Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers Jan 2019

Events:

General Meeting :

Monday, Jan 7, 2018 at the Ronald H. Roberts Temecula Library, Room A, 30600 Pauba Rd, at 6:30 PM. "*What's Up*" by Skip Southwick and the main presentation by Maureen Salmi titled "*Hawaiian Astro-Tourism*".

Please consider helping out at one of the many Star Parties coming up over the next few months. For the latest schedule, check the Calendar on the web page.

NASA APOD - NGC 6357: The Lobster Nebula - Image Credit: Dean Carr

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
by President Mark Baker

I have to admit that I got caught up in all the excitement that was so pervasive in 2018 in my colleagues and associates at NASA JPL, Cal Tech, and other Space related entities, but more importantly in our own communities. And YOU did that by supporting TVA and its Outreach efforts, whether at meetings, Star Parties, Star-B-Q's or just gabbing away!!! 2018 showed that the USA has restored Space Science as a priority after almost a decade of banishment… the once flat lined enthusiasm has not only got a heartbeat again, but sometimes it borders on tachycardia from all the excitement!!!

And it's not just a domestic euphoria either…foreign and even corporate organizations are all relieved to have our country back in the fold!!! The joint proposals of 2018 will now bear fruit in 2019 and beyond…projects and programs that will serve to expand human understanding a thousand fold, now out of a bottom drawer or secondary laptop, and into the limelight for all to appreciate!!!

Here's to all those that kept the faith and the pioneering spirit that makes human endeavors so awesome…

And TVA has plenty of opportunity to take our efforts to the next level also…new equipment, new people, potentially new facilities, new challenges!!!

So here's to all my fellow TVA members that have contributed to that spirit all along and got us "grounders" to look up, if just for a moment!! 2019 will prove to be a great year in so many ways, and thank you for being a part of it…

Clear, Dark Skies my Friends…

Looking Up Redux

compiled by Clark Williams

from these sources:
SeaSky.org
Wikipedia.com
in-the-sky.org
The American Meteor Society, Ltd.
cometwatch.co.uk
NASA.gov
TVA App (2.0.1296)
FullAndNewMoon App (2.0)
Starry Night Pro Plus 7 (7.6.3.1373)
SkySafari 6 Pro (6.1.1)
Stellarium (0.18.2)

ALL TIMES ARE LOCAL PST WILDOMAR/MURRIETA/TEMECULA

Times are given in 24-hour time either as hh:mm:ss or hhmmss. A time given as hhmm+ indicates that it is the hour of the next day. Similarly a time hhmm− indicates a time in a previous day. Some times are hhmm and seconds are not shown.

Moon Phases for the month by date: (all times are PST)

Saturday the 5th @ 1729 NEW in Sagittarius
Sunday the 13th @ 2246 FIRST QTR in Pisces
Sunday the 20th @ 2117 FULL in Cancer
Sunday the 27th @ 1311 THIRD QTR in Libra

Apogee comes on 2019-01-08 @ 2030 – 406, 114 km (252, 348 mi)
Perigee comes on 2019-01-21 @ 1759 – 357, 344 km (222, 043 mi)

2019 has: (13) new moons, (12) 1st Qtr moons, (12) Full moons, (12) 3rd Qtr moons
(0) Blue moons and (1) Black moon

Daylight Savings: (Pacific time is Timezone Uniform -8 GMT [-7 GMT PDT])
Starts: **2019 MAR 10 Sunday 0200 PST**
Ends: **2019 NOV 03 Sunday 0200 PDT**

Luna: Luna will rise late on the first, peeking above the horizon about fifty minutes past two. Luna is heading toward New on the 5th of the month so you should have some dark nights until mid-month when Luna has gotten around to rising about noon-twenty-four local time. And won't be setting until 0103+. By the end of the month we're deep into the 3rd quarter and dark night viewing will be back. In fact on the 31st Luna has hit the pillow by 1400 and you will have a full dark night for viewing. There are eclipses and more this month – see **Highlights** below.

