Sky notes

2004 February & March

by Neil Bone

Sun and Moon

The Sun's long climb from south to north on the ecliptic – its apparent annual path relative to the star background – gathers pace in February, and the days begin to lengthen noticeably. At 06h 49m Universal Time (UT; equivalent to GMT) on March 20, the Sun sits astride the celestial equator, this being the moment of the Vernal Equinox, taken calendrically to mark the beginning of spring in the northern hemisphere.

Observers following sunspot activity have had exciting times recently. The gradual decline of Cycle 23 towards the minimum anticipated in 2006/7 was interrupted in spectacular fashion during late October last year, when three large spot groups appeared. Visible to the suitably-protected naked eye, these complex active regions survived for several weeks, rotating back into view during November, and produced intense flare activity with consequent auroral storms. Sunspot activity has since settled back into a pattern more typical of the cycle's decline, but the events of October/November 2003 served as a useful reminder that the Sun can sometimes prove unpredictable.

Those following sunspot activity by the safe means of projection will welcome the ever-increasing observing opportunities through the spring months, with the Sun higher above the horizon and accessible for longer.

The Moon is New on February 20 and March 20, placing the darkest night-time skies into the middle fortnight of the month. With the ecliptic, near to which the plane of the Moon's orbit lies, steeply inclined in the western evening sky, the growing crescent Moon rapidly emerges to prominence in the days after New. By the time it is four days old (around February 24–25 and March 24–25), the Moon doesn't set until about 23h local time. Evenings around these dates will offer good viewing of the heavily cratered southern lunar highlands, with features close to the day–night line of the terminator thrown into sharp relief.

Full Moon falls on February 6 and March 6. Strong lunar glare will restrict viewing of faint objects for several days to either side of these dates.

British Summer Time comes into operation on Sunday March 28: not only will this cost us a valuable hour's sleep, it also means that observers must remember to subtract an hour from Civil Time to arrive at the astronomical standard of UT.

The planets

Spring 2004 offers a host of planetary viewing opportunities. Emerging from its March 4 superior conjunction on the far side of the Sun, Mercury makes its most favourable foray into the evening sky for the year towards the end of the month, reaching greatest elongation 19° east of the Sun on March 29. Setting 1h 40m after the Sun around the Equinox, Mercury should be visible low in the north-west as a magnitude 0 'spark'. When bright like this, Mercury sometimes appears slightly pinkish to the naked eye; some of this colour is real, some a result of reddening by the thick 'wedge' of Earth's atmosphere through which the planet is viewed.

Coincidentally, Venus also reaches its greatest elongation (46°) east of the Sun on March 29. At mag –4.3, Venus is unmistakeable. Indeed, as a dazzling 'Evening Star' it will be the brightest object in the pre-midnight sky in this interval apart from the Moon. By mid-February, Venus is setting more than three hours after the Sun. Telescopically, there isn't much to see beyond the planet's phase, gradually diminishing from gibbous to half-phase around the time of greatest elongation. Venus' apparent size increases during this interval as the planet draws closer to Earth. With Venus over 40° east of the Sun during February and March it may be possible to pick up the planet with the naked eye during daylight, especially on a clear, frosty late winter afternoon.

Almost as an afterthought, Mars continues the lingering tail-end of its apparition, in the evening sky moving from Aries to Taurus and setting around midnight in this interval, though hardly impressive any more at mag +1.

Jupiter reaches opposition (180° from the Sun in Earth's sky) on March 4, shining at mag –2.4 against the stars of Leo, and above the horizon night-long. Showing a slightly flattened disk – a consequence of its rapid, 10-hour axial rotation – Jupiter has a maximum diameter of just over 44 arcseconds at this time, revealing a pleasing amount of atmospheric detail even in instruments as small as 70–80mm aperture. Usually most prominent are the dark North and South Equatorial Belts (NEB and SEB) separated by the lighter Equatorial Zone (EZ). Numerous other, narrower belts and zones can be detected in larger telescopes. Spots, bays and festoons associated with the various circulatory systems in the Jovian atmosphere present an ever-changing pattern which can be challenging to draw.

