

## March 2018 Astronomy Calendar by Dave Mitsky

Some information supplied and/or added by Tony Donnangelo

All times are Eastern Standard Time (-5 hrs. U.T.). Daylight Saving Time (-4 hrs. U.T.) goes into effect at 2:00 a.m., March 11.

Events listed are based on a location of 40°N in the Eastern US and may not be visible in all areas.

Concerning moderate and minor meteor shower activity:

Do not have any high expectations. This general information is to account for why you might be seeing a few more than normal meteors during your observing session.

Lunar light rays may occur prior to or after the predicted time. Initial observations might have occurred after the ray's inception or continued after the observer's session. Rays may last a very short time or for many hours. Obtain further information; send reports (including non-occurrences and miss-calculations), photos, and observations of new rays to:

The Robinson Lunar Observatory: <http://www.lunar-occultations.com/rlo/rlondx.htm>.

- 3/1 Comet 327P/Van Ness is at opposition at 4.117 A.U.
- 3/1 Comet C/2018 A6 (Gibbs) is at opposition at 4.149 A.U.
- 3/1 The Moon is 0.91° north-northeast of the first-magnitude star Regulus (Alpha Leonis), with an occultation occurring in Greenland, northern Canada, and Alaska, at 1:00 a.m.
- 3/1 Full Moon (known as the Crow, Lenten, and Sap Moon) occurs at 7:51 p.m.
- 3/1 Rho Leonids meteor shower (minor activity) peaks through the 4th. Duration is from 2/13 through 3/13.  
Observing and History: [http://meteorshowersonline.com/showers/rho\\_leonids.html](http://meteorshowersonline.com/showers/rho_leonids.html)
- 3/3 155th Anniversary (1863) of the creation of the National Academy of Sciences.
- 3/3 Mars and Jupiter are in heliocentric conjunction (heliocentric longitude is 223.3°) at 5:00 p.m.
- 3/3 Pi Virginids meteor shower (minor activity) peaks through the 9th. Duration is from 2/13 through 4/8.  
Observing and History: [http://meteorshowersonline.com/showers/pi\\_virginids.html](http://meteorshowersonline.com/showers/pi_virginids.html)
- 3/4 Comet 127P/Holt-Olmstead is at opposition at 3.212 A.U.
- 3/4 Patrick Moore's 95th birthday (1923).
- 3/4 Mercury (magnitude -1.2) is 1.1° northwest of Venus (magnitude -3.9) at 1:00 a.m.
- 3/4 Neptune is in conjunction with the Sun at 9:00 a.m.
- 3/4 The Moon is 6.9° north-northeast of the first-magnitude star Spica (Alpha Virginis) at 9:00 p.m.
- 3/5 Mercury is at the ascending node through the ecliptic plane at 2:00 p.m.
- 3/5 Crisium, Mare (sunset) lunar light ray predicted to occur at 1:27:10 a.m.
- 3/6 Mercury crosses the celestial equator and enters the northern celestial hemisphere at 12:00 a.m.
- 3/7 Comet C/2017 X1 (PANSTARRS) is at closest approach to Earth at 3.913 A.U.
- 3/7 Comet 284P/McNaught is at opposition at 4.064 A.U.
- 3/7 The Moon is 4.0° north-northeast of Jupiter at 4:00 a.m.
- 3/8 The Moon is 9.3° north of the first-magnitude star Antares (Alpha Scorpii) at 2:00 p.m.
- 3/8 Jupiter is stationary in longitude at 11:00 p.m.
- 3/9 Comet P/2005 J1 (McNaught) is at closest approach to Earth at 1.822 A.U.
- 3/9 Comet 93P/Lovas is at opposition at 2.638 A.U.
- 3/9 Venus crosses the celestial equator and enters the northern celestial hemisphere at 1:00 a.m.
- 3/9 Fernelius (sunset) lunar light ray predicted to occur at 1:26:58 a.m.
- 3/9 Jupiter is stationary in right ascension, with retrograde motion to begin, at 4:00 a.m.
- 3/9 Last Quarter Moon occurs at 6:20 a.m.
- 3/9 Royal Astronomical Society ordinary meeting being held in London, United Kingdom.
- 3/9 The Moon is 1.8° south of asteroid (4) Vesta at 1:44 p.m.

3/9 The Moon is  $3.8^\circ$  north of Mars at 8:00 p.m.

3/10 Mercury (magnitude  $-0.8$ ) is at perihelion (0.3075 astronomical units from the Sun) at 6:00 a.m.

3/10 The Curtiss Cross, an X-shaped clair-obscur illumination effect located between the craters Parry and Gambart, is predicted to be visible at 4:19 p.m.

3/10 Leonids-Ursids meteor shower (minor activity) peaks 10/11. Duration is from 3/18 to 4/7. Observing and History: [http://meteorshowersonline.com/showers/leonids\\_ursids.html](http://meteorshowersonline.com/showers/leonids_ursids.html)

3/11 Daylight saving time in United States. Set clock ahead one hour at 2:00 a.m.

