

Sky notes

2004 April & May

by Neil Bone

Sun and Moon

The Sun's northwards climb along the ecliptic continues apace, with a concomitant lengthening of the hours of daylight during April and May. Not only do the nights become shorter: by the end of May, astronomical twilight, with the Sun no more than 18° below the horizon and the sky therefore never becoming fully dark, persists night-long from the latitudes of the English Midlands northwards.

Following last autumn's remarkable outburst of activity, sunspot cycle 23 has resumed its gradual decline towards minimum, expected a couple of years from now. Observers should still find a reasonable numbers of sunspots on the projected disk on most days.

New Moon occurs on April 19 and May 19, meaning that the darkest night-time skies will be found in the middle fortnight of the month in this interval. The thin waxing crescent, riding high on the steeply-inclined ecliptic, is well-presented in the western evening sky a couple of days after New in late spring. Full Moon falls on April 5 and May 4. At New Moon on April 19, a partial solar eclipse will be visible over southern Africa and the Southern Ocean, but no part of the event can be seen from the northern hemisphere.

May's Full Moon undergoes a total eclipse in Earth's shadow. The Moon's leading (easterly) edge first enters the dark central umbra at 18h 48m Universal Time (UT; BST minus 1 hour). Immersion becomes total at 19h 52m UT. Its eastwards motion – about one lunar diameter per hour – carries the Moon through the southern part of the umbra, totality lasting until 21h 08m UT. Thereafter, the Moon's eastern limb emerges back into sunlight, and the eclipse's umbral phase ends at 22h 12m UT.

In the north and west of the British Isles, the Moon will rise already totally eclipsed, and may prove hard to locate until a few degrees clear of the southeastern horizon. Those in the far southeast of the country should just catch the last stages of the Moon's passage into totality, with a rapidly-diminishing sliver of the sunlit westernmost limb visible at moonrise.

The Moon's low elevation, against the stars of Libra, may enhance the reddening of the totally-eclipsed surface usually seen during such events as a result of refraction of sunlight through Earth's atmosphere. Observers in the UK are certainly well-enough placed to see the last stages of the eclipse. From the point of view of photography, the

year's second total lunar eclipse in October will be a good deal more favourable.

The planets

Mercury is briefly visible in the evening sky right at the beginning of April, then rapidly heads towards inferior conjunction between Sun and Earth on April 17. The subsequent morning apparition, with greatest elongation 26° west of the Sun reached on May 14, is unfavourable for observers at northern latitudes.

Venus, meanwhile, is at its very best as an 'Evening Star' in early April, extremely prominent at magnitude -4.4 , and setting over four hours after the Sun. The planet remains spectacularly visible through April, then begins to close rapidly back towards the Sun during May ahead of the historic June 8 transit. From mid-May, Venus closes on the Sun in our line of sight by about a degree per day, and by the third week of the month is setting a couple of hours after sunset. During this time, Venus is also pulling around its orbit closer to Earth, presenting a larger apparent overall disk and an increasingly slender crescent phase. By late May, the crescent will be easily visible in small telescopes, and should even be revealed in steadily-held 10×50 binoculars.

Now well past its best, Mars keeps pace east of the Sun in the evening sky, setting around 22h 30m UT through April and May. The planet is now fainter than first magnitude, and far from us: the apparent, angular diameter is less than 55 arcseconds, and only very large telescopes will reveal much detail, probably with the aid of electronic imagery. Mars 'overtakes' Saturn in line of sight moving eastwards along the ecliptic in Gemini around May 24–25. The pair will be about 1.5° (three Moon-widths) apart in the evening twilight.

Jupiter, in Leo, remains very well-placed in the evening sky, shining at a bright mag. -2.2 . With an apparent disk diameter around 40 arcseconds,

the giant planet shows plenty of cloud detail in even quite small telescopes. The constantly-changing aspect of Jupiter's four main Galilean satellites can be followed in binoculars.

