Sky notes

2008 August & September

by Neil Bone

Sun and Moon

Sunspot activity remains stuck in a long minimum between cycles 23 and 24 with little sign, as of mid-2008, of the expected increase in activity. A few isolated, small high-latitude new cycle spots have been seen, alongside occasional short-lived groups associated with the old cycle, but spotless disks have been common in recent times. Daily monitoring by the safe projection method should enable observers to keep an eye on developments, and perhaps activity will finally pick up in the early autumn.

The Sun is heading southwards along the ecliptic, crossing the celestial equator at 15h 44m UT (Universal Time; equivalent to GMT, BST minus 1 hour) on September 22 – the northern hemisphere Autumnal Equinox. Observers will welcome the steadily-increasing hours of darkness.

The Moon is New on August 30 and September 29, putting the darkest evening skies in the first ten days or so of either month. Full Moon falls on August 16 and September 15. At this time of year, the shallow angle of the ecliptic to the eastern evening horizon results in the delay between moonrise on successive nights (retardation) being at a minimum for several nights just after Full. The waning gibbous Moon rises only about 20 minutes later from one evening to the next at this time – ideal for those wishing to observe lunar features close to the terminator (day-night line) under local sunset conditions. Even as late as Last Quarter (August 23, September 22), moonrise is well before midnight, affording good viewing opportunities at a more sociable hour.

At Full on the Saturday evening of August 16, the Moon undergoes a partial eclipse, clipping through the northern edge of Earth's dark shadow (umbra). From the British Isles, the event occurs close to moonrise. The Moon's leading, southeasterly limb makes first contact with the umbra at 19h 36m UT, about 20 minutes after moonrise in south-east England. Further north and west, the Moon rises slightly later, and will clearly show a growing dark 'nick' on its limb as it clears the horizon from Glasgow, for example. As with the partial lunar eclipse in 2006 September, this event affords the opportunity to frame wide-field images including foreground objects with the partially-eclipsed Moon low in the sky. The eclipse reaches its maximum extent (81% coverage, leaving a small portion of the Moon's northern hemisphere in sunlight) at 21h 11m UT. The Moon's trailing (westerly) limb exits the umbra at 22h 44m UT. While not quite as impressive as a total lunar eclipse, this event could show some interesting colour contrasts across the Moon's disk, with the northern part of the shadow appearing bluish, the southern more copper-red.

The partial lunar eclipse of 2006 September 7 at 19:01 UT. Like that event, the eclipse on 16 August this year will begin with the Moon low down, allowing foreground objects to be included in images. *Image by Neil Bone*.

The planets

Following superior conjunction on the far side of the Sun in late July, **Mercury** is technically an evening object during August and September, reaching greatest elongation 27° east of the Sun on September 11. Setting less than 40 minutes after the Sun, however, Mercury is invisible from UK latitudes; by contrast, observers in the southern hemisphere enjoy their most favourable apparition of the innermost planet for the year.

Venus is also in the evening sky but much too close to the Sun to be readily visible in August and September. Viewing conditions will improve in the autumn, and by Christmas Venus will indeed be a spectacular 'Evening Star'.

As its apparition draws to the usual lingering close, **Mars** joins Mercury and Venus in the western evening sky, lost from view in the near-solar glare. **Saturn** is also here, reaching conjunction on the Sun's far side on September 4. Early risers can glimpse Saturn, up at about 04h UT – two hours ahead of the Sun – towards the end of September. With the rings closing towards an edge-on presentation, Saturn appears relatively faint (magnitude +0.9) at this time, against the stars of eastern Leo.

Now past opposition, **Jupiter** is the only prominent naked eye planet, but only enjoys a relatively short evening viewing 'window' from the UK perspective. Low against the stars of Sagittarius, Jupiter sets around midnight UT in late August, and by 22h UT at the end of September. Telescopically, the planet's 45 arcsecond diameter oblate disk can offer rewarding viewing in even quite small instruments (80–100mm aperture at ×100 magnification), showing alternating dark belts and light zones in its turbulent atmosphere. The four bright (5th-magnitude) Galilean satellites are always entertaining to follow in binoculars or small telescopes. At mag –2.6, Jupiter is the brightest object apart from the Moon in August and September skies.

Observers using 10×50 binoculars can track down the outer ice-gas giant planets Uranus and Neptune, both favourably placed in this interval. Uranus reaches opposition (180° from the Sun in Earth's sky) on September 13, and at mag +5.8 should be easy to locate about 3° northeast of the 4th-magnitude star Phi (ϕ) Aquarii. At mag +7.8, Neptune is a bit trickier, but still well within binocular range. Neptune reaches opposition on August 15, about half a degree (an angular distance equivalent to the Moon's apparent diameter) to the southwest of 5th-magnitude 42 Capricorni. Finder charts for Uranus and Neptune are given on pp 85–86 of the BAA *Handbook*.