3/11 The Moon is at apogee, subtending  $29' 32''$  from a distance of 404,678 kilometers (251,455 miles), at 5:14 a.m.

3/11 The Moon is  $2.2^\circ$  north of Saturn at 9:00 p.m.

3/12 International Day of Planetaria.

3/12 Comet 74P/Smirnova-Chernykh is at opposition at 2.556 A.U.

3/12 Comet C/2016 N6 (PANSTARRS) is at closest approach to Earth at 2.601 A.U.

3/12 Comet C/2015 V4 (PANSTARRS) is at closest approach to Earth at 5.445 A.U.

3/12 John Theophile Desaguliers' 335th birthday (1683).

3/12 The Sun enters Pisces (ecliptic longitude  $351.57^\circ$ ) at 1:00 a.m.

3/13 Comet 74P/Smirnova-Chernykh is at closest approach to Earth at 2.556 A.U.

3/13 Moon is at the descending node (longitude  $314.5^\circ$ ) at 11:48 p.m.

3/14 Pi Day

3/15 Comet 125P/Spacewatch is at closest approach to Earth at 1.243 A.U.

3/15 Comet P/2012 K3 (Gibbs) is at opposition at 2.875 A.U.

3/15 Comet 257P/Catalina is at opposition at 4.018 A.U.

3/15 Comet P/2006 F1 (Kowalski) is at perihelion at 4.108 A.U.

3/15 Comet C/2017 D3 (ATLAS) is at opposition at 4.595 A.U.

3/15 Comet C/2016 E1 (PANSTARRS) is at closest approach to Earth at 7.650 A.U.

3/15 Mercury is at its greatest eastern elongation ( $18.4^\circ$ ) at 11:00 a.m.

3/16 Comet 62P/Tsuchinshan is at closest approach to Earth at 1.025 A.U.

3/16 Comet P/2015 X1 (PANSTARRS) is at opposition at 3.828 A.U.

3/16 Frederick Reines' 100th birthday (1918).

3/16 Heinrich Kayser's 165th birthday (1853).

3/16 The Moon is  $1.7^\circ$  south-southeast of Neptune at 10:00 a.m.

3/16 Mars is at the descending node through the ecliptic plane at 3:00 p.m.

3/16 Gamma Normids meteor shower (minor activity) peaks 16/17. Duration is from 11th to 21st. Observing and History: [http://meteorshowersonline.com/showers/gamma\\_normids.html](http://meteorshowersonline.com/showers/gamma_normids.html)

3/17 60th Anniversary (1958) of Vanguard 1 launch.

3/17 New Moon (lunation 1178) occurs at 9:12 a.m.

3/18 Comet 346P/Catalina is at opposition at 2.725 A.U.

3/18 Comet 235P/LINEAR is at perihelion at 2.732 A.U.

3/18 Comet 314P/Montani is at closest approach to Earth at 4.053 A.U.

3/18 Comet C/2016 E1 (PANSTARRS) is at opposition at 7.651 A.U.

3/18 The Moon is  $3.5^\circ$  south-southeast of Venus at 6:00 p.m.

3/18 The Moon is  $7.3^\circ$  south-southeast of Mercury at 7:00 p.m.

3/18 Delta Mensida meteor shower (minor activity) peaks 18/19. Duration is from 14th to 21st. Observing and History: [http://meteorshowersonline.com/showers/delta\\_mensids.html](http://meteorshowersonline.com/showers/delta_mensids.html)

3/18 Eta Virginids meteor shower (minor activity) peaks 18/19. Duration is from 2/24 to 3/27. Observing and History: [http://meteorshowersonline.com/showers/eta\\_virginids.html](http://meteorshowersonline.com/showers/eta_virginids.html)

3/19 Comet P/2012 O2 (McNaught) is at opposition at 2.706 A.U.

3/19 Mercury (magnitudes  $+0.5$ ) is  $3.8^\circ$  north-northwest of Venus (magnitude  $-3.9$ ) at 4:00 a.m.

3/19 The Moon is  $4.4^\circ$  south-southeast of Uranus at 3:00 p.m.

3/19 Beta Leonids meteor shower (minor activity) peaks through the 21st. Duration is from 2/14 through 4/25. Observing and History: [http://meteorshowersonline.com/showers/beta\\_leonids.html](http://meteorshowersonline.com/showers/beta_leonids.html)

3/20 Comet 235P/LINEAR is at opposition at 1.740 A.U.

3/20 Comet 61P/Shajn-Schaldach is at opposition at 3.901 A.U.

3/20 Comet C/2015 V4 (PANSTARRS) is at opposition at 5.456 A.U.

3/20 Comet C/2016 C1 (PANSTARRS) is at closest approach to Earth at 8.585 A.U.

