

## Sun and Planets:

Jupiter and Saturn can easily be seen well above the western horizon in the October evening sky. Mercury too can be spotted this month. It will be more than  $10^\circ$  above the western horizon at the end of civil twilight. Its apparent magnitude changes from -0.2 in the beginning of the month to +0.6 by the month end. On 20 October it reaches its maximum eastern elongation of  $24.6^\circ$ . Venus is too close to the Sun in the beginning of the month; but after mid-October it appears in the evening sky above the western horizon soon after sunset. See the map on page #4.

The Sun is in Virgo, the Virgin (*Kanya*). Mars is also in Virgo, west of the Sun and can be seen in the eastern sky just before sunrise after 15 October. Mercury and Venus move from Virgo to Libra, the Scale (*Tula*) on 9 and 15 October respectively. Jupiter and Saturn are in Ophiuchus, the Serpent Bearer (*Bhujangadhari* or *Sarpdhar*) and Sagittarius, the Archer, respectively.

## March of the Moon:

The Moon can be seen in the western sky in the beginning of the month. On 3 October, it will be  $\sim 4.5^\circ$  northwest of Jupiter. Antares ( $\alpha$  Scorpii or *Jyeshtha*) will lie below the Moon and Jupiter. On 5 October, the Moon will be less than  $3.5^\circ$  west (right) of Saturn. Later that night the Moon will occult Saturn but the two objects will have set by then and the event will not be visible over India.

On 11 and 14 October the Moon will pass less than  $5^\circ$  from Neptune and Uranus respectively. But the Moon will be nearly 92% illuminated on 11 October and full on 14 October; hence it will be difficult to sight these planets. (See *finding charts for Uranus and Neptune on pages 5, 6 and 7.*)

On 18 October the Moon will pass through the Hyades cluster in the constellation Taurus (the Bull or *Vrishabh*). It is less than  $3^\circ$  from Aldebaran ( $\alpha$  Tauri or *Rohini*). Then on the 19<sup>th</sup> it will occult the Crab nebula — but this will be a day time event for India.

## List of events

Dt	Dy	Time	Event
01	Tu		Venus: $13.1^\circ$ E
04	Fr	01:53	Moon-Jupiter: $2^\circ$ S
05	Sa	21:31	Moon South Dec.: $22.8^\circ$ S
05	Sa	22:17	First Quarter
06	Su	00:19	Moon Descending Node
06	Su	02:18	Moon-Saturn: $0.3^\circ$ N
10	Th	23:59	Moon Apogee: 405900 km
11	Fr	06:47	Moon-Neptune: $3.4^\circ$ N
14	Mo	02:38	Full Moon
11	Fr	08:14	Moon-Uranus: $4^\circ$ N
18	Fr	02:30	Moon-Aldebaran: $2.8^\circ$ S
20	Su	09:29	Mercury Elongation: $24.6^\circ$ E
20	Su	12:58	Moon Ascending Node
20	Su	13:37	Moon North Dec.: $22.9^\circ$ N
21	Mo	18:09	Last Quarter
22	Tu	04:42	Orionid Shower: ZHR = 20
22	Tu	10:11	Moon-Beehive: $0.7^\circ$ S
26	Sa	16:11	Moon Perigee: 361300 km
28	Mo	09:08	New Moon
28	Mo	13:47	Uranus Opposition
31	Th	20:10	Moon-Jupiter $1.3^\circ$ S

On 21 October the Moon will pass through the Gateway of Heaven. The Gateway of Heaven is an asterism formed by Castor ( $\alpha$  Geminorum), Pollux ( $\beta$  Geminorum), Procyon ( $\alpha$  Canis Minoris) and Gomeisa ( $\beta$  Canis Minoris). These four stars make a nice parallelogram which is roughly bisected by the ecliptic.

The mornings of 23 and 24 October will offer a good view of the thin lunar crescent passing north of Regulus (*Magha*). And then on the 31<sup>st</sup> the thin lunar crescent will lie west of Jupiter at sunset. See page #3 for a sky map suitable for Indian observers.

## Good time to observe the variable star Algol :

Algol or (Beta Persei,  $\beta$  Persei; RA 03h 08m 10s, Dec +40° 57' 20"), in the constellation Perseus, is one of the most exciting naked eye variable stars. The magnitude of the star varies from 2.1 to 3.4 and thus it can be easily observed even if the sky is moderately light-polluted.

