Sky notes

2007 October & November

by Neil Bone

Sun and Moon

The Sun sinks to ever-lower declinations on the celestial sphere as autumn advances, and the hours of daylight diminish considerably for those at the latitudes of the British Isles by the end of November – observing soon after tea-time is now a realistic prospect. Sunspot activity remains in the doldrums, with numerous spotless days marking the interregnum between cycles 23 and 24. The majority of the few active areas recorded recently – most conveniently by the safe method of projection – have been small single spots or pores. An upturn might be expected in the New Year.

For observers equipped with the increasingly-popular 'personal solar telescopes', capable of providing filtered views at the H-alpha wavelength, there is still a fair amount of prominence activity around the Sun's limb.

New Moon occurs on 11 October and 9 November, putting the darkest evening skies in the first fortnight of either month. Full Moon falls on 26 October and 24 November. The waxing gibbous Moon passes in front of the Pleiades star cluster on the night of 27–28 October, resulting in multiple occultation events. Unfortunately, the disappearance phases will be on the Moon's bright limb, and its glare will make observations tricky.

Civil clocks revert to GMT, equivalent to the standard Universal Time (UT) used in recording astronomical observations, on Sunday 28 October.

The planets

At inferior conjunction between Sun and Earth on October 23, Mercury is lost from view during October, then emerges to a very favourable morning apparition in early November. Greatest elongation, 19° west of the Sun, is reached on November 8, at which time Mercury will rise about 90 minutes ahead of sunrise. A little brighter than magnitude 0, Mercury should be nicely visible as a 'spark' in the pre-dawn for a couple of weeks around the time of greatest elongation.

Venus is a splendid 'Morning Star', rising nearly four hours before the Sun around the time of its greatest western elongation (46°) on October 28. Close to elongation, Venus will show a half-phase in small telescopes, similar to that of the last quarter Moon. Earlier in October, Venus has a gradually-broadening crescent phase. Through November, mag –4 Venus remains prominent, and will present a gibbous disk, shrinking in apparent diameter as the planet recedes from Earth.

While Venus becomes more distant, Earth starts to close towards Mars as December's opposition approaches. The Red Planet, brightening to mag –1 by late November, moves slowly eastwards against the background stars of western Gemini during October, then starts to move westwards (retrograde) by November's close. The apparent disk diameter increases markedly during this interval. In early October, Mars presents a 10 arcsecond disk. By late November, the disk appears 15 arcseconds across, sufficiently large to reveal surface markings in modest amateur telescopes in the 100–150mm aperture range; larger apertures are, of course, capable of resolving more. Calm, hazy autumn nights are sometimes blessed with steady seeing conditions, and with Mars climbing high in the eastern sky by late evening, viewing circumstances are favourable for observers at the northerly latitudes of the British Isles. It remains to be seen how visibility of Mars' surface features will be affected by the large-scale dust storm – the biggest on the planet since 2001 – which broke out in 2007 June.

Jupiter is pretty much lost to view low in the early evening western sky and too close to the Sun for effective observation. Saturn, near the 'tail' of Leo, becomes more favourably visible in morning skies during this interval, rising around midnight UT by late October. With the rings now presented at a much narrower angle, and therefore reflecting less sunlight towards us, Saturn appears comparatively dim to the naked eye (around mag +1) but is still an attractive telescopic target.

Saturn and Venus are fairly close together in the morning sky in mid-October. At closest approach, early on October 14, Saturn is three degrees north of the very much brighter Venus.

Minor planets

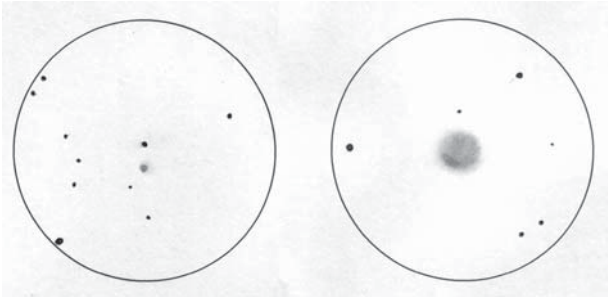
(1) Ceres is at opposition in early November, when it will be moving retrograde against the stars of the Taurus/Cetus border about 10° west of the Hyades. At about 7th magnitude, Ceres, largest of the asteroids and now assigned membership of the new class of Dwarf Planets, should be an easy binocular target.

Meteors

The minor **Piscid** shower, part of a near year-long 'drizzle' of meteor activity from close to the ecliptic plane, is active throughout October. Rates are never particularly high: a patient observer might note a couple of slow, moderately bright meteors per hour from this source. Background sporadic rates are, if anything, higher, perhaps amounting to as many as ten meteors/hr in the early morning hours at this time of year.

The **Orionids** are active from mid-October until early November, with a complex diffuse radiant midway between Betelgeuse and Gamma Geminorum. Observations are best made after midnight, when the radiant is gaining in altitude, and on a good night watchers might log 10–15 Orionid meteors each hour. Activity was somewhat enhanced last year, proving that even well-studied showers can sometimes spring surprises and need continued monitoring. The shower's broad peak usually comes between October 20–22. Increasing interference from the late-setting waxing gibbous Moon will restrict observations after about October 24.

