



## Sun, Planets and Transitions

The **Sun** will be in Ophiuchus, the Serpent Bearer (*Bhujangadhari* or *Sarpdhar*) on 1 December. Its angular diameter will be 32'16". It moves to Sagittarius, the Archer (*Dhanu*) on 18 December. The winter (or December) solstice will be on 21 December at 20:32 hours IST. On 31 December, the angular diameter of the Sun will increase to 32'32".

**Mercury** is in Ophiuchus on 1 December. Its evening appearances are over for this year. One can spot it with some difficulty on a few days in the beginning of the month. It will then reappear in the morning sky by mid-December. For observers in the mid-northern latitudes, the last 10 days of December are most favourable for observing Mercury in the pre-dawn sky. Its maximum western elongation will occur on 25 December at around 8 am.

Mercury moves to Scorpius, the Scorpion (*Vrushchika*), on 10 December. It is stationary on 15 December. It then reverses its direction of motion and moves back to Ophiuchus on 22 December.

### Ephemeris of Mercury:

Date	Alt*	Mag	Phase	diam"	El°
01 Dec	+02°	2.3	0.08	9.5	10.2 E
10 Dec	+04°	2.5	0.07	9.5	9.3 W
20 Dec	+14.5°	-0.1	0.74	7.4	21.1 W
30 Dec	+13.2°	-0.4	0.61	6.0	21.5 W

**Venus** is in Sagittarius on 1 December. It moves to Capricornus, the Sea Goat (*Makara*), on 7 December and passes less than a degree south of the globular cluster M75 (Messier 75). This is a giant globular cluster. It was discovered by Pierre Méchan in 1780 and included in Charles

### List of Events in December 2024 (Time in IST)

Dt	Dy	Time	Event
01	Fr	18:17	New Moon
01	Su	11:51	New Moon
01	Su	12:39	Antares 03° N of Moon
02	Mo	06:34	Mercury 4.9° N of Moon
03	Tu	04:01	Moon south declination: 28.5° S
03	Tu	17:38	Mars-Beehive: 1.6° N
05	Th	04:10	Moon-Venus: 2.4° N
06	Fr	07:41	Mercury inferior conjunction
08	Su	02:27	Mars stationary
08	Su	01:49	Jupiter opposition
08	Su	14:19	Moon-Saturn: 0.3° S
08	Su	16:03	Neptune stationary
08	Su	20:57	First quarter
09	Mo	14:07	Neptune 0.7° S of Moon (occltn)
10	Tu	01:06	Moon ascending node
12	Th	18:48	Moon perigee: 365400 km
13	Fr	12:55	Uranus 4.1° S of Moon
13	Fr	22:43	Moon-Pleiades: 0.1° S
14	Sa	06:42	Geminid Shower: ZHR = 120
14	Sa	23:59	Jupiter 5.4° S of Moon
15	Su	14:32	Full Moon
16	Mo	01:59	Mercury stationary
16	Mo	01:42	Moon north declination: 28.4° N
17	Tu	17:42	Moon-Pollux: 2.1° N
18	We	14:16	Moon-Mars: 1° S
18	We	16:58	Moon-Beehive: 2.8° S
20	Fr	11:07	Moon-Regulus: 2.6° S
21	Sa	14:50	Winter solstice (N. hemisphere)
22	Su	15:30	Ursid Shower: ZHR = 10
23	Mo	03:48	Last quarter
23	Mo	04:51	Moon descending node
24	Tu	03:09	Mercury-Antares: 6.8° N
24	Tu	12:55	Moon apogee: 404500 km
25	We	00:58	Moon-Spica: 0.2° S
25	We	07:29	Mercury elongation: 22° W
28	Sa	20:07	Moon-Antares: 0.1° N
29	Su	08:20	Mercury 6.3° N of Moon
30	Mo	10:36	Moon south declination: 28.4° S
31	Tu	03:57	New Moon



Messier's catalogue of comet-like objects.

