

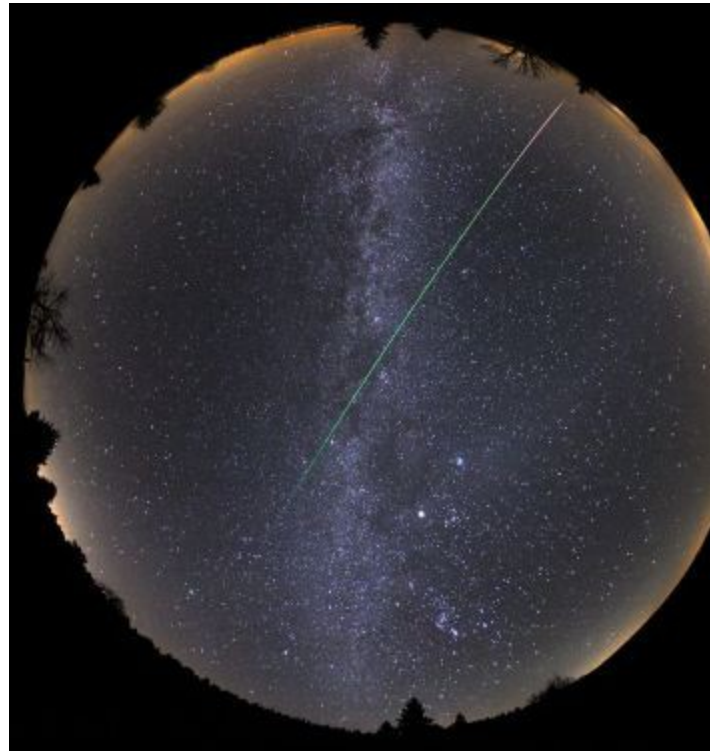


Events:

General Meeting : Monday, Nov 2, 2015 at the Temecula Library, 30600 Pauba Rd, Rm. B at 7 pm.

Following Mark Baker's comments, John Garrett will present "What's Up". Then we will have a presentation by Alex McConahay titled "Nightscapes" on the basics of incorporating Big Sky objects with earthly landscapes. All are welcome....

For the latest on Star Parties, check the [web page](#).



NASA APOD: Night of the Long Leonid – Image Credit & Copyright: [Stéphane Vetter \(Nuits sacrees\)](#)

WHAT'S INSIDE THIS MONTH:

Cosmic Comments

by President Mark Baker

Looking Up

by Curtis Croulet

How we know Mars has liquid water on its surface

by Ethan Siegel

Send newsletter submissions to Mark DiVecchio (markd@silologic.com) by the 20th of the month for the next month's issue.

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General information:

Subscription to the TVA is included in the annual \$25 membership (regular members) donation (\$9 student; \$35 family).

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Cosmic Comments – November/2015 **by President Mark Baker**

I must admit to feeling somewhat excited about the coming year what with the VMHS 16" scope having the slab poured for its observatory and the Crossover property finally getting into the permit and plan check process. If all goes right, we could start building our observatory facility by mid Spring...!!!

This, combined with Sam Pitts talk on his herculean efforts to build observatories in the Oregonian Outback, serves to drive me to start looking at what it will take to get the TVA into its own facilities. Obviously, we need to determine what features we need and want, so a committee needs to be created. After even minor research, I know there are many opportunities for funding, including grants and donations, so the only thing TVA members should need to contribute will be time and opinion!!

After our November meeting elections and with the 2016 BOD in place, I hope we can get a foundation – such as Celestial Moments of Temecula Valley - in place to start putting the pieces of the puzzle together and hit the ground running.

Working together, we can make great things happen that will serve not only TVA interests, but of the extended community as well... I'm hoping you will all be ready when its decided that "We are a GO for Launch"!!!

Clear, Dark Skies my Friends...





Looking Up – November 2015

by Curtis Croulet

Last Quarter Moon is November 3 at 4:24 AM; **New Moon** is November 11 at 9:47 PM; **First Quarter Moon** is November 18 at 10:27 PM; and **Full Moon** is November 25 at 2:44 PM.

We will have no bright planets available for evening star parties for the rest of the year.

Mercury will not be visible during November. Superior conjunction, which means it's on the other side of the Sun, is on November 17. With the messenger planet so close to the Sun, even daytime observing would be risky.

