What's Up?

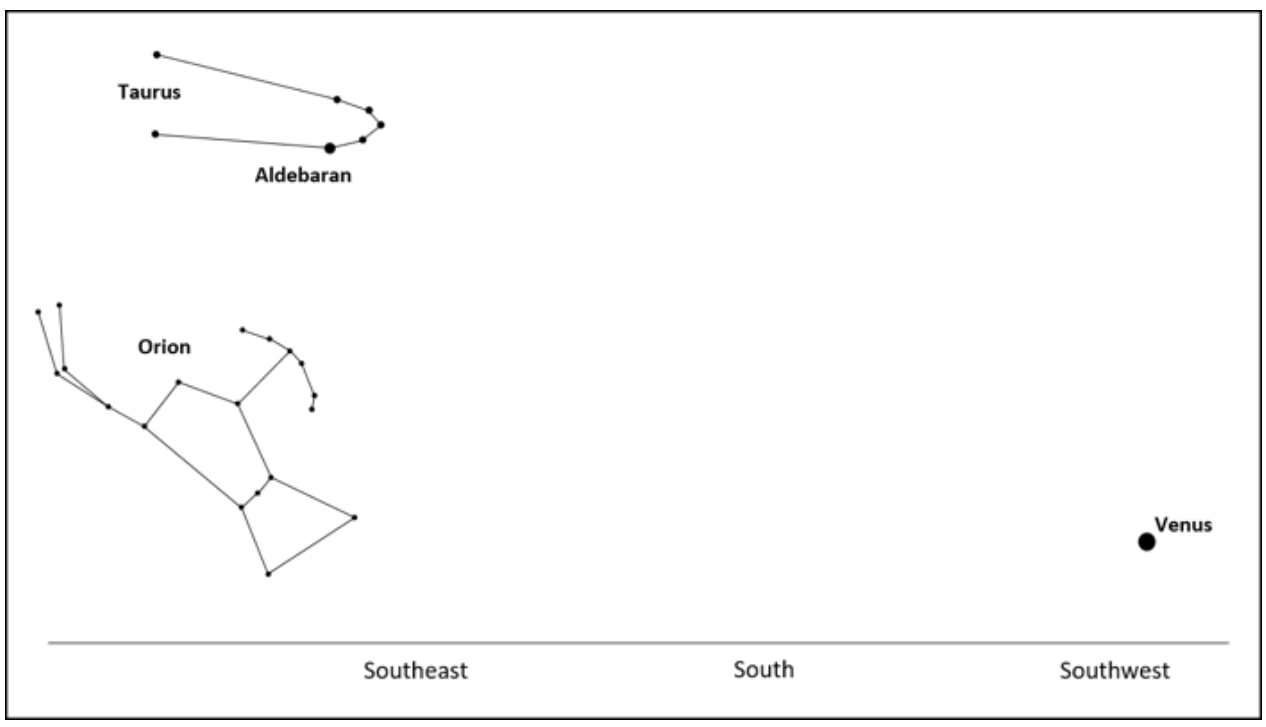
BY BARRY DECRISTOFANO

Hi, folks. As I look ahead to astronomical events happening in 2020, I see that there will be some noteworthy meetings-in-the-sky of some of our solar system cohabitants. You may have noticed one of these at the end of December. Just after sunset on December 28th, a slim crescent Moon could be seen just below the planet Venus. The two were a scant 3 degrees apart in our sky. Remember how you can measure angles in the sky by holding your fist out at arm's length (August 30th, What's Up? #4)? Well, 3 degrees is just a 1½-finger distance. More on this shortly.

I hope that the early-morning sky-watchers out there had a chance to find the Big Dipper, Arcturus, and Mars in the past couple of weeks. If you've been watching, you may have noticed that Mars is edging a little bit higher in the sky and a little bit more towards the South as dawn approaches. These are still there in the mornings and are now being joined by a 3rd Quarter Moon that will become a waxing crescent over the coming week. In the evening sky, Venus has been dominating our evenings, now at a dazzling -4 magnitude. What does that mean? The bottom line is that it means it is REALLY BRIGHT!

