



Newsletter of the Pomona Valley Amateur Astronomers

Science and everyday life cannot and should not be separated.

Rosalind Franklin



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nightwatch

September 2021

Star Party 09-11-21

Claremont's Cahuilla Park this last Saturday night was great for seeing Jupiter, Saturn, Venus, and the moon. Several families with kids saw all of them for the first time through a telescope. We had two 8-inch dobs checking out the sights. You could see

Jupiter's bands and three of its moons. Several took pictures of the moon with their mobile phones. Everyone had a great time!

Gary Thompson



Moon photo taken by Gary Thompson using his phone on 9/11/21.

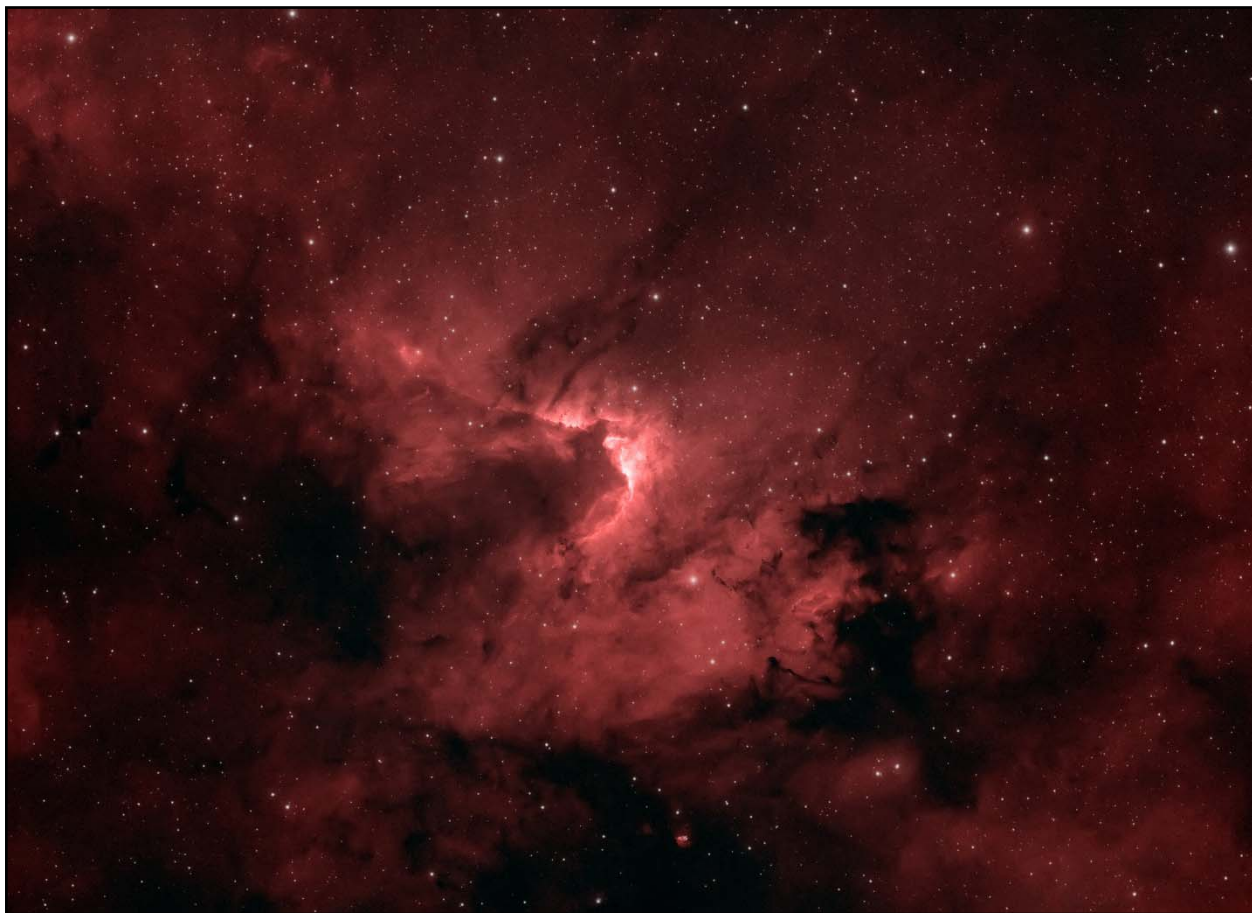
Cave Nebula

New moon weekend in September was also the long Labor Day weekend here in the US. Of course, that meant the dark site campground was fully booked, so we decided to go Wednesday/Thursday nights after Labor Day. From the bookings, this looked perfect as practically no one would be there. But, on August 30, all California National Forests were closed until at least September 17 due to the risk of wild fires. So, we have another narrow-band imaging session from home this month. One advantage to imaging from home is that I get to take lot more hours of data, which is needed since the amount of light pollution severely impacts the final results. While I haven't gone back to check, at 32 hours 10 minutes, this is probably the longest integration time I've ever done.

