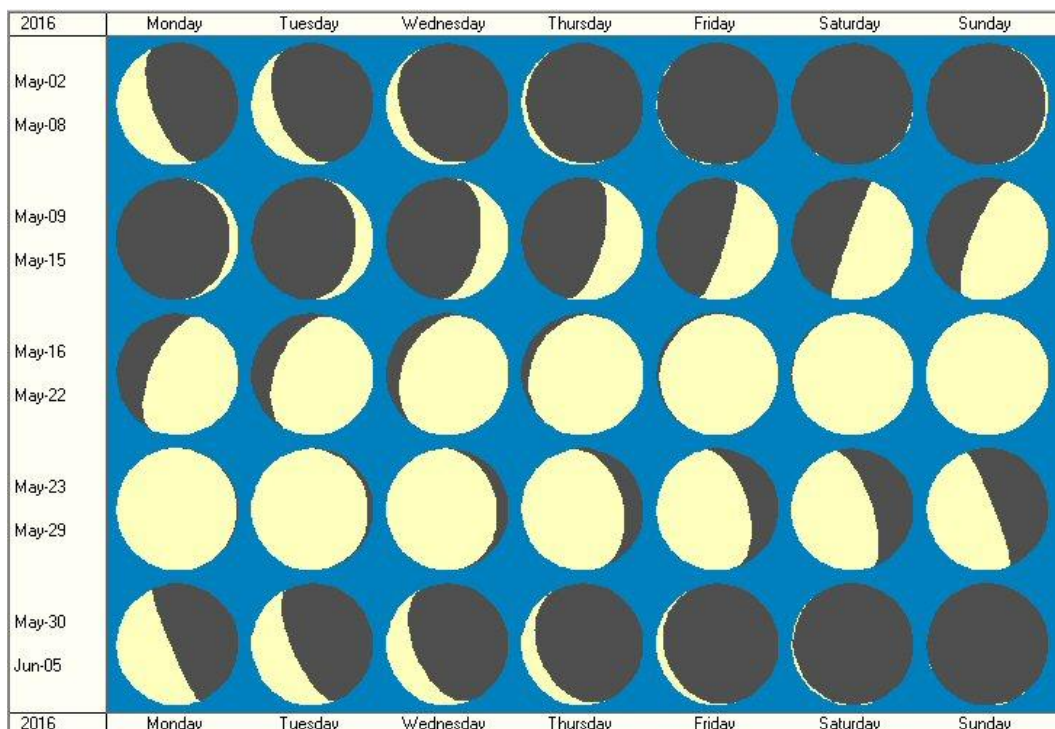
# THE SUN



A large sunspot imaged by SOHO on 14<sup>th</sup> April 2016

The Sun rises at 04:20 at the beginning of the month and at 04:00 by the end of the month. It will be setting at 19:00 at the beginning and 20:00 by the end of the month. Sunspots and other activity on the Sun can be followed live and day to day by visiting the SOHO website at: <http://sohowww.nascom.nasa.gov/>.