Algol is an eclipsing binary star with a period of 2 days, 20 hours, 48 minutes and 57 seconds or 2.867328 days. The eclipse takes place roughly over 10 hours. For nearly two days and ten hours the star remains at a constant magnitude of 2.1; then over a period of about five hours it fades to its minimum magnitude of 3.4. Then in the next five hours it returns back to its normal magnitude of 2.1.

The name Algol is derived from Al Ghoul, which means 'demon' in Arabic. It is quite possible that medieval Arab astronomers had noticed the variable nature of this star. The varying brightness of the star was first reported by the Italian astronomer Geminiano Montanari in 1667 but observationally documented by the British amateur astronomer John Goodricke. Goodricke announced his observations in May 1783. He also proposed a mechanism for the star's variability. He suggested that possibly a dark body was passing in front of the star causing a drop in the light received by us; or the star itself may have a cooler region which results in a drop in its brightness every time the cooler region is in the direction of Earth.

Goodricke was barely 19 years old then. Later, more stars like Algol were discovered. These stars are collectively known as eclipsing binaries or Algol type variable stars.

Some contemporary astronomers ridiculed Goodricke's proposal, sarcastically remarking that one might even find a planetary system around the stars. Today nearly three centuries later, this very method of observation of eclipses of stars is being used for finding planetary systems of distant stars.

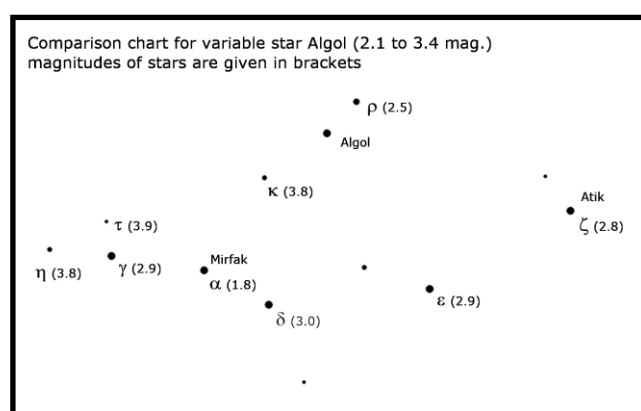
Goodricke presented his findings to the Royal Society in May 1783 for which he received the Copley Medal (given for outstanding achievements in research in any branch of science). He was elected a Fellow of the Royal Society on 16 April 1786. Alas, he never learned

of this honour. He died of pneumonia on 20 April before this news could reach him. It may also be noted that Goodricke became deaf in early childhood due to hay fever.

*For more information about Algol please visit <[wikipedia](#)>*

Algol can be compared with Gamma ( $\gamma$ ) Andromedae (mag 2.1) which lies to its west and Epsilon ( $\epsilon$ ) Persei (mag 2.9), ~0.5 mag brighter than when Algol is at minimum.

The finding and comparison chart for Algol is given below, with magnitudes of stars for comparison given in brackets (also see page 8).



The best time to watch the entire sequence of Algol fading to minimum and coming back to its normal magnitude is when the minimum takes place when the star is close to the local meridian. This happens around the end of October and beginning of November.

At other times one can observe the partial sequence of Algol fading or becoming bright.

As the star is very bright even the Full Moon is no hindrance when observing from a fairly dark site.

We have listed below the timings (in IST) of Algol minimum suitable for observations from India. These timings are taken from the [Sky and Telescope](#) site.

29 Oct 2019 @ 02:12 am  
31 Oct 2019 @ 11:00 pm  
03 Nov 2019 @ 07:49 pm  
18 Nov 2019 @ 03:54 am  
21 Nov 2019 @ 00:43 am  
23 Nov 2019 @ 09:32 pm

This year, the best night for observing the entire eclipse of this star is the night of October 31, 2019. The Moon on that night is just about 15% illuminated. It will set about three hours after the

Sun, while Algol will transit about seven hours after sunset. It is a good night to observe Algol minimum.

## Upcoming star parties

**Organizer:** Stargazing Mumbai

**Dates:** Saturday, 23 November 2019 and  
Saturday, 21 December 2019

**Place:** Mahuli, Asangaon, Maharashtra  
(about 80 km north of Mumbai on the  
Mumbai-Nasik highway)

**Details:** Overnight programs with  
constellation and night sky tour, observation  
of planets and deep sky objects.

**Fee:** Rs 300/= per person

**Contact:** Ms Pooja Tolia, +919112662662,  
[www.stargazingmumbai.in](http://www.stargazingmumbai.in)

Other organizations are welcome to send  
information about their star parties, to be  
published here.