### Ephemeris of Venus:

Date	Alt*	Mag	Phase	diam''	EI°
01 Dec	+30°	-4.2	0.68	17.19	43.6
10 Dec	+33°	-4.2	0.64	18.40	44.9
20 Dec	+36°	-4.3	0.60	19.98	46.0
30 Dec	+40°	-4.3	0.56	21.90	46.8

\* The altitude of the planet is given at the start of civil twilight if the planet is to the west of the Sun and at the end of civil twilight if it is to the east of the Sun.

**Mars** is in Taurus, the Bull (*Vrishabha*) this month. It will be stationary on 8 December at 02:27 hours, and then go into retrograde motion. It is less than 3° from the Beehive open cluster (*Pushya Nakshatra*) until 15 December.

### Ephemeris of Mars:

Date	Mag	Diam''	EI°
01 Dec	-0.5	11.66	123.8
10 Dec	-0.7	12.52	132.8
20 Dec	-0.9	13.43	144.1
30 Dec	-1.2	14.17	156.7

**Jupiter** remains in Taurus. It is visible all through the night this month. There are some nice events involving its moons (see below).

### Ephemeris of Jupiter:

Date	Mag	Diam''	EI°
01 Dec	-2.8	48.10	172.7
10 Dec	-2.8	48.11	176.8
20 Dec	-2.8	47.78	165.4
30 Dec	-2.7	47.10	154.0

**Saturn** remains in Aquarius, the Water-bearer (*Kumbha*). It travels nearly parallel to an imaginary line joining Lambda Aquarii (mag. 3.7) and Phi Aquarii (mag. 4.22). This can make for a small photography project. Point your telescope in the direction of these two stars. Sky permitting, take a few pictures every day. You can then make an excellent movie on Saturn's changing positions.

### Ephemeris of Saturn:

Date	Mag	Diam''	EI°
01 Dec	0.9	17.35	93.1
10 Dec	1.0	17.08	84.3
20 Dec	1.0	16.80	74.6
30 Dec	1.1	16.54	65.1

*(Disclaimer: we categorically mention here that we do not believe in astrology and believe that the only influence a planet has on us is to give us the viewing pleasure of its beauty. The sole purpose of giving the transition of planets and the Sun is to acquaint the reader with the Indian nomenclature of planets and constellations and also to show that the actual positions of the Sun and planets, which are based on modern computing, are very different from those given in astrology tables.)*

## March of the Moon

The Moon will pass south of Venus between 4 and 5 December. On 4 December, the lunar crescent can be seen below Venus. The next day it will be seen east of Venus. On 8 December the Moon will occult Saturn, but the event will take place in broad daylight. However, one can see the Moon 2° east of Saturn at dusk. This will also be beautiful to watch.

On 13 December, the near-Full Moon passes over the Pleiades (*Krutika*). From about 9 pm until midnight, it will occult many stars of the Pleiades. Unfortunately, the Moon will be near 96% illuminated, so the occultation events are not likely to be easy to observe.

On 14 December, the Moon passes within 5°30" from Jupiter. Between 16 and 17 December, it passes through the Gateway of Heaven, an asterism made by two stars of Gemini, viz. Castor and Pollux, and two stars of Canis Minor, Procyon and Gomeza.

On 18 December, the Moon will pass within 1° of Mars. This will happen close to noon time in India. Mars will rise about an hour and a half after sunset that night, and the Moon will follow after about 40 minutes. The Moon will be about 4° east of Mars. Join the two with an imaginary line; and look half-way north through a pair of

binoculars. You should be able to see the Beehive cluster. It is known as *Pushya Nakshatra* in India.

On 20 December, the Moon passes north of Regulus, or *Magha*. The pre-dawn sky of Christmas Day, 25 December, offers a beautiful sight of Spica above a 30% illuminated Moon. On 28 December, the Moon can be seen in the southern claw of Scorpius, the Scorpion (*Vrushchika*).

## The Geminids

The Geminids meteor shower will be active from 11 to 20 December 2024. It is expected to peak between 13 and 14 December. Observations of this shower will be marred by bright moonlight, since the Moon will be 97% illuminated.

