Temecula Valley Astronomer

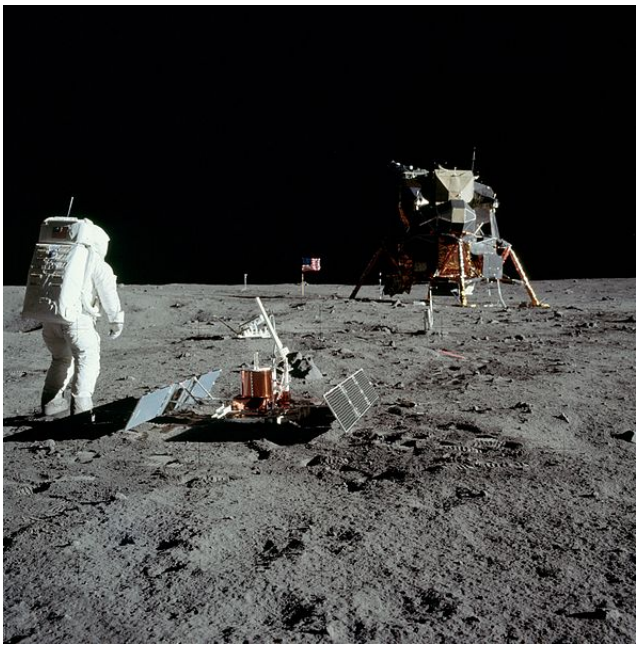
The monthly newsletter of the Temecula Valley Astronomers Oct 2018

Events:

General Meeting :

Since this newsletter has been delayed a week, the October meeting has already taken place. Watch out for the November 5th TVA meeting announcement in the next newsletter.

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.



Buzz Aldrin on the surface of the Moon and the Lunar Module (LM) "Eagle" during the Apollo 11 EVA. Photo Credit Neil Armstrong/NASA ***Photo ID:*** *AS11-40-5948*

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.

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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
by President Mark Baker

OUTREACH… this is my topic of choice this year, but it took a big hit recently with the loss of Jim Mettler. Jim supported TVA Outreach as often as possible, often doing so after work and on his way back to his aerie up in Idyllwild. He also enjoyed his time as a docent up at CalTech Palomar Observatory and the one-on-one opportunities there. But Jim also loved interacting with young people and could often be found providing his knowledge and enthusiasm to youth groups all over SoCal. I am not alone, I'm sure, when I admit to envy over his favorite mode of transport for himself and his equipment – his Pinzgauer. Jim will be sorely missed…and leaves a gaping hole to be filled.

Jim Mettler and his Pinzgauer. 2015 - Photo : GeeDeb.

And hopefully, someone will step up and take on the mantle Jim leaves behind. All it takes is a desire to "spread the word" and share your love for things Celestial. I know I feel impressed to do even more and to expand my efforts in Outreach…but I can use some help if we are to do more than just scratch the surface of what is needed. It does require sacrifice, but the rewards are exponential in comparison…

And so, my TVA family, look up, but remember, sharing is required. Thanks for all you do…!!!

Clear, Dark Skies my Friends…

Looking Up Redux

compiled by Clark Williams

from sources:
Sky and Telescope
Wikipedia
in-the-sky.org
The American Meteor Society, Ltd.
NASA.gov

ALL TIMES ARE LOCAL PST WILDOMAR

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.

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

Tuesday the 2nd @ 02:46 THIRD QTR
Monday the 8th @ 20:48 NEW
Tuesday the 16th @ 11:03 FIRST QTR
Wednesday the 24th @ 09:46 FULL
Wednesday the 31st @ 09:41 THIRD QTR

Perigee (1) comes on 2018-10-05 @ 22:31 – 366, 395 km (227, 668 mi)
Perigee (2) comes on 2018-10-31 @ 20:06 – 370, 200 km (230, 032 mi)
Apogee comes on 2018-10-17 @ 19:18 – 404, 225 km (251, 174 mi)

2018 has: (12) new moons, (12) 1st Qtr moons, (14) Full moons, (13) 3rd Qtr moons
(2) Blue moons and (1) Black moon