3/20 Mercury is at its greatest latitude north ( $7.0^\circ$ ) of the ecliptic plane at 12:00 p.m.  
3/20 Vernal Equinox occurs at 12:15 p.m.  
3/20 Dwarf planet/asteroid (1)Ceres is stationary at 5:00 p.m.  
3/20 Theta Virginids meteor shower (minor activity) peaks 20/21. Duration is from 3/10 to 4/21.  
Observing and History: [http://meteorsshowersonline.com/showers/theta\\_virginids.html](http://meteorsshowersonline.com/showers/theta_virginids.html)  
3/21 Comet 235P/LINEAR is at closest approach to Earth at 1.740 A.U.  
3/22 Comet P/2005 T2 (Christensen) is at opposition at 3.821 A.U.  
3/22 Asteroid (45) Eugenia is at closest approach to Earth at 1.595 A.U.  
3/22 Robert Millikan's 150th birthday (1868).  
3/22 Alfred Fowler's 150th birthday (1868).  
3/22 The Moon is  $9.0^\circ$  south-southeast of the bright open cluster M45 (the Pleiades or Subaru) in Taurus at 2:00 a.m.  
3/22 Mercury (magnitude +1.3) is  $10.8^\circ$  west of Uranus (magnitude +5.9) at 4:00 a.m.  
3/22 Mercury is stationary in right ascension, with retrograde motion to begin, at 1:00 p.m.  
3/22 The waxing crescent Moon is  $0.85^\circ$  north of the first-magnitude star Aldebaran (Alpha Tauri), with an occultation occurring in northern Europe, Greenland, the northwestern United States, and western Canada, at 7:00 p.m.  
3/22 Mercury is stationary in longitude at 8:00 p.m.  
3/23 Burnham (sunrise) lunar light ray predicted to occur at 8:47:23 p.m.  
3/23 Halley (sunrise) lunar light ray predicted to occur at 9:25:41 p.m.  
3/23 Hipparchus (sunrise) lunar light ray predicted to occur at 9:47:07 p.m.  
3/24 Comet P/2017 W3 (Gibbs) is at closest approach to Earth at 2.886 A.U.  
3/24 Comet P/2017 W3 (Gibbs) is at opposition at 2.886 A.U.  
3/24 25th Anniversary (1993) of discovery of Comet Shoemaker-Levy 9.  
3/24 85th Anniversary (1933) of the Pasamonte Meteorite Shower in New Mexico.  
3/24 Walter Baade's 125th birthday (1893).  
3/24 The Lunar X (the Purbach or Werner Cross), an X-shaped illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to be visible at 2:57 a.m.  
3/24 The Moon is  $4.3^\circ$  south of the bright open cluster M35 in Gemini at 9:00 a.m.  
3/24 First Quarter Moon occurs at 11:35 a.m.  
3/24 Mars is at western quadrature (i.e.,  $90^\circ$  from the Sun) at 12:00 p.m.  
3/24 Sunrise takes place on the isolated lunar mountain Mons Pico at 12:13 p.m.  
3/24 Mersenius P (sunrise) lunar light ray predicted to occur at 12:47:13 a.m. Moonset 3:30 am.  
3/24 Maginus (sunrise) lunar light ray predicted to occur at 9:16:04 p.m.  
3/25 European Summer Time. Set clock ahead one hour (European Union).  
3/25 Comet C/2017 M3 (PANSTARRS) is at opposition at 4.479 A.U.  
3/25 Christopher Clavius' 480th birthday (1538).  
3/25 Sunrise takes place on the isolated lunar mountain Mons Piton at 4:00 a.m.  
3/25 The Moon is  $8.4^\circ$  south of the first-magnitude star Pollux (Beta Geminorum) at 10:00 p.m.  
3/25 Goldschmidt (sunrise) lunar light ray predicted to occur at 12:44:46 a.m. Moonset 3:03 am.  
3/25 Hesiodus (sunrise) lunar light ray predicted to occur at 6:13:31 p.m.  
3/26 Comet 183P/Korlevic-Juric is at closest approach to Earth at 2.899 A.U.  
3/26 Comet 314P/Montani is at opposition at 4.062 A.U.  
3/26 15th Anniversary (2003) of the Park Forest Meteorite Shower (hit houses in Illinois).  
3/26 Nathaniel Bowditch's 245th birthday (1773)  
3/26 Cichus A (sunrise) lunar light ray predicted to occur at 1:49:39 a.m. Moonset 3:58 a.m.  
3/26 The Moon is at perigee, subtending  $32' 22''$  from a distance of 369,106 kilometers (229,352 miles), at 1:17 p.m.  
3/26 Campanus (sunrise) lunar light ray predicted to occur at 7:56:06 p.m.  
3/26 The Moon is  $1.8^\circ$  south of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 9:00 p.m.  
3/27 Comet 300P/Catalina is at opposition at 1.661 A.U.  
3/27 Comet 183P/Korlevic-Juric is at opposition at 2.899 A.U.  
3/27 Comet P/2007 S1 (Zhao) is at opposition at 3.932 A.U.  
3/27 Comet P/2010 TO20 (LINEAR-Grauer) is at opposition at 4.990 A.U.  
3/27 Comet C/2016 C1 (PANSTARRS) is at opposition at 8.593 A.U.