Meteors

The Perseids have a reasonably favourable return (see page 181), peaking on August 12. Absence of moonlight during the first ten days or so of August also favours the Alpha Capricornids and Delta Aquarids, the two most prominent of several showers emanating from radiants south of the Square of Pegasus. The Alpha Capricornids have their nominal peak on August 2, usually giving observed rates of only two or three meteors/hr for a couple of nights around this time. The shower makes up for low rates by producing a significant proportion of long, slow, bright meteors, climbing from the low southern sky. The Delta Aquarids show two radiants, the more northerly (near the 'Water Jar' asterism) showing peak activity on August 6, when observed

rates are usually between 5–10 meteors/hr. Delta Aquarids are quite swift meteors in comparison with those from the Alpha Capricornid shower.

Background sporadic (non-shower) meteor rates are at their highest during September, when observers carrying out watches after midnight may see upwards of ten meteors/hr in clear, moonless conditions. Also evident during September is a trickle of activity from close to the ecliptic plane, producing the multiple-radiant Piscid shower. The Piscids show observed rates of only one or two per hour, and are typically moderately-bright, slow meteors.

Variable stars

With Cygnus high in the south/southwestern sky on August and September evenings, this is a good time to start following the long-period (Mira-type) star Chi (χ) Cygni as it rises towards maximum brightness, expected in early November. By late August, Chi should be in range of 10×50 binoculars. Chi is located on Cygnus' 'neck', near the 4th-magnitude star Eta (η) Cyg. Finder charts showing suitable constant-brightness comparison stars can be found on the BAA website at **http://www.britastro.org/vss/xchartcat/chicyg.html** Magnitude estimates at weekly intervals should suffice to follow Chi Cygni's rise over the coming months.

Mira (Omicron (ο) Ceti) itself is also a worthwhile target for weekly observation from late August in the early morning sky. The star will, at this time, be at minimum light, fainter than mag +9 and perhaps rather testing for 10×50 binoculars: slightly larger aperture instruments (15×70s, say) will, however, show it quite readily. Mira is expected to reach maximum as a naked eye object at the end of the year – the first reasonably-favourable peak for some years: previous recent maxima have coincided with the star's departure into the western evening twilight in early spring.

Eclipsing binary Algol (Beta (β) Persei) has favourable minima on the nights of September 9–10, 12, 29–30 and October 2–3. During eclipse, Algol drops from mag +0.1 to +3.4 over a period of about five hours, taking the same time to recover.

Deep sky

Most observers would regard late spring as the best time for seeking out globular clusters. Early autumn, however, also has its fair share of showcase globulars, to the east of the Galactic hub. A good example is M30 (NGC 7099) in Capricornus, some 6° south of Delta (δ) and Gamma (γ) Cap at the eastern end of the 'wedge' of third- and fourth-magnitude stars making up the constellation. At mag +7.3, this is a reasonably easy object for 10×50 binoculars. Small telescopes show M30 as a hazy patch about 4 arcminutes across, elongated east-west: larger instruments resolve individual stars in the outer regions but this globular has a compact core. The mag +4.5 star 41 Cap is 30 arcminutes (a Moon-width) to the east.

The neighbouring constellation of Aquarius is home to a couple of Messier-listed globulars. The brighter is M2 (NGC 7089), 4° due north of third-magnitude Beta (β) Aqr. M2 is a very easy binocular target at mag +6.4, showing as a hazy spot with a star-like core. This is a compact globular cluster, cramming 100,000 stars into a sphere 175 light years across. Cosmologically-recent gravitational perturbations during its orbit around the Galactic centre have stretched M2, which has an apparent diameter of 10 arcminutes, elongated SE–NW.

Rather fainter and trickier – a small telescope in the 80mm aperture bracket might be required to show it well – is M72 (NGC 6981), 5° SE of fourth-magnitude Epsilon (ε) Aqr. This is a loose, fairly distant (52,000 light years) globular cluster with an apparent diameter of 6 arcminutes. A few degrees to its east is the asterism M73 (NGC 6944), comprising four faint stars in a 'Y' shape – not a genuine cluster, but one for Messier completists.

Perhaps best of the autumn globulars is M15 (NGC 7078) in Pegasus, 4° WNW from mag +2 Epsilon (ε) Peg (Enif). M15 is an easy binocular object at mag +6.0, showing as an extended circular haze 7 arcminutes across. Individual stars can be resolved in its outer fringes with telescopes as small as 100mm aperture.

Neil Bone

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