

The Terror!

Fall 2023

The news seemed to spread from Asia. Was it first heard in Korea? Or, no, the news of global calamity was spreading from China – that could be the epicenter; that was where it was first spotted! However, or wherever it had started, the terrible news was now racing across the globe. Civilization itself was at risk, and it became obvious that every single life on the planet may be snuffed out.

Had it just been religious fanaticism or eccentric political leaders, we could possibly have passed it off as just over-the-top fear of the unknown. However, there was also a cadre of respected scientists, those who were researching, checking, and supporting the “facts”. They told us that this had been predicted... it was bound to happen. And then, there was the press! The stories in the news and in print made it nearly impossible NOT to believe everything that was going on. Finally, here came the hucksters, those that were spreading misinformation, and cashing in with “protective” pills they knew would not work, and masks that had never been tested and could not guarantee survival. The world had gone berserk. And then, the other shoe dropped...

The British Monarch passed away in bed. Was this the first “western” victim? Political leaders were going into hiding. Teachers – at least those that had not cancelled their classes – were spreading the fear, telling their students that the end had come. Was this to be how humanity would meet its end? The date was May 18, 1910.

Scary, right? Maybe even more so because it seems so VERY familiar. Somehow, it feels like we’ve been there and done that. Yes, the threat was different, but the world-wide reaction was nearly the same...perhaps we really haven’t learned our lessons that well.



The 1910 apparition of *Halley's Comet* sent shockwaves across the globe. Astronomers had known of its arrival date for decades. Additionally, the world had only 4 months earlier witnessed the truly spectacular “*Daylight Comet*” which at magnitude -5.0, was visible to the naked eye in broad daylight! But *Halley's* was different, it would get close...very close, and many people around the world, still believed comets to be bad omens, or flat-out evil. Then, French astronomer *Camille Flammarion*, noted that the Earth *might* pass through the comet's tail which *could* be made up of “cyanogen gas”, which *could* “impregnate the atmosphere, and *might* snuff out all human life.” And so, the game was afoot...

Well, as “*Star Trek – Enterprise*” notes, “We’ve come a long way”...at least as far as comets are concerned! Today, far from being cast as one of the “*Four Horsemen of the Apocalypse*”, we think comets may have delivered primordial Earth’s water supply. They may even have seeded the planet with the organic material that led to the development of life on Earth. That’s quite a turnaround, eh? In fact, the jury is still out on just how much Earthly benefit we may owe to comets, but right now we may be on the very precipice of finding some of these answers. So, let’s review comets in the news!

First, I want to let you know that there is still a comet in the early morning sky, right now. **Comet Nishimura** will only be seen to Northern Hemisphere observers until September 16th. Then, it will move into the glow of the sun, and not return for another 435 years.



You only have a couple days to sneak a peek at Nishimura. I’m sorry, that’s bad on me, but in my defense, it wasn’t even discovered until August 12, and honestly it has still not brightened to naked-eye visibility.

Still, if you want to snag it in a small telescope or even a pair of binoculars, you should stalk the early morning skies, just before the Sun rises. Concentrate on the constellation of *Leo the Lion* and try to catch the comet near the lion’s tail.

Okay, so I didn’t give you enough notice to get a visually aided look at Nishimura before 2460, but there’s another comet “on the horizon”, so to speak.

Comet C/2023 A3, also known as **Comet Tsuchinshan-ATLAS** will start the hype all over again about this time in 2024. I say “hype”, because nobody – scientists, explorers, palm readers – really, folks, I mean NO-body knows what a comet will do when it finally reaches our Earthly confines. There are clues, but as I always say, “comets are like cats, they have tails, and they do EXACTLY what they want, WHEN they want to do it.” Predicting the next “comet of the millennium” is a fool’s errand. Do you remember **Kohoutek**? No, nobody does. Even I can’t remember it, and I wrote a paper for the **Kitt Peak** director at the time it arrived in 1973. It was considered one of the biggest duds in astronomy.

Kohoutek, though, was only “one” of the biggest duds...can you say **ISON**? Sure, sure you can. In 2013, many astronomers, completely ignoring Kohoutek’s cautionary tale, floated estimates that ISON may get “as bright as the full moon!” Ooooh, baby – that’s like walking out to the end of a 10-foot plank. Nothing good can come from such predictions; and it didn’t. ISON, a “**sun grazing comet**” never reached naked-eye visibility, and, like Icarus, it did not survive its close encounter with the Sun. In late November 2013, I was one of the Kitt Peak employees shepherding the press around the Mountain at night, waiting for ISON to reappear from its close pass around Sol. Instead, the comet disintegrated into a cloud of pixie dust, dashing dreams all over the world...well, at least for those on the Mountain.

