

Sun and Moon

Spring advances rapidly, and at the latitudes of the British Isles we now enjoy much-extended hours of daylight, affording plenty of opportunities for solar observing. Observers using the safe projection method can monitor sunspot numbers on a daily basis. Although we are close to the activity minimum between solar cycles 23 and 24, there have been some reasonably sizeable spotgroups in recent months, and there are indications (from professional magnetic polarity observations) that the first spots of the new cycle have begun to appear.

With the Sun's apparent motion carrying it steadily northwards on the ecliptic from one day to the next, nights become short by the end of May - by which time astronomical twilight (Sun never more than 18° below the horizon) persists night-long from the latitudes of the Midlands northwards.

The Moon is New on April 17 and May 16, placing the darkest night-time skies in the middle fortnight of the month during this interval. Full Moon falls on April 2, May 2 and June 1.

The planets

Mercury is very poorly placed in the morning sky during April, then reaches superior conjunction on the far side of the Sun on May 3. By May's close, it has become a favourable object in the northwestern sky as dusk gathers. During the last ten days or so of May, Mercury stands around 7° high in the WNW an hour after sunset, and should be

readily visible, fading only very slowly below magnitude zero from one evening to the next as its phase - visible in larger telescopes under steady conditions - diminishes. Greatest elongation 23° east of the Sun is reached on June 2, around which date Mercury shows a half-phase telescopically, and sets over 90 minutes after sunset.

Venus has become a really prominent 'Evening Star', visible in the northwestern sky for more than three hours after sunset by early April. At magnitude -4, Venus is brighter than anything else in the night sky apart from the Moon. The planet has stretched out to an angular elongation of over 40° eastwards (to the left in northern hemisphere skies) from the Sun, and will reach its farthest in early June.

As greatest elongation approaches, Venus' apparent phase decreases: as seen in a small telescope (60-80mm aperture at ×50, say), the planet presents a shrinking gibbous phase similar to that of the Moon a few days after first quarter. Little detail is normally to be seen in Venus' dazzling, reflective cloud-tops. By late May, Venus sets after midnight BST!

Almost forgotten, **Mars** is a morning object, rising a couple of hours before the Sun. At mag +1, the Red Planet is far from its most conspicuous against the stars of Pisces in the growing dawn. Its visibility will improve markedly during the summer, ahead of a favourable apparition for observers at northerly latitudes towards the end of the year.

Jupiter, prominent at mag -2 among the stars of Ophiuchus northeast of red Antares, is rather low in UK skies this year, but is currently approaching its best for 2007. Best-placed in the southsoutheast during the early hours in April, the giant planet presents a somewhat flattened disk with an equatorial diameter in excess of 40 arcseconds - sufficiently large to reveal some detail in telescopes as small as 60mm aperture. The alternating pattern of light zones and dark belts is augmented by spots, bays and festoons, which can be recorded in sketches by visual observers. The main obstacle to detecting detail is atmospheric seeing - the steadiness of the air - which is always worse when an object is low in the sky, as Jupiter will be in the coming weeks.

Small telescopes and binoculars will show the ever-changing configuration of the four Galilean satellites, fifth-magnitude points of light, to either side of Jupiter.

Magnitude +0.5 **Saturn**, to the west of Regulus in Leo, is best seen in the evening. The rings, which can be comfortably resolved in small telescopes, are slightly more open than they were at the start of 2007. The shadow cast by the planet's globe onto the

rings should now be quite obvious, to their eastern side. The broad waxing crescent Moon will be close to Saturn's north on the evening of May 22.

Minor planets and comets

Brightest of the asteroids, **(4) Vesta** is about 8° north of Jupiter in Ophiuchus in early April, and can be found in binoculars, at apparent magnitude +6.5. As it slowly moves retrograde (westwards) against the star background, Vesta brightens during May, and will be mag. +5.5 at the month's end as opposition approaches. In theory, Vesta will then be a naked-eye object, but its low altitude means that binoculars will be required for detection.

Observed on more perihelion returns (60!) than any other comet, **2P/Encke** may be glimpsed low in the northwestern evening sky as it brightens during the first fortnight of April. By April 10, it may be as bright as 5th magnitude, but its diffuse coma will show low contrast with the twilight sky, where it will be well below bright Venus, against the stars of Aries.