Visit <http://skytonight.wordpress.com> for more details about the shower and how to observe it.

## Minima of Algol

Algol (or  $\beta$  Persei) is one of the most exciting variable stars that can be easily observed even in a moderately light-polluted sky. It is an eclipsing binary star. Its period is 2.867328 days, or 2 days, 20 hours, 48 minutes and 57 seconds.

The entire eclipse takes place over roughly 10 hours. For nearly 2 days and 15 hours or so, the star remains at its near-constant magnitude of 2.1. It then starts to fade and reaches 3.4 magnitude (called minimum) in about five hours. The star then returns to its constant magnitude in the next five hours.

Timings suitable for Indian observers to observe the minima of Algol are given in the list of events below:

Tue	10/12/2024 @ 02:19
Thu	12/12/2024 @ 23:08
Sun	15/12/2024 @ 19:58
Thu	02/01/2025 @ 00:53

For more information and links, please visit the link below -

<https://skytonight.wordpress.com/2012/10/12/minima-of-algol/> .

## Events Involving the Moons of Jupiter

In the table below, we have listed events that can be seen from India. The table gives the timings of eclipses, occultations, transits and shadow transits of the moons of Jupiter, suitable for Indian observers. The timings are given in Indian Standard Time (IST).

The output is given as per the following abbreviations and notations:

**Columns:** 1 = date (given only for the first event listed for that day); 2 = time; 3 = satellite number.event type.phase.

**Satellite numbers:** 1 = Io; 2 = Callisto; 3 = Europa; and 4 = Ganymede.

**Event type:** Ec = eclipse; Oc = occultation; Tr = transit; and Sh = shadow transit.

**Phase:** D = disappear; R = reappear; I = ingress; and E = egress.

Example:

Events for 2 December and what they mean:

