August Skies over the Pinnacles

August 2025

by Jeff Hutton

August's Four Principal Phases of the Moon

August 1	First Quarter
August 9	Full Moon
August 16	Last Quarter
August 23	New Moon

Frequently Asked Questions about Telescopes

Over the last three months, I got a little into the weeds about building "kit" telescopes for the **First Light Learnshop**, planned for this fall. From time to time I am asked questions about telescopes, mainly, "which is the best kind to get?" My answer to that one is simple. The best kind of telescope to get is the one that will ***get used***. For most everyone, that means you want a telescope that is easy to set up and use and will show you cool stuff in the sky. What cool stuff? Big, Bright and Showy! Most people will start with the Moon. I've been at this for 60 years and I can still spend hours getting reacquainted with the lunar features, such as the big dark-appearing Maria, major craters, ejecta rays (debris that was blown out from some craters when an asteroid smacked into the Moon, millions and billions of years ago). But remember the one thing that you should never look at with your eyes and especially a telescope, is the Sun!

You can expect to see the Moon like this on a small reflecting of refracting telescope (more on that later).
I do not endorse one brand over another. Here are some examples:

Beginner's Refractor Telescope

Beginner's Reflector Telescope

You can expect to see the Moon look like this in either of these telescopes. If you want to clearly see the rings of Saturn, the phases of Venus of Jupiter's 'stripes', these scopes aren't powerful enough. The minimum amount of magnification needed to make out Saturn's rings is about 60X. The highest useful magnification for these little guys is about 40X.

Also, binoculars can be a good choice for budding star gazers and binoculars can also be used for sports and bird-watching!

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Never point binoculars, like your telescope, at the Sun!

Question 1: How far can a telescope see?
That depends on how bright the object you want to see and how large a aperture (measured across the telescope's big mirror or lens). Put it this way. If you launched a black tennis ball into Earth orbit, even a big telescope couldn't see it. But that same telescope might show you an exploding star, or supernova, from a billion light years away!

Question 2: What is magnification? That's a measure of how much bigger an object looks in a telescope or binoculars compared to how it appears to the unaided eye. Designated with an 'X', like I did above, you can think of it as how much closer the object appears in a telescope compared to how it does just to the eye.

Meet me and my homemade refractor telescope.

In the series of pictures below, I show how a plastic garden owl would appear
First, as it would in my backyard from the patio.
Second, about as it would appear in the telescope, magnified 20 times and
Third, magnified in the telescope at about 100X.

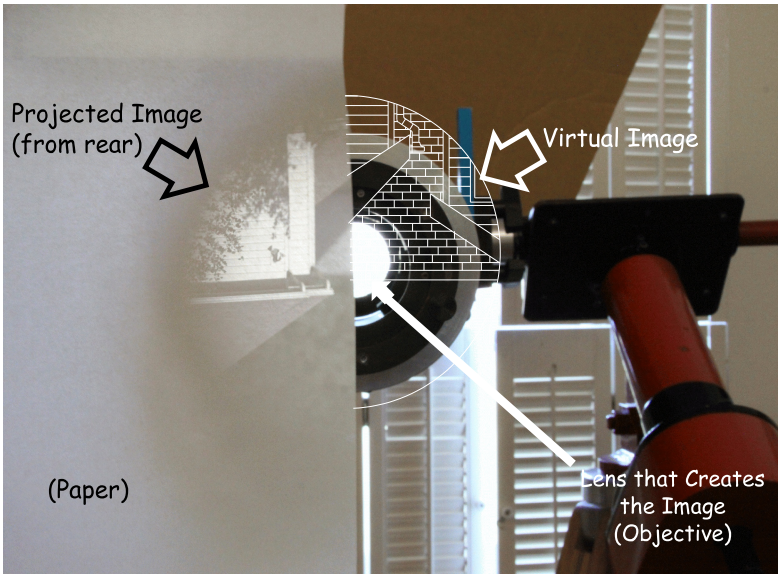
This is about the size of the planet Saturn when viewed through this telescope at 100X.

