

A Cosmic Conundrum

Fall 2019

It seems that we have walked this “tightrope” forever. For too long, astronomers have been stuck between the “rock” of selling our souls for public excitement and participation, and the “hard place” of laboring under freezing cold nights, alone in the dark, with nobody to share our enthusiasm. In fact, we often seek out remote locations with the darkest night, with nobody around to spoil our fun. Maybe that is the root of the problem! I’ve shared this meme before, but it bears repeating...



There are many community and public events that attract large, exuberant throngs of people. October 5, 2019 is a perfect example – it’s **International Observe the Moon Night!** Usually though, bringing out a telescope is like hosting an Alaska Democratic Presidential Convention; crowd control just isn’t a big issue. In fact, the dark nights and isolated locations that astronomers crave, very often contribute to a drastic reduction in public participation and excitement!

Have you ever wondered why food and beverages are usually available at star parties, when astronomers go into convulsions anytime people come up to their expensive telescope with food and drink in their hands? We’re always warning the public to leave the consumables away from the observing area, and incessantly admonishing our guests not to touch this or that, and don’t grab these, and on and on. Wouldn’t it just be better if there was no drinking and eating at star parties? Well, not if you want to attract a crowd! So, we compromise...very grudgingly...

Yes, astronomers may be intelligent - but they’re also a very conflicted group. Believe me, I have a **GF (Geek Factor)** of about 9.2, but I’m in rehab and getting better every day.

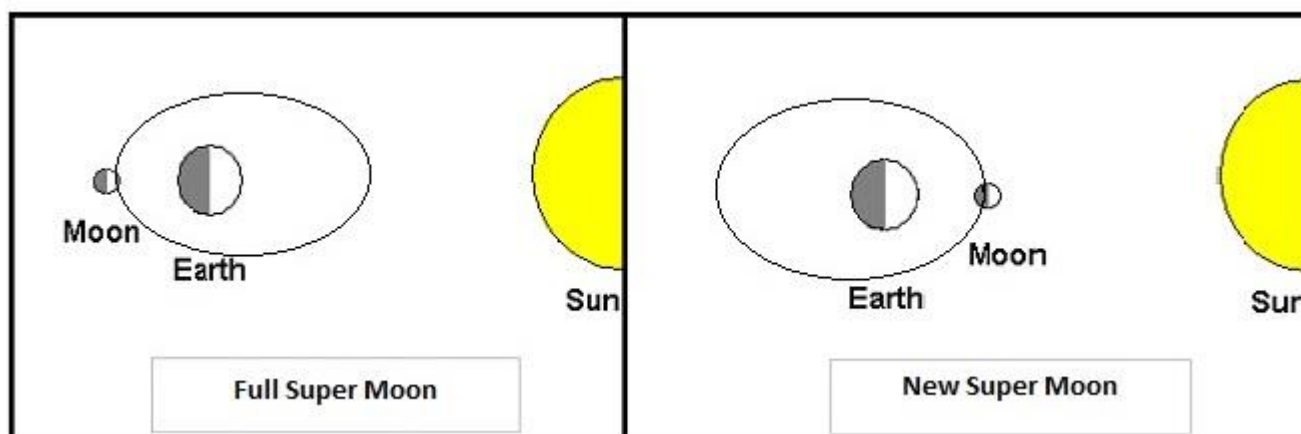
So, while astronomy enthusiasts detest the mob, and the lights and frenzy that come with them, a need to share our passion is secretly hidden and deeply rooted in our psyche. It’s a nearly tribal urge to share the visions and knowledge of the night sky with everyone. That’s the conundrum that results in “over-selling” the things we see and do. We create high expectations or misconceptions, which often leads to disappointment; and this, unfortunately, chases away the very people we’d hoped to attract.

In my opinion, astronomers should be more responsible and very measured when trying to “pump up the crowd” for an upcoming event. We should downplay (with rare exceptions) what we hope to see in the sky, or in an eyepiece, focusing instead on the questions we have, the answers we seek, and the ramifications of what we **actually** see in the telescope. Maybe that’s not quite as exciting as the science fiction claims, but what is lost in fleeting exuberance is more than made up for in long-term interest and understanding. I’ll gladly sacrifice crowd-size for real appreciation, any day – or night.

For the Fall Newsletter then, let’s look at a couple of the most egregiously over-hyped astronomy events and subjects. In the end, maybe we’ll reach a consensus, or at least come to an understanding, of what works best to advance this wonderful astronomy passion that we all want to share.