2	00:05:00	3.Sh.I
	00:49:36	3.Tr.I
	02:17:24	3.Sh.E
	02:50:24	3.Tr.E

Means that

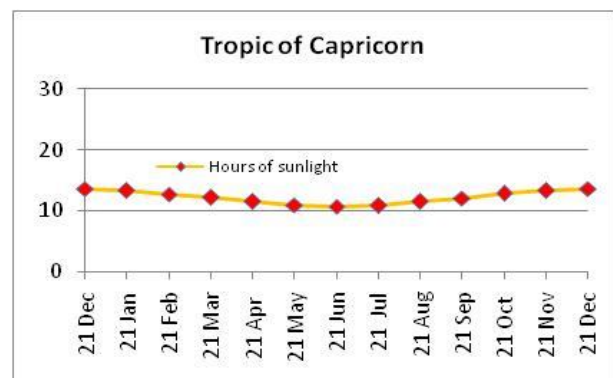
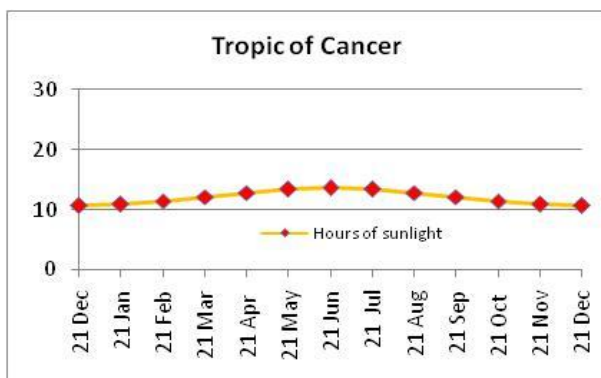
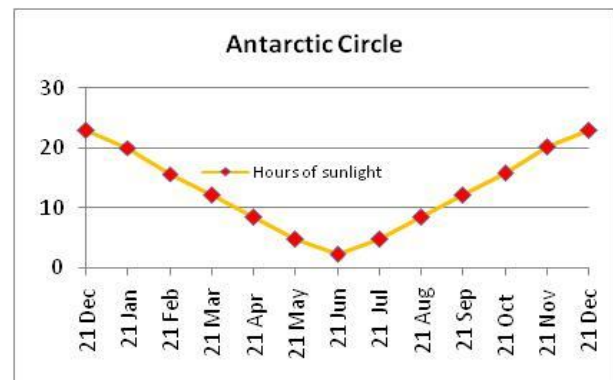
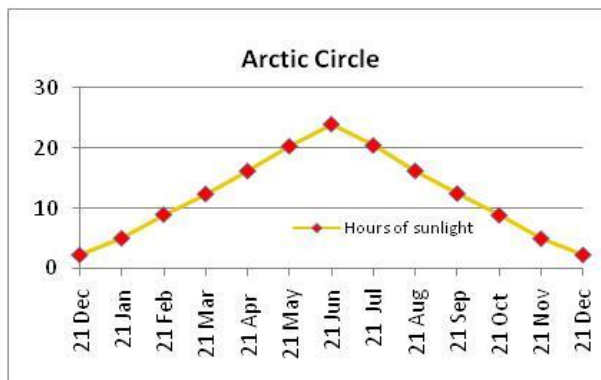
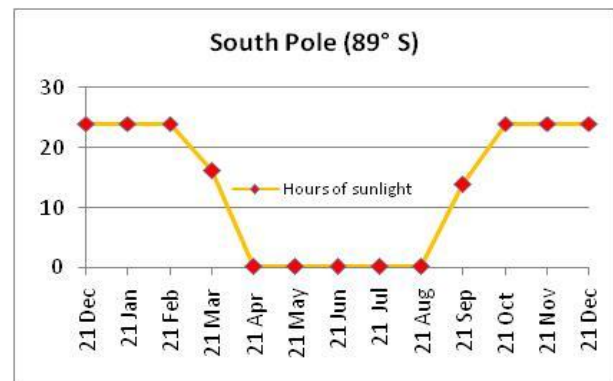
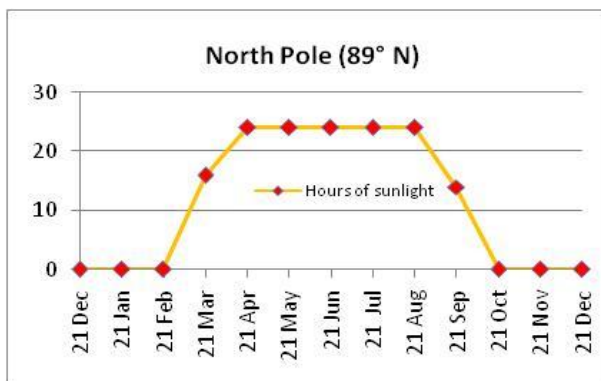
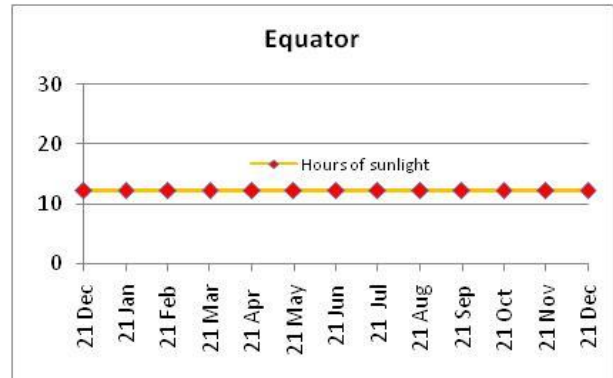
At 00:05:00 hours on 2 December, the shadow of Europa will transit Jupiter; a little later at 00:49:36 hours, Europa itself will begin to transit Jupiter. Europa's shadow will leave Jupiter at 02:17:24 hours, and Europa will exit Jupiter at 02:50:24 hours.

