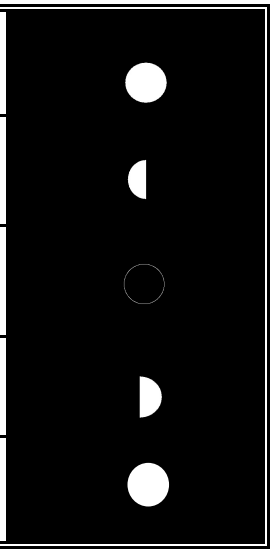
August Skies over the Pinnacles

August 2023

by Jeff Hutton

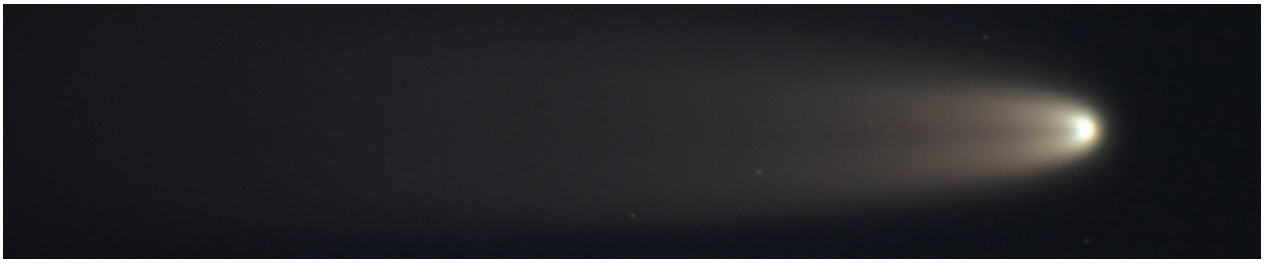
August's Four Principal Phases of the Moon

August 1	Full Moon	
August 8	Last Quarter	
August 16	New Moon	
August 24	First Quarter	
August 31	Full Moon (Blue Moon)	

A Great time to see a Meteor Shower!

I'll admit it, getting up really early has never been my favorite thing to do and I'll bet you feel the same way. There are some things that make it worth being forced out of a comfortable bed. Experiencing something 'out of this world' like a good meteor shower, is one of those things.

When you are lucky enough to gaze out over a really clear night, what do you see? Stars, of course! Lots and lots of stars. What about the empty, dark spaces between the stars you see? It turns out that this dark space isn't so empty. In the neighborhood around the planets, or 'planetary space', there is dust, lots and lots of dust. Much of this dust is leftover rock and metal that was here 4 billion years ago and that stuff came mostly from stars that died in a violent last gasp that ended in huge explosions. In our little corner of the galaxy, some of this material condensed together to form our Sun and the familiar planets. Not all of this material made it into the inner solar system which I think of as inside the orbit of Neptune. Much of it hung out a trillion miles away from the sun, held there by the feeble gravity of the sun. Some of this material still falls toward the Sun in the form of comets.

