nightwatch
Newsletter of the Pomona Valley Amateur Astronomers

Every answer given on principle of experience begets a fresh question. ***Immanuel Kant***

CHECK OUT PVAAs YOUTUBE CHANNEL

**Volume 45 Number 11** ***nightwatch*** **November 2025**

## President's Message - November 2025

Although the election of PVAA officers and board members traditionally takes place during the May general meeting we will have a special election during this month's general meeting on November 7 for Vice President. This is to fill the vacancy left by Joe Hillberg when he was made Vice President Emeritus on August 27. The position is open to all PVAA members in good standing. If you are interested in having your name on the ballot, please send an e-mail message to Claire Stover, the PVAA Newsletter Director, at pvaanightwatch@gmail.com prior to the November general meeting. The candidate who receives the most votes will be the new Vice President effective immediately.

In addition, we still have a need for a volunteer helper for Gary Thompson, the PVAA Director of Membership and Director of Publicity. The volunteer would help set up the computer for Zoom and in-person speaker presentations at the monthly general meetings held at Harvey Mudd College. Gary has created a detailed set of instructions for how to set up the computer which his assistant can use. If you are interested, please contact Gary at garynorms@gmail.com.

The Full Moon on Wednesday, November 5, will be a special "supermoon". As with all "supermoons" the Moon will reach its elongation from the Sun of 180 degrees at the same time it reaches perigee, the closest point to Earth along its orbit. However, on November 5, it will be closer to Earth than at any time since February 2019 – a distance of only 356,833 km or 221,726 miles. This will provide an opportunity to view and image the Moon at its greatest extent as seen from Earth.

Then in the morning of Tuesday, November 17, the Leonids meteor shower is expected to peak. This shower is associated with Comet Tempel-Tuttle (55P/Tempel-Tuttle) first discovered in 1865. It's expected to produce 10 to 15 meteors per hour as seen from dark viewing locations. Since the Moon will be a slender waning crescent, it won't interfere with the viewing of the shower.

May all of you have clear skies for viewing your favorite astronomical objects!

***Ken Elchert***

## Club Events Calendar

| | |
|---|---|
| Oct 29 | Board Meeting IHOP 6:00 PM |
| Nov 1 | Star Party – Joat/Cahuilla Park 5:30-7:30pm |
| Nov 7 | General Meeting 7:30 PM – Al Cangahuala "Europa Clipper: First Year of Operations" |
| Nov 22 | Star Party – GMARS |
| Dec 3 | Board Meeting 6:15 PM |
| Dec 6 | Holiday Party IHOP Upland |

**2026**

| | |
|---|---|
| Jan 3 | Full Moon |
| Jan 17 | Star Party – GMARS |
| Jan 21 | Board Meeting IHOP 6:00 PM |
| Jan 18 | New Moon |
| Jan 24 | Fontana Astronomy Night – Mary Vagle Nature Center, Fontana 4pm |
| Jan 30 | General Meeting 7:30 PM |
| Feb 1 | Full Moon |
| Feb 17 | New Moon |
| Feb 18 | Board Meeting IHOP 6:00 PM |
| Feb 21 | Star Party – GMARS |
| Feb 27 | General Meeting 7:30 PM |

## ELECTION OF PVAA OFFICERS

Once again, it's election time for the Pomona Valley Amateur Astronomers**.** The board asks that you mark your ballot in the prescribed manner so that it might be counted. Your ballot is important as it will help decide the next slate of officers. Select the nominee of your choice by marking an "**X**" above the appropriate line, and on unopposed nominees mark each office with an "**X**" above the appropriate line to elect the nominee or an "**X**" above the appropriate line to reject the nominee. Remember every ballot carries the same weight in this election.