Venus, Jupiter, and Mars are all in the pre-dawn sky. **Venus** is by far the brightest of the three, beginning November at mag -4.5. **Jupiter** starts November at a healthy -1.8, brightening a bit to -2.0 by the 30th. Poor **Mars** struggles to be noticed at mag +1.7. Better days are ahead for **Mars**, however. There'll be a nice opposition next year on May 22.

Uranus and Neptune are in Aquarius and Pisces, respectively. Both are ideally placed for evening observation. But **Pluto** is gone.

The **Leonid Meteors** peak on November 18. They are associated with Comet Temple-Tuttle, which returns every 33 years. The year of its return (last was 1999) and the years immediately preceding and following are sometimes accompanied by a "storm" of bright Leonids. This isn't such a year. But look anyway. Some people reported a very brief but intense outburst of Perseids back in August. You just never know what you might see.

This past month I attended the Advanced Imaging Conference in San Jose. The event consists of seminars about imaging the sky. Traditionally, the emphasis has been on CCD imaging of deep-sky objects, but this year's conference added sessions about DSLRs and planetary imaging. AIC also hosts what they call the Technology Showcase, an exhibit hall stuffed with vendors and equipment for the moneyed imager. Interestingly, Meade Instruments, a major exhibitor at every major astronomy show I can remember since the 1970s, was nowhere to be seen. Celestron was. A decade ago, who would have dreamed that Celestron, not Meade, would be the survivor of the telescope marketing wars? AIC is held annually in October, although there was a hiatus (no conference) in 2014. AIC is one of the annual highlights of my astronomical year. Meanwhile, the huge Arizona Science and Astronomy Expo, held in 2013 and 2014 in Tucson, appears to be defunct.

Let's look up.

I've been writing these essays for almost twenty years. I've always considered them to be a learning experience, not just for you, but also for me. Sometimes the intended course of an essay takes an unexpected turn. Consider this month's "Looking Up" essay, for example. November evenings are too early for the winter stars, and the summer stars are mostly gone. There's a vast area of the sky with dim stars and indistinct constellations. The only 1st



magnitude star in this empty quarter of the sky is Fomalhaut, far to the south. So I got to thinking about the “water constellations.” I thought they might be a good subject for the November essay. I thought I knew which constellations were included in the family of “water constellations.” I thought all of them were in the autumn evening sky. I was thinking of constellations like Capricornus, Aquarius, Pisces, Cetus, and Piscis Austrinus. Capricornus is a sea-goat – whatever that is. It’s usually depicted as a goat with the body and tail of a fish. The boat-shaped asterism that represents Capricornus has no resemblance to a hybrid goat-fish, at least not to me. Aquarius is the water-bearer. He’s a big guy who’s pouring out a jug of water. I see no distinctive pattern in the stars of Aquarius, except for the three-pointed asterism called the “water jar.” Pisces is a pair of fish, mutually connected by a V-shaped river of water or, perhaps, some sort of cord. One fish is marked by a circlet of stars. No distinctive asterism marks the other fish. Cetus is the sea monster that threatened Andromeda when she was chained to a rock. Piscis Austrinus is the southern fish.

I had fun reviewing these constellations, but only one of them is a “water constellation.” Capricornus, Aquarius, and Pisces may have watery connotations to astrologers, but for us they are simply water-associated parts of the “Zodiac Family” of constellations. There are no “water constellations.” There is a “Heavenly Waters Family.” And the Heavenly Waters Family doesn’t include any constellations from the zodiac.

The Heavenly Waters Family of constellations includes Delphinus, Equuleus, Eridanus, Piscis Austrinus, Carina, Puppis, Vela, Pyxis, and Columba. Some of these are generally thought of as winter constellations. Piscis Austrinus (southern fish) is most notable as the home of 1st magnitude Fomalhaut. Carina (keel), Puppis (stern), Vela (sail), and Pyxis (compass) are mostly southern constellations. They are pieces of the old constellation Argo (Jason’s ship), which is no longer recognized by astronomers. Puppis is home to Canopus, second brightest star in the night sky. Canopus barely clears our horizon on late winter evenings. Look for it directly south of Sirius, when Sirius is at its highest. Delphinus is a neat little diamond-shaped asterism that marks a dolphin. Delphinus swims overhead in the vicinity of Sagitta (arrow) and Aquila (eagle) during late summer. You may have heard of Eridanus, which represents a long river that meanders southwest of Orion. The river’s southern end is marked by the 1st magnitude star Achernar, which is just a bit too far south for us to see.

