

Sun and Moon

The Sun continues its southerly progress along the ecliptic, reaching the autumnal equinox position at 22h 23m Universal Time (UT = GMT; BST minus 1 hour) on September 22. At that precise time, the centre of the solar disk is positioned at the intersection between the celestial equator and the ecliptic, the latter great circle on the sky being inclined by 23.5° to the former. Calendrical autumn begins at the equinox, but amateur astronomers might more readily follow meteorological timing, wherein northern hemisphere autumn begins at the start of September. With the nights steadily drawing in, and becoming properly dark from early August onwards, there is certainly a feeling that summer is coming to its close. After the equinox, the hours of darkness exceed those of daylight, and longer sessions of night-time observing become possible.

Sunspot activity should reach its minimum for the current nominal 11-year cycle (no. 23 in the series) in the next 12 months. Remarkably, occasional large late-cycle spot groups continue to appear and daily observation by the safe method of projection remains productive.

The Moon is new on August 5 and September 3, placing the darkest night-time conditions in the opening fortnight of either month – good news for Perseid-watchers. Full Moon falls on August 19 and September 18, the latter being popularly known as the Harvest Moon. The shallow inclination of the ecliptic to the eastern evening horizon at this time means that although the Moon moves eastwards by about 13 degrees per day, it rises only a few minutes later from night to night in the week or so after Full. The third weeks in August and September present excellent opportunities to observe lunar features under their local evening/sunset illumination. Even as late as 29 August or 27 September, the waning crescent Moon is up before midnight UT.

The planets

Mercury is at inferior conjunction between the Earth and Sun in early August, then rapidly emerges into the morning sky. Greatest elongation, 18° west of the Sun, is reached on August 23, at which time Mercury will be rising about 90 minutes before sunrise, and may be glimpsed by careful observers as a magnitude 0 ‘spark’ in the gathering dawn

below Castor and Pollux. Mercury is soon lost from view again, arriving at superior conjunction beyond the Sun on September 18.

Venus continues its rather unfavourable showing as an ‘Evening Star’. Although it pulls out to over 40° elongation east of the Sun during September, Venus is also heading southwards, and as a result its setting-time after the Sun remains much the same – barely an hour – during this interval. Although bright at magnitude –4, Venus will be quite tricky to catch in the early twilight: viewing circumstances don’t really improve until the closing weeks of 2005.

Very much returning to prominence is Mars, brightening from mag –0.5 in early August to mag –1.6 at the end of September as the distance between Earth and the planet shrinks ahead of November’s opposition. By early August, the Red Planet – seen against the stars of the Pisces/Aries border – is already rising around 22h UT, and is unmistakable as the brightest object apart from the Moon in late-evening skies. By mid-September, Mars is up by the end of evening twilight, and with its apparent disk diameter now greater than 15 arcseconds, the planet may reveal some surface markings in even quite modest amateur telescopes (100–150mm aperture) under good conditions.

Jupiter becomes lost in the evening twilight during September, and is not well-placed for observation in this interval. Saturn returns from solar conjunction during August, now seen against the stars of Cancer (near the Praesepe open cluster M44). By mid-September, mag +0.4 Saturn rises around 01h UT, and the planet will be high enough for reasonable telescopic viewing in the couple of hours before dawn. Observers will find the ring system markedly more closed in presentation than during the opening months of 2005, with Saturn now farther south on the ecliptic.

Ideally placed for binocular observation in the midnight sky are Uranus (in Aquarius, south of the Water Jar asterism) and Neptune (on the Capricornus/Aquarius border). Neptune, at mag +7.8, reaches opposition (180° from the Sun in Earth’s sky) on August 8, while mag +5.7 Uranus, farther east along the ecliptic, is at opposition on September 1.

Noctilucent clouds and aurorae

Although their principal season for occurrence in the northern hemisphere is taken to be dur-

ing June and July, it is still quite possible that noctilucent clouds (NLC) could be seen into early August, particularly by observers at more northerly locations. Quite how late into August NLC can be seen remains to be determined: there have been suggestions that the visibility period has become longer in recent years. Observational reports will be welcomed by the Aurora Section.