### VOTING INSTRUCTIONS FOR ELECTION OF OFFICERS & DIRECTORS

Please do the following so your ballot will be valid:

1. Print the ballot then mark an X above the appropriate line opposite your choice for each office. Use pen. Ballots marked in pencil are invalid. Fold ballot and place in an envelope and return to:

Gary Thompson Treasurer, PVAA
P.O. Box 162 Upland, CA 91785

2. Sign your name on the outside of the envelope to authenticate your ballot. Do not write your name on the ballot.

3. Ballots must be received the day before the November 7, 2025 general meeting. Ballots received after November 6th are invalid and will not be counted.

4. You can also vote using Zoom during our General Meeting on Friday, November 7, 2025.

### Official ballot of the Pomona Valley Amateur Astronomers for the term of officers 2025-2026

| | YES | NO |
|---|---|---|
| **Vice President** | | |
| Shall Ron Hoekwater be elected to the office of Vice President | _____ | _____ |

## October 10 2025 General Meeting

Ken Elchert started out the meeting calling for volunteers to run for club Vice President. We will have an election during the next general meeting. He then gave his monthly presentation of current Astronomical Aerospace events.

The Griffith Observatory is having a writing contest for their monthly publication The Griffith Observer. Just go to their website to get the details: https://griffithobservatory.org/about/griffith-observer-magazine/annual-writing-contest/

There are a couple of comets you should be able to see, although challenging. The SWAN and comet C/2025 K1 (Atlas).

NASA has announced that the Perseverance rover has found evidence of past life. After reviewing the pictures and chemical analysis, they can only explain what they found to be created by life. This was not the discovery of life, but just evidence that life was there.

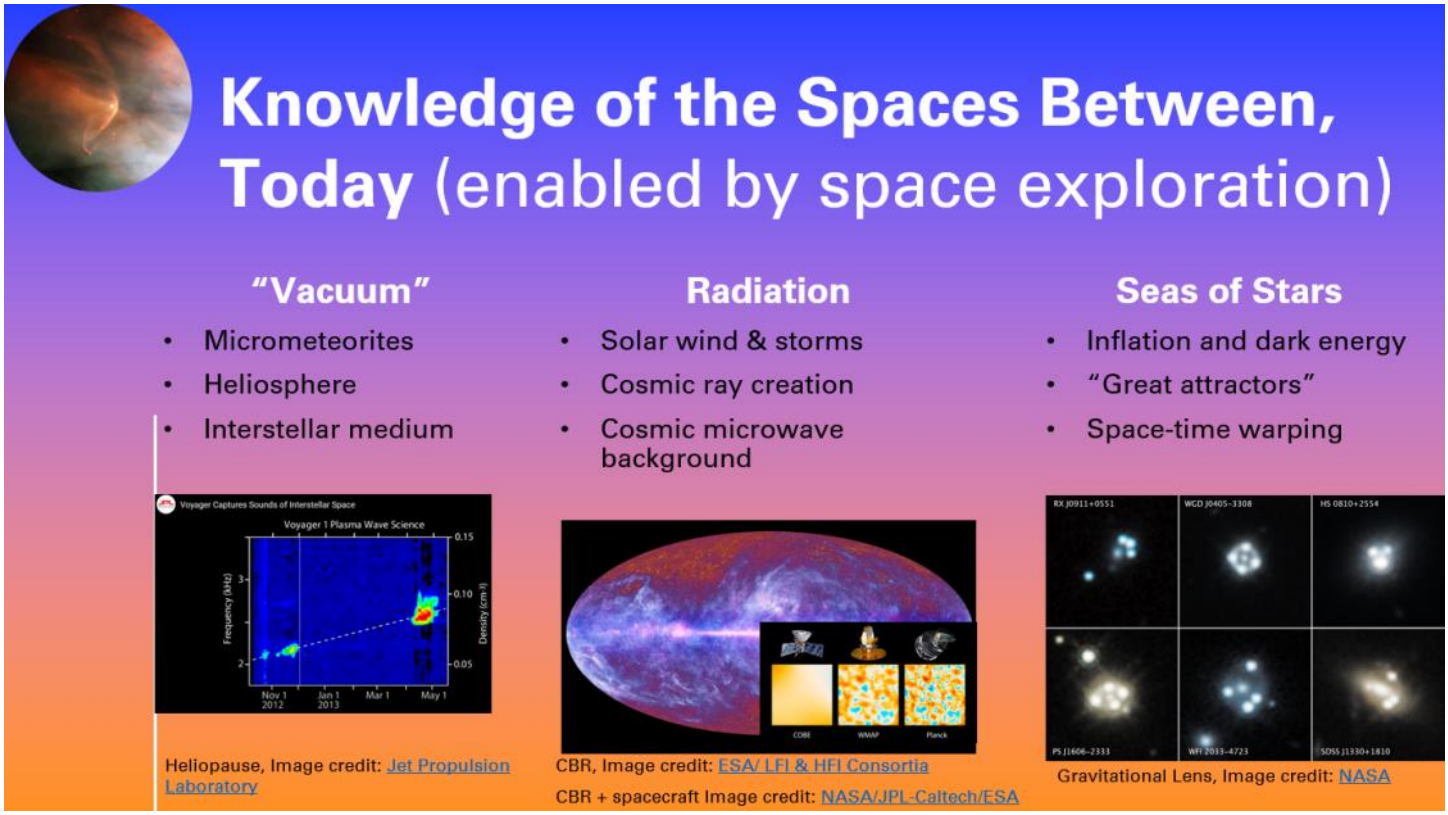
Ken brought in his book of "From the Earth to the Moon" by Jules Verne and pointed out the similarities between the book and modern spaceflight.