The target for the month is the Cave Nebula in Cepheus. There may be confusion regarding the name "Cave

Nebula" because prior to Sir Patrick Moore, a very prolific British amateur astronomer and TV personality, coining the name, it was used to describe Cederblad 201 (VdB 152) which is also in Cepheus. Many lists still indicate Ced 201 as the Cave Nebula. In reference to my image, the Cave refers to Sharpless 155 and Caldwell 9.

The Cave is situated about 2,400 light years away and while its magnitude is listed as 7.7, it is difficult to observe visually as the light is spread over a pretty wide area. For purposes of location, the Cave is the arced area near the center of the image. It lies in a predominately hydrogen-illuminated emission region that is actively forming stars. Star formation may be due to stellar wind compression from the star in the brightest part of the nebula.



I'm sending two images this time using two different narrow-band combinations. The first, mostly red one, is an (H)HOO image in which the hydrogen alpha (HA) signal is mapped to red while the oxygen-III (O-III) signal is mapped to green and blue. Additionally, the HA signal is used as a luminance layer for detail. Thirty six 10-minute HA frames (6 hours total) and 79 10-minute O-III frames (13 hours, 10 minutes total) were stacked using 29 dark frames, 21 flat frames, and 21 flat dark frames. While not "natural" colors, HOO images, in general, are

close to natural since the HA filter passes a specific color of red light and the O-III filter passes a specific color of blue-green light. However, it should be kept in mind that this is not what would be seen visually in a telescope. Nearly all nebulae are too faint to stimulate the color-sensing cells in your eyes, so at best, all you would see is a grayish smudge. So perhaps "natural color" is misleading, unless your eyes are 90mm wide and you can keep them open for 10 minutes!



The second is an (H)SHO image with RGB stars. This is a Hubble palette with HA as a luminance layer, where sulfur-II (S-II) is mapped to red, HA is mapped to green, and O-III is mapped to blue. This color mapping is not “natural” because both the S-II and HA filters pass red light, but at different colors or frequencies. The palette places the filtered images in increasing frequency order, so HA gets pushed to green instead of red. And finally, the HA data is so much stronger than the S-II and O-III data that the latter two need to be enhanced, otherwise the picture would just be a green nebula. So, while the colors red, green, and blue show where these elements are located in the nebula, the relative amounts are not correct. This

image includes the same data as in the (H)HOO version and adds 72 10-minute S-II frames (12 hours total) with the same number of calibration frames. The stars in this version were replaced with stars taken from an image made with 20 1-minute frames taken through each of red, green, and blue filters. This stack was uncalibrated, since I only wanted the stars, which were added as a last step in the process.

I hope you enjoy the spelunking until next month.

*Ron Ugo*lick

<https://www.astrobin.com/users/rucddu/>

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PVAA General Meeting 8/20/21

Our next two star parties, (October and November), will be at the Riverside Astronomical Society's GMARS (Goat Mountain Astronomical Research Station). Please visit their website at <http://www.rivastro.org/gmars.php> for info and directions.

PVAA has a tentative date of Sunday night - October 10th for a tour of the observatory at 5:50pm. – A half hour before sunset. More updates when we get closer to the date. Please check our Facebook page.

<https://www.facebook.com/groups/1378161432440156>

The speaker of the night was Dave Nakamoto of LAAS. The topic of his presentation was “Star Hopping” and the Garvey Ranch Observatory. This observatory is in a really, really bad location. It is next to a softball field that is brightly lit at night until 9:30pm. (Even if the game ended before 9pm.) It is surrounded by tall trees that block their view, and they can't trim the trees. It is in a city park that closes at 10pm. The only good thing about its location is that it is local. It does have a pier mounted 8-inch refractor for visual viewing, and a 4.7-inch refractor mounted on the side of the 8-inch, that is used for photography. It has an electronic finder with a 12-degree field of view.

One good thing to do when star hopping, make sure your finder scope's crosshairs are North-South and East-West. That way, when you are looking at a star chart, you can see from the nearest bright star to your object, how far up or down (North/South) you need to go, and how far right of left (East/West) you need to go. He has had more success doing it this way as

compared to going diagonal (NE/SW or NW/SE), especially with an equatorial mount. If you have an alt-azimuth mount like a Dobsonian telescope, (non-equatorial) – then adjust your crosshairs to N/S – E/W when you get to your nearest brightest star.

