# Sky notes

## 2005 October & November

*by Neil Bone*

## Sun and Moon

As autumn advances towards winter, the Sun's eastwards progress along the ecliptic carries it ever farther south of the celestial equator. Consequently, at the latitudes of the British Isles the hours of daylight diminish markedly in this interval, bringing long, dark evenings.

The Sun itself is, of course, an important daytime observational target, and its disk can be viewed by the safe method of projection using even small telescopes. Solar minimum is approaching – expected in mid-2006 – meaning that sunspot numbers should be low. The late declining phase of the current cycle (number 23 in series) has, however, seen a remarkable incidence of large sunspot groups, and even at this stage there may be a couple of active areas on the solar disk on most days. Equally, the approach of the activity minimum has also brought a number of days on which no sunspots at all have been visible.

The Moon is New on October 3, November 2 and December 1, placing the darkest evening skies in the opening and closing weeks of the month during this period. Full Moon, with attendant bright skies for several nights to either side, falls on October 17 and November 16.

At New Moon on Monday morning October 3, a solar eclipse will occur. On the central track of the Moon's shadow on Earth, which crosses the Iberian peninsula and North and East Africa, an annular eclipse will be seen: the Moon, close to apogee (farthest in its elliptical orbit from Earth) presents a 30' 21" disk, too small to completely cover that of the Sun (31' 58"), leaving a ring – *annulus* – of dazzling light at mid-eclipse.

From the British Isles, the event will be visible as a substantial partial eclipse, with 66% of the Sun's disk covered as seen from London, 59% at Glasgow – the most extensive for some years in the UK. Full details were given on page 189 of the August *Journal*. Two weeks later, the October 17 full Moon briefly clips the northern edge of Earth's shadow to produce a very small (maximum 6%) partial lunar eclipse but, occurring at mid-day, this will not be visible from the British Isles.

Observers will welcome the return of GMT to civil clocks on Sunday October 30, removing the need to remember to subtract an hour from times in observational recording to arrive at Universal Time (UT – BST minus an hour – used as an astronomical standard), and apparently bringing nightfall earlier.

## The planets

Mercury is technically an evening object through most of October and November, reaching greatest elongation 24° east of the Sun on November 3. Its unfavourable southerly declination, however, means that the innermost planet sets soon after the Sun, and it won't be visible from UK latitudes. Inferior conjunction between Earth and Sun is reached on November 24, then Mercury emerges into the pre-dawn sky, where it will be more favourably placed during early December.

Having spent much of the year poorly positioned, Venus at last comes to real prominence as an 'evening star' in the coming weeks. Greatest elongation 46° east of the Sun is reached on November 3, around which date telescopic observers should see the planet present a half-phase similar to that of the first quarter Moon. At magnitude –4, Venus hangs in the western sky as a bright beacon up to 90 minutes after sunset in mid-October. Over time, the delay between sunset and the setting of Venus stretches out, and by late November the planet will be visible low in the west for over two hours after dusk.

Mars provides the main planetary attraction, reaching opposition (180° from the Sun in Earth's sky) in Aries on November 7. While not quite as close, or spectacularly bright and apparently large, as at the perihelic opposition of 2003, the Red Planet has the advantage for observers at British latitudes of being somewhat farther north and therefore higher in the sky this time around. Potentially, telescopic viewing should be less prone to the adverse effects of atmospheric seeing (turbulence), making the detection of Mars' surface details somewhat easier. At magnitude –2.3, Mars will be the brightest object apart from the Moon in the early November midnight sky, and its red-orange colour makes it unmistakeable.