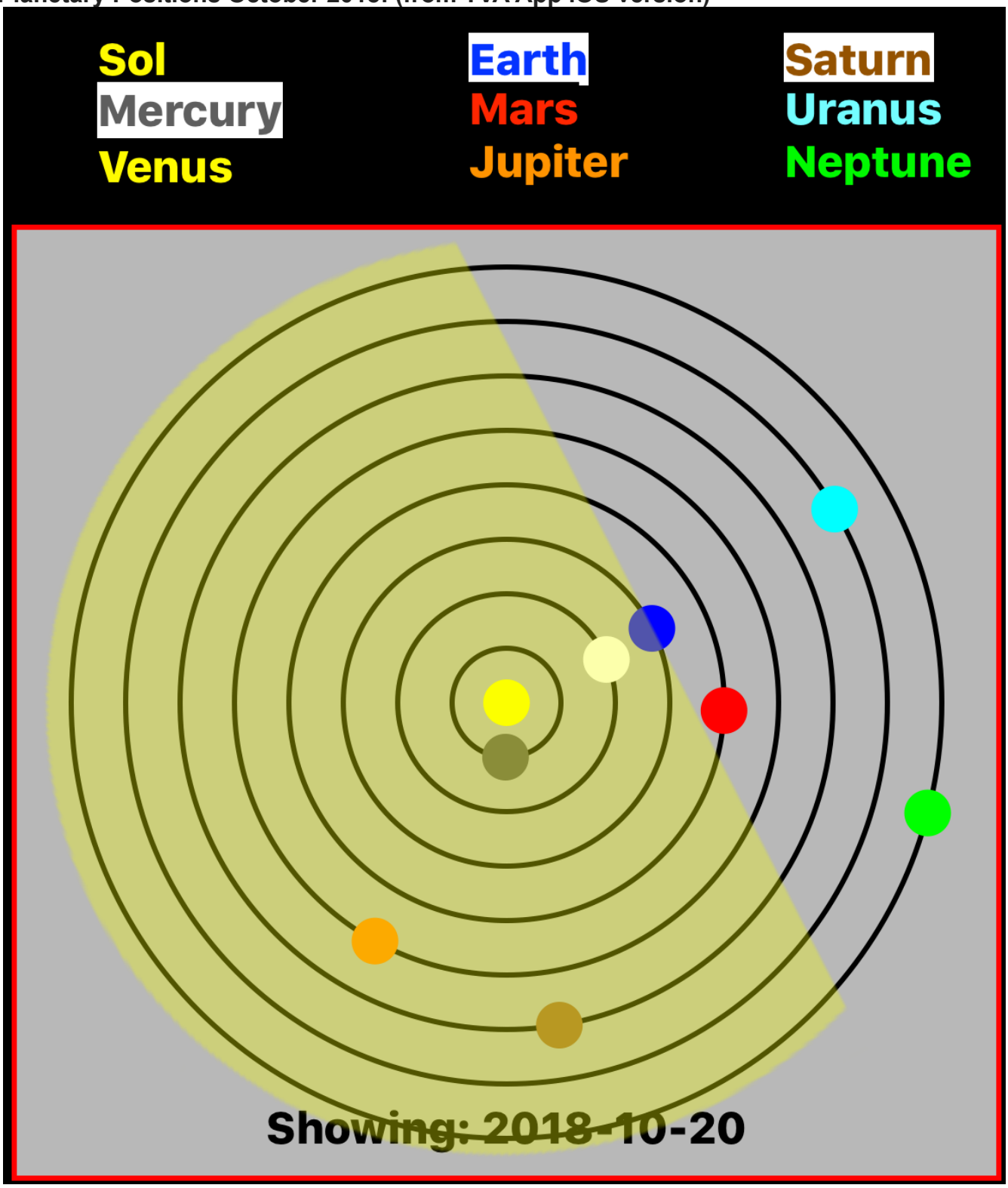
Luna: Luna can be found rising in Gemini at the beginning of the month about 2338. Approximately 50% illuminated and in 3rd Quarter. By mid month Luna is rising in Sagittarius as a Waxing Crescent and transiting in the afternoon about 18:15. By the end of the month Luna is rising in Cancer around 2334-- Waning Gibbous and around 57% illuminated.

Highlights: (distilled from Sky & Telescope and Clark's planetary Orrey program[s])

13 October: Dawn – If you have really dark skies you may get a view of the zodiacal light. Look east in the pre-dawn sky. The further north in latitude you are the better.
17 October: Evening – Algol at minimum for its average two-hour dimming at 2250.
20 October: Evening – Algol again at minimum around 2239.
20-22October: Evening – A medium Orionid meteor shower blotted out by a nearly full moon.

Planets:

Planetary Positions October 2018: (from TVA App iOS version)



- **Mercury:** At the start of the month Mercury rising after sunrise at 0722, Mercury will be about 97% illuminated. Your best view on the 1st should be just before Mercury sets at 1856. This will continue until the end of the month when Mercury will be setting slightly later at 1859.
- **Venus:** Still the evening star but not for long your best viewing of Venus is between 1900 and 1930 but Venus is only 16% illuminated. By the 20th of October Venus s lost to the Sun and won't emerge.until around the 28th but by then it is the Morning Star rising at 0643 just 20 minutes before sunrise.
- **Mars:** Mars is still dazzling this month becoming visible by Astronomical Twilight around 1955 and not setting until 0146+. Mid month finds Mars still in Capricornus and visible until 0123+. By month's end Mars is visible from 1921 thru 0103+. The Warrior is visible and a great star party object all month.
- **Jupiter:** Jupiter is fading in the west all month. Still visible at the start of the month you can see Jupiter from Astronomical Twilight (1955) until it sets at 2040. By mid month you'll have from 1937 until 1954. Somewhere around the 25th of October Jupiter will set before Astronomical Twilight.
- **Saturn:** The start of October you'll have from 1955 until 2317; a good 3 hours of viewing and imaging time. But the viewing time will decrease all month long by mid-month you will lose almost ½ hour in Astronomical Twilight, down to 1937 and The Ringed Wonder is setting by 2225; very nearly 3 hours even viewing. And by end of the month 1921 to 2127 yields merely 2 hours of ring viewing.
- **Uranus:** Uranus is rising at 1930 in the beginning of the month and doesn't transit until 0206+. It is a good time to try imaging this jewel or even to find it, with a magnitude of +5.7 and 100% illuminated. By mid-month you'll finding Uranus rising about 15 minutes after sunset and again not transiting until early next morning. The end of the month finds Uranus visible from 1921 until sunrise next morning.
- **Neptune:** Neptune is still trailing Mars visible in the beginning of the month by 1955 and transiting at 2309. Giving about 3 hours of viewing and/or imaging time. By mid-month Astronomical Twilight limits your viewing to from 1937to 0400+. Even by the end of the month the Trident is visible above the glow of the Sun by 1921 and you can observe or image until 0255+.
- **Pluto:** Pluto is dim this month at about mag +14.3 and 100% illuminated. Sitting between Saturn and Mars from our terrestrial point of view draw a triangle with Altair, Saturn and Mars as the vertices. Pluto is about mid distance between the two planets of the triangle's base. At the start of the month Pluto is visible from Astronomical Twilight at 1755 and doesn't set until 1230+. This means you have a lot of time to find and image this wonderful little planet. By mid-month Pluto is visible from 1937 until setting at about1132. End of month sees Astronomical Twilight at 1921ans sets about 2230. The point of all of this is that now is your best bet for viewing and imaging Pluto.

