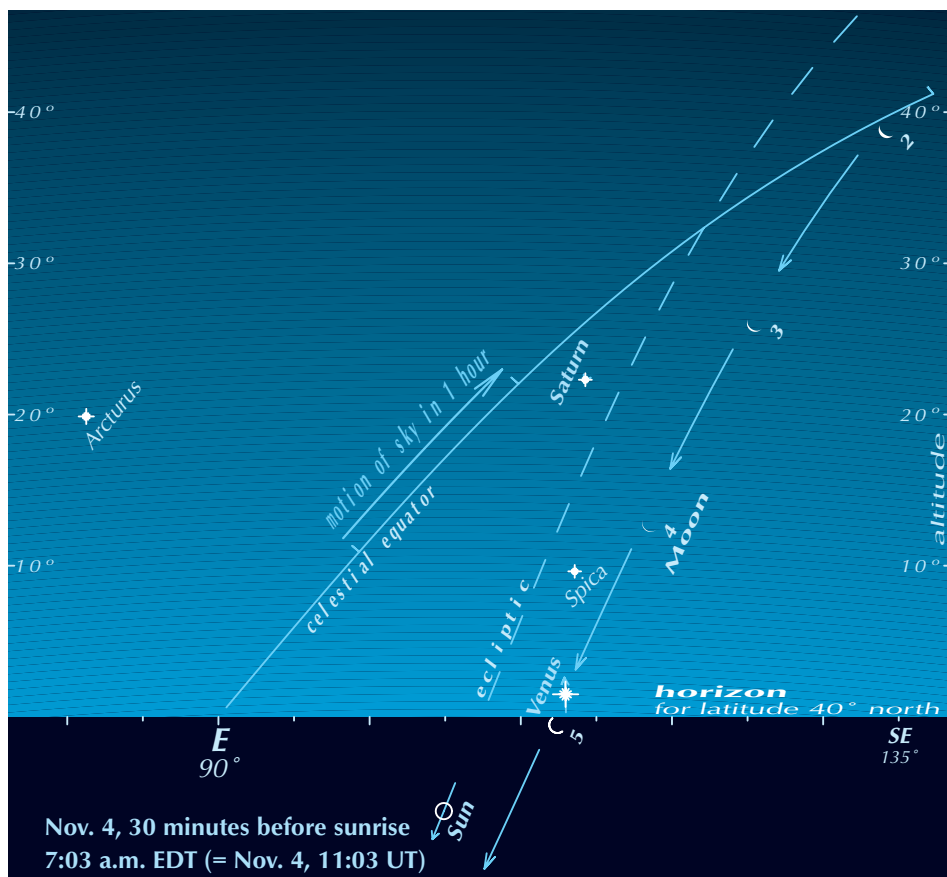


November

- 1 Mon. (2 UT=22 edt) Moon 4.7° S.S.W. of Regulus (about 69° from Sun in morning sky).
- 2 Tue. (0 UT=20 edt) Moon .62° N.N.E. of asteroid 3 Juno (57° from Sun in morning sky).
- 3 Wed. (10 UT= 6 EDT) The equation of time is at maximum for the year, 16.48 minutes. That is, the Sun is running fast (ahead of its average position): at 12 noon in mean solar time it has already passed the meridian about 16 minutes ago. See Feb. 11. (17 UT=13 EDT) Moon at perigee. Distance 57.10 earth-radii.
- 4 Thu. (1 UT=21 edt) Moon 7.3° S.S.W. of Saturn (30° from Sun in morning sky). (9 UT= 5 EDT) Mercury at aphelion, .4667 a.u. from the Sun. (22 UT=18 EDT) Moon 2.8° S. of Spica (18° from Sun in morning sky).
- 5 Fri. Southern Taurid meteors. See **METEORS**. (7 UT= 3 EDT) Moon 1.1° W. of Venus (only about 12° from the Sun).
- 6 SAT. (4:51 UT= 0:51 EDT) ● **Moon new**. Beginning of lunation 1087.

