



Temecula Valley Astronomer

The monthly newsletter of the Temecula Valley Astronomers June 2021

Events:

Virtual meeting via Zoom on 7 June at 7 PM. Join your fellow astronomers for What's Up, an IFI and Gallery assembled by Clark Williams. Watch your club email for meeting ID and password.

Until we can resume our monthly meetings, you can also interact with your astronomy associates on Facebook or by posting a message to our mailing list.

WHAT'S INSIDE THIS MONTH:

Cosmic Comments
by President Mark Baker

Editor's Note
by Paul Kreitz

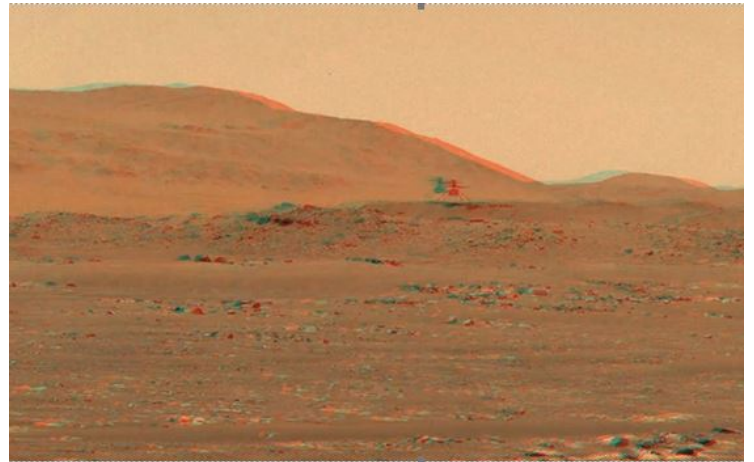
Looking Up Redux
compiled by Clark Williams

Random Thoughts – Happy Accidents
by Chuck Dyson

Astrophotography with Your Smartphone
by David Prosper (NASA/JPL)

Send newsletter submissions to Paul Kreitz <pkreitz@sbcglobal.net> by the 20th of the month for the next month's issue.

NASA's Ingenuity Helicopter continues to impress:



Get out your Blue – Green 3D glasses and watch Ingenuity flit across the Martian surface:

[Seeing NASA's Ingenuity Mars Helicopter Fly in 3D](#)

General information:

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

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Vice President: Sam Pitts <sam@samsastro.com>

Past President: John Garrett <garrjohn@gmail.com>

Treasurer: Curtis Croulet <calypte@verizon.net>

Secretary: Deborah Baker <geedeb@gmail.com>

Club Librarian: Vacant

Facebook: Tim Deardorff <tim-deardorff@yahoo.com>

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Cosmic Comments **by President Mark Baker**

In the past year of turmoil and angst, it has been gratifying, for those of us able, to share the beauties and wonders of the celestial hemisphere at South Coast Winery. Those within and without our communities have been blessed by Light when so much else darkens their lives... and it is appreciated by every guest that takes a moment to Look Up and chat with us. We have even inspired many to obtain their own equipment, whether it is binoculars or telescopes... I often joke that Orion owes me commission for the dozen or so XT8's that they've sold based on my recommendation!!!

But I still miss the schools, whether it is Star Parties or Clubs, and it brings joy to now start getting requests to continue where we left off, oh so long ago it seems... Hopefully, many of you will feel comfortable in joining us to resume what TVA does best – bringing the Universe down to Earth and sharing the inherent glories of the skies!!!

Every person, regardless of age or education, that we encourage to look up and ponder helps make the world a better place... they will ask questions and seek answers, even if it's just one time and one particular subject. We need to wonder... that is how humanity truly progresses!!!

Again, as I oft repeat, ad nauseum perhaps... Science is not stagnant, nor is it dead or dying. I'm proud that even a pandemic didn't stop the pursuit of human understanding... although it may have hampered the reward that interaction brings. Humans continue to press into the nether reaches of understanding, and we TVA members get to be on the front lines... either individually, or as a collective, we have opportunities to “share the wealth” within our communities and be rewarded with the Ooh's, Aah's, and even AHA's!!! Just because we promote looking up and wondering...

Clear, Dark Skies my Friends...





