Sky notes

by Neil Bone

2005 February & March

Sun and Moon

The Sun crosses north of the celestial equator at 12h 33m Universal Time (UT, equivalent to GMT) on March 20, marking the vernal equinox and the calendrical start of spring in the northern hemisphere. Following the equinox, the hours of daylight exceed those of darkness. Observers will already have noticed a steady lengthening of daylight, particularly from mid-February.

The Sun is now a more accessible target for daily observation by the safe technique of projection. Sunspot cycle 23 continues its slow decline towards the anticipated minimum in 2006, and several days with a complete absence of spots have been reported since the middle of last year. So, too, have been some remarkably large and active late-cycle spot groups, notably AR 10696, whose associated flare/coronal mass ejection activity triggered low-latitude auroral storms in the opening week of November 2004 – a year on from a remarkable series of similar events. Although the longterm trend in sunspot activity is downwards, the possibility still exists for occasional enhancements, and continued solar coverage will surely remain rewarding.

The Moon is New on February 8 and March 10, putting the darkest evening skies into the first half of the month in this interval. By the third week in either month, the waxing crescent will be high in the western evening sky, and ideally placed for observation. Even casual binocular examination will show a large amount of crater detail in the Moon's southern highlands at this time, thrown into relief by shadow close to the day-night line of the terminator. Up to four days after New, the growing crescent may well show Earthshine, whereby the shaded part of the Moon (where the Sun has yet to rise) is faintly illuminated by light reflected from Earth's cloud-tops, appearing a ghostly grey and clearly visible against the background sky. The effect is popularly known as 'The Old Moon in the New Moon's Arms' and can at times be prominent to the naked eye. Full Moon falls on February 24 and March 25, with bright skies unsuitable for observation of faint objects for several nights to either side.

Civil clocks advance to British Summer Time on Sunday March 27. Observers should remember to subtract one hour from civil time to arrive at the astronomical standard UT thereafter.

The planets

Mercury's best evening showing for the year comes in mid-March. Following superior conjunction on the far side of the Sun on February 14, the fast-moving innermost planet emerges into the western evening sky, setting an hour after the Sun by early March. Greatest elongation, 18° east of the Sun, comes on March 12, when Mercury will set 1h 40m after sunset. Observers with a clear northwestern horizon should find magnitude 0 Mercury relatively easy to locate: it may be easier to spot a few days ahead of greatest elongation, when at its brightest. Many visual observers report a

BAA Membership

The subscription rates for the 2004–2005 session are as follows:

Junior Members (under 18 years of age on 1st August) £13.50
Intermediate Members (18 or over and under 22) £16.50
Ordinary Members (22–65) £35.00
Senior Members (65 or over) £23.75

Affiliated Societies £35.00

Members of 50 or more years' standing no charge

Family Membership:
Where both Members are under 65 on 1st August £38.00
Where one or both Members are 65 or over £25.75
Family Membership is available for couples living at the same address. Only one *Journal* and *Handbook* will be sent although both may use the Library, attend meetings and have a vote.
Associate Membership £9.25

Associate Membership is open to all, including societies, but especially to educators and those under 18. Associate Members will receive the BAA *Handbook*, and may use the Library and attend meetings. They do not have a vote.

Circulars (if required):
UK and Europe £4.00
Outside Europe £9.00

Postage:
Overseas postage by surface mail for the *Journals* and *Handbook* is included in the above rates. To avoid postal delays and losses use of airmail is strongly recommended. Please add the following for airmail:

Europe (including the Canary Islands and Turkey) £9.25
Near and Middle East, the Americas, Africa, India, Malaysia, Singapore and Hong Kong £16.00
Australia, China, Japan, New Zealand, Taiwan and the Pacific Islands £17.70

Payment may be made in Sterling, US$ or Aus$, or by credit card using the BAA's secure website **www.britastro.org**. UK members are particularly requested to save administrative costs and time by paying their subscriptions by Direct Debit.

New members joining between August and January will be sent the publications of the current session. New members (regardless of age) joining between February and June may pay the reduced rate of *either* £21.00 for the February, April and June *Journals* plus the current *Handbook* or £14.00 for the above *Journals* without the *Handbook*.

