Sky notes

2007 February & March

by Neil Bone

Sun and Moon

February sees a marked increase in the hours of daylight, as the Sun's motion along the ecliptic carries it northwards. On March 21, at the time of the Vernal (Spring) Equinox, the Sun reaches the celestial equator. Thereafter the hours of daylight exceed those of darkness.

Although we are currently close to solar minimum, the Sun continues to produce occasional sizeable sunspots, which can be viewed by the safe method of projection. Sunspot cycle 24 is expected to take off during 2007, and the next 12 months should see a significant upturn in solar activity.

The Moon is New on February 17 and March 19, so observers will find the darkest evening skies in the second and third weeks of each month. With the springtime ecliptic quite steeply inclined relative to the western evening horizon, the waxing crescent Moon in the nights following New rapidly emerges to favourable visibility. By the time it is a four-day old crescent in March, for example, the Moon doesn't set until after midnight - excellent circumstances for those wishing to explore telescopically some of the interesting rugged terrain in the lunar southern hemisphere, where shadows throw features into sharp relief along the day-night line of the terminator.

The 6-day (almost First Quarter) waxing crescent Moon passes in front of the Pleiades star cluster in Taurus in late evening on the Friday to Saturday of February 23–24, offering multiple opportunities to observe occultation events. Stars will disappear behind the advancing (more easterly) limb of the Moon, which will almost certainly be dimly visible by earthshine, allowing observers to follow it right up to the moment of 'contact', at which stars abruptly disappear. Tripod-mounted binoculars or a small telescope will be required.

Spread over an angular area about two degrees across, the Pleiades cover much more sky than the Moon (roughly 30 arcminutes; 0.5°), and the lunar traverse – moving eastwards by its own diameter each hour – takes quite some time.

Full Moon falls on February 2, March 3 and April 2. At Full on March 3, the Moon undergoes total eclipse in Earth's shadow. The event is very favourably timed for observers in the British Isles, the first such since 2004. The Moon's leading, easterly limb first enters the deep shadow of the umbra at 21:30 UT (Universal Time; UT= GMT), and immersion becomes complete over the next hour and a quarter. During this ingress, the Moon will dim and take on a reddish, perhaps coppery, hue. Bluish or yellow fringing may also be apparent at the shadow's edge when viewed through binoculars or a small telescope. At totality, which lasts from 22:44-23:57 UT, the Moon shouldn't disappear from view, but will remain easily visible to the naked eye.

No two lunar eclipses are ever quite the same: the eclipsed Moon is illuminated by sunlight refracted through Earth's atmosphere into the umbra, and some events are darker than others depending on the amounts of suspended dust and/or cloud present. There have been few very major dust-ejecting volcanic eruptions recently, so it might be expected that this will be a relatively bright eclipse.

Totality ends as the Moon's easterly limb re-emerges into sunlight, and the trailing limb finally exits the shadow at 01:18 UT on March 4. Coming on a Saturday night to Sunday morning, with the Moon high to the south (against the stars of Leo), this eclipse could hardly be more favourable for observers in the UK.

Civil clocks revert to British Summer Time (BST) on Sunday March 25; from then on, observers should remember to subtract an hour to arrive at the astronomical standard of UT in their records.

The planets

Mercury has a favourable evening apparition in early February. During the first week of the month, Mercury sets in the southwest around 90 minutes after the Sun, and should be reasonably conspicuous in the twilight around magnitude –1, below the much more prominent Venus. Greatest elongation, 18° east of the Sun, is reached on February 7. Thereafter, Mercury closes quite rapidly back towards the Sun in the sky, reaching inferior conjunction on February 23. The subsequent morning (western) elongation, reaching its greatest on March 23, is unfavourable for observers in the British Isles, Mercury rising less than an hour before the Sun.

Having spent much of last year poorly placed, **Venus** has an excellent showing as an 'Evening Star' during the first half of 2007, and becomes really prominent during this interval. In early February, Venus sets around two hours after the Sun, and is unmistakable as a dazzling mag –4 object in the west as twilight deepens. By the end of March, Venus is visible for three hours after sunset; its elongation east of the Sun stretches out from 23 to 36° during this interval.

Telescopically, Venus is currently a fairly disappointing object: most amateur telescopes will show little more than its broad gibbous phase and featureless cloud-tops. Use of coloured or ultraviolet eyepiece filters in larger instruments may reveal some subtle details. The phase – similar to that of the Moon a couple of days before Full – shrinks slowly during February and March.

Mars has re-emerged into the morning sky from conjunction behind the Sun, but is unlikely to be particularly well seen at this time, appearing as a first-magnitude 'spark' in the dawn twilight.

Jupiter is a morning object, low in the southeast against the stars of Scorpius and rising about 02h in early March. Its southerly position this year makes Jupiter a trickier target for telescopic observation from UK latitudes, and at best the planet will never be much more than 15° above the southern horizon. Poor seeing conditions may restrict views in even the largest telescopes.