## Satellites of Jupiter in December 2024

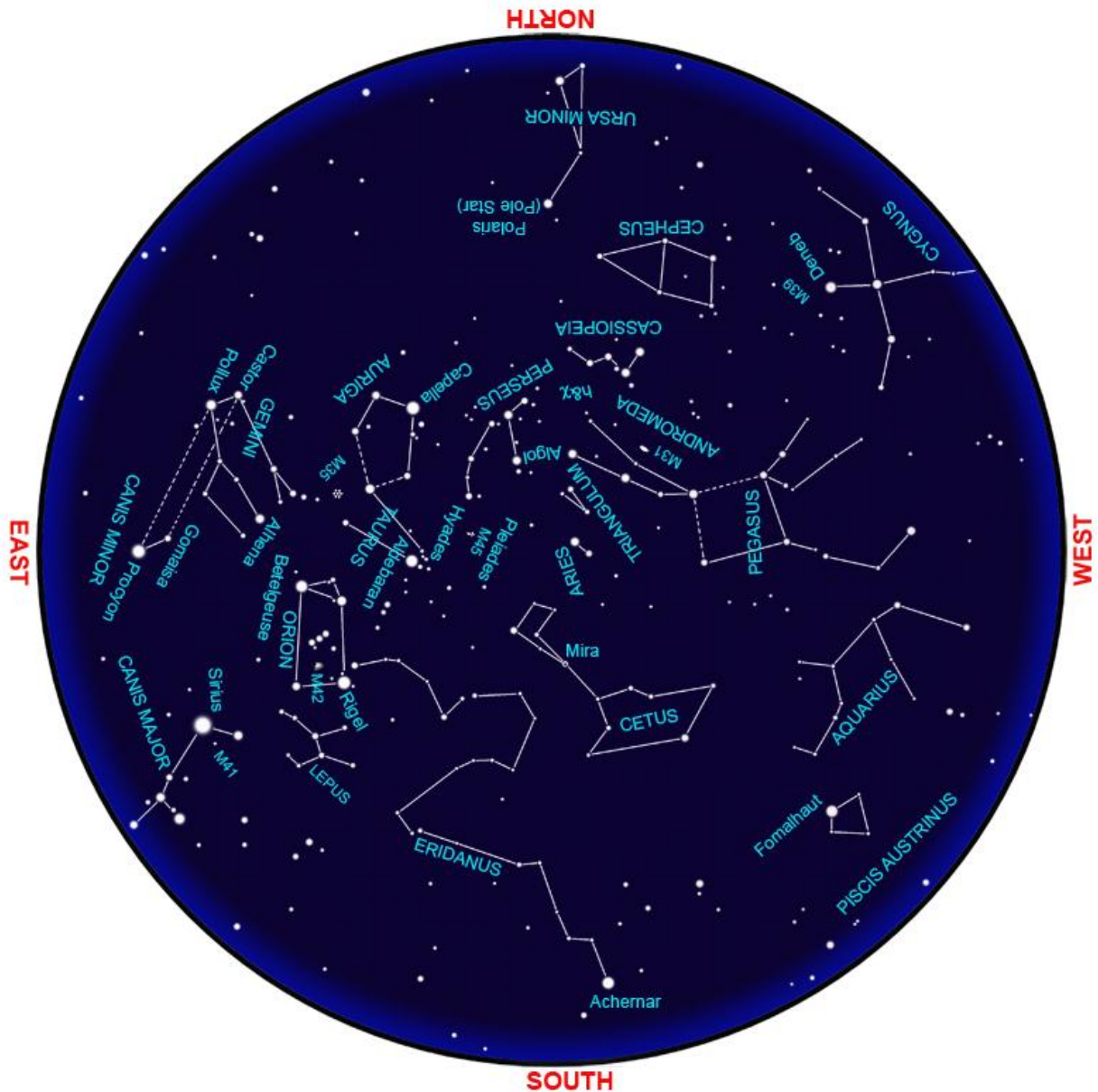
<u>1</u>	<u>2</u>	<u>3</u>		<u>1</u>	<u>2</u>	<u>3</u>		<u>1</u>	<u>2</u>	<u>3</u>		<u>1</u>	<u>2</u>	<u>3</u>
2	00:05:00	3.Sh.I		8	04:03:54	3.Tr.I		14	18:55:00	1.Tr.E		24	02:23:00	2.Tr.I
	00:49:36	3.Tr.I			04:05:00	3.Sh.I			19:05:48	1.Sh.E			03:11:06	2.Sh.I
	02:17:24	3.Sh.E		9	06:05:36	3.Tr.E		15	05:05:12	2.Oc.D			04:54:30	2.Tr.E
	02:50:24	3.Tr.E			06:18:36	3.Sh.E		16	00:08:30	2.Tr.I			05:45:18	2.Sh.E
	19:23:24	2.Sh.I			21:54:42	2.Tr.I			00:35:12	2.Sh.I		25	20:28:12	2.Oc.D
	19:41:12	2.Tr.I			21:59:18	2.Sh.I			02:39:54	2.Tr.E			23:58:12	2.Ec.R
	21:57:00	2.Sh.E		10	00:26:06	2.Tr.E			03:09:18	2.Sh.E		26	04:38:24	1.Oc.D
	22:12:36	2.Tr.E			00:33:12	2.Sh.E		18	05:35:00	1.Tr.I			00:02:36	3.Oc.D
					03:51:18	1.Tr.I			05:50:36	1.Sh.I			01:45:36	1.Tr.I
3	04:53:24	1.Ec.D			03:55:48	1.Sh.I			21:20:42	2.Ec.R			02:14:24	1.Sh.I
	02:01:06	1.Sh.I						19	02:54:18	1.Oc.D			03:57:30	1.Tr.E
	02:07:48	1.Tr.I		11	06:03:06	1.Tr.E			05:23:42	1.Ec.R			04:13:12	3.Ec.R
	04:13:36	1.Sh.E			06:08:24	1.Sh.E			20:45:54	3.Oc.D			04:27:06	1.Sh.E
	04:19:30	1.Tr.E			18:43:24	2.Ec.R			00:01:06	1.Tr.I		27	19:03:18	2.Sh.E
3	23:22:00	1.Ec.D		12	01:10:36	1.Oc.D		20	00:11:42	3.Ec.R			23:04:36	1.Oc.D
4	01:39:00	1.Oc.R			03:29:00	1.Ec.R			00:19:24	1.Sh.I		28	01:47:12	1.Ec.R
