

## April 2018 Astronomy Calendar by Dave Mitsky

Some information supplied and/or added by Tony Donnangelo

All times are Daylight Saving Time (-4 hrs. U.T.).

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>.

- 5/1 May Day or Beltane, a cross-quarter day.
- 5/2 Comet 169P/NEAT is at opposition at 1.609 A.U.
- 5/2 Robert Wood's 150th birthday (1868)
- 5/2 The Moon is 8.9° north of the first-magnitude star Antares (Alpha Scorpii) at 7:00 a.m.
- 5/2 Venus is 6.4° north of the first-magnitude star Aldebaran (Alpha Tauri) at 2:00 p.m.
- 5/3 Comet C/2017 E3 (PANSTARRS) is at opposition at 5.365 A.U.
- 5/3 Crisium, Mare (sunset) lunar light ray predicted to occur at 2:23:28 a.m.
- 5/4 Space Day.
- 5/4 Star Wars Day.
- 5/4 Comet 37P/Forbes is at perihelion at (1.610 AU)
- 5/4 Comet 30P/Reinmuth is at opposition at 1.816 A.U.
- 5/4 Jean-Charles de Borda's 285th birthday (1733).
- 5/4 Jean-Philippe de Cheseaux's 300th birthday (1718).
- 5/4 The Moon is 1.7° north of Saturn at 4:00 p.m.
- 5/5 National Astronaut Day.
- 5/5 Homolovi State Park Star Party being held in Homolovi State Park, Arizona.
- 5/5 Albert Marth's 190th birthday (1828).
- 5/5 Eta Aquarids meteor shower (major activity - 20 per hour for northern hemisphere observers) peaks at 3:00 a.m. Duration is from 4/21 to 5/12.  
Observing and History: [http://meteorshowersonline.com/eta\\_aquarids.html](http://meteorshowersonline.com/eta_aquarids.html)
- 5/5 The Moon, Mars, and Pluto lie within a circle of diameter 4.81° at 7:00 p.m.
- 5/5 The Moon is at apogee, subtending 29' 32'' from a distance of 404,457 kilometers (251,318 miles), at 8:35 p.m.
- 5/6 Comet 107P/Wilson-Harrington is at closest approach to Earth at 1.688 A.U.
- 5/6 Grove Gilbert's 175th birthday (1843).
- 5/6 The Moon is 2.7° north of Mars at 3:00 a.m.
- 5/6 May Librids meteor shower (minor activity) peaks on 6/7. Duration is from the 1st to 9th.  
Observing and History: [http://meteorshowersonline.com/showers/may\\_librids.html](http://meteorshowersonline.com/showers/may_librids.html)
- 5/7 Comet 143P/Kowal-Mrkos is at perihelion at 2.532 A.U.
- 5/7 Comet C/2017 A1 (PANSTARRS) is at opposition at 3.787 A.U.
- 5/7 Fernelius (sunset) lunar light ray predicted to occur at 3:39:35 a.m.
- 5/7 The Moon is at descending node (longitude 309.6°) at 6:22 a.m.
- 5/7 Last Quarter Moon occurs at 10:09 p.m.
- 5/8 Comet 253P/PANSTARRS is at perihelion at 2.037 A.U.
- 5/8 Comet 254P/McNaught is at opposition at 4.181 A.U.
- 5/8 Asteroid (4) Vesta is stationary in Aquila at 6:00 a.m.
- 5/8 The Curtiss Cross, an X-shaped clair-obscur illumination effect located between the craters Parry and Gambart, is predicted to be visible at 6:33 p.m.

5/8 Asteroid (4) Vesta (magnitude +6.3) is at perihelion (2.1517 astronomical units from the Sun) at 8:00 p.m.

5/8 Jupiter is at opposition (angular size 44.8'', magnitude -2.5) at 8:00 p.m.

5/8 Eta Lyrids meteor shower (minor activity) peaks from the 8th to 10th. Duration is from the 3rd to 12th. Observing and History:  
[http://meteorshowersonline.com/showers/eta\\_lyrids.html](http://meteorshowersonline.com/showers/eta_lyrids.html)

5/9 Comet C/2016 R2 (PANSTARRS) is at perihelion at 2.602 A.U.

5/9 Epsilon Arietids meteor shower (daylight activity) peaks on 9/10. Duration is from 25th to 27th. Observing and History:  
[http://meteorshowersonline.com/showers/epsilon\\_arietids.html](http://meteorshowersonline.com/showers/epsilon_arietids.html)

5/10 Comet P/2017 B4 (PANSTARRS) is at opposition at 2.933 A.U.

5/10 Comet 260P/McNaught is at opposition at 3.169 A.U.

5/10 Comet 230P/LINEAR is at opposition at 4.175 A.U.

5/10 Augustin-Jean Fresnel's 230th birthday (1788).

5/10 The Moon is 2.1° south-southeast of Neptune at 6:00 a.m.

