December Skies over the Pinnacles

December 2021

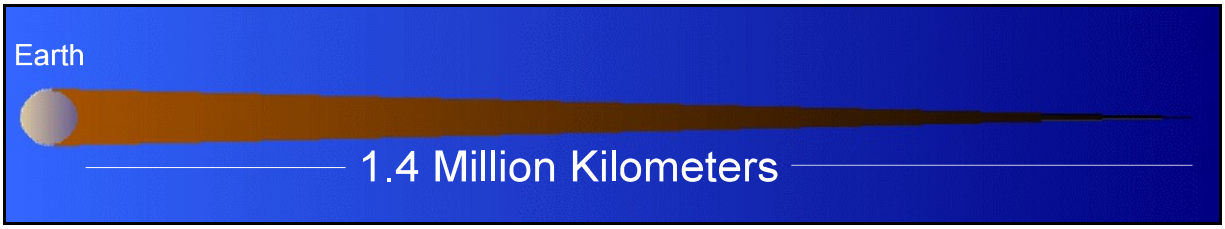
December's four principal phases of the moon

December 4	New Moon	
December 11	First Quarter	
December 19	Full Moon	
December 27	Last Quarter	

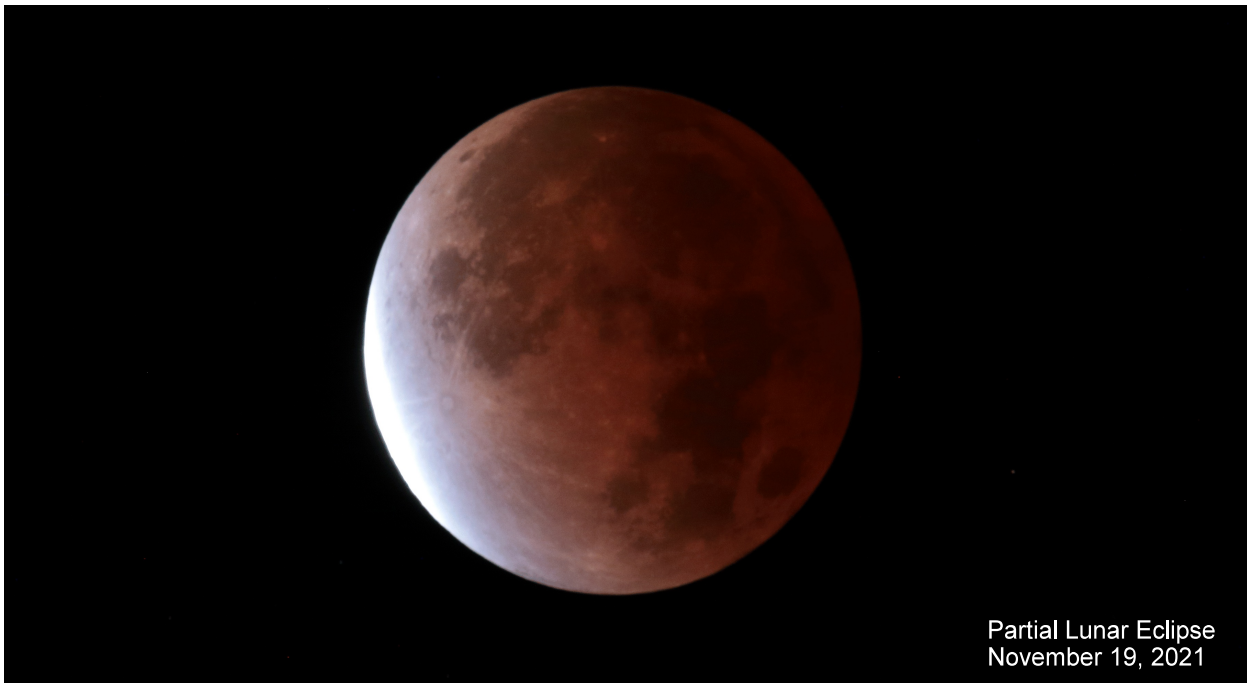
If you're a fan of old radio shows, you might recognize this phrase following the question: *"Who knows what evil lurks in the hearts of men?* ***The Shadow Knows!*** I don't know about evil detection but we can learn some interesting things from shadows.

The next evening the air is very clear and there are no clouds, look toward the east, down low near the horizon. Right after sunset you may see a band of darker sky hugging the horizon, usually with a pink band above and the fading blue sky above that. The low, dark band is called the **Belt of Venus**. Despite the name, it has nothing to do with that planet. As the sun sets, the solid body of our planet blocks sunlight from illuminating the atmosphere and we see the shadow of the earth. Keep watching. You'll see the **Belt of Venus** rise up higher as more of the Sun's light is blocked as we head toward nighttime.

The Earth's shadow doesn't stop at our own atmosphere. The darkest part of earth's shadow extends about 1.4 million kilometers into space and always points away from the Sun. Think of a giant ice cream cone with the Earth in the opening and the point extending out into space, opposite the Sun.