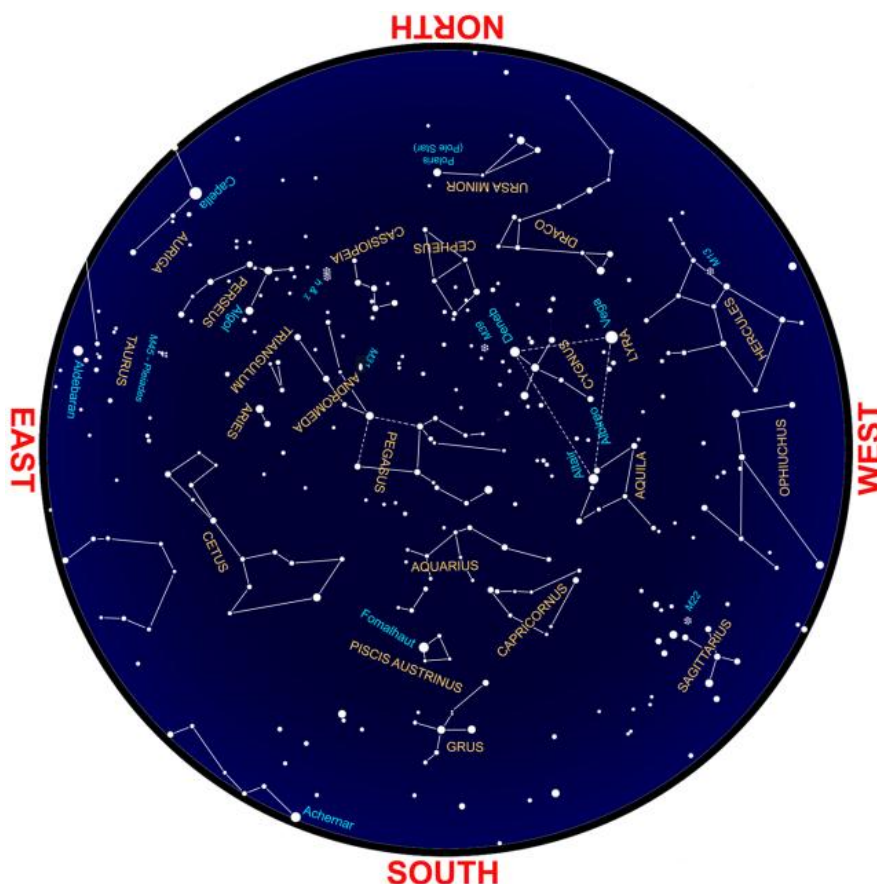
## Orionid meteor shower:

The yearly Orionid meteor shower peaks during the early hours of 22 October. The zenithal hourly rate (ZHR) of the shower is 20. ZHR is an indicator of the number of meteors that can be seen if the radiant of the shower is right overhead, that is at the zenith. These meteors are the debris of Comet 1P/Halley.

Orionid will be a challenging meteor shower this year. The radiant is nearly at the zenith about two hours before the local sunrise. The almost 45% illuminated Moon will be about 40° east of the radiant. The best way to observe this shower is to look about 45° above the horizon in the northwest, west or southwest directions.