Asteroids:

- Wednesday 05 October: Asteroid 27 Euterpe at opposition
- Tuesday 18 October: Asteroid 30 Urania at opposition

Meteors:

- The Orionid meteor shower will reach its maximum rate of activity on 21 October 2018. This unfortunately just about the time of the full moon.

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.
- Comet 21P/Giacobini-Zinner – Is at perihelion on Monday 10 October and reaches its brightest on Sunday 19 October.
- Comet 38P/Stephan-Oterma – Despite the name, comet 38P/Stephan-Oterma was discovered by Jerome Coggia at the Marseilles Observatory in January 1867, but the name was awarded to E J M Stephan, the Observatory Director as he first calculated the position with accuracy. This comet has an orbital period of 38 years defined as a Halley-type comet hence why it was last observed in 1980/1. Perihelion occurred in August so you should be able to find this in your scopes now. Could make a wonderful imaging possibility. It will remain well placed in the evening skies for the remainder of the year and into 2019 when it becomes almost circumpolar in the constellation of Lynx. (distilled from: http://www.cometwatch.co.uk)

Deep Sky:

In each case you should look for the following on or about the 15th Day of October 2018 at 2100 PDT and you will have about 20 minutes of viewing time total.

The one thing October brings us is deep sky beauties, calmer winds and the potential for gorgeous viewing and imaging:

- **Blinking Planetary** – AKA **NGC 6826** is a planetary nebula located in the constellation Cygnus. It is commonly referred to as the "blinking planetary", although many other nebulae exhibit such "blinking". When viewed through a small telescope, the brightness of the central star overwhelms the eye when viewed directly, obscuring the surrounding nebula. However, it can be viewed well using averted vision, which causes it to "blink" in and out of view as the observer's eye wanders. A distinctive feature of this nebula are the two bright patches on either side, which are known as Fast Low-Ionization Emission Regions, or ***FLIERS***. They appear to be relatively young, moving outwards at supersonic speeds. (Wikipedia)
- **NGC 6995** – The Veil Nebula is a cloud of heated and ionized gas and dust in the constellation Cygnus. It constitutes the visible portions of the Cygnus Loop (radio source W78, or Sharpless 103), a large but relatively faint supernova remnant. The source supernova exploded circa 3,000 BC to 6,000 BC, and the remnants have since expanded to cover an area roughly 3 degrees in diameter (about 6 times the diameter, or 36 times the area, of the full Moon). The distance to the nebula is not precisely known, but Far

Ultraviolet Spectroscopic Explorer (FUSE) data supports a distance of about 1,470 light-years. The Hubble Space Telescope captured several images of the nebula. The analysis of the emissions from the nebula indicate the presence of oxygen, sulfur, and hydrogen. This is also one of the largest, brightest features in the x-ray sky. (Wikipedia)

- **The Blue Snowball Nebula** – AKA the *Blue Snowball Nebula* or *Snowball Nebula*, is a planetary nebula located in the constellation Andromeda. The distance to this nebula is not known with any real accuracy. According to the Skalnate Pleso Catalogue (1951) the distance of NGC 7662 is about 1,800 light years, the actual diameter about 20,000 AU. In a more recent survey of the brighter planetaries, C.R.O'Dell (1963) derived a distance of 1,740 parsecs or about 5,600 light years, increasing the actual size to 0.8 light year, or nearly 50,000 AU. It has a faint central star that is variable, with a magnitude range of 12 to 16. The central star is a bluish dwarf with a continuous spectrum and a computed temperature of about 75,000K. The nuclei of the planetary nebulae are among the hottest stars known. NGC 7662 is a popular planetary nebula for casual observers. A small telescope will reveal a star-like object with slight nebulosity. A 6" telescope with a magnification around 100x will reveal a slightly bluish disk, while telescopes with a primary mirror at least 16" in diameter may reveal slight color and brightness variations in the interior. (Wikipedia)

October is great for both planetary and deep sky viewing and imaging. Spend some time outside with your scope. Summer is here Autumn is coming.

For now – Keep looking up.

Random Thoughts
by Chuck Dyson

ROOTS PART II
The Reflector/Refractor War Goes On

When we last left our happy and not so happy, in the case of Newton, telescope makers/ astronomers it would seem that Newton's prediction that refractor telescopes could never be really practical because of the chromatic aberration that was caused by the glass bending the different colors, wavelengths of light, different amounts was coming true. Despite various improvements in grinding, glass quality, and improvements in telescope assembly, the refractor telescope still needed to be F/25 or so to produce a useful image and this had the effect of producing telescopes that were monstrously long, culminating in Johannes Hevelius's 150 foot long open tube beauty that mostly just flapped in the breeze rather than show images of celestial bodies.