5/10 Jupiter is closest to the Earth (4.400 astronomical units) at 8:00 a.m.

5/11 Comet 25/5/P/Levy is at closest approach to Earth at 2.658 A.U.

5/11 Richard Feynman's 100th birthday (1918).

5/11 Royal Astronomical Society Ordinary Meeting is being held in London, United Kingdom.

5/12 Mercury is 2.0° south of Uranus at 9:00 a.m.

5/12 Comet 168P/Hergenrother is at opposition at 3.043 A.U.

5/12 John Hind's, 195/th birthday (1823).

5/12 May Piscids meteor shower (daylight activity) peaks 12/13. Duration is from 4th to 27th. Observing and History: [http://meteorshowersonline.com/showers/may\\_piscids.html](http://meteorshowersonline.com/showers/may_piscids.html)

5/13 Alexis-Claude Clairaut's 305th birthday (1713).

5/13 Mercury is at its greatest latitude south of the ecliptic plane (-7.0°) at 1:00 p.m.

5/13 The Moon, Mercury, and Uranus lie within a circle with a diameter of 4.44° at 2:00 p.m.

5/13 The Moon is 4.4° south-southeast of Uranus at 2:00 p.m.

5/13 The Moon is 2.3° south-southeast of Mercury at 3:00 p.m.

5/13 Southern May Ophiuchids meteor shower (minor activity) peaks from the 13th to 18th. Duration is from 4/21 to 6/4. Observing and History:  
[http://meteorshowersonline.com/showers/smay\\_ophiuchids.html](http://meteorshowersonline.com/showers/smay_ophiuchids.html)

5/13 The equation of time equals 3.65 minutes at 11:00 p.m.

5/14 Comet 227P/Catalina-LINEAR is at closest approach to Earth at 2.152 A.U.

5/14 Comet 348P/PANSTARRS is at opposition at 2.874 A.U.

5/14 Comet 113P/Spitaler is at opposition at 4.203 A.U.

5/14 Asteroid (16) Psyche is at is at is at closest approach to Earth at 2.238 A.U.

5/14 45th Anniversary (1973) of Skylab launch.

5/14 The Sun enters Taurus (longitude 53.46° on the ecliptic) at 3:00 a.m.

5/14 Omicron Cetids meteor shower (daylight activity) peaks 5/14 to 5/25. Duration is from 7th to 27th. Duration is from 5/7 to 6/9. Observing and History:  
[http://meteorshowersonline.com/showers/omicron\\_cetids.html](http://meteorshowersonline.com/showers/omicron_cetids.html)

5/15 Comet P/2012 O1 (McNaught) is at closest approach to Earth at 2.111 A.U.

5/15 Asteroid 203 Pompeja is at closest approach to Earth at 1.888 A.U.

5/15 55th Anniversary (1963) of Mercury 9 launch with astronaut Gordon Cooper.

5/15 Nicolas-Louis de Lacaille's 305/th Birthday (1713).

5/15 New Moon (lunation 1180) occurs at 7:48 a.m.

5/15 The Moon is 8.7° south-southeast of the bright open cluster M45 (the Pleiades or Subaru) in Taurus at 6:00 p.m.

5/15 Venus is at perihelion (0.7184 astronomical units from the Sun) at 7:00 p.m.

5/16 Comet C/2017 T1 (Heinze) is at closest approach to Earth at 1.302 A.U.

5/16 Comet 240P/NEAT is at perihelion at 2.134 A.U.

5/16 Comet 43P/Wolf-Harrington is at opposition at 3.589 A.U.

5/16 The Moon is 1.2° north of Aldebaran, with an occultation occurring in northernmost central Russia, northwestern Greenland, central and northern Canada, at 11:00 a.m.

5/16 May Arietids meteor shower (daylight activity) peaks on 16/17. Duration us from 5/4 to

6/6. Observing and History: [http://meteorshowersonline.com/showers/may\\_arietids.html](http://meteorshowersonline.com/showers/may_arietids.html)

5/17 Comet 263P/Gibbs is at closest approach to Earth at 1.658 A.U.

5/17 Comet 11P/Tempel-Swift-LINEAR is at opposition at 4.129 A.U.

5/17 Asteroid 439 Ohio is at closest approach to Earth at 2.329 A.U.

5/17 The Moon is 4.8° south of Venus at 3:00 p.m.

5/17 The Moon is at perigee, subtending 32' 51'' from a distance of 363,776 kilometers (226,040 miles), at 5:05 p.m.

5/17 Epsilon Aquilids meteor shower (minor activity) peaks on 17/18. Duration is 4th to 27th. Observing and History: [http://meteorshowersonline.com/showers/epsilon\\_aquilids.html](http://meteorshowersonline.com/showers/epsilon_aquilids.html)

5/18 Comet 66P/du Toit is at closest approach to Earth at 0.896 A.U.

5/18 Richard Tousey's 110th birthday (1908).

