Sky notes

by Neil Bone

2003 February & March

Sun and Moon

Sunspot cycle 23 is now well on the way down from its extended maximum, but on most days several spot groups should be visible. The only truly safe way to observe the Sun is to project its image through the telescope (even a small refractor will do) onto a piece of shaded clean white card. Daily drawings of the projected disk, and counts of spot groups, should be made whenever possible, to chart the progress of activity. With the current cycle quite well advanced – though minimum is still probably a good three or four years away! – spots are now beginning to appear closer to the solar equator.

The Sun crosses the celestial equator from south to north at 01h 00m Universal Time (UT, equivalent to GMT) on March 21, the moment of the Vernal Equinox. Spring arrives for the northern hemisphere, and the hours of daylight will thereafter exceed those of darkness. Ahead of the equinox, observers will have already noticed the hours of darkness dwindling, particularly from mid-February onwards.

The Moon is New on February 1, March 3 and April 1. During this interval, the darkest skies for night-time observing will come in the closing ten days or so of the month. With the ecliptic plane cutting a steep angle relative to the western evening horizon at this time of year, the waxing crescent after New emerges rapidly into the sky: by the time it is three to four days old, the Moon remains up until midnight.

Spring's late-setting crescent Moon often shows earthshine – popularly 'the Old Moon in the New Moon's arms', whereby the non-sunlit portion appears faintly illuminated, greyish against the dark sky background. The source of this illumination is sunlight reflected from Earth's cloud-tops. This lends an explanation for the common weather lore that bright earthshine is a sign of impending poor weather: clouds over the Atlantic produce strong earthshine, and will typically arrive over western Europe (bringing their rain!) a day or two later.

Full Moon falls on February 16 and March 18. British Summer Time returns on Sunday March 30, following which date UK observers must remember to subtract an hour from Civil Time to arrive at the astronomers' standard UT.

The planets

Mercury is poorly placed, low in the pre-dawn sky during early February. Following superior conjunction on the far side of the Sun on March 21, Mercury will emerge to a favourable evening elongation east of the Sun during April.

Saturn's rings remain wide-open towards the Earth. CCD image by Damian Peach, 2002 December 15

Venus has been a prominent 'Morning Star' at magnitude –4 for the past couple of months, but during February and March 2003 becomes less well placed as it starts to close in on the Sun in line of sight, and also heads southwards on the ecliptic. In early February, Venus rises more than 2.5 hours ahead of the Sun, but by mid-March, this gap has shrunk to just over an hour. Venus shows a gradually-increasing gibbous phase (similar to that of the Moon between First Quarter and Full) during this interval, but the apparent disk diameter will shrink as it retreats further around its orbit towards the far side of the Sun.

Mars is also in the morning sky, now starting to brighten a little as Earth on its faster, inner orbit catches up. By the beginning of March, the Red Planet has brightened above mag. +1, and is rising, among the stars of Sagittarius and Capricornus, over three hours before the Sun. The apparent disk diameter of just over 6 arcseconds is still a bit on the small side to reveal much detail in all but the largest telescopes, but in another couple of months we shall be well into a particularly favourable apparition during which Mars will command a lot of observer attention.

In the evening sky, meanwhile, Jupiter is now especially prominent, just east of the Praesepe open cluster (M44) in Cancer, reaching opposition – 180° from the Sun in Earth's sky – on February 2. At this time, the planet shines at mag. –2.5, and is brighter than anything else in the midnight sky. The large apparent disk, with an equatorial diameter of 45 arcseconds, shows a lot of detail – dark belts, light zones, spots and more – in most telescopes, while the four bright Galilean satellites are readily visible in binoculars. In a telescope, Jupiter appears markedly flattened, a consequence of its rapid (less than 10 hours) rotation, which also means that the visible details change quite quickly.

Saturn is close to Taurus' southern horn, the third-magnitude star Zeta Tauri, and is about as bright as it can be at mag. –0.1. The rings remain wide open towards Earth and are a magnificent sight for early-evening telescopic observers.

Minor planets

Brightest of the asteroids, (4) Vesta is at opposition in late March, when it will be an easy binocular object at mag. +5.9, moving westwards (retrograde) against the stars of the Virgo 'Bowl'. Vesta's motion over the course of a couple of nights can be caught on film by taking undriven 20-second exposures on ISO 400 film with a standard f/2 50mm lens; observers can download a chart from http://yan.open.ac.uk/~ajh47/2002chart1a.htm

Meteors

February and March are very much 'off season' for meteor activity, with only low background sporadic rates (a couple per hour, typically) in evidence, and no major showers. The Virginids can be relied on to produce a trickle of activity from mid-March, emanating from radiants in the Virgo Bowl and just east of Spica. Rates are never spectacular, but Virginids can occasionally be long, slow and quite bright.

Aurora

As sunspot activity declines, the chances for major eruptive events in the inner solar atmosphere – in turn leading to enhanced low-latitude auroral activity at Earth – must be considered lower now. It is still possible, however, that isolated flares and/or coronal mass ejections could occur. Statistically, the equinoxes are favoured as times when auroral activity can be seen at lower latitudes (thanks to Earth being immersed in

high-speed solar wind streams). It is still well worth watching the northern sky for unusual light this spring: alerts of disturbed conditions may be posted at **http://www.sec.noaa.gov/SWN**

Observers at higher latitudes – northern Scotland, say – may by now be starting to note increased numbers of quiescent aurora associated with coronal hole streams in the solar wind; these occur more frequently as sunspot numbers decline.