Highlights: (distilled from SeaSky.org and Clark's planetary Orrey program[s])

3--4 January: Evening – **Quadrantids Meteor Shower.** The Quadrantids is an above average shower, with up to 40 meteors per hour at its peak. It is thought to be produced by dust grains left behind by an extinct comet known as 2003 EH1, which was discovered in 2003. The shower runs annually from January 1-5. It peaks this year on the night of the 3rd and morning of the 4th. The moon will be a thin crescent and should not interfere with what could be a good show this year. Best viewing will be from a dark location after midnight. Meteors will radiate from the constellation Bootes, but can appear anywhere in the sky.

January 6: Evening - New Moon. The Moon will be located on the same side of the Earth as the Sun and will not be visible in the night sky. This phase occurs at 1728. This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

January 6: Before Sunrise - Venus at Greatest Western Elongation. The planet Venus reaches greatest eastern elongation of 47 degrees from the Sun. This is the best time to view Venus since it will be at its highest point above the horizon in the morning sky. Look for the bright planet in the eastern sky before sunrise.

January 6: Daytime - Partial Solar Eclipse. A partial solar eclipse occurs when the Moon covers only a part of the Sun, sometimes resembling a bite taken out of a cookie. A partial solar eclipse can only be safely observed with a special solar filter or by looking at the Sun's reflection. The partial eclipse will be visible in parts of eastern Asia and the northern Pacific Ocean. It will be best seen from northeastern Russia with 62% coverage. (NASA Map and Eclipse Information)

January 21: Evening - Full Moon, Supermoon. The Moon will be located on the opposite side of the Earth as the Sun and its face will be will be fully illuminated. This phase occurs at 2117. This full moon was known by early Native American tribes as the Full Wolf Moon because this was the time of year when hungry wolf packs howled outside their camps. This moon has also been know as the Old Moon and the Moon After Yule. This is also the first of three supermoons for 2019. The Moon will be at its closest approach to the Earth and ***may*** look ***slightly*** larger and brighter than usual.

January 22: Early Morning - Conjunction of Venus and Jupiter. A conjunction of Venus and Jupiter will be visible on January 22. The two bright planets will be visible within 2.4 degrees of each other in the early morning sky. Look for this impressive sight in the east just before sunrise.

