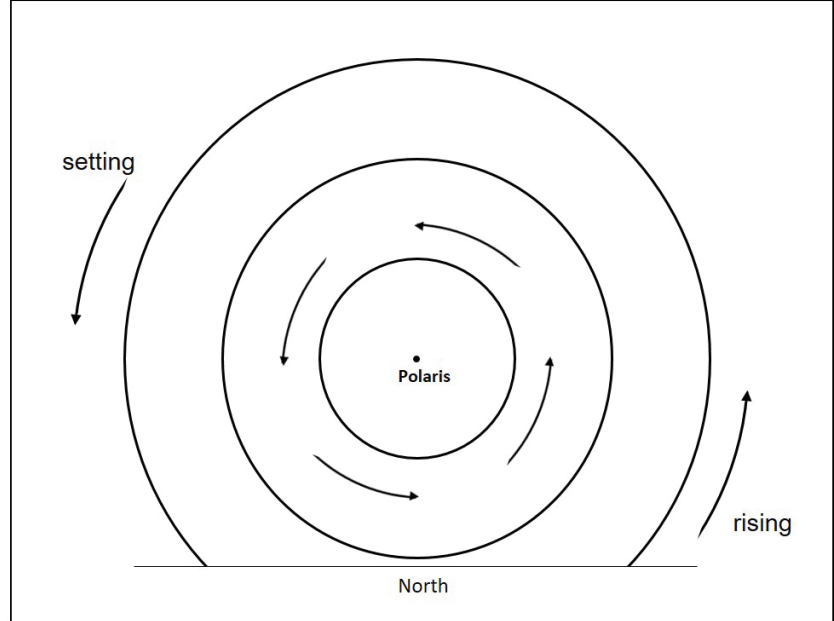
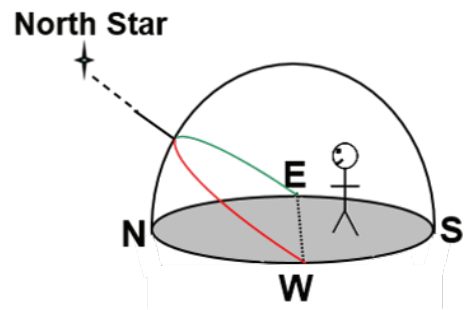


WHAT'S UP?

circumpolar (sər-kəm-ˈpō -ləɹ) – 1. continually visible above the horizon; 2. surrounding or found in the vicinity of a terrestrial pole; 3. The topic of this *What's Up?* installment. Let's talk about circumpolar stars—beginning with the pole star, aka Polaris or the North Star.

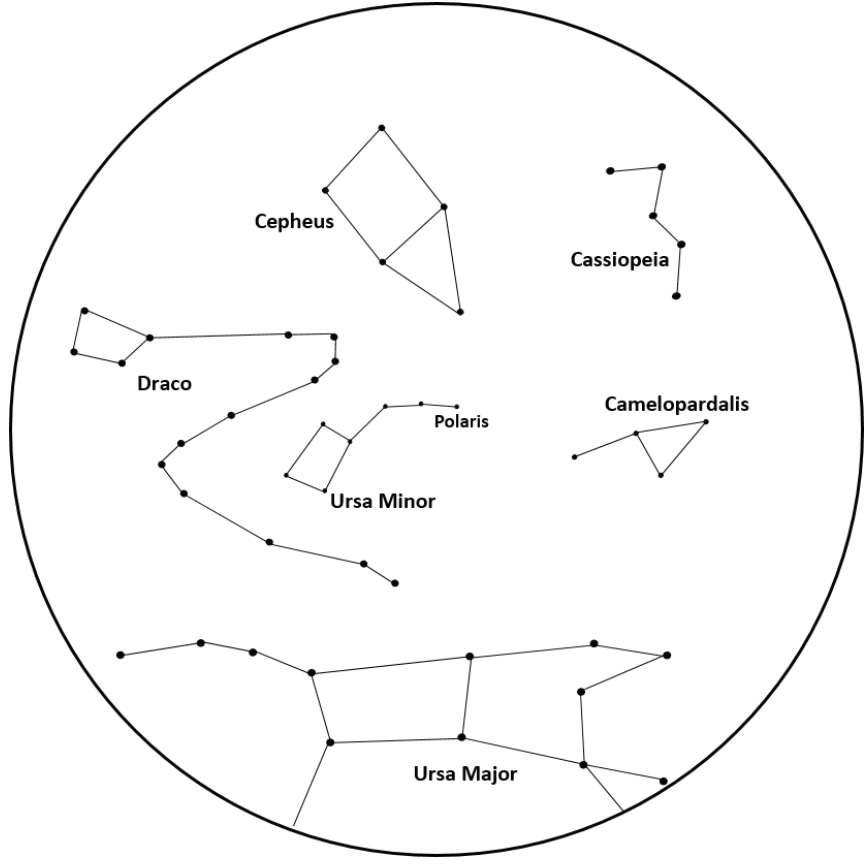
As you might remember from October 2nd (*What's Up?* #31), the North Star was located above the northern horizon. We know that since Polaris marks the north celestial pole in our skies, that it stays put – it doesn't rise and set. It's always up there even during the day when we can't see it. What about a star that is very close to Polaris? Let's do a thought experiment (a *gedanken* as my friend Lou was always fond of saying). It would circle around Polaris, right? But it is so high in the sky that it would never go below the horizon.