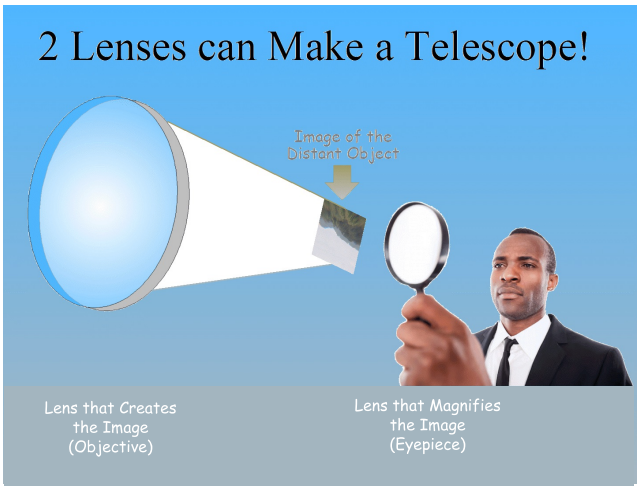
Question 3: How do telescopes work? If you look at them, telescopes are pretty simple machines. Let's start with refractor telescopes. A refractor uses a big lens at the front of a hollow tube and a little lens (actually a series of lenses) at the rear of the tube. You look through the lenses at the rear of the tube to see distant objects.

We've all used a magnifying glass. It uses a lens that is thicker in the middle than at the edges and it makes nearby things look bigger.

But this same lens can also project an image of an object.

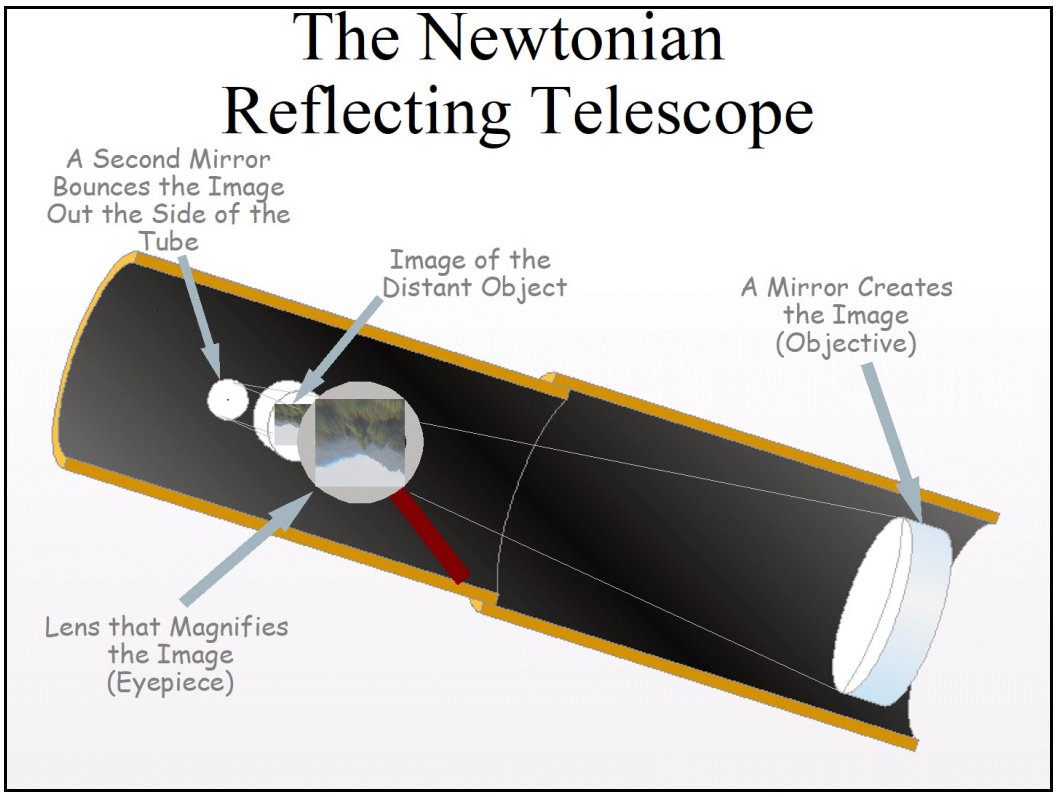
I pointed my telescope out the window and let the big lens in the front project an image of the house next door onto a piece of paper, just like a movie or computer projector. The image of the house you see on the paper (from behind) is called a **real image**. There is more of the image to the right of the paper but you can't see it there because if is a **virtual image**. It is drawn here so you can see where it is. In a telescope, the lens (or eyepiece) you have closest to your eye magnifies the virtual image.