Saturn reaches opposition, 180° from the Sun in Earth's sky, on February 11, around which date it will be visible all night. A few degrees to the west of Regulus in Leo, Saturn stands high to the south around midnight, and at magnitude 0 is bright and prominent, appearing dull yellow to the naked eye. With the planet now further south on the ecliptic than in 2006, Saturn's rings are more closed in their aspect towards us, but they are still sufficiently open to be resolved in even a 60mm aperture telescope. The dark Cassini Division between the dusky, outer A ring and brighter B ring can be resolved in telescopes of 100mm and greater aperture on steady nights, particularly at the eastern and western extremities - *ansae* - of the system. Saturn's globe shows some darker belts and light zones but, thanks to a layer of haze in the planet's upper atmosphere, these are less distinct than their jovian equivalents.

Mag +8 Titan, Saturn's brightest and largest satellite, can be located four ring-spans due west of the planet around February 9 and 25 and March 13 and 24, and due east about 8 days later.

Meteors

Meteor activity is at its lowest for the year during February and March, with only very minor showers and minimal sporadic rates in evidence. Towards the end of March, things pick up once more as the Virginids become active. The shower produces steady rates of two to three meteors/hr from radiants in the Virgo 'bowl' and to the east of Spica. Virginids are slow, and can sometimes be long-pathed, bright meteors.

Variable stars

Algol (Beta Persei) has favourably-timed eclipses for UK-based observers on February 2–3, 5, 8, 22–23, 25 and 28, and March 17–18 and 20. During eclipse, Algol fades from mag +2.1 to mag +3.4, a difference that is quite noticeable, and the star's variations can readily be followed with the naked eye.

The famous long period variable Mira (Omicron Ceti) should have brightened to naked eye visibility by early February, and is expected to reach maximum brightness in mid-March. On average, Mira peaks around third magnitude, but some maxima can be markedly brighter, others fainter. The star lies a little to the west of the triangle of Alpha, Gamma and Delta Ceti, marking the head of Cetus. Maxima occur at intervals of 330 days (11 months), and for the past several years have coincided with solar conjunction, when the star has been lost from view in the bright sky, so the 2007 apparition gives a first chance for a while to catch Mira at its brightest, just before – in late March – it becomes immersed in the western evening twilight.

Deep sky

While the bright constellations including and around Orion in the southern sky rightly command a lot of attention early on February evenings, signs of spring's approach are already apparent in the sky by about 22h UT in mid-month. By then, Orion is heading into the southwest, and to the east Cancer and Leo are well placed. Standing vertically on its 'handle', the Plough rises rapidly in the northeast. Following the line of the handle down to the eastern horizon takes the view to orange Arcturus, at magnitude –0.04 the fourth brightest star in the sky.

Arcturus is the principal star of Boötes, and the region between this constellation and the Plough contains a number of interesting objects for late-evening viewing in February and March.

Boötes' second-brightest star, Epsilon (Izar) is a good, challenging double for smaller telescopes. The brighter component is a mag +2.7 yellow star, while its mag +5.1 companion appears slightly greenish. The pair are separated by 2.8 arcseconds, the fainter star lying at position angle 335°, to the northwest of the primary. Epsilon Boötis can be resolved in a 100mm aperture telescope at ×200, but the difference in brightness between the components can make this a tricky object on nights of unsteady seeing.

Roughly at the right-angle of a triangle between Arcturus and (mag +3) Gamma Boötis, M3 (NGC 5272) in the neighbouring constellation of Canes Venatici is one of the finest globular clusters in the northern sky. At mag +5.9, it is obvious in 10×50 binoculars, and only a little fainter than the more celebrated M13 in Hercules. Small telescopes show it as a circular haze with 'grainy' outer regions; in even a 100mm aperture instrument, there are hints of resolution into individual stars on M3's fringes.

Alkaid (Eta UMa) at the end of the handle of the Plough is a good starting point for a star-hop to find the famous 'Whirlpool' Galaxy M51 (NGC 5194/5195), 3.5° to its southwest. On a clear, dark night, the mag +8.4 galaxy can be seen in 10×50 binoculars as an elongated hazy patch, broader at its southern end. Small telescopes show this more clearly, revealing condensations representing the nuclei of the main galaxy (NGC 5194) and its tidally-disrupted neighbour (NGC 5195). In larger telescopes – 250mm aperture and upwards – some hints can be seen of the spiral arm structure from which the galaxy takes its popular name (coined by Lord Rosse following observations with his 72-inch 'Leviathan' telescope at Birr Castle in 1845). Most prominent is the spiral arm to the northwest.

Many more galaxies can be found in the Leo, Coma and Virgo regions, high in the southeast in the latter parts of the night; these will become deep sky observers' main fare once spring arrives in earnest.

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