Sky notes

2008 June & July

by Neil Bone

Sun and Moon

The Sun reaches its highest declination for the year on the celestial sphere a minute before 00h UT (Universal Time; BST minus one hour) on June 21, the time of the northern hemisphere summer solstice. The hours of daylight are at their maximum for the year, with the Sun above the horizon for 16 hours 28 minutes at the latitude of London, and a whole hour longer at the latitude of Edinburgh. Observers north of 51°N experience astronomical twilight (the Sun no more than 18° below the horizon, even at its lower culmination – due north – at midnight) from the beginning of June until July 19. Light midsummer skies are a particular problem for observers in Scotland and Northern Ireland, where the nights barely become dark enough for 5th-magnitude stars to be visible.

Sunspot activity has remained low during the opening months of 2008, as the long minimum between cycles 23 and 24 continues. Late March saw a flurry of activity associated with the old cycle, but there has been little sign, as yet, of the expected 'take off' in cycle 24.

The Moon is New on June 3, July 3 and August 1, giving the darkest evening skies in the opening and closing weeks of the month. Full Moon falls on June 18 and July 18, low against the stars of Scorpius and Sagittarius.

At August's New Moon, a total solar eclipse will be seen along a narrow track from northern Canada across Greenland, and on to Siberia and China. From the British Isles, a small partial eclipse will be visible in the morning. Like sunspot activity, this can be safely observed by projecting the solar image through a small telescope onto white card. First contact between the Moon's leading (easterly) limb and the westerly limb of the Sun occurs at 08h33m UT at Greenwich, 08h24m UT at Edinburgh, the eclipse ending at 10h05m and 10h11m UT at the respective locations. (For BST, add one hour to these times.) Maximum obscuration of the Sun by the dark body of the Moon will be 35% from Edinburgh, 22% at Greenwich. Weather permitting, observers in the Shetland Isles will see almost 50% of the Sun covered at mid-eclipse.

The planets

Following inferior conjunction between Sun and Earth on June 7, **Mercury** moves into the morning sky, reaching greatest elongation 22° west of the Sun on July 1. For a week or so after this date, Mercury rises about an hour ahead of sunrise. At magnitude 0, the planet will be difficult to pick out in the bright sky, among the stars of Taurus east of the Hyades. Mercury is at superior conjunction on the far side of the Sun on July 29.

Venus reaches superior conjunction on June 9, and emerges only slowly into the evening sky thereafter. The planet is unlikely to be seen from UK latitudes until late October, when it will begin a splendid apparition as the 'Evening Star'.

Now well past its best, **Mars** remains just about visible in the early evening sky, setting around 21h UT by late July. By this time, Mars has faded to mag +1.7 and shows a tiny disk barely 4 arcseconds in apparent diameter as it tracks gradually eastwards against the stars of Cancer and Leo. Mars passes 38 arcminutes – slightly more than the Moon's apparent diameter – south of Saturn on the evening of July 10, a conjunction rather muted by bright twilight and low altitude.

Jupiter reaches opposition, 180° from the Sun in Earth's sky, on July 9, when it will be visible all night, culminating due south at midnight. At mag –2.7, Jupiter is the brightest object in July's night sky apart from the Moon. Telescopically, the giant planet shows a large, oblate disk with an equatorial diameter of 46–47 arcseconds: large enough that even a 60mm aperture telescope can reveal some if its cloud details. Appearing just above Sagittarius' 'Teapot' asterism, however, Jupiter is rendered a rather tricky target by low altitude in the summer of 2008. From the south coast of England, Jupiter culminates only 17° up, while observers in central Scotland see it only 12° above the southern horizon at best. Poor seeing is likely to limit the ability of even large telescopes to reveal fine detail, with the planet being viewed through a thick 'wedge' of air, rendered unsteady by daytime heat. On those rare occasions when steady seeing is found, Jupiter will show a pattern of alternating dark belts and lighter zones, parallel to the equator. Smaller spots (storm systems) and 'festoons' of darker material extending from the belts into the zones may also be seen.

The four bright Galilean satellites are always pleasing to pick out, and are visible in binoculars and small telescopes as 5th magnitude pinpoints to either side of the planet in an ever-changing configuration aligned to Jupiter's equatorial plane.

Like Mars, **Saturn** is pretty much lost from view in the bright western evening sky, setting around 21h UT by mid-July. Saturn fades to mag +0.8 during July as it pulls away eastwards from Regulus in Leo.

Meteors

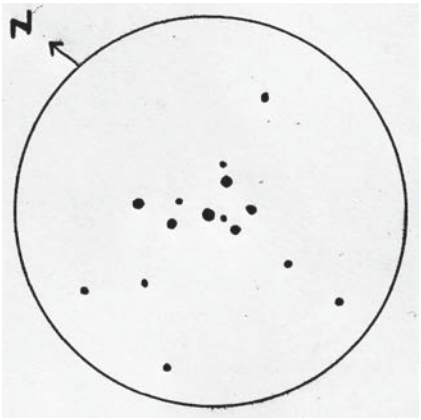
July sees activity beginning to pick up markedly, after the quieter spring months. By late July, several showers with radiants in the low southern sky below the Square of Pegasus are in evidence, and their combined activity can make late-night meteor watches in the closing week of the month quite rewarding. Dark-sky conditions will prevail after about July 26, and the Moon won't be a nuisance again until just after the Perseid maximum on August 12. Observers carrying out watches in late July will notice a few early Perseids, with the radiant at this time to the north of Andromeda, some way west of where it lies at maximum.