Considering the sharp limitations on the size of optically pure or clean glass that could be made at the time and the lack of an effective and practical mount to hang the ever longer scopes on it would seem that Mr. Newton's idea that reflector telescopes should rule was firmly in the driver's seat. If only there was someone who could actually build a decent reflector. William Herschel to the rescue, sort of.

While Herschel's day job was music his night hobby was astronomy and by all accounts was very persistent at trying new metal formulas for his mirrors. Herschel's persistence was rewarded with a metal formula that reflected 60% of the light that fell on it, for comparison Newton's mirrors reflected 16% of light and today's standard mirror coatings reflect 89% of light. Herschel also should have benefited, but I can find no evidence of the fact, from John Hadley's work from 1721 as he developed the first crude techniques for figuring a parabolic mirror instead of a spherical mirror and this would have eliminated the spherical aberration that in fact made the images from Newton's mirrors little better than the refractors that he was looking down on.

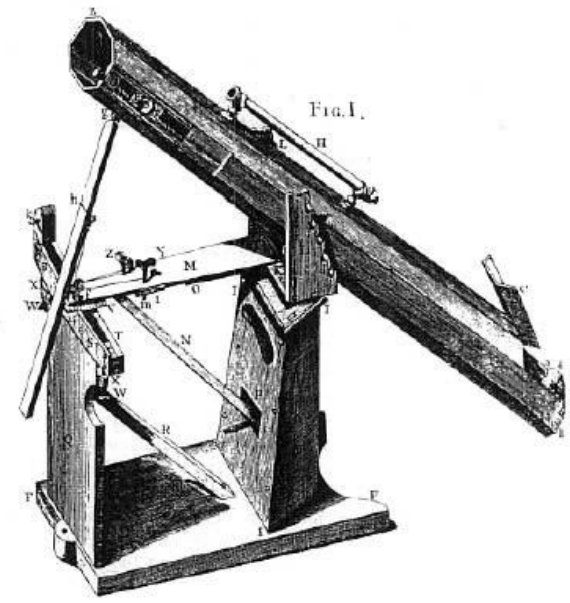


Figure 1- Hadley Telescope

In 1781 Herschel discovers Uranus and becomes the instant star astronomer of England and suddenly his hobby becomes his well-funded day, and night, job. Like any suddenly funded researcher, Herschel immediately started building larger reflectors and immediately started to run into problems. The first problems were with the mirrors themselves because as the mirrors got bigger they got heaver and started to bend and flex under their own weight and in addition the metal would creep, wrinkle around the edges, and blur the image of the object being viewed. The other problems that Herschel encountered were the designs for telescope mounts could best be described as acceptable mediocrity for small reflectors (see Fig. 1) and got worse as the scope got bigger; for Herschel's 49.5 inch diameter and 40 foot long scope (see Fig. 2) they were dangerous nightmares, Herschel broke his leg falling off the thing, and the mount required several people to operate it. The final problem that Herschel faced and it was a problem with all metal mirror telescopes was the fact that the metal surface would oxidize over time and the mirror would need to be removed and as the surface could not be reapplied the entire mirror would need to be re-figured and for this reason metal mirror telescopes often had, finances permitting, two or three mirrors cast at the same time so that one of the spares could be in the telescope while the primary was being refurbished, quite the financial pain in the pocket book.