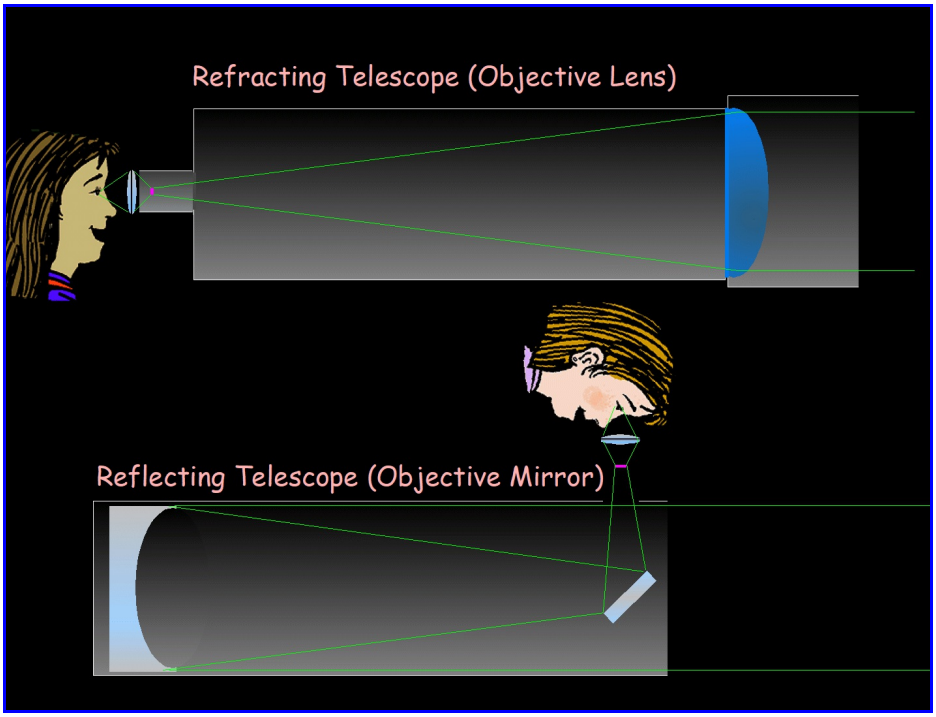


Now, put these two lenses together and you get a telescope! The lens in front, called the **objective** creates an image. The lens near your eye, called the **eyepiece**, magnifies the image made by the objective.

A reflector telescope works the same way but the image is made with a concave mirror which is shaped deeper in the center than at the edges. In 1668, not long after the famous astronomer, Galileo, first used his refractor telescope to view the heavens, England's Isaac Newton invented the reflecting telescope which bears his name.



A little flat mirror near the front of the hollow telescope tube 'bounces' or reflects the virtual image made by the concave mirror through a hole in the side, where it can be magnified by a lens or a series of lenses, the eyepiece. That's where you can see the magnified image of a distant object! Reflector telescopes are generally easier to make than refractor telescopes.



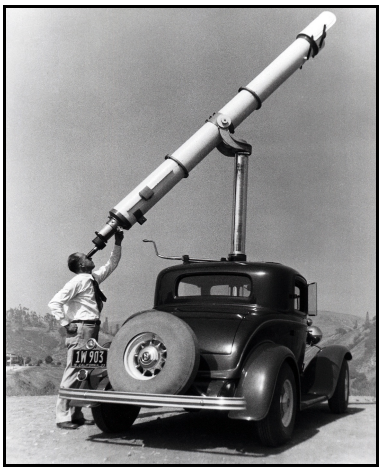
A reflecting telescope is the kind of telescope we'll be assembling this fall in the

First Light Learnshop!

