Ponder the Portage County Skies with Paul
Sky events for August 2008
01 New Moon @ 5:13 A.M.
01 Total Solar Eclipse N.E. Canada to N. Asia
02 Moon 2 degrees under Venus @ 10 A.M.
03 Moon 4 degrees under Saturn @ 9 A.M.
04 Moon 4 degrees under Mars @ 7 A.M.
05 Venus 1 degree N. of Regulas @ 4 P.M.
08 First Quarter Moon @ 3:20 P.M.
10 Moon at apogee (251,380 miles from Earth)
12 Perseid meteor shower peaks
13 Moon 3 degrees S. of Jupiter @ 9 A.M.
13 Venus 0.2 degrees S. of Saturn @ 2 P.M.
15 Mercury 0.7 degrees S. of Saturn @ 7 P.M.
16 Full Moon @ 4:16 P.M.
23 Mercury 1.2 degrees S. of Venus @ Noon
23 Last Quarter Moon @ 6:50 P.M.
25 Moon at perigee (229,097 miles from Earth)
27 (1984) Teacher in Space program announced
30 New Moon @ 2:58 P.M.

What are the celestial highlights for August? **Conjunctions abound this month as on the 1st at sunset Mercury, Venus, Saturn and Mars are all lined up on the western horizon about 10 degrees (a closed fist at arms length) apart respectfully. Mercury appears to be moving toward Saturn at about twice the rate of Venus so by midmonth the three of them are together setting in the west northwest about 39 minutes after sunset. The moon moves about its diameter (1/2 degree) each hour or about 12 degrees per day. Note above that the moon appears to pass five major celestial objects during the first four days of August as it passes Mercury & the sun at dawn on the 1st, then passes Venus, Saturn, and Mars respectively on the 2nd, 3rd, and 4th.**

What about the Perseid Meteor Shower on the 12th? **On the night of the 11th the shower will start (like any other meteor shower) at midnight standard time (thus 1 a.m. daylight savings time) as the vehicle we are riding on, called Earth, spins making Portage County go from a side window to becoming the front windshield, plowing through the dusty footsteps left over by some comet or asteroid in the past. However, after the waxing gibbous moon sets at about 1:26 a.m. the sky will darken. You can expect to see 60 to 90 shooting stars per hour from 1:26 a.m. until 4:03 a.m., at which time astronomical twilight starts.**

Shooting stars are not stars, and the spherical Earth does move, any more recent paradigm shifts in Astronomy? **Black Holes once were portrayed as these monsters that ate up everything in their path but now Astronomers have discovered there exist at least one large black hole at the center of every galaxy, including our Milky Way. So now some Astronomers think that perhaps Black Holes are a necessity for a galaxy to exist. Black Holes remain complex celestial objects that continue to amaze.**

Talking about complex, what is a complex number? **Like Black Holes, complex numbers were once thought to be imaginary, worthless, even blemishes of mathematical calculations as they involve the square root of a negative number. The square root of 9 is 3, because 3 times 3 equals 9. But the square root of a –9 does not exist as no real number times itself equals a -9. But if you define i to be the square root of –1 then the square root of a –9 is 3i, a complex number.**

Who was the mathematician that tamed a complex number geometrically? **Actually, a retired Norwegian surveyor, Caspar Wessel (1745-1818) was the first to represent complex numbers as a two dimensional vector number. Note the diagram shows how to graph the complex number 2 + 3i by simply moving 2 over on the real axis and 3 up on the imaginary axis to locate the head of the vector whose tail is always at the origin (0,0). Mr. Wessel showed that complex numbers add, subtract, multiply, and divide just like vectors do. He also demonstrated that multipling a complex number by i graphically rotates the complex number 90 degrees counterclockwise.**

Can you give me one example of how a profession uses complex numbers? **Engineers know that placing a capacitor in a circuit causes a voltage phase shift of 90 degrees clockwise which is the same as multiplying by i. Then they add an inductor to the circuit because an inductor causes a voltage phase shift 90 degrees counterclockwise which is the same as multiplying by –i. Therefore together the capacitor and inductor result in no phase shift at all.**
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