

The Astronomical Sky Above Edinburgh and Lothian November 2023

November offers 2 planets – Jupiter and Uranus – at opposition which is the best observing opportunity since the Earth lies between the planet and the Sun. In fact, both will be at their brightest for the year since they also reach closest approach to Earth. Venus also experiences a Lunar occultation and Saturn changes direction so there is a lot to see in the November sky.

In late autumn, the Sun's altitude continues to lower in the sky as the Sun starts the month in Libra and enters Scorpio on 23 November at 2:44 pm. However, since 1930, the IAU constellation boundaries now place the Sun in a second constellation in November, namely Ophiuchus (The Serpent Bearer). So the Sun leaves Scorpio and enters Ophiuchus on 30 November at 3:17 am. Daylight shortens from 09:14:06 (9.235 hours) on 1 November to 07:28:02 (7.467 hours) on 30 November so we gain 1 hour and 46 minutes of night time by the end of the month.

The Moon enters last quarter on 5 November at 8:37 am in Cancer. Lunar apogee (furthest from Earth) follows on 6 November at 9:52 pm and takes the Moon to 404,530 km away from Earth—around 20,130 km closer than average—subtending an angle of 29.5 arcminutes. The new moon appears on 13 November at 9:27 am in Libra beginning a new synodic (Lunar) month. The first quarter of the new cycle shows up on 20 November at 10:50 am in Aquarius. Lunar perigee (closest to Earth) on 21 November at 9:09 pm finds the Moon some 369,854 km away from Earth—around 14,546 km closer than average—subtending an angle of 32.3 arcminutes. Late in the month, the full Beaver Moon makes an appearance on 27 November at 9:16 am in Taurus.

For the inner planets, Mercury passes through aphelion—furthest from the Sun—on 6 November at 5:46 pm when it is well below the local horizon. It is a daytime object in November which rules it out for observing. Venus moves from Leo into Virgo early in the month and remains easily visible as a morning object hovering around -4.2 mag. It will be occulted—blocked from view—by the Moon on 9 November at 9:36 am. Earlier, in the wee hours, the 'morning star' will shine brightly next to the waning crescent Moon in the east. Venus reaches perihelion—closest to the Sun—on 28 November at 12:37 pm in Virgo.

For the superior planets: Mars, like Mercury, is a daytime object following the Sun. It will be completely hidden behind the Sun when it reaches orbital conjunction on 18 November at 5:42 am. Jupiter is the highlight of the November sky, though, as it reaches closest approach to Earth on 1 November at 9:02 pm some 596 million km (33 light minutes) away making it -2.9 mag. It reaches opposition on 3 November at 5:02 am in Aries. Since it is at opposition, it will be visible all night long for the entire month. Saturn, at 0.8 mag, is best observed in the evening in Aquarius. It barely rises above 20° but it will reverse its retrograde orbit on 4 November at 6:30 am. It will reach eastern quadrature on 23 November at 9:47 am when the

angle between the Sun, Earth and Saturn is exactly 90° . Uranus also has its closest approach with Earth at 2,787 million km (155 light minutes) on 13 November at 11:45 am and reaches opposition on the same day at 5:21 pm so offers good visibility all night in Aries. At 5.6 mag it may be visible to the naked-eye but binoculars would help. Indeed, Uranus dances a merry jig with Jupiter throughout November and is 10° – 15° away from the bright planet. A handy reference guide is that 10° is approximately the angle subtended by a closed fist held at an arm's length with one eye closed. Neptune at 7.8 mag will require a telescope or binoculars and can reach 30° above the horizon as it sweeps across the south in the evening hours.

For 2-body conjunctions ($< 5^\circ$ apart) between solar system objects, we have nothing that has high visibility. However, Saturn reaches conjunction (at 2.5° apart) with the first quarter Moon on 20 November at 4 pm in Aquarius a few minutes after sunset. Some 150 minutes later it passes the meridian and will offer much better visibility whilst remaining close to the first quarter Moon.

Meteor showers in November are restricted to the Taurids, Leonids and the tail end of the Orionids reported in last month's article.