- 3/27 Sinus Iridum (sunrise) lunar light ray predicted to occur at 1:59:22 a.m.
- 3/27 The Moon is at the ascending node (longitude 133.7°) at 6:59 a.m.
- 3/28 Comet P/2005 JN (Spacewatch) is at opposition at 1.423 A.U.
- 3/28 Comet P/2012 K3 (Gibbs) is at closest approach to Earth at 2.848 A.U.
- 3/28 Asteroid (3) Juno (magnitude +10.3) is 3.2° north-northwest of Neptune (magnitude +8.0) at 6:44 a.m.
- 3/28 The Moon is 0.98° north-northeast of the first-magnitude star Regulus (Alpha Leonis), with an occultation occurring in Alaska and northeastern Asia, at 11:00 a.m.
- 3/28 Venus is 0.07° south-southeast of Uranus at 9:00 p.m.
- 3/29 Comet 50P/Arend is at opposition at 4.157 A.U.
- 3/29 Comet P/2010 TO20 (LINEAR-Grauer) is at closest approach to Earth at 4.989 A.U.
- 3/29 Tullio Levi-Civita's 145th birthday (1873).
- 3/29 Saturn is at western quadrature at 10:00 a.m.
- 3/29 Eta Draconids meteor shower (minor activity) peaks through the 31st. Duration is from the 3/22 through 4/8.  
Observing and History: [http://meteorshowersonline.com/showers/eta\\_draconids.html](http://meteorshowersonline.com/showers/eta_draconids.html)
- 3/30 Comet 312P/NEAT is at opposition at 3.803 A.U.
- 3/30 Comet P/2014 U4 (PANSTARRS) is at opposition at 4.079 A.U.
- 3/31 Comet 105P/Singer Brewster is at opposition at 1.276 A.U.
- 3/31 Comet C/2017 F2 (PANSTARRS) is at closest approach to Earth at 6.077 A.U.
- 3/31 Full Moon occurs at 8:37 a.m.
- 3/31 Tau Draconids meteor shower (minor activity) peaks through 4/2. Duration is from 3/13 through 2/2.  
Observing and History: [http://meteorshowersonline.com/showers/tau\\_draconids.html](http://meteorshowersonline.com/showers/tau_draconids.html)

Nicolas-Louis de Lacaille (1713-1762), Caroline Herschel (1750-1848), Josef von Fraunhofer (1787-1826), John Herschel (1792-1871), Percival Lowell (1855-1916), Albert Einstein (1879-1955), and Walter Baade (1893-1960) were born this month.

Titan, Saturn's largest satellite, was discovered on March 25, 1655 by the Dutch astronomer Christiaan Huygens. The English astronomer Edward Pigott discovered the spiral galaxy M63 (the Black Eye Galaxy) on March 23, 1779. The English astronomer Sir William Herschel discovered Uranus on March 13, 1781. The grand design spiral galaxy M101 was discovered by the French astronomer Pierre Méchain on March 27, 1781. Asteroid 2 Pallas was discovered by the German astronomer Heinrich Wilhelm Matthias Olbers on March 28, 1802. Asteroid 4 Vesta was discovered by Heinrich Wilhelm Matthias Olbers on March 29, 1807. The first photograph of the Moon was taken on March 23, 1840. The Czech astronomer Luboš Kohoutek discovered Comet C/1973 E1 (Kohoutek) on March 7, 1973. The rings of Uranus were discovered on March 10, 1977. The Spanish amateur astronomer Francisco Garcia Diaz Garcia discovered supernova SN 1993 in the spiral galaxy M81 (Bode's Galaxy) on March 28th, 1993.

The zodiacal light may be visible in the western sky after sunset from dark locations during the second half of March.

Information on Iridium flares and passes of the ISS, the Tiangong-1, the Tiangong-2, the USAF's X-37B, the HST, and other satellites can be found at <http://www.heavens-above.com/>

The Moon is 12.9 days old, is illuminated 98.0%, subtends 33.0 arc minutes, and is located in the constellation of Leo at 0:00 UT on March 1st. Full Moon occurs on March 2nd and again on March 31st. (The second Full Moon in a month is now considered by some to be a Blue Moon.) New Moon occurs on March 7th. The Moon is at apogee (at a distance of 63.45 Earth-radii) on March 11th and perigee (at a distance of 57.87 Earth-radii) on March 26th. The Moon will occult Regulus on March 1st and 28th and Aldebaran on March 22nd from certain parts of the world. Consult <http://www.lunar-occultations.com/iota/bstar/bstar.htm> for information on these lunar occultation events. Visit <http://saberdoesthestars.wordpress.com/2011/07/05/saber-does-the-stars/> for tips on spotting extreme crescent Moons. Click on [http://www.calendar-12.com/moon\\_calendar/2018/march](http://www.calendar-12.com/moon_calendar/2018/march) for

a March lunar calendar. Times and dates for the lunar light rays predicted to occur this month are available at <http://www.lunar-occultations.com/rlo/rays/rays.htm>