Geoff Reber was our main speaker of the night. His presentation was titled "Astronomy, Spaceflight, Their Future." Geoff is a Principal Engineer at The Aerospace Corporation. He used the American Astronomical Society's definition of astronomy: The study of everything outside the earth's atmosphere. We need to have spacecraft to see the spectrum of light (especially infrared) that the atmosphere blocks. Now we have spacecraft that can detect gamma rays that give astronomers a "heads up" to look at a specific place in the sky. With this we can see kilonovas. (A kilonova is the merger of stars, or black holes, not a massive explosion of a supernova.) While space is a vacuum, it is not completely empty. There is radiation from the cosmic microwave background left over from the beginning of the universe. There is light from other stars, micrometeorites, and an occasional hydrogen atom floating around between the stars.

To fly into space, you need to overcome gravity and create momentum. You need to survive and beat the tyranny of the rocket equation. To go into orbit around the earth, you need to go 17,900 mph. To go to the moon, you must go a minimum of 25,100 mph to escape the pull of earth's gravity. The faster you want to go, the more fuel you will need. The more fuel you need, the bigger the rocket. The bigger the rocket, the more fuel you will need again. That is why the rocket has stages, throwing away the mass of the empty fuel tanks. When you are sending humans into space, they need power, air, food, water, radiation and meteorite protection, communications, and heat and A/C. That adds even more weight. (Yes, satellites need power, communications, and protection. – But not nearly as much.) The amount of money spent on space systems has ballooned, surpassing what governments are spending 3 to 1. The advent of reuseable rockets has brought down the cost of going into space, and increased the frequency of launches, not having to build a new rocket for every launch.

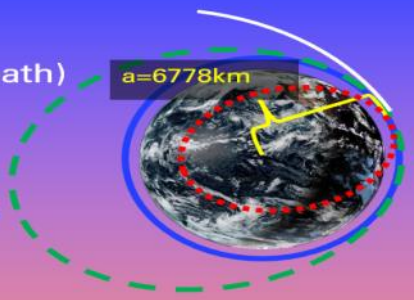
We are at the beginning of a new space age. Better spacecraft, bigger astronomical space observatories like the James Webb Space Telescope. With bigger rockets just now coming online like Vulcan, New Glenn, and Starship, the utilization of space is about to explode.