Zodiacal light

Observers with a clear, really dark western horizon should find this a fairly favourable year to look for the zodiacal light in the evening sky 60–90 minutes after sunset. The cone of sunlight, reflected from myriad dust particles in the ecliptic plane, is steeply angled to the western horizon around the equinox. From about March 24, into the last week of the month, should be a good time to look – with the Moon not yet risen, and Venus also out of the way. The zodiacal light is comparable in brightness to the fainter parts of the Milky Way, and requires good dark conditions to be visible: a sea horizon over the Atlantic on the western side of the British Isles is probably a necessity.

Variable stars

Algol (β Persei) has favourable eclipse minima on the nights of February 15–16 and 18, and March 10. During eclipses, the star fades quite noticeably from mag. +2.1 to +3.4 over the course of about five hours, taking the same time to recover.

Observers out in the early morning hours should be able to follow the long period Mira-type variable χ (Chi) Cygni on the rise towards its mid-April maximum. Located near Eta Cygni, midway along the Swan's Neck, Chi Cyg shows one of the most extreme ranges known for a Mira variable, from minimum mag. +13 to maximum +5; some maxima can be even brighter. By mid-February, Chi Cygni should be in binocular range, and estimates of its brightness made at weekly intervals will be welcomed by the Variable Star Section, which can provide suitable comparison charts for a small charge to cover copying and postage.

Deep sky

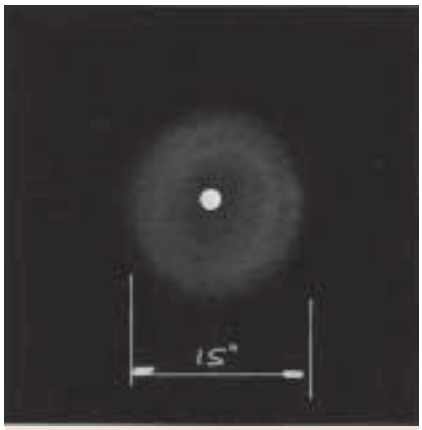
By early February, the bright constellations around Orion are already on the meridian to the south as darkness falls, and by late evening they are beginning to sink in the western sky. The closing week of March presents more or less the last chance for the season to observe the Orion Nebula, M42, in a dark sky.

In Orion's place, fainter early spring groups come to dominate the southern sky later in the evening. These too have their – albeit less obvious – attractions. Puppis, on the meridian around 9 pm in early March, lies in the southern part of the winter Milky Way, and is home to three fine Messier Catalogue open clusters M46, M47 and M93. East from Puppis and slightly higher up is the circlet of third- and fourth-magnitude stars marking the head of Hydra, the Water Snake – a large constellation sprawling across seven hours of right ascension (105°).

The difficult, face-on spiral galaxy M83 in Hydra. CCD image by Adrian Catterall, taken from La Palma on 1998 June 24. 127mm Astrophysics refractor at f/8, ST8 CCD. Three RGB images of 10, 20 and 40 minutes, autoguided. The original may be seen in colour on Adrian's Web page at www.observatory.demon.co.uk/m83.html

Hydra contains one of the less well-observed Messier open clusters, M48. This is found about 10° SSW from Hydra's head, and is a sparse scattering of 40 stars, covering an area slightly larger than that of the Moon. The cluster is perhaps best observed in 10×50 binoculars.

A few degrees above Hydra's head is M67, a compact rich cluster of faint stars in Cancer. Jupiter's proximity in the coming weeks rather mutes the binocular spectacle of M44, the Praesepe, at Cancer's heart.



The bright planetary nebula NGC 3242, the 'Ghost of Jupiter', drawn by Stewart Moore. 355mm f/5 Newtonian ×142, no filter.

Hydra's snaking form can be followed eastwards from the head towards Alphard, appropriately 'the Lonely One' in Arabic, reflecting its somewhat isolated position as the only reasonably bright star in the area. Shining at mag. +2.00, Alphard appears slightly reddish.

Although comparatively empty of bright stars, Hydra has a number of fine deep sky objects worthy of attention. Low altitude, however, dictates that these will be seen only on the clearest of nights. NGC 3242 is, at mag. +7.8, a bright planetary nebula, sometimes known as 'the Ghost of Jupiter'. Lying 15° ESE of Alphard, NGC 3242 culminates only 30° above the southern horizon, even from the south of England, and – dimmed by atmospheric extinction – can prove harder to find than its catalogue magnitude suggests.

The situation is even worse for the face-on galaxy M83, near Hydra's tail at the eastern end of the constellation. Again, the catalogue magnitude +7.6 is a little deceptive; M83's light is spread over an area about half the size of the Moon. Its southerly declination places M83 less than 20° above the horizon from the UK at best.

Easier to find is Hydra's third Messier object, M68. Found by extending the line between Corvus' easternmost stars (Delta and Beta Crv) southwards, M68 is a compact globular cluster of mag. +7.7, and shows as a 12 arcminute granular haze in small telescopes.

Snaking low over the southern horizon, Hydra is often overlooked in favour of early spring's brighter groupings (Leo is well up in the midnight sky, for example) but provides the patient observer with an open cluster, a galaxy, a planetary nebula and a galaxy!

Neil Bone