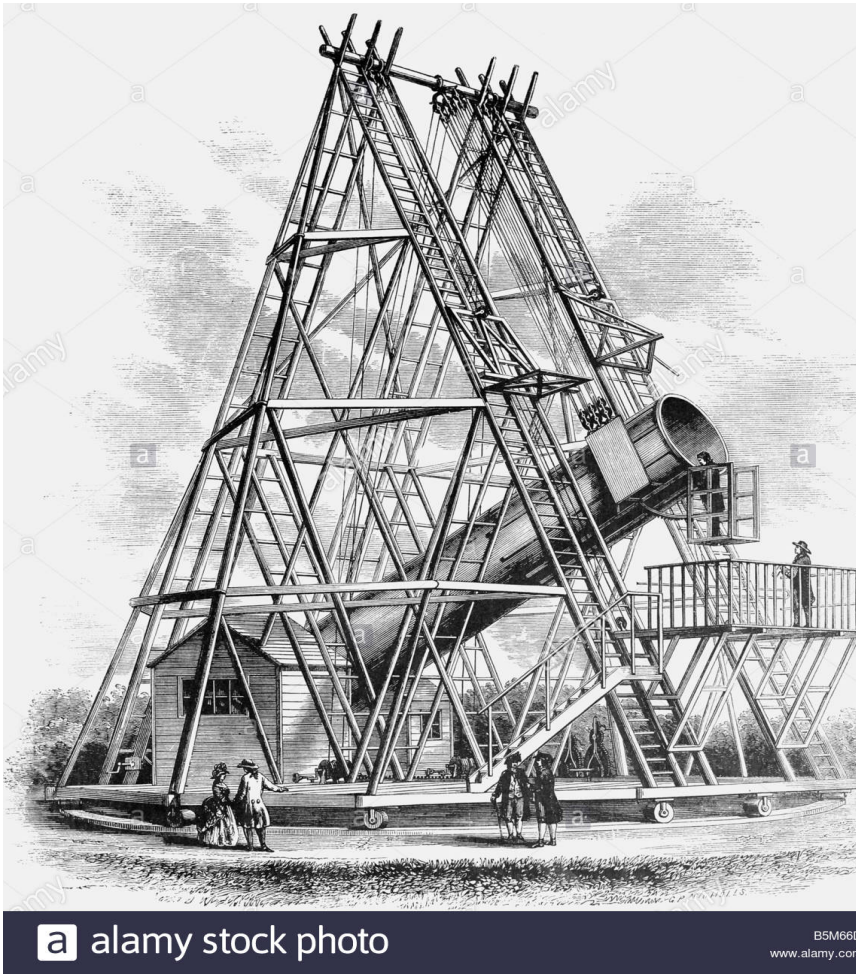


Figure 2-40 Foot Telescope of William Herschel

Even though the 49.5 in. scope was being funded by the king of England there was a limit to the funding and thus Herschel was able to make only one mirror for the scope. When it was first completed the Herschel scope was the largest in the world and a source of great national pride, not to mention scientific bragging rights in England; but after using it, or trying to use it, several times and running into several operating problems the scope rapidly rather than slowly fell out of favor with Mr. Herschel. In the end, when the mirror absolutely had to be refurbished,

Herschel abandoned the scope and did most of his observing and logged most of the items in his catalogue with an 18.5 in. scope. The same fate for the same reasons befell the 72 inch telescope built by the 3rd Earl of Rosse.

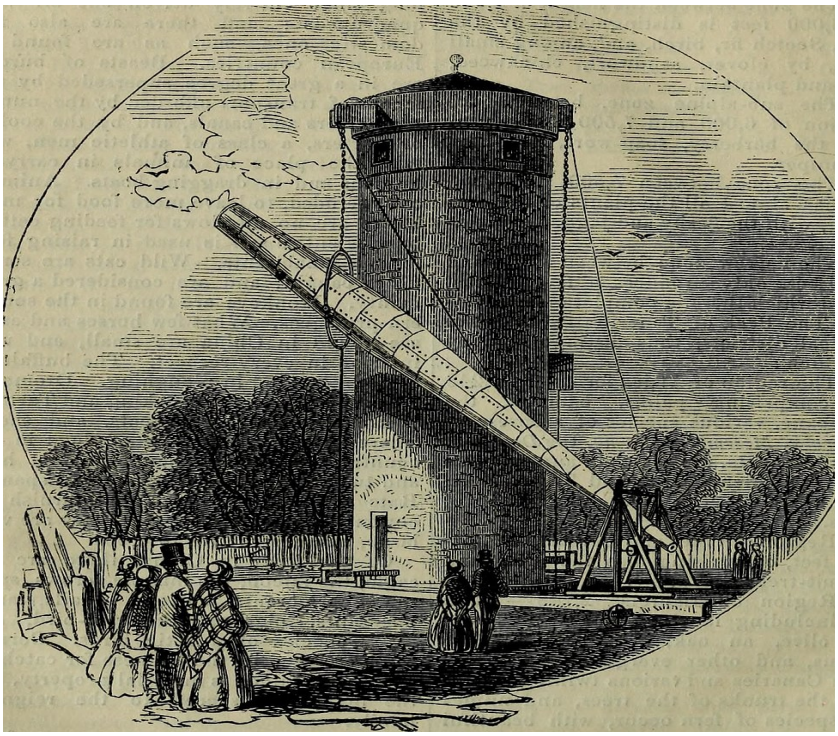


Figure 3-The Craig Telescope on Wandsworth Common in London - The Family Tutor 1851

Are we at the end of out telescope rope? Nope! The people who dared dispute Mr. Newton's proclamation that there was no hope for the hopeless refractors had been gradually producing better, clearer, glass and producing larger and larger glass blanks that could be ground into lenses. Ah but there was still the problem with the mount even though the new Fraunhofer double objective lens made shorter focal length telescopes possible they were still large and bulky and worse yet were suspended by cables and thus hung and swayed in the breeze, you could get seasick looking through these scopes in any kind of breeze (Fig. 3).

Fraunhofer realizes that if people are going to buy his bigger lens they are going to want a better way to mount the scope holding the lens.

Fraunhofer's answer was to invent what we now call, because Fraunhofer was German, the German equatorial mount. The response is fantastic and although the first mount was awkward and cumbersome to operate, changes and improvements were made to the mount at a rapid rate and by the 1880's it was ready to take on truly large refractors. The telescope still had a significant weakness and that was its eyepiece. The only two eyepieces available were the two element Huygens (1662) and the two element Ramsden (1782) both produce images that are not very sharp and rather than producing that walking in space experience you get a peeping through a keyhole experience, I know this because I have used both of them to gain some perspective. In 1849 the Kellner eyepiece is introduced and in the 1860's the Plossl, orthoscopic, and monocentric followed in rapid succession.

With the major problems taken care of who wants to be the first to build a super refractor and start the second coming of the refractor? Who better than the rising power on the world stage the United States and who better in the United States than the newly rich of San Francisco?

James Lick wants to build a memorial to himself that will cause the people of San Francisco to remember him long after he is dead and he first thinks of a pyramid in the downtown area but the regents of the UC system convince him to build a world class observatory in his name. When Lick asks where in San Francisco they will build this observatory they tell him that it will be built on a mountain top that is fog free and has good seeing, this will be the first observatory that is built to optimize the conditions for the telescope and not for the comfort of the astronomer, a game changer.