The Sun is in Aquarius on March 1st at 0:00 UT. It enters Pisces on March 12th. The Sun crosses the celestial equator at 16:15 UT on March 20th, bringing spring to the northern hemisphere. At the equinox, the Sun is located in Aries and has a longitude of zero degrees.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on March 1st: Mercury (magnitude -1.3, 5.3", 93%, 1.26 a.u., Aquarius), Venus (magnitude -3.9, 10.0", 98% illuminated, 1.66 a.u., Aquarius), Mars (magnitude +0.8, 6.7", 89% illuminated, 1.40 a.u., Ophiuchus), Jupiter (magnitude -2.2, 39.1", 99% illuminated, 5.05 a.u., Libra), Saturn (magnitude +0.6, 15.9", 100% illuminated, 10.48 a.u., Sagittarius), Uranus (magnitude +5.9, 3.4", 100% illuminated, 20.73 a.u. on March 15th, Pisces), Neptune (magnitude +8.0, 2.2", 100% illuminated, 30.92 a.u. on March 15th, Aquarius), and Pluto (magnitude +14.3, 0.1", 100% illuminated, 33.96 a.u. on March 15th, Sagittarius).

In the evening, Mercury, Venus, and Uranus can be seen in the west. Jupiter is located in the southeast at midnight. Mars and Jupiter are in the south, Saturn is in the southeast, and Neptune is in the east in the morning sky.

During March, Mercury dims in brightness from magnitude -1.3 to magnitude +5.3 but grows in apparent size from 5.3 to 1.0 arc seconds. Mercury and Venus are 1.1 degrees apart on the evening of March 3rd. On March 5th, Mercury is 1.4 degrees due north of Venus. The speediest planet continues to increase its separation from Venus until it attains its greatest altitude on March 15th when it reaches greatest eastern elongation. It's situated approximately 12 degrees above the western horizon 30 minutes after the Sun sets. Mercury draws closer to Venus again as its altitude decreases after maximum elongation.

Venus shines at magnitude -3.9 for the entire month but gains only 0.5 arc second in angular diameter. By the end of March, Venus sets more than 1.5 hours after the Sun.

Mars increases in apparent size by 25%, from 6.7 arc seconds to 8.4 arc seconds, and brightens from magnitude +0.8 to magnitude +0.3, this month. Mars exits Ophiuchus and enters Sagittarius on March 12th. The Red Planet is situated halfway between M8 (the Lagoon Nebula) and M20 (the Trifid Nebula) on the morning of March 19th. Mars is at western quadrature on March 24, which results in the planet exhibiting its largest phase effect. On the morning of March 28th, Mars passes 1.3 degrees north of the seventh-magnitude globular cluster M28. It passes 0.9 degree west-northwest of the fifth-magnitude globular cluster M22 on the morning of March 31st. Mars and Saturn are about 17 degrees apart as March begins but the gap closes to less than two degrees by the end of the month. At that time, the two planets rise within one minute of each other.

Jupiter increases in brightness from magnitude -2.2 to magnitude -2.4 and grows in apparent size by 3.4 arc seconds this month. It rises about 20 minutes before midnight on March 1st. The waning gibbous Moon passes four degrees north of the planet on March 7th. On March 9th, Jupiter ceases prograde or eastern motion and then begins to retrograde through the constellation of Leo. All four of the Galilean satellites are on the same side of Jupiter on March 1st, March 11th, March 24th, and March 25th. Callisto passes due north of Jupiter on the morning of March 25th. Data on these and other Galilean satellite events is available online at <http://www.shallowsky.com/jupiter/> and <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> and on page 51 of the March 2018 issue of *Sky & Telescope*. Click on <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> or consult page 50 of the March 2018 issue of *Sky & Telescope* to determine transit times of the central meridian by the Great Red Spot.

Saturn rises around 3:30 a.m. local time as the month begins. Saturn's rings span 37 arc seconds and are inclined 26 degrees during March. The Ringed Planet can be found about two degrees north of M22 for the entire month. The waning crescent Moon passes two degrees to the north of Saturn on

March 11th. Saturn is at western quadrature on March 29th. This produces an enhanced three-dimensional effect when observing the planet. Click on <http://www.curtrenz.com/saturn> for a wealth of information on Saturn. For information on the major satellites of Saturn, browse <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/>

Uranus is located 2.3 degrees due west of the fourth-magnitude star Omicron Piscium in southeastern Pisces. The seventh planet is 25 degrees above the western horizon as darkness falls. The Moon passes 4.4 degrees south-southeast of Uranus on March 19th. Uranus and Venus undergo their closest conjunction since 2003 on March 28th.