You should have a good star map, or access to star map program like Starry Night or Stellarium. You can run these at home and print off the screens to take outside with you. Measure out on the map how far for the bright star you need to go in one direction, and then the other. One thing you will need to know is: What is the Field-Of-View of your finder scope? When you are using paper star charts, you should cut out a circle the size of your finder's Field-Of View (FOV), then laminate it so you can use it over and over again. How many of your finder's FOVs do you need to move over, and how many up or down? Also try to memorize the star patterns along the way, so you know you are on the right path. In his example, Dave went from a very bright star – Vega – to M13, also known as the Great Globular Cluster in Hercules. He memorized several star patterns along the way, and he could backtrack, as he loves to check other stars out, instead of going directly to his target without stopping. Dave enjoys the trip as much as viewing his target. He really likes paper star charts as they do not require a power source. Don't get frustrated that star hopping doesn't always work the first time. Instead, enjoy the view, and marvel at the wonder of it all.

Gary Thompson





8-inch refractor with side mounted 4.7-inch refractor with cameras



Star Hopping from Vega to M13.

Club Events Calendar

Sep 17 General Meeting –
 Brian Carter “Three-Body Problem”

Oct 9 Star Party – GMARS

Oct 10 Garvey Ranch Observatory

Oct 13 Board Meeting

Oct 22 General Meeting –
 Tim Thompson “James Webb Space Telescope”

Nov 6 Star Party – GMARS

Nov 10 Board Meeting

Nov 19 General Meeting (presentation: TBD)

Dec 11 Christmas Party

**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!

Weird Ways to Observe the Moon

David Prosper

International Observe the Moon Night is on October 16 this year– but you can observe the Moon whenever it's up, day or night! While binoculars and telescopes certainly reveal incredible details of our neighbor's surface, bringing out dark seas, bright craters, and numerous odd fissures and cracks, these tools are not the only way to observe details about our Moon. There are more ways to observe the Moon than you might expect, just using common household materials.

Put on a pair of sunglasses, especially **polarized sunglasses!** You may think this is a joke, but the point of polarized sunglasses is to dramatically reduce glare, and so they allow your eyes to pick out some lunar details! Surprisingly, wearing sunglasses even helps during daytime observations of the Moon.

One unlikely tool is the humble **plastic bottle cap!** John Goss from the Roanoke Valley Astronomical Society shared these directions on how to make your own bottle cap lunar viewer, which was also suggested to him by Fred Schaaf many years ago as a way to also view the thin crescent of Venus when close to the Sun:

“The full Moon is very bright, so much that details are overwhelmed by the glare. Here is an easy way to see more! Start by drilling a 1/16-inch (1.5 mm) diameter hole in a plastic soft drink bottle cap. Make sure it is an unobstructed, round hole. Now look through the hole at the bright Moon. The image brightness will be much dimmer than normal – over 90% dimmer – reducing or eliminating any lunar glare. The image should also be much sharper because the bottle cap blocks light from entering the outer portion of your pupil, where imperfections of the eye's curving optical path likely lie.” Many report seeing a startling amount of lunar detail!

You can **project the Moon!** Have you heard of a “Sun Funnel”? It's a way to safely view the Sun by projecting the image from an eyepiece to fabric stretched across a funnel mounted on top. It's easy to make at home, too – directions are here: bit.ly/sunfunnel. Depending on your equipment, a Sun Funnel can view the Moon as well as the Sun– a full Moon gives off more than enough light to project from even relatively small telescopes. Large telescopes will project the full Moon and its phases, with varying levels of detail; while not as crisp as direct eyepiece viewing, it's still an impressive sight! You can also mount your smartphone or tablet to your eyepiece for a similar Moon-viewing experience, but the funnel doesn't need batteries.

Of course, you can join folks in person or online for a celebration of our Moon on October 16, with International Observe the Moon Night – find details at moon.nasa.gov/observe. NASA has big plans for a return to the Moon with the Artemis program, and you can find the latest news on their upcoming lunar explorations at nasa.gov.



Sun Funnels in action! Starting clockwise from the bottom left, a standalone Sun Funnel; attached to a small refractor to observe the transit of Mercury in 2019; attached to a large telescope in preparation for evening lunar observing; projection of the Moon onto a funnel from a medium-size scope (5 inches).

Safety tip: NEVER use a large telescope with a Sun Funnel to observe the Sun, as they are designed to project the Sun using small telescopes only. Some eager astronomers have melted their Sun Funnels, and parts of their own telescopes, by pointing them at the Sun - large telescopes create far too much heat, sometimes within seconds! However, large instruments are safe and ideal for projecting the much dimmer Moon. Small telescopes can't gather enough light to decently project the Moon, but larger scopes will work.