5/18 Omar Khayyam's 970th birthday (1048).

5/18 Northern May Ophiuchids meteor shower (minor activity) peaks on 18/19. Duration is from 4/8 to 6/16. Observing and History: [http://meteorshowersonline.com/showers/nmay\\_ophiuchids.html](http://meteorshowersonline.com/showers/nmay_ophiuchids.html)

5/19 Comet 66P/du Toit is at perihelion at 1.290 A.U.

5/19 Comet P/2010 H2 (Vales) is at closest approach to Earth at 2.256 A.U.

5/19 Comet P/2018 A4 (PANSTARRS) is at perihelion at 2.395 A.U.

5/19 Comet P/2014 U2 (Kowalski) is at opposition at 3.028 A.U.

5/19 Comet 120P/Mueller is at opposition at 4.235 A.U.

5/19 John Hayford's 150th birthday (1868).

5/19 Green Bank Observatory Single Dish Training School being held through the 23th at Green Bank, West Virginia.

5/19 The Moon is 8.0° south of the first-magnitude star Pollux (Beta Geminorum) at 9:00 a.m.

5/20 Comet 118P/Shoemaker-Levy is at opposition at 3.363 A.U.

5/20 Comet 84P/Giclas is at opposition at 3.775 A.U.

5/20 30th Anniversary (1978) of Pioneer Venus 1 launch.

5/20 The Moon is 1.4° south of the bright open cluster M44 (the Beehive Cluster or Praesepe) in Cancer at 8:00 a.m.

5/20 The Moon is at the ascending node (longitude 128.4°) at 9:15 a.m.

5/21 Glenn Curtiss' 140th birthday (1878).

5/21 Venus is 0.73° north of the bright open cluster M35 in Gemini at 6:00 a.m.

5/21 Burnham (sunrise) lunar light ray predicted to occur at 9:03:39 p.m.

5/21 Halley (sunrise) lunar light ray predicted to occur at 9:45:03 p.m.

5/21 The Moon is 1.4° north-northeast of the first-magnitude star Regulus (Alpha Leonis) at 10:00 p.m.

5/21 Hipparchus (sunrise) lunar light ray predicted to occur at 10:07:45 p.m.

5/21 The Martian northern hemisphere autumnal equinox occurs at 11:00 p.m.

5/21 First Quarter Moon occurs at 11:49 p.m.

5/21 Venus is at its greatest declination north (25.1°) at 10:00 p.m.

5/22 Mars Autumnal Equinox.

5/22 Comet 215P/NEAT is at opposition at 3.056 A.U.

5/22 David Levy's 70th birthday (1948).

5/22 The Lunar X (also known as the Werner or Purbach Cross), an X-shaped clair-obscur illumination effect involving various rims and ridges between the craters La Caille, Blanchinus, and Purbach, is predicted to be visible at 3:06 a.m.

5/22 2018 Annual Meeting of the Canadian Astronomical Society (CASCA) being held through the 26th in Victoria, Canada.

5/22 Sunrise takes place on the isolated lunar mountain Mons Pico at 12:59 p.m.

5/22 Maginus (sunrise) lunar light ray predicted to occur at 9:04:44 p.m.

5/23 Sally Ride USA postage stamp released.

5/23 Comet 24P/Schaumasse is at opposition at 1.453 A.U.

5/23 Comet 159P/LONEOS is at perihelion at 3.625/A.U.

5/23 Comet 104P/Kowal is at opposition at 4.057 A.U.

5/23 Goldschmidt (sunrise) lunar light ray predicted to occur at 2:30:34 a.m. Moonset 2:46 a.m.

5/23 Sunrise takes place on the isolated lunar mountain Mons Piton at 4:46 a.m.