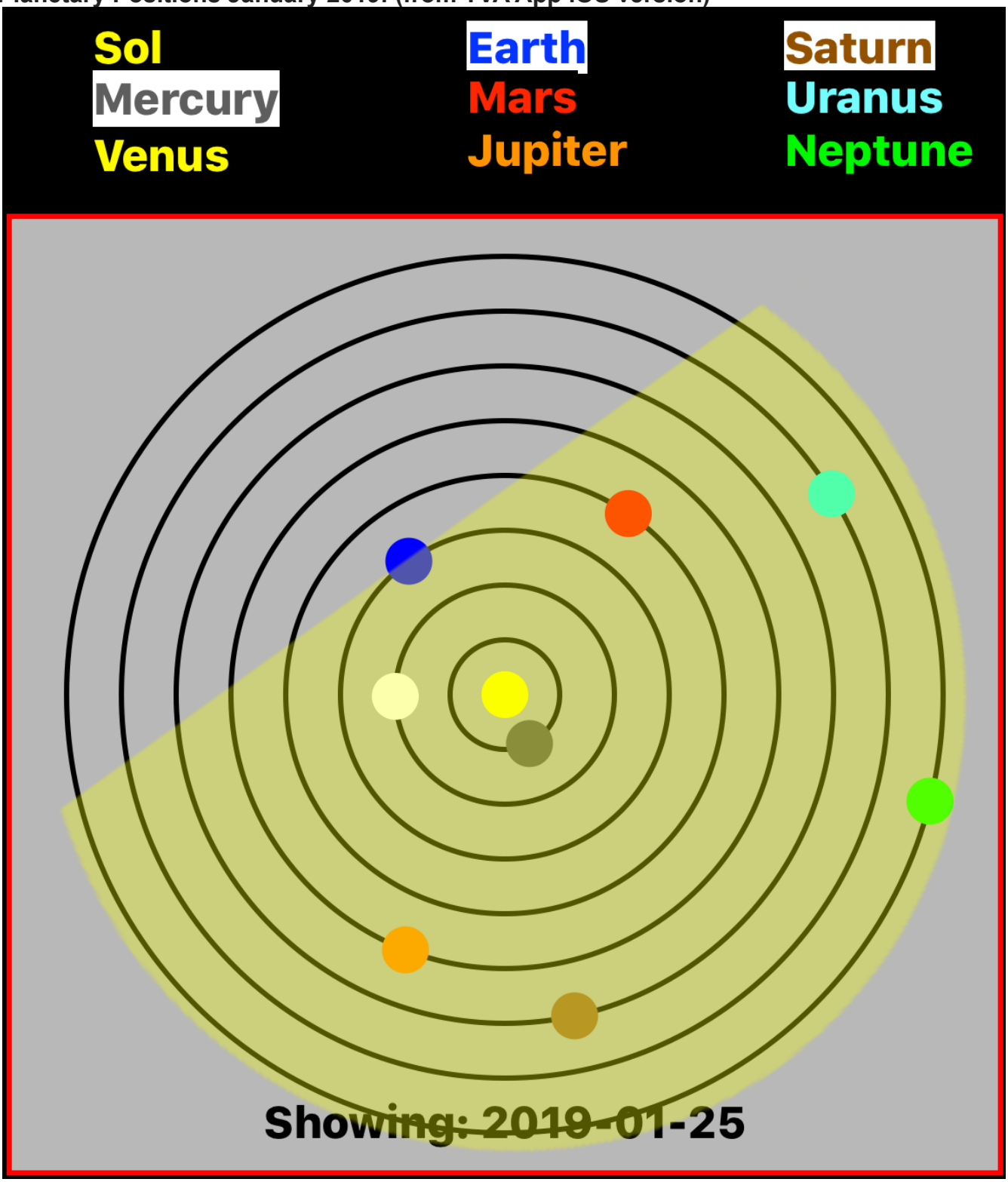
January 21: Evening - Total Lunar Eclipse. A total lunar eclipse occurs when the Moon passes completely through the Earth's dark shadow, or umbra. During this type of eclipse, the Moon will gradually get darker and then take on a rusty or blood red color. The eclipse will be visible throughout most of North America, South America, the eastern Pacific Ocean, western Atlantic Ocean, extreme western Europe, and extreme western Africa. (NASA Map and Eclipse Information)

Algol minima: (All times PST)

01/03/19	0753
01/06/19	0442
01/09/19	0132
01/11/19	1021
01/14/19	0710
01/17/19	0359
01/20/19	1249
01/23/19	0938
01/26/19	0627
01/29/19	0317

Planets:

Planetary Positions January 2019: (from TVA App iOS version)