Gift Aid

UK Income Tax payers are encouraged to complete a Gift Aid certificate for their subscriptions and other donations. Please request a Gift Aid form from the Office if you have not previously completed one. The BAA can claim a tax refund at any time during the year.

pinkish tint to the planet, which appears to be real, though slightly enhanced by atmospheric reddening low in the sky. Those with telescopes in the 200mm and upwards aperture class may be able to make out Mercury's half-phase on the relatively tiny (8 arcseconds) disk close to greatest elongation. By March 29, Mercury has drawn back to inferior conjunction between the Earth and Sun.

Venus is very poorly placed, close to the Sun and unlikely to be seen in this interval. The planet reaches superior conjunction on March 31, and will languish low in the western sky for much of the rest of 2005.

Mars keeps pace ahead of the Sun in the predawn, rising a couple of hours before sunrise and brightening slowly during February and March. By the end of March, Mars' apparent diameter is finally beginning to increase as the distance between it and Earth diminishes. At just under 6 arcseconds, and mag +0.9, Mars at this time is still rather too far off to reveal much in most amateur telescopes, although expert imagers such as Damian Peach have succeeded in recording surface details even under these unfavourable circumstances. Mars will be better placed in a few months.

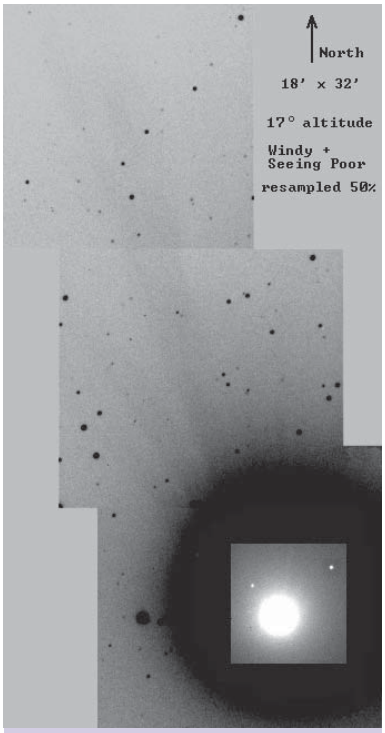
Jupiter is becoming ever more favourable, as early April's opposition approaches. Located just below the 'Bowl' of Virgo, Jupiter rises in late evening through this period, and is well-placed, reasonably high up for observation, in the early morning hours. Reaching mag –2.4 by late March, Jupiter is currently the brightest object in the night sky after the Moon. The disk of the planet, somewhat flattened by its rapid (just under 10 hours) rotation, has a maximum diameter in excess of 40 arcseconds and shows plenty of cloud detail in telescopes of 100mm aperture and greater: even a 60mm telescope at ×50 will reveal the principal dark north and south equatorial belts (NEB and SEB), separated by the lighter equatorial zone (EZ). Observers with binoculars and small telescopes can follow the shifting pattern of the four main Galilean satellites, strung out to either side of Jupiter along the planet's equatorial plane.

High among the stars of Gemini, to the southwest of Castor and Pollux, Saturn remains excellently placed for evening observation during this period, setting around 02h UT by late March: many will doubtless give Saturn their attention before midnight, then turn eastwards to view Jupiter. The rings are still well open as presented towards Earth, and as the planet pulls away from opposition, the shadow of the globe onto the rings east of Saturn will become more pronounced telescopically. The brightest of Saturn's many satellites – Titan – can be found about four ring-spans due west of the planet around February 4 and 20 and March 8 and 24, and due east by the same distance some eight days later. At mag +8, Titan is easily found even in a small telescope.

Minor planets

(2) Pallas, second of the asteroids to be discovered (by Heinrich Olbers in 1802) is at opposition during March, reaching a peak magnitude of +7.1 around March 20 – well within reach of 10×50 binoculars as it loops northwestwards through the Bowl of Virgo. A finder chart is available on the Asteroids and Remote Planets Section website at **http://www.britastro.org/arps/.**

Comets



Comet 2004 Q2 Machholz imaged by Martin Mobberley on 2004 December 16.