5/24 Comet 107P/Wilson-Harrington is at perihelion at 0.970 A.U.  
 5/24 Comet C/2018 C2 (Lemmon) is at closest approach to Earth at 1.201 A.U.  
 5/24 Cichus A (sunrise) lunar light ray predicted to occur at 1:50:20 a.m.  
 5/25 Towel Day annual tribute to Douglas Adams.  
 5/25 Comet 5D/Brorsen is at closest approach to Earth at 2.295 A.U.  
 5/25 Comet P/2011 U2 (Bressi) is at opposition at 4.583 A.U.  
 5/25 Sinus Iridum (sunrise) lunar light ray predicted to occur at 2:30:58 a.m. Moonset 3:49 am.  
 5/25 The Moon is 7.0° north-northeast of the first-magnitude star Spica (Alpha Virginis) at 10:00 p.m.  
 5/26 Comet 234P/LINEAR is at closest approach to Earth at 2.354 A.U.  
 5/26 Comet 187P/LINEAR is at closest approach to Earth at 2.888 A.U.  
 5/26 Comet 187P/LINEAR is at opposition at 2.888 A.U.  
 5/26 Comet P/2011 U2 (Bressi) is at closest approach to Earth at 4.583 A.U.  
 5/27 Comet 255P/Levy is at opposition at 2.698 A.U.  
 5/27 Comet P/2017 G2 (PANSTARRS) is at closest approach to Earth at 2.954 A.U.  
 5/27 Comet 187P/LINEAR is at perihelion at 3.881 A.U.  
 5/27 The Moon is 3.8° north-northeast of Jupiter at 4:00 p.m.  
 5/28 Comet C/2015 VL62 is at closest approach to Earth at 2.895 A.U.  
 5/28 Comet 215P/NEAT is at closest approach to Earth at 3.051 A.U.  
 5/28 Comet 157P/Tritton is at opposition at 3.884 A.U.  
 5/28 Chi Scorpiids meteor shower (minor activity) peaks from 5/28 to 6/5. Duration is from 5/6 to 7/2. Observing and History:  
[http://meteorshersonline.com/showers/chi\\_omega\\_scorpiids.html](http://meteorshersonline.com/showers/chi_omega_scorpiids.html)  
 5/29 Full Moon, known as the Milk or Planting Moon, occurs at 10:19 a.m.  
 5/29 The Moon is 8.8° north of Antares at 3:00 p.m.  
 5/30 Comet C/2017 B3 (LINEAR) is at closest approach to Earth at 3.873 A.U.  
 5/30 Comet 144P/Kushida is at opposition at 3.888 A.U.  
 5/30 Hannes Alfvén's 100th birthday (1908).  
 5/30 Raymond Dugan's 140th birthday (1878).  
 5/30 Mercury is 4.5° south-southeast of M45 at 3:00 a.m.  
 5/31 Comet 164P/Christensen is at perihelion at 1.685 A.U.  
 5/31 Comet 227P/Catalina-LINEAR is at opposition at 2.195 A.U.  
 5/31 The Moon is 1.9° south of asteroid (4) Vesta at 9:47 a.m.

Nicolas Lacaille (1713-1762), Joseph Lockyer (1836-1920), Williamina Fleming (1857-1911), and Frank Drake (1930) were born this month.

The German astronomers Gottfried and Maria Magarethe Kirch discovered the bright globular cluster M5 on May 5, 1702. On May 1, 1759, the English amateur astronomers John Bevis and Nicholas Munckley observed Comet Halley on its first predicted return. The Italian astronomer Annibale de Gasparis discovered asteroid 14 Irene on May 19, 1851. Asteroid 14 Irene was discovered on May 19, 1851 by the English astronomer John Russell Hind. The German astronomer Robert Luther discovered asteroid 26 Proserpina on May 6, 1853. The Australian astronomer John Tebbutt discovered the Great Comet of 1861 on May 13. The English astronomer Norman Pogson discovered asteroid 80 Sappho on May 2, 1864. Norman Pogson discovered asteroid 87 Sylvia on May 16, 1866. The 40-inch Clark refractor at the Yerkes Observatory saw first light on May 21, 1897. The Griffith Observatory opened to the public on May 14, 1935. Nereid, Neptune's third-largest satellite, was discovered on May 1, 1949 by the Dutch-American astronomer Gerard Kuiper.

The broad peak of the Eta Aquarid meteor shower centered on May 6th is compromised by a waning gibbous Moon. Southern hemisphere observers are favored. Eta Aquarid meteors are debris from the famous periodic comet 1P/Halley. See <https://www.amsmeteors.org/meteor-showers/meteor-shower-calendar/> for additional information.

Information on Iridium flares and passes of the ISS, 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 14.8 days old, is illuminated 99.3%, subtends 30.6 arc minutes, and is located in Libra on May 1st at 0:00 UT. The Moon is at its greatest northern declination on May 19th (+20.5 degrees). The Moon is at its greatest its greatest southern declination on May 5th (-20.5 degrees). Longitudinal libration is at maximum (+5.5 degrees) on May 25th and at minimum (-6.6 degrees) on May 12th. Latitudinal libration is at maximum (+6.5 degrees) on May 15th and at minimum (-6.6 degrees) on May 27th. The Moon is at apogee (distance 63.41 Earth-radii) on May 6th and at perigee (distance 57.04 Earth-radii) on May 17th. New Moon occurs on May 15th. The Moon occults Aldebaran from certain parts of the world on May 16th. Consult for <http://www.lunar-occultations.com/iota/iotandx.htm> more on lunar occultations. Visit <http://saberdoesthestars.wordpress.com/2011/07/05/saber-does-the-stars/> for tips on spotting extreme crescent Moons. 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 located in Aries on May 1st. It enters Taurus on May 14th.

