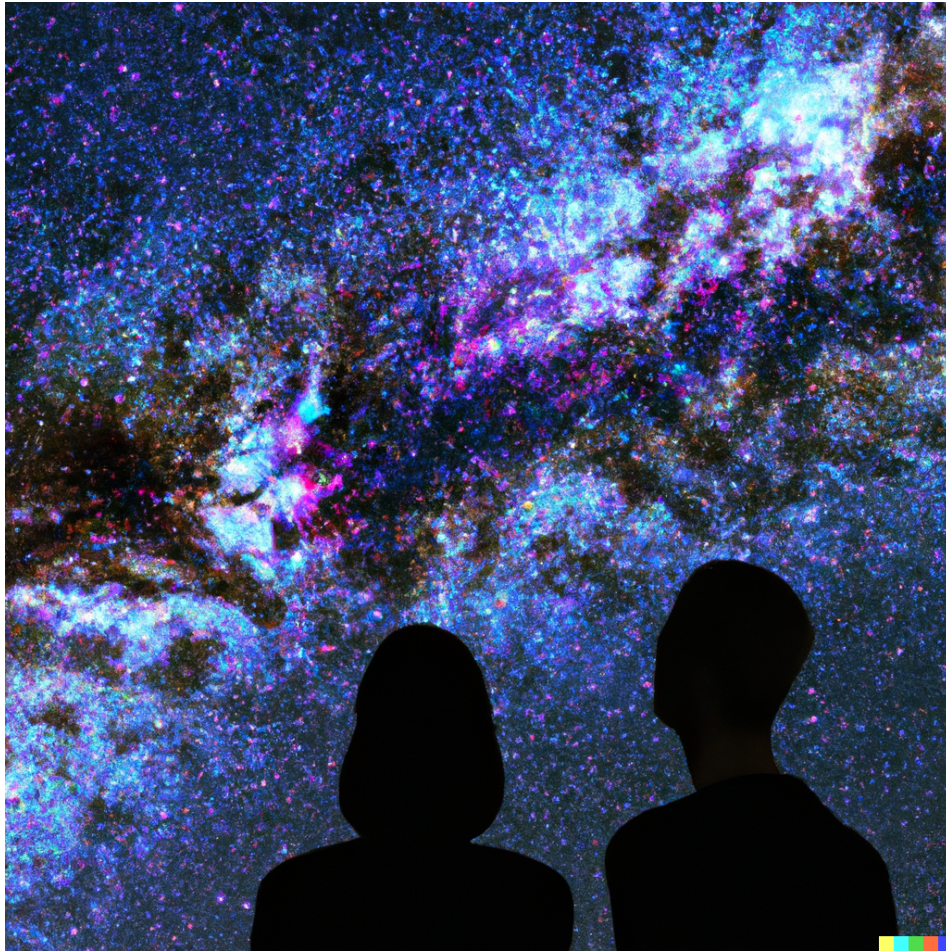


WHAT'S UP IN APRIL

By Bernie Reim



The month of April is named after the Latin “aprilis” which means “to open”. That is exactly what this part of the northern hemisphere will be doing later this month as the earth and the flowers and trees awaken along with most of the other flora and fauna in this area. Many seasonal birds will also return from the south all throughout this month.

April is always the first full month of spring. This April much more will happen than just the earth and its inhabitants reawakening and enjoying warmer and longer days again. Over 70 million of its 8 billion current inhabitants are expected to make the effort to place themselves directly in the narrow 110-mile-wide path of the lunar shadow on Monday afternoon, April 8 to experience their own awakening in a much larger sense. About 30 million people already live right in this narrow path that the moon’s shadow will carve from northwestern Mexico, then from Texas to Maine including a direct path over Niagara Falls and on into Canada until the 240,000 mile-long lunar shadow cone lifts off the earth again over Newfoundland less than two hours later, racing over 3,000 miles of land in about 90 minutes at higher speeds than most of our military jets could attain.

All you will need to do is to get yourself right into this narrow shadow cone where it intersects with the surface of the earth. The alignment of any 3 heavenly bodies is called a syzygy. You would then become the fourth body in this perfect alignment so that you can

experience all of the wonders that such an alignment offers by being in the right place at the right time. Then all you need is clear skies on that afternoon of Monday, April 8.