***Gary Thompson***



# Overcoming Gravity…

- Kepler: $k * T^2 = a^3$ (elliptical orbits)
- Huygens: $F_c = m\frac{v^2}{a}$ (mechanics of a curved path)
- Newton: $F_g = G\frac{m \times m_2}{a^2}$ (law of gravitation)

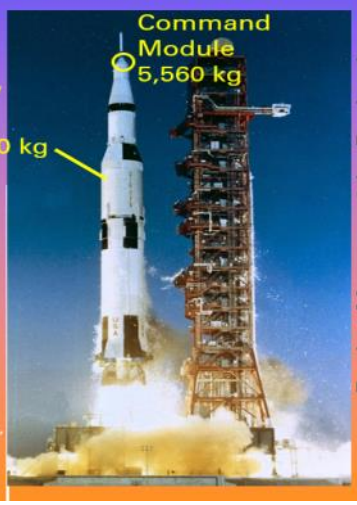



Period, T = 92.5 minutes
Height = 400 km

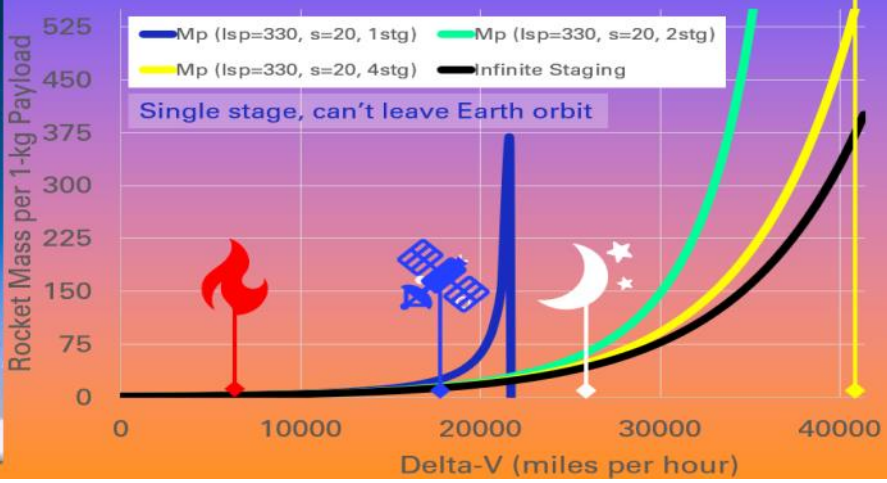
## just requires *speed*

| Airplane | Straight to ISS | ISS Orbit | Escape Velocity |
|---|---|---|---|
| 1,000 km/hr | 10,000 km/hr | 28,200 km/hr | 40,300 km/hr |
| 620 mph | 6,200 mph | 17,900 mph | 25,100 mph |

# Defeating the Tyranny of the Rocket (equation)




SA-502 Launch, image credit: NASA




# Commercial Space Sector Rapid Growth in Size and Capability

Radius roughly corresponds to size of the global space market, adjusted for dollar inflation

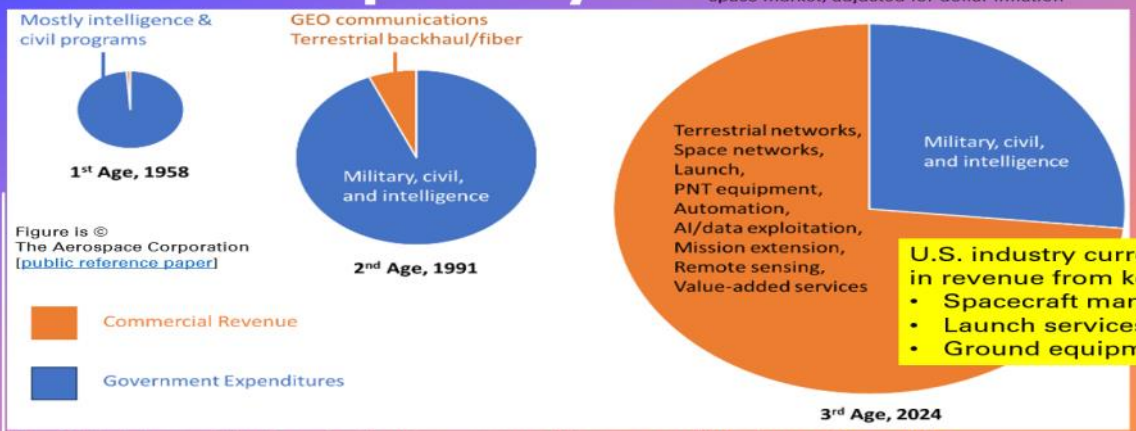



Figure is © The Aerospace Corporation [public reference paper]