Brightness, apparent size, illumination, distance from the Earth in astronomical units, and location data for the planets and Pluto on May 1st: Mercury (magnitude +0.3, 7.8", 46% illuminated, 0.86 a.u., Cetus-Pisces border), Venus (magnitude -3.9, 11.5", 88% illuminated, 1.45 a.u., Taurus), Mars (magnitude -0.4, 11.1", 88% illuminated, 0.85 a.u., Sagittarius), Jupiter (magnitude -2.5, 44.7", 100% illuminated, 4.41 a.u., Libra), Saturn (magnitude +0.4, 17.5", 100% illuminated, 9.50 a.u., Sagittarius), Uranus on May 16th (magnitude +5.9, 3.4", 100% illuminated, 20.80 a.u., Aires), Neptune on May 16th (magnitude +7.9, 2.3", 100% illuminated, 30.29 a.u., Aquarius), and Pluto on May 16th (magnitude +14.2, 0.1", 100% illuminated, 32.72 a.u., Sagittarius).

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

Mercury glides eastward through the constellations of Pisces, Aries, and Taurus in May. It brightens from magnitude +0.3 to magnitude -1.6 and shrinks in apparent diameter from 7.8 arc seconds to 5.2 arc seconds over the course of the month. Mercury is just four degrees above the eastern horizon one half -hour before sunrise on May 1st and loses altitude with each passing day.

During May, Venus shines prominently in the evening sky. It increases in angular diameter from 11.5 arc minutes to 13.1 arc seconds while decreasing in illumination from 88% to 81% during the course of the month. Its altitude at sunset increases from approximately 24 degrees to 27 degrees. The brightest planet is located approximately five degrees north of Melotte 20 (the Hyades) and ten degrees east of M45 (the Pleiades) on May 1st. By May 13th, Venus lies halfway between Beta and Zeta Tauri. A thin waxing crescent Moon passes five degrees south of it on May 17th. Venus enters Gemini on May 19th. It is less than one degree from M35 on the evenings of May 20th and May 21st.

Mars doubles in brightness to magnitude -1.2 and grows in apparent size by one third to 15.1 arc seconds during May. It rises just before 1:30 a.m. local time as the month begins. At that time, Mars is situated about fifteen degrees east of Saturn in eastern Sagittarius. The waning gibbous Moon passes almost three degrees to the north of Mars on May 6th. The Red Planet passes less than one-half of a degree south of the globular cluster M75 on May 14th. The planet's prograde or direct motion takes it from Sagittarius to Capricornus on May 15th. The Martian southern hemisphere vernal equinox occurs on May 22nd. As a result, the south polar ice cap will begin to shrink. The dark triangular surface feature known as Syrtis Major is on the Martian central meridian in early May. Mare Cimmerium is prominent a week later. In the middle of the month, the volcanic Tharsis region is at the center of the planet's disk. Solis Lacus, the Eye of Mars, is on the CM by May 21st. Mars rises a bit after midnight by month's end.

On May 1st, Jupiter lies four degrees east of the third-magnitude Zubenelgenubi (Alpha Librae). By the end of the month, it is somewhat less than one degree from the star. When Jupiter reaches opposition on the night of May 8th, it will rise at sunset and set at sunrise. On that date, the gas giant shines at magnitude -2.5 and subtends 44.8 arc seconds from a position 37 light minutes distant and 16 degrees south of the celestial equator. At the time of opposition, Europa subtends 1.0 arc second, Io 1.1 arc seconds, Callisto 1.5 arc seconds, and Ganymede 1.7 arc seconds. A shadow transit by Io begins at 10:56 p.m. EDT on May 7th, followed by a transit of Io two minutes later. On the night of May 8th, Io, Europa, and Callisto lie to the east of the planet and Ganymede lies to the west. Io begins to transit Jupiter at 10:37 p.m. EDT on May 30th and is joined by its shadow at 11:07 p.m. EDT. The waxing gibbous Moon passes four degrees to the north of Jupiter on May 27th. Articles on observing Jupiter and the Great Red Spot (GRS) appear on pages 48 to 50 and pages 52 and 53 respectively of the May 2018 issue of *Sky & Telescope*. Browse <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> or

[http://www.projectpluto.com/jeve\\_grs.htm](http://www.projectpluto.com/jeve_grs.htm) in order to determine transit times of Jupiter's central meridian by the GRS. GRS transit information also appears on page 49 of the May 2018 issue of *Sky & Telescope*. Data on the Galilean satellite events is available on page 50 of the May 2018 issue of *Sky & Telescope* and online at <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/> and <http://www.projectpluto.com/jevent.htm>

At mid-month, Saturn shines at magnitude +0.3 and has an apparent equatorial diameter of 18 arc seconds. Its rings are inclined by 26 degrees and subtend 40 arc seconds. In late May, Saturn transits the meridian at about 3:00 a.m. local time. It lies less than four degrees northeast of the third-magnitude star Lambda Sagittarii and 1.7 degrees north of the bright globular cluster M22 on May 1st. The Ringed Planet's retrograde motion takes it to position 1.8 degrees northwest of M22 by the end of May. The waning gibbous Moon passes less than two degrees north of Saturn on May 4th. For further information on Saturn's satellites, browse <http://www.skyandtelescope.com/observing/interactive-sky-watching-tools/>

Uranus is 2.2 degrees south-southeast of Mercury at dawn on May 13th but is too faint to be seen.

