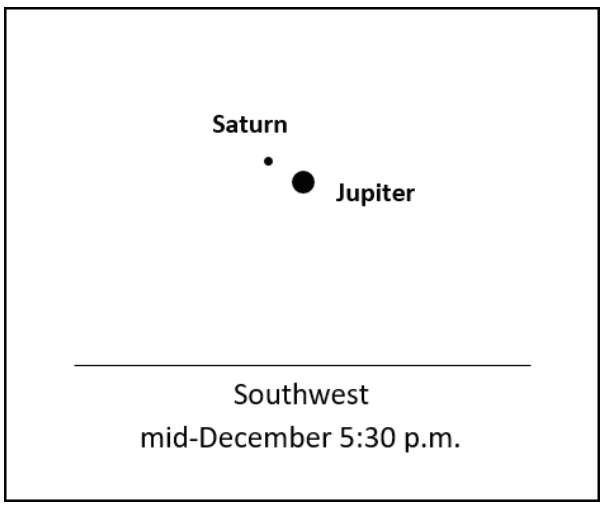
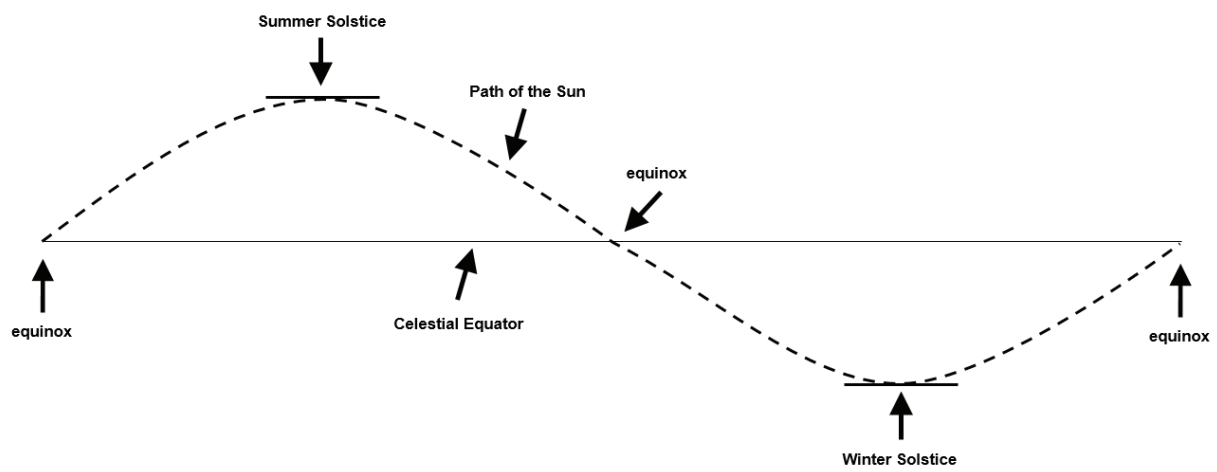
WHAT'S UP?

Hello. What's up? Well, we have three things of note happening in the coming weeks – a meteor shower, a solstice, and a conjunction. First things first. 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. This is usually one of the best showers of the year and since the Moon will be a New Moon, we will have a nice dark sky. If it's cloudy that night, don't despair because the meteors should be visible a couple of days before and after the 13th, too. As regular readers of this column know, you don't need any equipment to view the meteor shower. Set up a comfortable chair (one that reclines is best), bundle up, sit outside in an open area, and look up!

Next comes the conjunction. For the past month or so, I've been encouraging you to go out and find Jupiter and Saturn in the evening sky. If you have been doing that and if you have been comparing how far apart they are each time you look, you might be noticing that they are appearing closer and closer together in the sky. Since Jupiter is closer to the Sun than Saturn, it orbits the Sun faster than Saturn (Kepler's 3rd Law – see *What's Up?* #18, 4/17/20). Jupiter orbits the Sun once every 12 earth-years and Saturn orbits once every 30 earth-years. The upshot of this is that approximately every 20 years, from our vantage point on Earth, we see Jupiter pass Saturn in our sky. That is happening now and, on the afternoon of December 21st, the two planets will be in conjunction. A conjunction is when a planet, or the Moon, or the Sun appear close to another object in the sky. This meeting of Jupiter and Saturn in our sky will bring the two planets to within about 1/10 of a degree of each other. That's really close! One way to think about that distance is to compare it to the size of the Full Moon in our sky. The Full Moon is ½-degree wide. So, at conjunction, Jupiter and Saturn will be just 1/5 of the width of the Moon apart. Binoculars and telescopes will easily show both planets in the same field of view. I think the sight of Jupiter, Jupiter's four largest moons, and Saturn (rings and all) in one view will be unforgettable. I encourage you to observe this event. For days before and after the 21st, these planets are must-see night sky objects. If it's possible that such an event could have a down side, it's this – Jupiter and Saturn are sinking lower and lower in our southwestern sky as evening falls. By the 21st, they will be only about 10 degrees above the horizon. This means that a clear view to the southwest is essential. No trees. No buildings. Also, because they are so low in the sky, the atmosphere will distort our view. Nevertheless, do get outside after sunset and take in the sight! The diagram shows where you can find them. Jupiter is easy. It's far and away the brightest object in the southwest at sunset. Saturn will be the dimmer object above and to the right of Jupiter. It's about 5 times dimmer than Jupiter.



The last member of our triad is the Winter Solstice. On the same day that Jupiter and Saturn are in conjunction, 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), the Sun stops moving 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 21st, 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.

For the pre-dawn risers out there, by the time you get outside (around 5:30 a.m.), the bright beacon on the southeast horizon is Venus. And a beacon it is. It currently appears about 5 times brighter than Jupiter!

You can reach me at **astroblog@comcast.net** with any questions and comments you have. This is *What's Up?* Installment #35.

Until next time, Keep looking up! *Barry*