While declining sunspot activity makes major aurorae extending to lower latitudes less likely, the appearance of coronal holes in the latter parts of the cycle does bring the possibility of recurrent, relatively quiescent auroral displays for observers at, for example, the latitudes of northern Scotland. The weakened solar magnetic field associated with coronal holes allows the escape of broad streams of energetic particles which may sweep across Earth for several days at a time, returning at roughly 27-day intervals corresponding to the Sun’s rotation. Coronal hole streams can energise the auroral ovals, producing displays consisting of stable, quiet arcs or bands, with only occasional rayed activity, at higher latitudes. Encounter between such streams and Earth is particularly favoured around the equinoxes, and the autumn of 2005 might be a productive time for the quiet ‘Scottish aurora’, to borrow a term from Aurora Section Director Ron Livesey.

Meteors

Absence of moonlight favours this year’s return of the ever-popular Perseids, peaking on August 12–13. Activity should be noted from the shower from late July through to August 20. Also active at this time are the Alpha Capricornids, Delta Aquarids and Iota Aquarids, from radiants below the Square of Pegasus. A detailed prospectus for the Perseids can be found in the Notes and News section on page 189 of this *Journal*.

September brings the highest background sporadic rates of the year for observers in the northern hemisphere, with up to 10–12 meteors/hr visible from a clear, dark location in the latter half of the night. Observers following this activity in September will also detect a few Piscid meteors, from multiple radiants near the ecliptic. Rates are usually little more than a trickle of one or two per hour, but may be higher around September 8, when a radiant just east of the Circlet of Pisces reaches its nominal maximum. Like other showers emanating from the ecliptic region, the Piscids produce fairly



slow meteors, mostly rather modest in brightness.

Variable stars

Having been at peak brightness – usually around third magnitude – in early May, Mira (Omicron Ceti) will probably be fading to the limit of naked eye visibility by the time it re-emerges to view in August, following solar conjunction. Binocular observers should be able to follow this long period variable star down towards minimum later in the autumn. Mira is relatively easy to locate, just west of the triangle of Alpha, Gamma and Delta Ceti.

Also fading, from maximum in early July, is Chi Cygni, another star of the Mira class of slowly-pulsating variables. Chi may still be a faint naked eye object near Eta Cygni, midway along Cygnus' 'neck', in early August, but will probably require binoculars for observation by September.

Always worth keeping an eye on, R Coronae Borealis is now an evening object in the western sky. At irregular intervals, R CrB – tucked inside the eastern half of Corona's circlet – fades from its normal sixth magnitude to well below binocular visibility. Fades, due to condensation of carbon in the star's extended atmosphere, are unpredictable and abrupt, taking less than 10 days: in recent years, these have had the awkward habit of occurring just as R CrB's visibility becomes more restricted in early autumn.

The eclipsing binary Algol (Beta Persei) becomes better placed for observation during September. Favourable eclipses occur on the evenings of September 4, 24–25 and 27. Perseid watchers may also notice Algol at minimum (mag +3.4, as opposed to its usual +2.1) on August 12–13.

Deep sky

On August and September evenings, Cygnus flies overhead and into the western sky. Also well described as the 'Northern Cross', Cygnus' distinctive form indeed resembles a Swan in flight, with its brightest star Deneb marking the tail (as is implicit in the translation of the star's name from Arabic), Gamma Cygni at the intersection of the Cross its body, Delta and Epsilon forming stubby wings, and Albireo (Beta Cygni) representing the head at the end of the outstretched neck.

Deneb is familiar as one of the Summer Triangle stars, together with Vega in Lyra to its northwest, and Altair in Aquila to the south. At mag +1.3, Deneb is visually the

faintest of the three, but appearances are deceptive. Intrinsicly, this star is one of the most luminous in our Galactic neighbourhood – it simply appears relatively dimmed thanks to its enormous distance of 1600 light

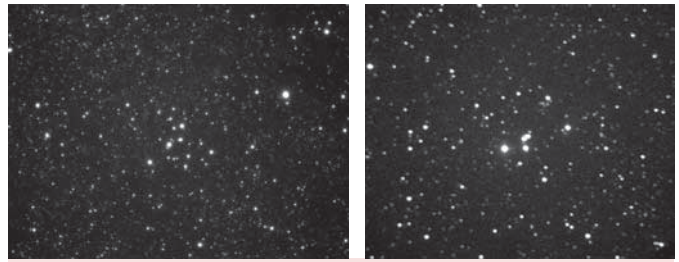
years (whereas mag +0.8 Altair and mag 0.0 Vega are at 17 and 25 light years respectively). Deneb is a highly luminous supergiant in the same league as Rigel in Orion.