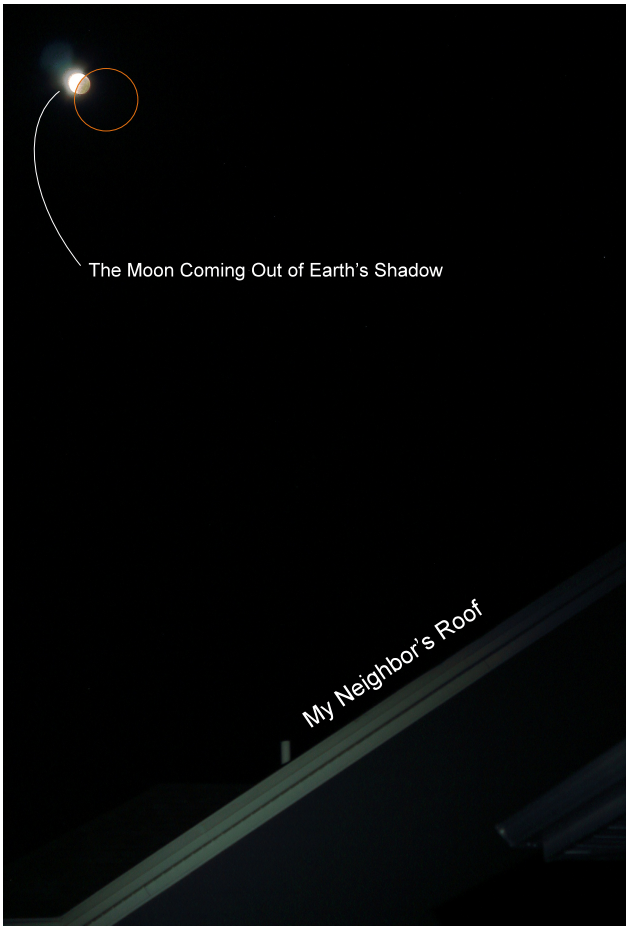
From time to time the Moon's orbit brings it through Earth's shadow and we get to see our planet's shadow as it points away from the Sun and out into space. The moon takes on a reddish color because most of the sunlight reaching the moon has gone through Earth's atmosphere and gets tinted red and orange, the same red and orange we enjoy at sunrise and sunset. I took this picture at about 4AM on November 19.



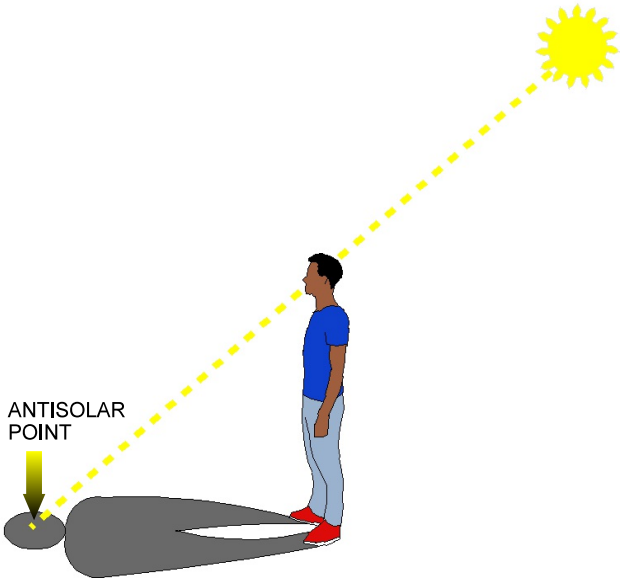
But look closely at this image. Sometimes the blue scattered sunlight that makes our skies blue makes it to the Moon during an eclipse and we can see a pale blue band at the edge of the reddish part of the shadow.

You can even see the curvature of the Earth by the shape of the shadow on the moon. (Flat-Earther's hate this.) I made this image 50 minutes after the one above was taken.

