

Summer Moon Illusion

June 28 2007

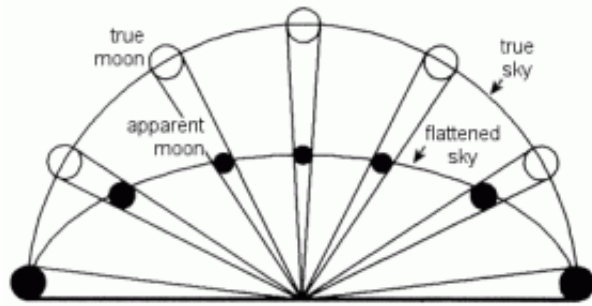


A time-lapse sequence of the moon rising over Seattle. To the camera, the moon appears to be the same size no matter what its location on the sky. Credit and copyright: Shay Stephens.

Sometimes you can't believe your eyes. This weekend is one of those times.

On Saturday night, June 30th, step outside at sunset and look around. You'll see a giant moon rising in the east. It looks like Earth's moon with the usual craters and seas, but something's wrong. This full moon is strangely inflated. It's huge!

You've just experienced the Moon Illusion.



The "flattened sky" model for the Moon Illusion.

Sky watchers have known for thousands of years that low-hanging moons look unnaturally big. Cameras don't see it, but human eyes do; it's a genuine illusion.

This weekend's full moon hangs lower in the sky than any other full moon of 2007, so the Moon Illusion is going to be strong. What makes the moon so low? Consider the following: The sun and full moon lie on opposite sides of the sky. They are like a see-saw: when one is high, the other is low. Because the summer solstice was just last week (June 21st), the sun is near its highest point in northern skies. The full moon is correspondingly low.

When you look at the moon, rays of moonlight converge and form an image about 0.15 mm wide in the back of your eye. High moons and low moons make the same sized spot. So why does your brain think one is bigger than the other? After all these years, scientists still aren't sure of the answer.

A similar illusion was discovered in 1913 by Mario Ponzo, who drew two identical bars across a pair of converging lines, like the railroad tracks pictured right. The upper yellow bar looks wider because it spans a greater apparent distance between the rails. This is the "Ponzo

Illusion."

Some researchers believe that the Moon Illusion is Ponzo's Illusion, with trees and houses playing the role of Ponzo's converging lines.

Foreground objects trick your brain into thinking the moon is bigger than it really is.

But there's a problem: Airline pilots flying at very high altitudes sometimes experience the Moon Illusion without any objects in the foreground. What tricks their eyes?

Maybe it's the shape of the sky. Humans perceive the sky as a flattened dome, with the zenith nearby and the horizon far away. It makes sense; birds flying overhead are closer than birds on the horizon. When the moon is near the horizon, your brain, trained by watching birds (and clouds and airplanes), miscalculates the moon's true distance and size.

There are [other explanations](#), too. It doesn't matter which is correct, though, if all you want to do is see a big beautiful moon. The best time to look is around moonrise, when the moon is peeking through trees and houses or over mountain ridges, doing its best to trick you. The table below (scroll down) lists moonrise times for selected US cities.

A fun activity: Look at the moon directly and then through a narrow opening of some kind. For example, 'pinch' the moon between your thumb and forefinger or view it through a cardboard tube, which hides the foreground terrain. Can you make the optical illusion vanish?

Stop that! You won't want to miss the Moon Illusion.

Source: Dr. Tony Phillips, Science@NASA

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