Mexico has the best weather prospects, then Texas, and then they go downhill from there as the shadow progresses towards the northeast. If the clouds are light you may find an opening for those critical three and a half minutes. If not, then try to catch a live feed of the event from another location even as you are watching it. Almost everyone along the eclipse path from Oregon to South Carolina on Monday, August 21 of 2017 was able to experience this great event. I saw that one from Driggs, Idaho, near Yellowstone and the Grand Tetons which created a perfect and dramatic backdrop for such a grand and memorable natural spectacle.

There is still some time to practice any photography that you may want to do to try to capture and share this majestic event with others. There are many great websites and practical videos on how to best accomplish this, so try to watch some of them to be properly prepared. Of course you will never be able to really capture the essence of such an out-of-this world experience, but it is always worth making the effort anyway.

Only 12 humans have ever walked on the moon, but in a very real sense you can actually let the moon come to you for a few precious minutes on that day without even doing all of the rigorous training that astronauts have to do! It will just be the shadow, but you will be surprised about how much information that shadow can convey about our only natural satellite and then you will never look at the moon the same way again.

Try to pick a spot with as much open space and altitude as possible to best experience this shadow which will plunge the entire landscape including you into deep twilight darkness. It will race over you at about 2,000 miles per hour, so you get a great sense of this constant speed along with an idea of the width and distance to the moon since it will only last just over 3 minutes. It would last a little longer if the moon were closer to the earth at that time. Also make sure to take some time to look all around you to see the full 360-degree deep salmon-colored twilight. This way you instantly become aware of our entire life-giving atmosphere all at once instead of just the evening or morning slice that you can see twice every single day if it is clear at sunrise and sunset.

There are many other strange phenomena to look for as the sun gets smaller and smaller in our sky. All of the shadows around you will get super sharp, the temperature will drop 10 or more degrees, animals and birds will go to sleep, crickets would start to chirp if there are any, and many other strange and other-worldly effects will happen. Shadow bands will race across the earth like snakes just before and after totality, caused by a refraction effect in our atmosphere. Try to create hundreds of dancing crescent suns all around you simply by letting the sun shine through the holes in a colander or a straw hat or any pinholes you can create to spell anything out with the sun as the light source.

Look for the pink ring of the chromosphere of the sun and any prominences or solar flares that may be happening as the sun gets covered. That is the only time it will be safe to remove your solar filters from your eyes or cameras or binoculars, just for those 3 short minutes. Then make sure you put them right back on after that.

Look for Bailey's beads during the last minute before totality as the last few rays of the sun shine through the valleys on the moon between its mountains. Then the diamond ring effect is the last brilliant flash of light before the sun disappears as if it dropped into a black hole and was torn right out of the fabric of space-time and everything that you thought you knew about

the familiar sun and earth and sky becomes instantly alien. You will be lifted right off the face of the earth to the edge of space 60 miles straight up where it is always black because there is no more atmosphere to scatter the sunlight and make our familiar sky blue. There is no need to pay 2 million dollars to ride a rocket to this edge and become weightless for a few minutes when you can just place yourself in the right place at the right time and experience something similar.

Another thing that amazed me beyond all of that was how all the bright planets and some stars became instantly visible as the sun went out. This time you will see Venus, Saturn, and Mars to the right of the sun since they are morning planets, and you will see Jupiter to the left of the sun since it is now an evening planet in Aries, where the sun will be during this eclipse. You should also be able to see all of the 8 bright stars that make up the Winter Hexagon along with the Pleiades just to the left of the sun and Jupiter. That would include Taurus, Gemini, Orion, and Sirius in Canis Major, the brightest star in our sky from either hemisphere.

A huge bonus to look for during this eclipse that did not exist during the 2017 eclipse is the fact that a certain comet named Pons Brooks could be visible just 3 degrees to the right of Jupiter during this eclipse. You will probably need binoculars to see it, so be prepared. This comet may even become visible to the naked eye later this month at night in Aries the Ram.

Another thing you will not be prepared for if you have never seen a total eclipse before is the fact that the pearly white and ethereal corona or atmosphere of the sun also becomes instantly visible as everything else goes dark. This atmosphere extends nearly 3 million miles into space all around the sun, or about 4 times the width of the normally visible part of the sun. Remember that this pearly corona is always there, but it only shines forth when the rest of its brilliant light is temporarily extinguished by the moon. Its temperature reaches over 2 million degrees while the solar surface is only 10,000 degrees F, which is still one of many unsolved mysteries that the sun still holds. Its constantly changing shape will also be very different from 2017 since the sun is now near its solar maximum in 2025 and hundreds of sunspots should be visible.

