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## Astronomy Bulletin - The Night Sky: December 12, 1992 to February 15, 1993

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## THE NIGHT SKY

December 12, 1992 to February 15, 1993

Those who live in the comparatively dark skies of the heartland of the United States may still enjoy the transitory events of the sky. The dark, clear skies of winter make it possible for young people to be thrilled by the brightness of Venus, the stealthy appearance of the crescent Moon after sundown or the flash of a meteor across the sky. Meteor showers, so called because a number of "shooting stars" appear in the sky at about the same time from the same point in the sky, present an opportunity to witness the transitory event of a shooting star.

The Leonid meteor shower occurring this month is a good case in point. Viewers will be partly handicapped this year by the last quarter moon, but the event still presents an opportunity to discuss some of the interconnections of objects in space. Our understanding of this shower has an interesting history. While it has long been recognized as an annual event, not until the spectacular shower of 1833 did astronomers become sincerely interested in its cause. That year, literally thousands of shooting stars were observed in a fifteen-minute period early in the morning of November 12. People from Iowa to Massachusetts were frightened by the event which some thought marked the end of the world.

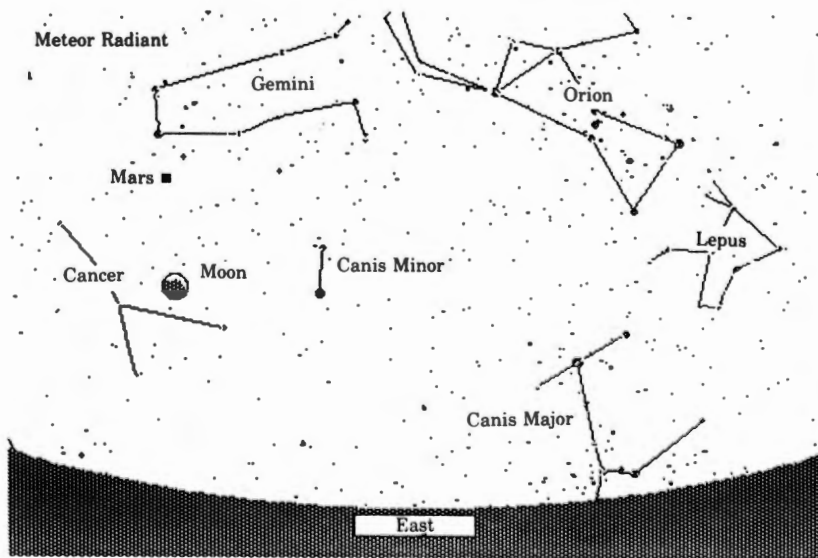
Later astronomers recognized that this event was similar to showers that had been observed in 1698 and 1799 and concluded that the shower had a period of about 33 years. In 1863, H.A. Newton (no relation to Isaac Newton) and Schiaparelli (discoverer of Martian "canals") calculated the orbit of the shower, and soon other astronomers recognized that it had the same path as the comet Tempel-Tuttle, discovered in 1866. The shower is the result of the Earth intersecting the orbit of the comet and colliding with tiny particles of materials that have separated from the comet itself. Truly we run into comet dust! In the case of this shower, we run into the stream almost head on, so the velocity of the collision is equal to the Earth's orbital velocity, 44 miles (70 km) per second, added to the velocity of the comet, which is approximately the same as that of the Earth. The resulting collisions at this "closing velocity" is such that an ounce (28 g) of this material has a kinetic energy equal to the chemical energy of 30 lbs (14 kg) of TNT! No wonder the tiny grains of material flash with such brilliance when they impact the comparatively dense media of the Earth's atmosphere. Put November 1999 on your calendar, when the next major return of the shower will celebrate the end of the century.

If you miss the Leonids in November, look for the Germinids, the Ursids or the Quadrantids later in the winter.

**Figure 1:** On the night of December 12 and the morning of December 13th, the Geminid meteor shower occurs. Unfortunately, the nearly full Moon in the same region of the sky as the radiant will make it nearly impossible to see any meteors. The Moon will be illuminated 87 percent and at 10:00 PM will appear 20° above the horizon. It will be a nuisance for meteor observing all night long. *Mars* can be seen about 11° above the Moon.

**Figure 2:** In the evening twilight on December 21, the planets *Venus* and *Saturn* will appear to be very close together in the sky. The pair of planets will be about 21° above the horizon. Saturn is approximately 1° to the upper-right of Venus. Venus is approximately 50 times brighter than Saturn. Seen through a small telescope, Venus will appear to be illuminated about 64 percent.