International OBSERVE
THE MOON NIGHT 2021

SATURDAY
OCTOBER 16TH



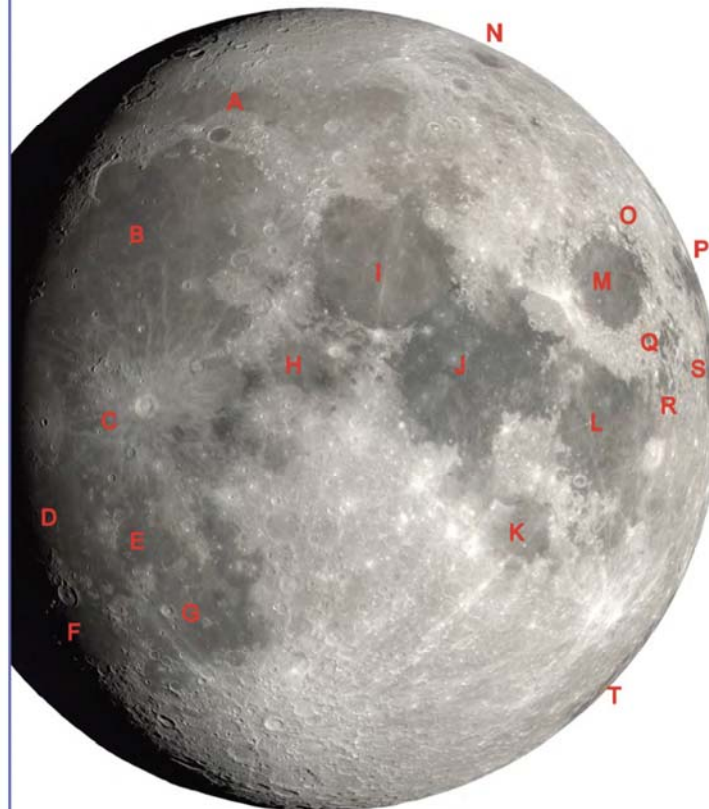
NORTHERN HEMISPHERE MOON MAP WITH
LUNAR MARIA (SEAS OF BASALT)

Moon Map

This map was created for International Observe the Moon Night 2021. It depicts the Moon as it will appear from the northern hemisphere at approximately 11:00 PM EDT on October 16, 2021 (3:00 AM UTC on October 17).

Lunar Maria (Seas of Basalt)

You can see a number of maria tonight. Once thought to be seas of water, these are actually large, flat plains of solidified basaltic lava. They can be viewed in binoculars or even with the unaided eye. Tonight, you may be able to identify 18 maria on the Moon. This includes four seas along the eastern edge that are often hard to see. Because of libration, a slight apparent wobble by the Moon in its orbit around Earth, tonight we get to peek slightly around the northeast edge of the Moon, glimpsing a sliver of terrain normally on the Moon's far side.



Map generated with NASA's Dial-A-Moon
(<https://svs.gsfc.nasa.gov/4874>)

- | | | |
|--|--|---------------------------------|
| A. Mare Frigoris (Sea of Cold) | H. Mare Vaporum (Sea of Vapors) | O. Mare Anguis (Serpent Sea) |
| B. Mare Imbrium (Sea of Rains) | I. Mare Serenitatis (Sea of Serenity) | P. Mare Marginis (Border Sea) |
| C. Mare Insularum (Sea of Isles) | J. Mare Tranquillitatis (Sea of Tranquility) | Q. Mare Undarum (Sea of Waves) |
| D. Oceanus Procellarum (Ocean of Storms) | K. Mare Nectaris (Sea of Nectar) | R. Mare Spumans (Sea of Foam) |
| E. Mare Cognitum (Known Sea) | L. Mare Fecunditatis (Sea of Fertility) | S. Mare Smythii (Smyth's Sea) |
| F. Mare Humorum (Sea of Moisture) | M. Mare Crisium (Sea of Crises) | T. Mare Australe (Southern Sea) |
| G. Mare Nubium (Sea of Clouds) | N. Mare Humboldtianum (Humboldt's Sea) | |



MOON.NASA.GOV/OBSERVE

#ObserveTheMoon

You can download and print NASA's observer's map of the Moon for International Observe the Moon Night! This map shows the view from the Northern Hemisphere on October 16 with the seas labeled, but you can download both this map and one of for Southern Hemisphere observers, at: bit.ly/moonmap2021 The maps contain multiple pages of observing tips, not just this one.