ASTRONOMICAL CALENDAR 2019

The left column gives **Julian Dates** (number of days from 4713 B.C. Jan. 1 noon), useful for finding time spans between events by subtraction. The first 3 digits of the Julian date (245) are omitted.

Hours and minutes, where given, are in Universal Time.

Occasions such as "Moon 1.25° N.N.E. of Venus" are **appulses**: closest apparent approaches. They are slightly different from **conjunctions**, when one passes north of the other as measured in right ascension or in ecliptic longitude. A **quasi-conjunction** is an appulse without a conjunction, and typically happens when a planet is near its stationary moment.

For **meteor showers**: ZHR (zenithal hourly rate) is an estimate of the number to be seen under ideal conditions at the peak time if the radiant were overhead; actual rates may be very different. Peak times (predicted from where the center of the stream seems to cross Earth's orbit) are uncertain; best to start watching the night before. Meteor are usually most abundant in the morning hours.

Tell me of erros you notice. They're inevitable, but more easily corrected here than in the former printed *Astronomical Calendars*!

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This calendar may be subject to improvement. Come back to it!

Explanation of terms can be found in our glossary book ***Albedo to Zodiac***. There is more about each topic in ***The Astronomical Companion***. And events in this list can be traced in the large ***Zodiac Wavy Chart*** for the year. For all these, see **universalworkshop.com**

8485.458	Jan 1 Tue	23	Moon 1.25° N.N.E. of Venus; 47° from the Sun in the morning sky
8485.482		24	Mercury at descending node through the ecliptic plane
8485.529	2 Wed	1	Mars crosses equator northward
8485.748		6	Saturn at conjunction with the Sun
8486.627	3 Thu	3	**Earth at perihelion**; 0.9833 AU from the Sun
8486.708		5	Moon 8.4° N.N.E. of Antares; 32° and 33° from the Sun in the morning sky
8486.896		10	Moon 3.1° N.N.E. of Jupiter; 30° from the Sun in the morning sky
8487.350		20	**Quadrantid meteors**; ZHR 110; 2 days before New
8488.271	4 Fri	19	Moon 2.76° N. of Mercury; 15° from the Sun in the morning sky
8488.807	5 SAT	7:22	Latest sunrise, at latitude 40° north
8489.292		19	Moon 0.88° N. of Saturn; 3° from the Sun in the morning sky
8489.300		19	Venus dichotomy (D-shape)
8489.562	6 SUN	1:29	**New Moon**; beginning of lunation 1188. Partial eclipse of the Sun
8489.691		5	**Venus at westernmost elongation**; 46.9° from Sun in morning sky

8490.269			18	Uranus stationary in longitude; resumes direct motion
8490.507	7	Mon	0	Moon at descending node; longitude 296.7°
8490.514			0	Uranus stationary in right ascension; resumes direct motion
8491.125			15	Moon shows minimum libration for the year, 1.22°
8492.680	9	Wed	4	Moon at apogee; distance 63.67 Earth-radii
8494.244	10	Thu	18	Mercury at southernmost declination, -24.15°
8494.542	11	Fri	1	Moon 2.96° S.S.E. of Neptune; 54° from the Sun in the evening sky
8494.725			5	Pluto at conjunction with the Sun
8495.851	12	SAT	8	Mercury at aphelion, 0.4667 AU from the Sun
8496.521	13	SUN	1	Moon 5.0° S.S.E. of Mars; 76° from the Sun in the evening sky
8497.000			12	Mercury 1.72° S. of Saturn; 10° from the Sun in the morning sky; magnitudes -0.6 and 0.5
8497.781	14	Mon	6:45	**First Quarter Moon**
8498.188			17	Moon 4.8° S.S.E. of Uranus; 95° and 94° from the Sun in the evening sky
8498.708	15	Tue	5	Mars at ascending node through the ecliptic plane
8500.458	16	Wed	23	Venus 7.8° N. of Antares; 47° from the Sun in the morning sky; magnitudes -4.4 and 1.0
8500.604	17	Thu	3	Moon 8.5° S.S.E. of the Pleiades; 124° and 123° from the Sun in the evening sky
8500.641			3	Middle of eclipse season: Sun is at same longitude as Moon's descending node, 296.7°
8500.840			8	Venus at northernmost latitude from the ecliptic plane, 3.4°
8501.271			19	Moon 1.63° N. of Aldebaran; 133° and 132° from the Sun in the evening sky
8502.313	18	Fri	20	Mercury 1.53° S. of Pluto; 7° from the Sun in the morning sky; magnitudes -0.8 and 14.3
8502.561	19	SAT	1	Uranus at east quadrature, 90° from the Sun
8503.596	20	SUN	2	Sun enters Capricornus, at longitude 299.71° on the ecliptic
8503.877			9	Sun enters the astrological sign Aquarius, i.e. its longitude is 300°
8504.271			19	Moon 7.0° S. of Pollux; 174° and 170° from the Sun in the midnight sky
8504.450			23	Moon at ascending node; longitude 116.8°
8504.719	21	Mon	5:16	**Full Moon. Total eclipse of the Moon**
8505.333			20:00	Perigee only 14.7 hours after Full Moon
8505.333			20:00	Moon at perigee; distance 56.03 Earth-radii
8506.167	22	Tue	16	Venus 2.41° N. of Jupiter; 46° from the Sun in the morning sky; magnitudes -4.3 and -1.8
8506.646	23	Wed	4	Moon 2.46° N.N.E. of Regulus; 153° from the Sun in the morning sky
8510.375	26	SAT	21	Moon 7.3° N.N.E. of Spica; 103° from the Sun in the morning sky
8511.208	27	SUN	17	Moon shows maximum libration for the year, 10.11°
8511.383			21:11	**Last Quarter Moon**