## THE MOON PHASES IN MAY



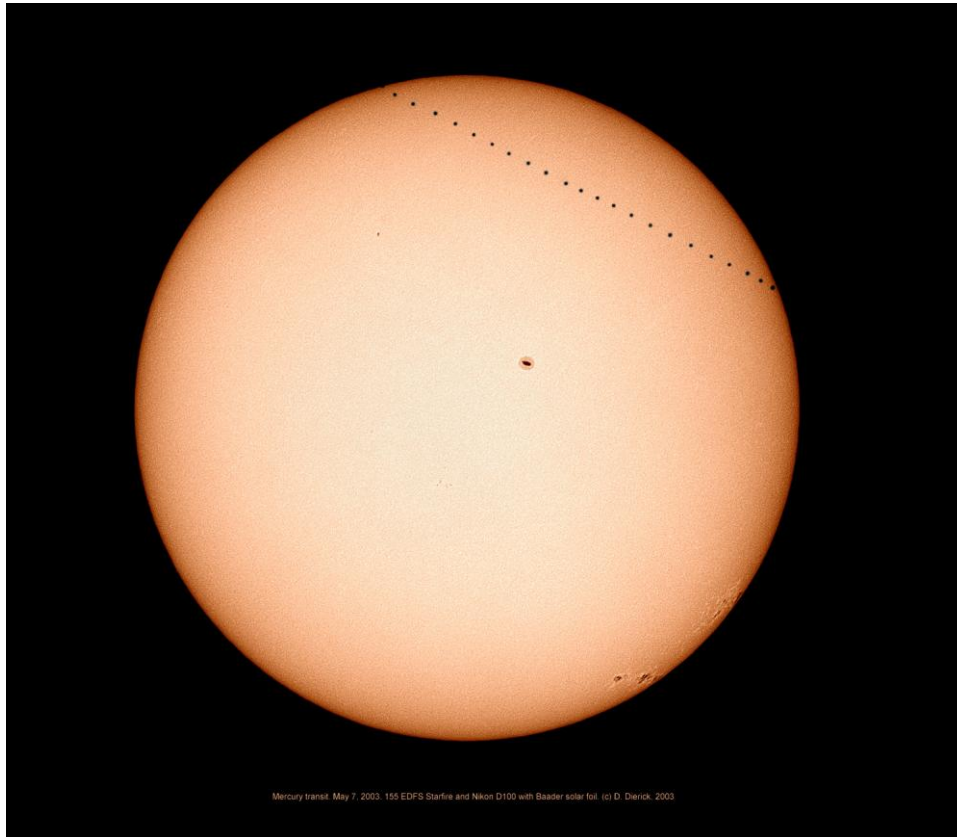
New Moon will be on the 6<sup>th</sup> May

First Quarter will be on 13<sup>th</sup> May

Full Moon will be on 21<sup>st</sup> May

Last Quarter will be on 29<sup>th</sup> May

## MERCURY TRANSIT 9<sup>th</sup> MAY 2016



The transit of Mercury on 7<sup>th</sup> May 2003 imaged by D. Dierick

There will be a transit of the innermost planet Mercury on the morning of the 9<sup>th</sup> May. This type of 'Transit' occurs when a planet appears to move across the face of the Sun. Other types of transits occur when a moon passes in front of a planet (most commonly Jupiter) and when a planet in orbit around another star passes in front of that star.

The transit on 9<sup>th</sup> May will start at 12:12 BST, will be at its mid point at 14:57 and will finish at 18:42. Mercury will appear as very black dot on the surface of the Sun looking much like a 'full stop'. The observer will need to look very carefully for Mercury because it is very small compared to the Sun.

Mercury is the smallest of all the main planets in our solar system. It is just 4,879 kilometres in diameter compared to Earth at 12,756 kilometres in diameter. It is in fact not a lot larger than our Moon which is 3,476 kilometres in diameter. The Sun is 1,391,400 kilometres in diameter. This means 285 Mercury discs could fit across the disc of the Sun. The disc of Mercury does actually appear a little larger when it is in front of the Sun because it is closer to us. The Sun is about 149.6 million kilometres from us and Mercury is about 91.7 million kilometres from us when it is in front of the Sun.

Mercury is the nearest planet to the Sun and therefore has the shortest orbit of all the planets. It takes just 87.66 Earth days to complete its orbit around the Sun so its year is equivalent to 87.66 Earth days. Oddly Mercury's day is very long and is equivalent to 58.6 Earth days. So this produces the rather strange timing on Mercury of one year having only 1½ days.

So on the 9<sup>th</sup> May what can we expect? First of all it must be stressed that it is very dangerous to look directly at the Sun as this may cause damage to the eyes. Looking at the Sun through binoculars or a telescope will cause certain blindness. The Sun must only be observed using a suitable Solar Filter or have its image projected on to a screen. Mercury will appear on the eastern rim of the Sun at about 12:15 and move west across the Sun until it disappears over the western rim at about 18:40.