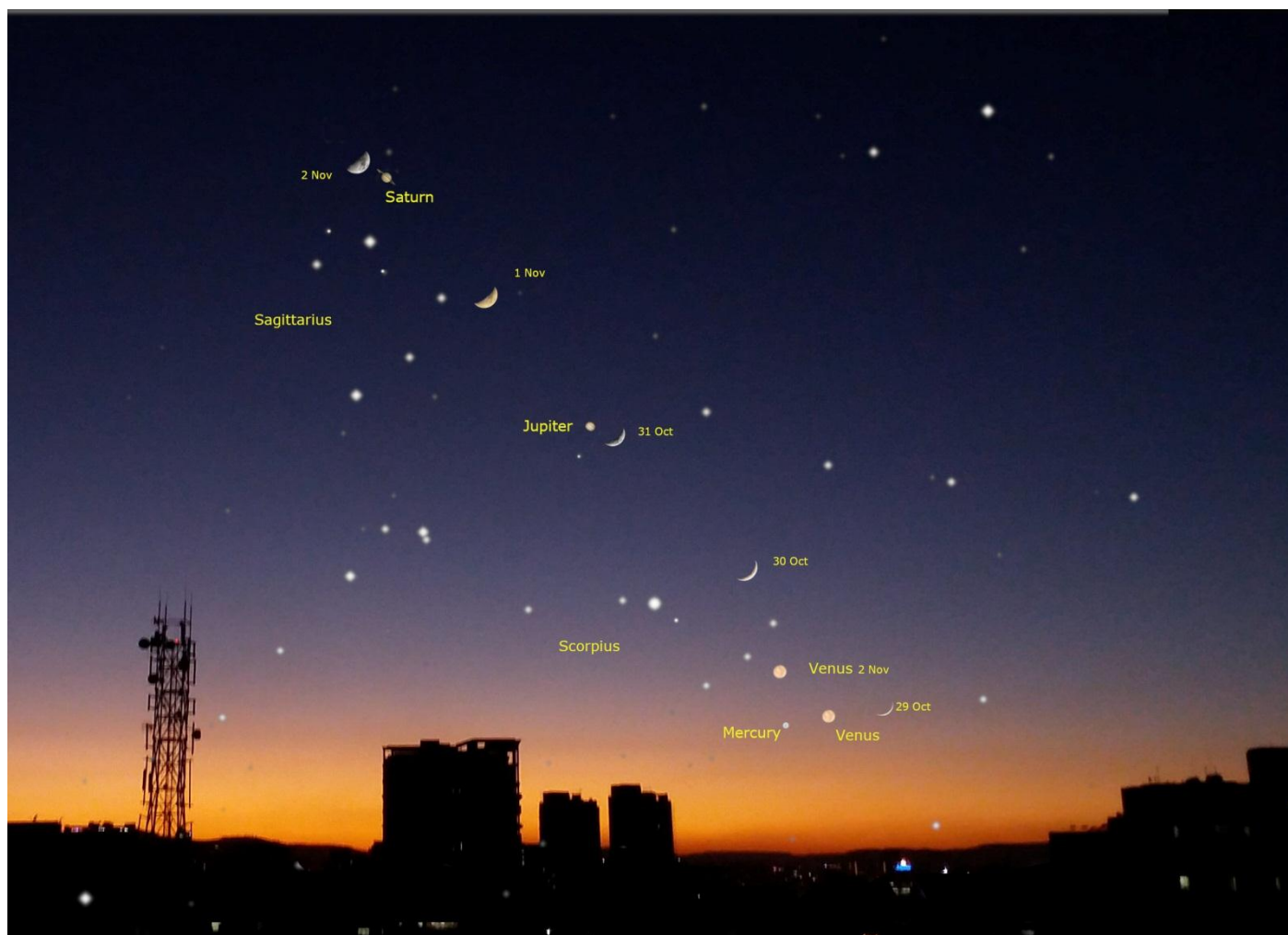
For more on observing meteor showers, visit  
<https://skytonight.wordpress.com/wish-upon-a-shooting-star/>

The sky map for the month of October, drawn for mid northern latitude, to be used around 9:30 p.m. local time.



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





The western sky from 29 Oct to 2 November. Images of planets are for the purpose of illustration only.

## Readers' feedback:

Dear Sir,

Thank you so much for sharing this. This is great initiative and indeed will be helpful to us.

Regards

Karuna Gamre, 1 September 2019

Sir,

Thanks for this excellent initiative. This will be really helpful for all astronomy enthusiast for upcoming season.

I will be glad to be any help you need for this.

I and my small group of enthusiast won't mind sharing expenses you incur to publish this.

Thanks once again.

Gaurang Bhatt, 1 September 2019

This initiative is wonderful. Just the right kind of information.

Purvi Udhwani, 1 September 2019

Wow, this is great!

I have been following EarthSky for updates on astronomical events. But since it's American, it's kinda hard to keep track of the difference in time zones, and location differences!

Your newsletter is just what I needed.