8513.607	30	Wed	3	Mercury at superior conjunction with the Sun; 1.407 AU from Earth; latitude -6.93°
8513.938			11	Moon 8.4° N.N.E. of Antares; 60° and 61° from the Sun in the morning sky
8514.563	31	Thu	2	Moon 2.74° N.N.E. of Jupiter; 53° from the Sun in the morning sky
8515.250			18	Moon 0.19° E.N.E. of Venus; 45° from the Sun in the morning sky
8516.111	Feb 1	Fri	15	Mercury at southernmost latitude from the ecliptic plane, -7.0°
8516.5	2	SAT		Ground Hog Day
8516.813			8	Moon 0.65° N.N.E. of Saturn; 28° from the Sun in the morning sky
8517.775	3	SUN	7	Moon at descending node; longitude 296.8°
8519.378	4	Mon	21:04	**New Moon**; beginning of lunation 1189
8519.813	5	Tue	8	Moon 0.23° S.E. of Mercury; 5° from the Sun in the evening sky
8519.894			9	Moon at apogee; distance 63.74 Earth-radii; farthest in year
8521.875	7	Thu	9	Moon 2.98° S.S.E. of Neptune; 27° from the Sun in the evening sky
8522.780	8	Fri	7	Alpha Centaurid meteors; ZHR 6; 3 days after New
8525.350	10	SUN	20	Moon, Mars, and Uranus within circle of diameter 5.68°; 66° east of the Sun
8525.396			22	Moon 5.7° S.S.E. of Mars; 66° from the Sun in the evening sky
8525.521	11	Mon	1	Moon 4.7° S.S.E. of Uranus; 68° and 67° from the Sun in the evening sky
8526.153			16	The equation of time is at a minimum of -14.24 minutes.
8527.434	12	Tue	22:25	**First Quarter Moon**
8527.750	13	Wed	6	Mars 0.98° N.N.W. of Uranus; 65° from the Sun in the evening sky; magnitudes 1.0 and 5.8
8527.958			11	Moon 8.4° S.S.E. of the Pleiades; 96° from the Sun in the evening sky
8528.5	14	Thu		St. Valentine's Day
8528.646			4	Moon 1.68° N. of Aldebaran; 105° from the Sun in the evening sky
8531.370	16	SAT	21	Sun enters Aquarius, at longitude 327.89° on the ecliptic
8531.750	17	SUN	6	Moon 7.0° S. of Pollux; 146° and 144° from the Sun in the evening sky
8531.904			10	Moon at ascending node; longitude 116.5°
8533.042	18	Mon	13	Venus 1.08° N. of Saturn; 43° from the Sun in the morning sky; magnitudes -4.1 and 0.7
8533.464			23	Sun enters the astrological sign Pisces, i.e. its longitude is 330°
8533.750	19	Tue	6	Mercury 0.67° N.N.W. of Neptune; 15° from the Sun in the evening sky; magnitudes -1.0 and 8.0

8533.869			8:51	Perigee only 7.0 hours before Full Moon
8533.869			8:51	Moon at perigee; distance 55.94 Earth-radii; nearest in year
8534.104			15	Moon 2.41° N.N.E. of Regulus; 177° and 179° from the Sun in the midnight sky
8534.162			15:53	**Full Moon**
8535.167	20	Wed	16	Mercury at ascending node through the ecliptic plane
8537.5	23	SAT	0	Venus, Saturn, and Pluto within circle of diameter 5.13°; 44° west of the Sun
8537.750			6	Venus 1.40° N. of Pluto; 42° from the Sun in the morning sky; magnitudes -4.1 and 14.3
8537.750			6	Moon 7.2° N.N.E. of Spica; 130° from the Sun in the morning sky
8537.970			11	Mars and Jupiter at heliocentric opposition; longitudes 71.0° and 251.0°
8539.835	25	Mon	8	Mercury at perihelion, 0.3075 AU from the Sun
8540.978	26	Tue	11:29	**Last Quarter Moon**
8541.208			17	Moon 8.3° N.N.E. of Antares; 87° and 88° from the Sun in the morning sky
8541.552	27	Wed	1	**Mercury at easternmost elongation**; 18.1° from Sun in evening sky
8542.146			16	Moon 2.31° N.N.E. of Jupiter; 77° from the Sun in the morning sky

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8544.292	Mar 1	Fri	19	Moon 0.40° N.E. of Saturn; 53° from the Sun in the morning sky
8544.642	2	SAT	3	**Moon, Saturn, and Pluto within circle of diameter 4.67°**; 50° west of the Sun
8544.960			11	Moon at descending node; longitude 296.0°
8545.438			23	Moon 1.23° S.S.E. of Venus; 40° and 41° from the Sun in the morning sky
8546.976	4	Mon	11	Moon at apogee; distance 63.72 Earth-radii
8547.723	5	Tue	5	Mercury stationary in right ascension; starts retrograde motion
8548.259			18	Mercury stationary in longitude; starts retrograde motion
8548.5	6	Wed		Ash Wednesday
8549.170			16:04	**New Moon**; beginning of lunation 1190
8549.208			17	Moon 2.99° S.S.E. of Neptune; 4° and 1° from the Sun in the evening sky
8549.546	7	Thu	1	Neptune at conjunction with the Sun
8550.046			13	Mercury at northernmost latitude from the ecliptic plane, 7.0°
8550.292			19	Moon 7.9° S.S.E. of Mercury; 13° from the Sun in the evening sky
8552.5	10	SUN		Clocks forward 1 hour (America)
8552.833			8	Moon 4.6° S.S.E. of Uranus; 41° from the Sun in the evening sky
8554.188	11	Mon	17	Moon 5.5° S.S.E. of Mars; 57° and 56° from the Sun in the evening sky

8554.956	12	Tue	11	Sun enters Pisces, at longitude 351.57° on the ecliptic
8555.208			17	Moon 8.2° S.S.E. of the Pleiades; 69° and 68° from the Sun in the evening sky
8555.917	13	Wed	10	Moon 1.86° N. of Aldebaran; 77° from the Sun in the evening sky
8556.5	14	Thu		Gamma Normid meteors; ZHR 6; near First Quarter
8556.561			1	Jupiter at west quadrature, 90° from the Sun
8556.895			9	Venus at descending node through the ecliptic plane
8556.935			10:26	**First Quarter Moon**
8557.570	15	Fri	2	Mercury at inferior conjunction with the Sun; 0.618 AU from Earth; latitude 5.70°
8559.125	16	SAT	15	Moon 6.8° S. of Pollux; 118° and 117° from the Sun in the evening sky
8559.183			16	Moon at ascending node; longitude 114.9°
8559.5	17	SUN		St. Patrick's Day
8561.563	19	Tue	2	Moon 2.46° N.N.E. of Regulus; 152° from the Sun in the evening sky
8562.316			19:35	Moon at perigee; distance 56.34 Earth-radii
8563.417	20	Wed	22:01	**March or spring or vernal equinox**
8563.417			22:01	Sun enters the astrological sign Aries, i.e. its longitude is 0°
8563.571	21	Thu	1:42	**Full Moon**
8565.188	22	Fri	17	Moon 7.1° N.N.E. of Spica; 157° and 158° from the Sun in the morning sky
8565.403			22	Spring equinox on Mars
8568.563	26	Tue	2	Moon 8.1° N.N.E. of Antares; 114° and 115° from the Sun in the morning sky
8569.646	27	Wed	4	Moon 1.91° N.N.E. of Jupiter; 102° from the Sun in the morning sky
8569.985			12	Mercury stationary in right ascension; resumes direct motion
8570.674	28	Thu	4:10	**Last Quarter Moon**
8571.079			14	Mercury stationary in longitude; resumes direct motion
8571.729	29	Fri	6	Moon 0.25° E. of Saturn; 78° and 79° from the Sun in the morning sky
8572.047			13	Moon at descending node; longitude 293.7°
8573.451	30	SAT	23	Mercury at descending node through the ecliptic plane
8573.792	31	SUN	7	Mars 3.1° S.S.E. of the Pleiades; 50° from the Sun in the evening sky; magnitudes 1.4 and 2.9