An astronomer from the east is brought out to survey the mountains around San Jose and he recommends Mt. Hamilton. Lick requests that the state and county build a road to the top of the mountain and they do. In 1880 an order for a 36 inch crown and flint lens, the world's largest, along with the telescope tube and equatorial mount is placed with the Alvin Clark & Sons Co., Alvin Clark & Sons will go on to build 5 of the world's largest refractor telescopes. The glass for the Fraunhofer lens is poured in France; the blanks are shipped to Massachusetts for figuring by Clark. Finished lenses are then shipped by rail to San Jose California, and finally by horse drawn carriage are taken to the top of Mt. Hamilton; and miracle of miracles one arrives unbroken the other, not so much.

Trouble with pouring and figuring a replacement lens delayed the Lick seeing first light until 1887, although the scope was not fully operational until 1888. James Lick died about 12 years before the telescope was completed and as it was to be his memorial he requested that he be buried in the foundation of the telescopes mount, and he is. As the Lick observatory was being built atop 4200 ft. Mt. Hamilton, Percival Lowell reasoned that higher would be better and he was

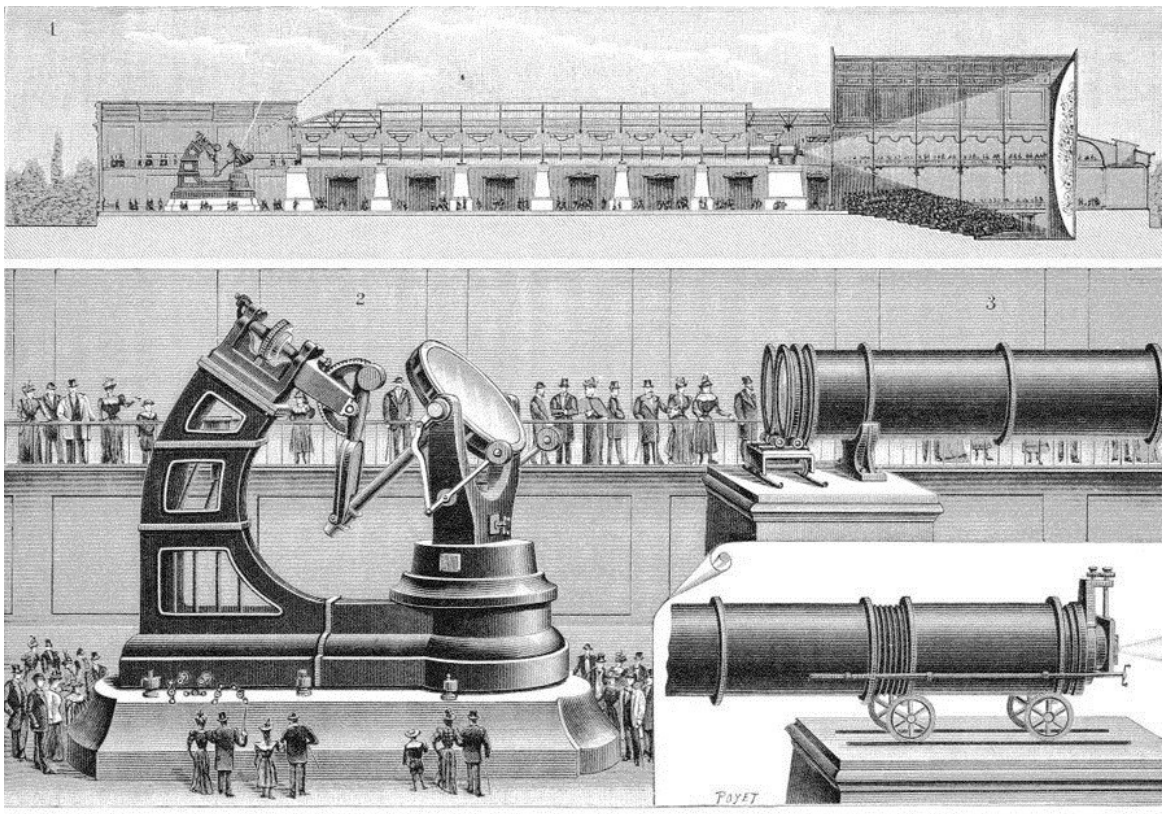


Fig. 3. — Détails de la grande lunette. — 1. Vue d'ensemble. — 2. Le sidérostat. — 3. La lunette. — 4. L'oculaire.

Figure 4- Paris Exhibition Telescope

determined to study Mars and needed the best viewing conditions that he could get; ergo, he bought land at 7200 ft. outside of the city of Flagstaff in the territory of Arizona on a hill that he named Mars Hill. The exploits of Mr. Lowell and the discovery of Pluto by Clyde Tombaugh are well known but less well known is the ground breaking work done at Mars Hill by several other astronomers who were free to pursue their interests with the 24 in. scope when Mars was not in a favorable viewing position. All of this trivia aside, it was becoming abundantly clear that if you were going to have a world-class telescope and do world-class work your observatory was going on a mountain top and not in a building on campus in town. Many of the important, by their own estimation, citizens of Los Angeles realize that their city does not have a world-class state-of–the-art telescope and they do have a great 5700 ft. mountain, Mt. Wilson, to put one on. The president of the University of Southern California in Los Angeles sensing opportunity rallied the good citizens and their pocket books to the cause and soon had enough in pledges to order a 40 in. crown and flint lens from Clark. This telescope would be 4 inches bigger than the one in San Francisco and a new world's largest refractor. Unfortunately by the time the blanks were delivered to Clark. there had been a sharp downturn in the L.A. real estate market, again, and the good citizens of Los Angeles no longer had the monies that were pledged; left with no other options USC broke its contract with Clark. USC's withdrawal from the project left Clark. with two large lens blanks and no taker for the project.