First up on my short-list of **“Subjects to Forget About...Forever”** is **“The Supermoon”**. This really is the posterchild of all made-up astronomical wonders or concerns. In fact, I don’t think I ever heard the term before the late 90’s or early 2000’s. I don’t know why this became such an issue, though I suspect that it came about as doom & gloom proponents were looking for the next **“boogey-man”** that could destroy the Earth. All types of calamity and imagined psychological effects are attributed to the Big-and-Bad-Moon...without any research or evidence, by the way. So, what is it, when is the next occurrence, and how should we deal with it...or, should we deal with it at all? I think you know my answer, but in the interest of consensus and inclusion, here’s what we know...

We all know that planets and moons orbit not in CIRCULAR but in ELLIPTICAL paths. Consequently, there’s a time during EACH monthly lunar orbit when our Moon is CLOSEST to and then FURTHEST from the Earth. Actual scientists call them **Lunar Perigee** and **Lunar Apogee** respectively. Then, when three astronomical bodies all line up (as in the images below) it’s called a **syzygy**. Combining the terms, a Full Moon at closest approach is called a **Perigee Syzygy** (a Moon-Earth-Sun alignment), while a New Moon at closest approach is also a Perigee Syzygy (an Earth-Moon-Sun alignment). In either case, a “MICROMoon” would be an **Apogee Syzygy** – when the moon is farthest away.



Pseudo-scientists refer to a FULL Moon at closest approach as a “Supermoon”. They have no name for a NEW Moon at closest approach, and that is our first clue that something is amiss in their universe. Let’s face it, when was the last time you were told that we were going to have a Supermoon during New Moon, or even at the First or Last Quarter Moon? You realize of course that there is a “super moon” every single month! And yet, if there were ever a time that we might worry about a Supermoon causing Earthly devastation, it would be during a New Supermoon. There is actual data about this event – it’s called **“Spring” or “King” Tides**. During New Moon, the gravitational forces of the Sun and Moon combine to give a very slightly greater effect than at other times.



The other thing to recognize about the supermoon is that it’s just a bit more than 5% larger than your run-of-the-mill regular full moon. In fact, there’s only about a 12% difference between a “MICROMoon” and a big ol’ “SUPERmoon”. Most people are hard-pressed to even notice the difference from month to month...it ain’t easy! There’s a more noticeable size appearance between the RISING full moon and a full moon that’s high overhead. And even this is an optical illusion, with no greater impact than the fictional supermoon.

Here's the final nail in the "Supermoon Coffin":

<u>2019 Full Moons</u>	<u>2019 New Moons</u>	<u>2019 Lunar Perigee (near)</u>	<u>2019 Lunar Apogee (far)</u>
Jan. 20, 8:30pm	Jan. 5, 6:29pm	Jan 21, 12:59pm	Jan 8, 9:28pm
Feb. 19, 8:55am	Feb. 4, 2:05pm	Feb. 19, 2:02am	Feb. 5, 2:28am
Mar. 20, 6:44pm	Mar. 6, 9:05am	Mar. 19, 12:47pm	Mar. 4, 4:26am
			Mar. 31, 5:13pm
Apr. 19, 4:13am	Apr. 5, 1:52am	Apr. 16, 3:04pm	Apr. 28, 11:19am
May 18, 2:12pm	May 4, 3:47pm	May 13, 2:52pm	May 26, 6:27am
Jun. 17, 1:32am	Jun. 3, 3:03am	Jun. 7, 4:15pm	Jun. 23, 12:49am
Jul. 16, 2:39pm	Jul. 2, 12:17pm	Jul. 4, 10:00pm	Jul. 20, 4:58pm
	Jul. 31, 8:13pm	Aug. 2, 12:11am	
Aug. 15, 5:30am	Aug. 30, 3:38am	Aug. 30, 8:53am	Aug. 17, 3:49am
Sep. 13, 9:34pm	Sep 28, 11:27am	Sep. 27, 7:24pm	Sep. 13, 6:32am
Oct. 13, 2:09pm	Oct. 27, 8:40pm	Oct. 26, 3:38am	Oct. 10, 11:28am
Nov. 12, 6:36am	Nov. 26, 8:07am	Nov. 23, 12:40am	Nov. 7, 1:35am
Dec. 11, 10:13pm	Dec. 25, 10:14pm	Dec. 18, 1:25pm	Dec. 4, 9:08pm

The chart above allows us to correlate all the 2019 full and new moons with lunar perigee and apogee. In fact, August, September, and October represent exactly my point...New Supermoons! We have already survived the first two. I think everyone should go out to see the last New Supermoon of 2019, on Saturday and Sunday, October 26 and 27. But, it's a new moon people – good luck with that!

Next up on my list of things to be brutally honest about are **Meteor Showers**. Don't get me wrong, I just love meteor showers! During the peak of a good shower I am often in the back yard, on a chaise lounge with a warm beverage, a red flashlight, and my stopwatch; truth be told, I'm out there during crappy showers too. I love these things, but remember, I rate high on the Chuck Dugan GF Scale. How high? Well, these are framed and mounted posters on my study wall:



I love meteor showers about as much as I do this 1950's sci-fi theme! Congrat's to Pete and the Kitt Peak Graphics Department. Still, it's time to fess up and be honest about these events.

