SkyNews Astronomical events for Indian observers

Volume 1 Issue 4, December 2019

Sun and Planets:

The first week of December 2019 offers a last chance to observe Jupiter and Saturn (in 2019) before these planets are lost in the glare of the Sun. Both these planets set soon after sunset. Mercury sets just before sunset and is too close to the Sun to be seen. On the other hand we have Venus appearing as the 'Evening Star' above the western horizon at sunset and moving higher, towards the east, every day. It lies between Jupiter and Saturn until 11 December, after which it appears to the east of Saturn. Neptune and Uranus are very conveniently placed for observations in the early part of the night. Mars can be seen in the morning sky just before sunrise.

The December solstice will take place on the 22nd at 09:49. In the northern hemisphere of the Earth the event is called Winter Solstice. On this day solar rays will be perpendicular on latitude -23.5° or the 23.5° south parallel, also known as the Tropic of Capricorn.

Jupiter is in conjunction with the Sun on 27 December at 23:36 IST. At this time it will be exactly behind the Sun.

Transitions of the Sun and planets:

(Disclaimer: we categorically mention here that we do not believe in astrology and believe that an 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.)

The Sun moves from Ophiuchus, the Serpent Bearer (*Bhujangadhari* or *Sarpdhar*) on 18 December to Sagittarius (*Dhanu*).

Mercury moves from Libra (*Tula*) to Scorpio (*Vrischik*) on 11 December and then on 14 December to Ophiuchus, and to Sagittarius on 29 December.

Venus moves from Sagittarius to Capricornus (*Makara*) on 20 December.

Mars is in Virgo (*Kanya*) and moves towards Libra.

Jupiter and **Saturn** are in Sagittarius this month.

List of Events

Dt	Dy	Time	Event
04	We	12:28	First Quarter
04	We	20:32	Neptune 3.8 N of Moon
05	Th	09:39	Moon Apogee: 404400 km
08	Sa	19:22	Uranus 4.2 N of Moon
11	We	16:26	Aldebaran 3.0 S of Moon
11	We	16:33	Venus-Saturn: 1.8° N
12	Th	10:42	Full Moon
13	Fr	19:45	Moon Ascending Node
14	Sa	02:27	Moon North Dec.: 23.2° N
14	Sa	22:58	Pollux 5.3 N of Moon
14	Sa	23:55	Geminid Shower: ZHR = 120
15	Su	21:24	Moon-Beehive: 1° S
17	Mo	12:34	Regulus 3.6 S of Moon
19	Th	02:00	Moon Perigee: 370300 km
19	Th	10:27	Last Quarter
22	Su	09:49	Winter Solstice
23	Mo	07:19	Moon-Mars: 3.6° S
23	Mo	09:21	Mars 3.3 S of Moon
23	Mo	08:30	Ursid Shower: ZHR = 10
26	Th	10:43	New Moon
26	Th	10:48	Annular Solar Eclipse
26	Th	12:55	Jupiter 0.2 S of Moon
26	Th	18:31	Moon Descending Node
27	Fr	01:41	Moon South Dec.: 23.2° S
27	Fr	17:25	Saturn 1.2 N of Moon
27	Fr	23:36	Jupiter Conjunction
29	Su	07:02	Moon-Venus: 1.1° N

March of the Moon:

On 1 December Jupiter, Venus and Saturn can be seen in this order and nearly on a straight line, starting with Jupiter close to the horizon. The Moon, which will be about 25% illuminated, will be further to the east after Saturn.

The Moon then passes less than 4° from Neptune on 4 December; four days later on 8 December it passes just about 4° from Uranus.

On 11 December the Moon can be seen rising with Aldebaran (*Rohini*).

Full moon is on 12 December. That night it will be close to the zenith about seven hours after sunset. Declination of the Moon will be +22°30'

and those close to this latitude can observe zero shadow cast by moonlight.

On 15 December the Moon is 1° south of the Beehive cluster. It then passes north of Regulus (*Magha*) on 17 December. On this day the Moon and Regulus can be seen nearly overhead, south of the zenith, at dawn. On 21 December the Moon can be seen slightly above the line joining Arcturus or α Bootis (*Swati*) and Spica or α Virginis (*Chitra*); it is much closer to Spica than to Arcturus.