Equuleus is probably the most obscure constellation visible from our latitude. Equuleus represents a sea-horse. I dare speculate that most of you have never heard of it. Equuleus lies between Pegasus and Delphinus. It has no distinctive pattern. It contains no deep-sky showpieces. I once made an evening project of observing every deep-sky object in Equuleus that was within range of my Meade 10-inch SCT. All I found was a sparse scattering of faint galaxies.

So this was my learning experience. The “water constellations” were washed away by the Heavenly Waters Family, which included a suite of constellations very different from what I imagined.

Clear skies.



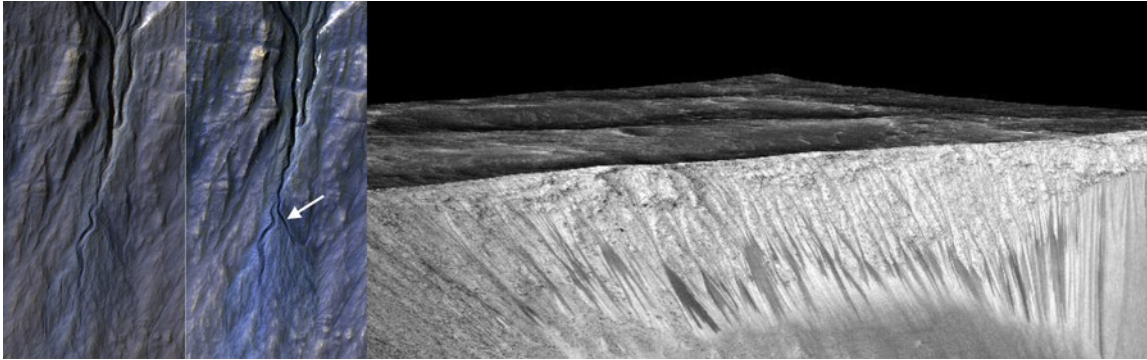
How we know Mars has liquid water on its surface by Ethan Siegel

Of all the planets in the solar system other than our own, Mars is the one place with the most Earth-like past. Geological features on the surface such as dried up riverbeds, sedimentary patterns, mineral spherules nicknamed "blueberries," and evidence of liquid-based erosion all tell the same story: that of a wet, watery past. But although we've found plenty of evidence for molecular water on Mars in the solid (ice) and gaseous (vapor) states, including in icecaps, clouds and subsurface ices exposed (and sublimated) by digging, that in no way meant there'd be water in its liquid phase today.

Sure, water flowed on the surface of Mars during the first billion years of the solar system, perhaps producing an ocean a mile deep, though the ocean presence is still much debated. Given that life on Earth took hold well within that time, it's conceivable that Mars was once a rich, living planet as well. But unlike Earth, Mars is small: small enough that its interior cooled and lost its protective magnetic field, enabling the sun's solar wind to strip its atmosphere away. Without a significant atmosphere, the liquid phase of water became a virtual impossibility, and Mars became the arid world we know it to be today.

But certain ions—potassium, calcium, sodium, magnesium, chloride and fluoride, among others—get left behind when the liquid water disappears, leaving a "salt" residue of mineral salts (that may include table salt, sodium chloride) on the surface. While pure liquid water may not persist at standard Martian pressures and temperatures, extremely salty, briny water can indeed stay in a liquid state for extended periods under the conditions on the Red Planet. It's more of a "sandy crust" like you'd experience on the shore when the tide goes out than the flowing waters we're used to in rivers on Earth, but it means that under the right temperature conditions, liquid water does exist on Mars today, at least in small amounts.

The measured presence and concentration of these salts, found in the dark streaks that come and go on steep crater walls, combined with our knowledge of how water behaves under certain physical and chemical conditions and the observations of changing features on the Martian surface supports the idea that this is the action of liquid water. Short of taking a sample and analyzing it in situ on Mars, this is the best current evidence we have for liquid water on our red neighbor. Next up? Finding out if there are any single-celled organisms hardy enough to survive and thrive under those conditions, possibly even native to Mars itself!



Images credit: NASA/JPL-Caltech/Univ. of Arizona, of a newly-formed gully on the Martian surface (L) and of the series of gullies where the salt deposits were found (R).

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The TVA is a member club of [The Astronomical League](#).