Albireo is a well-known colour contrast double star, to which I am sure many of us return repeatedly for a quick look. The primary component is a mag +3.3 orange star, the secondary a green star of mag +5.1 (other observers may see the fainter star as blue or turquoise). The two have an apparent separation of 34 arcseconds, and can be resolved in any small telescope, or even with tripod-mounted 10×50 binoculars.

Another fine colour contrast object in Cygnus is the pairing of Omicron¹ and 30 Cyg, roughly halfway from Deneb to Delta Cygni (the northerly 'wing'). Mag +3.8 Omicron¹ is orange, while 30 (mag +4.9) appears green. A bluish 7th-magnitude star (SAO 49338) nearby adds to the attractiveness of this binocular spectacle.

Cygnus lies in the rich northern Milky Way and contains numerous faint open star clusters: binocular sweeping here is a pleasant pastime. Among the Cygnus open clusters are a couple listed in the Messier Catalogue. M39 (NGC 7092) is the brighter, and lies around 9° ENE from Deneb. A rather loose collection of about 30 stars of 5th magnitude and fainter, M39 covers an area 30 arcminutes (a Moon-width) across, and is best seen in binoculars: telescopically it becomes, disappointingly, rather lost in the Milky Way background.

A couple of degrees south of Gamma Cygni, M29 (NGC 6913) is more compact, with a diameter of 7 arcminutes. Here can be



Summer binocular targets: open clusters in Cygnus, photographed by Nick Hewitt. *Left:* M39; *right:* NGC 7058.

found around 20 stars ranging from 7th to 9th magnitude, in a triangular outline. At a distance of 7000 light years, M29 is dimmed by dust in the line of sight through the Milky Way plane.

Observers seeking a challenge might like to try for one of Cygnus' visually faintest, but most celebrated objects, the Veil Nebula (see page 219). The remnant of a supernova which exploded about 5000 years ago, the Veil is a fragmentary loop of nebulosity some three degrees across, a couple of degrees southeast of Epsilon Cygni (the Swan's more southerly 'wing'). The brightest segment is on the east of the loop, catalogued as NGC 6992 and 6995, near the fourth-magnitude star 52 Cygni. Some observers claim to be able to detect this under very dark skies with nothing more than 10×50 binoculars. My own first observation of it last year was made with an 80mm *f*/5 short-focus refractor at low power (×17) giving a wide field, and aided by an OIII filter on a night of exceptional transparency. The Veil glows faintly in the light of excited oxygen at wavelengths of 500.7 and 485.9 nm in the green; use of the filter, which passes only these wavelengths, enhances the nebula's contrast with the sky background. NGC 6992 appears as a narrow streak, aligned NNW–SSE, with NGC 6995 as a 'hook' at its southern end. This is one of those 'iconic' objects, familiar from countless photographic renditions in the glossy publications, of which the first direct – *your* eyeball! – view is a guaranteed memorable observation.

Neil Bone

Solar viewers for October's partial eclipse

For the partial eclipse of the Sun on 2005 October 3 (see page 189) the BAA has imported a new consignment of safe solar viewers from Thousand Oaks Optical of California. These are similar to the viewers supplied for the Venus transit (which if not damaged, may of course still be used). Available from the BAA office for £1.75 each incl. UK p&p. 25 or more, £1 each.

Send your name and address with your cheque or credit card no. and expiry date to the BAA, Burlington House, Piccadilly, London W1J 0DU. Tel: 020 7734 4145; e-mail office@britastro.org. Cheques should be made payable to the British Astronomical Association. Alternatively you can buy online using our secure server at www.britastro.org/sales. **Please allow at least 21 days for delivery.**