5	20:29:48	1.Sh.I			20:10:54	3.Ec.R			02:13:00	1.Tr.E			20:11:48	1.Tr.I
	20:33:42	1.Tr.I			22:17:12	1.Tr.I			02:32:06	1.Sh.E			20:43:12	1.Sh.I
	22:42:18	1.Sh.E			22:24:30	1.Sh.I			21:20:18	1.Oc.D			22:23:42	1.Tr.E
	22:45:30	1.Tr.E		13	00:29:00	1.Tr.E			23:52:24	1.Ec.R			22:55:54	1.Sh.E
6	20:04:48	1.Oc.R			00:37:06	1.Sh.E			18:48:06	1.Sh.I		29	20:15:54	1.Ec.R
7	02:50:00	2.Ec.D			19:36:30	1.Oc.D		21	20:39:00	1.Tr.E			04:38:48	2.Tr.I
	05:24:36	2.Ec.R			21:57:42	1.Ec.R			21:00:48	1.Sh.E		30	05:46:54	2.Sh.I
												31		

## Ephemeris of the Sun at Various Latitudes

The accompanying diagrams depict the hours of actual sunlight (as opposed to twilight) at various latitudes throughout the year. The diagrams are based on real data, and include extrapolations and interpolations where the data was not available. Note that the North and South Poles actually refer to latitudes  $89^\circ$  North and South respectively, since no data was available for the  $90^\circ$  North and South points.



**This sky map for December is drawn for mid-northern latitudes,  
to be used around 9:30 p.m. local time**



For notes on stargazing [click here](#).

Or visit <https://skytonight.wordpress.com/monthly-sky-notes-and-links/>

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