The four bright Galilean satellites are visible in binoculars and small telescopes, shuttling back and forth more or less in the plane of Jupiter's equator.

Saturn is in Gemini, and remains a magnificent telescopic sight with its rings still close to as widely-open as they can be towards us. With a maximum span of 45 arcseconds (similar to Jupiter's apparent diameter), the rings can currently be resolved in quite small telescopes. Saturn's globe, with a diameter just under 20 arcseconds, is less revealing of detail than that of Jupiter. Larger telescopes will show some faint banding and, perhaps, a darker south polar cap. At mag 0, Saturn is considerably fainter than Jupiter. Saturn's large satellite Titan is, at mag +8, a reasonably easy telescopic target, due east of the planet around February 3 and 19 and March 6 and 22, and due west about eight days following these dates.

Minor planets

(1) Ceres remains within binocular range close to 8th magnitude, resuming direct (eastwards) motion against the stars of northern Gemini in late February.

Comets

2002 T7 LINEAR could become a reasonable binocular object during this interval, low and rather awkwardly placed in the evening twilight below the Square of Pegasus during February. During March, the comet is too close to the Sun for observation. After solar conjunction, 2002 T7 moves into southern skies, where it may become a prominent naked eye object, sadly inaccessible from the British Isles.

Meteors

February and March are very much the doldrums of the meteor year, with no major showers and only minimal background sporadic activity in evidence. Even dedicated regular observers may baulk at the prospect of rates of only one or two meteors per hour on a cold February night. Late March brings some improvement as the Virginids come 'on stream' from the radiant in the Virgo Bowl just east of Spica. Virginids are slow and can

sometimes have long paths up from the low east/southeastern sky.

Variable stars

The unstable supergiant star Rho Cassiopeiae, just west (right) of Cassiopeia's 'W', remains on the binocular observers' alert-list. Professional spectroscopic observations suggest that unusual activity from this star – normally around 5th magnitude – is imminent, and it bears watching on a nightly basis.

Algol (Beta Persei) has favourably-timed eclipses on the nights of February 17–18 and 20 and March 11–12 and 14. During eclipses, this famous 'Demon Star' drops from mag +2.1 to a minimum mag +3.4 over the course of about five hours, taking the same time to recover to peak brightness.

Deep sky

Mid-February offers the best early-evening viewing 'window' for the magnificent Orion nebula (M42), well up in the southern sky around 8 pm. This is, indeed, the best time to catch the Orion region's many treasures, including the fainter nebula M78 just northeast from the slanting line of the Belt stars. By mid-March, Orion is sinking rapidly southwestwards by mid-evening.

The spring stars which take the place of Orion and the surrounding bright constellations seem rather dim in comparison, but there is still much of interest to seek out on a March evening. Cancer sits on the meridian due south as full darkness arrives on a mid-March night. Always well worth seeking out in binoculars is the Praesepe or Beehive open cluster, M44, at Cancer's heart. On a good night, this will show as a hazy patch to the naked eye, with an overall brightness of mag +3 spread over an area 80 arcminutes across (more than twice the Moon's apparent size). An extended object like this is best observed at low powers, and 10×50 binoculars are ideal. Binoculars resolve the cluster into a mass of faint stars surrounding a central quadrilateral; in total, there are about 350 stars in the cluster.

In springtime, our evening view is away from the plane of the Milky Way and into the depths of intergalactic space. March is traditionally the favoured time for a dip in the Virgo 'Bowl', in whose northeast corner can be found many galaxies belonging to the relatively nearby Virgo–Coma cluster. These can, in some respects, be seen even better in clear dark skies late on a February night. Navigating around the several Messier Catalogue galaxies here may initially seem a daunting prospect, but a little patience and perseverance will help reel these in.