Meteor showers are tough, guys. Unless you get the once-in-a-century “**Meteor Storm**”, with rates of hundreds per minute, the highest rated shower is about 120 streakers per hour...and that’s a smokin’ hot event! What this means is that between midnight and 3:00am, in perfect weather conditions, under perfectly dark skies, with no obstructions, no distractions, no moon, and a super-human eyeball that sees 360 degrees from horizon to horizon, you just might be able to see 2 meteors per minute...if they aren’t too faint. The AOC (Actual Observable Count) would likely be about 1 easy-to-see meteor every 2 or 3 minutes. Think of AOC as high IQ, and no common sense – you won’t score big numbers.

I bring up meteor showers because we are just now entering, what I consider to be, prime time, the crème-de-la-crème of the meteor season. The **Orionids of October**, the **Leonids of November**, and the **Geminids of December** are about as good as it gets. Still, I don’t overly emphasize the excellent peak rates – instead, I like to conduct comet-building demonstrations. In these events, I talk about the relationship between comets and meteors, and about the very real impacts that both have had on plants, animals, and the water on Earth. When done, with a bit of flair, it’s usually more than enough of an inducement to get a companion or two to help with your midnight meteor counting!

The moon is not treating our best showers with any respect this year, but below are the three prime meteor showers coming up for the remainder of 2019:

<u>NIGHT OF</u>	<u>SHOWER</u>	<u>PEAK RATE</u>	<u>MOON PHASE</u>
Monday, October 21/22	Orionids	30 – 40 per hour	Last Quarter
Sunday, November 17/18	Leonids	50 – 60 per hour	Last Quarter – 2 Days
Friday, December 13/14	Geminids	75 – 100 per hour	Full + 2 Days

My final pet peeve is **Binocular Observing**. Similar to meteor showers, I really don’t have any serious problem with using binoculars for astronomical purposes; I have several pair in different configurations. I just believe that we need to understand, and be honest about, what we’ll see with binoculars, at least compared to even a small telescope. This comes up, because I was just recently re-introduced to this question. A friend and client asked about getting some binoculars for a relative, and wouldn’t they be an acceptable way to start out with night sky viewing. I asked, “Do they REALLY want binoculars, or do they actually want a telescope?” Well, a telescope is more expensive, and binoculars might be a good introduction, was the thought. Okay...

Look, binoculars are great for viewing a number of night sky wonders. They’ll keep you busy for, well, maybe for hours! I peruse the binocular sections of the magazines and I’ve critiqued many binocular viewing guides in which “bino’s” are touted as a less-expensive portal to the universe, opening the doors to planets, stars, nebulae, and galaxies with wonderful... Stop the madness...PLEASE!

Binoculars are fine for viewing large and relatively bright objects. The Moon comes to mind...maybe even a Supermoon! Scanning the **Milky Way** for large star clusters is a great way to pass an hour at night. A dozen or so **Open Clusters** (M11, M44, and M45 are excellent examples) are within your easy grasp. Hopefully you’ll come across the **Orion Nebula, M42**, because it’s the one excellent nebula for binoculars. You want globulars and galaxies? There are two...TWO! **Andromeda (M31)** may be the quintessential binocular object because of its sheer size in the sky. The other is **Omega Centaurus**, and that is only visible from deep in the southern U.S. and only during late May to early July. The only planets that are suited for binoculars are Jupiter, because of it’s **Galilean Moons**, and Earth, because you can use your binoculars for BIRDWATCHING!



Here are a few of the best objects you can see with binoculars. On the left is the summertime Milky Way as seen from Kitt Peak National Observatory west of Tucson. The size and brightness of our home galaxy is beautifully enhanced by the wide field and low power of good binoculars. At center is the Orion Nebula, M42, the best stellar nursery in the sky, by Reid Susmark. And then, on the far right we have...yes, BIRDS!

Yes, absolutely, you may be able to SEE many objects in a good pair of binoculars; but being able to appreciate the detail and beauty of most of these wonders requires a bit more. And then, in about a month, the new observer who wants more, catches a nasty case of **“aperture fever”**. For new and committed observers, it’s a very contagious disorder that is only cured by a new telescope! I’m not going to go through all the benefits of binoculars here – we’ve done that in other issues. But let me recommend that if you’re trying to find out if someone really WANTS a telescope, purchase a relatively inexpensive but useful pair of binoculars. In short order you’ll know if astronomy was a fleeting fancy, or if you’ve created a budding new, passionate astronomer, like many of us. In either case, you will not have wasted a lot of money – the binoculars will always be there to work with a new telescope!

