Idaho Skies

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Idaho Skies is a column for beginning amateur astronomers and those interested in astronomy. Suggestions about the column are gladly accepted by the columnist, at paul.verhage@boiseschools.org

This month look for the star Vega in the constellation of Lyra the Lyre. Vega comes from the Arabic for swooping eagle. Many see its constellation as an eagle and not the harp or lyre we're familiar with today. Vega is the lucida of Lyra and known to astronomers as Alpha Lyrae. For mid-latitudes, Vega is the brightest star to pass nearly overhead. At a distance of just 25 light years away, Vega is one of the closest stars visible in the northern hemisphere. Some stars are bright because they're very large stars. Vega is bright primarily because it's so close. Its brightness makes it the fifth brightest star in the sky (we can see 3 of the 5 brightest stars from most of the US and 4 of the 5 brightest from places like the coast of the Gulf of Mexico).

Vega is a young star (as far as stars go) at 400 million years old. However, because its more massive than the sun (slightly more than two times heavier), Vega only has another 400 million years to go before its nuclear fires g out and it collapses into a hot white dwarf. The sun has at least another 5 billion years to go and will expire with the same fate.

Vega is close enough that special telescopes can see its surface as a circle. What's odd about the surface of Vega is that the center of its disk is hotter than the rim. Further studies have shown Vega rotates very rapidly. As a result, its squashed into a flattened sphere. We see Vega as perfectly round because we see it from its poles. The dark rim visible in our telescopes is the equator of the star that, because of its rapid rotation, is further from the star's core and therefore cooler and darker.

Infrared space telescopes show a warm cloud around Vega. The cloud appears to be a disk of dust and gas in orbit around the star. The disk is not unlike the early suns' disk that our solar system formed from. In Vega's case, any planets it creates won't have long to develop life before the home star dies. Vega appears nearly overhead after the fall of darkness in early August.

August 1 – 7

The moon is new on the 1st. What's really great about this full moon is that the moon's orbit intersects the sun at new moon. In other words, there's a solar eclipse. The only problem is that it occurs at night for us, so only people living in Asia, Northern Europe and Russia, and Greenland will see it.

There are two meteor showers reaching their peak this week. The Alpha Capricornids reach their peak on the 1st and the Southern Iota Aquarids reach their peak on the 6th. The Alpha Capricornids are an old meteor shower. Because of its age, the orbit of the meteors is very diffuse and a parent comet or asteroid cannot be located with certainty. You can expect to see around 10 meteors per hour from this stream and on average, they'll be brighter than most other meteors. On the negative side, the shower's radiant is low to the horizon for the Northern hemisphere.

The Southern Iota Aquarids are part of a very diffuse meteor shower with two separate peaks. Expect to see 7 or 8 meteors per hour from this shower. Since Aquarius is a summer zodiacal constellation, it never climbs very high above the horizon for Northern observers. With the Capricornids, Aquarids, and soon the Perseids active, August is a busy month for meteor observing.

August 8 – 14

The moon is first quarter on the 8th. Over the next few days the moon's light will wash out the fainter meteors from the August meteor showers. But have no fear, the moon still sets early enough that you can enjoy the showers.

Thirty years ago on the 8th, the United States landed its first and only spacecraft to date on the planet Venus. Pioneer Venus 2 was the second spacecraft of an armada that the US send to Venus. The first spacecraft when into orbit around Venus while the second one, called the multiprobe, carried four probes designed to descend through the Venusian atmosphere making measurements.

The 640 pound (empty weight) multiprobe bus carried a 700 pound large probe and three 200 pound smaller probes. Part of the additional weight of the large probe was its parachute system that slowed its descent so it could collect more data higher in the atmosphere. The probes were not designed to collect data on the surface of Venus. The fact that one of the small probes, named the Day Probe, did survive on the surface for an hour was an unplanned for benefit. The four probes were sealed spheres carrying instruments to measure the temperature, pressure, cloud particle size and density, atmospheric gasses, acceleration, infrared radiation, and sunlight intensity. The multiprobe bus was also designed to collect data on the Venusian atmosphere, but in this case, only the highest reaches of the atmosphere. For without a heat shield, the multiprobe bus burned upon reentry at an altitude of 68 miles above the surface.

