



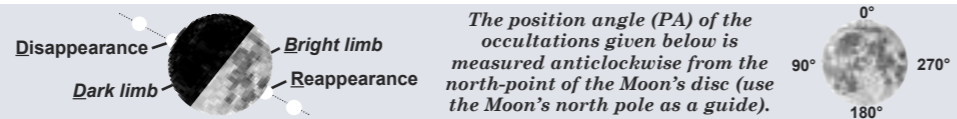
Moon phases

	Last quarter 26 May, 16:34 25 Jun, 09:46		New 04 May, 22:46 03 Jun, 10:02		First quarter 12 May, 01:12 10 Jun, 05:59		Full 18 May, 21:11 17 Jun, 08:31
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Apsides

Date	Apsis	Dist (km)	Size	Date	Apsis	Dist (km)	Size
13 May, 22h	Perigee	369,009	32' 23"	07 Jun, 23h	Perigee	368,504	32' 26"
26 May, 13h	Apogee	404,138	29' 34"	23 Jun, 08h	Apogee	404,548	29' 32"

Occultations



Date	Name	ZC	Mag	Phase	Data for Greenwich			Data for Edinburgh				
					Time	PA°	Alt°	Az°	Time	PA°	Alt°	Az°
09-May	63 Geminorum	1129	5.3	DD	21h 30m	64	24	275	21h 24m	58	27	269
19-May		2401	5.6	RD	22h 17m	278	11	143	22h 19m	283	6	141

These are the only occultations for this period, based on the following criteria: *Mag*: Visual magnitude. *Phase*: (R)eaching, (D)isappearance or (G)raze at (D)ark or (B)right lunar limb. *Alt*: Altitude. *The Moon's height*. *Az*: The angular position along the horizon measured clockwise from true north (through E, S, W back to N). *PA*: Position Angle, measured anticlockwise from the direction of the celestial North Pole. This listing shows lunar occultations of stars brighter than mag +6, observable with small telescopes in a sky dark enough to be seen without difficulty. For data specific to your own locality or details of fainter occultations, contact Occultation Section Director Mell Jeffery (address on p46).

Occultation notes

Due to the length of daylight hours and the criteria chosen for the data there are only two decent observable occultations this period. Of course, there are many stars occulted by the Moon and should any one be interested in a lengthier list for their location, I am happy to provide this for you.

The event on 9 May, 63 Geminorum, will be a struggle for those further north as the altitude plays a key part. As seen from the table; in Edinburgh the event takes place at an altitude of just six degrees above the horizon making it very difficult to observe.

ZC 2401 is occulted again this period as it was during March but in this instance, it is at a more reasonable hour and visible country wide.

Mell Jeffery

Meteor notes

Only one major meteor shower is active during the period covered by this issue, and that is the Eta Aquarids. Activity began around mid-April and continues until late May, reaching a peak on the night of 4-5 May. Unfortunately for British observers, these meteors are best seen from the southern hemisphere because the radiant does not rise until very late in the night from mid-northern latitudes and remains low in the sky. The good news is that observing conditions will be as good as can be, with a New Moon keeping

skies dark. The meteors appear as swift-moving streaks and are one of two showers produced each year when the Earth intersects the orbits of particles ejected by Halley's Comet (1P/Halley). The other is the Orionids in October. If the radiant were higher in the sky, then rates of 40 meteors an hour might be expected at maximum. As it is, you might see around a quarter of that rate for an hour or more before dawn twilight intrudes.

Paul Sutherland



▲ Two Eta Aquarid meteors within a one-second observation in 2014, taken by a camera belonging to the NASA All Sky Fireball Network in Pennsylvania. Credit: NASA/MSFC/MEO/Danielle Moser.

Planets

Mercury is at Superior Conjunction, behind the Sun, on the 21 May and then moves into the evening sky, reaching greatest eastern (evening) elongation from the Sun on the 23 June. For mid-UK observers it may become visible very low down in the north-west, shortly after 21:00 UT from the 1 June. It will increase in elevation, at the same time night after night, until elongation; however, the late summer sunset may make it hard to spot. Mercury and Mars are extremely close together on the evening of the 18th which makes for an interesting observation, if you can locate them.