**Figure 3:** Early in the morning of December 22, another meteor shower, called the Ursids, will appear to radiate from the constellation Ursa Minor. This meteor shower normally produces about 15 meteors per hour. Fortunately, the Moon will have set at 3:45 PM on the previous afternoon and will not interfere with meteor observing.



**Figure 1**  
December 12, 1992  
10:00 PM

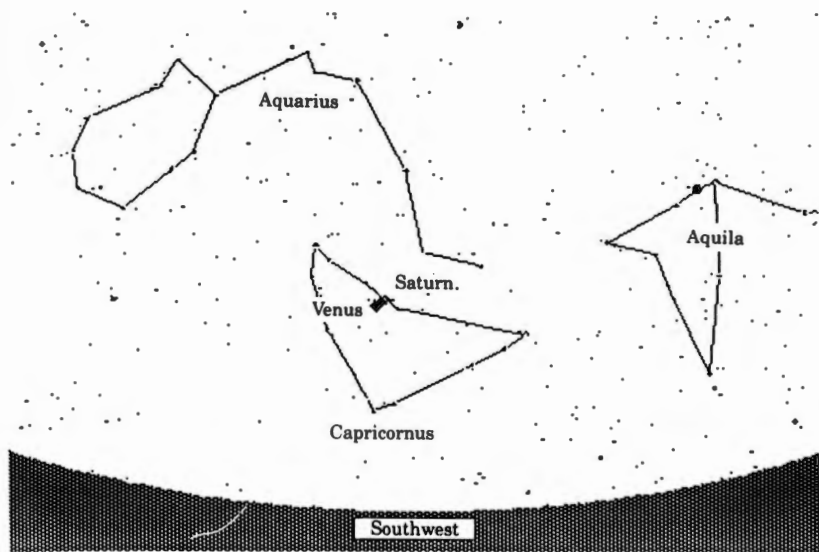


Figure 2  
 December 21, 1992  
 6:00 PM

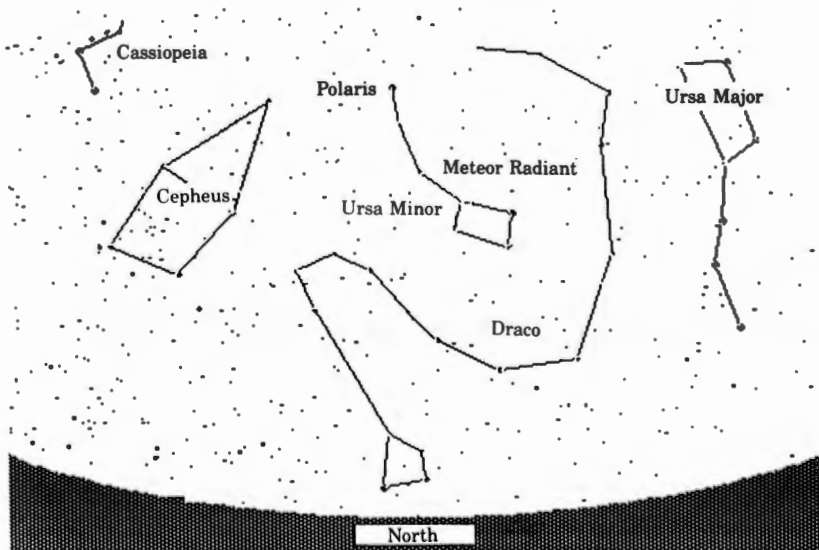
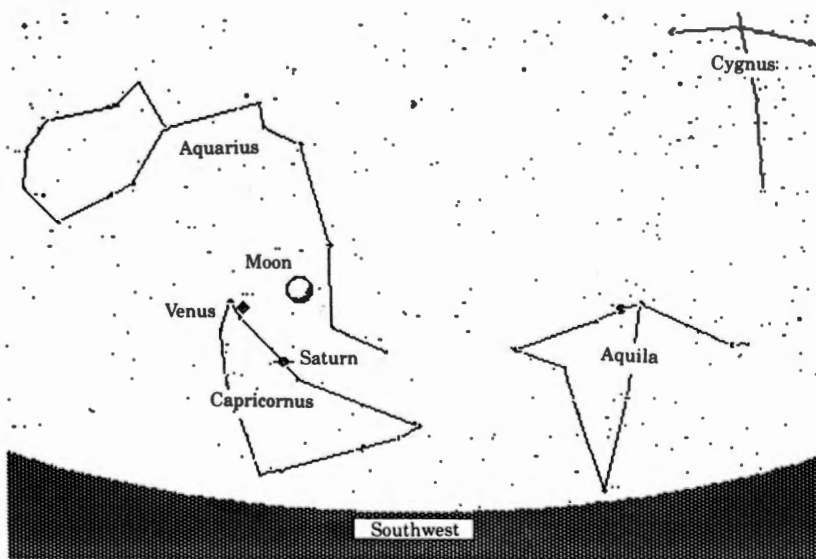