- 7 SUN. First Sunday in November: **change clocks back** 1 hour, from Daylight-Saving Time to Standard Time. Done in Europe on last Sunday in Oct. See 2nd and last Sundays in March. On this night officially the clock hour 1–2 a.m. is repeated. The mnemonic is: “Spring forward, Fall back.” (3 UT=22 est) Neptune stationary in longitude; resumes direct (eastward) motion. (3 UT=22 est) Moon 1.8° S.S.W. of Mercury (only about 12° from the Sun). (5 UT=24 est) Neptune stationary in right ascension; resumes direct (eastward) motion. The stationary moment in longitude is 2 hours earlier. (23 UT=18 EST) Moon 1.7° S.S.E. of Mars (about 22° from Sun in evening sky).
- 8 Mon. (1 UT=20 est) Moon 2.5° N. of Antares (about 24° from Sun in evening sky). (3 UT=22 est) Mars, Moon, and Antares within circle of diameter 4.44°; 31° East of the Sun.
- 9 Tue. (20:15 UT=15:15 EST) Moon at ascending node (longitude 273.6°).
- 11 Thu. Martinmas, a cross-quarter day in Scotland; see *Ast. Companion*, SEASONS. (1 UT=20 est) Mars 3.9° N. of Antares (about 21° from Sun in evening sky); magnitudes 1.4 and 1.0.
- 12 Fri. Northern Taurid meteors. See **METEORS**. (10 UT= 5 EST) Autumn equinox on Mars.
- 13 SAT. (16:37 UT=11:37 EST) ● **Moon at first quarter**.

- ||| 14 SUN. (1 UT=20 est) Moon 4.6° N.N.W. of Neptune (94° from Sun in evening sky). (18 UT=13 EST) Mercury, Mars, and Antares within circle of diameter 4.85°; 28° East of the Sun.
- ||| 15 Mon. (12 UT= 7 EST) Moon at apogee. Distance 63.44 earth-radii. (19 UT=14 EST) Mercury 2.4° N.N.E. of Antares (17° from Sun in evening sky); magnitudes –0.4 and 1.0.
- ||| 16 Tue. (9 UT= 4 EST) Moon 6.6° N.N.W. of Jupiter (about 119° from Sun in evening sky). (15 UT=10 EST) Venus stationary in right ascension; resumes direct (eastward) motion. The stationary moment in longitude is 52 hours later. (18 UT=13 EST) Moon 5.9° N.N.W. of Uranus (123° from Sun in evening sky).



Observers' highlights for November by Fred Schaaf

Highlight of the month will probably be Venus's vault up into the dawn sky—but maybe stronger-than-average Leonids display?

Venus Springs Steeply Away from Sunrise. After inferior conjunction on October 29, Venus leaps high into the dawn sky of mid-northern latitudes during the course of November. Observers around 40° N will have to struggle to glimpse Venus rising less than half an hour before the Sun as November begins. But by month's end, Venus precedes the Sun by about 3 hours and 20 minutes! At this inferior conjunction Venus's Earthward face was only about 1 per cent illuminated—a crescent over 1' long as she passed closest to Earth. But Venus doesn't stay a long eyelash-thin crescent for many days. By mid-November the planet is still well over 50%

in length but its phase has thickened to 10 per cent lit. By the end of November it is almost ¼ lit and its disk diameter less than ¾'. November closes with Venus near maximum brightness, a breathtaking lantern high in the dawn.

Saturn and Spica Escape Venus. In early November Venus rises directly below Spica and the much-higher Saturn. At first Venus gains ground on the star and planet but eventually returns from retrograde to direct motion and they get away. Venus comes closest to Spica—less than 4° from it—on November 17 and closest to Saturn—a little more than 14° from it—on November 22.

Enhanced Numbers of Leonids or Not. The Taurid meteors avoid the Moon in the first week of November. The Leonid meteors have put on some enhanced displays in the past few years as Earth has encountered special denser threads of meteoroid stream. The main Leonid display should

- ||| 17 Wed. **Leonid meteors.** See **METEORS**. **Quite favorable year** for this sometimes huge shower (no enhanced activity is predicted). (17 UT=12 EST) Venus halts 3.8° E. of Spica (28° and 31° from Sun in morning sky); magnitudes –4.5 and 1.0. A quasi-conjunction; no conjunction in r.a.
- ||| 18 Thu. (10 UT= 5 EST) Neptune at east quadrature. (21 UT=16 EST) Venus stationary in longitude; resumes direct (eastward) motion.
- ||| 19 Fri. (5 UT= 0 EST) Jupiter stationary in right ascension; resumes direct (eastward) motion. The stationary moment in longitude is 13 hours earlier.
- i 20 SAT. (16 UT=11 EST) **Mercury 1.7° S. of Mars** (19° from Sun in evening sky); magnitudes –0.4 and 1.4. Conjunction in r.a. is 9 hours later. Beginning of a *quintuple* conjunction: Mercury loops back past Mars Dec. 14, re-passes it 2011 Feb. 20, loops back past it again 2011 Apr. 19, finally re-passes it 2011 21.

