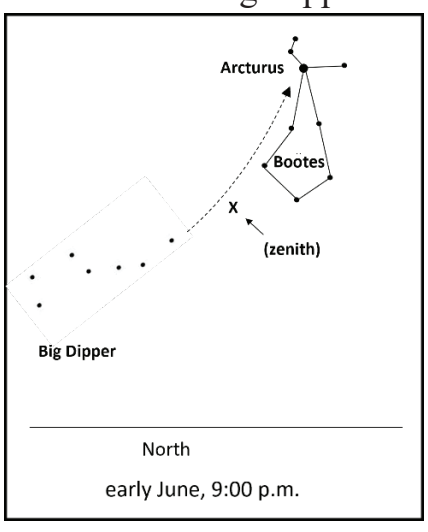
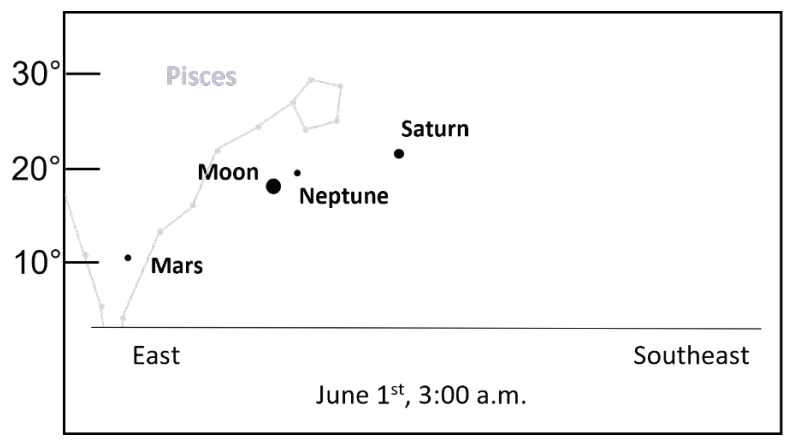
WHAT'S UP?

Hello, and Happy Summer. Warm weather and mild nights are upon us, but so are more hours of daylight, which isn't great if you get your kicks looking at the night sky. We can't even think about star-gazing until at least 9:00 p.m. and, really, it's not dark-dark until 10:30. When the stars do start to appear though, the first you'll probably notice is high in the southeast. That star is *Arcturus*, the brightest star in the constellation *Boötes, the Herdsman*. Pronounced *bo-OH-teez*, the main stars in this grouping form a kite-like shape pointed northward, with Arcturus at its tail. One of the ancient constellation names (Homer refers to it in the *Odyssey*), its name may refer to the sounds made by driving a herd of animals or an ox-driver because of its location near the Great Bear (which is sometimes seen as an ox pulling a cart).[1] Its true source is lost in history. Being near the Great Bear, *Ursa Major*, makes for one of those mnemonics that amateur astronomers like to use – "Arc to Arcturus". This tells us to find the Big Dipper and follow the curve of its handle. This arc, when extended to the brightest star in that direction, leads to Arcturus. Find the Big Dipper, upside-down in the North, and follow its handle. A red giant star, Arcturus is 25 times the size of the Sun and, at a distance of 37 light-years, the reddish-orangish light we see left there in 1987. That's practically yesterday in the astronomy world. I'd like you to notice something about the Big Dipper/Arcturus diagram. Above, I said that you'll see Arcturus high in the southeast sky, but in the diagram, it looks like it's in the north. This is a common problem with sky charts. To us, as we stand in our yard, the starry sky fills a half-dome over our heads. It's not flat like this newspaper page. Using the chart I've drawn, as you follow the Dipper's handle out to Arcturus, you'll actually follow the arc entirely over your head, until you are facing southeast. Arcturus at this time of night is about 65 degrees above the southeast horizon which is another way of saying if you trace the arc to find it, you'll wind up looking 25 degrees past the zenith (the point in the sky directly over your head).



A few weeks ago, some folks in our area were treated to an appearance of the *Aurora Borealis*, or the *Northern Lights*. These are colorful displays of ionized gasses high in our atmosphere. They are caused by electrically charged particles from the Sun colliding with the atoms of gas in our atmosphere. When they meet, the atoms (primarily nitrogen and oxygen) gain energy (ionize). When the atoms return to normal, they release that energy as light. This is similar to how a neon light works. Auroras occur mainly above the Earth's poles, both north and south poles. In the southern hemisphere, these are called the *Aurora Australis*. The particles coming from the Sun are what we call the solar wind, and they are constantly coming at us and creating auroras. Why don't we see these more often? Because of the shape of the Earth's magnetic field, the particles of the solar wind get channeled towards the poles of the field which (sort of) coincide with the north and south poles of the Earth. It takes an especially strong outburst of solar particles to create an aurora large enough to be seen at lower latitudes. Here, at 42 degrees above the Equator, it doesn't happen often. Large outbursts of matter from the Sun do occur cyclically though and we are near a peak in one such cycle. Additionally, the current cycle is much more active than cycles in the recent past. This means that for the next year or so, we will probably have more opportunities to see an aurora from down here. I'll surely be keeping an eye out for one. How? I regularly check the website of the Geophysical Institute at the University of Alaska, Fairbanks. They have a great and easy to interpret website for aurora forecasts. If you go to https://www.gi.alaska.edu/monitors/aurora-forecast or use this QR code shown, click on the small map labeled 'N. America' (the default map is for Alaska). You'll see two features. One is a broad green band. Locations under this would see the aurora pretty much overhead. You'll also see a thin green line. Locations under the line would be where the aurora just touches the northern horizon. That's the very limit of visibility. Locations between the green line and the green band would see the aurora higher and higher up in the sky. Check the site and if there is a day when that thin green line is well south of Massachusetts, hope for clear skies that night, go out after dark and look towards the north. Good luck!

Planet Roundup: Early risers these days are treated to a lineup of planets. Looking towards the east around 3:00 a.m., and tracing a path up and to the right, they can find Mars, Neptune, and Saturn. An hour and a half later, just before the Sun pops up, Uranus, Mercury, and Jupiter are added to the list. In addition, during the first few days of June, a waning crescent Moon passes through the planet parade. As to the Moon, the New Moon is on June 6th, the 1Q Moon is on the 14th, the Full Moon occurs on the 21st, and the 3Q Moon is on the 28th.



You can email me at astroblog@comcast.net with any questions and comments. This is *What's Up?* installment #85.

[1] Ridpath, I. (2018). Star tales. Cambridge, The Lutterworth Press.

Barry