The Taurids, radiant from Taurus (The Bull), have 2 components. The Southern Taurids are radiant from one of the Bull's hooves near the star Tau o-1 on the map provided. These meteors peak around 6 November and Tau o-1 rises around 6 pm and sets about 12 hours later so the meteors are viewable all night but optimal due south at almost 43° altitude after midnight. The Northern Taurids, radiant from near M45 (The Pleiades), peak around 13 November. Since the Moon is close to new, the dark skies will provide excellent viewing. Again M45 rises late afternoon and will be visible after sunset for 10+ hours so check out these shooting stars around midnight in the south at almost 58° altitude. The parent comet is 2P/Encke,

co-discovered by M échain and Messier in 1786, and should generate 5–10 meteors per hour when they are both active.

The Leonids, radiant from Leo (The Lion), peak in the early hours of 18 November. Conditions are favourable as the close star Algieba rises after 10:30 pm the evening before and the Moon has set by then. The shower may provide 10–15 events per hour over the next 6 hours. Best after midnight as they rise from 10° to 50° altitude as they move from east to south. The parent comet is 55P/Tempel-Tuttle discovered in 1865.

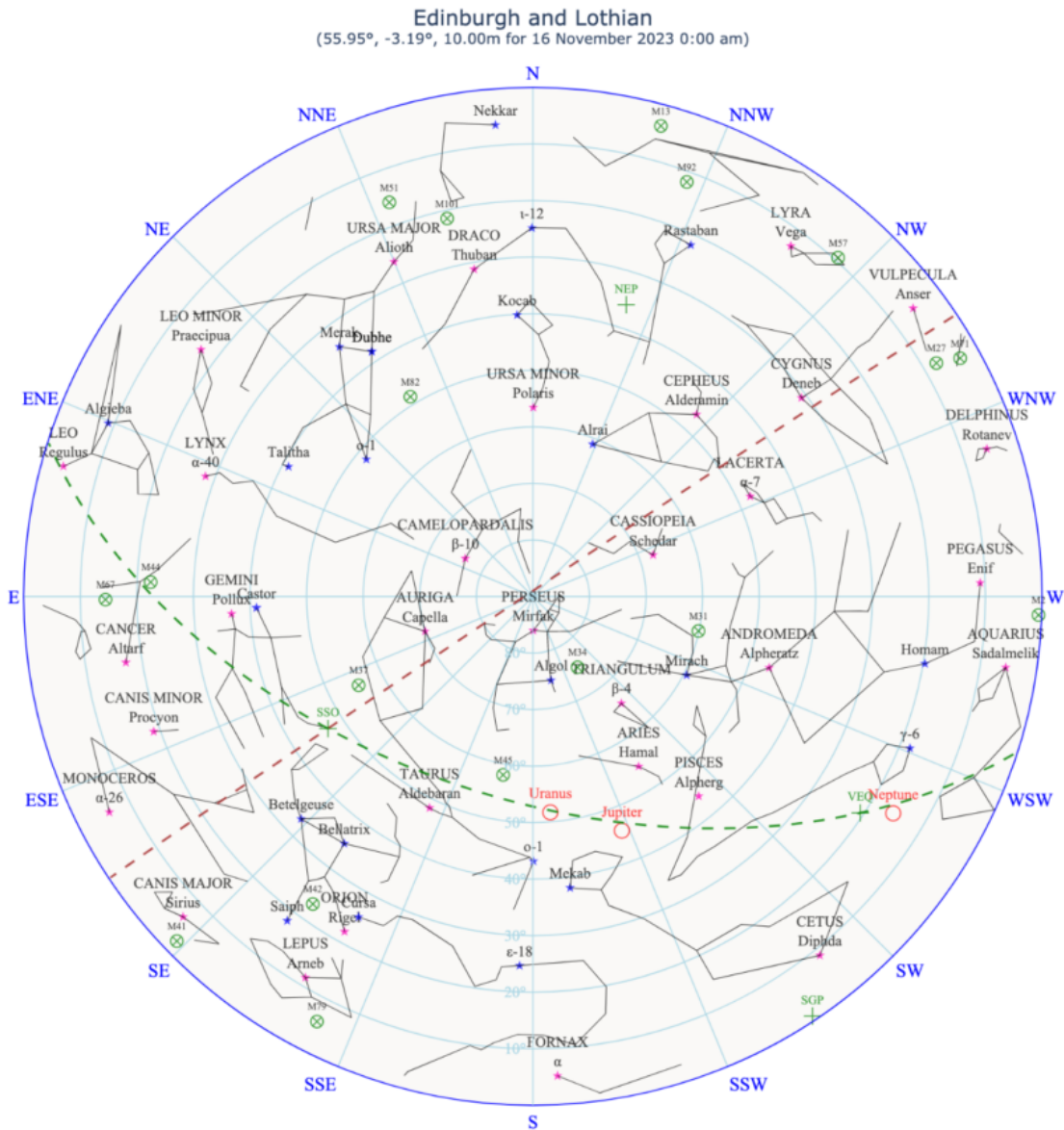
The comet C/2023 H2 (Lemmon) may also brighten to 5.8 mag at a distance of 0.2 AU on 9 November. At an altitude of 40° after 6 pm it could be visible with the naked-eye in Hercules (Hercules).