- **Mercury:** The Winged Messenger is lost to the glare of the Sun all month.
- **Venus:** Is the Morning Star. Your best bet in the beginning of the month is between 0320 and 0524. By mid-month this has not changed much with viewing between 0320 and 0526. By the end of the month you'll have a great view of the Waning Crescent Moon sitting between Venus and Jupiter at about 0520 with Saturn peeking just above the horizon.
- **Mars:** Mars is still visible this month rising on the first about 1104. Transiting just after sunset and not setting until 2308. Mid-month finds Mars visible about the same time and setting around 0103+. You will have a Waxing Gibbous Moon to contend with however about 38° 23' 24" eastward. By the end of January Mars will be rising during daylight and transiting before Astronomical Dusk but doesn't set until 2247.
- **Jupiter:** Jupiter is also a morning object at the beginning of the month rising at 0445 but lost to the glare of the Sun by 0653. By mid-month Jove will be visible between 0403 and sunrise. It will be right next to Venus separated by about 6° 48'. The end of the month will give you quite a sight if you are an early riser, Jupiter, Moon and Venus all sitting in the early morning sky about 0414. The Moon will be in Waning Crescent and only 16% illuminated. Should be quite a sight lasting for almost an hour before Sol rises to spoil the fun.
- **Saturn:** The start of January you'll find the ringed wonder in the early morning sky rising and setting with the sun. Saturn will be leading Sol by mid-month rising in the early morning about 0607. If you are extremely lucky you'll find Mercury rising at about 0636 before the glow of the Sun obliterates the viewing. By the end of the month you'll get a little longer view of Saturn as it rises at 0511 and won't get washed out until about 0617. Plus you'll be able to see Venus, Luna and Jupiter all rising along the ecliptic.
- **Uranus:** Uranus is still a good and challenging find rising on the first around noon but transiting by 1850 and not setting until 0124+. Uranus is trailing Mars to the east about 27° 51' 42". By mid month Uranus will be very difficult to find with the Waxing Gibbous Moon only 20° 9' 53" away. By the thirty-first however you'll have from Astronomical Dusk to 2323 to view and image the blue pearl.
- **Neptune:** Neptune is still visible but will be a real challenge for small scopes as it is +7.9 but only 0.2 arcseconds. The first of the month finds the aqua jewel transiting about sun rise and setting about 2109. By mid-month the set time has decreased to 2055 and by the end of the month knock off an hour to find Neptune setting by 1955. Like I said a challenge.
- **Pluto:** Like the Elves of Númenor Pluto has faded in the West. Pluto is gone until we round the winter part of Earth's orbit and head into spring.

Asteroids:

- Okay. I searched for asteroids in 2019 with a reasonable magnitude; say less than or equal to +10 in January there is nothing except the regulars: Juno, Vesta. Hebe, Eros, Herculina, and TG 387. So consult your local planetarium software or try https://www.asteroidsnear.com/year?year=2019.
- We do have to talk about 2002 NT7 because of course we will all be asteroid dust by the 1st of February. Soon every lunatic with a limited educations will be waxing gloriously about the "End of the Earth" (again). 2002 NT7 is a 2km asteroid that is supposed to slam into the Earth on 2019 February 1. It will of course be difficult for 2002 NT7 t0 do that since it will have passed the earth on January 23rd or 29th (I forget which) at a distance of 0.45 AU. That is correct 2002 NT7 will miss the earth by almost half the distance of the earth to the sun.

Meteors:

- The new Moon on January 6th creates optimum viewing conditions for the expected **Quandrantid meteor shower** (QUA) maximum on **January 4th 02h20m UT** – λ⊙ 283 . ◦16, expected ZHR = 120 (can vary ≈ 60–200).

Comets:

- Comets come in various classifications:
  - 1) Short Period comets – further broken down into:
    - Halley Type: The Halley Types are believe to come from the Kuiper Belt and have periods in excess of 20-years.
    - Jupiter Type: The Jupiter types have a period less than or equal to 20-years.
    - Short period comets may have a near circular orbit or an elliptical orbit. The latter being far more common.
  - 2) Long Period comets – thought to originate from the Oort cloud these comets have periods of over 200 years and have random inclinations around the celestial sphere.
- Unless some bright long period comets are discovered it promises to be a disappointing year for comet enthusiasts. The year begins with a potentially naked eye comet [**46P/Wirtanen**] from 2018, though as it is close to the Earth it will be large and diffuse. The year closes with another close approaching comet but its brightness is uncertain. A long period comet that reaches perihelion in 2020 should be within small telescope range at the end of the year. Not much is visible in between! (https://www.ast.cam.ac.uk)
- **46P/Wirtanen** – discovered photographically on January 17, 1948, by the American astronomer Carl A. Wirtanen. The plate was exposed on January 15 during a stellar proper motion survey for the Lick Observatory. Due to a limited number of initial observations, it took more than a year to recognize this object as a short-period comet (Wikipedia)

Deep Sky: (Note: L/Z is an abbreviation for ALT/AZ | R/D is an abbreviation for Right Ascension/Declination)

In each case, unless otherwise noted, you should look for the following on or about the 15th Day of January 2019 at 2100 PST and you will have about 20 minutes of viewing time total.