U.S. industry currently leads in revenue from key sectors:
- Spacecraft manufacturing
- Launch services
- Ground equipment

1. Global demand (and production) for commercial space capability is growing rapidly
2. Growth includes commercial innovations satisfying traditionally government-driven needs

## More Beauty in Sharpless

After a touch and go weather forecast, we headed out to the dark site on Thursday, Sept. 18. The forecast for Thursday was cloudy during the day with clearing late at night, although there was a possibility of a shower overnight. I didn't set up just in case the rain came. Friday and Saturday were forecast to be clear and mostly didn't disappoint. Saturday was a little cloudy just before dawn.

**TARGET**

The target for September is another Sharpless object, SH2-154. It is also listed in the Lynd's Bright Nebula catalog as LBN 521. It's a fairly bright emission nebula in Cepheus occupying the center of my image and appears to be associated with a large molecular cloud (a stellar nursery where stars are formed) of about ten thousand solar masses. The most recent estimate places the nebula at about 3,260 light years away and from our viewpoint spans about 2-3 full moons across. It is lit by a giant blue B0 star. To find the star, look at the center of the image and find an arc of 4 white stars, then follow the arc clockwise to see two yellowish stars. The upper one of those is the star illuminating the nebula.

There is also a small open cluster toward the lower left of the image. This is NGC 7419, notable for having 5 red giants. The cluster is probably about 14 million years old and about 9,950 light years away. Some of the bright stars appear to be associated with the cluster but actually are foreground stars.

Finally, the feature I find most interesting in the image is in the lower right. It looks like a small rosette with a bright star in the middle. It is interesting to zoom into and see the structures. I cannot find a designation for it, even by combing SIMBAD, a database that includes 5.5 million non-stellar objects.

**IMAGING AND PROCESSING**

The (HaL)(HaR)GB image was taken over the nights of September 19 and 20 using my SVR90T 90mm StellarVue refractor reduced to f/5.6 on the Paramount MYT mount. Images were taken through Astrodon type E filters with a ZWO ASI294MM Pro monochrome camera. They were shot at 0 gain (by mistake) and 2x2 binning. The image was drizzle-stacked to full resolution. Calibration was done using 15 dark, 15 flat, and 15 flat dark frames. N.I.N.A. was used to set up a sequence to take 2 luminance frames for each R, G, B, and H-alpha frame, dithering between each set of 6 frames. A total of 3 hours, 30 minutes of 10-minute frames were taken through the H-alpha filter. Three hours, 25 minutes of luminance frames; 1 hour, 45 minutes of red frames; 1 hour and 40 minutes of green frames; and 1 hour, 50 minutes of blue frames were taken. All the broadband frames were 5-minute exposures. Guiding was done using PHD2 controlling a ZWO ASI174MM guide camera attached to an Orion Mini Guidescope. Guiding was excellent, especially Saturday night, varying between 0.2 to 0.5 arcsecs rms.

Pixinsight was used for processing. *WeightedBatchPreprocessing* was used for calibration, stacking, and drizzling frames. Drizzling increased the resolution from 1.95 arcsec/pixel to 0.97 arcsec/pixel. The R, G, and B frames were discarded after being combined using *ChannelCombination* to form the RGB color image. While there did not appear to be severe gradients present, *SpectrophotometricFluxCalibration* was performed followed by *MultiscaleGradientCorrection*. Focusing first on the RGB image, *BackgroundNeutralization* was applied followed by correct only *BlurXterminator* (*BXT*). Afterward, the frame was color calibrated using *SpectroPhotometricColorCorrection*. Full *BXT* followed by *NoiseXterminator* (*NXT*) and *StarXterminator* (*SXT*) resulted in a starless RGB image and an RGB stars only image. The RGB stars were stretched using the *StarStretch* script and set aside. Before any stretching of the starless RGB image, the R channel was extracted for later blending with the H-alpha and luminance frames.