How about another star a bit further away? It too, would rotate around Polaris but never to close enough to the horizon to sink out of sight. Right? We can continue this thought experiment with stars further and further away from Polaris with the same result. Until, that is, we get far enough away that the circle the star makes DOES meet the horizon and to a circle even further away that goes below the horizon. A star that far away from Polaris would be seen to rise and set each day. If we drew a picture of what happens, it would look like this diagram. The stars that are always above the horizon and never rise and set are the *circumpolar stars*.

There are six constellations that are entirely or almost entirely, in our circumpolar sky and parts of nine others. We have already talked about some of these. *Ursa Major* is home to the Big Dipper which is currently right on the horizon as night falls. *Cepheus* and *Cassiopeia* are the king and queen associated with the story that links Andromeda, Perseus, and Pegasus. As to the other three, *Ursa Minor* (the Lesser Bear) is the closest to the North Celestial Pole. In fact, the star at the end of the bear's tail is none other than Polaris. Wrapped around the bear is the long and winding *Draco* (the Dragon). The other is *Camelopardalis* (the Giraffe). It's good to get to know these stars. They will always be visible on clear nights regardless of the time of year and can provide us with anchor points to launch our journeys to the rest of the night sky.

In my last article, I described the Blue Moon as the name given to the second Full Moon occurring in a month. Later, we met a neighbor at the Kingston Farmers' Market (as we picked up our meat and chicken shares from local Plympton farms, Revival Farm, Bogside Acres, and Plympton Poultry) and I explained that the definition I gave was the commonly accepted one, but that there was more to the story. Here is the story as I have come to know it. Let's start with what we know (and a little math). If there were exactly 30 days from Full Moon to Full Moon and the year were exactly 360 days long, there would be 12 Full Moons every year ($360 \div 30 = 12$). But we know that there are 29.5 days from one Full Moon to the next and that our year is $365 \frac{1}{4}$ days long. This means that every 2 $\frac{1}{2}$ to 3 years, we have 13 Full Moons in the year and since we only have 12 months, one of those months must have two Full Moons. It's in those months that we now say we get a Blue Moon. It turns out that this definition of a Blue Moon was published in an astronomy magazine in the 1940's and was a misinterpretation of the definition from a farmers' almanac that had been using the term since the 1800's. That original definition was based on the same set of facts about the time between full moons and the length of a year, but was expressed differently. If there were only 12 Full Moons in a year, each of the four seasons would have three of them. Because we actually get a thirteenth Full Moon, one of the seasons will have four, not three Full Moons. When this occurs, the third Full Moon in the season having four was called the Blue Moon. With this definition, there was no Blue Moon in 2020. The last Blue Moon was in May 2019 and the next will be in August 2121. Know you know!



In the night sky, Jupiter, Saturn, and Mars still dominate our evenings. Enjoy them! Also, have you measured the separation between Jupiter and Saturn? Do so, and keep measuring it over the coming weeks.

You can reach me at astroblog@comcast.net with any questions and comments you have. This is *What's Up?* Installment #34. "Circumpolar." Merriam-Webster.com Dictionary, Merriam-Webster, <https://www.merriam-webster.com/dictionary/circumpolar>. Accessed 7 Nov. 2020.

Until next time, Keep looking up!
Barry