8574.5	Apr 1	Mon		All Fools' Day
8574.508			0	Moon at apogee; distance 63.59 Earth-radii
8575.771	2	Tue	7	Moon 2.55° S.S.E. of Venus; 35° and 34° from the Sun in the morning sky
8576.354			21	Mercury 0.38° N. of Neptune; 25° and 26° from the Sun in the morning sky; magnitudes 0.8 and 8.0
8576.558	3	Wed	1	**Moon, Mercury, and Neptune within circle of diameter 3.39°**; 26° west of the Sun

8576.563			2	Moon 3.1° S.S.E. of Neptune; 26° from the Sun in the morning sky
8576.583			2	Moon 3.4° S.S.E. of Mercury; 26° from the Sun in the morning sky
8578.869	5	Fri	8:51	**New Moon**; beginning of lunation 1191
8580.208	6	SAT	17	Moon 4.5° S.S.E. of Uranus; 16° and 15° from the Sun in the evening sky
8582.438	8	Mon	23	Moon 8.0° S.S.E. of the Pleiades; 42° and 41° from the Sun in the evening sky
8582.896	9	Tue	10	Moon 4.6° S.S.E. of Mars; 48° and 47° from the Sun in the evening sky
8583.146			16	Moon 2.09° N. of Aldebaran; 51° from the Sun in the evening sky
8583.372			21	Jupiter at southernmost declination, -22.68°
8583.692	10	Wed	5	Mercury, Venus, and Neptune within circle of diameter 5.15°; 31° west of the Sun
8583.771			7	Venus 0.29° S.S.E. of Neptune; 33° from the Sun in the morning sky; magnitudes -3.9 and 8.0
8583.820			8	Mercury at aphelion, 0.4667 AU from the Sun
8583.864			9	Saturn at west quadrature, 90° from the Sun
8584.178			16	Jupiter stationary in longitude; starts retrograde motion
8584.179			16	Jupiter stationary in right ascension; starts retrograde motion
8585.314	11	Thu	20	**Mercury at westernmost elongation**; 27.7° from Sun in morning sky
8586.257	12	Fri	18	Moon at ascending node; longitude 112.0°
8586.295			19:05	**First Quarter Moon**
8586.396			22	Moon 6.6° S. of Pollux; 91° from the Sun in the evening sky
8587.5	14	SUN		Palm Sunday.
8588.521	15	Mon	1	Mars 6.5° N. of Aldebaran; 45° from the Sun in the evening sky; magnitudes 1.5 and 0.9
8588.917			10	Moon 2.63° N.N.E. of Regulus; 125° from the Sun in the evening sky
8589.400			22	The equation of time is 0.
8590.313	16	Tue	20	Mercury 4.3° E. of Venus; 27° and 31° from the Sun in the morning sky; magnitudes 0.2 and -3.9; quasi-conjunction
8590.419			22:03	Moon at perigee; distance 57.10 Earth-radii
8591.603	18	Thu	2	Venus at aphelion, 0.7282 AU from the Sun
8592.5	19	Fri		Good Friday
8592.625			3	Moon 7.1° N.N.E. of Spica; 173° and 175° from the Sun in the midnight sky
8592.938			11	Sun enters Aries, at longitude 29.09° on the ecliptic
8592.966			11:11	**Full Moon**
8593.872	20	SAT	9	Sun enters the astrological sign Taurus, i.e. its longitude is 30°
8594.5	21	SUN		Easter

8595.958	22 Mon	11	Moon 7.9° N.N.E. of Antares; 141° and 142° from the Sun in the morning sky
8596.251		18	Lyrid meteors; ZHR 18; 3 days after Full
8596.466		23	Uranus at conjunction with the Sun
8596.5	23 Tue		Pi Puppid meteors; ZHR 10; 3 days before Last Quarter
8597.021		13	Moon 1.66° N.N.E. of Jupiter; 129° from the Sun in the morning sky
8597.698	24 Wed	5	Pluto stationary in longitude; starts retrograde motion
8598.370		21	Pluto stationary in right ascension; starts retrograde motion
8599.125	25 Thu	15	Moon 0.45° S.E. of Saturn; 104° and 105° from the Sun in the morning sky
8599.126		15	Moon at descending node; longitude 290.7°
8600.429	26 Fri	22:18	**Last Quarter Moon**
8601.5	28 SUN		Clocks forward 1 hour (Europe)
8602.267		18	Moon at apogee; distance 63.43 Earth-radii
8603.499	29 Mon	24	Saturn stationary in longitude; starts retrograde motion
8603.564	30 Tue	2	Saturn stationary in right ascension; starts retrograde motion
8603.958		11	Moon 3.3° S.S.E. of Neptune; 52° from the Sun in the morning sky
8604.080		14	Mercury at southernmost latitude from the ecliptic plane, -7.0°

8605.708	May 2 Thu	5	Saturn 2.71° W. of Pluto; 111° and 109° from the Sun in the morning sky; magnitudes 0.5 and 14.3; quasi-conjunction
8606.125		15	Moon 3.4° S.S.E. of Venus; 28° and 27° from the Sun in the morning sky
8606.896	3 Fri	10	Moon 2.73° S.S.E. of Mercury; 19° from the Sun in the morning sky
8607.096		14	Mars and Saturn at heliocentric opposition; longitudes 105.2° and 285.2°
8607.625	4 SAT	3	Moon 4.4° S.S.E. of Uranus; 11° and 10° from the Sun in the morning sky
8608.449		22:46	**New Moon**; beginning of lunation 1192
8609.5	6 Mon		1st day of Ramadan (1440 A.H.)
8609.5			**Eta Aquarid meteors**; ZHR 50; 1 day after New
8609.708		5	Moon 7.9° S.S.E. of the Pleiades; 16° and 15° from the Sun in the evening sky
8610.396		22	Moon 2.23° N. of Aldebaran; 24° from the Sun in the evening sky
8611.5	8 Wed		Eta Lyrid meteors; ZHR 3; 3 days before First Quarter
8611.542		1	Moon 3.2° S.S.E. of Mars; 38° from the Sun in the evening sky
8612.167		16	Mercury 1.26° S.S.E. of Uranus; 14° from the Sun in the morning sky; magnitudes -0.8 and 5.9
8613.286	9 Thu	19	Moon at ascending node; longitude 109.3°