Meteors

Following the low overall activity levels of early spring, April brings something of an upturn in meteor rates. The **Lyrids**, active from April 19-25, are quite well placed in 2007, with the peak expected late in the evening of April 22-23. At this time, the Moon is a waxing crescent, setting around 01h local time, leaving dark skies for the later parts of the night when the shower radiant - some 10° to the southwest of Vega - is at its highest. Best observed rates will probably be found in the interval leading up to dawn on April 23, when perhaps 6-8 Lyrids per hour might be seen. Produced by debris from Comet C/1861 G1 (Thatcher), Lyrids are swift, sometimes bright meteors: some reports suggest that bright Lyrids were notably abundant last year. In some years, enhanced activity has occurred and, like all meteor showers, the Lyrids bear continued monitoring in case anything unusual happens. Away from maximum, activity is rather modest, but still requires coverage by dedicated observers.

The ever-present random sporadic background meteor activity shows a slight increase

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Image of the face-on spiral galaxy M101 by Jeremy Shears.

during April and May, and is certainly up from the 'doldrums' of the year's opening quarter.

Variable stars

On spring evenings, Corona Borealis is often the first port of call for regular variable star observers, checking the visibility or otherwise of the noted carbon-rich ancient star **R Coronae Borealis**. For the past three years or so, R CrB has been close to its maximum brightness, around magnitude +6, but the star is prone to abrupt fades as clouds of carbon condense in its extended atmosphere, and over the course of a week or so it can drop from easy binocular view to become a difficult object even in large amateur telescopes. Located inside the eastern side of Corona's 'circlet', R CrB bears nightly surveillance.

Observers checking Corona's appearance also keep an eye open for possible outbursts from a variable of an entirely different type, **T Coronae Borealis**. Sometimes also known as the 'Blaze Star', T CrB has been seen in outburst on two occasions so far, in 1866 and 1946, when it was briefly seen as bright as mag +2 and +3 respectively. Each outburst was short-lived, the star fading back below naked eye visibility within a week. In its current quiescent state, T CrB is around mag +10, a reasonable target for a 100mm aperture telescope. Like other novae, this is a close binary system, in which a dwarf component acquires material from the atmosphere of an extended giant companion. Over time, sufficient mass is accumulated on the surface of the dwarf to cause 'nuclear runaway', leading

to a brief interlude of rapid, intense brightening. In 'conventional' novae, such episodes may recur at intervals of tens of thousands of years. For objects like T CrB, the recurrence interval is more likely to be of the order of several decades. No-one can predict when T CrB will next erupt and, like its celebrated constellation-mate, this star – just east of Corona's 'circlet' – bears nightly inspection.

Charts for R CrB and T CrB are available on the Variable Star Section web pages at <http://www.britastro.org/vss>

Deep sky

In late evening at the end of April going into early May, Virgo is on the meridian due south – making this a good time for galaxy-hunting in the constellation's 'bowl'. The Plough is

high overhead in the zenith, the stars of its 'handle' pointing downwards towards mag –0.04 Arcturus, fourth-brightest star in the sky and lead luminary of Boötes, well up in the southeast. Boötes' second-brightest star, **Epsilon** (Izar) is a good testing double for medium-aperture (100mm, say) telescopes. Consisting of a mag +2.7 orange primary with a mag +5.1 companion at a separation of 2.8 arcseconds, this can be quite a tricky object, thanks largely to the difference in brightness between the components. I find that use of a 'fringe-killer' eyepiece filter helps to separate them clearly at $\times 200$. Some sources suggest that the fainter star (at position angle 339° to the NNW of the primary) is greenish, but the colour isn't particularly pronounced.

While spring's main concentration of galaxies is found in the Virgo-Coma region to the south, a couple of the finest are located around the Plough's handle, and are presented at their best high in the sky at this time. **M101** (NGC 5457) is quite easily found by hopping 5° along a line of 5th-magnitude stars from Mizar (Zeta UMa) towards the Handle's tip. M101 is a face-on spiral galaxy, with a fairly bright, concentrated nucleus. In a 100mm aperture telescope, it appears as a diffuse circular 8th-magnitude haze. The extended spiral arms show low contrast with the surrounding sky, and M101 is a tricky target for binoculars. Medium-aperture telescopes show the brighter, innermost parts, with an apparent diameter of perhaps 10 arcminutes (about one-third that of the Moon).

Close (3.5°) to the SW of Alkaid (Eta UMa) on the tip of the Plough's handle, mag +8.4 **M51** (NGC 5194) is the famous 'Whirlpool Galaxy', another face-on spiral in Canes Venatici. Smaller than M101 with an apparent diameter of about 6 arcminutes, M51 is visible in 10×50 binoculars on a good night. In small telescopes, M51 and the smaller NGC 5195 with which it is interacting, presents an elongated outline. Larger instruments show M51's bright northeastern spiral arm, which appears to connect the two.

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