Editor's Note by Paul Kreitz

We have many knowledgeable members who have thought provoking articles stashed in the back of their heads, just waiting for an opportunity to see the light of day. NOW would be an excellent time to bring one forth! How about something on "Using a DSLR In Astrophotography"? Or "What We Expect To Find On Titan"? Or whatever is in the back of YOUR mind? Send your submission to pkreitz@sbcglobal.net, (by the 20th of the month) and see it in print next month! Chuck Dyson and Clark Williams have been doing just that for many months. How about you?

Looking Up Redux – June 2021

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 8

SkySafari 6 Pro

Stellarium

timeanddate.com/astronomy

<https://www.fourmilab.ch/earthview/pacalc.html>



ALL TIMES ARE LOCAL PACIFIC TIME (PDT / PST) UNLESS NOTED OTHERWISE

Times are given in 24-hour time as: (hh is hours, mm minutes, ss seconds)

hh:mm:ss or hhmmss

hhmm+ (time of the next day)

hhmm- (time of the previous day)

hhmm (seconds not shown)

yyyymmddThhmmss (Full date as: year month day Time separator hours minutes seconds)

Moon Phases for the month by date:

Thursday the 24th @ 1140 FULL in SAGITTARIUS

Wednesday the 2nd @ 0025 THIRD QTR in AQUARIUS



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Thursday the 10th @ **0353** NEW in TAURUS
Thursday the 17th @ **2055** First QTR in VIRGO

Apogee comes on 2021-06-07 @ **1928** – 406,228 km (252,419 mi)
Perigee comes on 2021-06-23 @ **1153** – 359,959 km (223,668 mi)

2021 has: (12) new moons, (13) 1st Qtr moons, (13) Full moons, (12) 3rd Qtr moons
(1) Blue moon and (0) Black moons

Daylight Savings: Starts: 2021-Mar-14 : Ends: 2021-Nov-07

Luna: Luna is waning gibbous on the first of the month, headed for NEW on the 10th rising at **0107**, transiting at **0636** and setting by **1205**. Luna by mid-month is 21% illuminated. Rising at **0914** and transiting late afternoon at **1631** setting at **2342**.

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

June 10 - Annular Solar Eclipse. An annular solar eclipse occurs when the Moon is too far away from the Earth to completely cover the Sun. This results in a ring of light around the darkened Moon. The Sun's corona is not visible during an annular eclipse. The path of this eclipse will be confined to extreme eastern Russia, the Arctic Ocean, western Greenland, and Canada. A partial eclipse will be visible in the northeastern United States, Europe, and most of Russia. ([NASA Map and Eclipse Information](#)) ([NASA Interactive Google Map](#))

June 20 - June Solstice. The June solstice occurs at **2021**. The North Pole of the earth will be tilted toward the Sun, which will have reached its northernmost position in the sky and will be directly over the Tropic of Cancer at 23.44 degrees north latitude. This is the first day of summer (summer solstice) in the Northern Hemisphere and the first day of winter (winter solstice) in the Southern Hemisphere.

June 24 - Full Moon, Supermoon*. The Moon will be located on the opposite side of the Earth as the Sun and its face will be fully illuminated. This phase occurs at **1140**. This full moon was known by early Native American tribes as the Strawberry Moon because it signaled the time of year to gather ripening fruit. It also coincides with the peak of the strawberry harvesting season. This moon has also been known as the Rose Moon and the Honey Moon. This is also the last of three supermoons* for 2021. The Moon will be near its closest approach to the Earth and may look slightly larger and brighter than usual.

*Supermoon is an “astrology” term and has no meaning in astronomical terms.