8613.625	10	Fri	3	Moon 6.3° S. of Pollux; 65° and 64° from the Sun in the evening sky
8613.742			6	Venus at southernmost latitude from the ecliptic plane, -3.4°
8615.550	12	SUN	1:12	**First Quarter Moon**
8616.188			17	Moon 2.88° N.N.E. of Regulus; 98° from the Sun in the evening sky
8617.412	13	Mon	21:54	Moon at perigee; distance 57.86 Earth-radii
8617.876	14	Tue	9	The equation of time is at a maximum of 3.65 minutes.
8618.053			13	Sun enters Taurus, at longitude 53.47° on the ecliptic
8619.979	16	Thu	12	Moon 7.1° N.N.E. of Spica; 148° from the Sun in the evening sky
8620.435			22	Mars at northernmost declination, 24.56°
8622.208	18	SAT	17	Venus 1.08° S.S.E. of Uranus; 23° from the Sun in the morning sky; magnitudes -3.9 and 5.9
8622.382			21:10	**Full Moon**
8623.136	19	SUN	15	Mercury at ascending node through the ecliptic plane
8623.354			21	Moon 7.8° N.N.E. of Antares; 167° and 168° from the Sun in the morning sky
8624.250	20	Mon	18	Moon 1.71° N.N.E. of Jupiter; 157° from the Sun in the morning sky
8624.833	21	Tue	8	Sun enters the astrological sign Gemini, i.e. its longitude is 60°
8625.038			13	Mercury at superior conjunction with the Sun; 1.322 AU from Earth; latitude 1.42°
8625.104			15	Mercury 3.7° S.S.E. of the Pleiades; 0° and 4° from the Sun in the evening sky; magnitudes -2.3 and 2.9
8626.300	22	Wed	19	Moon at descending node; longitude 288.5°
8626.458			23	**Moon, Saturn, and Pluto within circle of diameter 2.94°**; 130° west of the Sun
8626.458			23	Moon 0.63° S.E. of Saturn; 131° from the Sun in the morning sky
8627.805	24	Fri	7	Mercury at perihelion, 0.3075 AU from the Sun
8629.229	25	SAT	18	Mercury 6.5° N.N.W. of Aldebaran; 5° and 8° from the Sun in the evening sky; magnitudes -1.8 and 0.9
8630.059	26	SUN	13	Moon at apogee; distance 63.36 Earth-radii
8630.190			16:33	**Last Quarter Moon**
8631.333	27	Mon	20	Moon 3.5° S.S.E. of Neptune; 78° from the Sun in the morning sky
8635.083	31	Fri	14	Moon 4.5° S.S.E. of Uranus; 35° from the Sun in the morning sky

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8636.375	Jun 1	SAT	21	Moon 3.1° S.S.E. of Venus; 20° from the Sun in the morning sky
8637.042	2	SUN	13	Moon 7.9° S.S.E. of the Pleiades; 12° from the Sun in the morning sky
8637.729	3	Mon	6	Moon 2.27° N. of Aldebaran; 4° and 6° from the Sun in the morning sky
8637.918			10:02	**New Moon**; beginning of lunation 1193

8638.015			12	Mercury at northernmost latitude from the ecliptic plane, 7.0°
8639.208	4	Tue	17	Moon 3.7° S. of Mercury; 17° and 16° from the Sun in the evening sky
8640.146	5	Wed	16	Moon 1.60° S. of Mars; 29° from the Sun in the evening sky
8640.372			21	Mercury at northernmost declination, 25.50°
8640.450			23	Moon at ascending node; longitude 107.9°
8640.896	6	Thu	10	Moon 6.2° S. of Pollux; 39° and 38° from the Sun in the evening sky
8641.5	7	Fri		Daytime Arietid meteors; ZHR 30; 3 days before First Quarter
8642.469			23:16	Moon at perigee; distance 57.78 Earth-radii
8643.396	8	SAT	22	Moon 3.0° N.N.E. of Regulus; 72° from the Sun in the evening sky
8643.5	9	SUN		Whit Sunday
8643.688			5	Venus 5.1° S.S.E. of the Pleiades; 18° and 19° from the Sun in the morning sky; magnitudes -3.9 and 2.9
8644.750	10	Mon	5:59	**First Quarter Moon**
8645.138			15	**Jupiter at opposition**; magnitude -2.6
8647.250	12	Wed	18	Moon 7.3° N.N.E. of Spica; 123° and 122° from the Sun in the evening sky
8647.899	13	Thu	10	The equation of time is 0.
8648.688	14	Fri	4:31	Earliest sunrise, at latitude 40° north
8650.688	16	SUN	5	Moon 7.8° N.N.E. of Antares; 166° and 164° from the Sun in the evening sky
8651.333			20	Moon 1.99° N.N.E. of Jupiter; 173° from the Sun in the midnight sky
8651.479			24	Venus 4.7° N. of Aldebaran; 16° and 17° from the Sun in the morning sky; magnitudes -3.9 and 0.9
8651.854	17	Mon	8:30	**Full Moon**
8653.271	18	Tue	19	Mercury 0.22° N.N.E. of Mars; 24° from the Sun in the evening sky; magnitudes 0.2 and 1.8
8653.577	19	Wed	2	Moon at descending node; longitude 287.6°
8653.688			5	Moon 0.56° S.E. of Saturn; 159° from the Sun in the morning sky
8654.063			14	Mercury 5.4° S.S.W. of Pollux; 25° and 26° from the Sun in the evening sky; magnitudes 0.3 and 1.2
8655.833	21	Fri	8	Mars 5.5° S. of Pollux; 24° from the Sun in the evening sky; magnitudes 1.8 and 1.2
8655.925			10	Neptune stationary in longitude; starts retrograde motion
8656.164			15:56	Sun enters the astrological sign Cancer, i.e. its longitude is 90°
8656.164			15:56	**June or summer solstice**
8656.492			24	Neptune stationary in right ascension; starts retrograde motion
8656.616	22	SAT	3	Sun enters Gemini, at longitude 90.43° on the ecliptic

8657.5		23	SUN	June Boötid meteors; ZHR 5; 2 days before Last Quarter
8657.821			8	Moon at apogee; distance 63.43 Earth-radii
8658.463			23	**Mercury at easternmost elongation**; 25.2° from Sun in evening sky
8658.667		24	Mon 4	Moon 3.6° S.S.E. of Neptune; 104° from the Sun in the morning sky
8659.908		25	Tue 9:47	**Last Quarter Moon**
8661.420		26	Wed 22	Mercury at descending node through the ecliptic plane
8662.563		28	Fri 2	Moon 4.5° S.S.E. of Uranus; 60° from the Sun in the morning sky
8663.315			19:33	Latest sunset, at latitude 40° north
8664.438		29	SAT 23	Moon 7.9° S.S.E. of the Pleiades; 37° and 38° from the Sun in the morning sky
8665.125		30	SUN 15	Moon 2.25° N. of Aldebaran; 29° from the Sun in the morning sky

