Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers Sept 2015

Events:

Star Party : No general meeting in September. Instead join us for a Star Party at the home of Curtis Croulet in Anza. Watch your email for details and directions.

For the latest on Star Parties, check the web page.

Trifid Nebula, M20, Jul 2015, Anza Gap Observatory, Anza, CA. TEC 140 (5.5-inch) f/7 refractor with a QSI 683 CCD camera. 12 hour exposure. Curtis Croulet

WHAT'S INSIDE THIS MONTH:

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

Like us on Facebook

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

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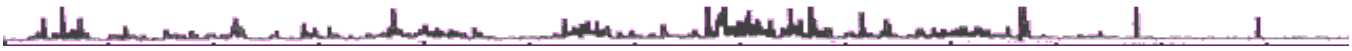
Cosmic Comments – September/2015
by President Mark Baker

It's so gratifying to work within the community on projects close to our hearts and minds and share the thoughts and feelings of those that are "outside" our close knit sphere in the TVA. Recently, John Garrett and Chuck Dyson made major contributions to an event sponsored by the Library, and several of you go out of your way to do the same in a variety of ways – StarFest's, Star Explorations, Meteor Madness, etc.

Deborah Cheong, Paul Kreitz, and I are supporting a community event involving the Celebration of Mars Exploration which will be initially centered again at the Library starting in mid-October with a cabinet display, and culminating on November 9th with a presentation, Q&A, and several related displays around the Community Rooms, stationed by various organizations. We are currently in the planning stages with Richard "Rocket Man" Dierking and David Hinrichs of TMS and have the support of library staff.

If anyone else would like to be involved, you are more than welcome…there is so much material available on this subject to be shared, dating back to the times of Lowell and EGB and including the future plans by many countries. So feel free to jump in and help us Celebrate the exploration of the Red Planet, Mars…!!!

Clear, Dark Skies my Friends…



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The 2015 Golden State Star Party!

By Will Kramer

I was able to attend the 2015 Golden State Star Party, which was held from July 15th – July 19th way up in Adin, CA, at the Frosty Acres Ranch in the far northern part of the state. Over 300 astronomers were set up there on open cattle ranch land at approximately four thousand feet of elevation, and in the distance to the northwest, Mt. Shasta could be seen about 65 miles away! Leaving at 4:00 am, I took the scenic route on Hwy 395 all the way past Bishop and Mono Lake, north through Reno, Nevada, and back into California again to Susanville, where I traveled north on Hwy 139 all the way to the turn off for the site. I had expected the one way trip to be between 700 and 800 miles, but it was actually only 640 miles, and I arrived at the GSSP site about 5:30 pm, even with a couple stops for gas and lunch!

The huge open field was organized into many long rows of observers' telescopes and their vehicles or tents, each with the name of one of the planets in our solar system, and there was another adjacent field for overflow attendance, called the Ort Cloud! I parked and set up at the west end of Jupiter Row, which consisted of almost all large Alt-Azimuth reflectors. My 15" Dob fit right in there, although it was the *smallest* – the other scopes ranged from 16" all the way to 28", and there were two of those!

I was tired from the long drive and lack of sleep the night before, so I didn't think I would observe that first night with my scope, but as it turned out, I did. The thrill of a very dark and beautiful night kept me going, as there were only a few stray lights from across the valley on Hwy 299, and there was NO sky glow on any horizon! And with good seeing too, my scope provided the best views I've ever had of many fine objects, like M5, M13, M57, and especially the spiral galaxy M51, where the spiral arms were clearly visible – no averted vision necessary! Also notable that first night was the view of NGC 7331, and being able to find the Stephan's Quintet galaxy group with ease. The other astronomers nearby on Jupiter Row were advanced visual observers, with agendas already planned that they worked on through the night. Finally, I konked out and had to go to sleep, but this night was wonderful and I found out later that it was one of the best nights remembered even by veterans of many GSSP's!