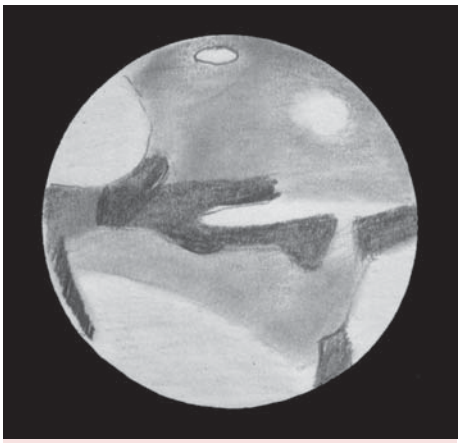
Telescopically, Mars presents a disk of just over 20 arcseconds' diameter around opposition, sufficiently large that a 70mm aperture instrument should just show some of the more prominent dark surface features (though observers should bear in mind that these are lower in contrast than, say, the lunar maria). Telescopes of 100mm and greater aperture should certainly be capable of revealing more. The planet's bright south polar cap is presented towards us, but will be much diminished in size around opposition, it being autumn in Mars' southern hemisphere at this time. The prominent dark Syrtis Major will be presented close to the central meridian of the visible disk in late evening during the third week of October and again in the last week of November, for UK-based observers.

Jupiter is at conjunction beyond the Sun on October 22, re-emerging into the pre-dawn sky towards the end of November when it will be rising about 90 minutes ahead of sunrise.

Rather better placed at this time is Saturn, a mag. +0.2 object against the stars of Cancer. By early November, Saturn rises around 23h UT, and will be reasonably high in the eastern sky during the early morning hours. As the planet moves to a more southerly declination on the ecliptic, the presentation of the rings becomes less open; observers will notice a marked difference in the rings' telescopic appearance relative to that in the early months of 2005. Those using larger aperture telescopes should be able to discern some of the subtle dark belts and light zones on the globe of Saturn itself.

## Meteors

Autumn brings a general upturn in meteor activity, with background sporadic rates at their highest for the year (perhaps 8–10 per hour on occasion), and a number of minor showers in evidence. The weak Piscids, from which rates of a couple of slow meteors per hour may be found, have a nominal peak on October 13.



Neil Bone's drawing of Mars on 2003 September 29 at 21:25 UT shows what can be seen with a modest telescope in good conditions (seeing I–II). Central meridian longitude 252.5°. South is at the top. Hellas is prominent south of Syrtis Major on the preceding (western) limb. The south polar cap is visible, as is the Argyre impact basin. Sinus Meridiani is approaching the central meridian. 102mm refractor ×200. *N. M. Bone*.

Observers should be alert to the possibility of an outburst from the Giacobinids (Draconids) early on the evening of Saturday October 8–9. Comet 21P/Giacobini–Zinner was at perihelion in early July, and Earth will pass close to the ascending node of the comet's orbit (where the plane of this intersects that of Earth's orbit) around 17h UT on October 8. This is 92 days after the comet's arrival at the node. In the past, node passages when Earth has closely followed the comet have been marked by strong meteor showers (notably 1933 and 1946, when meteor storms – rates in excess of 1000 meteors/hr – occurred) consistent with encountering concentrated strands of meteoroidal debris behind the comet. This time around, the encounter circumstances are rather distant, and Giacobinid activity is by no means certain to occur, but it is essential that observations are made if at all possible to check. See also John Mason's report on page 241 of this *Journal*.

Activity, should it occur, will come from a radiant near the 'head' of Draco. The meteors have low entry velocities (21 km/s) and the bulk of any Giacobinids seen may well be faint. The 5-day waxing crescent Moon shouldn't affect observations too badly, and it is recommended that observers watch for possible Giacobinid activity from late dusk until 21h UT. Even negative reports will help in placing constraints on the extent of the debris field around the nucleus of comet 21P/Giacobini–Zinner.

Adverse moonlight conditions affect the Orionids at their broad maximum in the third week of October. From late October and through November, the Taurids give steady low rates (5 meteors/hr) from radiants near the Hyades and Pleiades. Produced by debris from Comet 2P/Encke, the Taurids are noted for occasional slow, bright meteors, although BAA Meteor Section results show the shower not to be as rich in fireballs (meteors brighter than mag −5) as some reports in the popular literature would suggest.

Unfavourable moonlight blights the 2005 return of the Leonids, peaking on November 17–18. Following the enhanced activity of 1994–2002, associated with the return of their parent comet 33P/Tempel–Tuttle, Leonid rates appear to be settling back to the more modest levels found in the 1980s.

