

On June 21st at 16.55hrs BST, the Sun reached the furthest extent of its journey north and began its slow perambulation south. The furthest extent of the Sun's excursion north is marked by the Tropic of Cancer, a circle around the Earth at latitude  $23.4^{\circ}$  north.

Anyone standing on the Tropic of Cancer on June 21st would see the Sun pass directly overhead at local noon.

The beginning of the Sun's journey south is slow. By July 1st it will still be close to  $23^{\circ}$  north but by the end of the month it will have sunk to about  $18^{\circ}$  north. Despite this, people don't usually begin to become aware of nights drawing in until late August, so there is still plenty of summer left to enjoy.

### **The Moon & Lunar Eclipse**

The Moon will be new on July 2nd and will be at first quarter on July 9th. It will be full on July 16th and will be at last quarter on July 25th. The full Moon on the 16th will undergo a partial eclipse. It will rise around 21.00hrs BST already in eclipse. The greatest eclipse will occur around 22.30hrs BST when 65% of the Moon's diameter will be in shadow. The Moon will still be low in the sky having an altitude of about  $8^{\circ}$ . Lunar eclipses have two phases - umbral and penumbral.

The umbral phase occurs when the Sun throws the dark shadow of the Earth onto the surface of the Moon. An astronaut standing on the Moon in the umbral shadow would see the Sun completely obscured by the Earth.

Surrounding the umbral shadow is the penumbral shadow, a subtler shadow and less easy to discern. In this phase our astronaut would see the Sun partially obscured by Earth, an effect complicated by Earth's atmosphere refracting sunlight.

In the July eclipse, the umbral phase will end around midnight leaving the subtle and graded penumbra which will not leave the Moon completely until about 1.15hrs BST. The event will be best viewed using binoculars, preferably tripod mounted if you are going to follow the eclipse for any length of time.

### **Asteroid/Star Eclipse**

Continuing with the subject of eclipses, during the night of July 25th/26th an asteroid, 135 kilometers in diameter, is predicted to pass in front of a +11 magnitude star causing it to dim by two magnitudes for a period of up to 10 seconds. Although events of this type are not uncommon, the tracks of the events are narrow so you have to be in the right place to see the magnitude change. We are lucky that this time Bury St Edmunds is quite close to the center line of the track.

The star affected is in the constellation of Aquila. Its catalogue designation is TYC 5157-01423-1 and is to be found at Right Ascension 19 hours 44 minutes 33 seconds, Declination  $-6^{\circ} 53$  minutes 58 seconds. The event is predicted to occur sometime during the 11 minutes between 1.13hrs and 1.24hrs BST. You will require a telescope of at least 6 inches, preferably motor driven, for viewing this event. Practicing finding the star beforehand will pay dividends. Prior to the event use a planetarium program such as Stellarium to identify the star and the pattern of stars in the telescope's field of view and then go out and locate the star in your telescope so you are well prepared ahead of time. Good luck.

### **The Planets**

Mercury, Venus and Mars are too close to the Sun this month for observing. Jupiter is among the stars of Ophiuchus shining at magnitude -2.5. Of interest at the moment is the activity of the Great Red Spot which appears to be shrinking and has been described as unravelling, almost as if the rotation of the spot about its center is feeding material into the adjacent belt.

Saturn, following behind Jupiter along the ecliptic, comes to opposition on July 9th. It is shining at magnitude +0.1 among the stars of Sagittarius.

At the moment Saturn's rings are wide open so it is particularly spectacular. I like to follow the shadow of the planet on the rings. At opposition the shadow is hidden but, as the planet moves away from the alignment with Earth and the Sun, the shadow on the rings behind the planet will appear and will grow as it moves further from the alignment.

Saturn has a number of moons visible in a small telescope. Before going out to look for the moons, it is worth using a planetarium program to plot where they are. They are easier to find if you know where to look.

Uranus is a binocular object that has just returned to the morning sky. It shines at magnitude +5.8 in the constellation of Aries.

Neptune shines at magnitude +7.8. It is a morning object and is in the constellation of Aquarius.

### **Messier Objects**

Last month we considered a number of Messier objects which are to be found in the zodiacal constellations of Scorpius and Sagittarius and which are currently visible in the south during the short nights of summer.

The ecliptic is a line describing the apparent path of the Sun around the sky as a result of the Earth's annual journey around its orbit. The ecliptic passes through all twelve of the constellations which make up the zodiac.

There is an additional constellation, Ophiuchus, which lies along the ecliptic. In fact, at the present time, the Sun spends more time in Ophiuchus than it does in Scorpius.

Ophiuchus is a large constellation which lies above and between Scorpius and Sagittarius and, at the moment, is easy to find as it is acting as host to prominent Jupiter.

Last month I commented on the number of globular clusters catalogued by Messier in the constellations of Scorpius and Sagittarius. This month there are seven Messier globulars in Ophiuchus numbered 9,10,12,14, 19, 62 and 107. As before I will leave those of you that collect Messier globular clusters to locate these objects. Stellarium will provide you with both a star chart and Right Ascension, Declination coordinates.

Until we meet again next month, clear skies.