New Moon is on 26 December. An Annular Solar Eclipse will take place at 10.45 am. On 27 December the Moon will be 1.2° south of Saturn soon after sunset, above the western horizon; it will be a challenge to see this close approach by the Moon and Saturn.

Geminid Meteor Shower:

A very faithful meteor shower, the Geminids, is expected to peak on 14 December at 23:55 IST. The shower is active from 4-17 December.

The following information is extracted from the International Meteor Organization.

'The Geminids are usually the strongest meteor shower of the year and meteor enthusiasts are certain to circle December 13 and 14 on their calendars. This is the one major shower that provides good activity. As the name suggests the radiant of the shower lies in the constellation of Gemini. The radiant is well placed from 22:00 onward. The Geminids are often bright and intensely colored. Due to their medium-slow velocity, persistent trains are not usually seen. These meteors are also seen in the southern hemisphere, but only during the middle of the night and at a reduced rate.

Shower details - Radiant: 07:28 +32.2°,
ZHR: 150 - Velocity: (medium) - 35 km/sec
Parent Object: 3200 Phaethon (asteroid).'

However, the Geminids in 2019 are likely to disappoint observers. On the night of December 13-14, 2019 when the peak is expected, a bright, 96% illuminated Moon will also be in the sky. Many fainter meteors will be lost in the glare of lunar light.

For more on observing a meteor shower visit https://skytonight.wordpress.com/wish-upon-a-shooting-star/

Venus above the Western Horizon in 2019-20

Venus has now reappeared above the western horizon and can be seen soon after sunset. Superior conjunction of Venus with the Sun took place on 13 August, 2019. On that day it was exactly behind the Sun. In December 2019 it climbs eastward each day nearly vertically. After about 20 December it starts moving towards the north. Until the first week of April it continues to move along a line making about a 40° angle to the horizon. Then it quickly swings westward along a line that is almost perpendicular to the horizon. Inferior conjunction takes place on 3 June, 2020. It will also be closest to the Earth on that day.

Between its farthest and closest distance from the Earth, the angular size of Venus changes by a factor of 6, and yet its magnitude remains almost the same. This is because like the Moon, we also see phases of Venus which can be observed using a small telescope.

Soon after its superior conjunction, nearly the entire disk of Venus can be seen. By about February 2020 its gibbous phase can be easily observed using a telescope with a 100 mm primary. On 27 March it is exactly half illuminated. This phase is called dichotomy. Very close to this date, Venus is also at its maximum eastern elongation from the Sun.

Venus can also cast a shadow. To observer the shadow cast by Venus we need a clear, dark night. A good time to see the shadow cast by Venus will be from about three days after full moon until new moon.