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Algol minima: (All times Pacific Time)

06/01/2021	1532
06/04/2021	1221
06/07/2021	0910
06/10/2021	0559
06/13/2021	0248
06/15/2021	2337
06/18/2021	2025
06/21/2021	1714
06/24/2021	1403
06/27/2021	1051
06/30/2021	0740



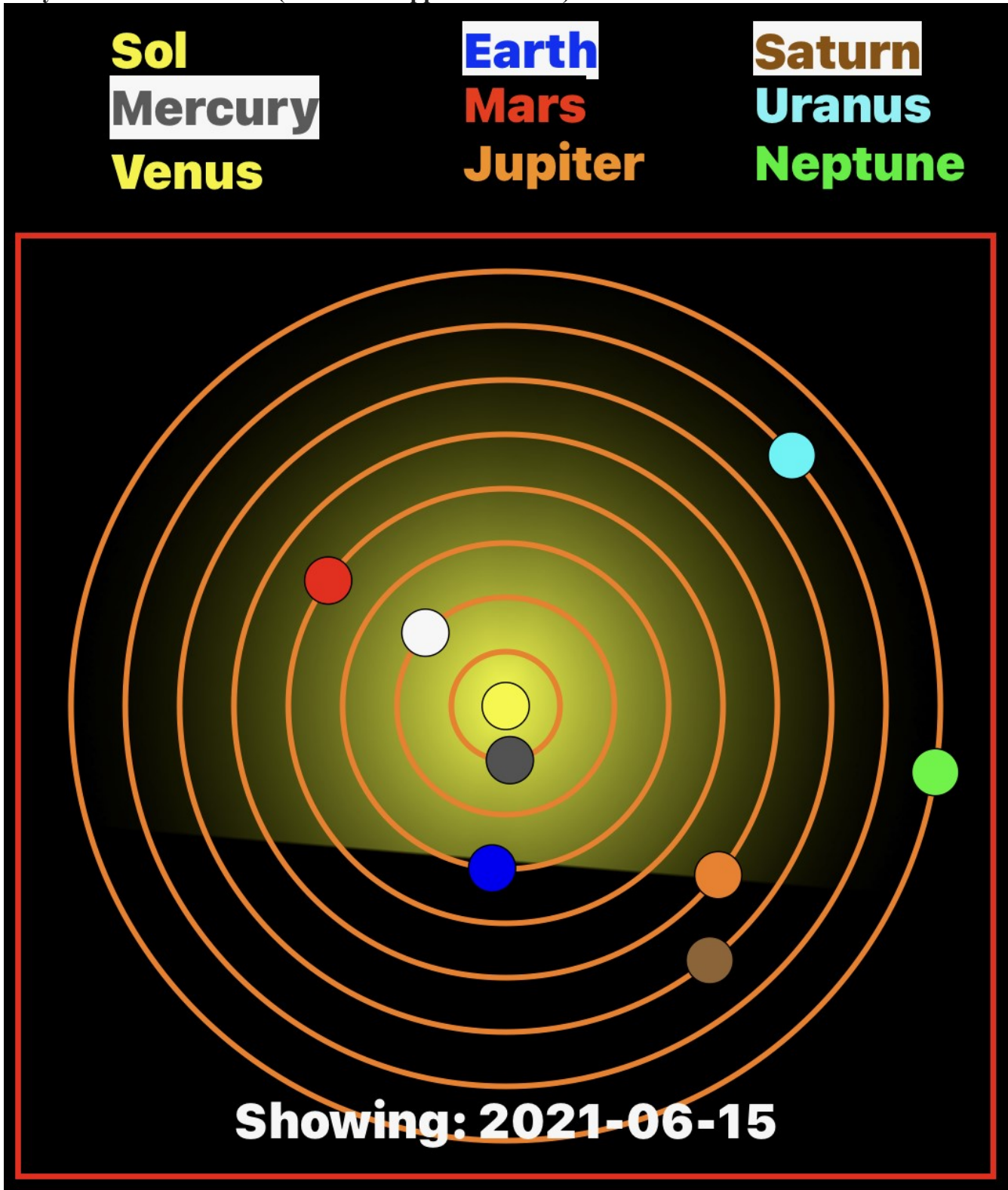


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Planets:

Planetary Positions June 2021: (from TVA App iOS version)