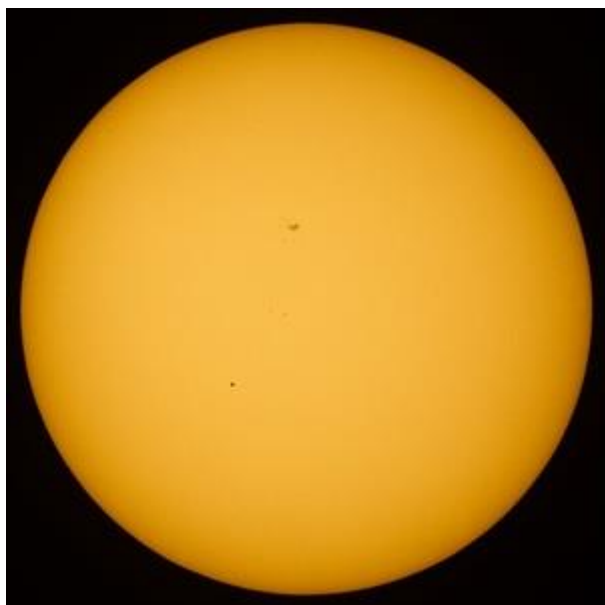
If you’d like to know more about these subjects, check out these past issues of my newsletter, or send me an email, and I’ll forward a copy to you:

For the SuperMoon :	“Lunar Legends, Lies, and Lore”,	Fall, 2015	Issue #40
For Meteor Showers:	“Autumn Showers”	Fall, 2013	Issue #33
For Binocular Observing:	“Double Down – Binocular Astronomy”	Fall, 2010	Issue #22
And:	“Chuck’s Top 10 List”	Spring, 2015	Issue #38

We’ll end the newsletter with some upcoming events that don’t need to be overly hyped! The first, as I mentioned earlier, is **International Observe the Moon Night**. This has been held every fall for about the last 10 years, and it is now presented near the first quarter moon. The half phases – first and third quarter – are the best time for lunar observing. The long shadows created in these Sun, Earth, Moon configurations are what gives the moon its best 3-D appearance; the contrast between sunlight and darkness brings the craters, mountains, and gently rolling plains into stark relief. I held a “prequel” on October 4, 2019 at Donaldson Elementary in Tucson for about 120 students, siblings, and parents, and the moon was at her very best. And, on **Saturday, October 5th**, I’ll have “Gal”, my 6” LX75 set up out front of my house for anyone to drop by and get great views of the moon, Jupiter, and Saturn. Looks like a great night. Email me and I’ll forward directions – or, you can log into the IOMN website and find my event registered to get the address and phone number.

Next up is my free **“7th Annual Nearly Halloween Star Party”** – also held at my home. This one is a big event with several hosted telescopes giving great views and commentary. Come by to meet “Sue”, “Gal”, “Dobby”, and even the big girl, “Fay”; they’ll all be there to show off a beautiful fall night sky.

And then there’s **Mercury** – the diminutive one gets no press at all. On Veteran’s Day, November 11, the tiny messenger god will **transit** across the disk of the Sun. Only two planets can actually make this journey as seen from Earth, Venus and Mercury, as they orbit closer to the Sun. The next Venus transit won’t come around for about 100 years, but Mercury transits are a bit more frequent. However, because of transit timing, if you miss it this time, you won’t see this happen from the United States until 2049! It’s not easy to catch this event – Mercury is really tiny – and you need special solar-viewing filters. I do plan to host an event for this transit, but details are still not final. I’ll send an update when I know where we’ll be, but the time though has already been cosmically set. We’ll catch the transit from Tucson after sunrise when it is already in progress. It will last until a bit after 11am.



A Mercury transit is a tough critter to catch, even when the skies are clear. At left is a nice, yellow-filtered, image from the last time this happened. Take a look, and then look again – that is NOT Mercury at the upper center of the solar disk! It’s a sunspot, which is actually LARGER than the tiny planet. Look below the sunspot, toward the 7am position, and about half-way to the Sun’s edge; that tiny, sharply defined, round speck is Mercury.

Finally, I’ll be taking on a couple new teacher partners for **Project ASTRO** again this year. Our 2-day seminar is set for **October 18 and 19**, and during that time we’ll once again visit the **Kitt Peak National Observatory** – one of my favorite places on Earth. If anyone would like to be more involved in Astronomy, this is a great way to make your activities and relationships more formal. Just let me know, and I can forward you all the contact info you need. Or, if you’d just like to help me out with my school programs and activities, I can always use some good assistants!

Keep in touch, people. If you have any comments, questions, suggestions, or even complaints, please don’t hesitate to email, or call me. It’s always great to hear from my newsletter readers.

Keeping Busy Until the Winter Newsletter!
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