Sky notes

2007 June & July

by Neil Bone

Sun and Moon

The Sun reaches its most northerly position on the ecliptic on June 2, the date of the Summer Solstice. For a few days around this time the Sun rises as far north of east and sets as far north of west as it can, and the hours of daylight are at a maximum for the year for observers at the latitudes of the British Isles. Even at midnight, the Sun is never far below the horizon at UK latitudes: from the Midlands northwards, astronomical twilight, with the Sun never more than 16° below the horizon, prevails throughout the short nights of June and July.

Sunspot activity – best observed using the safe projection method – currently remains low as we pass through the minimum between cycles 23 and 24. Observers have reported a spotless disk on several days during the opening months of 2007, and the few active areas which have appeared have tended to be small, single spots. An upturn in activity may arrive before the year is out.

The Moon is New on June 15 and July 14, around which dates the nights will be as dark as they can get at this time of year. Full Moon, languishing low in the southern sky, falls on June 1 and 30 (the second of these, being the second Full Moon of a calendar month, is popularly described as a Blue Moon), and July 30.

Earth reaches aphelion – the most distant point in its elliptical orbit around the Sun – on July 7.

The planets

Mercury is briefly visible in the evening sky at the start of June, reaching greatest elongation 23° east of the Sun on June 2. Around this time, Mercury sets some 90 minutes after the Sun, and will be visible as a magnitude –1 'spark' in the gathering twilight: binoculars will help in locating it. For a few evenings, Mercury stands 6° high in the westnorthwest an hour after sunset, fading steadily from night to night: by the end of June's opening week, the planet will be difficult to find.

By June 28, Mercury has arrived at inferior conjunction, between Earth and Sun. It then emerges into the morning sky, reaching greatest elongation 20° west of the Sun on July 20. Around this time, Mercury will reach magnitude 0, and rise a little over an hour before sunrise, appearing against the stars of western Gemini.

Venus continues its very prominent showing as 'evening star', reaching greatest elongation 45° west of the Sun on June 9. Around this date, Venus will show a half-phase (like that of the first quarter Moon) in small telescopes. Half-phase – dichotomy – is normally reached a little before the date of greatest evening elongation, an anomaly known as the Schröter Effect. Around the time of greatest elongation, Venus sets three hours after the Sun. As June advances, Venus draws back closer to the Sun in line of sight, and by mid-July sets about 90 minutes after sunset. During this time, the planet will show an increasing disk diameter (over 40 arcseconds by late July) and a steadily-diminishing crescent phase. Small telescopes in the 60–70mm aperture bracket will show this clearly, and by late July even a pair of steadily-held 10×50 binoculars should show Venus' crescent. For most observers, Venus is probably at its most interesting at this time.

By mid-July, Venus is closing in on the Sun by a degree per day, and it will become tricky to spot, even at a brilliant magnitude –4, in the early evening twilight as the month draws to a close.

Having languished low in the bright predawn sky for much of the year so far, Mars starts to become more prominent in this interval, steadily brightening to mag +0.5 by late July. Now seen against the backdrop of western Taurus, Mars rises around midnight UT. As Earth and Mars close towards each other ahead of December's opposition, the Red Planet shows an increasing apparent disk diameter: at 7 arcseconds, Mars in late July will reveal some of its dark albedo features to larger telescopes (200mm aperture upwards). Naked eye observers may find it interesting to compare the red of Mars with similarly-bright Aldebaran's hue in the early morning sky at June's close.

Jupiter reaches opposition – 180° from the Sun in Earth's sky – on June 5. Located against the stars of Ophiuchus, to the northeast of Antares in Scorpius, Jupiter is rather low in the sky for UK-based observers in 2007. Even at its midnight culmination the giant planet is only 17° above the horizon from southern England. This low in the sky, the view is especially prone to the adverse effects of atmospheric turbulence – 'seeing' – on warm summer nights. At magnitude –2.5, Jupiter is the brightest object apart from the Moon in the summer midnight sky. Telescopically, it shows a flattened disk with an equatorial diameter of 45 arcseconds – sufficiently large that instruments as small as 60mm aperture will show some detail in the planet's cloudy atmosphere. The dominant features are dark belts and lighter zones and spots. The Great Red Spot and its recently-evolved 'Red Junior' counterpart continue to attract much observer attention.

Even for those with no more equipment than binoculars, Jupiter can be a fascinating object. A pair of handheld 10×50s are sufficient to reveal the four bright (5th-magnitude) Galilean satellites and their continually-changing pattern, strung out to either side along Jupiter's equatorial plane.

Saturn's apparition draws to a close during this interval. At mag +0.6, the ringed planet lies west of Regulus in Leo. Right at the beginning of July, Saturn and Venus are close together in the evening sky, less than a degree (two Moon-diameters) apart on July 2. Like Venus, Saturn becomes lost in the evening twilight before July is out.

Minor planets

Brightest of the asteroids, (4) Vesta reaches opposition in early June, slowly moving retrograde (westwards) against the stars of Ophiuchus, some ten degrees due north of Antares. During the first week of June, Vesta can be found 4° south of the 3rd-magnitude star Zeta Ophiuchi. At mag +5.5, Vesta is readily visible in binoculars.

One of the brightest noctilucent cloud displays of recent years occurred on 2006 July 14–15. This image, taken at 22:00 UT, was obtained near Chichester by Neil Bone.