Neptune is in conjunction with the Sun on March 4th. It rises an hour before sunrise on March 31st but won't be readily visible again until late April.

Online finder charts for Uranus can be found at <http://www.nakedeyeplanets.com/uranus.htm> and [http://www.skyandtelescope.com/wp-content/uploads/WEB\\_Uranus\\_Neptune17.pdf](http://www.skyandtelescope.com/wp-content/uploads/WEB_Uranus_Neptune17.pdf)

Click on <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> for JavaScript utilities that will illustrate the positions of the five brightest satellites of Uranus.

See <http://www.curtrenz.com/uranep.html> for additional information on Uranus.

Pluto is not a viable target this month.

For more on the planets and how to locate them, browse <http://www.nakedeyeplanets.com/>

Comet C/12016 R2 (PanSTARRS) shines between tenth and eleventh magnitude as it heads northeastward through Perseus in March. It passes less than five degrees southeast of the faint emission nebula NGC 1499 (the California Nebula) in mid-March. Visit <http://cometchasing.skyhound.com/> and <http://www.aerith.net/comet/future-n.html> for additional information on comets visible this month.

Dwarf planet/asteroid 1 Ceres dims from magnitude +7.4 to magnitude +8.0 as it loops southeastward through northern Cancer during March.

Asteroid 51 Nemausa (magnitude +10.2) occults a 11.5-magnitude star in Sextans on the morning of March 14 along a path running from New Jersey and western New York into Canada. Consult <http://asteroidoccultation.com/> for further information on the event. Asteroid 45 Eugenia (magnitude +10.8) reaches opposition in Virgo on March 18th. Asteroid 18 Melpomene (magnitude +10.2) reaches opposition in Virgo on March 21st.

A wealth of current information on solar system celestial bodies is posted at <http://www.curtrenz.com/astronomy.html> and <http://nineplanets.org/>

Various events taking place within our solar system are discussed at <http://www.bluewaterastronomy.info/styled-4/index.html>

Information on the celestial events transpiring each week can be found at <http://astronomy.com/skythisweek> and <http://www.skyandtelescope.com/observing/sky-at-a-glance/>

Free star maps for March can be downloaded at <http://www.skymaps.com/downloads.html> and <http://www.telescope.com/content.jsp?pageName=Monthly-Star-Chart>

The famous eclipsing variable star Algol (Beta Persei) is at a minimum, decreasing in magnitude from 2.1 to 3.4, on March 2nd, 5th, 8th, 11th, 14th, 17th, 20th, 22nd, 25th, 28th, and 31st. Consult <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> for the times of the eclipses. Favorable dates for observing Algol at mid-eclipse from the eastern United States include March 17th (12:50 a.m. EDT or 4:50 UT) and March 19th (9:39 p.m. EDT or 1:39 UT March

20th). For more on Algol, see <http://stars.astro.illinois.edu/sow/Algol.html> and <http://www.solstation.com/stars2/algol3.htm>

It is possible to observe all 109 (or 110) Messier objects during a single night around the time of the vernal equinox, if the Moon phase and local latitude are favorable. For information on running a so-called Messier Marathon, browse <http://messier.seds.org/xtra/marathon/marathon.html> and <http://www.richardbell.net/marathon.html>

Information on observing some of the more prominent Messier galaxies is available at <http://www.cloudynights.com/topic/358295-how-to-locate-some-of-the-major-messier-galaxies-and-helpful-advice-for-novice-amateur-astronomers/>

Finder charts for the Messier objects and other deep-sky objects are posted at <https://freestarcharts.com/messier> and <https://freestarcharts.com/ngc-7023> and [http://www.cambridge.org/features/turnleft/seasonal\\_skies\\_october-december.htm](http://www.cambridge.org/features/turnleft/seasonal_skies_october-december.htm)

Telrad finder charts for the Messier Catalog and the SAC's 110 Best of the NGC are posted at [http://www.astro-tom.com/messier/messier\\_finder\\_charts/map1.pdf](http://www.astro-tom.com/messier/messier_finder_charts/map1.pdf) and <http://www.saguaroastro.org/content/db/Book110BestNGC.pdf> respectively.

Data on current supernovae can be found at <http://www.rochesterastronomy.org/snimages/>

Deep-sky object list generators can be found at <https://dso-browser.com/> and <http://www.virtualcolony.com/sac/> and <http://tonightssky.com/MainPage.php>

Freeware sky atlases can be downloaded at <http://www.deepskywatch.com/files/deepsky-atlas/Deep-Sky-Hunter-atlas-full.pdf> and <https://www.uv.es/jrtorres/triatlas.html>

Comet information for: March 17, 2017 (New Moon).