I tried to rest in the car most of the next day, and one of the amenities provided by the GSSP was a shower trailer, that made a big difference for all the astronomers in attendance! During the day the wind gusted hard across the open country, so all the scopes were covered up and kept in a low position so they would not be in danger of tipping over. Clouds would also form in the afternoons, but in most cases, both the wind and the clouds were likely to fade away after the sun went down, and it was neat to see the sun set near the silhouetted Mt. Shasta! After dinner, which was held under a very large tent enclosure, a speaker gave a good talk on the "New Horizons" mission to Pluto, which had just made its historic flyby two days before! Another fine observing night followed, but some almost invisible thin, high clouds prevented it from being quite as good as the first night. But I was more rested, and still had some great views through the 15" scope. Some of these included M101 in Ursa Major, the "great" M22, and my best ever observation of the globular M92 in Hercules, which is often overlooked because of its proximity to M13. One thing I noticed was that at latitude 41 degrees north, I could tell that Polaris was a little higher in the sky, but what I really found was that the southern constellations like Scorpius and Sagittarius seemed to be much lower towards the horizon than what I am used to!

One of the high points of this GSSP for me was the chance to meet "Astronomer Howard", who I went to high school with all three years in Colorado. We did not know each other back then, but we already had scopes and were into astronomy, so if there had been an Astronomy Club at our high school, it would have been us! We were able to get a picture taken with a sign I made for the "Astronomy Club". On Friday morning, I traveled to the northwest to take some close up photos of Mt. Shasta. I made it all the way to Weed, CA, where I had lunch before coming back to the site to get ready for the next night.

The speaker this evening was Rich Ozer, who appeared to be in charge of the GSSP, and the talk was all about the Stellafane Conference in Vermont. Afterward, the clouds from the afternoon were still there, but instead of dissipating like the previous night, it suddenly began to rain, and thunderstorms were upon us! There was not much we could do but bundle up for the night, but it was a good lesson on how quickly the weather can change in the far northeast of CA, and with the winds that whipped up by mid-morning the next day, everything that had gotten soaked was completely dry! Also helping to forget that wet night was a great pancake breakfast that was served at 10 am – all you could eat!

There were some activities during the day when I wasn't trying to sleep, and one of them on Saturday was the chance to watch as one of the guys decided to wash his scope's 18" primary there literally in the field. First stop was by the shower trailer to be hosed off, and then he took the mirror back to his tent and carefully cleaned it with distilled water, gentle soap, and cotton balls. Judging by how dirty the mirror was before he started, we joked that he would probably gain at least two magnitudes while observing that night!

I tried to sleep on the picnic tables under the big tent the rest of the afternoon without any real success; however, with the last night approaching, I was still going to set up the scope again and try to get some observing in. It started out well with the crescent Moon and crescent Venus together, setting low in the west near Mt. Shasta, and there were enough open areas of sky to give us some observing opportunities as darkness arrived. I was able to view the Veil Nebula and M39 in Cygnus, and the globular M3, as well as brief looks at M51 and M101 again, and the M33 spiral later on. But we were just observing between clouds, so I took some time to walk over to where Howard and Tom had their 28" telescopes set up, and talk to them briefly and look through the big scopes for a while! Because of the clouds and the long drives ahead in the morning, everyone started finishing up a little earlier that last night. The photos below are examples of the giant scopes that were there!

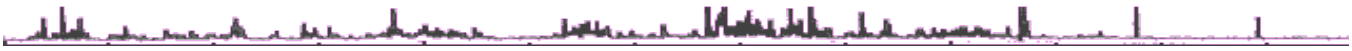
Thoughts in Conclusion:

My trip to the Golden State Star Party was well worth waiting for. I enjoyed the scenic mountain route I took along Hwy 395 and it was neat to see the High Sierras again, too. It put the White Mountain trips we took into better perspective – I passed the Big Pine turn off at 9:00 am on the trip north. It's NOT that far, and I think the TVA should try to go to Grandview Campground more often again! Heading north past Mono Lake and through Nevada was great too, and the Hwy 139 north from Susanville was much nicer than expected – a quality mountain highway that took me almost directly to the site!

The GSSP is a well run and rewarding astronomical event in a spacious location with a very dark sky. The shower trailer and porta-potties were very welcome additions, and while I was able to survive on the hot dogs and baloney sandwiches I brought with me, I will definitely pay

for the steak dinners in the package the next time I can go there again! This may not be a trip I can plan every year, but I won't be surprised if the astronomical urge begins to tug at my memories, reminding me of this great star party held way up in northern CA. And this year's trip was all the more special because I was also able to visit the great California volcanos, Mt. Shasta and Mt. Lassen, for the first time along the way!