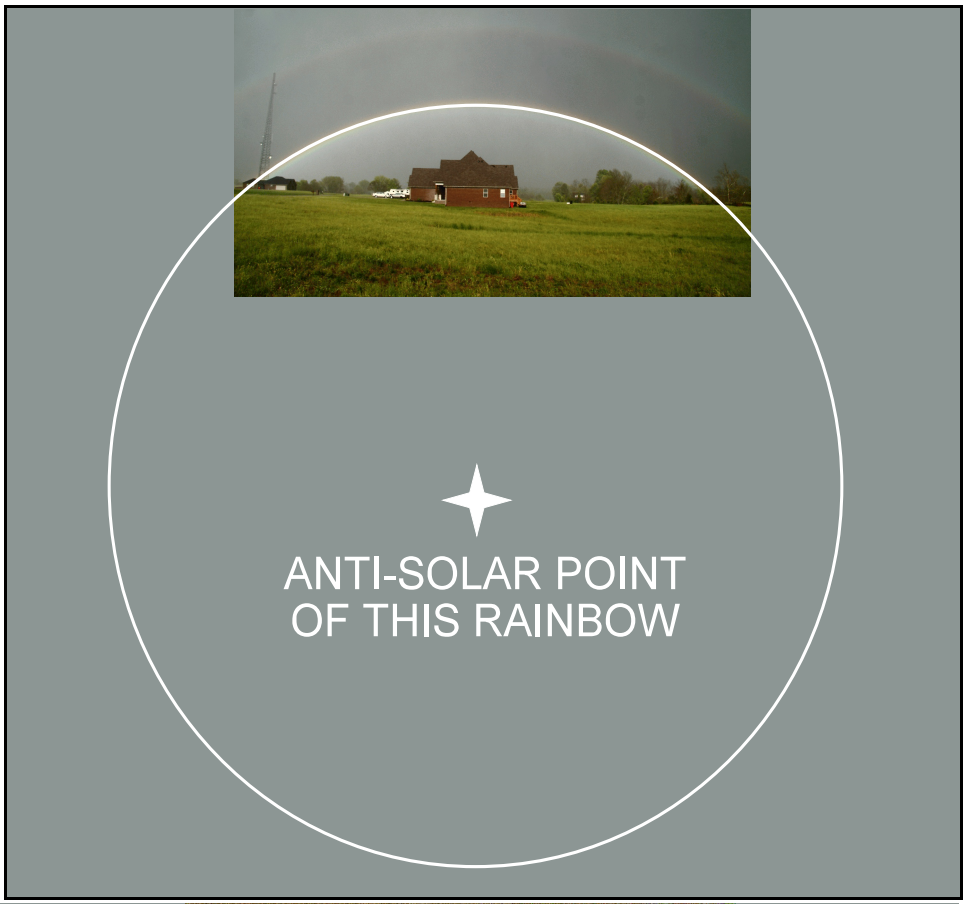
I love putting things into human perspective. Here's a picture of the moon taken at the same time as the one above but how appeared to the eye . You can see my neighbor's roof at the bottom.



I drew an orange circle on this image just to show where the Earth's shadow is as it recedes into space, away from the Sun. The point that is in the center of Earth's shadow is called the **antisolar point.** That's the point in space directly opposite the sun from the viewer.



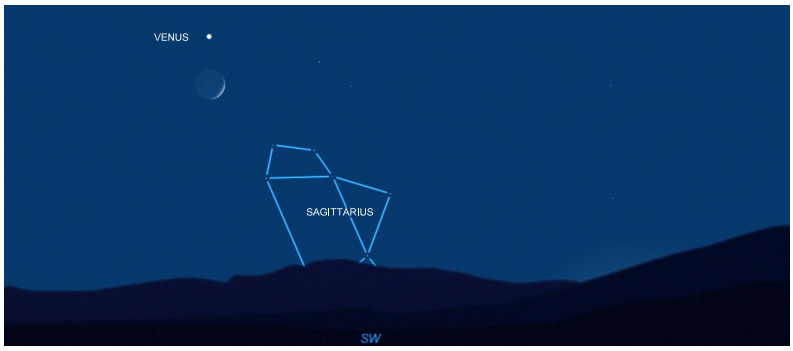
Even a rainbow has an **antisolar point**. Because the sun is above the horizon the **antisolar point** is below the horizon.



Attractions in December

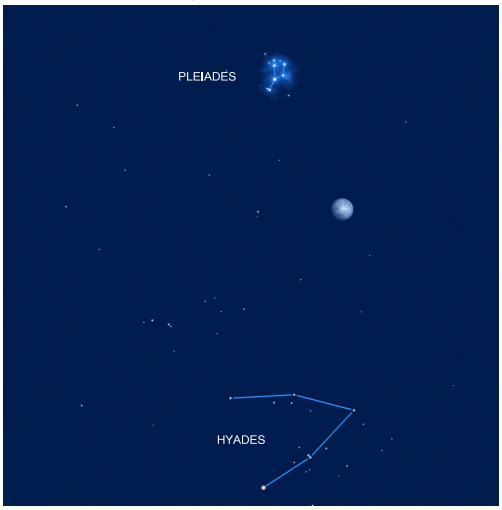
All Month Jupiter, Saturn and Venus will grace the sky just above your southwestern horizon. Think of this as an Advent gift**!**

December 6 Binocular Alert! Look for brilliant Venus just above the thin crescent Moon.



December 14 The Earth passes through the swarm of space dust (as it does every year) and we will be treated to the annual Geminid meteor shower. The Moon will set around 3AM, just about the right time for you to leave your warm bed to enjoy some "shooting stars". Despite the cold, this shower is one of the best. You might see up to 50 meteors per hour. See my August, 2021 "Skies" article for tips on successful meteor watching.

December 16 Once again, see the almost full moon making a visit between the Pleaides and V-shaped Hyades star clusters in the constellation Taurus.



December 21 On this day, the Earth's northern hemisphere is pointed as far away from the direction of the sun as it ever gets. Yes, it's the Winter Solstice and winter is here!

December 25 **Merry Christmas!**

December 29 Binocular Alert! Scan the southwestern horizon Venus and fainter Mercury just after the sun sets.