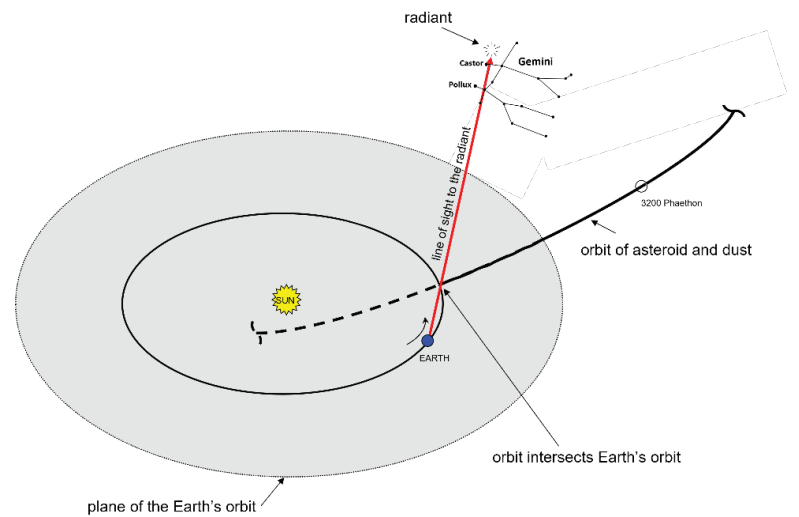
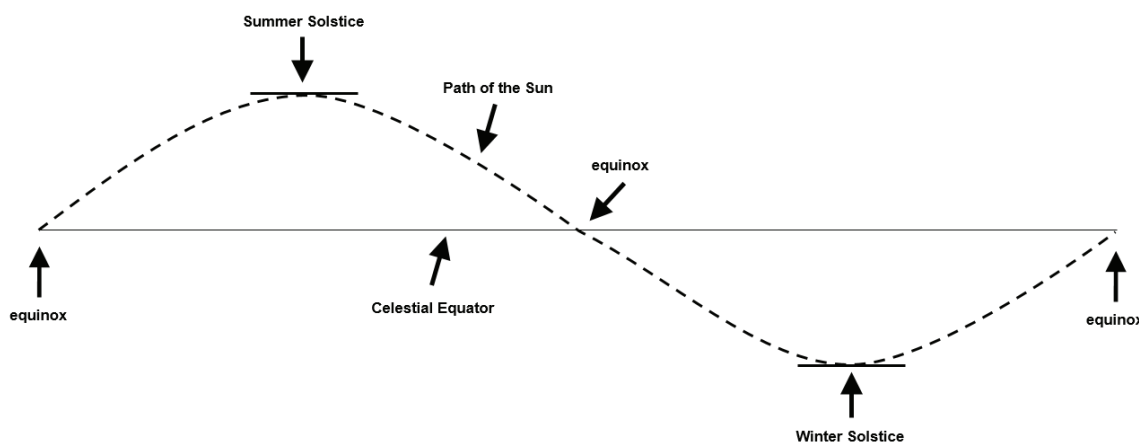


# WHAT'S UP?

Hi. I hope that you are easing into the flurry of December social activities. It can get a bit crazy. When it does, go outside after it gets dark (by 5:30 p.m. these days!), breathe deeply, slowly, and take in the early winter night sky. The coming weeks will bring some of the most beautiful nights and sights of the year. Let's get started seeing what's in store. The night of December 13-14 is the peak of the Geminids meteor shower. The tiny bits of dust from the asteroid 3200 *Phaethon*, will create those bright streaks of light in the night sky that we call meteors. These streaks are the result of a bit of space dust entering our atmosphere and burning up as it is heated by friction with the air. This is usually one of the best showers of the year and since the Moon will be a waxing crescent and set around 6:30 p.m., we will have a nice dark sky. These meteors are called *Geminids* because the point in the sky that the meteors appear to be coming from (the *radiant*) is located in the constellation *Gemini*. These days, Gemini rises in the east around 7:00 p.m. and, while you can start looking for Geminids as soon as it is dark, the best time to view is after midnight. Why? After the middle of the night, we are on the side of the Earth that is moving forward as we orbit the Sun. So, it's like driving into a rainstorm – we get more meteors on our windshield than we do on our rear window. When you are looking for meteors, relax your eyes and just scan the sky. Don't look directly towards the radiant, look at the sky away from there – that's where you'll find the meteors. If you are going to be looking for Geminids before 1:00 a.m. or so, look generally from the eastern horizon to straight up. As the night goes on, you can adjust the middle of your scan higher into the sky. Just slowly scan the sky. We may be able to see about 30 to 40 meteors per hour from this shower when it is at its peak. You don't need any equipment to view a meteor shower. Set up a comfortable chair (one that reclines is best), bundle up, sit outside in an open area, and look up! We like to also have music (a meteor-watching playlist I put together) and something warm to sip. If it's cloudy that night, don't despair because the meteors should be visible a couple of days before and after the 13<sup>th</sup>, too.



December also brings us the Winter Solstice. On December 21<sup>st</sup>, the Sun stands still. Wait – what? Well, that's what *solstice* means – the word comes from the Latin words for *Sun* and *to stand*. Why do we say that the Sun stands still? At a solstice (winter or summer), from our point of view, the Sun stops moving in one direction and begins moving in the opposite direction. At the Winter Solstice, the Sun stops its motion southward, below the celestial equator and begins to move northward, to cross the celestial equator again at the beginning of Spring, and it continues northward until it changes direction again on the Summer Solstice. At the moment of the solstice, it stands still in its north-south cycle. If we plot the position of the Sun during the year



on a map of the sky, it looks like this diagram. The Sun's path varies above and below (north of and south of) the celestial equator. The solstices are the extreme upper and lower points of the Sun's path. We can't see lines and arrows in the sky, though. The best way to understand this motion of the Sun in our sky is to observe it. On and around the 21<sup>st</sup>, notice where the Sun rises and sets. Mark it in your mind (or even

better, in a notebook) by noticing a building or tree that lines up with the point of the sunrise or sunset. Over the course of the coming months, repeat this observation. After a month or so, you will see that the points on the horizon you are marking each time are further and further northward. That means they are to the left if you're marking the sunrise and to the right if you're marking the sunset. Get to know the rhythm of the Sun's movement. It's an important part of our natural environment.

**Planet Roundup:** The outer planets that we talked about last time are still with us in our night sky. By 6:00 p.m., Saturn is about 30 degrees above the south-southwestern horizon. At magnitude 0.9, it easily stands out this part of the sky. Neptune is 45 degrees above the southern horizon. At magnitude -2.7, Jupiter shines brilliantly in the southeast, also 45 degrees high. Moving eastward, we can find Uranus about 15 degrees to the left and slightly below Jupiter. For you early risers out there, Venus rises at 4:00 a.m. At magnitude -4.1, it is about 3½ times as bright as Jupiter. Mercury and Mars are both too close to the Sun to be seen right now. The New Moon is on the 12<sup>th</sup>, 1Q Moon is on the 19<sup>th</sup>, the Full Moon occurs on the 26<sup>th</sup>, and the 3Q Moon isn't until next year(!) – January 3<sup>rd</sup>. I recently received a wonderful email from a reader (thank you!). You can email me at [astroblog@comcast.net](mailto:astroblog@comcast.net) with any questions and comments. This is *What's Up?* installment #78.

Barry