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- **Mercury:** Mercury is an evening object in the beginning of the month. It is illuminated at 6% and 3.06 apparent magnitude. Mercury sets at **2050** with the sun preceding at **1956**. Mercury by mid-month is lost in the sun. By the 30th Mercury is once again a morning object. Rising by **0426** followed by sunrise at **0540**.
- **Venus:** Is the evening star on the first of the month, setting by **2118**, preceded by sunset at **1956**. By mid-month Venus is setting at **2136** preceded by sunset at **2002**. By the 30th Venus is setting at **2144** preceded by sunset at **2004**.
- **Mars:** Mars is back in the sky on the first, not setting until **2300**. By mid-month Mars is transiting at **1532** but there is a waxing crescent Moon sitting just under 27° 15' to the east along the ecliptic at 28% illumination. Should be a visual and binocular possible view. End-of-month finds the Warrior transiting at **1511** and not setting until **2206**.
- **Jupiter:** Jupiter is a morning object on the first of the month rising at **0052** and preceding sunrise at **0538**. However, a Last-Quarter Moon is rising by **0139** and almost 50% illuminated. By mid-month Jove is rising at **2354** while the sun follows at **0536+**. Come the end of month Jupiter is peeking above the horizon by **2255**. However, the 63% illuminated Moon will be rising at **0009+** and chasing Jove the rest of the night.
- **Saturn:** Saturn rises about **2353** on the 1st while sunrise is at **0537+**. Saturn by mid month is rising by **2257** preceding sunrise at **0536+**. By the end-of-the-month Saturn is rising at **2156** followed by the sun at **0540+**. There is a 56% illuminated Moon will be rising at **0037+** and chasing Saturn the rest of the night.
- **Uranus:** On the first of the month Uranus is rising by **0402** followed by the sunrise at **0538**. By the ides Uranus rising at **0309**, followed by sunrise at **0536**. End-of-month finds Uranus rising at **0212** followed by sunrise at **0540**. There will already be a 65% waning gibbous Moon 65° to the west along the Ecliptic.
- **Neptune:** Neptune is rising at **0150** in the beginning of the month. With a 61% illuminated Moon only 23° to the West along the Ecliptic. By the 15th Neptune is rising at **0052**. By the end of the month Neptune is rising at **2353**. but it is lost to the glare of the Moon just 10° to the west along the Ecliptic.
- **Pluto:** Pluto rises by **2259** on the first of the month, with a 50% illuminated moon not rising until **0139+**. By mid-month Pluto is rising by **2103** while the Moon is getting ready for moonset at **0018+**. By the 30th Pluto is rising at **2103** with a 56% illuminated moon not rising until **0037+**.

Asteroids:

- Still a dearth of asteroids. I searched for asteroids in 2021 with a reasonable magnitude; say less than or equal to +10 in June there is nothing except the regulars: Juno, Vesta. Hebe, Eros and Herculina. So consult your local planetarium software or try:
<https://www.asteroidsnear.com/year?year=2021>

Meteors:

- July will see the return of a couple of meteor shower regulars. June is fairly quiet.

Comets: come in various classifications:

- 1) Short Period comets – further broken down into:
 - Halley Type: The Halley Types are believed 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 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.

One comet of interest this month. Comet **5D/Brosen.**, a comet in Canes Venatici; 86% illuminated, visual magnitude +9.9 on the 15th of June 2021 at **2100**. It rises at **1250**, transits at **2036** and sets at **0425+**. You should have an excellent shot at imaging it if you want the practice.

Deep Sky:

Notes:

L/Z abbreviation for ALT/AZ

R/D abbreviation for Right Ascension/Declination

α is right ascension

δ is declination

In each case, unless otherwise noted, you should look for the following on or about the 15th Day of June 2021 at 2100 PDT and you will have about 20 minutes of viewing time total.

It's galaxy season and The Virgo Diamond is high in the sky so let's look for some less familiar objects:

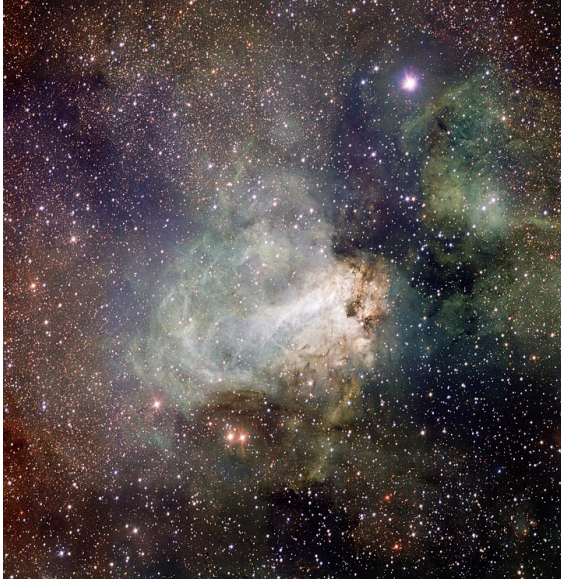
- **Cat's Eye Nebula:**



The Cat's Eye Nebula (also known as NGC 6543 and Caldwell 6) is a planetary nebula in the northern constellation of Draco, discovered by William Herschel on February 15, 1786. It was the first planetary nebula whose spectrum was investigated by the English amateur astronomer William Huggins, demonstrating that planetary nebulae were gaseous and not stellar in nature. Structurally, the object has had high-resolution images by the Hubble Space Telescope revealing knots, jets, bubbles, and complex arcs, being illuminated by the central hot planetary nebula nucleus (PNN). It is a well-studied object that has been observed from radio to X-ray wavelengths. (Wikipedia)

*Illustration 1: By J.P. Harrington and K.J. Borkowski (University of Maryland), and NASA - HST's Greatest Hits, Public Domain,
<https://commons.wikimedia.org/w/index.php?curid=36064>*

- **M17 – The Omega Nebula:**



The Omega Nebula, also known as the Swan Nebula, Checkmark Nebula, and the Horseshoe Nebula (catalogued as Messier 17 or M17 or NGC 6618) is an H II region in the constellation Sagittarius. It was discovered by Philippe Loys de Chéseaux in 1745. Charles Messier catalogued it in 1764. It is by some of the richest starfields of the Milky Way, figuring in the northern two-thirds of Sagittarius. (Wikipedia)

Illustration 2: By ESO/INAF-VST/OmegaCAM. Acknowledgement: OmegaCen/Astro-WISE/Kapteyn Institute - <http://www.eso.org/public/images/eso1119a/>, CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=26367295>

June is great for both viewing and imaging. Spend some time outside with your scope. Summer is coming.

For now – Keep looking up.

RANDOM THOUGHTS – “Happy Little Accidents”

By Chuck Dyson

Although I have absolutely no interest in nor any ability to paint, I still enjoyed a TV show by a quirky individual who gave painting lessons on PBS. Bob Ross was his name and his half hour class, for me, was more comedy than serious painting. No matter what the painting lesson was at some point Mr. Ross would put a gob of color on the canvas or cause a line to be on the canvas that was an accident, and he would then stand back and say “How can I include this little accident into the painting?” The “accident” was always turned into a new and previously unthought of element for the painting. At the end of each lesson Mr. Ross would stand back and comment on how the “happy little accident” had actually made the painting better.



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Because I am primarily a biologist by training my first example of a happy little accident will be a microbiological example. In 1928 Alexander Fleming, later to become Sir Alexander Fleming, who was by all accounts a brilliant but sloppy bacteriologist researcher, prepped some auger petri dishes in order to study the anti-microbial effects of different compounds. After prepping the plates and inoculating them with staphylococcus bacterium our hero promptly set off for a weekend at a seaside resort. Returning to the lab on Monday Fleming found most of the plates growing with the staphylococcus but some had fungal contaminants in them. He was in the act of throwing the contaminated plates away when he noticed that one plate contaminated with a mold had a large area around the mold colony where the bacterium had been killed. The mold was penicillin and was the source of the first really successful antibiotic.

Our first astronomer/physicist had an unhappy little accident with a very happy ending for science, in a life that was way too short. Joseph Ritter Fraunhofer was the 10th or the 11th child of a poor lens grinder who died when Fraunhofer was 11 years old. To ease the family's financial burden Fraunhofer was made an apprentice to a rather disreputable glass and mirror master craftsman. Fraunhofer's unhappy little accident occurred when the house/workshop that he was apprenticed to caught fire and collapsed with him in it. The rescue attempt came to the notice of the local prince-electoral who was in charge of the district. When he arrived on scene the neighbors were quick to tell him the horrible living and working conditions Fraunhofer was living and working in. After Fraunhofer was rescued the prince-electoral had a little talk with the master craftsman about the working conditions and study time in his shop. After the "talk" Fraunhofer, aided by monies from the prince-elect and a local businessman, was able to get books and teach himself math and physics. In his late teens Fraunhofer was able to buy out his apprentice contract and open his own lens grinding business. In short order the shop featured a Fraunhofer grinding machine using Fraunhofer grinding compounds turning out superior lenses.