Next, full *BXT*, *NXT*, and *SXT* were applied to both the H-alpha and luminance frames resulting in starless H-alpha and luminance frames. The frames with stars removed were discarded. The H-alpha frame had *LinearFit* applied using the extracted R frame as the reference frame and the corrected H-alpha frame was blended with the extracted R frame using the *ImageBlend* script to create an HaR channel. This blended channel was used to replace the R channel in the RGB image to form the HaRGB frame. Similarly, *LinearFit* was applied to the luminance frame using the extracted R frame as the reference and then combined with the extracted R frame to create the HaL frame. The HaRGB and HaL frames were independently stretched with *GeneralizedHyperbolicStretch* before being combined using *ImageBlend* using the color blend mode. This starless (HaL)(HaR)GB was slightly green, so the green was reduced using *SCNR* and then *Curves* was used to adjust the contrast. Finally, the stars were screened into the (HaL)(HaR)GB frame using ImageBlend to make the final image with RGB stars.

We're looking forward to heading out to the dark site again in October, but it will depend on whether the compound reopens, among other things.

Until then, clear skies,

***Ron Ugolick***

https://www.astrobin.com/users/ruccdu/

Joat Star Party 11/1/25 - Gary Thompson

***Tim Thompson – Facebook post 11/8/24***

Today is the 368th birthday for English mathematician, scientist & natural philosopher Edmond (or Edmund) Halley [1656-1742]. He is certainly most widely known for his eponymous Halley's Comet, officially known as 1P/Halley, reflecting its status as the first comet known to be periodic.

The comet is named after him because he is the one who discovered its periodicity. In 1705 Halley published "Synopsis of the Astronomy of Comets", in which he used the relatively new law of gravitation, which had been published by Isaac Newton [1643-1727] in his “Principia” (1687), to argue that comets observed in 1531, 1607 and 1682, were all in fact the same comet, returning on a periodic journey around the sun. After estimating the perturbing effects of Jupiter, and other planets, he predicted that the comet would return in 1758. His prediction was verified when Johann Palitzsch [1723-1788] discovered the comet on Christmas Day, 1758. The effect of Jupiter had been a bit stronger than Halley thought, and the comet was delayed compared to Halley's expectations, but although late in the year, it was still found in 1758.

Meanwhile, by 1682 mathematician Halley had shown that Kepler’s 3rd law implied an attractive force with an inverse square law for the distance. But, in collaboration with other well-known mathematicians, they were unable to prove that an inverse square law also explained elliptical orbits. So, again in 1682, Halley visited the aforementioned Issac Newton [1643-1727] and posed the problem to him, only to discover that Newton had already solved the problem, but was evidently not motivated to publish it. This meeting resulted in Newton eventually publishing his magnum opus, Philosophiæ Naturalis Principia Mathematica (Mathematical Principles of Natural Philosophy) in 1687. Halley paid for the publication out of his own pocket, and proof-read the pre-print copies.

It is distinctly possible that one of the most important books in the history of science would not have been published at all without Halley pressuring Newton to do so, and doing much of the publishing work for Newton. So it was largely Halley who masterminded the publication of Newton's Principia, whereby Halley was able to discover the periodicity of his eponymous comet.

Halley had become assistant to the first Astronomer Royal (1675-1719) John Flamsteed [1646-1719] in 1675, and followed Flamsteed as the second Astronomer Royal (1720-1742).

