We are accustomed to looking into the sky at things—The Sun, Moon, stars, five planets, aurora, meteorites and the occasional bright comet are all visible to us, with just our eyes. There are even a couple of nearby galaxies and a handful of nebulae and globular clusters that can be seen under dark skies, entirely without the aid of optical devices. It has been so throughout human history. A good pair of binoculars or just a small telescope opens up to us marvels of the Cosmos that our ancestors didn’t even dream existed. One wonders what shock and awe ran through Galileo’s mind and body when he first turned his primitive telescope upon the craters of the Moon; or as he discovered the tiny, circling moons of Jupiter!

On January 7, at the Annual Meeting of the American Astronomical Society, astronomers announced that Kepler telescope findings indicate that about 17 percent of the stars in the Milky Way host planets around the size of Earth. If our Galaxy has just 100-billion stars, (estimates range up to 400-billion) then there are 17-billion planets from .75 to 1.25x the size of Earth. Some of these should orbit in their Star’s habitable zone, where liquid water can exist. Earth orbits near the outer edge of the Sun’s habitable zone, Venus at the inner edge.

Kepler 22b vs. Earth, NASA- JPL Illustration, Space.com

Only 4.36 light years away, is the Sun-like star, Alpha Centauri B. Circling it is a planet just 1.5x Earth’s size. However, it orbits so close to the star that its surface is probably molten lava--unlikely to harbor life. Another neighboring Sun-like star, Tau Ceti, (G8, 11.9 Ly) is orbited by what appear to be two “Super Earths” (2–6x Earth’s size) in its habitable zone. Then there’s Kepler 22b, a “Goldilocks” planet 2.4x Earth’s size that may have a “just right” surface temperature of 72F. Located 600 light years away, it’s still relatively nearby—in our galactic “neck of the woods,” so to speak.

These findings suggest that given the billions of stars in the Galaxy, habitable planets may be common. The Sun has two Earth-types: Venus and Earth. We know that 50% of those are not only habitable, but host life. If just 1 in 5 of the possible Earth-like planets are habitable, then there might be nearly 4-billion in the Milky Way. With upwards of 100 billion galaxies in the observable Universe, the card deck appears to be stacked in favor of habitability. As more data comes in from Kepler and other planet hunting programs, we should probably find an “Earth-Twin,” within the next few years—if not sooner.
High above you in the evening skies in early February, just after dark (about 8:00) bright, pale Jupiter pops into view, floating near the Hyades star cluster in Taurus. The gas giant has completed its retrograde loop and now begins marching east again, towards Gemini. About the same time, in the southeast, one of the most recognizable constellations in the sky, mighty Orion, the Hunter begins his climb, with his fierce mastiff, Canis Major at his heel. Brilliant Sirius is the jewel on the dog’s collar. Due to its close proximity to the Sun at only 8.6Ly, it’s the brightest star in the sky. This hot, blue-white (spectral type A) ball of seething gas burns hydrogen on the main sequence. Twice as massive as the Sun and 22 times as luminous, the “Dog Star’s” surface temperature is a fierce 22,000 degrees Fahrenheit. Moreover, Sirius has a hidden companion, a white dwarf—the burned out remnant of a Sun-like star that exhausted its hydrogen, and is now no more than a very slowly cooling cinder.

North of the Ecliptic, near the Zenith ride the stars of the winter constellations Auriga, Andromeda and Triangulum. Among these three float some of the finest deep sky objects in the Northern Hemisphere: M-31, The Andromeda Galaxy; M-33, The Pinwheel, and three fine, binocular visible open clusters: M-36, M-37 and M-38. Each cluster lies relatively nearby in galactic terms, only about 4,000 Ly away.

High above them all in the North, is Ursa Major, “The Great Bear.” Within its borders is The Big Dipper, (also known in agrarian societies as The Plough) one of the most familiar asterisms in the skies. These 7 bright stars are visible in every season, circling the Pole. At the bend of the Dipper’s handle are the paired stars, Mizar and Alcor. The ability to separate the two naked eye, was often used in years past as a simple test of visual acuity. Mizar is itself a binary star, with its companion orbiting 14 arc seconds away. Five of the Dipper’s seven stars are members of a traveling open cluster, moving through space in the same direction.

Deep-sky objects in Ursa Major include the elusive, low surface brightness Owl nebula, M-97, Interacting galaxies, M-81 & M-82, and M-101, a face-on spiral twice the diameter of the Milky Way. This “Grand Design” spiral was, until recently, thought to be our twin, but new studies have shown that our Galaxy is in fact a Barred Spiral, with only two major arms. Dark skies beckon the weekends of Feb. 1-4 and 8-10, so put on your winter weather gear and brave the cold.

Our next DAS meeting is: 7pm Tues. Feb 26th, Room 961 Bay College. Until then, and always, “Keep Looking Up!” Dan
We have been invited to join the Wm Bonifas Fine Arts Center in sponsoring an Astronomy related exhibit this fall in celebration of Escanaba’s 150th Anniversary. On September 26, Mary Stewart Adams, the Program Director for The Headlands International Dark Sky Park just west of Mackinaw City will be present for the opening of the gallery exhibit of her astronomy related artwork. Mary publishes an annual calendar aimed at teaching children about Astronomy facts and lore. At the Headlands, Mary oversees a year-round program of educational and informative events for people of all ages, drawing upon her experience as a star lore historian and artist.

The Headlands, Dark Sky Park

Emmet County
Michigan.

Photo: The Milky Way over Lake Michigan, from The Headlands.

Robert de Jonge.com

Go to: darksky@emmetcounty.org to read articles about the park and see videos of Mary explaining the Park’s programs, astronomical events, etc.

Co-incidentally, during the autumn months of September through November, Comet ISON (C2012 S-1) will be making its swing through the inner Solar System. Many astronomers are predicting that this visitor from the far-reaches of the Solar System could brighten to become “The Comet of the Century.” At perihelion on November 28, it will pass within 725,000 miles of the surface of the Sun. If it survives this encounter, it may well brighten to daylight visibility. Our nights might then be host to a Comet with a tail that stretches across most—if not the entire-night sky!

Expectations for ISON are high for several reasons. When still beyond Jupiter’s orbit it appeared brighter than most recent comets have, which suggests it might be a pristine object from the Oort Cloud. Studies suggest it may also have a fairly-large nucleus, some 6 miles wide. Further, ISON’s orbit appears to be very similar to that of the Great Comet of 1680, which sported a tail so long and bright that it was reportedly visible in broad daylight.

That would make ISON the greatest comet anyone now alive has ever seen. If so, then public interest in Astronomy might be greater this fall than it has ever been. We need to start planning for public observing sessions, and preparing to record this event.

Other possibilities we are considering to get the public involved in astronomy this year include inviting well-known Marquette area Astro-photographer, Shawn Malone to a DAS meeting or other event to display her work and to discuss her techniques for photographing the Aurora, etc. Shawn’s astro-photography been featured at: Space.com, WeatherUnderground.com, and on TV’s Weather Channel. She has won numerous awards for her photography. Examples of her work are at: www.LakeSuperiorPhoto.com.

As the Sun is also nearing peak activity, we are planning to hold some daylight public viewing sessions, and are purchasing a 10”full aperture solar filter to use for these events.

We need your input as we discuss ways to promote the science and hobby of astronomy in our area throughout 2013. You attendance at our winter and spring DAS Club meetings is encouraged and will be appreciated.

Our next meeting is scheduled for 7pm, Tuesday, February 26, in Room 961 at Bay College, Escanaba. Visitors always welcome.