Results from Pioneer Venus and similar spacecraft indicate that the atmosphere of Venus is hot and corrosive. With a pressure 92 times greater than earth's, it carbon dioxide atmosphere crushes the spacecraft we send to the surface of the planet. On the surface, the temperature is hot enough to melt lead (860 degrees) and it never cools off at night. By watching the probes drift through the atmosphere via radio, we know the surface winds of the planet are very light. However, the gentle winds combined with its huge surface pressure would make it nearly impossible to walk against the wind. Venus most likely began life similar to earth. However, because of its closer distance to the sun, it surface temperature grew too hot for liquid water to remain stable. Eventually all of the planet's water evaporated to form a green house gas surrounding the planet. Without surface water, none of the planets carbon dioxide was trapped in carbonate minerals leading to even a greater amount of green house gasses in the atmosphere. Venus may be a model for earth's future. As the sun ages and grows hotter, it will warm our oceans until they evaporate away. However, we still have a billion years before this happens.

Antares, the heart of the scorpion, Scorpius, is 5 degrees away from the moon's right on the 10th. So look at the moon with your binoculars on the night of the 10th for an orange spark of light. At 620 light years away, the light of Antares you see tonight left in 1388.

The moon is at apogee on the 10th. Its greatest distance from earth this month is 251,379 miles away. It takes a radio wave 1-1/3 seconds to reach the moon tonight.

Arguably the best meteor shower, the Perseid meteor shower, reaches its peak intensity on the night of the 11th and morning of the 12th. Because of the warm nights of August and the intensity and reliability of this shower, the Perseids are one of the better attended night time events. This year though, the light of the waxing gibbous moon will interfere. However, the moon sets at 2:00 AM and the sun doesn't rise for another 4-1/2 hours. That gives viewers over three good hours of observing. You can expect up to 60 meteors from this shower, so don't miss the best of the best.

NASA launched the ISEE-3 spacecraft 30 years ago on the 12th. ISEE, or International Sun-Earth Explorer, and was one of a triplet of spacecraft launched to explore the magnetic interactions between the sun and earth. Initially placed at the earth-sun L1 point, it orbited the balance point between the earth's and the sun's gravity. From that vantage point one million miles away, it monitored changes in the interplanetary medium (consisting of mostly plasma) for changes brought about by solar activity. Beginning in 1982, ISEE-3 spent 18 months changing its orbit so that it would fly to the other side of the earth in order to measure how our magnetic field interacts with the solar wind. By the end of 1983, the spacecraft had gained enough energy from lunar flybys to escape the earth-moon system and head to comet Giacobini-Zinner. With a comet flyby now on its schedule, the spacecraft was renamed the International Comet Explorer, or ICE. ICE passed the comet in September 1985 and then headed to Comet Halley. ICE was the American contribution to the spacecraft exploration of the comet in 1986. Since ICE didn't carry cameras, it could only measure the magnetic fields and plasmas around the comets.

August 15 – 21

The moon is full on the 16th. Often the full moon before or after a solar eclipse experiences a lunar eclipse. Such is the case this month, however, unfortunately for us, the partial lunar eclipse occurs during the day, and therefore we don't get to see it. The full moon in August is often called the Dog Days Moon.

August 22 – 30

The moon reaches last quarter moon on the 23rd. Since the moon close to the Pleiades this morning, you ought to take a look at it in your binoculars. You may be surprised to discover the Pleiades star cluster is larger than the moon.