	Constellation	Rises	Transits	Sets
C/2017 T1 (Heinze)	Aquarius	4:10 a.m.	10:09 a.m.	4:06 p.m.
C/2015 O1 (PannSTARRS)	Hercules	6:29 p.m.	4:32 a.m.	2:40 p.m.
C/2017 K6 (Jacques)	Taurus	9:41 a.m.	3:53 p.m.	10:05 p.m.
C/2017 T3 (ATLAS)	Andromeda	4:41 a.m.	1:31 p.m.	10:19 p.m.
185P/Petrew	Cetus	9:18 a.m.	3:49 p.m.	10:20 p.m.
24P/Schaumasse	Ophiuchus	11:58 p.m.	5:17 a.m.	10:36 a.m.
62P/Tsuchinshan 1	Virgo	8:41 p.m.	2:56 a.m.	9:11 a.m.
C/2016 N6 (PannSTARRS)	Draco	circumpolar	11:17 p.m.	
C/2016 M1 (PannSTARRS)	Aquila	1:54 a.m.	7:53 a.m.	1:53 p.m.
174P/Echeclus	Aries	8:33 a.m.	3:20 p.m.	10:08 p.m.
C/2016 R2 (PannSTARRS)	Perseus	8:17 a.m.	4:40 p.m.	1:05 a.m.
C/2017 O1 (ASSASSN)	Camelopardalis	circumpolar	7:45 p.m.	

For location (40°16'N 76°45'W) Hummelstown, PA, USA:

March 1:

	<b>Mercury</b>	<b>Venus</b>	<b>Mars</b>	<b>Jupiter</b>	<b>Saturn</b>	<b>Uranus</b>	<b>Neptune</b>	<b>Pluto</b>
Right ascension	23 <sup>h</sup> 27 <sup>m</sup> 43.4 <sup>s</sup>	23 <sup>h</sup> 35 <sup>m</sup> 58.2 <sup>s</sup>	17 <sup>h</sup> 17 <sup>m</sup> 46.3 <sup>s</sup>	15 <sup>h</sup> 23 <sup>m</sup> 10.0 <sup>s</sup>	18 <sup>h</sup> 30 <sup>m</sup> 43.4 <sup>s</sup>	1 <sup>h</sup> 36 <sup>m</sup> 3.9 <sup>s</sup>	23 <sup>h</sup> 0 <sup>m</sup> 50.7 <sup>s</sup>	19 <sup>h</sup> 27 <sup>m</sup> 57.4 <sup>s</sup>
Declination	-4° 20' 3"	-4° 4' 53"	-22° 48' 20"	-17° 20' 39"	-22° 22' 18"	9° 25' 42"	-7° 17' 46"	-21° 31' 47"
Range (AU)	1.254	1.662	1.398	5.039	10.469	20.583	30.933	34.140
Elongation from Sun	10.3°	12.4°	80.3°	107.7°	63.5°	45.1°	3.1°	50.2°
Brightness	-1.3	-3.8	0.8	-2.0	0.6	5.9	8.0	14.3
Equatorial Diameter	5.37"	10.04"	6.70"	39.13"	15.87"	3.42"	2.21"	0.10"
Phase Angle	32.6°	17.0°	38.4°	10.0°	5.1°	2.0°	0.1°	1.3°
Constellation	Aquarius	Aquarius	Ophiuchus	Libra	Sagittarius	Pisces	Aquarius	Sagittarius
Meridian transit	12:59	13:07	06:48	04:54	08:01	15:05	12:30	08:58
Rises	07:13	07:20	02:12	23:52	03:23	08:33	06:56	04:17
Sets	18:46	18:54	11:24	09:51	12:38	21:36	18:04	13:39
Altitude	-12.8°	-14.2°	26.1°	30.0°	21.8°	-25.4°	-9.6°	16.3°
Azimuth	84.8°	83.2°	169.0°	199.9°	151.2°	50.3°	91.5°	138.4°
% illumination	92.6	97.8	89.2	99.2	99.8	100	100	100

April 1:

	<b>Mercury</b>	<b>Venus</b>	<b>Mars</b>	<b>Jupiter</b>	<b>Saturn</b>	<b>Uranus</b>	<b>Neptune</b>	<b>Pluto</b>
Right ascension	20 <sup>h</sup> 37 <sup>m</sup> 16.9 <sup>s</sup>	21 <sup>h</sup> 38 <sup>m</sup> 54.7 <sup>s</sup>	16 <sup>h</sup> 14 <sup>m</sup> 14.1 <sup>s</sup>	15 <sup>h</sup> 17 <sup>m</sup> 0.7 <sup>s</sup>	18 <sup>h</sup> 21 <sup>m</sup> 28.1 <sup>s</sup>	1 <sup>h</sup> 32 <sup>m</sup> 40.8 <sup>s</sup>	22 <sup>h</sup> 57 <sup>m</sup> 27.5 <sup>s</sup>	19 <sup>h</sup> 24 <sup>m</sup> 59.5 <sup>s</sup>
Declination	-20° 31' 23"	-15° 31' 52"	-20° 35' 56"	-17° 1' 16"	-22° 28' 0"	9° 5' 18"	-7° 38' 40"	-21° 35' 46"
Range (AU)	1.396	1.699	1.636	5.437	10.793	20.227	30.818	34.382
Elongation from Sun	9.3°	6.5°	70.2°	84.2°	40.6°	69.2°	27.1°	25.9°
Brightness	-0.7	-3.8	1.1	-1.8	0.6	5.8	8.0	14.3
Equatorial Diameter	4.82"	9.82"	5.72"	36.26"	15.40"	3.48"	2.22"	0.10"
Phase Angle	20.7°	8.8°	35.5°	10.4°	3.7°	2.7°	0.9°	0.7°
Constellation	Capricornus	Capricornus	Scorpius	Libra	Sagittarius	Pisces	Aquarius	Sagittarius
Meridian transit	11:45	12:47	07:22	06:26	09:30	16:40	14:05	10:33
Rises	06:59	07:41	02:37	01:26	04:52	10:10	08:32	05:52
Sets	16:32	17:53	12:08	11:25	14:07	23:10	19:38	15:14
Altitude	29.2°	32.4°	3.8°	-3.6°	19.8°	18.1°	32.2°	25.9°
Azimuth	180.0°	162.3°	238.8°	250.7°	213.2°	93.4°	137.7°	198.7°
% illumination	0.5	94.1	88.0	99.6	99.8	100	100	100



For location (40°16'N 76°45'W) Hummelstown, PA, USA:

March 1:

Event	Time	Altitude	Azimuth
Minimum altitude:	00:19	-57.3°	360°
Astronomical twilight begins:	05:10	-18.0°	85°
Nautical twilight begins:	05:42	-12.0°	90°
Civil twilight begins:	06:13	-6.0°	95°
Sunrise:	06:41	-0.8°	99°
Maximum altitude:	12:20	42.3°	180°
Sunset:	17:59	-0.8°	261°
Civil twilight ends:	18:26	-6.0°	265°
Nautical twilight ends:	18:58	-12.0°	271°
Astronomical twilight ends:	19:29	-18.0°	276°

April 1:

Event	Time	Altitude	Azimuth
Minimum altitude:	01:11	-45.2°	0°
Astronomical twilight begins:	05:18	-18.0°	67°
Nautical twilight begins:	05:51	-12.0°	73°
Civil twilight begins:	06:23	-6.0°	79°
Sunrise:	06:51	-0.8°	83°
Maximum altitude:	13:11	54.4°	180°
Sunset:	19:32	-0.8°	277°
Civil twilight ends:	19:59	-6.0°	282°
Nautical twilight ends:	20:32	-12.0°	287°
Astronomical twilight ends:	21:05	-18.0°	293°

The objects listed below are located between 8:00 and 10:00 hours of right ascension.

Thirty binary and multiple stars for March: Struve 1173, Struve 1181, Struve 1187, Zeta Cancri, 24 Cancri, Phi-2 Cancri, Iota-1 Cancri, Struve 1245, Iota-2 Cancri, 66 Cancri, Struve 1327 (Cancer); Struve 1270, Epsilon Hydrae, 15 Hydrae, 17 Hydrae, Theta Hydrae, 27 Hydrae, Struve 1347, Struve 1357, Struve 1365 (Hydra); 3 Leonis, Struve 1360, 6 Leonis, Omicron Leonis (Leo); Struve 1274, Struve 1282, Struve 1333, 38 Lyncis, Struve 1369 (Lynx); h4046 (Puppis)

Notable carbon star for March: T Cancri (Cancer)

Thirty-five deep-sky objects for March: M44, M67, NGC 2775 (Cancer); Abell 33, M48, NGC 2610, NGC 2642, NGC 2811, NGC 2835, NGC 2855, NGC 2935, NGC 2992, NGC 3052, NGC 3078 (Hydra); NGC 2903, NGC 2916, NGC 2964, NGC 2968, NGC 3020 (Leo); NGC 2859, NGC 3003, NGC 3021 (Leo Minor); NGC 2683 (Lynx); NGC 2567, NGC 2571 (Puppis); M81, M82, NGC 2639, NGC 2654, NGC 2681, NGC 2685, NGC 2742, NGC 2768, NGC 2787, NGC 2841, NGC 2880, NGC 2950, NGC 2976, NGC 2985 (Ursa Major)

Top ten binocular deep-sky objects for March: M44, M48, M67, M81, M82, NGC 2571, NGC 2683, NGC 2841, NGC 2903, NGC 2976

Top ten deep-sky objects for March: M44, M48, M67, M81, M82, NGC 2654, NGC 2683, NGC 2835, NGC 2841, NGC 2903

Challenge deep-sky object for March: Abell 30 (Cancer)

Top ten binocular deep-sky objects for February: M35, M41, M46, M47, M50, M93, NGC 2244, NGC 2264, NGC 2301, NGC 2360