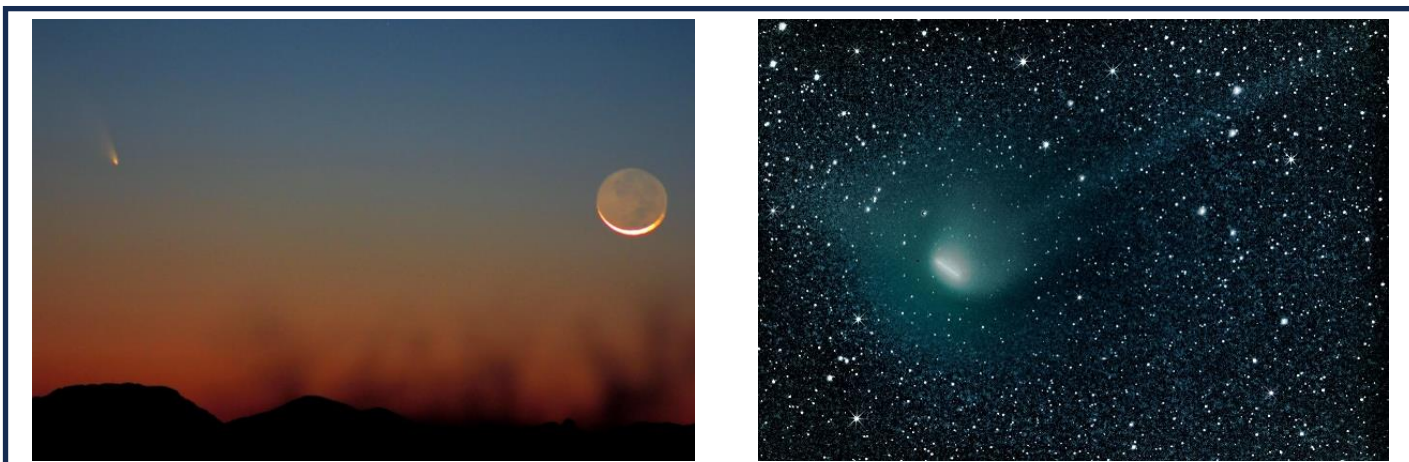
There are others, but understand that comets UNDERwhelm, far more than they OVERwhelm. Most comets fizzle – they don’t sizzle. Remember this when the next “comet of the century” comes to town.

Now, that is not to say that comets can’t be spectacular and very interesting. Comets such as Halley in 1986, and **Hale-Bopp** in 1997 thrilled the public. They offered incredible night-time views for many months as they made their trek through the inner solar system.



Comet Halley (left) seen here during its 1986 apparition, returns every 76 years, and is considered a “short period comet”. Comet McNaught (center) put on a spectacular show for observers in the southern hemisphere during its 2007 display. McNaught is a “non-periodic” comet, which means this was likely its first and only trip to the inner solar system. Comet Hale-Bopp (right) on the other hand is classified as a “long period” comet, those with orbits of over 200 years. While Hale-Bopp may well return for another big show, estimates of its orbit show it won’t be back for about 4200 years.

Comets can also be a challenge to Astro-photographers – particularly comets that aren’t “super-bright”. These wayward visitors move through our skies without really following the “rules” very well (again, cats come to mind). A comet’s path can be difficult to track, and photographers often have to “stack” images to “fix them” against the starry background. Here is an example from my own images.



At left is my 2013 image of *Pan-STARRS* and the crescent Moon. The comet was bright enough to capture in the western sky near sunset. The “earth-shine” on the Moon shows good detail, and the comet’s tail is just coming out. But, look at the bushes! My camera wasn’t fast enough to stop their motion in the breeze. At right though, I have a different problem. Fellow astronomer Kevin Bays and I snagged Comet ZTF (also known as “*The Green Comet*” from my home in February 2023. The weirdly straight, elongated green nucleus against the sharp background shows the comet moves differently than the stars. To improve the image, I could have used multiple, faster, stacked images to freeze the motion of comet and stars in my final, processed image. But, I’ll take the camera shot!