Figure 3  
 December 22, 1992  
 12:00 AM

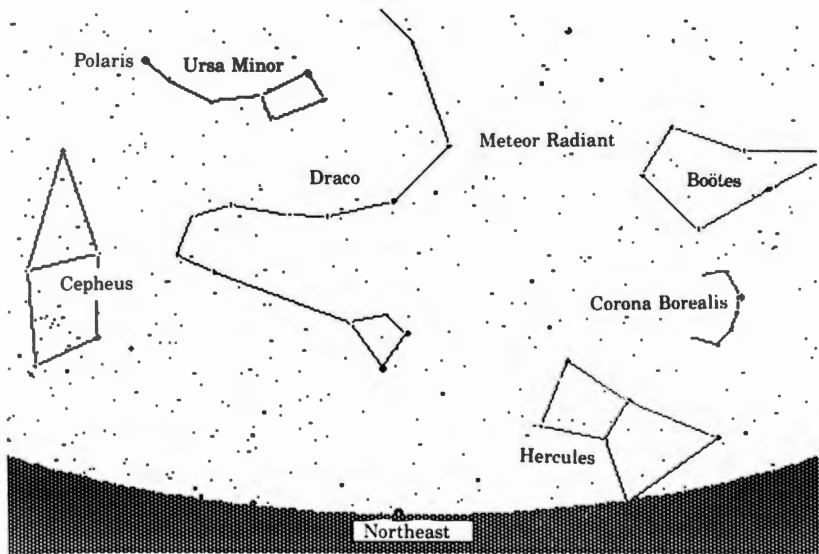
**Figure 4:** On the evening of December 27, an interesting arrangement of the Moon and two planets will occur approximately  $20^\circ$  above the horizon. The Moon will appear to be a thin crescent illuminated only 15 percent. The bright planet *Venus* will be located  $6^\circ$  to the lower-left of the Moon. Venus, through a small telescope, will appear to be illuminated 62 percent. *Saturn* will be located  $7^\circ$  below the Moon.

**Figure 5:** Early in the morning of January 3, the meteors of the Quadrantid meteor shower will appear to originate from a point between the constellations Draco and Boötes. The Quadrantid showers usually produce about 40 meteors per hour. The Moon sets at 2:44 AM and after that time will no longer be a factor in observing meteors.

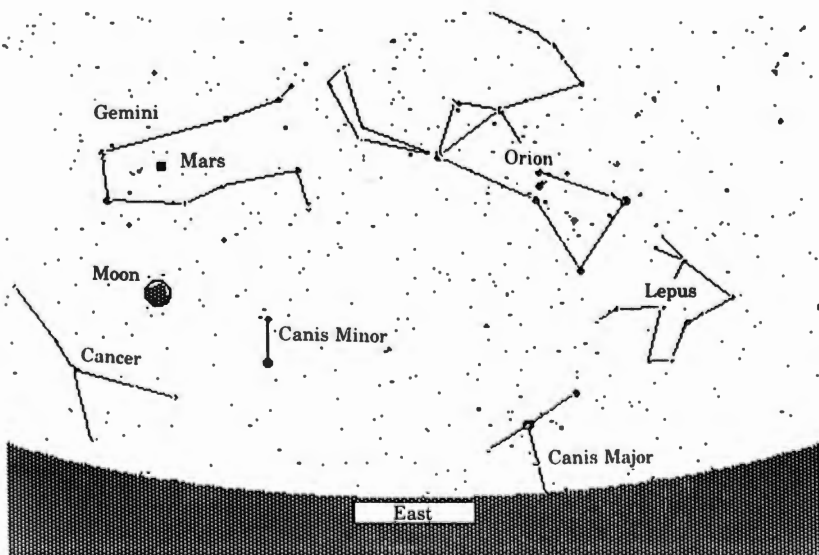
**Figure 6:** Early in the evening on January 8, the Moon and *Mars* will be visible in the eastern sky. The nearly full Moon will be located about  $18^\circ$  above the horizon. Mars will be the bright object  $12^\circ$  above the Moon.