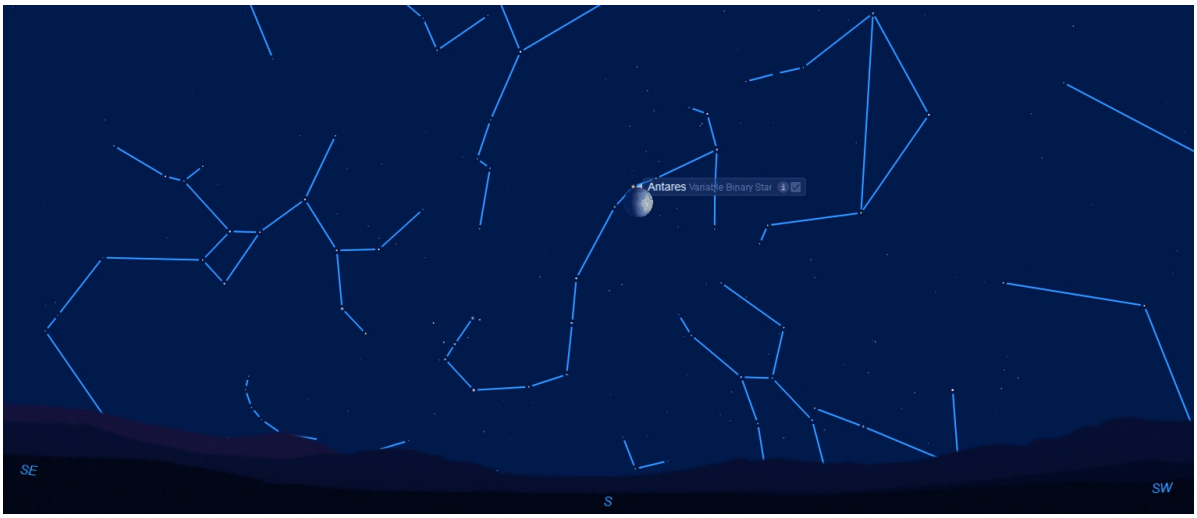
Attractions in August

When you hold your hand all the way out and hold three fingers out, like the scout's salute in panel 2, your fingers create an **angular distance** of 5 degrees**,** about the width of the bowl of the Big Dipper. When I talk about the angular distance between, say, the Moon or a star or planet, I'll say that they are separated by a certain number of angular degrees. Sky and Telescope magazine is my source for most of the following information.

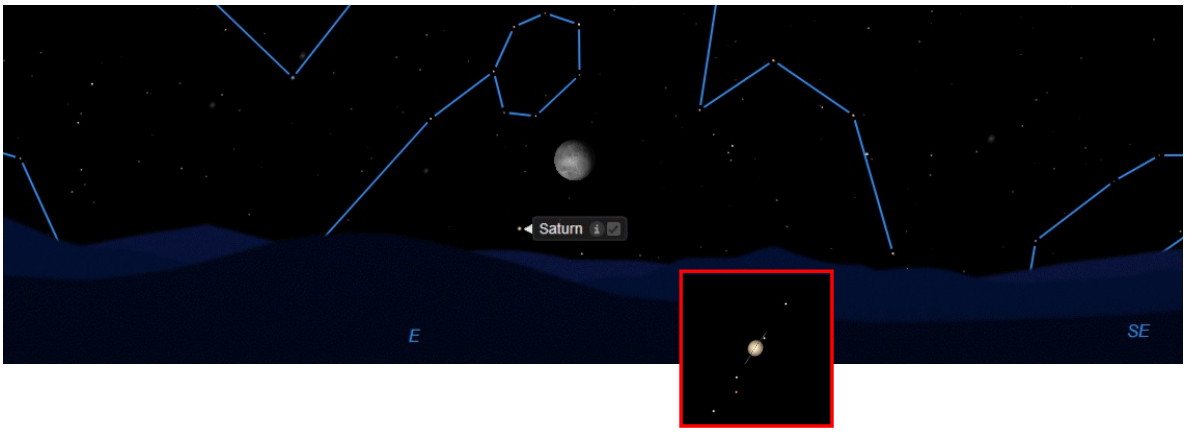
August 2 Come to the Forestry Outreach Center at the entrance if Indian Fort trail to join the Pinnacles Astronomy Club for a star Party! We'll see the Moon at its best, one day past first quarter as it approaches the red star Antares**,** as well as colorful double stars, remnants of exploded star systems, through some large telescopes and a glimpse of the center of our Milky Way Galaxy. We'll also point out some of the midsummer constellations overhead. I will start at 8PM with a short presentation about telescopes.



August 3 Go outside just as it is getting dark and see an unusual sight. The gibbous Moon will seem to have a cherry on top! The "cherry" is the red star Antares, known as the red heart of Scorpius, the scorpion. Only about one degree will seem to separate our Moon and the star.