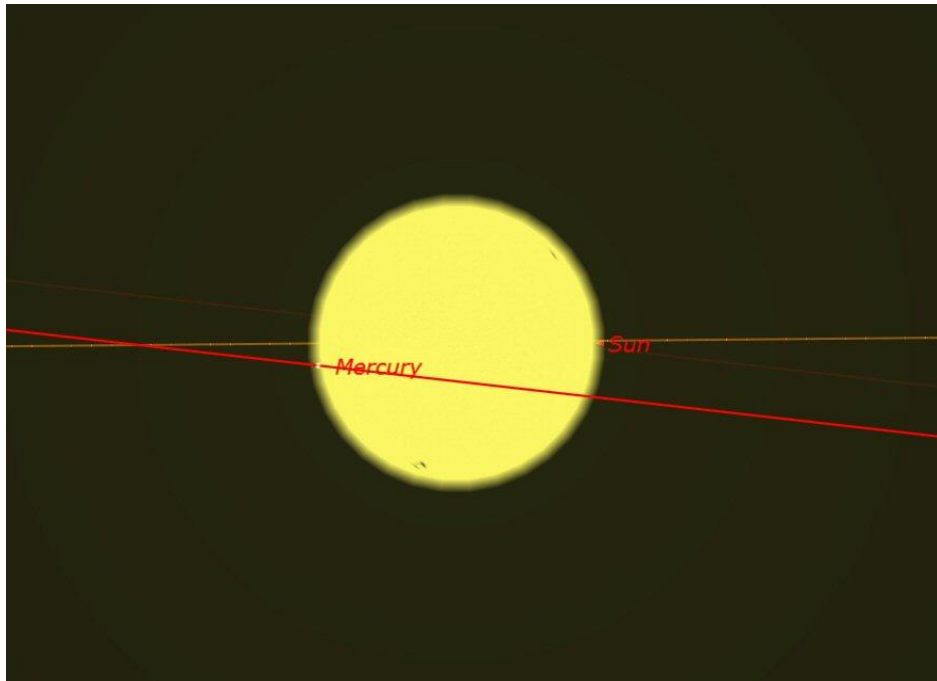
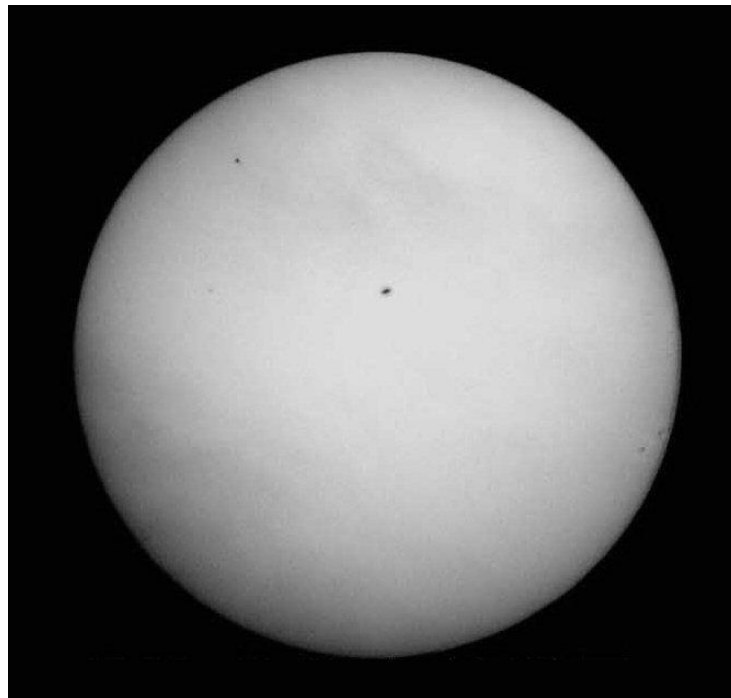


Diagram of Mercury's orbit superimposed on the Sun on 9<sup>th</sup> May

The last transit of Mercury was on 8<sup>th</sup> November 2006 but this transit was not visible from the UK. The last transit of Mercury that was seen from the UK was on 7<sup>th</sup> May 2003. This transit started at 05:13 and finished at 10:32. The mid-point of the transit occurred at 07:52.



The 7<sup>th</sup> May 2003 transit imaged at 08:30

The image above shows the 2003 transit with Mercury at the top left and a Sun Spot towards the centre. Diagram of area on Earth where transit will be visible

The next transit of Mercury will be on 11<sup>th</sup> November 2019 but will be less favourable from the UK. The next transit that will be favourable from the UK will be on 13<sup>th</sup> November 2032.

There are only two planets in our Solar System that can transit the Sun these are the innermost planets Mercury and Venus. This is because they are the only planets that can pass between Earth and the Sun. All the other planets orbit further out from Earth. Venus transits are much rarer and are among the rarest of predictable astronomical phenomena. They occur in a pattern that repeats every 243 years, with pairs of transits eight years apart separated by gaps of 121.5 years and 105.5 years.