- i 21 SUN. Alpha Monocerotid meteors. See **METEORS**. Very unfavorable year for this periodically major shower. (17:28 UT=12:28 EST) ○ **Moon full**. See **SPECIAL MOONS**. (21 UT=16 EST) Moon 1.5° S.E. of Pleiades (177° and 176° from Sun in the midnight sky).
- i 22 Mon. (7 UT= 2 EST) Venus (at the end of its retrograde loop) 14.3° E.S.E. of Saturn (32° and 46° from Sun in morning sky); magnitudes –4.6 and .9. (10 UT= 5 EST) Sun enters the astrological sign Sagittarius, i.e. its longitude is 240°. But astronomically it is still in Libra. See *Ast. Companion*, PRECESSION.
- i 23 Tue. (10 UT= 5 EST) ☉ Sun enters Scorpius, at longitude 241.01° on the ecliptic. (18 UT=13 EST) Venus at ascending node through the ecliptic plane.
- ||| 24 Wed. (6:26 UT= 1:26 EST) Moon at descending node (longitude 92.9°). (16 UT=11 EST) Mercury at greatest latitude south of the ecliptic plane) –7.0°.
- ||| 25 Thu. (18 UT=13 EST) Moon 8.5° S. of Pollux (130° from Sun in morning sky).
- ||| 26 Fri. (20 UT=15 EST) Moon 4.3° S. of Beehive Cluster (about 116° from Sun in morning sky).

- ||| 28 SUN. (7 UT= 2 EST) Mercury at greatest declination south) –25.9°. (8 UT= 3 EST) Moon 4.9° S.S.W. of Regulus (about 96° from Sun in morning sky). (20:37 UT=15:37 EST) ● **Moon at last quarter**.
- ||| 29 Mon. (15 UT=10 EST) Mars at heliocentric conjunction with Pluto; that is, passes it as seen from the Sun. Their heliocentric longitude is 274.8°. (23 UT=18 EST) Moon .72° S.S.E. of asteroid 3 Juno (76° from Sun in morning sky).
- ||| 30 Tue. (6 UT= 1 EST) ☉ Sun enters Ophiuchus, at longitude 247.91° on the ecliptic. This is not one of the twelve traditional houses of the Sun; see *Ast. Companion*, ZODIAC. (19 UT=14 EST) Moon at perigee. Distance 57.92 earth-radii.

In November evenings the **Milky Way** spans the sky symmetrically from east to west (passing straight overhead for those who live about latitude 60° north).

We therefore now have our most open view out of the “south window” of our galaxy—as in May we had a much more open view out of its “north window.” Out of this south window we look into the middle of our Local Group of galaxies, seeing our neighbors in Andromeda, Triangulum, Dorado, etc.; whereas out of the north window we looked inward on the vaster supercluster (centering in Virgo) on whose edge our group hovers. See *Ast. Companion*, OUTFRUSH.

Times are given in UT (Universal Time, same as local time at Greenwich on the 0° meridian of longitude). EST: clock times in eastern U.S.; **est**: in previous day. To convert to other times, see world map inside back cover. Positions given for the Moon (such as “2° north of Mars”) are as seen from center of Earth; from north edge of Earth, Moon appears nearly 1° farther south.

● ○ ● ○ Moon new, 1st quarter, full, last quarter
■ ||| ||| i amount of Moon-dark time

[Among the incidents in the trenches] A private relates how a cry from an amateur astronomer, “Come and see Cassiopeia,” prompted a rush of Tommies hoping to see a French girl.

Review of *The Soldier's War*, by Richard van Emden, 2009

Telescope: A device having a relation to the eye similar to that of the telephone to the ear, enabling distant objects to plague us with a multitude of needless details.

Ambrose Bierce, *The Devil's Dictionary*, 1911

occur on the American night of November 17-18 when only the final hours of night are moonfree. But see **METEORS** for discussion of possibilities of Leonids at other times.

Jupiter Well-Placed, Mercury and Mars Low at Dusk. By month's end, Jupiter is at its highest not long after the end of evening twilight, and it remains bright and big. Mars sets more than an hour after the Sun all month but is very low in dusk. Observers at mid-northern latitudes will have trouble seeing the conjunction of Mars and Mercury on November 21, not to mention the conjunction of Mercury with Antares on November 15 and the Mercury-Mars-Antares trio on November 14.

Moon-Venus Pairing. On November 5, an ultra-slender lunar crescent rises only about 2½° below Venus—but, for viewers around 40° N, only about 35 minutes before sunrise.