Neptune is located one degree west of the fourth-magnitude star Phi Aquarii this month. The Moon passes two degrees south of the ice giant on the morning of May 10th. Neptune rises at about 2:00 a.m. local daylight time on May 31st.

Pluto lies in northeastern Sagittarius and transits the meridian before dawn.

Comet C/2016 R2 (PanSTARRS) passes northeastward through Auriga in May. The comet is at perihelion on May 9th. It lies some two degrees south of the first-magnitude star Capella (Alpha Aurigae) in the early part of the month. On May 21st, Comet PanSTARRS passes about two degrees north of the second-magnitude star Beta Aurigae. Visit <http://cometchasing.skyhound.com/> and <http://www.aerith.net/comet/weekly/current.html> for information on these and other comets visible this month.

The dwarf planet/asteroid 1 Ceres dims from magnitude +8.4 to magnitude +8.7 as it travels southeastward through Cancer and Leo this month. Ceres passes just south of Kappa Leonis (magnitude +4.5) on the evening of May 18th. Asteroid 4 Vesta (magnitude +6.3) is stationary on May 8th and is at perihelion on May 9th. Asteroid 472 Roma occults a 10.8-magnitude star in Serpens Caput during the early morning of May 11th and asteroid 201 Penelope occults a 9.9-magnitude star in Virgo on the night of May 21st-May 22nd for observers in certain parts of the United States. See <http://asteroidoccultation.com/> for additional information. Asteroids brighter than magnitude +11.0 that reach opposition this month include 39 Laetitia (magnitude +10.4) on May 3rd, 15 Eunomia (magnitude +9.8) on May 8th, 16 Psyche (magnitude +10.7) on May 10th, and 13 Egeria (magnitude +10.7) on May 19th.

Information on asteroid occultations taking place this month is available at [http://www.asteroidoccultation.com/2018\\_05\\_si.htm](http://www.asteroidoccultation.com/2018_05_si.htm)

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

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 May can be downloaded at <http://www.skymaps.com/downloads.html> and <https://www.telescope.com/content.jsp?pageName=Monthly-Star-Chart>

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

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

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

*Stellarium* and *Cartes du Ciel* are two excellent freeware planetarium programs that are available at <http://stellarium.org/> and <https://www.ap-i.net/skychart/en/start>

Deep-sky object list generators can be found at <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 <http://astro.mxd120.com/free-star-atlases>

Comet information for: May 15, 2017 (New Moon).

	Constellation	Rises	Transits	Sets
48P/Johnson	Capricorn	1:54 a.m.	7:03 a.m.	12:13 p.m.
c/2017 T3 (ATLAS)	Aries	5:02 a.m.	12:42 p.m.	8:22 p.m.
66/P du Toit	Pisces Austrinus	4:53 a.m.	8:28 a.m.	12:02 p.m.
29/P Schwassmann-Wachmann 1	Pisces	2:47 a.m.	8:48 a.m.	2:49 p.m.
37P/Forbes	Aquarius	2:41 a.m.	7:50 a.m.	1:00 p.m.
C/2015 O1 (PannSTARRS)	Ursa Major	circumpolar	10:41 p.m.	
185P/Petrew	Monoceros	9:50 a.m.	4:33 p.m.	11:16 p.m.
C/2016 N6 (PannSTARRS)	Lynx	circumpolar	5:24 p.m.	
C/2016 M1 (PannSTARRS)	Sagittarius	11:58 p.m.	5:06 a.m.	10:15 a.m.
C/2016 R2 (PannSTARRS)	Auriga	5:04 a.m.	3:19 p.m.	1:35 a.m.

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

May 1:

Event	Time	Altitude	Azimuth
Minimum altitude:	01:04	-34.7°	360°
Astronomical twilight begins:	04:23	-18.0°	51°
Nautical twilight begins:	05:01	-12.0°	58°
Civil twilight begins:	05:37	-6.0°	64°
Sunrise:	06:07	-0.8°	69°
Maximum altitude:	13:04	64.9°	180°
Sunset:	20:02	-0.8°	291°
Civil twilight ends:	20:32	-6.0°	296°
Nautical twilight ends:	21:08	-12.0°	302°
Astronomical twilight ends:	21:47	-18.0°	310°

June 1:

Event	Time	Altitude	Azimuth
Minimum altitude:	01:05	-27.7°	0°
Astronomical twilight begins:	03:40	-18.0°	38°
Nautical twilight begins:	04:26	-12.0°	47°
Civil twilight begins:	05:07	-6.0°	54°
Sunrise:	05:39	-0.8°	60°
Maximum altitude:	13:05	71.8°	180°
Sunset:	20:31	-0.8°	300°
Civil twilight ends:	21:03	-6.0°	306°
Nautical twilight ends:	21:44	-12.0°	313°
Astronomical twilight ends:	22:31	-18.0°	323°