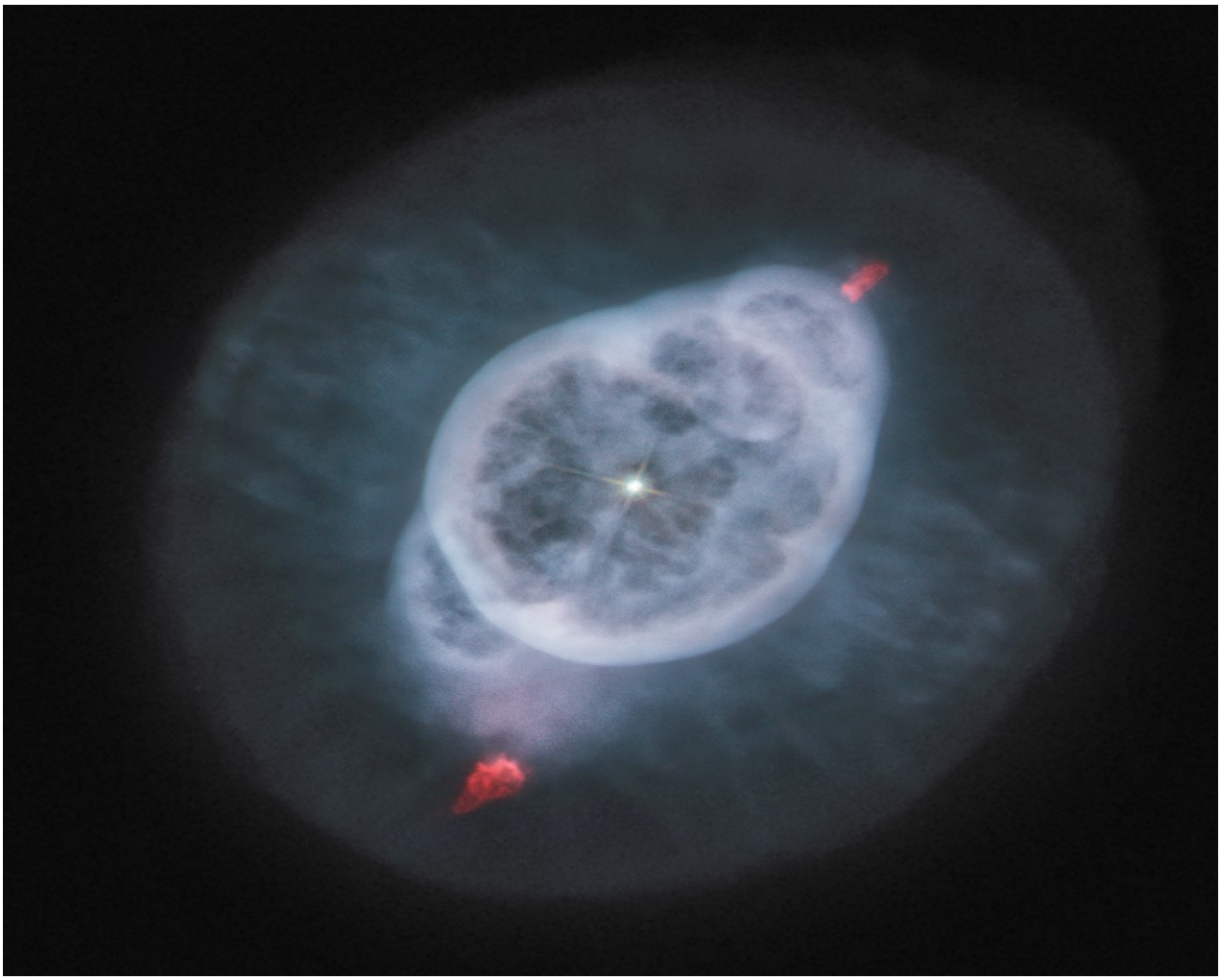
Lets look for some more unusual objects:

- **Lower's Nebula** – AKA Sharpless 2-261 is a 10th magnitude Bright Nebula appearing in the constellation Orion. It is 2935 light years from our solar system. On the 15th it will be visible from Astronomical Dusk, transiting around 2217 until setting around 0506+. This is not an easy target. L/Z : <+65° 04' 26"/130° 46' 32"> R/D: 06h 17m 30.71s E/+15° 48' 40.4" Sharpless 2-261. (SkySafari 6 Pro)

Clifford Marcus Creative Commons License
https://dso-browser.com/profile/clifford_marcus

- **NGC 1555** – AKA Hind's Variable or Sharpless 2-238 is a reflection nebula located in the constellation Taurus. Discovered on October 12, 1852 surrounding the star T Tauri (a variable between mag +9 to +13). It appears as an extremely faint haze on the W or WSW side of T Tauri, in the direction of a +14 magnitude star.

- **NGC 3242 –** AKA Ghost of Jupiter, the Eye Nebula is a planetary nebula in Hydra. William Herschel discovered this planetary nebula on February 7, 1785. The nebula measures around two light years long from end to end, and contains a central white dwarf with an apparent magnitude of +11. The inner layers of the nebula were formed some 1,500 years ago. The two ends of the nebula are marked by FLIERs, lobes of fast moving gas often tinted red in false-color pictures. NGC 3242 can easily be observed with amateur telescopes and appears bluish-green to most observers. Larger telescopes can distinguish the outer halo as well. (Wikipedia) Note: This one will rise at 2122 and transit at 0236+.



Judy Schmidt -- Flicker: NGC 3242 "Ghost of Jupiter" Creative Commons License

January is great for both viewing and imaging. Spend some time outside with your scope. Winter is here.

For now – Keep looking up.

Random Thoughts
by Chuck Dyson

Astronomers Vacation Part Two

As I mentioned in last month's column when the resident astronomer of the Chabot Science Museum, Conrad Jung, determined that Warren, my brother-in-law, and I were not just casual visitors to the museum but informed astronomy amateurs we were treated to a private and extensive tour of the telescopes.

One of the items that Conrad showed us was an original eyepiece to the Warner & Swasey, optical glass by Brashear, telescope. Having an original eyepiece is quite the big deal as the scope and its mount had been through several moves and had been operated by dozens of people for public viewings. Actually having an original eyepiece is a very big deal with a scope of this era because a dive into the advertisements in old astronomy magazines (and yes they have been digitized and are on the internet) shows you that you did not just buy a telescope you bought a custom made astronomy system: telescope, mount, and eyepieces, because each system was custom made and parts were often not interchangeable even with telescopes from the same manufacturer.

As I examined the eyepiece and its extension tube I realized that in back of the actual eyepiece was a set of corrector lenses and these were Petzval lenses designed to reduce the chromatic aberration inherent in a Fraunhofer designed telescope. It seemed just a bit odd to me that originally each eyepiece would have had its own Petzval lens setup attached to it but then I remembered that although we now live in an era of mass production, it hasn't always been this way. In the 1880's and until around 1910 there were exactly two factories capable of making large disks of mostly optical glass - that is in the world not in the United States. I said "mostly optical glass" because the ability to regularly and easily produce large volumes of glass that was not inhomogeneous, transmitted different amounts of light through in different areas, or had striae, bits of glass that formed a crystalline structure when it solidified rather than forming an amorphous, random, structure, or had areas with debris, air bubbles or bits of unmelted rock parts, in them just did not exist in that time. It is also good to remember that when one of the Lick Observatory lens elements was broken during shipment to the observatory it took years to produce a replacement for it.

Another reason to favor a Petzval arrangement for the early refractor telescopes is that although a three lensed almost APO arrangement had been worked out by a gentleman named George Dollond in 1763, the cost of the three lens arrangement would have been staggering for a large telescope and the weight of the three lenses at the end of the optical tube would have made the design and construction of a stable tube and mount a very significant engineering challenge.