The last “comet” on our agenda is less about “seeing”, and more about “knowing”. Launched in September 2016, the **OSIRIS-REx** probe spent years making its way to a good-sized asteroid **Bennu**. Bennu is not “technically” a comet, but some dead comets, those which have lost all their volatile gases, look like, and may in fact become a type of asteroid. Once the probe reached Bennu, it landed and

scooped up a small sample of “asteroid material”. OSIRIS-REx is now returning that precious cargo to Earth, in a kind of “relay-material-dump” scheduled for September 24. If all goes well, scientists the world over will have about 2-ounces of primordial material to study. The Bennu material will actually become the rarest minerals on Earth, just as soon as it gets here. Truthfully, its value is inestimable to the scientists waiting to study it. Keep your eyes on the news this September 24th!

Finally, before a quick run through of our Fall skies, here’s some “comet trivia”. Not all comets have names – some just have numerical designations. I’m sure that everyone just really wants to, has to, just gotta know how to translate those numerical ID’s. Well, here it is:

After 1994, the **International Astronomical Union (IAU)** began applying official designations to comets in a way that was “easier” to understand. First, there is an alphabetic character followed by a slash. This character indicates the TYPE of comet.

If it’s “P/” that means a **SHORT-PERIOD** comet; one with an orbit of 200 years or less.

If it’s “C/” that indicates a **NON-PERIODIC** (no known orbit), or **LONG-PERIOD** comet (an orbit of more than 200 years). I don’t know why it’s not “N/” and “L/”; That’s just part of the “**Pluto Demotion People**” making comet names “easy”, I guess.

There are other letters to start a comet name, but these suffice for us, and I’ll let you do your own research if you want to know more.

After the “letter-slash” combination, (and this is the easy part) there is a YEAR of discovery.

For Nishimura, we’re up to C/2023.

Then things get strange – not really stone-cold-nutso’s, but just a bit odd. After the YEAR, there is a “space” followed by another LETTER. That letter designates in which half of which month the comet was discovered. Now, follow me here. The letter “A” means the FIRST HALF of JANUARY. If the comet was discovered in the SECOND HALF of JANUARY, it would get the letter “B”. For those months that have 31 days, I have absolutely no idea if “the middle day #16” goes in the first or second half.

The first half of February gets “C”, while the second half of February gets the letter “D”. And so on.

So, Nishimura has a “P”, and that means...uh, I’ll get it, um, ooh, ooh, “P” means the second half of August! But that’s odd...Nishimura was discovered on August 12, which is definitely in the FIRST half of August. Why is it designated with a “P”?? Again, I have no CLUE, but it may have something to do with NOT using an “I” or an “O”. If that’s true, why use either one? If you find out why, let me know!

Finally, after the half-month designator, there’s another number. That number represents how many comets have been discovered to that point during that half-month. Nishimura was the 1st comet discovered in the “P-half-month”, so it’s full IAU designation is: **C/2023 P1**