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

May 1:

	Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Right ascension	0 <sup>h</sup> 56 <sup>m</sup> 39.8 <sup>s</sup>	4 <sup>h</sup> 25 <sup>m</sup> 7.8 <sup>s</sup>	19 <sup>h</sup> 42 <sup>m</sup> 20.6 <sup>s</sup>	15 <sup>h</sup> 7 <sup>m</sup> 46.2 <sup>s</sup>	18 <sup>h</sup> 37 <sup>m</sup> 49.0 <sup>s</sup>	1 <sup>h</sup> 48 <sup>m</sup> 31.3 <sup>s</sup>	23 <sup>h</sup> 8 <sup>m</sup> 30.8 <sup>s</sup>	19 <sup>h</sup> 30 <sup>m</sup> 41.2 <sup>s</sup>
Declination	2° 54' 31"	22° 32' 29"	-22° 42' 38"	-16° 15' 4"	-22° 15' 48"	10° 37' 17"	-6° 31' 23"	-21° 31' 12"
Range (AU)	0.869	1.447	0.840	4.412	9.492	20.874	30.504	33.196
Elongation from Sun	26.9°	27.2°	107.5°	171.8°	122.2°	12.0°	55.3°	109.9°
Brightness	0.4	-3.8	-0.4	-2.4	0.3	5.9	7.9	14.2
Equatorial Diameter	7.74"	11.53"	11.15"	44.69"	17.51"	3.38"	2.24"	0.10"
Phase Angle	93.7°	39.9°	40.1°	1.5°	4.9°	0.6°	1.6°	1.6°
Constellation	Pisces	Taurus	Sagittarius	Libra	Sagittarius	Aries	Aquarius	Sagittarius
Meridian transit	11:26	14:54	06:12	01:39	05:08	12:17	09:38	06:01
Rises	05:16	07:32	01:35	20:32	00:30	05:42	04:01	01:19
Sets	17:36	22:17	10:48	06:40	09:46	18:53	15:15	10:42
Altitude	52.6°	43.0°	-6.4°	-52.9°	-17.7°	58.3°	36.9°	-7.7°



	<b>Mercury</b>	<b>Venus</b>	<b>Mars</b>	<b>Jupiter</b>	<b>Saturn</b>	<b>Uranus</b>	<b>Neptune</b>	<b>Pluto</b>
Azimuth	180.2°	95.9°	245.6°	300.8°	255.5°	155.5°	214.6°	248.2°
% illumination	46.1	88.4	88.2	100	99.8	100	100	100

June 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	4 <sup>h</sup> 15 <sup>m</sup> 48.6 <sup>s</sup>	7 <sup>h</sup> 8 <sup>m</sup> 36.5 <sup>s</sup>	20 <sup>h</sup> 33 <sup>m</sup> 52.2 <sup>s</sup>	14 <sup>h</sup> 52 <sup>m</sup> 36.1 <sup>s</sup>	18 <sup>h</sup> 31 <sup>m</sup> 57.4 <sup>s</sup>	1 <sup>h</sup> 54 <sup>m</sup> 45.1 <sup>s</sup>	23 <sup>h</sup> 10 <sup>m</sup> 31.8 <sup>s</sup>	19 <sup>h</sup> 29 <sup>m</sup> 12.5 <sup>s</sup>
Declination	21° 17' 46"	24° 25' 26"	-21° 46' 27"	-15° 14' 41"	-22° 21' 14"	11° 11' 35"	-6° 20' 1"	-21° 37' 12"
Range (AU)	1.310	1.266	0.607	4.473	9.147	20.647	30.015	32.786
Elongation from Sun	5.2°	34.6°	125.7°	154.2°	153.6°	40.4°	84.9°	140.4°
Brightness	-1.7	-3.9	-1.2	-2.3	0.2	5.9	7.9	14.2
Equatorial Diameter	5.13"	13.19"	15.44"	44.07"	18.17"	3.41"	2.28"	0.10"
Phase Angle	17.0°	53.2°	34.5°	4.7°	2.6°	1.9°	1.9°	1.1°
Constellation	Taurus	Gemini	Capricornus	Libra	Sagittarius	Aries	Aquarius	Sagittarius
Meridian transit	12:41	15:34	05:01	23:17	03:00	10:22	07:38	03:57
Rises	05:23	08:03	00:21	18:12	22:18	03:44	02:00	23:12
Sets	20:00	23:05	09:41	04:27	07:38	16:59	13:15	08:38
Altitude	37.3°	69.6°	-70.8°	-17.9°	-62.7°	4.4°	-37.3°	-69.5°
Azimuth	267.3°	223.5°	342.7°	95.1°	56.4°	280.9°	297.6°	27.7°
% illumination	97.1	80.2	91.1	99.8	99.9	100	100	100

The objects listed below are located between 12:00 and 14:00 hours of right ascension.