## Variable stars

Long autumn evenings offer good opportunities to follow eclipses of Algol (Beta Persei). During eclipses, the star fades noticeably, from mag +2.1 to +3.4. The fade and rise each take about five hours, and with Algol well up throughout the lengthening nights, the eclipses on October 14–15 and 17–18, and again on November 6–7, 26–27 and 29–30 are each well placed.

One of winter's 'signature' stars, Betelgeuse (Alpha Orionis) is now prominent from late evening onwards. This massive red giant star is a slowly-pulsating variable whose changing light output, between mag +0.4 and +1.2, can comfortably be followed by naked eye observers. Betelgeuse varies in brightness over several overlapping periods, as a result of differing 'modes' of pulsation in the star's extended outer layers. Short-term variations on timescales of months are seen, together with an apparent longer period cycle lasting about six years. In 2004–'05 Betelgeuse was comparatively bright, and its red colour particularly prominent. Brightness estimates can be made at intervals of 7–10 days from late autumn through to April. Suitable comparison stars include Capella (mag +0.1), Procyon (mag +0.4), Aldebaran mag +0.8) and Pollux (mag +1.2).

## Deep sky

With the Square of Pegasus and Andromeda high in the eastern sky, October and November evenings offer good views of neighbouring galaxies to our own in the Local Group. The Andromeda Galaxy M31, just above the mid-point of the more northerly chain of Andromeda's stars trailing from the northeast corner of the Square of Pegasus, is a familiar object to many: at mag +3.4 it is readily visible to the naked eye on a haze- and Moon-free night.

Tucked in below Andromeda, next to Aries, Triangulum is a fairly undistinguished constellation, but home to another prominent Local Group galaxy, M33. M33 (NGC 598) is a relatively easy binocular object, lying 4° northeast from Alpha Trianguli, the third-magnitude star at the Triangle's sharp, westward-pointing tip. With a catalogue magnitude +5.7, M33 is a face-on galaxy, its diffuse, open spiral arms showing low contrast with the background sky; paradoxically, the galaxy is better seen at low magnifications in binoculars than it is with large apertures at high magnifications. There are reports of the 70×40 arcminute M33 being seen with a pair of 10×50s on hazy autumn nights when 150mm and larger-aperture telescopes struggled to show it. M33's small, concentrated nucleus has earned it the name of the 'Pinwheel Galaxy'. On very clear nights, larger telescopes will reveal the major star-forming region in the northwestern part of the galaxy, which has its own object designation as NGC 604. See also Stewart Moore's observing note on page 293 of this *Journal*.

The autumn evening eastern sky is home to a couple of excellent planetary nebulae. M76, in Perseus, is arguably the trickiest of the Messier objects, requiring a good transparent night for best visibility – any autumn haze will certainly compromise the view. At mag +10.1 and covering an area of 3×1 arcminutes, M76 appears visually as an elongated patch aligned NW–SE. An 80mm aperture telescope at medium power (×40, say) will show it reasonably well. I find that averted vision helps: the trick is to place the nebula towards the nose from the centre of the observing eye.

A good guide for location is the fourth-magnitude star Phi Persei, midway between Gamma Andromedae and Alpha Cassiopeiae. M76 lies 40 arcminutes to the NNE of Phi Per. Larger telescopes show a twin-lobed structure reminiscent of the brighter M27, and from which M76 takes its popular nickname of the Little Dumbbell. The lobes are given separate designations as NGC 650 and NGC 651 in the *New General Catalogue*.

While M76's low surface brightness makes it a tricky object to track down, the other standout planetary nebula in this region of sky is easy to overlook because of its relatively small size and concentration of light. NGC 7662 in Andromeda is among the brighter planetaries at mag +8.3, but has an apparent diameter of only 12 arcseconds: at low magnifications in a small telescope, it appears as a bluish field star, 3° west of the fourth-magnitude star Iota Andromedae (in the 'wedge' of fainter stars north of – above – the Andromeda Galaxy). Use of a narrow-passband OIII eyepiece filter, isolating oxygen emissions which are strong in planetary nebulae but a minor component of starlight, makes NGC 7662 stand out from the low power field. Telescopes of 100mm and greater aperture will show NGC 7662 as a more extended object with a faint halo. Its pronounced colour lends this autumn gem the popular name of the Blue Snowball.

**Neil Bone**