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8666.438	Jul 1	Mon	23	Moon 1.64° S.S.E. of Venus; 12° from the Sun in the morning sky
8667.303		2	Tue 19:16	**New Moon**; beginning of lunation 1194. Total eclipse of the Sun
8667.788		3	Wed 7	Moon at ascending node; longitude 107.6°
8668.229			18	Moon 6.1° S. of Pollux; 13° from the Sun in the evening sky
8668.750		4	Thu 6	Moon 0.19° E.N.E. of Mars; 20° and 19° from the Sun in the evening sky
8668.917			10	Moon 3.3° N.N.E. of Mercury; 22° from the Sun in the evening sky
8669.458			23	**Earth at aphelionn**; 1.0167 AU from the Sunom the Sun
8669.708		5	Fri 4:60	Moon at perigee; distance 57.03 Earth-radii
8670.032			13	Venus at ascending node through the ecliptic plane
8670.458			23	Mercury 3.8° S.S.E. of Mars; 21° and 19° from the Sun in the evening sky; magnitudes 1.7 and 1.8
8670.688		6	SAT 5	Moon 3.1° N.N.E. of Regulus; 46° from the Sun in the evening sky
8671.680		7	SUN 4	Mercury stationary in right ascension; starts retrograde motion
8671.695			5	Venus at northernmost declination, 23.43°
8671.790			7	Mercury at aphelion, 0.4667 AU from the Sun
8672.465			23	Mercury stationary in longitude; starts retrograde motion
8673.955		9	Tue 10:55	**First Quarter Moon**
8674.207			17	**Saturn at opposition**; magnitude 0.1
8674.479			24	Moon 7.3° N.N.E. of Spica; 97° and 96° from the Sun in the evening sky
8674.512		10	Wed 0	Middle of eclipse season: Sun is at same longitude as Moon's ascending node, 107.5°
8677.938		13	SAT 11	Moon 7.8° N.N.E. of Antares; 140° and 139° from the Sun in the evening sky

8678.375			21	Moon 2.31° N.N.E. of Jupiter; 145° from the Sun in the evening sky
8678.821	14	SUN	8	**Pluto at opposition**; magnitude 14.2
8680.833	16	Tue	8	Moon 0.44° E.S.E. of Saturn; 174° and 173° from the Sun in the midnight sky
8680.880			9	Moon at descending node; longitude 287.7°
8681.402			21:38	**Full Moon. Partial eclipse of the Moon**
8683.274	18	Thu	19	Mars at northernmost latitude from the ecliptic plane, 1.8°
8685.510	21	SUN	0	Moon at apogee; distance 63.58 Earth-radii
8685.795			7	Sun enters Cancer, at longitude 118.26° on the ecliptic
8685.958			11	Moon 3.6° S.S.E. of Neptune; 130° from the Sun in the morning sky
8686.019			12	Mercury at inferior conjunction with the Sun; 0.582 AU from Earth; latitude -6.58°
8687.208	22	Mon	17	Venus 6.0° S. of Pollux; 6° and 9° from the Sun in the morning sky; magnitudes -3.9 and 1.2
8687.620	23	Tue	3	Sun enters the astrological sign Leo, i.e. its longitude is 120°
8689.555	25	Thu	1:19	**Last Quarter Moon**
8689.604			3	Mercury 5.6° S.S.W. of Venus; 7° and 6° from the Sun in the morning sky; magnitudes 4.1 and -3.9
8689.958			11	Moon 4.5° S.S.E. of Uranus; 85° and 86° from the Sun in the morning sky
8690.994	26	Fri	12	The equation of time is at a minimum of -6.55 minutes.
8691.833	27	SAT	8	Moon 7.9° S.S.E. of the Pleiades; 63° and 64° from the Sun in the morning sky
8692.049			13	Mercury at southernmost latitude from the ecliptic plane, -7.0°
8692.5	28	SUN		Piscid Austrinid meteors; ZHR 5; 4 days before New
8692.521			1	Moon 2.25° N. of Aldebaran; 55° from the Sun in the morning sky
8694.465	29	Mon	23	Uranus at west quadrature, 90° from the Sun
8694.5	30	Tue		**Southern Delta Aquarid meteors**; ZHR 25; 2 days before New
8694.5				Alpha Capricornid meteors; ZHR 5; 2 days before New
8695.211			17	Moon at ascending node; longitude 107.6°
8695.646	31	Wed	4	Moon 4.5° N. of Mercury; 14° from the Sun in the morning sky
8695.646			4	Moon 6.1° S. of Pollux; 14° and 16° from the Sun in the morning sky
8696.281			19	Mercury stationary in right ascension; resumes direct motion
8696.396			22	Moon 0.71° N.E. of Venus; 4° from the Sun in the morning sky

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8696.633	Aug	1	Thu	3:12 **New Moon**; beginning of lunation 1195

8696.662		4	Mercury stationary in longitude; resumes direct motion
8697.375		21	Moon 1.65° N.N.E. of Mars; 11° and 10° from the Sun in the evening sky
8697.801	2 Fri	7:13	Moon at perigee; distance 56.35 Earth-radii
8698.063		14	Moon 3.1° N.N.E. of Regulus; 20° from the Sun in the evening sky
8701.729	6 Tue	6	Moon 7.3° N.N.E. of Spica; 71° and 70° from the Sun in the evening sky
8703.230	7 Wed	17:32	**First Quarter Moon**
8703.5	8 Thu	0	Mercury 9.2° S. of Pollux; 19° and 23° from the Sun in the morning sky; magnitudes 0.4 and 1.2
8703.883		9	Venus at perihelion, 0.7185 AU from the Sun
8705.167	9 Fri	16	Moon 7.8° N.N.E. of Antares; 114° and 113° from the Sun in the evening sky
8705.458		23	**Mercury at westernmost elongation**; 19.0° from Sun in morning sky
8705.521	10 SAT	1	Moon 2.46° N.N.E. of Jupiter; 118° and 117° from the Sun in the evening sky
8706.623	11 SUN	3	Sun enters Leo, at longitude 138.18° on the ecliptic
8707.049		13	Jupiter stationary in longitude; resumes direct motion
8707.166		16	Jupiter stationary in right ascension; resumes direct motion
8707.465		23	Uranus stationary in longitude; starts retrograde motion
8707.596	12 Mon	2	Uranus stationary in right ascension; starts retrograde motion
8707.938		11	Moon 0.31° E. of Saturn; 146° from the Sun in the evening sky
8708.115		15	Moon at descending node; longitude 287.4°
8708.125		15	Jupiter 6.9° N.E. of Antares; 115° and 110° from the Sun in the evening sky; magnitudes -2.3 and 1.0; quasi-conjunction
8708.5	13 Tue		Perseid meteors; ZHR 110; 3 days before Full
8709.729	14 Wed	6	Venus at superior conjunction with the Sun; 1.731 AU from Earth; latitude 3.06°
8710.985	15 Thu	12	Venus brightest; magnitude -3.92°
8711.021		12:30	**Full Moon**
8711.105		15	Mercury at ascending node through the ecliptic plane
8712.971	17 SAT	11	Moon at apogee; distance 63.69 Earth-radii
8713.188		17	Moon 3.5° S.S.E. of Neptune; 156° and 157° from the Sun in the morning sky
8713.458		23	Mars 0.66° N.N.E. of Regulus; 5° from the Sun in the evening sky; magnitudes 1.8 and 1.4
8713.5	18 SUN		Kappa Cygnid meteors; ZHR 3; 3 days after Full
8715.774	20 Tue	7	Mercury at perihelion, 0.3075 AU from the Sun
8716.750	21 Wed	6	Venus 0.90° N.N.E. of Regulus; 2° from the Sun in the evening sky; magnitudes -3.9 and 1.4