Saturn is nearing the end of another superb apparition with the rings still nearly as wide-open as possible towards Earth. At mag. $+0.1$, the ringed planet is slowly tracking eastwards against the stars of Gemini, setting around midnight UT in late April. The coming weeks offer the last really good viewing opportunities for the planet until the autumn.

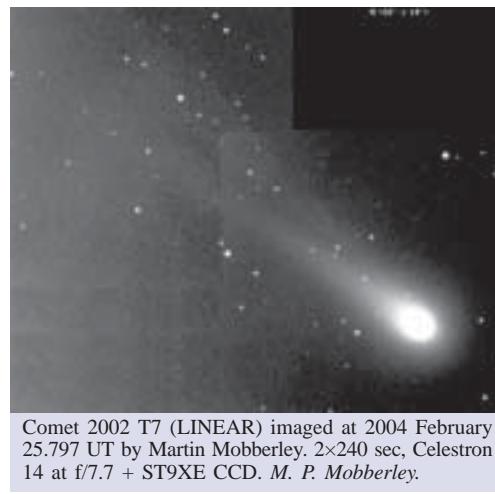
Comets

C/2001 Q4 NEAT: Discovered over two years ago by the NASA/JPL Near Earth Asteroid Tracking programme, this comet finally reaches perihelion (closest in its long elliptical orbit to the Sun) on May 15. By this time, having hitherto been a southern hemisphere object, C/2001 Q4 NEAT will be tracking rapidly northwards against the stars of Cancer, east (left) of Castor and Pollux in the western evening sky.

At its brightest in the week or so after perihelion, the comet may reach first magnitude and show some 10° of tail. More pessimistic estimates suggest a somewhat fainter third-magnitude showing. Either way, observers can hopefully look forward to a well-placed naked-eye comet in May's evening skies, with its best showing coinciding with the dark of the Moon.

The comet will continue to track north towards the 'Pointers' of the Plough over the next several weeks, and will remain in binocular view for some time to come. Observations from the southern hemisphere up to the time of writing in early February show 2001 Q4 to be well on course for a bright showing.

Meanwhile, **Comet C/2002 T7 LINEAR** – a fine binocular object from UK latitudes in early spring – should



Comet 2002 T7 (LINEAR) imaged at 2004 February 25.797 UT by Martin Mobberley. 2×240 sec, Celestron 14 at f/7.7 + ST9XE CCD. M. P. Mobberley.



be a prominent naked-eye object for those in the southern hemisphere from late April.

Meteors

Bringing a slight upturn in the otherwise rather flat spring-time activity, the Lyrids have a favourable return, with maximum on April 21–22 coinciding with the dark of the Moon. Activity can be expected between April 19 and 25, from a radiant some 10° southwest of Vega, rising high in the eastern sky during the post-midnight hours.

Lyrid rates are usually fairly modest, perhaps 8–10 meteors/hr at best, translating to a sky- and radiant altitude-corrected Zenithal Hourly Rate of about 12. Unexpected outbursts of higher rates have occurred in the past, most recently in 1982. Lyrid meteors are swift, and the brighter shower members sometimes leave brief persistent ionisation trains.

Variable stars

The long-period (Mira-type) star Chi Cygni is expected to reach maximum light in the second half of May, and should be well within binocular range during this interval. At maximum, Chi typically attains fifth magnitude, but it can on occasion be brighter, becoming a noticeable naked-eye ‘extra’ star on the Swan’s neck near fourth-magnitude Eta Cygni. Chi Cyg has an average period of 408 days from one maximum to the next, and should remain visible in binoculars well into the summer. Magnitude estimates should be made at roughly weekly intervals, and charts showing suitable constant-brightness comparison stars can be downloaded from <http://www.britastro.org/vss/charts.html>.

Mira itself reaches maximum light in late May, but will not be observable in the near-solar glare: indeed, we won’t see this star well at the bright phase of its 330-day cycle until the spring of 2007.

Now more accessible in spring evening skies is R Coronae Borealis, an ancient carbon-rich star prone to occasional unpredictable fades as material condenses out in its extended atmosphere. Normally around sixth magnitude, R is found inside the eastern (left in the northern hemisphere) side of the circlet of Corona Borealis. R CrB can fade from binocular view over the course of a week or so, and it is worth checking its status on every possible clear night.