I appreciate the effort it takes. Kudos and much thanks :)

Love,

Aditya Hegade, 2 September 2019

### These pages are contributed by:

Arvind Paranjpye

([paranjpye.arvind@gmail.com](mailto:paranjpye.arvind@gmail.com))(<http://arvindparanjpye.blogspot.com/>) and Anjanee Rao ([rao.anjanee@gmail.com](mailto:rao.anjanee@gmail.com))

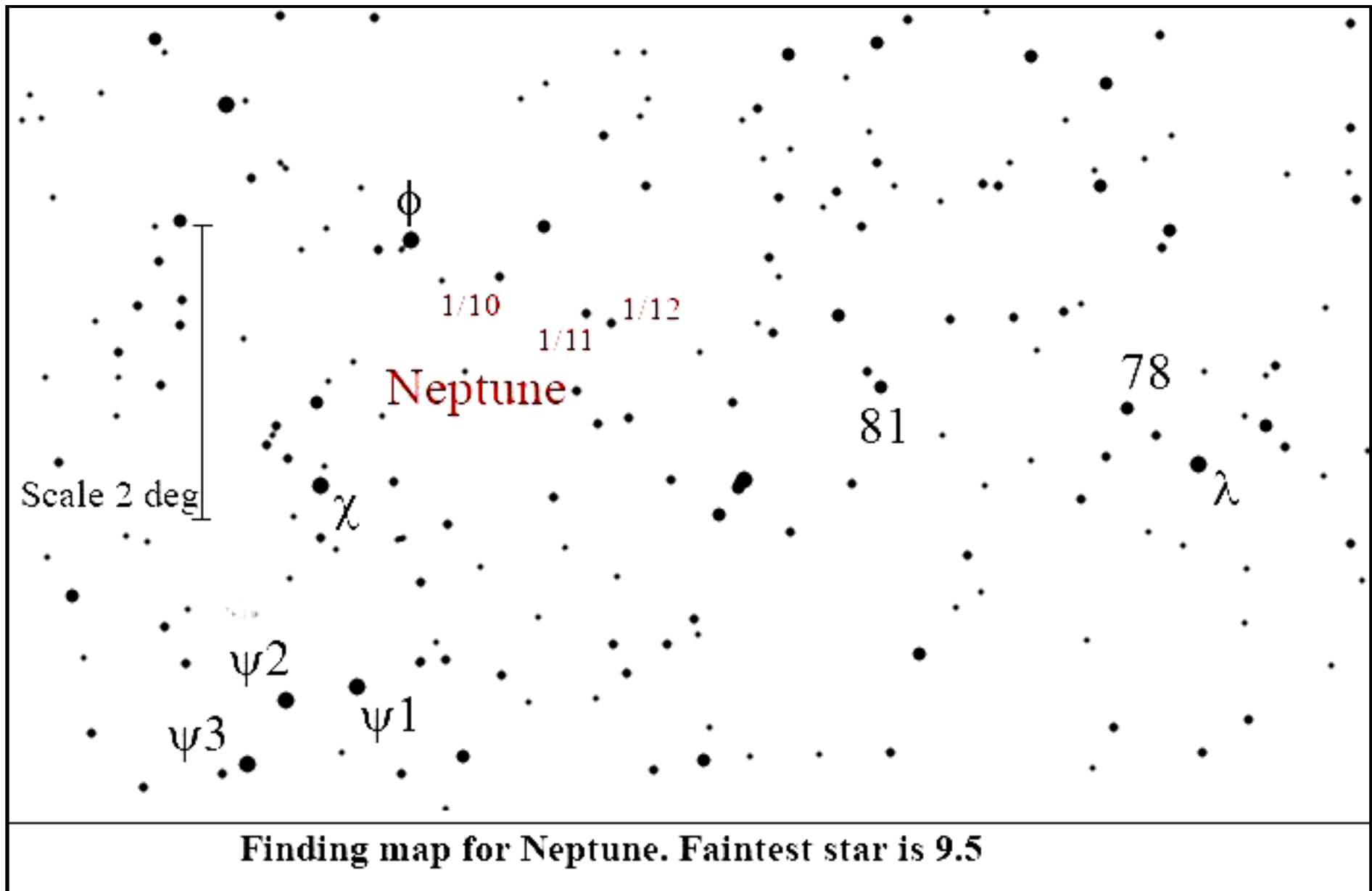
### Acknowledgements:

<http://www.lunar-occultations.com/iota/occult4.htm>

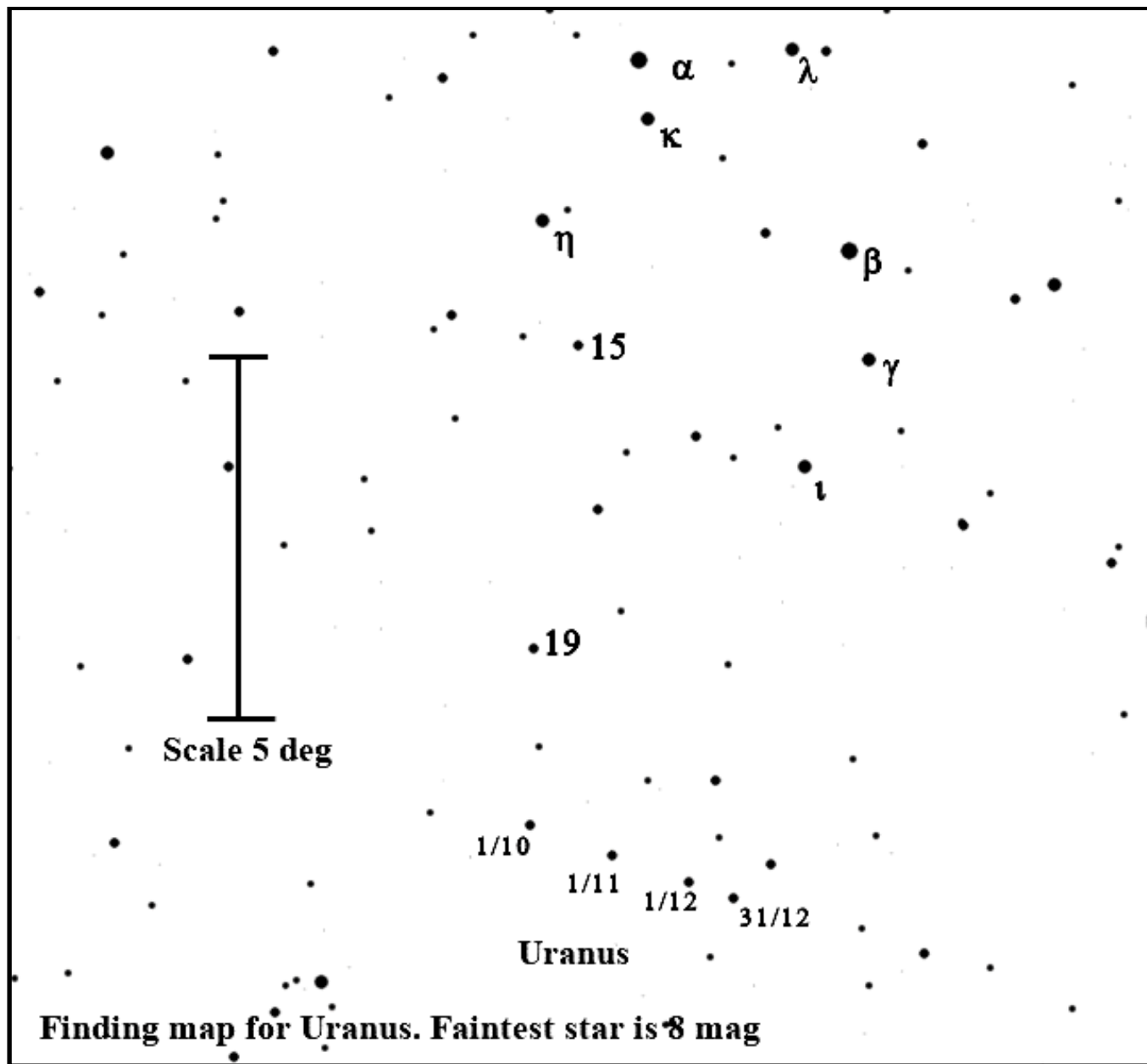
by Dave Herald for International Occultation Timing Association.

<https://eclipse.gsfc.nasa.gov/SKYCAL/SKYCAL.html> by Fred Espenak and Sumit Dutta.