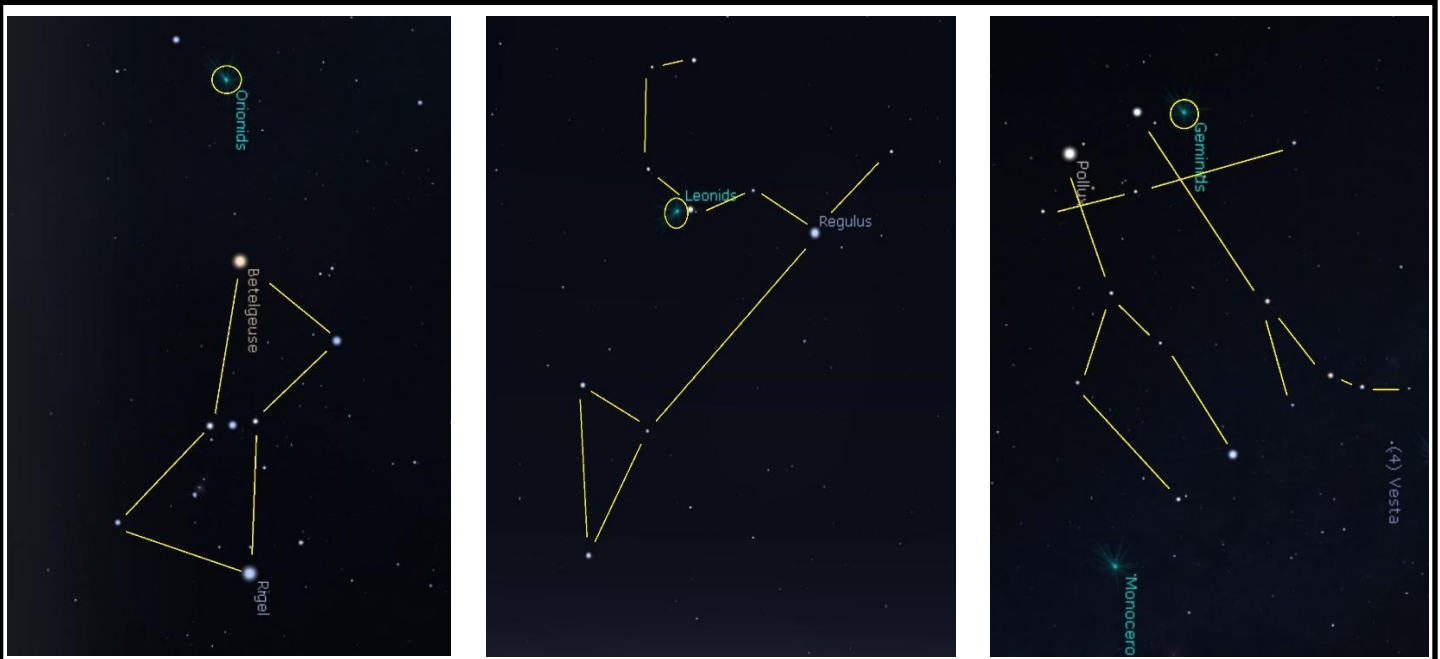
So, there you go...easy peasy (really?!). And, with that out of the way, we’re on to the Fall Night Sky!

Fall is when we get some of our very best meteor shower displays; and Fall 2023 should not disappoint. October 21/22 brings the **Orionid Shower** right at first-quarter Moon. From 12midnight until sunrise is your best time to catch these as they radiate out from just above **Betelgeuse**. Meteor showers are related to comets – they are the “trail of disintegrating material” left behind in the comet’s orbit. So, comets are cosmic litter-bugs. The Orionids are the left-overs from Halley’s Comet.

November brings us one of my favorite displays...the **Leonids**, on the night of November 17-18. Borne of **Comet Tempel-Tuttle**, the Leonids have occasionally exploded in a “**Meteor Storm**” with thousands

visible every hour. This year, no such massive display is expected, but with little impact from a 4-day-old Moon, look for about 10 to 20 meteors per hour radiating out from Leo the Lion.

Finally, the night of December 13/14 brings an impressive show from the **Geminid Shower**. Geminids are unique in that they are not cometary leftovers – it appears that this shower originates from an asteroid designated **3200 Phaethon**. This may in fact be additional confirmation of the comet-asteroid transition, but in any case, this year the Geminids should definitely get top billing. Peaking at only one day after new Moon, there will be no lunar interference. Radiating out from a point near **Castor** in the constellation of **Gemini**, it may be possible to snag more than 100 meteors per hour – a great show!



For amateur astronomers, meteor showers are about as much fun as you can have without batteries. You just need eyeballs! First, find the appropriate constellation – usually the best viewing is after midnight, but sometimes you get lucky, earlier. Then, watch all around the sky from the shower’s “*radiant*”. In the image at left, use a line from *Rigel* through *Betelgeuse* to find the radiant for the Orionids. At center, you can see that the Leonids radiate out from a point just behind the Lion’s mane. Finally, at right, the Geminids of December radiate out from a point next to the “head” of the twin Castor. Grab a lounge chair, a warm beverage of your choice, and enjoy the show!