Although most widely known as an astronomer, Halley was also one of the founders of the modern science of geomagnetism. Over the period 1698-1700 Halley explored the magnetic variations of compasses in the North Atlantic, as an aid to navigation, which he published in 1700 & 1701. But Halley had already published a map of the world, showing winds on the global ocean, in 1686. It was in fact, the first meteorological chart ever published. So he had a hand in the early days of geophysics & meteorology, as well as astronomy.

## Upcoming Celestial Events
## November 2025

events visible in southern California highlighted in yellow

PST = UTC – 8 hrs
PST = PDT – 1 hr
PDT = UTC – 7 hrs
PDT = PST + 1 hr

| Date | Day | LA Time | Event | Direction | Altitude (deg) | Moon Phase/ Illumination |
|---|---|---|---|---|---|---|
| Nov 10 | Mon | 1:15 am<br>10:00 pm-4:20 am-6:00 am | Moon near Jupiter<br>δ = 3.85° | E-S-W | 7-77-69 | Waning Gibbous<br>69% |
| Nov 11-12 | Tue – Wed | 11:30 pm – 5:00 am | Northern Taurid Meteor Shower peaks<br>~ 5/hr | E | ----- | Waning Gibbous<br>61% |
| Nov 12 | Wed | 10:41 am<br>Not visible | Mercury near Mars<br>δ = 1.4° | ----- | ----- | Waning Crescent<br>39% |
| Nov 12 | Wed | 2:58 pm – 5:46 pm<br>Not visible | Lunar occultation of Regulus | ----- | ----- | Waning Crescent<br>36% |
| Nov 17- 18 | Mon – Tue | 11:30 pm – 5:00 am | Leonids Meteor Shower peaks<br>~ 15/hr | E | ----- | Waning Crescent<br>7% |
| Nov 19 | Wed | 10:47 pm | New Moon | ----- | ----- | New Moon<br>0% |
| Nov 29 | Sat | 8:42 am<br>Visible 10-12 pm 11/28 | Moon near Saturn<br>δ = 3.32° | ----- | 33.5 to 10.8 | Waxing Gibbous<br>60% |
| | | | | | | |

Lunation No. 1272

Lunation No. 1273

And on the side, in 1693, Halley published mortality tables for the City of Breslau, in Silesia (now the city of Wrocław in Poland). This may not have been the first study of age-related mortality, but it certainly was an early effort. Halley's tables formed the basis for later actuarial tables in the life insurance business, and landed Halley a spot in the Insurance Hall of Fame.

There is some question as to the proper pronunciation of his name. In fact, Halley himself changed the pronunciation between "Hay-lee", "Haw-lee" and "Hal-lee" in some unpredictable fashion. So pick your favorite.

**https://en.wikipedia.org/wiki/Edmond_Halley** (Wikipedia)
**https://mathshistory.st-andrews.ac.uk/Biographies/Halley/** (Mathematical biography - University of St. Andrews, Scotland)
**https://www.newworldencyclopedia.org/entry/Edmond_Halley** (New World Encyclopedia)
**https://www.westminster-abbey.org/.../comme.../edmond-halley** (Westminster Abbey)
**https://www.rmg.co.uk/stories/topics/magnetic-mr-halley** ("The Magnetic Mr. Halley" - Royal Museums, Greenwich)
**https://www.insurancehalloffame.org/edmond-halley-simple** (Insurance Hall of Fame)
**https://www.worldhistory.org/Edmond_Halley/** (World History Encyclopedia)
**https://en.wikipedia.org/wiki/Halley's_Comet** (Halley's comet - Wikipedia)
**https://en.wikipedia.org/wiki/Astronomer_Royal** (Astronomer Royal - Wikipedia)
**https://www.npg.org.uk/.../portrait/mw09662/Edmond-Halley** (Portrait of Halley - National Portrait Gallery,

The portrait of Halley shown here comes from the National Portrait Gallery in London. Dated circa 1720, it is oil on canvas credited to British portrait artist Isaac Whood [1688-1752].

The description from the NPG reads: "Halley is depicted in this portrait by Whood with a volume marked 'Newton' and a chart showing the path across southern England which he predicted for the total solar eclipse of 22 April 1715."