Even though the Petzval lens solution was the overwhelmingly practical answer to the chromatic aberration problem encountered with big telescopes it did come with its own set of problems. Again, today you would have a difficult time finding a telescopic eyepiece that does

not have an optical coating on it but in 1880's not so much. For me the story of how we got optical coatings starts with a gentleman named Ben Franklin, you may have heard about him in your history classes in school. In 1774 Mr. Franklin was in England as a spokesperson for the American colonists presenting the case to his Royal Majesty that the poor colonists were being over taxed.

While in England, Mr. Franklin became fascinated with and involved in the Royal Society. In 1775, he submitted a paper to the society that was accepted and published on an experiment that he had performed. Mr. Franklin went to Mount Pond on Claphan Common with a carefully measured teaspoon of oil. The oil was poured onto the water. Mr. Franklin noted two things: first, the oil spread out to approximately ½ acre in size; second, the oil calmed the waves of the pond remarkably.

What Mr. Franklin was interested in was could the waves in a harbor be calmed with oil to make working on ships easier. Unfortunately, as we all know the king did not reduce and repeal those taxes and later that year Mr. Franklin relocated to Paris where he encouraged the French to support the American war against the British.

With M. Franklin working in Paris, the British members of the Royal Society decided that the paper that had been hailed as original and insightful was now trash and it was promptly buried in the archives - that is why you have never heard of this experiment. Recently a scientist looking into the archives of the Royal Society rediscovered this paper and performed Mr. Franklin's original experiment at the same pond with the same results but with the knowledge that he was working with molecules of oil and knowing the average size of the molecules, he was able to show that what Mr. Franklin had actually done was to create a film of oil exactly one molecule thick, just what is needed to create a coating for optical lenses, an opportunity missed.

Of course others were able to produce thin coatings of chemicals on glass from solutions, first in mirrors then photography and then on telescopic mirrors, see Publications of the Astronomical Society of the Pacific 1911 V 23 for the exact technique for wet coating your telescopes own glass using the Brashear method. Enter Lord Rayleigh who rather than clean a tarnished optical eyepiece used it and realized that the view was better and brighter not worse and realized that this meant that the tarnish was reducing the amount of surface reflected light and this led to the understanding that coatings could reduce surface reflected light if only a practical method of applying the coating could be found.

As an aside, the eyepiece at Chabot had an oxidized coating on it and I was going to suggest to Conrad that he clean it, now that I know the truth about such oxidized surfaces I thank God that I kept my mouth shut. The trouble with wet coatings is they seemed to work well for photographic plates and mirrors but not so much for refractor telescope lenses and the lenses in the eyepiece. In 1935 Olexander Smakula working for the Zeiss Co. perfected a way to coat lenses with metallic compounds that made them anti-reflective. The process was declared a state secret by the German government and so in WWII, the German military had superior optics, especially in low light situations, to the allies. And yet, in 1946 after we had won the war, Popular Mechanics magazine in August of that year published an article on how the

scientists at MIT and Caltech had actually invented the process and in 1939 had partnered with Bausch & Lomb to produce coated lenses for the military binoculars. One does wonder how all of those field reports on the superiority of the German optics could have been so wrong.

But coated lenses were all the rage and it quickly became the standard to have all of your lenses coated in the astronomy market place so much so that today you need to be really old or an aficionado of antique telescopes and eyepieces to claim that you have actually seen a ghost image in your eyepiece, where as in the days before coated lenses ghost images of brighter objects, especially the Moon, were a standard part of the viewing experience.

Good Night All and Cheers,
Chuck

January's Evening Eclipse and Morning Conjunctions
By David Prosper

Observers in the Americas are treated to an evening **total lunar eclipse** this month. Early risers can spot some striking morning conjunctions between **Venus**, **Jupiter**, and the **Moon** late in January.