The businessman who had also helped Fraunhofer recognized a great talent when he saw it and promptly brought the lad into his own glass business as a master craftsman and researcher. The first thing the new employee does is to improve the glass making furnace because, after all, even if you do a great job grinding and polishing a bad piece of glass you have a bad lens. The Fraunhofer furnace, as it came to be known, produced larger quantities of good, homogenous optical glass of both the crown and flint formulation than any before, this meant bigger refractors could be made. You may recognize the crown and flint glasses as the two components of a, you guessed it, Fraunhofer lens system. This was by far the best lens system for reducing chromatic aberration; however, wanting to reduce even more the chromatic aberration artifact in his telescopes led Fraunhofer to develop the spectroscope. Although Newton had spread white light into its different components with an optical prism, he had not been able to see any detail in the light. By combining Newton's prism with an optical tube Fraunhofer was able to magnify and spread out the spectrum and see details within it. What we now call Fraunhofer lines are the optical signatures of all the chemical elements within a star along with information of what their



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concentration in the star is. In 1814 Fraunhofer demonstrated his spectroscope and 21 years later in 1835 Auguste Comte made his blunder when he said "Because they are so far away all man will ever know about stars is their distance and color" the seeds to destroy his statement were already sown and in the 1860's Gustav Kirchhoff, using a Fraunhofer spectroscope, would measure the composition of the stars.

Isaac Newton did not have just one happy little accident he had several and none of these accidents involved an apple. Trouble for Newton began in 1781 when William Herschel, using the worlds largest telescope that just happened to have the worlds best optics, discovered a star that was close enough that he could actually resolve the disc. Now before you say "Herschel what were you thinking" remember the first actual measurement of a star's distance, other than our sun, is more than fifty years away and the resolution of this scope is so much better than any other scope at this time that Herschel has already identified several nebulae. At this time nebula means any object that cannot be resolved as a stellar object. They were actually stellar clusters so, the boy and his telescope are hot and it is possible that he has just resolved a stellar disk. Subsequent work actually showed that Herschel's "star" was actually only a planet, but hey, this is still a really big deal, got Herschel a royal appointment with a stipend it did.

Soon after the discovery and final naming of Uranus, Newton's troubles began. As often happens others had recorded this blue-green "star" without realizing that it was actually a planet but having numerous sightings with the position calculated and noted the orbital path and speed was soon known. Bad news for Newton, the calculated path and the observed path did not agree. Despite rechecking the orbital data and recalculating the orbit no one could get the two to agree. Whispers of the need to redo Newton's theory of gravity were beginning to be heard. Then in 1835 Newton got a big help from his old pal Edmond Halley. Halley, a lifelong supporter of Newton and principal source of moneys to publish Principia, was also a meticulous researcher of Greek records. He not only identified eight stars that had shifted their positions over two thousand years but he was also able to identify twenty-two appearances of a comet, now called Halley's comet, and predict it's return date very, very accurately. When Halley's comet was a full day late at perihelium astronomers knew that it had encountered an object, planet, that had changed the orbit of the comet. The hunt was on for planet eight and in 1846 three astronomers, one English, Adams, and two French, La Verrier and Galle announced the discovery of Neptune. This dang near starts a national pride war; but in the end all three get credit and relative peace returns to the world.