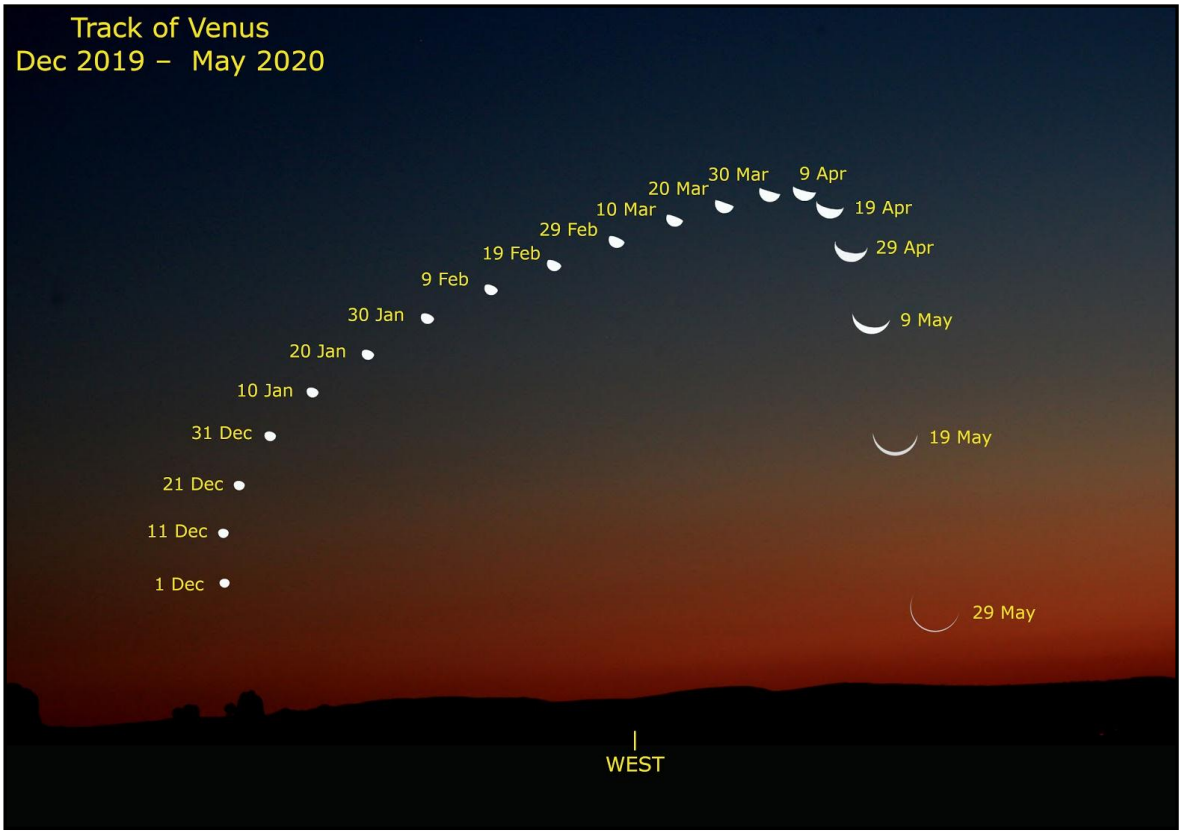
We will discuss how to observe a shadow due to Venus in the next issue.

Upcoming Star Parties:

Organizer:	**Stargazing Mumbai**
URL:	**www.stargazingmumbai.com**
Dates:	Saturday, 21 December 2019
Place:	Mahuli, Asangaon, Maharashtra (about 80 km north of Mumbai on the Mumbai-Nasik highway)
Details:	Overnight programmes with constellation and night sky tour, observation of planets and deep sky objects.
Fee:	Rs 300/= per person
Contact:	Ms Pooja Tolia, +919112662662

Track of Venus from 1 December 2019 to 29 May 2020 (~40 min after local sunset)

