WHAT'S UP IN SEPTEMBER

By Bernie Reim

September always marks the beginning of fall for us in the in the northern hemisphere. This year that will happen at exactly 3:21 p.m. on Wednesday the 22nd. That moment in time is also called the autumnal equinox and is further defined by the sun's path on the ecliptic crossing over the celestial equator moving southward or lower in the sky.

That moment along with the vernal equinox in March to begin the spring season are the only two days each year when the sun rises due east and sets due west for everyone on Earth except for the poles. Within a couple days of that day everyone on Earth will also experience 12 hour long days and 12 hour long nights, hence the name equinox, which simply means equal night.

Those are two important unifying days for everyone on Earth in a time of so much polarization and division. All of us already live under the same sky and share the same earth and the same air, but we don't usually think about that, so this would be a good time to do remember that and act accordingly.

We had a fairly good summer with no extreme droughts or floods, but many other parts of the world were not as lucky. Some of the smoke from the wildfires out west 3,000 miles away affected our astronomy viewing for just a couple of nights this summer. I remember that the moon had an odd pinkish-orange hue for many hours after it rose above the horizon and throughout the whole night before it set. Usually it takes on a similar color because of our viewing it through more of our atmosphere for just 20 minutes after it rises or before it sets.

Even though the nights are getting several minutes longer each night, they will also be much crisper and less humid, which will make for some great viewing this month and next.

The highlights for this September include 4 of our 5 brightest planets being visible in the evening sky, Neptune at opposition, another good comet visible in a telescope, some more asteroids at opposition, and some good conjunctions of the moon and planets.

We lost Mars last month into the western sky and it will not return until December as a morning sky object. Keep in mind that all of our missions to the Red Planet are exceeding expectations now. The Chinese Zhurong rover is exploring the Utopia Planitia region, which is the largest known impact basin on Mars or anywhere else in our solar system. This terrain harbors many very interesting geological features including a frozen lake about a mile beneath its surface that holds about as much water as Lake Superior. Even more intriguing are several large bodies of liquid water farther below the cold and sterile Martian surface.

There are some exotic mud volcanoes where the Zhurong rover is now exploring. They just detected some more Mars quakes and found evidence that volcanoes were active on Mars until just 50,000 years ago instead of 3 million years ago as previously believed. This rover also plans to return samples to earth for the first time, as does our own Perseverance Rover. Our Ingenuity helicopter has already flown over 12 flights for over 22 minutes and nearly 2 miles. It doesn't fly very high or go very far each time, but that is still an amazing engineering feat to fly anything in that thin Martian atmosphere which is only 1 % of the density of our own air at sea level. That is the equivalent of flying a helicopter on Earth at about 100,000 feet or 20 miles high, which has never been done. That is only 3 times lower than the two recent controversial forays to the edge of space about 60 miles high.

I think those two flights were beneficial and inspirational to humans on Earth as test flights to carry thousands of people into space over the next decade or so. Only about 500 people have ever been to space as of now, so that will change soon. It is vitally important that many

more of us attain this overview effect that all of the astronauts have attained and our own local Maine astronaut, Jessica Meir talks about at length. Jessica was recently chosen as one of just 18 astronauts, 9 men and 9 women, 9 veterans and 9 rookies, as part of the Artemis mission to return to the moon and establish a permanent presence there.

We need to see the earth in a new light and treat it differently and with much more respect if we are to provide a higher quality and more sustainable life to all 7.9 billion humans currently inhabiting our blue planet.

I recently had a great experience of seeing our Earth in a new way without ever leaving its surface. I was up two hours before sunrise right on the beach. Orion and about half of the Winter Hexagon were directly in front of me rising out of the ocean with Jupiter and Saturn setting behind me in the west. Orion will be in the same place again rising out of the ocean soon after sunset as fall ends in about 3 months. The later you stay up, the farther you are looking into the next season, since the whole sky appears to rotate two hours per month or 4 minutes per day due to our revolution around the sun at 67,000 mph or 18.6 miles per second. So if you are up at midnight, you will see the same sky at 10 pm one month later.

The tide was coming in and the creatures in the nearby salt marsh were just beginning to stir. As the myriad hues of the dawn sky ever so slowly intensified on this humid summer morning, it looked just like an image of the elemental beach, ocean, and sky were developing in a huge heavenly darkroom and I was part of the whole picture.

I gained a sense of the round earth rotating at 750 miles per hour at our latitude as the stars were slowly fading out even as our own day star was beginning to announce its reappearance. We all really do live on “spaceship earth”, but we need to make more time to recognize that fact and live up to some of the implications of that great truth.

Our two largest planets, Jupiter and Saturn were at opposition last month and they are still very well placed in our evening sky for the rest of the summer and for most of this fall. They each rise about 4 minutes earlier each night, so they are both up in the eastern sky well before the sun sets. Jupiter is about 15 times brighter than Saturn. They are both still in retrograde or westward motion against the fixed background of stars and they are both dwelling in opposite ends of Capricorn the Sea Goat.

You can see the four large Galilean moons of Jupiter with just a pair of binoculars, but you will need a telescope to see Saturn’s rings, up to 5 of Saturn’s moons, cloud bands and the red spot on Jupiter, and eclipses and shadow transits of Jupiter’s Galilean moons.

Both Venus and Mercury are evening planets and they can be seen close together very low in the western sky just half an hour after sunset. The star Spica in Virgo is directly between them and a slender waxing crescent moon will join the pair on the 9th.

Neptune reaches opposition in Aquarius on the 14th, but you will need a pair of binoculars to see it bluish-greenish disk at 7.7 magnitude. It will be near the full moon on the 19th.

The comet of the month is 67P/ Churyumov-Gerasimenko. We dropped a probe on this strange-shaped comet 7 years ago. It has an odd, rubber duck-shaped nucleus about 2 miles across, as if two comets were somehow stuck together like a snowman. It will glow at 10th magnitude so you will need an 8 inch telescope to see it. It returns every 6.4 years.

Sept.3. On this day in 1976 Viking 2 landed on Mars.

Sept.5. Venus will be 2 degrees north of Spica this evening.

Sept. 6. New moon is at 8:52 p.m. EDT.

Sept.8. The moon passes near Mercury this evening.

Sept 9.The moon passes 4 degrees north of Venus this evening.
Sept. 10. The asteroid Pallas is at opposition.
Sept. 11. The moon is at perigee, or closest to the earth today at 228,951 miles.
Sept. 13. First quarter moon is at 4:39 p.m. Mercury is at greatest eastern elongation.
Sept. 14. Neptune is at opposition and visible all night long in Aquarius.
Sept. 16. The moon passes 4 degrees south of Saturn tonight.
Sept. 18. The moon passes 4 degrees south of Jupiter tonight.
Sept. 20. Full moon is at 7:55 p.m. This is the famous Harvest Moon.
Sept.22. The autumnal equinox is at 3:21 p.m. EDT.
Sept. 23. On this day in 1846, J. Galle discovered Neptune, which has made just over one orbit around the sun since then, since it takes 165 years.
Sept. 25. Ole Romer was born on this day in 1644. He is a Danish astronomer who first measured the speed of light in 1676 along with Cassini by timing eclipses of the moons of Jupiter.
Sept.26. The moon is at apogee at 251,432 miles from Earth today.
Sept. 28. Last quarter moon is at 9:57 p.m.