The finding of Neptune using Newton's formulas was hailed as a resounding proof that his theories were correct. The ghost of Newton smiled and the worlds scientific community cheered. Even as most of the science community cheered the whisperers started up again. "Yes his formulas worked for Neptune but what about Mercury?" The planet Mercury was consistently 42 arc seconds off its predicted position every century. This is a ridiculously small amount, so small



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an error that Einstein mocked astronomers as being the best hair splitters on the planet. No matter the whispers continued and the ghost of Newton was frowning. Newton needs his formula for calculating the effects of gravity saved and Einstein needs a real world proof of his special theory of relativity. Eventually a bright physicist said, "Let's see if Einstein's special theory of relativity can actually predict the perceived discrepancy in Mercury's orbit." They did and with a remarkable degree of accuracy special relativity predicted the discrepancy. The ghost of Newton smiled again and Einstein got to have his likeness printed on millions of t-shirts.

Is the ghost of Newton smiling today? NO! Because the whispers are busy again and today it is MOND (Modified Newtonian Dynamics). Starting in the 1920's it increasingly became apparent that there was more stuff in the universe than we could see, galaxies moving too fast to be in clusters and galaxies rotating too fast to not fly apart. Two hypotheses have been advanced to explain these phenomena. The first is dark matter, stuff that is there but does not interact with light. The second is that Newton's gravity formula does not work over great distances, MOND. Even though today the evidence is starting to greatly favor dark matter the issue is still not settled and the ghost is not smiling.

William Herschel, not content with one happy little accident actually had another. Wanting to understand how much energy, heat, was in different colors of light. Herschel used a prism to create a spectrum and then carefully placed a thermometer in each color and being a good scientist placed one thermometer just beyond the red end of the spectrum. As expected all the color thermometers showed some degree of temperature rise. Surprisingly, the reference thermometer also had a temperature rise. Herschel had discovered the infrared part of the spectrum, the first part of the invisible wavelengths of light. Eventually this would lead to the understanding of all the wavelengths of light in what we now call the electromagnetic spectrum. One result of this accident was the eventual ability to capture and record gamma rays, the most energetic of all the photons. As gamma rays are produced in quantity by nuclear bombs, the US, in order to assure compliance with nuclear arms treaties, launched gamma ray detecting satellites. Except for the occasional burst from India, Pakistan, and North Korea no bursts were detected on Earth but the heavens were alive with Gamma Ray Bursts (GRBs) and this launched the publication of thousands of research papers.

In a fickle twist of fate in 1948 two researchers published an article on George Lemaitre's idea of the entire universe coming from one big event (the big bang) and predicted a signal that would be leftover from this event. No one was interested and the paper was buried in the library's stacks and forgotten. In the 1960's there was renewed interest in what was now called the big bang theory and Robert (Bob) Dicke of Princeton independently reproduced the original work and designed an instrument (Dicke Radiometer) to detect the signal of the CMB. At Bell Labs the phone company was convinced there was a future in microwave satellite communication and hired two researchers to investigate how to best design a microwave communication system.



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The investigators (Arno Penzias and Robert Wilson) became aware of the Dicke Radiometer and actually built it. In the now famous story Penzias and Wilson worked with their Dickie Radiometer to identify and remove all sources of interference of the microwave signal. They were able to identify and remove all of the interference signals except for one very low frequency hiss that was present no matter where the radiometer was pointed. Finally, on the advice of a colleague, Penzias and Wilson called Dicke. Dicke, who was in the process of building his own Dicke Radiometer, when the call ended turned to his graduate students and said, "Boys we have been scooped." In the end because of the happy little accident of making a phone call Penzias and Wilson got the Nobel Prize and Dicke, who had done all of the theoretical work and designed the detection equipment, got to stay at Princeton and work in obscurity.

In 1609 while relaxing on his patio, after a hard day of hustling money to pay his ever-increasing debts, Galileo Galilei said to himself "One wonders, what I would see if I turned my telescope up to the stars?" He did just that and if you listen carefully, you can still hear Galileo screaming at his printer "Stop the presses! I need to publish a book titled *Sidereus Nuncius* (The Stars Announce) and it will absolutely change everything!" And he did, and it did. This happy little accident is still changing everything.