2004Q2 Machholz: Having reached perihelion in late January, Comet Machholz should still be a naked eye object, perhaps around fourth magnitude, in early February. Seen against the stars of Camelopardalis (east – left – of Cassiopeia and Perseus), the comet is circumpolar from the latitudes of the British Isles through the coming weeks. By late February and early March, binoculars might be required to catch the fading comet as it moves towards the head of Ursa Major through the faint background of Camelopardalis and Lynx. UK-based observers should be able to follow Comet Machholz until early summer, given its favourable position at a high northerly declination.

Meteors

February marks the low point in the meteor observer's year, with only minor shower activity present and the background sporadic rate at its lowest (perhaps only one or two meteors per hour). By late March, the Virginids are in evidence, producing low rates, typically less than five meteors/hr, from radiants in the Virgo Bowl and to the east of Spica. Virginid meteors are often long and slow, and can sometimes be bright.

The zodiacal light

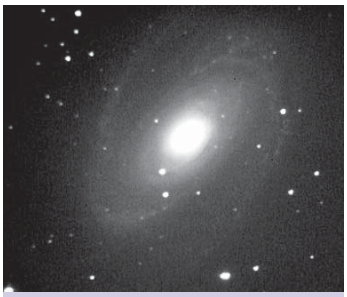
A rare sight nowadays, thanks to the spread of artificial light pollution, the zodiacal light is a diffuse, conical glow seen in the western sky about 90 minutes after sunset at times when the ecliptic cuts a steep angle to the western horizon: early March provides a good opportunity to look for it. Produced by reflection of sunlight from interplanetary dust lying in the ecliptic plane, the zodiacal light is comparable in brightness to the fainter parts of the Milky Way, and it can only really be well seen from locations with a clear, dark western horizon – observing sites on the western side of the British Isles are favoured. The zodiacal light is swamped by a crescent Moon, and even the presence of Venus as an 'Evening Star' can make it hard to detect. With the latter out of the way, and the Moon at New on the 10th, the first 10–12 days of March possibly present the best chances for seeing the evening zodiacal light from the UK in 2005; observers with a clear, dark easterly horizon can try for the morning equivalent before dawn in September.

It has been suggested that the zodiacal light's brightness varies in response to solar activity, being greatest towards the end of the sunspot cycle when the out-flowing solar wind contains steady, high speed particle streams escaping from coronal holes, exciting the interplanetary medium. If this theory is correct, the next three or four years could prove a particularly good time in which to look for and perhaps try to photograph the zodiacal light.

Aurorae

The same late-cycle coronal hole streams which may enhance the zodiacal light bring recurrent auroral activity, often in the form of quiescent, stable arcs, at higher latitudes. Observers in the north of Scotland are well-positioned to see such activity, which tends

to persist over several successive nights, repeated at intervals of roughly 27 days corresponding to the Sun's apparent rotation period. Alignment between fast solar wind streams and Earth's magnetosphere is most favourable close to the equinoxes, making February and March potentially profitable months for aurorae at higher UK latitudes.



Galaxies M81 and M82 imaged by Nick Hewitt with a 200mm telephoto lens and SXV CCD camera.

The vigorous lower latitude storm aurorae associated with large, active sunspot groups are less likely this late in the cycle but, as shown by events in 2004 November, are not totally impossible. It is well worth keeping an eye on the 'space weather' websites for up-to-date forecasts. A good data source is **http://www.sec.noaa.gov/SWN**

Variable stars

Algol (Beta Persei) can be followed through favourable eclipses from the British Isles on February 1, 21–22 and 24, and March 16. During these, the star fades from mag +2.1 to +3.4, a drop in brightness which is quite apparent to the naked eye. Shorter nights following the vernal equinox mean that the next favourable eclipses of this star won't occur until the autumn.

The prototype long-period variable Mira (Omicron Ceti) should brighten to easy binocular, or even faint naked eye, range by the end of March. Mira is found a few degrees west of the triangle of stars Alpha, Gamma and Delta Ceti, marking Cetus' head. Already rather far over to the western sky by mid-evening in March, Mira will be lost from view close to the Sun by the time it reaches peak brightness in early May.

Returning to view in late evening is R Coronae Borealis, the carbon-rich 'reverse nova' inside the eastern half of Corona's circlet. A sixth-magnitude star at maximum light, where it spends most of its time, R CrB can plummet from binocular view in the space of a week or so when obscuring carbon clouds condense in its extended atmosphere. Many observers check nightly for the onset of such a fade, and to make estimates of the star's magnitude. Some reports suggest the R CrB may have been 'flickering' slightly in brightness in autumn 2004 just as it became awkward for viewing in the twilight. Does this indicate that another fade is imminent? Observers will follow R CrB with interest from early spring onwards.