8717.271			19	Moon 4.4° S.S.E. of Uranus; 111° and 112° from the Sun in the morning sky
8718.920	23	Fri	10	Sun enters the astrological sign Virgo, i.e. its longitude is 150°
8719.123			14:58	**Last Quarter Moon**
8719.167			16	Moon 7.8° S.S.E. of the Pleiades; 89° and 90° from the Sun in the morning sky
8719.875	24	SAT	9	Moon 2.37° N. of Aldebaran; 81° from the Sun in the morning sky
8720.229			18	Venus 0.29° N.N.E. of Mars; 3° from the Sun in the evening sky; magnitudes -3.9 and 1.8
8721.553	26	Mon	1	Mars at aphelion, 1.6661 AU from the Sun
8722.577	27	Tue	2	Moon at ascending node; longitude 106.7°
8723.083			14	Moon 6.1° S. of Pollux; 40° and 41° from the Sun in the morning sky
8724.750	29	Thu	6	Mercury 1.28° N.N.E. of Regulus; 6° from the Sun in the morning sky; magnitudes -1.6 and 1.4
8725.5	30	Fri	0	Moon 3.1° N.N.E. of Regulus; 7° from the Sun in the morning sky
8725.539			1	Venus at northernmost latitude from the ecliptic plane, 3.4°
8725.604			3	Moon 1.86° N.N.E. of Mercury; 6° and 5° from the Sun in the morning sky
8725.943			10:37	**New Moon**; beginning of lunation 1196
8725.985			12	Mercury at northernmost latitude from the ecliptic plane, 7.0°
8726.021			13	Moon 2.91° N.N.E. of Mars; 4° and 1° from the Sun in the evening sky
8726.165			15:58	Perigee only 5.3 hours after New Moon
8726.165			15:58	Moon at perigee; distance 56.00 Earth-radii
8726.271			19	Moon 2.79° N.N.E. of Venus; 6° and 5° from the Sun in the evening sky

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8727.5	Sep	1	SUN	1st day of Muslim year (1441 A.H.)
8727.5				Aurigid meteors; ZHR 5; 2 days after New
8728.335			20	The equation of time is 0.
8728.962		2	Mon 11	Mars at conjunction with the Sun
8729.083			14	Moon 7.1° N.N.E. of Spica; 45° and 44° from the Sun in the evening sky
8730.188		3	Tue 17	Mercury 0.64° N.N.E. of Mars; 2° and 1° from the Sun in the evening sky; magnitudes -1.8 and 1.7
8730.560		4	Wed 1	Mercury at superior conjunction with the Sun; 1.369 AU from Earth; latitude 6.47°
8732.438		5	Thu 23	Moon 7.6° N.N.E. of Antares; 88° and 87° from the Sun in the evening sky
8732.632		6	Fri 3:11	**First Quarter Moon**
8732.833			8	Moon 2.27° N.N.E. of Jupiter; 92° from the Sun in the evening sky
8735.083		8	SUN 14	Moon 0.15° E.S.E. of Saturn; 118° from the Sun in the evening sky

8735.142			15	Jupiter at east quadrature, 90° from the Sun
8735.235			18	Moon at descending node; longitude 286.0°
8736.182	9	Mon	16	September Epsilon Perseid meteors; ZHR 10; 4 days after First Quarter
8736.800	10	Tue	7	**Neptune at opposition**; magnitude 7.8
8740.057	13	Fri	13	Moon at apogee; distance 63.71 Earth-radii
8740.063			14	Mercury 0.29° S.S.W. of Venus; 8° from the Sun in the evening sky; magnitudes -0.9 and -3.9
8740.375			21	Moon 3.4° S.S.E. of Neptune; 174° and 176° from the Sun in the midnight sky
8740.690	14	SAT	4:34	**Full Moon**
8743.846	17	Tue	8	Sun enters Virgo, at longitude 174.16° on the ecliptic
8744.479			24	Moon 4.2° S.S.E. of Uranus; 138° and 139° from the Sun in the morning sky
8744.691	18	Wed	5	Saturn stationary in right ascension; resumes direct motion
8744.799			7	Saturn stationary in longitude; resumes direct motion
8746.438	19	Thu	23	Moon 7.6° S.S.E. of the Pleiades; 116° and 117° from the Sun in the morning sky
8746.477			23	Mars and Neptune at heliocentric opposition; longitudes 167.4° and 347.4°
8747.146	20	Fri	16	Moon 2.59° N. of Aldebaran; 108° from the Sun in the morning sky
8748.613	22	SUN	2:42	**Last Quarter Moon**
8749.389			21	Mercury at descending node through the ecliptic plane
8749.771	23	Mon	7	Moon at ascending node; longitude 104.4°
8749.827			7:51	**September of fall or autumn equinox**
8749.827			7:51	Sun enters the astrological sign Libra, i.e. its longitude is 180°
8750.458			23	Moon 5.9° S. of Pollux; 67° and 68° from the Sun in the morning sky
8752.938	26	Thu	11	Moon 3.1° N.N.E. of Regulus; 33° from the Sun in the morning sky
8754.355	27	Fri	21	Saturn at southernmost declination, -22.52°
8754.604	28	SAT	2:29	Moon at perigee; distance 56.10 Earth-radii
8754.604			2:29	Perigee only 16.0 hours before New Moon
8754.688			5	Moon 3.8° N.N.E. of Mars; 10° and 9° from the Sun in the morning sky
8755.269			18:27	**New Moon**; beginning of lunation 1197
8755.5	29	SUN		Rosh Hashanah, 1st say of Hebrew year 5780 A.M.
8755.708			5	Mercury 1.29° N.N.E. of Spica; 18° from the Sun in the evening sky; magnitudes -0.3 and 1.0
8756.167			16	Moon 4.0° N.N.E. of Venus; 14° and 13° from the Sun in the evening sky
8756.521	30	Mon	1	Moon 7.0° N.N.E. of Spica; 18° and 17° from the Sun in the evening sky
8756.604			3	Moon 5.8° N.N.E. of Mercury; 19° from the Sun in the evening sky