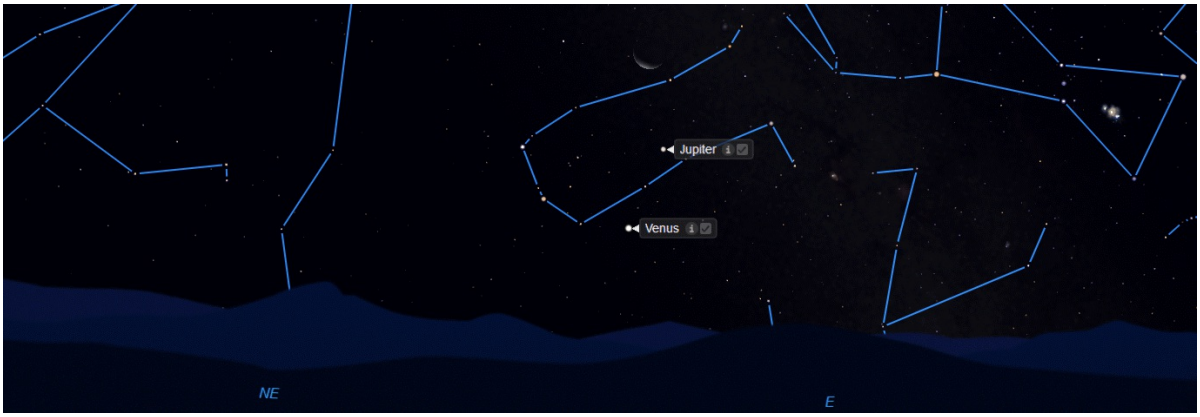


August 11 Yay! Our favorite ringed planet Saturn will make her return to evening skies, rising in the east right after the Moon. Start looking for the pair around 11PM.
Even with a big telescope, the rings will be hard to spot because they are still nearly edge-on from our view from Earth.

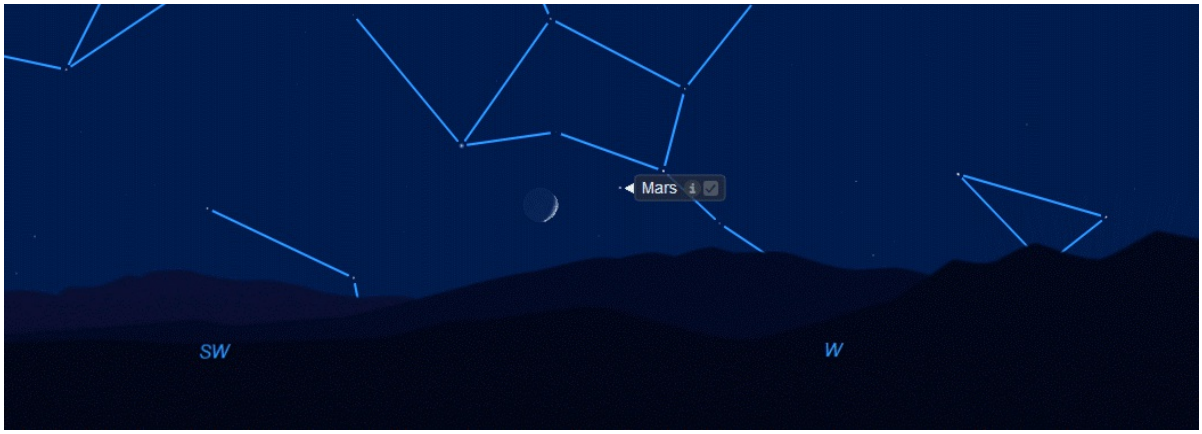


August 12-13 Time for the return of the annual Persied Meteor Shower. The name comes the constellation, Perseus which happens to be in the direction the Earth is headed at this time of the year. That creates an illusion that the "falling stars", or meteors seem to come from the direction of Perseus. The bright Gibbous Moon will likely make it hard to see all but the brightest meteors. Dress warm and go out after 2AM pm the 13th to get the best view.

August 19 If you are an early riser, well before sunrise, you'll be rewarded by a very pretty display of the crescent Moon, Jupiter and Venus in the east-northeast that will be about 14 degrees tall. Look before 6AM.



August 26 This evening, enjoy the pretty sight of a sliver of a moon just 6 degrees above the the planet Mars..



August 30 This evening the Moon pays another visit to red Antares in the south-southwest. This star appears line-of-sight as the plane that the Moon and planets follow as they track along their own orbits. This plane is called the ecliptic, because knowing where it is can help astronomers predict eclipses of the Moon and Sun.