Most prominent of the showers from the southern sky are the Delta Aquarids and Alpha Capricornids. The Delta Aquarids have two radiants: a northern component from close to Aquarius' 'Water Jar' asterism, and a southern 20° to the SSE of this. The southern radiant is the more active, and peaks around July 29, giving observed rates of 5–8 meteors/hr. Delta Aquarids are medium-paced meteors, and the shower is not particularly noted for producing bright events. By contrast, the Alpha Capricornids make up for their rather modest peak rates (typically only 3 or 4 meteors/hr, close to August 2) in showing a fair abundance of long, slow, bright meteors. The radiant lies close to the wide naked-eye pairing of Alpha and Beta Cap in the western side of Capricornus.

By late July, background sporadic meteor rates are also quite respectable, and when these are combined with the Delta and Iota Aquarids, Capricornids and Alpha Capricornids, and low-activity Alpha Cygnids, a patient observer may be able to log up to 20 meteors per hour from a dark site in the post-midnight hours as the month draws to a close.

Noctilucent clouds

With continued low sunspot activity, it seems likely that we shall, for a fourth successive year, enjoy a productive 'season' during June and July for these enigmatic high-atmosphere clouds. Forming at altitudes close to 82km, noctilucent clouds (NLC) occur when tem-



Sketch of the open cluster M29 in Cygnus. 80mm f/5 refractor, ×40, 2007 May 17. *Neil Bone.*

peratures in the high polar atmosphere are at their lowest – during the northern summer. Heating by X-ray and UV output from solar flares associated with sunspot groups appears to inhibit NLC formation around solar maximum. The current extended solar minimum has seen extensive NLC displays in 2006, and numerous, if somewhat less spectacular, sightings all the way to southern England during summer 2007. The three weeks centred on the summer solstice are perhaps the peak time for sightings.

NLC are distinctive, appearing silvery-blue and often finely-banded. Binoculars show their fine structure, whereas cirrus clouds much lower in the atmosphere simply become a featureless haze in the magnified view. NLC are seen towards the north of the sky, particularly, once the Sun has set at least 6° (but no more than 16°) below the horizon. From more northerly latitudes, displays can cover the whole sky. The clouds make excellent photographic subjects.

Reports of sightings, giving double date (e.g. June 27–28), UT and extent in azimuth and altitude of the display are welcomed by the Aurora Section, and can be sent to: Ken Kennedy, 80 Torridon Road, Broughty Ferry, Dundee, DD5 3JH. It's useful if observations can be recorded on exactly the hour, and 15, 30 and 45 minutes past the hour, to allow comparison of displays' appearances from different locations. Rough annotated sketches can be a good quick way of recording displays.

Variable stars

R Scuti is the brightest of the RV Tauri class of variables, and is an excellent star for binocular observers to follow during the summer and autumn months. An evolved red giant star, R Sct shows several modes of pulsation in its outer layer, leading to a light curve showing alternating deep and shallow minima. For much of the time, R Sct is around 6th magnitude, but deep minima can take it down to mag +8. The star is easy to locate, just west of the star cluster M11 in Scutum, south of Aquila. A chart showing suitable constant-brightness comparison stars can be found at **http://www.britastro.org/vss/xchartcat/r-sct-026.html**. Magnitude estimates should ideally be made at roughly weekly intervals.

R Coronae Borealis has remained stubbornly faint since its fade last July, and in spring 2008 was visible only in the largest amateur telescopes. Recovery towards maximum, usually around 6th magnitude, may occur during the coming months, and observers with small telescopes and binoculars could find it rewarding to check the eastern side of Corona's circlet for the star's 'return'. Many regular VS observers also check Corona Borealis on every clear night in the hope of catching a further outburst from the recurrent nova T CrB (the 'Blaze Star') which erupted from its normal quiescent 10th magnitude to mag +2 in 1866, and mag +3 in 1946. T CrB is located just southeast of the circlet.

Deep sky

By midnight on a late June evening, the 'Summer Triangle' of Deneb (Alpha Cygni, mag +1.4), Vega (Alpha Lyrae, mag 0.0) and Altair (Alpha Aquilae, mag +0.8) is high in the southeastern sky. The 'Northern Cross'of Cygnus is a good area to explore with binoculars and small telescopes, even in twilit midsummer conditions.

Roughly midway between Deneb and the zigzag of faint stars forming Lacerta – almost a miniature version of Cassiopeia's 'W' – is the open cluster M39 (NGC 7092). Containing 30 stars of mag +6.5 and fainter spread over an area of 30 arcmin (the Moon's apparent diameter), M39 is disappointing telescopically, but shows really well in 10×50 binoculars. Superimposed on the rich starfields of the northern Milky Way, M39 lies 800 light years away.

Much more distant at 7000 light years, M29 (NGC 6913) is dimmed by dust in the Milky Way plane in our line of sight. Easily found just under 2° south of Gamma Cygni (the central star of the Northern Cross), M29 is a tighter collection of about 20 stars of mag +7 to +9 in an area 7 arcminutes across. Binoculars show it as a partially-resolved haze, while any small telescope will reveal its true nature as an open cluster.

Cygnus contains several fine double stars for small telescopes. Best-known, of course, is Albireo (Beta Cygni), the star marking the head at the end of the Swan's outstretched neck. Albireo has components of mag +3.3 and +5.1 separated by a wide 34.4 arcseconds: steadily-mounted 10×50 binoculars will just separate them, and the double is clearly resolved in any small telescope at ×30 magnification. The primary appears orange, while the secondary (at position angle 054°, to the northeast) is greenish – a really nice colour contrast.

Slightly more challenging in terms of location is 61 Cygni, found at the right angle of a triangle with Deneb and Epsilon Cygni (the Swan's lower wing). This nearby (11.2 light years) system comprises mag +5.2 and +6.1 stars separated by 30 arcseconds, with the fainter star at PA 146° (to the southeast) from the primary.

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