



SUN Moving through *Gemini* into *Cancer*. There will be a total eclipse of the Sun on the 22nd tracking across India, Bhutan, China and out into the Pacific Ocean. Observers outside this narrow track will see a partial eclipse. The duration of the eclipse will be maximised by the recent perigee.

MOON New Moon on the 22nd, Full Moon on the 7th. There is a penumbral lunar eclipse on the 7th but of such a minor magnitude it will be impossible to detect with the human eye.

PLANETS **Mercury** is out of sight during this month.
Venus is still a morning object low down in the pre-dawn sky and shining at -4.0^M .
Mars is a morning object moving from *Aries* into *Taurus* at 1.0^M .
Jupiter dominates the morning sky at -2.6^M . It does not appear to move much against the background stars of *Aquarius* though since it is performing its retrograde loop past opposition. Have a look for its Galilean moons and belts, which should be easily visible in even a modest telescope.
Saturn is an evening object at 1.1^M in *Leo*. By the end of the month it will set before midnight.

COMETS 22P/Kopff is a binocular object of around 10^M this month, but slowly fades, remaining in *Aquarius*, and will be around 12^{th} magnitude in November when it sinks into the evening twilight for northern observers.

METEORS There are two extended showers this month.
 Between Jul 15th and Aug 15th you will be able to see the η Aquarids. These have a maximum of 20 per hour on Jul 29th.
 Between Jul 15th and Aug 20th the Pisces Australids will be active. This is a less interesting shower, having a peak rate of only 10 per hour on the 31st.

STARS *R corona borealis* is just on the limit of visibility at 6^M , but out of the blue it will fade down to 12^M - 250 times fainter! The reason for this is that this star is carbon rich and ejects shells of dark soot that obscure the starlight.
 Another star nearby, *T corona borealis*, is normally invisible to the naked eye at 10^M . Every once in a while it will flare up to 2^M - one of the brightest stars in the constellation.
Zubenelgenubi (α *librae*) is a fine binocular double.
 Look for the baleful red glare of Antares the heart of the Scorpion. The name actually means "the rival of Mars". This is an example of a red supergiant star with a diameter of about 4 A.U.s. Telescopes show it to be embedded in a cloud of glowing gas and dust.
 α herculis or Ras Algethi (literally "the head of the Kneeler") is a lovely coloured double star which appears orange/green through a telescope.
Acrab (β *scorpii*) is a good double star for modest telescopes.

NEBULÆ No worthwhile nebulae in this area of the sky.

CLUSTERS This is a good month for star clusters. The finest globular cluster visible from the northern hemisphere is located in *Hercules* and is a naked eye object. M13 contains roughly 100 000 old red stars and was the target of a radio message designed to contact extra-terrestrial life forms in 1974. Sadly, due to the incredible distance of this cluster, it will be about 52 000 years before we get a reply! Neighbouring globular cluster M92 is less spectacular, but worth a look in binoculars.
 In *Serpens Caput* there is the binocular cluster M5, whilst *Ophiuchus* plays host to two fine binocular globular clusters: M10, M12, M9, M107 and M14. The galactic cluster IC4665 is a good binocular object above the shoulder of *Ophiuchus*.
 In *Scorpius* you will find the bright globulars M4, M80, M19 and M62, but these are rarely seen very high above the horizon. Even lower down are two galactic clusters M6 and M7, both requiring a clear southern horizon.

GALAXIES There are no galaxies visible in this region of the sky for small instruments, but the Milky Way stretches down through *Scorpius*. A binocular sweep of this region will give you more stars than you can count!