Venus rises due east at around 04:00 UT in early May, shining at magnitude -3.9, but its brilliance will still be hard to spot as it draws ever closer to the Sun. Once found it can be followed into daylight and will show a 98 per cent illuminated disc some 10 arcseconds across but great care must be taken when the Sun lies so close. By early June Venus rises only minutes before the Sun and may be considered lost to most UK observers without specialist equipment.

In early May, **Mars** is still clinging on in the evening sky, appearing mid-way between Capella and Betelgeuse shortly after 20:30 UT. It will have little more than 20 degrees of elevation and sets by 23:00 UT. It can be followed into June but is best seen sooner if you are to have a chance of seeing surface detail.

Jupiter is the best object on display in this period, visible before midnight and observable until dawn. It reaches opposition on the 10 June, transiting due-south at midnight UT on that date, but at no great elevation due to the low altitude of the ecliptic during the summer months. However, its brightness of magnitude -2.6 will make it obvious against the stars of Ophiuchus and cloud banding and the Great Red

Spot should be visible during periods of good seeing.

An Atmospheric Dispersion Corrector (ADC) will greatly help improve the view allowing significantly more detail to be seen on this low-altitude target. On the 5 June from 00:35 UT a double shadow transit event may be seen. Ganymede and its shadow tracks across the southern edge of Jupiter's North Polar Region and Io casts its shadow on the North Equatorial belt. The split between a moon and its shadow will be obvious even though it is only 5 days before opposition. A similar event happens from 03:29 UT on the 12 June with each moon sitting almost directly above its shadow; however, Jupiter will be close to setting at this time and hard to observe from the UK.

In this period **Saturn** rises around 2 hours after Jupiter and follows a near identical path across the southern sky; it therefore suffers from the same problems of low altitude at southerly transit. Its ring system is still well seen from Earth, tilted some 24 degrees towards us with the northern pole of the planet on view. Once you have finished with mighty Jupiter, switch to beautiful Saturn and try to pick out variations in its ring system; once again an ADC will help greatly with this.

Uranus and **Neptune** are both morning objects and are quickly lost to the morning twilight. Faint Neptune will be particularly hard to see in this period. Uranus may be found towards the end of June, nearly due east and some 15 degrees above the horizon from around 02:00 UT, just as the sky starts to lighten. The outer "Ice Giant" planets are probably best left until later in the year when they will greatly improve in visibility.

Alan Clitherow

Variable star notes

Eclipsing Binaries:

As we move into summer, the nights become shorter with fewer opportunities to observe either beta Persei (Algol) or RZ Cassiopeia. In fact, there are no eclipses of Algol visible from the UK during May or June. However, there are two opportunities to observe RZ Cassiopeia in May. On the 11 May and the 17 May, RZ Cassiopeia will be in mid-eclipse at approximately 23:30 UT and 23:00 UT respectively. No eclipses of RZ Cassiopeia will be visible in June.

Long-Period Variable:

R Boötes will be on the rise during May and June, after reaching minimum in February. R Leonis will be visible low in the west during May but will disappear in the evening twilight of June. Unfortunately, it will also be fading, as it is predicted to reach minimum in July, so will only interest observers with large telescopes.

Looking to the north, both T Ursa Majoris and S Ursa Majoris are rising. S Ursa Majoris is predicted to reach maximum in June and T Ursa Majoris will reach maximum in July. T Cephei is also rising and predicted to reach maximum in June/July. All three stars should be visible with binoculars, despite the bright summer nights. R Ursa Majoris is fading, and is predicted to reach minimum in August, so won't be a binocular object.

Both R Serpentis and Chi Cygni are visible in the east. R Serpentis will be rising and should reach maximum during May/June. Chi Cygni will be fading and should reach minimum brightness in July/August; when it will only be visible to owners of large telescopes.

Matthew Barrett