A good starting point is the fourth-magnitude star Rho Virginis, just inside the northeastern side of the Bowl. Rho is centred in a triangle of mag 6–7 stars. A line from the southwestern (lower right) star of the triangle extended north (up) through Rho by 1.5° takes the view to the pairing of M59 and M60. These are easily visible in an 80mm wide-field refractor. M60 is the more easterly and has an overall mag +8 and a strong central condensation. M59 is in the same low-power (×40) field, appearing less condensed and slightly fainter; both appear fairly circular in outline. The catalogue magnitudes for M60 and M59 are +8.8 and +9.6, with respective diameters of 5 and 7 arcminutes.

In this star-sparse territory, it is almost more feasible to use the galaxies themselves to 'hop' from one object to the next. From M59, it is a short hop to the next galaxy M58, about one field-width at ×40 to the west (right). M58 has a catalogue mag +9.7. I see it as fairly even in brightness across its E–W elongated 'surface', and best revealed by the age-old trick of averted vision (looking slightly to one side of the object to more effectively use the eye's light-sensitive rods). An 8th-magnitude star lies just to the west of the galaxy.

Another short 1.5° hop northwards from M58 arrives at the M89/M90 pair on the Virgo–Coma border. M89, the more southerly of the pair is a giant elliptical galaxy of mag +9.8, while M90, a degree to its north, is a mag +9.5 spiral.

The chain of galaxies continues on over the border into Coma Berenices, and observers could spend several nights becoming familiar with the many objects in this region – surely a more fruitful pursuit to savour these, than simply sprint through them on the 'Messier Marathon' popular with American observers at this time of year. The galaxies here lie at a distance of about 65 million light years, meaning that the light now arriving in observers' retinas departed at the end of the dinosaurs' time on Earth.

Neil Bone

A Pro-Am CCD Photometry Symposium

(jointly organised by the Variable Star Section and the Instruments and Imaging Section, and supported by the Royal Astronomical Society)

Saturday 2004 May 15

at the Humfrey Rooms, Castilian Terrace, Northampton

This will be a meeting designed for all those who are interested in conducting CCD photometry, and is aimed at encouraging discussion and collaboration in this field. Speakers already booked include:

Prof. Tim Naylor, Exeter University. For many years Prof. Naylor has supported amateur work on cataclysmic variable stars; he will talk about ***New CCD projects for amateur telescopes.***

Dr Peter Wheatley, Leicester University. Dr Wheatley is one of the instigators of the WASP Project; he will update us on this project, and will also talk about ***Robotic Telescopes: a threat to amateur observers?***

Tonny Vanmunster is CBA Belgium (Centre for Backyard Astrophysics), and as such, he has, for many years, conducted publishable unfiltered, time-series photometry on targets of interest. He will be talking about ***CCD photometry of transient objects.***

Workshop sessions will include *Nick James* talking about cometary photometry, with a live demo, and *Richard Miles* on asteroid photometry. There should be time for a *Discussion Session* in which the VS will briefly mention initiatives that are being set up to assist the new observer, and you have the opportunity to tell us how you would like more help.

All day software try-out sessions: PCs will be available in a side room providing the opportunity to try out popular photometry software including the widely-used *AIP4Win*. This software is being updated regularly; give us your feedback so that we can collate all comments to feed back to the authors. Try out the VS section *Data Template*, designed to help you organise and check out your reduced photometry; feedback on this is welcomed.

Poster displays of current work: There will be poster displays of the *VS CCD Target list* (the new CCD charts will be available on the day, too) and of real science already being done by amateurs; come along to find out, and join existing collaborations, or set up new ones. Bring posters showing any work that you are doing, to encourage discussion and collaboration.

CCD linearity testing: John Saxton has kindly agreed to bring along equipment for testing the linearity of CCD cameras, so if you would like to know exactly how well your camera performs, bring it for testing. You will need to bring all that you need to operate your camera and save images for analysis; if you are in any doubt, or need the use of a PC, please let the meeting organisers know in advance.

Meeting organisers: Karen Holland and Bob Marriott [kho@star.le.ac.uk]