One could argue that the November constellations take on a distinctly watery theme as we have views of Cetus (The Sea Monster), Pisces (The Fishes), Aquarius (The Water Bearer), Delphinus (The Dolphin) and Eridanus (The River). Even Capricornus (The Sea Goat) and Piscis Austrinus (The Southern Fish) skim over the horizon for a few hours in the early evening and Hydra (The Female Water Snake) rises after midnight.

Also visible in the sky will be Camelopardalis (The Giraffe), Pegasus (The Winged Horse), Andromeda (The Chained Maiden), Perseus (The Hero) and Lacerta (The Lizard), whilst along the Ecliptic we can spot Cancer (The Crab), Gemini (The Twins) and Taurus (The Bull) along with our circumpolar regulars Cassiopeia (The Seated Queen), Draco (The Dragon), Ursa Minor (The Little Bear), Ursa Major (The Great Bear) and Cepheus (The King).

Edinburgh and Lothian Ephemeris

1 November 9:02 pm	Earth Jupiter closest at 595,753,767 km	Aries
3 November 5:02 am	Jupiter at opposition	Aries
4 November 6:30 am	Saturn retrograde orbit reverses to direct	Aquarius
5 November 8:37 am	Last quarter Moon	Cancer
6 November 5:46 pm	Mercury aphelion 69,817,161 km	Libra
6 November 6:00 pm	Southern Taurid meteors peak over next 12 hours	Taurus
6 November 9:52 pm	Lunar apogee 404,530 km	Leo
9 November 9:36 am	Venus occulted by Moon	Virgo
9 November 6:00 pm	Comet C/2023 H2 (Lemmon)	Hercules
11 November 8:49 am	Moon at descending node	Virgo
13 November 9:27 am	New Moon, lunation 295	Libra
13 November 11:45 am	Earth Uranus closest at 2,787,230,967 km	Aries
13 November 5:21 pm	Uranus at opposition	Aries
13 November 6:00 pm	Northern Taurid meteors peak over next 12 hours	Taurus
18 November 0:00 am	Leonid meteors peaking over next 6 hours	Leo
18 November 5:42 am	Mars at orbital conjunction	Libra
20 November 10:50 am	First quarter Moon	Aquarius
20 November 4:00 pm	Moon Saturn at conjunction, 2.49° apart	Aquarius
21 November 9:09 pm	Lunar perigee 369,854 km	Aquarius
23 November 9:47 am	Saturn at eastern quadrature	Aquarius
23 November 2:44 pm	Sun leaves Libra, enters Scorpio at 0.988 AU	Scorpio
24 November 11:02 am	Moon at ascending node	Pisces
27 November 9:16 am	Full (Beaver) Moon	Taurus
28 November 12:37 pm	Venus perihelion 107,478,341 km	Virgo
30 November 3:17 am	Sun leaves Scorpio, enters Ophiuchus at 0.986 AU	Ophiuchus



The sky above Edinburgh and Lothian at midnight on 15/16 November. The figure also applies at 1 am on 1 November and 11 pm on 30 November. The green, dashed, line is the Ecliptic and the brown, dashed, line is the Milky Way. Asterisms below 10° may be truncated because of distortion. To use the map, face any direction and then rotate the map until that cardinal point is nearest to you. The zenith (point directly overhead) is at the centre of the circle and the edge is the horizon.