Will Kramer



Looking Up – September 2015
by Curtis Croulet

The **Autumnal Equinox** is Wednesday, September 23 at 1:21 AM PDT. This is when the Sun crosses the celestial equator, heading south along the ecliptic.

Last Quarter Moon is September 5 at 2:54 PM; **New Moon** is September 12 at 11:41 PM; **First Quarter Moon** is September 21 at 1:59 AM; and **Full Moon** is September 27 at 7:50 PM. There's a total lunar eclipse that night. More information below.

Mercury will be low in the morning sky in the first few days of September. This is not one of the better apparitions of Mercury.

Venus and **Jupiter** are both now in the pre-sunrise sky. Jupiter will be much too close to the Sun to be visible as September begins, but you might get a good view of it by the end of the month.

Mars is also in the dawn sky. Mars is tiny, too small to show detail in any amateur telescope.

Saturn is in northwestern Scorpius. The ringed planet, which we greeted so ecstatically back in May, is edging worryingly into the southwestern evening sky. It sets around 11 PM on September 1, and a bit after 9 PM at month's end.

Uranus is in Pisces.

Neptune is in Aquarius. Opposition is on August 31. Uranus and Neptune are both visible and identifiable in small telescopes and even in ordinary binoculars, although Neptune is about at the limit of visibility in typical birding binoculars. A properly aligned go-to telescope makes finding these distant orbs a snap. The September 2015 issue of *Sky & Telescope* has good finder charts on p.49.

Pluto is in Sagittarius. Clyde Tombaugh's baby is mag 14. Good luck trying to see it! The July 2015 issue of *Sky & Telescope* has a good finder chart on pp.52-53. These charts are also available on the *S&T* website.

Let's look up.

Our Full Moon on September 27 is called the Harvest Moon. This is the name given to the Full Moon nearest the Autumnal (or Fall) Equinox, which occurs on September 23. In northern climates, the Harvest Moon occurs when the autumn or fall harvest is in full swing. The bright light of the Full Moon helps farmers work late at night.

Coinciding with the Harvest Moon is a total lunar eclipse. When the Moon rises around 6:30 PM on September 27, the eclipse will be underway. In fact, the Moon will be well into the umbra, the darkest part of the Earth's shadow. Totality – when the Moon is entirely within the umbra -- begins at 7:11 PM. Mid-eclipse is at 7:48 PM, and totality ends at 8:23 PM.
Let's talk about one of the basic concepts of astronomy: magnitude.

We measure the brilliance of celestial objects with the magnitude scale. The scale that has been in use for at least two millennia gives bright objects low numbers and dim objects high numbers. Sirius, brightest star in the night sky, has a magnitude of -1.44. The faintest objects that are observable with the Hubble Space Telescope are about magnitude 31.5. The very brightest thing in our sky is the Sun at magnitude -27.

Usually, when explaining the magnitude scale, the writer will say something about the scale being unintuitive. By this reasoning, one might expect bright stars to have high numbers and dim stars to have low numbers – the reverse of the system in use. But there are more than historical reasons for the system we have.

We know what our brightest objects are. Excepting a colossal supernova, we will probably never have anything in our sky brighter than the Sun. But we don't know the dimmest objects that we will observe. Caltech is building the TMT, the 30-meter telescope. The European Southern Observatory is building the 39-meter E-ELT, the European Extremely Large Telescope. As telescopes get bigger, they record ever-fainter objects. If we gave bright things big numbers and faint things small numbers, then the small numbers would get smaller and smaller, going into tiny decimal numbers with lots of leading zeros. Is that more convenient than simple positive numbers for faint objects?

The scale we use is generally thought to have originated with the Greek astronomer Hipparchus, who lived in the 2nd Century BC. He binned the visible stars into six magnitudes. The brightest stars were 1st magnitude, and the dimmest stars were 6th magnitude. He thought that adjacent magnitudes differed by a factor of 2. That is, a 1st magnitude star was twice as bright as a 2nd magnitude star.