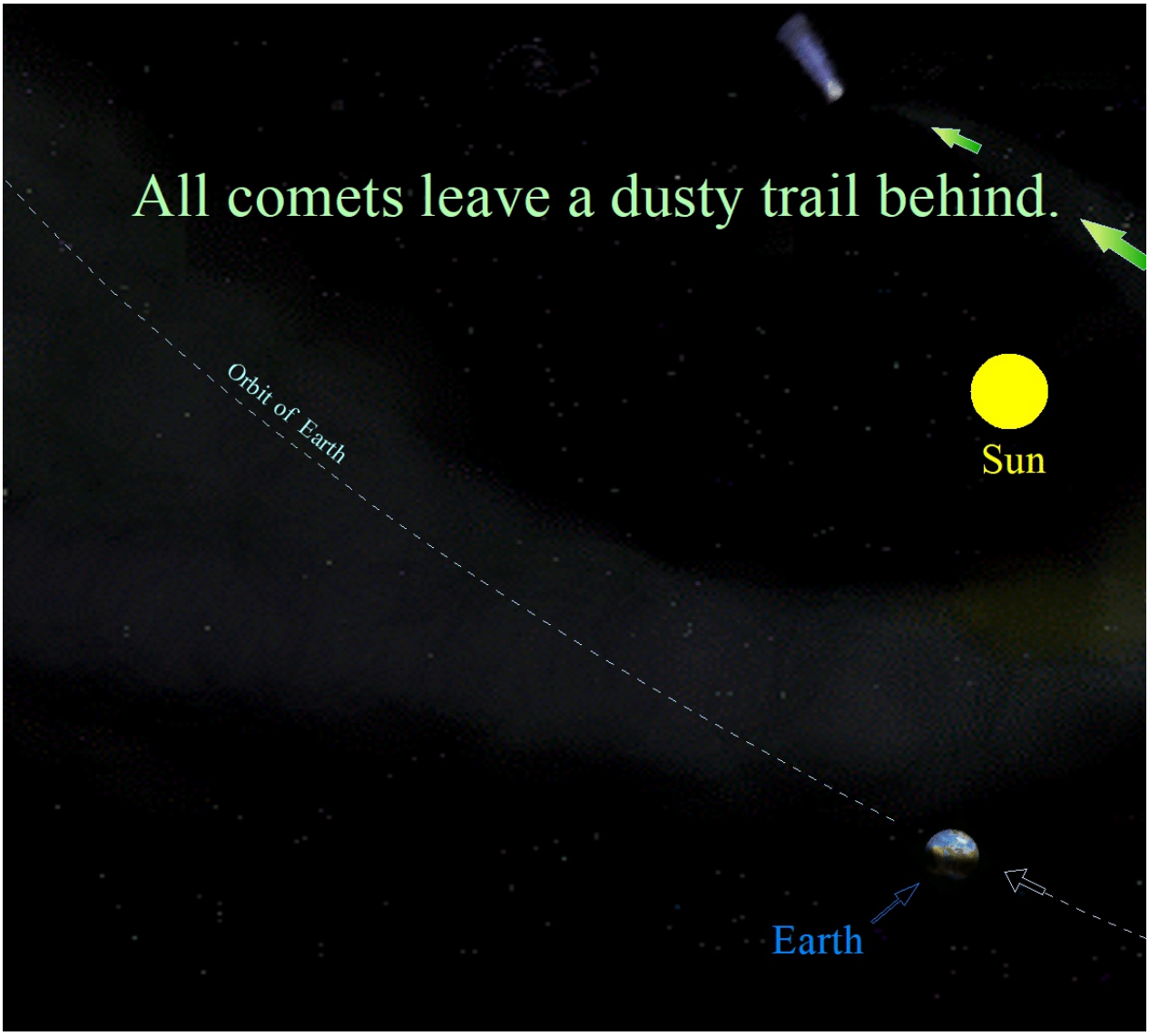


This is a picture I took in 2021 of a comet called *Neowise* as it appeared over my neighbor's house in the north. See the tail of the comet on the left? The tail is made mostly of sand-sized grains of rock that may some night be seen as 'shooting stars' above your head.

When a comet makes its way close to the sun, it is heated up, so the ice that makes up most of the comet releases the 'sand' that it mixed in to the ice and a trail of dust is left behind. The next time you see a jet high in the daytime sky, imagine that the jet is a comet and its contrail is the dust trail left behind in space.

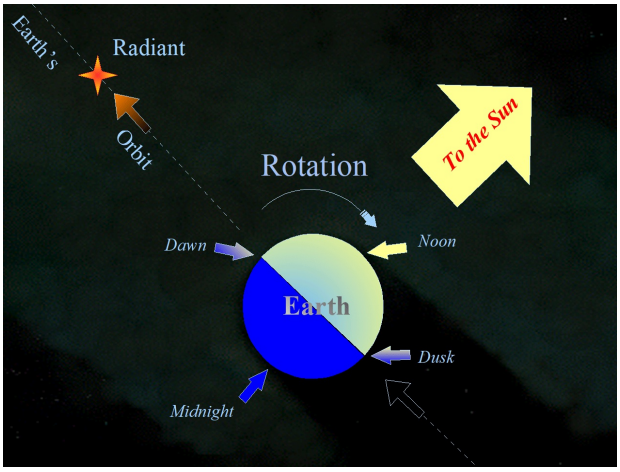
OK, so what is a meteor shower? When the Earth ploughs through a comet's old 'contrail' many

of these dust particles are forced into the atmosphere at great speeds, some move as fast as 30,000 miles per hour. Friction excites the air around the meteor as well as the meteor, itself to glow. These 'shooting stars' or meteors come mostly from comets that may have dazzled our ancestors.



In the illustration above we see the Earth about to plough into the dust trail left behind by a comet. So why do you have to drag yourself out of bed during the last few hours of nighttime?

In the illustration on the right, we can see that the half of the Earth pointed toward the Sun is in daylight and the opposite side is having night time. Earth is traveling on its orbit around the Sun (orange arrow). The night time part of the Earth that is *also* facing toward comet's dusty tail will see the most meteors in the sky. Do you see the orange point ahead of the earth that is labeled "Radiant"? That's the point in the sky that appears in 'front' of the Earth at this moment. Since Earth's orbit is nearly circular the radiant moves across the sky like the headlights of a car that is making a turn. Annual meteor showers take their name from the constellation that happens to be near the radiant at that time. During August 12-13 the Earth is heading toward the constellation called Perseus. That's why this meteor shower is called the Persieds.