Deep sky

Having languished low over the northern horizon during December–January evenings, Ursa Major wheels high into the east in February and March, making this an ideal time to seek out some of its many deep sky treasures. While the strip of sky from Leo to Coma Berenices and Virgo is rightly renowned for its abundance of spring-visible galaxies, the region around the Plough is also home to several excellent targets for amateur instruments. These include a couple of late additions to Messier's list (as finalised by Camille Flammarion in 1921).

One of the more obvious targets for observers using small telescopes is Mizar (Zeta Ursae Majoris), the mag +2.3 middle star in the Plough's 'handle'. Together with its mag. +4.0 companion Alcor (12 arcminutes to the northeast), this makes an easy naked eye double star.

Examination of Mizar in a small telescope offering ×40 magnification reveals this to be a closer pairing, with components of mag +2.3 and +4.0 separated by 14 arcseconds. None of these stars shows pronounced colour, but this is an attractive system for medium-power viewing in small instruments.

Ursa Major's standout objects are surely the galaxies M81 (NGC 3031) and M82 (NGC 3034), a gravitationally-connected pair about 12 million light years away. At mag +6.9, M81 is an easy binocular object, found five degrees east of Sigma[1], Sigma[2] and Rho UMa, fifth-magnitude stars marking the Bear's 'ears' north of the Plough.

In a small telescope, M81 appears as an oval haze (it is a spiral galaxy). M82, 38 arcminutes – a bit more than a Moon-width – to its northeast appears as a faint bar of light lying ENE–WNW with a mag +9 star near its western tip. At mag +8.4, M82 is slightly harder to see, but the pair can be comfortably fitted together in the field at ×30.

Best seen on a really transparent dark night, one of Ursa Major's most celebrated objects is the Owl Nebula (M97, NGC 3587), 2.5° southwest of Merak (Beta UMa, the southerly 'Pointer'). With an overall (integrated) mag +9.7, M97 spreads over a circular area 3 arcminutes across and has relatively low surface brightness At ×20 in my 80mm f/5 wide-field refractor, however, it is a reasonably easy object in good conditions. Observers with access to OIII or UHC 'nebula' filters will find these useful in boosting the contrast – the Owl is a planetary nebula emitting strongly at OIII's green wavelength. Larger apertures (at least 200mm) are needed to reveal M97's dark 'eyes'.

Between M97 and Merak, M108 (NGC 3556) is a faint spiral galaxy (catalogue mag +10.0). In my 80mm at ×40, I see it as a 'smudge' about 10 arcminutes long, elongated E–W with a couple of mag +8.5 stars to its west in the field. Slightly brighter (mag +9.8), but perhaps more difficult in small instruments is M109 (NGC 3992), just east of Gamma UMa at the southeastern base of the Plough's bowl). M109 is a barred spiral galaxy, with a mag +9 field star immediately to the west in the low power field.

Finally, Ursa Major is home to the splendid face-on spiral galaxy M101 (NGC 5457), which can be found by star-hopping southeastwards along a line of four 5th-magnitude stars trailing away from Mizar. A degree-and-a-half northeast from the last star in line, M101 can be seen as a large, diffuse oval patch with integrated mag +7.9. Small amateur telescopes show only the innermost 25% of this large object, which lies 27 million light years away and has a total photographic apparent diameter two-thirds that of the Moon.

Neil Bone

Employment opportunity in the BAA office

A vacancy will shortly arise in the BAA office in Piccadilly, London, for a keen and dynamic individual to help the BAA move forward as the premier organisation for amateur astronomy in the UK.

Familiarity with modern office computer systems (PC-based) is essential and experience with working in a small office environment would be an advantage. A new computerised membership management system is in process of installation and an important part of the task of the appointee will be to work with existing staff to maximise the opportunities presented by this new system. Training will be given where necessary. Salary, terms and job specification will depend upon the experience and requirements of the person appointed and the skills they can bring to the Association. A part-time appointment may be considered.

If interested please contact the President, Mr Tom Boles, by e-mail or telephone in confidence for an informal discussion.