**Figure 4**  
December 27, 1992  
6:30 PM



**Figure 5**  
**January 3, 1993**  
**3:00 AM**



**Figure 6**  
**January 8, 1993**  
**7:30 PM**

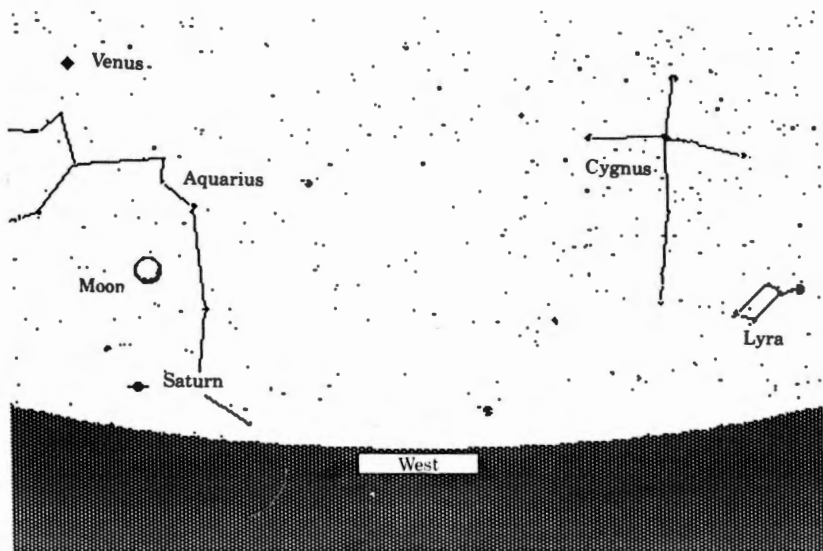
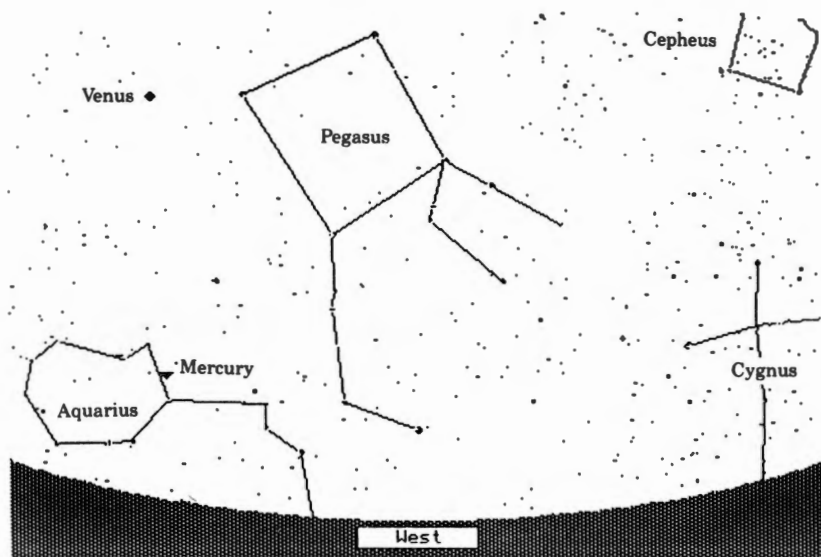


Figure 7  
 January 24, 1993  
 6:00 PM

**Figure 7:** Early in the evening twilight on January 24, a viewer may see the Moon, *Venus* and *Saturn*. A very thin crescent  $16^\circ$  above the horizon, the Moon will be illuminated only 5 percent. (Using a pair of binoculars may be helpful). *Saturn* will be close to the horizon ( $5^\circ$ ) and may not be visible except under ideal conditions. *Venus* will be the bright object approximately  $24^\circ$  above and to the left of the Moon. Through a small telescope, *Venus* will appear to be illuminated only 48 percent.

**Figure 8:** Early in the evening on February 15, *Mercury* and *Venus* will be visible. *Mercury* is the bright object located about  $13^\circ$  above the horizon. Viewers may find a pair of binoculars helpful. *Venus* will be  $27^\circ$  above *Mercury*. Through a small telescope, *Venus* will appear to be illuminated only 34 percent.



**Figure 8**  
February 15, 1993  
6:00 PM

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