Up to 100 meteors from the Persied Meteor Shower can rain down in a single hour. Don't worry, almost all of these tiny grains of rock will burn up 23 miles above the ground.

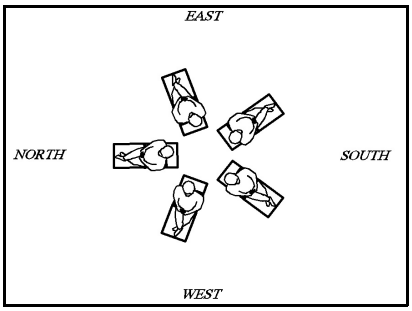
Here's a check list in case you want to see the natural light show. The reflected light of the moon this August will not interfere when the Persied meteors make their appearance in the early predawn sky.

1. Be ready to make hot chocolate, tea or coffee in the early hours of the morning.

2. Lay out warm clothes and, if you have them, sleeping bags. During the very early hours of morning, your body will be at its coolest and very susceptible to getting cold when you go outside.

3. Set your alarm for (ugh!) 2:30 or 3AM. Trying to stay up all night never worked for me or most of my astronomy friends and we tended to fall asleep through the best hours of meteor watching.

4. The more people you can get to join you in this madness the better! Even though lots of meteors will appear, if it's just you out there, you'll miss most of them. That's because meteors can appear anywhere in the sky-and you can't see the whole sky at once. Try to arrange yourselves in a 'star' pattern, on chaise lounges, with your heads toward the middle.



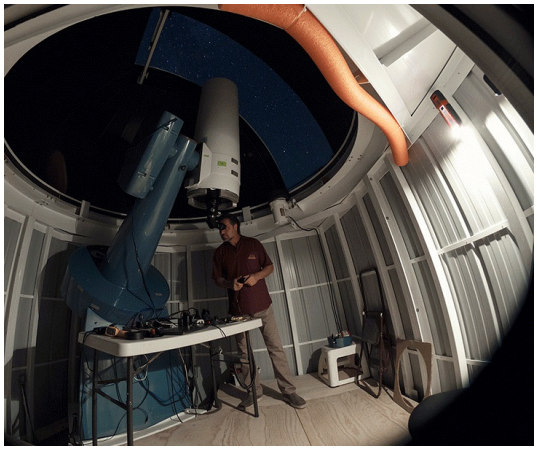
This way, everyone can concentrate on one part of the sky. If one person calls out after seeing a meteor in their section of sky the others can quickly turn to see it, too!

Before an object falls into Earth's atmosphere, it is called a **meteor**oid.
While the object is streaking through the sky, it is called a **meteor**.
If any part of a meteor survives it's fiery trip through the atmosphere and makes it to the ground, it is called a **meteor**ite.

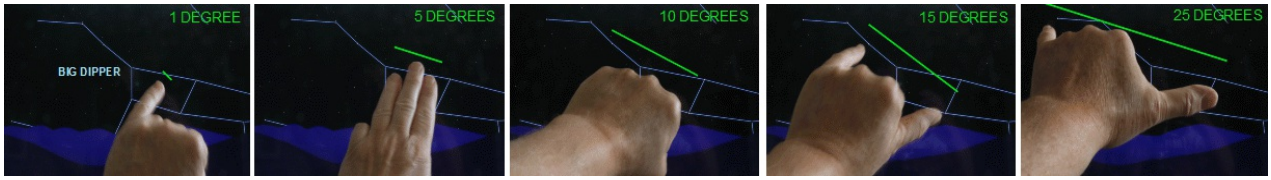
Not all natural objects that make it to the ground are little pebbles. Sometimes a much larger object crashes through the atmosphere. Most just put on a good show in the sky but objects as large as buildings can make life difficult or dangerous. These usually originate from asteroids which are much more dense than comets. A famous recent example occurred over the Russian town of Chelyabinsk in February of 2013.

Check out this story on YouTube: https://www.youtube.com/watch?v=gRrdSwhQhY0

I'm excited to tell you that Berea College's retired Boller & Chivens telescope has now joined the search for undiscovered asteroids that could later prove to pose a danger to us Earthlings.