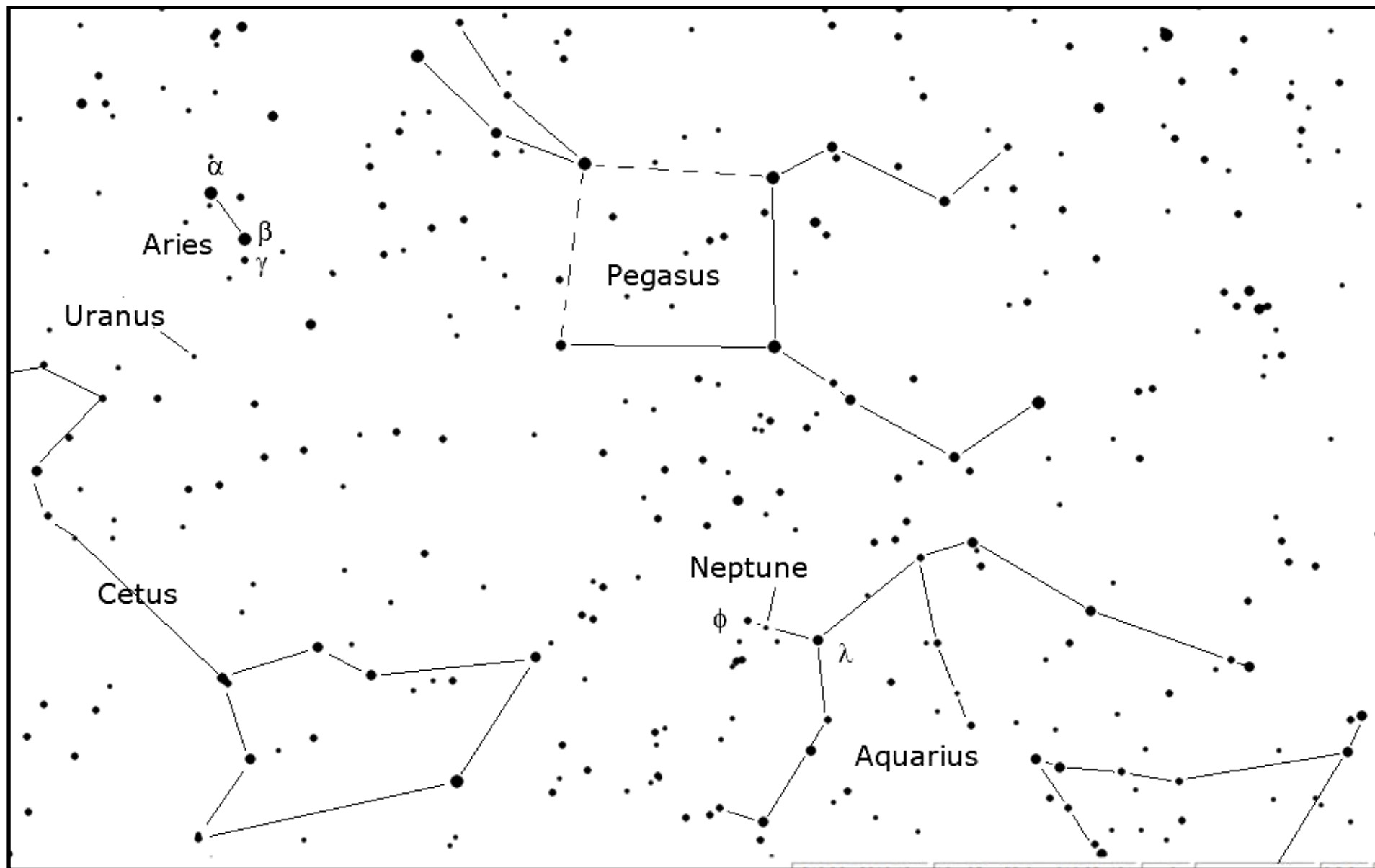
Graphics using GNU Image Manipulation Program (GIMP) a cross-platform image editor: <https://www.gimp.org/>



Positions of Neptune on 1 October, 1 November and 1 December. First identify clearly the stars phi and lambda in Aquarius. Then you may star hop from Lambda to 78, from there to 81 and then to Phi. Neptune reverses it path on 27 November. We will talk about this in the next issue.



This map is similar to one given in the SkyNews issue of September 2019, except that we have added the positions of Uranus on 1 October, 1 November, and 1 and 31 December



This map shows the positions of Uranus and Neptune with respect to the constellations Aries, Pegasus, Cetus and Aquarius. Compare this map with the all-sky map given on page 3.

Comparison chart for variable star Algol (2.1 to 3.4 mag.)  
magnitudes of stars are given in brackets