Beyond all of that you will glimpse a more real and permanent reality that far surpasses any ordinary awareness. It may only last around 3 minutes, but you will find that all sense of time and space disappear, leaving you in a timeless eternity that is always present regardless of any total solar eclipse.

I had the sense that I could instantly see and understand truths about our sun, earth, and moon and catch a glimpse of the inner workings and constant motions in our solar system that human eyes were never meant to see and human minds were never meant to understand.

All of this and much more (every eclipse is an individual experience just as every rainbow is unique for the viewer from that particular perspective) is only possible if you place yourself right into this lunar shadow and preferably as close to the center line as possible. As Annie Dillard stated so eloquently in her 1982 book *Teaching a Stone To Talk*: "Seeing a partial eclipse bears the same relation to seeing a total eclipse as...flying in an airplane does to falling out of one. Although one experience precedes the other, it in no way prepares you for it." Don't just stay in the Portland area or any other part of Maine that will not be right in this path. Even a 99% eclipse is nothing compared to a total solar eclipse because it will not go dark, you will not see the corona, the stars and planets will not come out and almost none of the other effects that I described will happen.

The last total solar eclipse over Maine was on July 20 of 1963 and the next one will not be until Monday, May 1 of 2079. The next one in this country will not happen until August 23 of 2044, so make every effort to see this one. I guarantee that you will not be disappointed if it is clear.

All the rest of the highlights for this month or almost any month pale in comparison to such a phenomenal, rare, and unforgettable event as a total solar eclipse, the single greatest natural event that you could ever experience in astronomy, but I will cover a few of them anyway. The first good meteor shower since January will happen on Monday morning, April 22. Caused by Comet Thatcher, you would normally see about 20 Lyrids per hour emanating from Lyra in the summer triangle, but this time it happens just before the full moon, so you will see about half that many towards dawn if it is clear.

Look for a close conjunction of Mars and Saturn very low in the eastern morning sky on April 5. A thin waning crescent moon will join the pair the next morning. Then keep watching as they get even closer until they start drifting apart again after the 10th. Venus is the remaining morning planet now rising about half an hour before the sun. We will lose it by the end of next month.

April 1. On this day in 1997 Comet Hale-Bopp made its closest approach to the sun. Last quarter moon is at 11:15 p.m. EDT.

April 3. John Harrison was born on this day in 1693. He was an English clock maker that invented the marine chronometer to keep accurate time at sea to solve the longitude problem in 1730 and eventually collect a prize of 20,000 pounds which now would be around 3 million pounds.

April 7. The moon is near Venus in the morning sky. The moon is at perigee, or closest to the earth today at 222,979 miles. This makes for a longer total solar eclipse and a wider path for the moon on the earth. The Compton Gamma Ray observatory was launched on this day in 1991. It discovered about one gamma ray burst every day. It came down just 9 years later.

April 8. New moon is at 2:21 p.m. A total solar eclipse will happen from Mexico to Canada.

April 10. The moon passes near Jupiter this evening.

April 11. Halley's Comet made its closest approach to Earth on this day in 1986.

April 12. On this day in 1961 Yuri Gagarin became the first human to orbit the earth.

April 14. Christiaan Huygens was born on this day in 1629. He invented the pendulum clock in 1656 and the spacecraft that landed on Titan, the largest moon of Saturn on January 14 of 2005 was named in his honor.

April 15. First quarter moon is at 3:13 p.m. Leonardo da Vinci was born on this day in 1452.

April 22. The Lyrid meteor shower peaks this morning.

April 23. Full moon is at 7:49 p.m. This is also called the Grass, Egg, Pink, or Fish Moon.

April 25. On this day in 1990 the Hubble Space Telescope was launched. It is still working.

April 26. Arno Penzias was born on this day in 1933. He won the 1978 Nobel Prize in physics along with Robert Wilson for their discovery of the microwave background radiation in 1964 that is always present everywhere and was the first real proof that the Big Bang occurred. The moon passes near Antares in Scorpius once again this morning.

April 28. Jan Oort was born on this day in 1900. He was a Dutch astronomer. The Oort cloud, a distant spherical shell of billions of icy bodies which is the source of most of our comets, was named for him. It starts at 5,000 A.U., from the sun (100 times farther out than Pluto) and goes all the way out to 100,000 A.U., or over 1 light year away. Eugene Shoemaker was born on this

day in 1928. He was an astronomer and geologist that discovered several comets including Shoemaker-Levy 9 that broke up and hit Jupiter in 21 pieces from July 16 to July 22 of 1994. I saw 5 of those impacts.