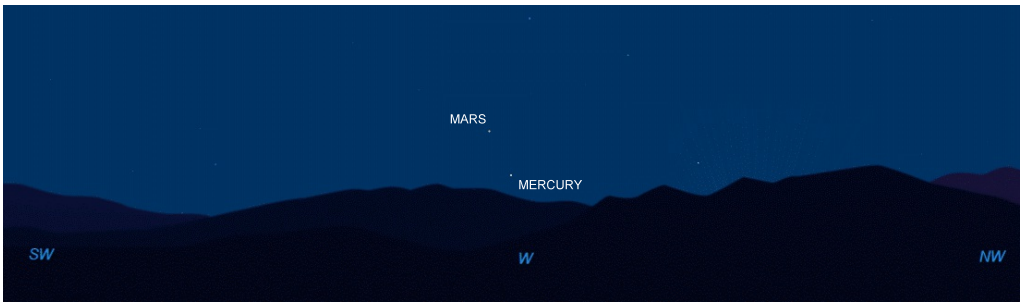


Attractions in August



For instance, 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 distance between, say, the Moon and a star or planet, I'll say that they are separated by a certain number of degrees. Sky and Telescope magazine is my source of most of the following information.

August 10 **Binocular Alert!** Go out just as the dusk light begins to fade to spy the Planets Mars and Mercury settling toward the western horizon. Mars is above, Mercury, below.



August 12,13 Even these are the "official" dates for this remarkable and predictable meteor shower, Persieds may be seen overhead anytime from mid-July to September. A single dedicated meteor watcher can see over 30 "shooting stars" each hour near these dates.

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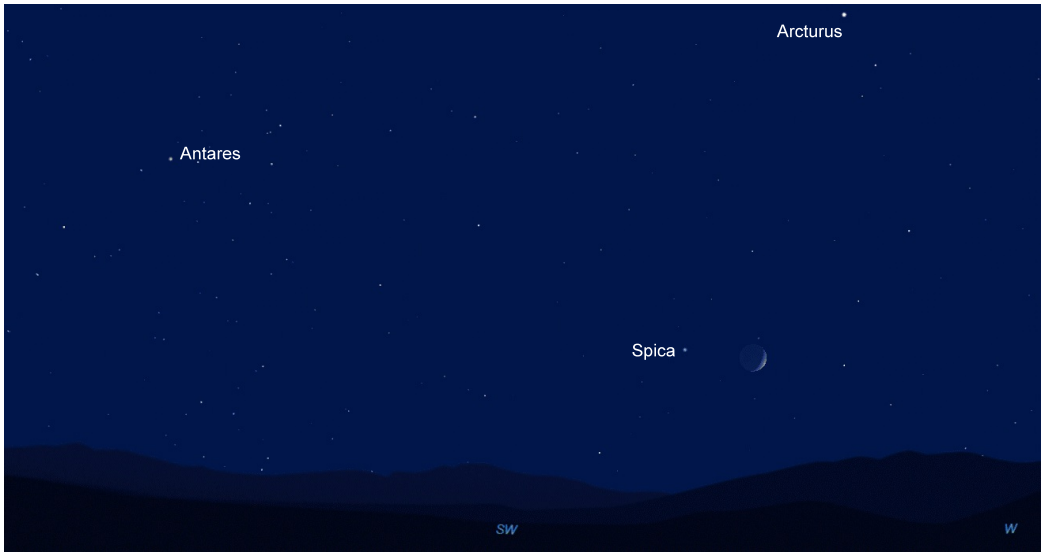
August 12-13 Peak nights of the **Persied Meteor Shower**. You might catch sight of a Persied meteor at any predawn morning from July 17 through August 24. But Earth's orbit carries us through the densest part of a cloud of dust left behind by a comet called Swift-Tuttle August 12 through 13. We hear about the Persieds more than any other annual meteor shower because it occurs during the comfortable, warm season in the northern hemisphere. An alert bunch of observers, all looking at different areas of the sky, can tally up to 75 "shooting stars" per hour.

August 18 Binocular Alert! Now catch planet Mars and our Moon 1 degree apart just before the follow The Sun toward the western horizon. Make sure you wait until the sun is well set before you look!

August 20 This evening check out the crescent Moon as it creeps toward the pretty blue star, Spica. Can you find red Antares to the left and orange Arcturus above?



August 24 **Binocular and telescope alert!** Because the star Antares lies very close to the Moon's summer path in the sky, Often they try to occupy the same patch of celestial real estate! Well, not really, Antares is about 1 million times farther away than our Moon. The Moon will cover-up, or occult Antares at about 10:42. Find the Moon at about 10:30 and watch how it seems to creep toward the night side of the Moon until it suddenly 'blinks out' 12 minutes later. Now, if you have a telescope, use a medium-power eyepiece and watch very carefully as the moon is just about to cover the star. Antares is a double star so if you pay close attention, you see the star seem to suddenly get a bit dimmer just before it disappears. Antares dimmer companion, called Antares B gets covered by the moon first.