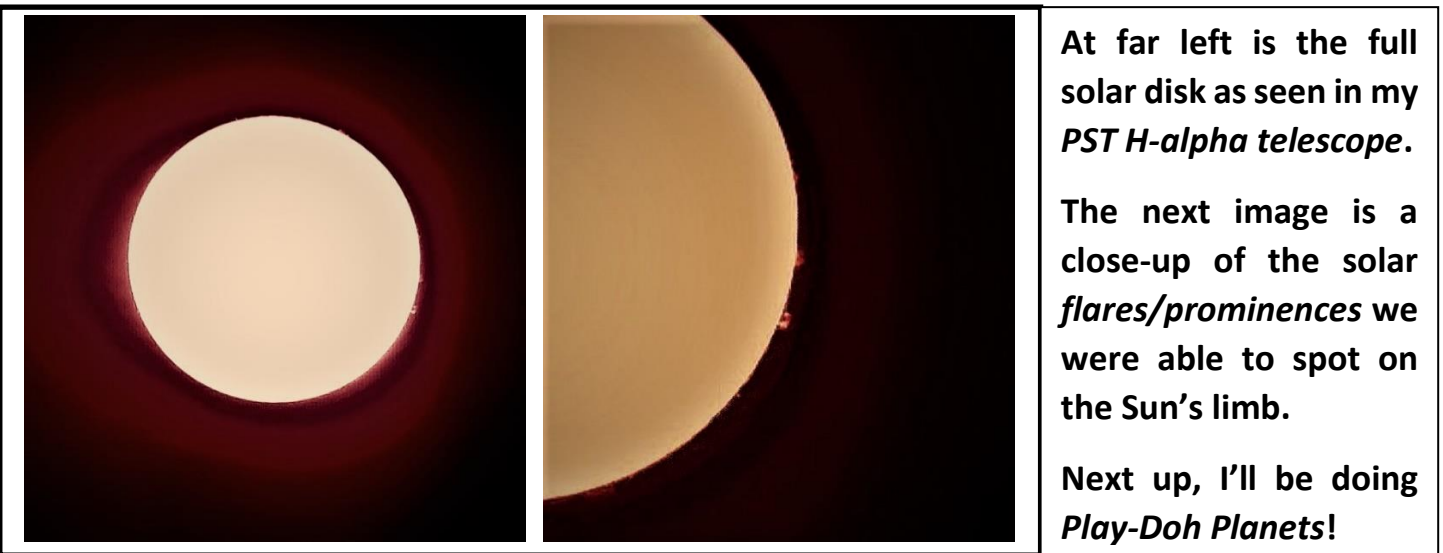
Now, meteor showers and comets aren’t even half of the eye-candy we have in the sky this fall! The Fall 2023 Planetary Parade has already started. **Saturn** reached opposition at the end of August, so it is in the sky for great views from sunset to sunrise. Find it now low over the eastern horizon just as the sun sets in the west. **Neptune** will also join the “ringed wonder” as September draws to a close. In early November, **Jupiter** too reaches opposition, joined two weeks later by **Uranus**. That means all four “**gas giants**” will be over the eastern horizon starting in November. Time to get the telescope out!

Adding to the fall excitement, Saturday, October 14th brings the “**Ring of Fire**” **Solar Eclipse** to the Four Corners and central New Mexico region. Here in Tucson, we’ll experience a terrific “**partial solar eclipse**”, with about 80% of the Sun’s face covered by the Moon. I hope to be setting up at Silverbell/Crossroads Park near my house for public viewing. The eclipse begins just after 8am, with max eclipse at about 9:30am. The entire show ends just after 11:00am local time. I’ll try to send out a notice of my public program in case anyone would like to stop by for a quick look!

And here are a few more dates to put on your **AAAZ calendar** (that reminds me – more at the end of this newsletter.) September 22 is **International Astronomy Day**. There are usually astronomy events set up all over the country in celebration of this bi-annual event.

October 21 is not just the peak of the Orionid Meteor Shower, it's also **International Observe the Moon Night (IOMN)**. I am trying to put a program together to live stream Lunar Imaging as part of this program with the group from **The Smithsonian**. This night also happens to be the night of my **Annual AAAZ Free Star Party**. I don't know if this is just going to be a very busy and special night, or if everything is just going to go crazy and blow up in my face! I'll keep everyone posted.

And finally, school has started up again this year. I already have 5 teachers that I am supporting with astronomy programs at **Twin Peaks**. Last week, we started them off with Solar Observing. Maybe not the smartest decision ever...it was 105 degrees out there. Each of the five classes came out for about 40 minutes of viewing. That means I was out there for a very challenging 6 hours! On the other hand, I think – according to the teacher responses – that it was a successful day. Here are a couple images from that day, using my **C8 Visual Telescope**, and my slaved **Coronado PST**:



If I can be of assistance with any of your own class or club programs, just give me a call or send me an email. I also wanted to let you all know that I have collected enough images to start putting together my **Astronomy Adventures AZ 2024 Calendar**. I can hear the enthusiasm, already! I'm hoping to have it ready to ship by mid-November – just in case anyone wants a dozen or so for Christmas gifts. The calendar will sell for \$24.95 this year. Let me know if you want to get on the 2024 calendar list.

Have a Great Fall Everyone!



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