In Chicago there is a newly minted PhD astronomer named George Ellery Hale and he convinces the regents of the University of Chicago to go for it and a gentleman named Yerkes to pay for it, with promises of eternal glory by Hale. The University quickly forms a site selection committee and they soon recommend a site by Lake Geneva, Wisconsin because of its high altitude, 1000 ft., and its clear skies, 70% clear for two months out of the year.

The project rapidly moves forward and in 1895 the Yerkes Observatory sees first light. The Yerkes telescope will only be the world's largest refractor for five years because in 1900 at the Great Paris Exhibition a monster 49 in. refractor is presented to the world (see fig.4). Let me give you some idea of what I mean by monster; The 36 in. Lick telescope tube and mount weighed in at 25,000 pounds and was 57 ft. long, the Yerkes telescope at 40 in. weighed in at 52,000 pounds tube and mount and was 60 ft. long; but the Paris 49 in. was never actually weighed because with a focal length of 187 ft. the telescope tube had to be built horizontally in a covered hallway that ended in a room with a removable roof so that the Foucault siderostat, a 6 ½ ft. diameter mirror, could shine the light from the sky into the telescope tube and a second room at the other end of the hall that housed the eyepiece and a wall that the telescopic image could be projected on.

The monster telescope delighted the public but terrorized observatory operators; so, there were no offers to purchase the scope and the backers declared bankruptcy the scope was broken up with the lens and the siderostat going to the Observatoire de Paris where they remain today, a stark reminder that in 1900 the era of the large refractor came to a sudden and screeching halt.

What will replace the large refractors as large metal mirrors seem a poor choice? In 1835 Justus von Liebig coats the back of some glass with silver and makes the modern bathroom mirror and although this is a much better reflector of light than any metal mirror, it is not

suitable for astronomy because the light must go through the glass to get to the silver and through the glass again to get to the eyepiece and this will really blur the image. It is not until 1857 that Léon Foucault creates the first silvered glass mirror telescope and in the 1858 he invents and uses the Foucault test; this test enables him to grind and finish a mirror in an almost perfect parabola. Although the metal surface on the glass tarnishes just like the surface on the metal mirror it is a lot easier to just wash off the tarnished metal and replace it with a new coating than to completely refinish the surface as one must do with the metal mirrors.

Even though the glass metal mirror is better than the all metal mirror it is still an untried technology and no one wants to be the first to build a really large, expensive glass mirror telescope and possibly have it flop. However, back at Yerkes a young George Ellery Hale is getting very frustrated with the seeing conditions and clouds in Wisconsin and he has to make a major decision because as a Christmas present his father has had a 60 in. glass mirror blank made for him. The big question: does George have the glass ground and a telescope for it be built at Yerkes or does he and the glass blank go elsewhere.

As luck would have it he is working with E. E. Barnard who is probably the finest astrophotographer of the day and is the guy that the UC Regents had survey the sight for the Lick telescope. Barnard tells Hale "California is the place you want to be". Hale listens to him and with both Barnard and glass blank in tow, accepts a position as head and only professor in the science department at Throop University in Pasadena. Throop University will morph into the California Institute of Technology (Caltech) and Hale will build the 60 in. and the 100 in. scopes on Mt. Wilson along with one of the world's great solar observatories and, almost as a side job, recruit the people that turn Throop University into the Caltech powerhouse that it is today.

Hale was to die before his opus magnus, the 200 in. telescope on Palomar Mountain was completed. Hale should not only be remembered as the man who almost single-handedly propelled the large reflector telescopes into prominence but also as the man who accomplished the almost impossible as he was the man who made Newton smile, posthumously but smile none the less, because he, Hale, completely validated Newton's prophesy of 350 years ago that the mirrored reflector telescope would be the ultimate telescope that astronomers would use and refractors would never match up to the capabilities of the mirror.

And yet I must say on clear and moonless nights when I go out to look at objects in the heavens, I find it, for me, much more satisfying to be at the backend of my refractor than at the side of my Newtonian; there is no science here just the joy of observing. I think that this is all that I should say on the subject now because I can see the corners of Mr. Newton's mouth turning down and I absolutely do not want his ghost haunting me as I try to observe.

Cheers,
Chuck

Observe the Moon

By Jane Houston Jones and Jessica Stoller-Conrad

This year's International Observe the Moon Night is on Oct. 20. Look for astronomy clubs and science centers in your area inviting you to view the Moon at their star parties that evening!

On Oct. 20, the 11-day-old waxing gibbous Moon will rise in the late afternoon and set before dawn. Sunlight will reveal most of the lunar surface and the Moon will be visible all night long. You can observe the Moon's features whether you're observing with the unaided eye, through binoculars or through a telescope.

Here are a few of the Moon's features you might spot on the evening of October 20:

Sinus Iridum—Latin for "Bay of Rainbows"—is the little half circle visible on the western side of the Moon near the lunar terminator—the line between light and dark. Another feature, the Jura Mountains, ring the Moon's western edge. You can see them catch the morning Sun.