Absence of moonlight favours the **Taurids** in the first ten days of November. The shower has two radiants – a northern branch near the Pleiades and a southern west of the Hyades in early November. Activity usually shows a broad peak centred around November 3, with combined observed rates for the two radiants perhaps reaching 5–8 meteors/hr. In some years, the Taurids produce notable numbers of slow, bright meteors, as last occurred in 2005. Even in a more typical year, as 2007 is likely to be, there are enough moderately-bright events in the mag 0 to –3 range to reward a



A study in contrasts. Aquarius' two celebrated planetary nebulae, as seen with an 80mm f/5 refractor, sketched by Neil Bone. *Left:* NGC 7006, ×40, unfiltered view, 2004 October 18. *Right:* NGC 7293, ×17, OIII filter, showing some hint of structure in southern portion, 2004 September 8. North is up in both sketches.

patient observer's efforts, and the shower certainly merits more attention than it has received in recent years.

Dark post-midnight skies favour the **Leonids** at their maximum on November 17–18. As explained on page 224 of this *Journal*, although the high activity that attended the turn of the millennium is now past, the shower remains a very worthwhile observational target.

Variable stars

Having peaked in brightness late in September, the long-period (Mira-type) variable Chi Cygni should be a naked eye object in early October. Appearing as an 'extra' star along the neck of the Swan, close to 4th-magnitude Eta Cygni, Chi typically reaches mag +5 at maximum light – though it can sometimes be markedly brighter, as in 2004 and especially 2006. With Cygnus well up in the western evening sky during late autumn, observers have a good chance to follow Chi's decline as it becomes a binocular object during the closing quarter of 2007.

The prototype long-period variable, Mira (Omicron Ceti) itself should be at minimum light in early October, a testing object for binocular observation at mag +9. By November, Mira should be a somewhat easier target as it starts to rise towards next February's maximum.

Eclipsing binary Algol (Beta Persei) has favourable minima for UK-based observers on October 1–2, 18–19, 21–22 and 24, and November 10–11, 13–14 and 16. During eclipse, Algol drops from mag +2.2 to +3.4, the entire cycle taking about ten hours.

Deep sky

The low southern evening sky of autumn can appear almost disappointingly empty, once the bright stars of Sagittarius have departed the scene. Below the Square of Pegasus, flying high midway up the southeastern heavens, lie the dim 'Water' constellations Capricornus, Aquarius and Pisces, none graced with any stars brighter than third magnitude.

Capricornus is home to a fine, wide optical double star in Beta Capricorni, which forms a wide pairing with Alpha Capricorni near the constellation's western end. Beta Cap has a yellow-orange primary (Beta^1) of mag +3.1, with pale green mag +6.1 Beta^2 3.5 arcminutes to its west, easily separated in 10×50 binoculars and showing a pleasing colour contrast. The stars' respective distances are 325 and 829 light years, so there is no physical connection between them.

Neighbouring Aquarius offers contrast of a different kind, between its two most notable planetary nebulae – the Saturn Nebula (NGC 7009) and Helix Nebula (NGC 7293). Both are accessible in telescopes as small as 80mm aperture, but use of an OIII or UHC eyepiece filter is almost essential for successful detection.

NGC 7009 lies 5° ESE from the 4th-magnitude star Epsilon Aquarii (or 10° east of Beta Cap). One of the brighter planetary nebulae at mag +8.3, NGC 7009 is comparatively easy, despite its low altitude in British skies. In part, this is due to its compactness – the Saturn Nebula's long axis is 44 arcseconds, and its light is contained in a small area of sky. In a small telescope at low magnifications (×40, say) it can appear quite starlike – use of a filter to 'blink' it can help in identification. Planetaries like this, whose light output is largely at the 495.9nm and 500.7nm of doubly-ionised oxygen, appear undimmed with the filter in place, whereas background stars – whose light output will cover a far wider range of the spectrum – appear dimmed.

Larger telescopes and higher magnifications will show the extensions – 'ansae' –to either side of the nebula, rather like the extremities of Saturn's rings, from which the object takes its popular name.

At a distance of 300 light years, the iconic Helix Nebula is the closest planetary nebula to the Solar System. With an integrated, overall magnitude of +7.3, it might be expected to be an easy object. Its light is, however, spread over an area 13 arcminutes across – nearly half the Moon's apparent width – so it has extremely low surface brightness. Also, for UK-based observers it is rather low in the southern sky, some 9° NNE from Fomalhaut. Consequently, the Helix can be rather elusive. A low-power, wide field view, aided by an OIII or UHC filter, gives the best chance of seeing NGC 7293. In my own small-scope setup (80mm, ×17) I was surprised by how readily the Helix showed on a fairly average night in 2004 September when viewing through an OIII filter; the unfiltered view, however, was a lot less contrasty.

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