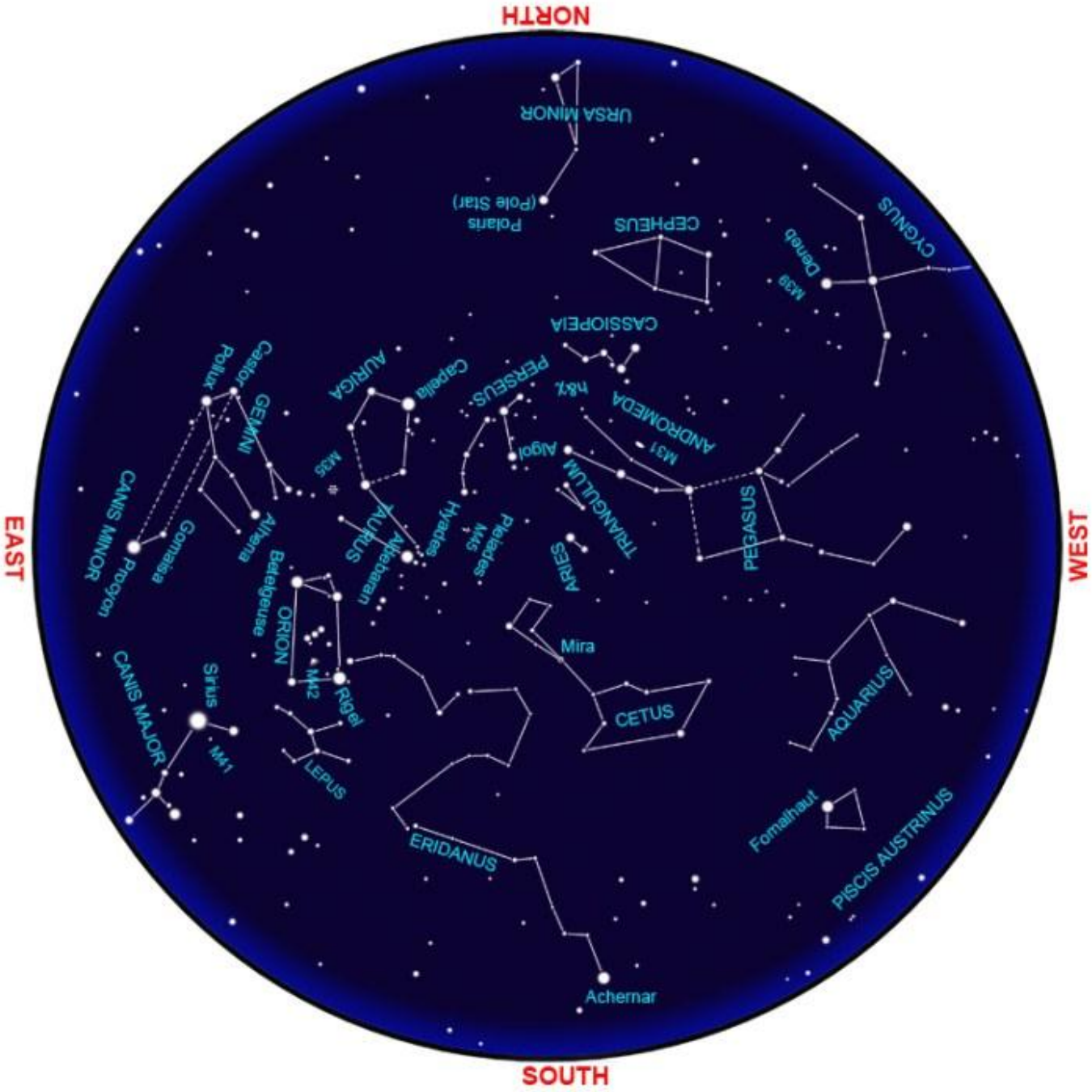
The sizes of Venus shown in this figure are in proportion when viewed through a telescope.



Ephemeris of Venus

	Date	R.A	Dec	Diameter	Mag
2019	01 Dec	18h 30m	-24° 44'	11.62	-3.9
	11 Dec	19h 24m	-23° 46'	12.03	-4.0
	21 Dec	20h 17m	-21° 37'	12.49	-4.0
	31 Dec	21h 07m	-18° 26'	13.03	-4.0
2020	10 Jan	21h 56m	-14° 26'	13.64	-4.0
	20 Jan	22h 41m	-09° 48'	14.35	-4.0
	30 Jan	23h 25m	-04° 47'	15.18	-4.1
	09 Feb	00h 08m	+00° 26'	16.15	-4.1
	19 Feb	00h 49m	+05° 38'	17.31	-4.2
	29 Feb	01h 31m	+10° 38'	18.69	-4.2
	10 Mar	02h 12m	+15° 15'	20.38	-4.3
	20 Mar	02h 52m	+19° 18'	22.47	-4.3
	30 Mar	03h 32m	+22° 40'	25.07	-4.4
	09 Apr	04h 09m	+25° 13'	28.36	-4.5
	19 Apr	04h 42m	+26° 54'	32.58	-4.5
	29 Apr	05h 08m	+27° 44'	37.96	-4.5
	09 May	05h 22m	+27° 41'	44.57	-4.5
	19 May	05h 20m	+26° 39'	51.70	-4.3
	29 May	05h 02m	+24° 28'	56.97	-3.9

Sky map for the month of November, drawn for mid northern latitudes, to be used around 9:30 p.m. local time



You may visit ASI – POEC link below for the maps for other months
http://astron-soc.in/outreach/resources/sky-maps/

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