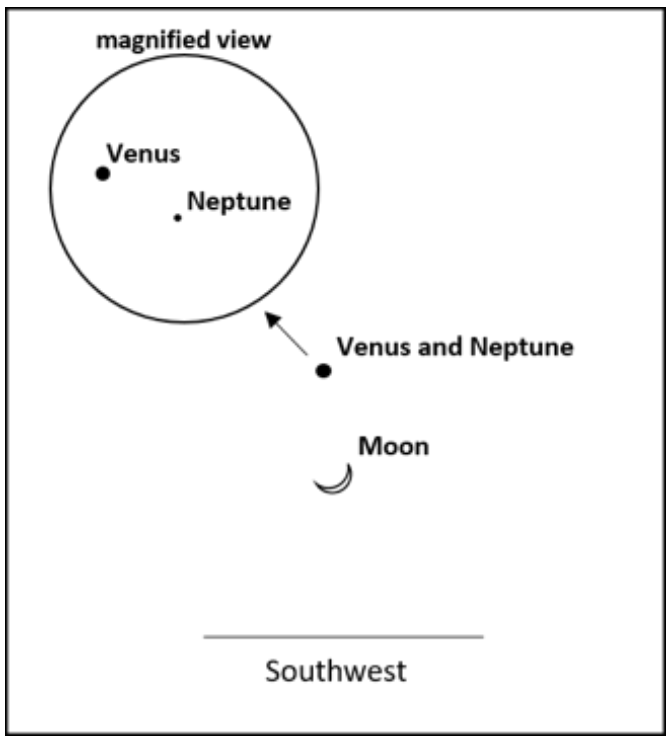
Back in the days before telescopes and instruments that can measure how much light an object emits, ancient astronomers (we're talking Greeks a few centuries BCE) catalogued the stars they could see and called the brightest ones, 1st magnitude stars. The next brightest were 2nd magnitude stars, and so on, down to the dimmest stars they could see which were called 6th magnitude stars.

Jump to modern days…When it became possible to quantify just how bright a star (or planet) was, the system of assigning visual magnitudes needed to be refined. So, it was decided that an interval of five magnitudes would represent a 100-fold difference in brightness. This means that a 6th-magnitude star appears 100 times dimmer than a 1st-magitude star (6 - 1 = 5). For this mathematical relationship to work out, each interval of 1 magnitude winds up being about a 2.5-fold difference in brightness: 2.5 x 2.5 x 2.5 x 2.5 x 2.5 = (close to) 100. Also, being able to measure brightness more precisely meant that not all stars of a given magnitude were really the same. For example, some 1st-magnitude stars appear brighter than others. This forced astronomers to designate some stars as 0th-magnitude and even some as having a negative magnitude! Meaning that objects with a negative magnitude are BRIGHTER than ones with a positive magnitude. Confusing? Yes, but because of the original ranking system, that's the way it is. When I tell you that Venus is shining at a magnitude of -4 that means that it appears 100 times brighter to us than Aldebaran – the 1st-magnitude star in the constellation Taurus (the Bull). You can find Aldebaran up above the constellation Orion, in the East-Southeast these evenings. Aldebaran is a reddish star that marks the eye of the bull.



Talk of Venus leads me back to telling you about an upcoming meeting of planets in our sky. On January 27th, Venus and Neptune will be about ¼-degree apart in our evening sky. Neptune will be below and to the right of Venus. Spotting Neptune will be tricky. At a visual magnitude of 8, it's not visible without equipment. To see it, you'll need a telescope or a pair of binoculars that give at least a magnification of 20. Even then, it is so close to the much brighter Venus that you can't have both in the same field of view. Venus will completely washout the fainter Neptune. But these are the challenges that amateur astronomers love. Can you see the faint blue dot? If so, that's Neptune! You might have better luck the night before when the two planets will be about 1 degree apart (Neptune will be above and to the left of Venus on that night).

When a planet, or the Moon, or the Sun appear close to another object in the sky, we call the event a conjunction. Technically, a conjunction is only the moment when the two objects have the same Right Ascension. Right Ascension is the celestial equivalent of our earthly term, longitude. Just as we locate a place on Earth using longitude and latitude, objects in the sky are located by knowing their Right Ascension and Declination. (Sometimes objects are also said to be in conjunction when they have the same Ecliptic longitude. In these cases, the Ecliptic is used as the reference instead of the celestial equator.) In our upcoming case of Venus and Neptune, they will be close enough to each other in our evening sky for the event to be called a conjunction. The actual moment of this conjunction of the two planets – the moment that they have the same Right Ascension – comes at 2:23 p.m. that afternoon. (Their conjunction with respect to Ecliptic longitude occurs at 3:01 p.m.) To add to the view, a very slim crescent Moon will hang about 7 degrees below Venus. As the year goes on, I'll alert you to other conjunctions, too.



One last note: From time to time, I refer to content from previous What's Up? articles.

In case you haven't seen the articles I refer to, you can always get them at the Express's website. (http://plymptonhalifaxexpress.ma.newsmemory.com). Once at the site, click on the image of the front page and then go to the far right and click on "Search Archives" and search for "astroblog" (you can get all but two of them with that search). You can also get them at the South Shore Astronomical Society's website (http://ssastros.org). At the bottom of the menu on the left, click on "What's Up?". Or, just email me about what you're looking for. Also, I'll start numbering these to help find past information.

Keep looking up!

Barry