Also more accessible in the latter part of the night now is Delta Scorpii, a young massive B-class star which has undergone an unexpected brightening over the past few years. From a catalogue magnitude of +2.3, Delta Sco has become as bright as mag. +1.6

during what appears to be a ‘shell’ episode involving ejection of its outer layers.

Deep sky

Late spring’s evening view turns back inwards from the intergalactic depths of the Leo/Virgo region to the centre of our own Milky Way galaxy, in the direction of Scorpius and Sagittarius. The constellations of Ophiuchus and Scorpius, on the May midnight meridian, abound with globular clusters which appear concentrated in the line of sight towards the Galactic hub. Globular clusters contain dense concentrations of ancient stars, and form a ‘halo’ around the Galaxy’s centre. Many of these objects are visible in binoculars and small telescopes.

One of the easiest to find is M4 (NGC 6121), a shade more than a degree west of red Antares in Scorpius. Binoculars show M4 quite readily as a diffuse, mottled hazy 6th-magnitude smudge. As one of the less densely-packed globulars, M4 can be partially resolved into individual stars in telescopes of as little as 80mm aperture at medium power ($\times 50$, say). Its overall apparent diameter of 26 arcminutes is only slightly less than that of the Moon.

Nearby, some four degrees northwest (up and to the right) from Antares is a more compact globular, M80 (NGC 6093). Its smaller (9 arcminutes) diameter makes M80 in some respects easier to pick up in binoculars than M4, although it is about a magnitude fainter. Telescopically, M80 shows a dense core with more diffuse outer regions.

M4 and M80 lie at respective distances of 6500 and 28,000 light years: M4 is one of the closest globular clusters to the solar system.

Ophiuchus is home to seven globular clusters which made the Messier list, and many more faint NGC objects. Easiest for UK-based binocular observers are M12 and M10, both close to mag. +7 and quite high up in the southeastern sky on a late spring evening. These globulars appear quite diffuse in binoculars and their outer regions are partially resolved in small telescopes. Each has an overall diameter of about 15 arcminutes – half a Moon-width – and both fit into the same field in 10 \times 50 binoculars, some 10° east of the wide naked-eye pairing of Delta and Epsilon Ophiuchi.

Ophiuchus also contains a fine open star cluster, IC 4665. Just north of Beta Ophiuchi, on the constellation’s eastern side, this is a loose scattering of about 30 mag. +7 to +8 stars spread over an area 1.5° across – ideally suited to a wide-field binocular view.

Neil Bone

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)

Now an additional day due to public demand!

Saturday & Sunday 2004 May 15/16

at the Humfrey Rooms, Castilian Terrace, Northampton

A meeting designed for all those interested in conducting CCD photometry, aimed at encouraging discussion and collaboration in this field. Speakers include:

Prof. Tim Naylor, Exeter: *New CCD projects for amateur telescopes.*

Dr Peter Wheatley, Leicester: *The WASP project; and Robotic Telescopes: a threat to amateur observers?*

Tonny Vanmunster, CBA Belgium: *CCD photometry of transient objects.*

Dr Richard Beare, Project Director (Education), Faulkes Telescope: *Photometric projects using the Faulkes Telescopes*

Workshop sessions; All day software try-out sessions; Poster displays; CCD linearity testing. For full details see the notice on page 51 of the February Journal.

Sunday programme

A more relaxed session, at which all are encouraged to attend and contribute, even very short items. Attendees who already plan to speak at this session include David Boyd, Richard Miles, Steve Parkinson, Roger Pickard, John Saxton & Stan Waterman. Please inform the organisers if you would like to speak at this session, although there will be plenty of time for unscheduled talks on the day – so do turn up, with your slides/overheads/laptop, if you have something to contribute.

Accommodation and further details:

See the I&I Section Web page [www.britastro.org/iandi] or contact the organisers.

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