Ponder the Portage County Skies with Paul
Sky events for January 2007
Dec. 30th Comet Tuttle 1° from Pinwheel Galaxy
2 Earth @ perihelion (91.4 million miles from Sun)
3 Moon at apogee (251,861 miles from Earth)
4 Quadrantid meteor shower (peaks 1:30 A.M.)
8 New Moon @ 05:37 hrs.
15 1st Q. Moon @ 13:46 hrs.
19 Moon at perigee (227,689 miles from Earth)
20 Mercury @ greatest eastern elongation (19°)
22 Full Moon @ 07:35 hrs.
27 Apollo 1 fire (1967) (White, Grissom, Chaffee)
28 Space Shuttle Challenger explodes (1986)
29 3rd Q. Moon 21:03 hrs.
30 Moon at apogee (251,365 miles from Earth)
31 Apollo 14 launched (1971)

Why is the first day of winter (Dec. 22, the shortest amount of daylight) and perihelion (Jan. 2, Earth closest to the sun) not the same day? **These two factors — the Earth's elliptical orbit around the Sun and tilt of the Earth's axis — cause the Sun to be at a slightly different position in the sky from day to day when viewed at a particular time of the day. The elliptical orbit causes the Earth to travel faster in the winter (closest to the sun) and slower in the summer (farthest from the sun). In fact, we in the northern hemisphere experience over a week shorter winter because of Kepler's 2nd law.**

How did the Quadrantid meteor shower get its name and will it be a good one? **Quadrans Muralis used to be a constellation that was annexed to Hercules, Bootes, and Draco. This is one of the years ('08) strongest showers, with 120 meteors per hr.**

When is the best time to see Mercury this month? **Look for Mercury on the 8th (–0.9 magnitude) just south of the sunset (16:40 till 17:30 hrs.) or look for it just west of the very young Moon (3° above and to Mercury's left) on the 9th. On the 20th you'll have an extra hour to catch Mercury as it is the highest it ever gets in sky (19° above the SW horizon).**

Are there any other prime objects to note this month? **Comet Tuttle is slightly visible under dark skies until the 10th. Also, this is the last year to see Saturn's rings as next year ('09) the rings will be edge on. Saturn rises around 9 P.M. near Regulus in Leo the Lion. Through a telescope, watch for the shadows of Saturn's moons as they move across the disk this month/year. Lastly, note the two brightest objects in the pre-dawn sky (Venus, and Jupiter) as they approach throughout the month.**

Talking about prime, what is a prime number? **A prime number is a natural number that is only evenly divisible by both 1 and itself. Thus, 15 is not prime because it is evenly divisible by 5, and 13 is prime because it is only divisible by 1 and 13.**

Why are prime numbers so important? **Prime #'s are important to *all people*. An example is cryptology. Cryptology is the study of using secret writing. This is used to keep some government information secret. It is also used on the Internet to help keep certain information private. For example, if you buy something on the Internet with a credit card, a prime number is used to send their number to the online store. This keeps another person from finding your credit card number and using it to buy things.**

Where did the word prime come from? **This is one of the standard meanings of our 'prime' or 'primary.' In a multiplicative sense prime numbers are thus the first numbers, the numbers from which all other numbers arise (through multiplication).**

Can you give me some highlights in the history of prime numbers? **Again, whole books are written on prime numbers but here are two that stood out for me. The first use of an *inductive proof* was to prove there is no largest prime number. Euclid said: 1). Either there exists a largest prime number or not. 2). Lets say there is a largest prime number P. 3). If you took the product of every prime number less than P and added 1 you would obtain an even larger prime number than P. 4). Our assumption is #1 leads to a contradiction, thus there cannot be a largest prime number.**

In about 200 BC, Eratosthenes found a way called *The Sieve of Eratosthenes.* This method literally strains out prime numbers as you go. Lets use it to find all the prime numbers less than 16. Write down 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16. Since 2 is the first prime number, take it out and set it aside (taking 2 out is like priming the pump). Now cross out all multiplies of 2 and the first # in what remains must be prime 3, 5, 7, 9, 11, 13, 15. Now place 3 with 2 in your going list of primes and remove all multiples of 3. Then place 5 in your prime lists with 2 and 3 and remove all multiples of 5, etc. leaves 2, 3, 5, 7, 11, and 13 as the first six prime numbers. GNATS