As you get ready to drive to work on the morning of the 24th, look for the moon between the Hyades and Pleiades. Both star clusters are close to earth (relatively speaking) and great binocular objects. You can begin looking for them as early as 2:00 AM.

The moon reaches the perigee of its orbit or point of closest distance from earth late on the night of the 25th. Its closest distance from earth this month is 229,097 miles. That's 22,282 miles closer than it was on the 11th. That puts the moon close to three earth diameters closer to us.

Five years ago on the 25th, NASA launched the last of the great observatories. The Spitzer Space Telescope was the largest, most sensitive infrared space telescopes launched to date. Its orbit trails behind the earth's so that over time, it falls further and further away from the earth. Its great distance from the warm earth increases the lifetime of its 96 gallons of frigid liquid helium. It also means that astronauts cannot service the telescope or refill its liquid helium tank when it empties. Its 34 inch diameter mirror gives Spitzer the ability to penetrate the dust around the cores of galaxies and the ability to detect countless black holes hidden within distant galaxies. Because of Spitzer's spectrograph, we have evidence that supernovae explosions not only create new elements like argon, but also create dust from elements like silicon. Spitzer's image of the Omega Centauri globular cluster shows there's very little dust between its stars, but that the stars are not all the same age, leading astronomers to conclude the cluster is actually the core of a dwarf galaxy that got to close to the Milky Way galaxy and swallowed up. Only three of the four great observatories are still functioning, the Hubble Space Telescope, Chandra X-ray Observatory, and Spitzer. NASA ordered the Compton Gamma Ray Observatory to reenter the earth's atmosphere once they were no longer comfortable with their ability to control it. Although, from what I've read years ago, this decision has more political overtones as it was made to encourage the reluctant Russians to abandon and destroy their Mir space station.

Since the moon is rapidly approaching new, beginning the 28th and running for the next two weeks, the zodiacal light is visible in the mornings. The zodiacal light is so faint that it needs all the help it can get from dark skies. So look for a triangular shaped pillar of

faint light in the east 90 minutes before sunrise from the darkest location you can find. Afterwards, you can probably find it less than perfect skies.

Also on the morning of the 28th, the moon passes 3 lunar diameters from the Beehive star cluster. Look to the moon's lower left with your binoculars for this sprinkle of stars. The crescent moon's light will have minimal affect on the cluster's stars.

The moon is new on the 30th. Don't expect to see it again until the evening of September 2nd or 3rd.

This Month's Sources

The Royal Society of Canada, Observer's Handbook 2008
Baalke, Ron, Space Calendar, 9 May 2008, <www.jpl.nasa.gov/calendar/>
Kaler, James, Stars: Vega, 30 May 2008, 4 June 2008, <www.astro.uiuc.edu/~kaler/sow/>
Night Sky Explorer (software)
Kronk, Gary W., Meteor Showers Online, Alpha Capricornids, 9 May 2008, <http://meteorshowersonline.com/showers/alpha_capricornids.html>
Kronk, Gary W., Meteor Showers Online, Iota Aquarids, 9 May 2008, <http://meteorshowersonline.com/showers/iota_aquarids.html>
Goddard Spaceflight Center, Pioneer Venus Project Information, 6 January 2005, 9 May 2008, <http://nssdc.gsfc.nasa.gov/planetary/pioneer_venus.html>
Wikipedia, Pioneer Venus Project, 2 April 2008, 9 May 2008, <http://en.wikipedia.org/wiki/Pioneer_Venus_project>
Kronk, Gary W., Meteor Showers Online Perseids, 9 May 2008, <http://meteorshowersonline.com/perseids.html>
NASA, ICEE3, 2 April 2008, 9 May 2008, <http://nssdc.gsfc.nasa.gov/nmc/masterCatalog.do?sc=1978-079A>
NASA, Spitzer Space Telescope, 9 May 2008, <http://www.spitzer.caltech.edu/spitzer/

Dark Skies and Bright Stars,
Your Interstellar Guide