8758.924 Oct 2 Wed 10 Pluto stationary in right ascension; resumes direct motion
8759.399 22 Pluto stationary in longitude; resumes direct motion
8759.760 3 Thu 6 Mercury at aphelion, 0.4667 AU from the Sun
8759.771 7 Moon 7.3° N.N.E. of Antares; 61° and 60° from the Sun in the evening sky
8760.333 20 Venus 2.88° N.N.E. of Spica; 14° from the Sun in the evening sky; magnitudes -3.9 and 1.0
8760.396 22 Moon 1.87° N.N.E. of Jupiter; 69° and 68° from the Sun in the evening sky
8762.199 5 SAT 16:47 **First Quarter Moon**
8762.286 19 Moon at descending node; longitude 283.2°
8762.375 21 Moon 0.31° S.E. of Saturn; 92° from the Sun in the evening sky
8762.553 6 SUN 1 October Camelopardalid meteors; ZHR 5; near First Quarter
8763.868 7 Mon 9 Summer solstice on Mars
8764.074 14 Mars crosses equator southward
8764.294 19 Saturn at east quadrature, 90° from the Sun
8765.493 8 Tue 24 **Draconid meteors**; ZHR 20; 3 days after First Quarter
8766.5 10 Thu Southern Taurid meteors; ZHR 5; 3 days before Full
8767.276 19 Moon at apogee; distance 63.64 Earth-radii
8767.5 11 Fri Delta Aurigid meteors; ZHR 2; 2 days before Full
8767.583 2 Moon 3.4° S.S.E. of Neptune; 149° from the Sun in the evening sky
8770.382 13 SUN 21:10 **Full Moon**
8771.646 15 Tue 4 Moon 4.1° S.S.E. of Uranus; 165° and 166° from the Sun in the morning sky
8773.667 17 Thu 4 Moon 7.4° S.S.E. of the Pleiades; 143° from the Sun in the morning sky
8774.375 21 Moon 2.81° N. of Aldebaran; 134° from the Sun in the morning sky
8774.5 18 Fri Epsilon Geminid meteors; ZHR 3; 3 days before Last Quarter
8775.807 19 SAT 7 Pluto at southernmost declination, -22.39°
8776.661 20 SUN 4 **Mercury at easternmost elongation**; 24.6° from Sun in evening sky
8776.812 7 Moon at ascending node; longitude 101.4°
8777.5 21 Mon **Orionid meteors**; ZHR 25; near Last Quarter
8777.750 6 Moon 5.6° S. of Pollux; 94° from the Sun in the morning sky
8778.028 12:40 **Last Quarter Moon**
8780.018 23 Wed 12 Mercury at southernmost latitude from the ecliptic plane, -7.0°
8780.222 17 Sun enters the astrological sign Scorpius, i.e. its longitude is 210°
8780.313 20 Moon 3.3° N.N.E. of Regulus; 60° from the Sun in the morning sky
8780.5 24 Thu Leo Minorid meteors; ZHR 2; 3 days before New
8781.595 25 Fri 2 Venus at descending node through the ecliptic plane

8782.946 26 SAT 10:42 Moon at perigee; distance 56.65 Earth-radii
8783.354 21 Moon 4.2° N.N.E. of Mars; 19° and 18° from the Sun in the morning sky
8783.5 27 SUN Clocks back 1 hour (Europe)
8783.979 12 Moon 7.0° N.N.E. of Spica; 11° and 10° from the Sun in the morning sky
8784.652 28 Mon 3:39 **New Moon**; beginning of lunation 1198
8784.835 8 **Uranus at opposition**; magnitude 5.7
8785.964 29 Tue 11 Mercury at southernmost declination, -22.42°
8786.167 16 Moon 3.7° N.N.E. of Venus; 21° and 20° from the Sun in the evening sky
8786.292 19 Moon 6.4° N.N.E. of Mercury; 22° from the Sun in the evening sky
8787.167 30 Wed 16 Moon 7.1° N.N.E. of Antares; 34° and 33° from the Sun in the evening sky
8787.708 31 Thu 5 Mercury 2.55° S.S.W. of Venus; 20° and 21° from the Sun in the evening sky; magnitudes 0.5 and -3.9
8788.039 13 Sun enters Libra, at longitude 217.80° on the ecliptic
8788.125 15 Moon 1.30° N.N.E. of Jupiter; 46° and 45° from the Sun in the evening sky
8788.150 16 Mercury stationary in longitude; starts retrograde motion
8788.352 20 Mercury stationary in right ascension; starts retrograde motion

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8789.403 Nov 1 Fri 22 Moon at descending node; longitude 280.3°
8789.833 2 SAT 8 Moon 0.67° S.S.E. of Saturn; 66° from the Sun in the evening sky
8790.5 3 SUN Clocks back 1 hour (America)
8791.126 15 The equation of time is at a maximum of 16.49 minutes.
8791.932 4 Mon 10:22 **First Quarter Moon**
8794.833 7 Thu 8 Moon 3.6° S.S.E. of Neptune; 121° from the Sun in the evening sky
8794.867 9 Moon at apogee; distance 63.51 Earth-radii
8797.333 9 SAT 20 Venus 3.9° N. of Antares; 23° from the Sun in the evening sky; magnitudes -3.9 and 1.0
8797.479 24 Mars 2.83° N.N.E. of Spica; 23° and 24° from the Sun in the morning sky; magnitudes 1.8 and 1.0
8798.5 11 Mon Armistice Day
8798.833 8 Moon 4.1° S.S.E. of Uranus; 165° from the Sun in the evening sky
8799.074 14 Mercury at ascending node through the ecliptic plane
8799.136 15 Mercury at inferior conjunction with the Sun; 0.676 AU from Earth; latitude 0.05°
8799.136 15 **Transit of Mercury across the Sun**
8799.5 12 Tue Northern Taurid meteors; ZHR 5; near Full
8800.067 13:36 **Full Moon**