Cheers, Chuck





Astrophotography With Your Smartphone

By David Prosper

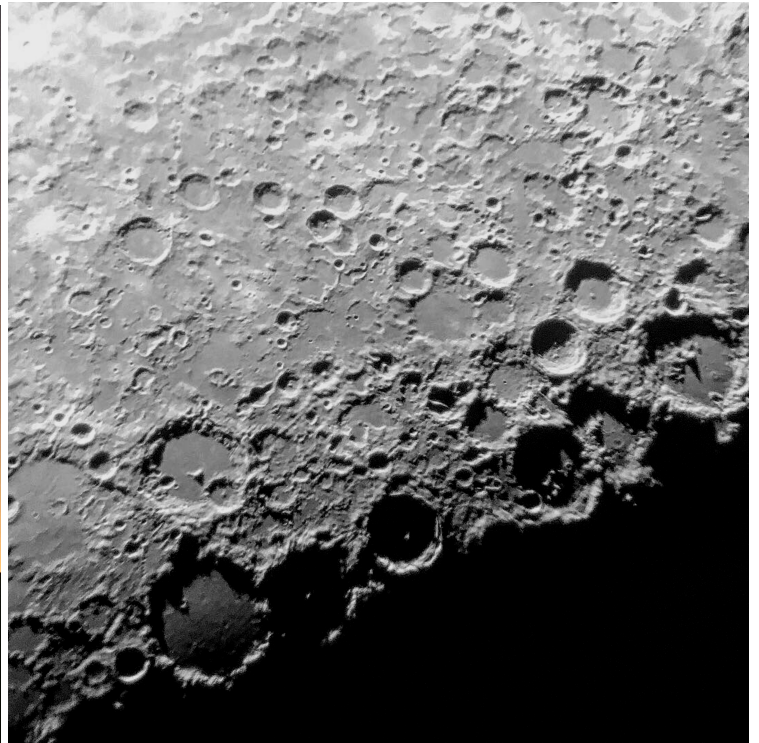
Have you ever wanted to take nighttime photos like you've seen online, with the Milky Way stretched across the sky, a blood-red Moon during a total eclipse, or a colorful nebula? Many astrophotos take hours of time, expensive equipment, and travel, which can intimidate beginners to astrophotography. However, anyone with a camera can take astrophotos; even if you have a just smartphone, you can do astrophotography. Seriously!

Don't expect Hubble-level images starting out! However, you can take surprisingly impressive shots by practicing several basic techniques: steadiness, locked focus, long exposure, and processing. First, steady your smartphone to keep your subjects sharp. This is especially important in low light conditions. A small tripod is ideal, but an improvised stand, like a rock or block of wood, works in a pinch. Most camera apps offer timer options to delay taking a photo by a few seconds, which reduces the vibration of your fingers when taking a shot. Next, lock your focus. Smartphones use autofocus, which is not ideal for low-light photos, especially if the camera readjusts focus mid-session. Tap the phone's screen to focus on a distant bright star or streetlight, then check for options to fine-tune and lock it. Adjusting your camera's exposure time is also essential. The longer your camera is open, the more light it gathers - essential for low-light astrophotography. Start by setting your exposure time to a few seconds. With those options set, take a test photo of your target! If your phone's camera app doesn't offer these options, you can download apps that do. While some phones offer an "astrophotography" setting, this is still rare as of 2021. Finally, process your photos using an app on your phone or computer to bring out additional detail! Post-processing is the secret of all astrophotography.

You now have your own first astrophotos! Wondering what you can do next? Practice: take lots of photos using different settings, especially before deciding on any equipment upgrades. Luckily, there are many amazing resources for budding astrophotographers. NASA has a free eBook with extensive tips for smartphone astrophotography at bit.ly/smartastrophoto, and you can also join the Smartphone Astrophotography project at bit.ly/smartphoneastroproject. Members of astronomy clubs often offer tips or even lessons on astrophotography; you can find a club near you by searching the "Clubs and Events" map on the Night Sky Network's website at nightsky.jpl.nasa.gov. May you have clear skies!



A small tripod for a smartphone. They are relatively inexpensive – the author found this at a local dollar store!



The Moon is large and bright, making it a great target for beginners. The author took both of these photos using an iPhone 6s. The crescent moon at sunset (left) was taken with a phone propped on the roof rack of a car; the closeup shot of lunar craters (right) was taken through the eyepiece of a friend's Celestron C8 telescope.



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This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!



The TVA is a member club of [The Astronomical League](https://www.astronomicalleague.org/)