A **total lunar eclipse** will occur on **January 20th** and be visible from start to finish for observers located in North and South America. This eclipse might be a treat for folks with early bedtimes; western observers can even watch the whole event before midnight. Lunar eclipses take several hours to complete and are at their most impressive during totality when the Moon is completely enveloped by the umbra, the darkest part of Earth's shadow. During totality the color of the Moon can change to a bright orange or red thanks to the sunlight bending through the Earth's atmosphere - the same reason we see pink sunsets. The eclipse begins at 7:34 pm Pacific Standard Time, with totality beginning at 8:41 pm. The total eclipse lasts for slightly over an hour, ending at 9:43 am. The eclipse finishes when the Moon fully emerges from Earth's shadow by 10:51 pm.

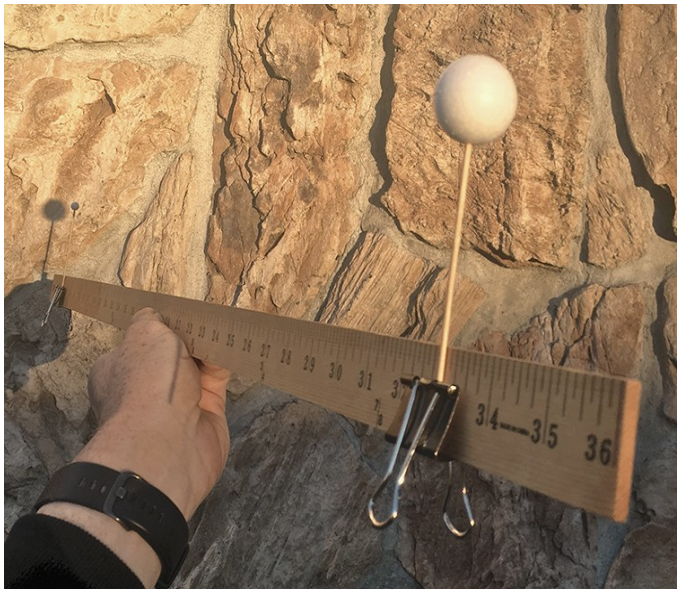
Lunar eclipses offer observers a unique opportunity to judge how much the Moon's glare can interfere with stargazing. On eclipse night the Moon will be in **Cancer**, a constellation made up of dim stars. How many stars you can see near the full Moon before or after the eclipse? How many stars can you see during the total eclipse? The difference may surprise you. During these observations, you may spot a fuzzy cloud of stars relatively close to the Moon; this is known as the "**Beehive Cluster**," **M44**, or **Praesepe**. It's an open cluster of stars thought to be about 600 million year old and a little under 600 light years distant. Praesepe looks fantastic through binoculars.

Mars is visible in the evening and sets before midnight. It is still bright but has faded considerably since its closest approach to Earth last summer. Watch the red planet travel through the constellation Pisces throughout January.

Venus makes notable early morning appearances beside both **Jupiter** and the **Moon** later this month; make sure to get up about an hour before sunrise for the best views of these events. First, Venus and Jupiter approach each other during the third full week of January. Watch their conjunction on the 22nd, when the planets appear to pass just under 2 ½ degrees of each other. The next week, observe Venus in a close conjunction with a crescent Moon the morning of the 31st. For many observers their closest pass - just over half a degree apart, or less than a thumb's width held at arm's length - will occur after sunrise. Since Venus and the Moon are so bright you may st1ill be able to spot them, even after sunrise. Have you ever seen Venus in the daytime?

If you have missed **Saturn** this winter, watch for the ringed planet's return by the end of the month, when it rises right before sunrise in Sagittarius. See if you can spot it after observing Venus' conjunctions!

You can catch up on all of NASA's current and future missions at nasa.gov



*Have you ever wondered how eclipses occur? You can model the Earth-Moon system using just a couple of small balls and a measuring stick to find out! The "**yardstick eclipse**" model shown here is set up to demonstrate a lunar eclipse. The "Earth" ball (front, right) casts its shadow on the smaller "Moon" ball (rear, left). You can also simulate a solar eclipse just by flipping this model around. You can even use the Sun as your light source! Find more details on this simple eclipse model at* ***bit.ly/yardstickeclipse***

This article is distributed by NASA Night Sky Network

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