Eighty binary and multiple stars for May: 1 Bootis, Struve 1782, Tau Bootis, Struve 1785, Struve 1812 (Bootes); 2 Canum Venaticorum, Struve 1624, Struve 1632, Struve 1642, Struve 1645, 7 Canum Venaticorum, Alpha Canum Venaticorum (Cor Caroli), h2639, Struve 1723, 17 Canum Venaticorum, Otto Struve 261, Struve 1730, Struve 1555, h1234, 25 Canum Venaticorum, Struve 1769, Struve 1783, h1244 (Canes Venatici); 2 Comae Berenices, Struve 1615, Otto Struve 245, Struve 1633, 12 Comae Berenices, Struve 1639, 24 Comae Berenices, Oto Struve 253, Struve 1678, 30 Comae Berenices, Struve 1684, Struve 1685, 35 Comae Berenices, Burnham 112, h220, Struve 1722, Beta Comae Berenices, Burnham 800, Otto Struve 266, Struve 1748 (Coma Berenices); h4481, h4489, Struve 1604, Delta Corvi, Burnham 28, h1218, Struve 1669 (Corvus); H N 69, h4556 (Hydra); Otto Struve 244, Struve 1600, Struve 1695, Zeta Ursae Majoris (Mizar), Struve 1770, Struve 1795, Struve 1831 (Ursa Major); Struve 1616, Struve 1627, 17 Virginis, Struve 1648, Struve 1658, Struve 1677, Struve 1682, Struve 1689, Struve 1690, 44 Virginis, Struve 1719, Theta Virginis, 54 Virginis, Struve 1738, Struve 1740, Struve 1751, 81 Virginis, Struve 1764, Struve 1775, 84 Virginis, Struve 1788 (Virgo)

Notable carbon star for May: SS Virginis

One hundred and sixty-five deep-sky objects for May: NGC 5248 (Bootes); M3, M51, M63, M94, M106, NGC 4111, NGC 4138, NGC 4143, NGC 4151, NGC 4214, NGC 4217, NGC 4244, NGC 4346, NGC 4369, NGC 4449, NGC 4485, NGC 4490, NGC 4618, NGC 4631, NGC 4656, NGC 4868, NGC 5005, NGC 5033, NGC 5297, NGC 5353, NGC 5354, Up 1 (Canes Venatici); Mel 111, M53, M64, M85, M88, M91, M98, M99, M100, NGC 4064, NGC 4150, NGC 4203, NGC 4212, NGC 4251, NGC 4274, NGC 4278, NGC 4293, NGC 4298, NGC 4302, NGC 4314, NGC 4350, NGC 4414, NGC 4419, NGC 4448, NGC 4450, NGC 4459, NGC 4473, NGC 4474, NGC 4494, NGC 4559, NGC 4565, NGC 4651, NGC 4689, NGC 4710, NGC 4725, NGC 4874, NGC 5053 (Coma Berenices); NGC 4027, NGC 4038-9, NGC 4361 (Corvus); M68, M83, NGC 4105, NGC 4106, NGC 5061, NGC 5101, NGC 5135 (Hydra); M40,

NGC 4036, NGC 4041, NGC 4051, NGC 4062, NGC 4085, NGC 4088, NGC 4096, NGC 4100, NGC 4144, NGC 4157,  
NGC 4605, NGC 5308, NGC 5322 (Ursa Major); M49, M58, M59, M60, M61, M84, M86, M87, M89, M90, M104,  
NGC 4030, NGC 4073, NGC 4168, NGC 4179, NGC 4206, NGC 4215, NGC 4216, NGC 4224, NGC 4235, NGC 4260,  
NGC 4261, NGC 4267, NGC 4281, NGC 4339, NGC 4343, NGC 4365, NGC 4371, NGC 4378, NGC 4380, NGC 4387,  
NGC 4388, NGC 4402, NGC 4429, NGC 4435, NGC 4438, NGC 4517, NGC 4526, NGC 4535, NGC 4536, NGC 4546,  
NGC 4550, NGC 4551, NGC 4567, NGC 4568, NGC 4570, NGC 4593, NGC 4596, NGC 4636, NGC 4638, NGC 4639,  
NGC 4643, NGC 4654, NGC 4666, NGC 4697, NGC 4698, NGC 4699, NGC 4753, NGC 4754, NGC 4760, NGC 4762,  
NGC 4866, NGC 4900, NGC 4958, NGC 5044, NGC 5054, NGC 5068, NGC 5077, NGC 5084, NGC 5087, NGC 5147,  
NGC 5170, NGC 5247, NGC 5363, NGC 5364 (Virgo)

Top ten deep-sky objects for May: M3, M51, M63, M64, M83, M87, M104, M106, NGC 4449, NGC 4565

Top ten deep-sky binocular objects for May: M3, M51, M63, M64, M84, M86, M87, M104, M106,  
M61 111

Challenge deep-sky object for May: 3C 273 (Virgo)