Just south of the Sinus Iridum you can see a large, flat plain called the Mare Imbrium. This feature is called a mare—Latin for "sea"—because early astronomers mistook it for a sea on Moon's surface. Because the Moon will be approaching full, the large craters Copernicus and Tycho will also take center stage.

Copernicus is 58 miles (93 kilometers) across. Although its impact crater rays—seen as lines leading out from the crater—will be much more visible at Full Moon, you will still be able to see them on October 20. Tycho, on the other hand, lies in a field of craters near the southern edge of the visible surface of the Moon. At 53 miles (85 kilometers) across, it's a little smaller than Copernicus. However, its massive ray system spans more than 932 miles (1500 kilometers)!

And if you're very observant on the 20th, you'll be able to check off all six of the Apollo lunar landing site locations, too!

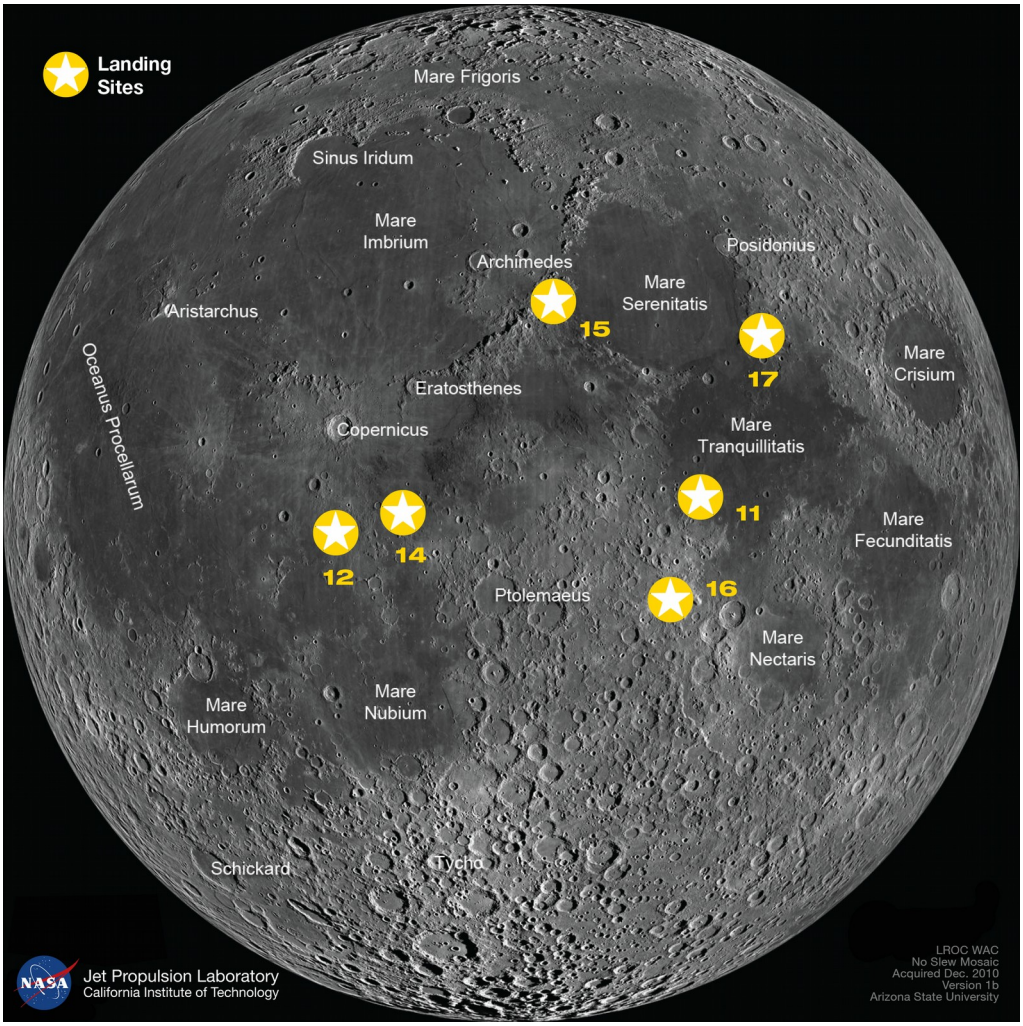
In addition to the Moon, we'll be able to observe two meteor showers this month: the Orionids and the Southern Taurids. Although both will have low rates of meteors, they'll be visible in the same part of the sky.

The Orionids peak on Oct. 21, but they are active from Oct. 16 to Oct. 30. Start looking at about 10 p.m. and you can continue to look until 5 a.m. With the bright moonlight you may see only five to 10 swift and faint Orionids per hour.

If you see a slow, bright meteor, that's from the Taurid meteor shower. The Taurids radiate from the nearby constellation Taurus, the Bull. Taurids are active from Sept. 10 through Nov. 20, so you may see both a slow Taurid and a fast Orionid piercing your sky this month. You'll be lucky to see five Taurids per hour on the peak night of Oct. 10.

You can also still catch the great lineup of bright planets in October, with Jupiter, Saturn and Mars lining up with the Moon again this month. And early birds can even catch Venus just before dawn!

You can find out more about International Observe the Moon Night at https://moon.nasa.gov/observe.



Caption: This image shows some of the features you might see if you closely observe the Moon. The stars represent the six Apollo landing sites on the Moon. Credit: NASA/GSFC/Arizona State University (modified by NASA/JPL-Caltech)

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