Meteors

June's twilit skies are far from ideal for meteor observing, although by this time the background sporadic rate will have picked up somewhat. Patient observers may also detect a trickle of activity from the Ophiuchid radiants low in the southern sky during June: this near-ecliptic activity is never prolific, giving rates of only one or two meteors per hour.

July brings a marked upturn in activity, as several radiants south of the Square of Pegasus come 'on stream'. Most obvious are the Alpha Capricornids and Delta Aquarids peaking towards the month's end. These maxima unfortunately coincide with July's Full Moon, but conditions will by the same token be much more favourable for summer's main event – the Perseid maximum in August.

Noctilucent clouds

The twilit nights of June and July offer optimal viewing conditions for noctilucent clouds (NLCs), a summertime phenomenon of the high atmosphere, forming at altitudes close to 82km. These tenuous clouds cannot be seen in daytime, becoming visible only when the Sun is between 6 and 16° below the observer's northern horizon – conditions that obtain throughout the summer night at latitudes north of the Midlands. NLCs become visible in the twilight as they remain sunlit long after any low-atmosphere (weather!) clouds are in Earth's shadow. Their distinctive silver-blue colour and intricate, often rippled or banded structure, makes NLCs easy to recognise, especially coupled with the 'night shining' nature from which they take their name.

NLCs are believed to comprise water ice condensed onto dusty (probably meteoric) debris in the high atmosphere, forming at a time when temperatures close to the mesopause reach their annual minimum. Their formation is particularly favoured at times when the high atmosphere is less prone to heating by ultraviolet and X-rays associated with solar flare activity; with sunspot minimum upon us the summer of 2007 – like that of 2006 – is likely to be a particularly productive NLC 'season'.

Reports of NLC sightings are collected by the BAA Aurora Section. Visual observers can record the presence and extent (altitude and azimuth) of displays: sketches are a useful means of quickly noting the relevant information. NLCs make attractive photographic subjects. At ISO 400, exposures of 1–3 seconds' duration with a 50mm lens at f/2.8 usually work well.

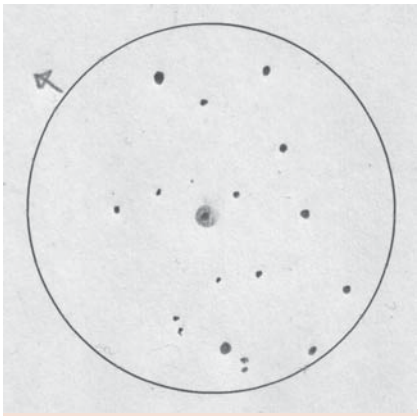
Variable stars

The long-period (Mira-type) variable Chi Cygni should brighten into binocular range during June and July, ahead of its September maximum. Located a few degrees from eta Cygni on the Swan's 'neck', the star was notably bright at its last peak in the summer of 2006. Weekly estimates suffice to follow its variations, and making a start now should allow observers to assemble their own extended lightcurve stretching well into the autumn months.

R Scuti, brightest of the RV Tauri class of pulsating variable stars, is well-placed for observation during the summer. Found just west of the 'Wild Duck' cluster (M11), R Sct like others of the class shows alternating deep and shallow minima in its light curve. For much of the time it is around 6th magnitude, but deep minima can take R Sct as faint as magnitude +8. Again, this is a star that can be followed adequately by weekly observation.

One to check on a nightly basis through the summer is, of course, R Coronae Borealis, as described in April's *Journal*. Normally around mag +6, in comfortable binocular range, R CrB is prone to abrupt deep fades due to condensation of carbon particles in its extended atmosphere.

Charts for these, and many other interesting variable stars, are available on the Variable Star Section Web pages at **http://www.britastro.org/vss**



M56 sketched by Neil Bone using an 80mm f/5 refractor at ×40, 2006 May 29–30.

M56 imaged by Paul Brierley in 2006 July. Orion Optics SPX 200 F5.6 and Atik 2-HS CCD camera with an Atik focal reducer, 6×15 seconds.

Deep sky

Led by the bright (mag +0.04) blue-white star Vega, the distinctive, compact constellation Lyra is high overhead on June and July nights, and is home to three summer showpiece objects. First of these is the celebrated 'Double Double' star, Epsilon Lyrae, just a couple of degrees to Vega's northeast. To the naked eye, Epsilon appears as a pair of 4th-magnitude stars, separated by a testing 3.5 arcminutes: if your eyes aren't quite up to splitting them, binoculars will easily do so. Telescopically, each of these components can be resolved into a tight pairing. Epsilon[1] (the more northerly) has components of mag +5.4 and +6.5 separated by 2.6 arcseconds; Epsilon[2] comprises mag +5.1 and +5.3 stars separated by 2.3 arcseconds. These can be comfortably separated in a 100–150mm aperture instrument at ×200.

Between Beta and Gamma Lyrae, the stars making up the base of the parallelogram of stars forming Lyra's body, is M57 (NGC 6720), the Ring Nebula. One of the brightest planetary nebulae (at mag +8.8), this is a splendid sight in telescopes of 100mm and greater aperture. At a magnification of ×150 in any reasonably-sized instrument, this object really does look like a celestial smoke ring; on warm summer nights when the seeing is unsteady, it appears to shimmer against the background sky.

Less frequently visited, the globular cluster M56 (NGC 6779) is another fine Lyra object, found roughly midway between Albireo and Gamma Lyrae. Small telescopes show a circular haze perhaps 5 arcminutes across with a marked central condensation, easier to find and brighter than its catalogue magnitude +8.3 might at first suggest.

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