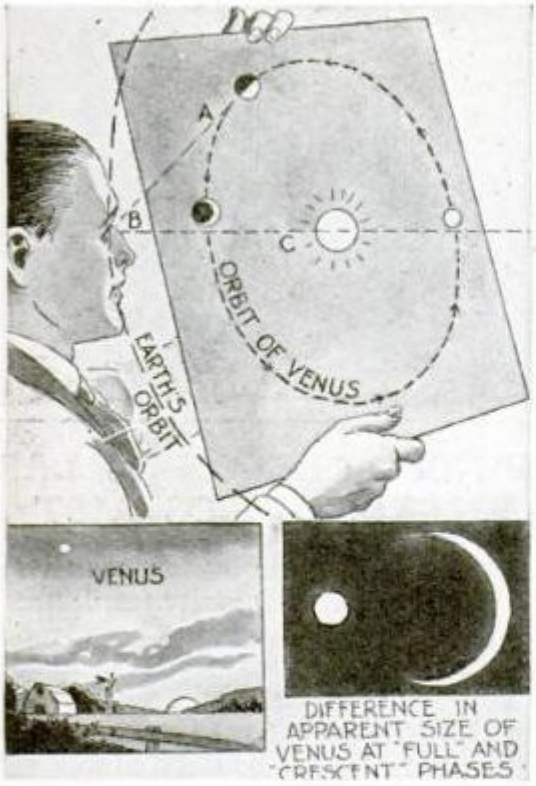
Hipparchus's original work is lost. We know about it because the Alexandrian philosopher Ptolemy, who lived from about AD 90 to AD 168, used the Hipparchus magnitude scale in his

Almagest, a compendium of everything known about “natural philosophy” (i.e., what we call science).

This crude system was used up to the mid-19th Century. As astronomy evolved out of its origins in astrology and became allied with physics, astronomers needed a more precise scale for measuring brightnesses. The English astronomer Norman Robert Pogson formalized the current scale in 1856. Pogson set the difference between adjacent magnitudes as the fifth root of 100, which is about 2.512. In this system, a 1st magnitude star is 2.512 times brighter than a 2nd magnitude star. This is called *Pogson’s Ratio*. Pogson defined Polaris as being exactly magnitude 2.0. Alas, Polaris was found to be a variable star, so later astronomers set Vega as the anchor at magnitude 0.00. Alas again, slight adjustments have been necessary for Vega, which is now magnitude 0.03. Vega, however, is only the fifth brightest star in the night sky. So negative magnitudes had to be adopted for the brighter stars and planets.

We’ve been talking mostly about *apparent* magnitude. The subject of *absolute* magnitude, which uses the same magnitude system but in a different manner, will await another essay.

Clear skies.



VENUS BRIGHTER WHEN WE SEE LESS OF IT

ALMOST everyone knows that the bright star we often see in the West near the new moon is Venus, but few know that this planet goes through all the phases from "new" to "full," just as the moon does. Still fewer know that, unlike the moon, Venus is many times brighter when she is a thin crescent than when we see her full face!

The diagrams above explain both this surprising contradiction and the reason for the planet's phases.

POPULAR SCIENCE MONTHLY

JANUARY, 1931

The circle drawn on the piece of cardboard held by the man represents the orbit of Venus, with the sun at its center. A larger imaginary circle, passing through the man's eye, is the earth's orbit. It is plain that Venus can never appear farther away from the setting sun than the angle *A B C* (about forty-five degrees) and that, twice in its orbit, it is in line with the sun and earth—once on the far side of the sun, and once on the near side, between the sun and us.

The "crescent," "first quarter," and "full" symbols along the orbit show how Venus appears to us, at these points in her path. The phases are visible in a small pocket telescope or powerful field glass magnifying ten or more diameters. Galileo discovered them with his telescope, which was about this power.

Now for the contradiction. Another glance at the sketch explains it. When Venus is "full," she is about 134,400,000 miles more distant than when showing us her "crescent." The two small images, showing her comparative sizes at maximum and minimum distance, prove that, even as a thin crescent, Venus reflects more of the sun's light to us than when the complete area of her disk is visible.

The TVA is a member club of The Astronomical League.