8800.917	13	Wed	10	Moon 7.3° S.S.E. of the Pleiades; 170° from the Sun in the morning sky
8801.625	14	Thu	3	Moon 2.94° N. of Aldebaran; 162° and 161° from the Sun in the morning sky
8803.744	16	SAT	6	Mercury at perihelion, 0.3075 AU from the Sun
8803.867			9	Moon at ascending node; longitude 99.1°
8804.979	17	SUN	12	Moon 5.4° S. of Pollux; 121° from the Sun in the morning sky
8805.438			23	**Leonid meteors**; ZHR 15; 2 days before Last Quarter
8807.383	19	Tue	21:12	**Last Quarter Moon**
8807.583	20	Wed	2	Moon 3.6° N.N.E. of Regulus; 87° and 88° from the Sun in the morning sky
8808.101			14	Mercury stationary in right ascension; resumes direct motion
8808.296			19	Mercury stationary in longitude; resumes direct motion
8808.5	21	Thu		Alpha Monocerotid meteors; ZHR 5; 5 days before New
8810.124	22	Fri	15	Sun enters the astrological sign Sagittarius, i.e. its longitude is 240°
8810.821	23	SAT	7:42	Moon at perigee; distance 57.50 Earth-radii
8811.253			18	Sun enters Scorpius, at longitude 241.14° on the ecliptic
8811.354			21	Moon 7.1° N.N.E. of Spica; 37° from the Sun in the morning sky
8812.021	24	SUN	13	Moon 4.0° N.N.E. of Mars; 28° from the Sun in the morning sky
8812.042			13	Venus 1.41° S. of Jupiter; 26° from the Sun in the evening sky; magnitudes -3.9 and -1.8
8812.542	25	Mon	1	Mercury 9.5° E. of Mars; 20° and 29° from the Sun in the morning sky; magnitudes -0.3 and 1.7; quasi-conjunction
8812.688			5	Moon 1.81° N.N.E. of Mercury; 19° and 20° from the Sun in the morning sky
8813.954	26	Tue	11	Mercury at northernmost latitude from the ecliptic plane, 7.0°
8814.130			15:07	**New Moon**; beginning of lunation 1199
8814.604	27	Wed	3	Moon 7.1° N.N.E. of Antares; 7° from the Sun in the evening sky
8814.914			10	Neptune stationary in longitude; resumes direct motion
8815.238			18	Neptune stationary in right ascension; resumes direct motion
8815.5	28	Thu		November Orionid meteors; ZHR 3; 1 day after New
8815.930			10	**Mercury at westernmost elongation**; 20.1° from Sun in morning sky
8815.979			12	Moon 0.78° N.N.E. of Jupiter; 24° and 23° from the Sun in the evening sky
8816.198			17	Venus at southernmost declination, -24.79°
8816.269			18	Venus at aphelion, 0.7282 AU from the Sun

8816.313			20	Moon 1.87° N. of Venus; 28° and 27° from the Sun in the evening sky
8816.676	29	Fri	4	Moon at descending node; longitude 278.6°
8817.396			22	Moon 0.95° S.S.E. of Saturn; 41° from the Sun in the evening sky
8817.642	30	SAT	3	**Moon, Saturn, and Pluto within circle of diameter 3.60°**; 42° east of the Sun
8818.067			14	Sun enters Ophiuchus, at longitude 248.04° on the ecliptic

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8819.5	Dec 2	Mon		Phoenicid meteors; ZHR 5; 2 days before First Quarter
8821.790	4	Wed	6:58	**First Quarter Moon**
8822.146			16	Moon 3.8° S.S.E. of Neptune; 94° from the Sun in the evening sky
8822.675	5	Thu	4	Moon at apogee; distance 63.41 Earth-radii
8824.5	7	SAT		Puppid-Velid meteors; ZHR 10; 3 days after First Quarter
8824.570			2	Jupiter at southernmost declination, -23.30°
8826.104	8	SUN	15	Moon 4.3° S.S.E. of Uranus; 137° from the Sun in the evening sky
8826.191			16:35	Earliest sunset, at latitude 40° north
8826.5	9	Mon		Monocerotid meteors; ZHR 3; 3 days before Full
8828.271	10	Tue	19	Moon 7.3° S.S.E. of the Pleiades; 162° and 161° from the Sun in the evening sky
8828.917	11	Wed	10	Venus 1.80° S. of Saturn; 30° from the Sun in the evening sky; magnitudes -4.0 and 0.6
8828.958			11	Moon 2.95° N. of Aldebaran; 170° and 169° from the Sun in the evening sky
8829.5	12	Thu		Sigma Hydrid meteors; ZHR 3; near Full
8829.718			5:14	**Full Moon**
8830.292			19	**Venus, Saturn, and Pluto within circle of diameter 2.68°**; 30° east of the Sun
8831.094	13	Fri	14	Moon at ascending node; longitude 98.4°
8831.146			16	Venus 1.13° S. of Pluto; 31° and 30° from the Sun in the evening sky; magnitudes -4.0 and 14.4
8831.375			21	Moonnor southernmost declination in ye 23.233.23°
8832.018	14	SAT	12	Geminid meteors; ZHR 120; 2 days after Full
8832.229			18	Moon 5.3° S. of Pollux; 148° and 149° from the Sun in the morning sky
8833.5	16	Mon		Coma Berenicid meteors; ZHR 3; 3 days before Last Quarter
8833.792			7	Mercury 5.0° N.N.E. of Antares; 14° and 15° from the Sun in the morning sky; magnitudes -0.6 and 1.0
8834.792	17	Tue	7	Moon 3.7° N.N.E. of Regulus; 115° from the Sun in the morning sky
8836.344	18	Wed	20:16	Moon at perigee; distance 58.05 Earth-radii
8836.348			20	Sun enters Sagittarius, at longitude 266.61° on the ecliptic
8836.707	19	Thu	4:58	**Last Quarter Moon**
8837.358			21	Mercury at descending node through the ecliptic plane

8837.5	20 Fri		December Leo Minorid meteors; ZHR 5; 1 day after Last Quarter
8838.442		23	Venus at southernmost latitude from the ecliptic plane, -3.4°
8838.646	21 SAT	4	Moon 7.2° N.N.E. of Spica; 65° from the Sun in the morning sky
8839.5	22 SUN		**Ursid meteors**; ZHR 15; 3 days before New
8839.681		4:21	Sun enters the astrological sign Capricornus, i.e. its longitude is 270°
8839.681		4:21	**December or winter solstice**
8840.688	23 Mon	5	Moon 3.4° N.N.E. of Mars; 38° and 39° from the Sun in the morning sky
8841.958	24 Tue	11	Moon 7.1° N.N.E. of Antares; 22° and 23° from the Sun in the morning sky
8842.5	25 Wed		Christmas
8843.000		12	Moon 1.93° N.N.E. of Mercury; 9° from the Sun in the morning sky
8843.151		16	The equation of time is 0.
8843.718	26 Thu	5:14	**New Moon**; beginning of lunation 1200. Annular eclipse of the Sun
8843.833		8	Moon 0.30° N.E. of Jupiter; 1° from the Sun in the evening sky
8844.043		13	Moon at descending node; longitude 278.4°
8844.333		20	Moon at southernmost declination in year, -23.23°
8845.021	27 Fri	13	Moon 1.23° S.S.E. of Saturn; 16° and 15° from the Sun in the evening sky
8845.273		19	Jupiter at conjunction with the Sun
8846.604	29 SUN	3	Moon 1.01° S.S.E. of Venus; 34° from the Sun in the evening sky
8847.728	30 Mon	5	Mercury at aphelion, 0.4667 AU from the Sun
8847.845		8	Middle of eclipse season: Sun is at same longitude as Moon's descending node, 278.3°