Surprising New Meteor Shower

By Clark M. Thomas

Abstract

The night after this Memorial Day 2022 treated curious stargazers in Virginia to a new, surprisingly odd meteor shower. Billed as an either/or event, and possibly a storm, it turned out to be unlike any other cascade that I have witnessed over many decades of looking up. This observer's essay covers its cometary origin; what we in Virginia saw and did not see; and my analysis of why it all appeared so unusual even to experienced stargazers.

Sometimes the "sky gods" smile at mortals who behold their heavens. We in Virginia recently were tormented by a full lunar eclipse when the night was cloudy, while both nights before and after were clear. Fortunately, the seeing after Memorial Day in Roanoke was fine for viewing anything, with a new moon.

Here below is the origin story for what was seen during the very first appearance of what is called the tau Herculids. After the event arrived, it was more like a Boötes meteor shower "centered" near bright Arcturus which anchors Boötes:

Before the Meteors Arrived

> "The comet, officially known as 73P/Schwassmann-Wachmann, or SW3, was discovered in 1930 by German observers Arnold Schwassmann and Arno Arthur Wachman. It wasn't spotted again until the late 1970s, and in the 1990s the comet shattered into several pieces, NASA said.
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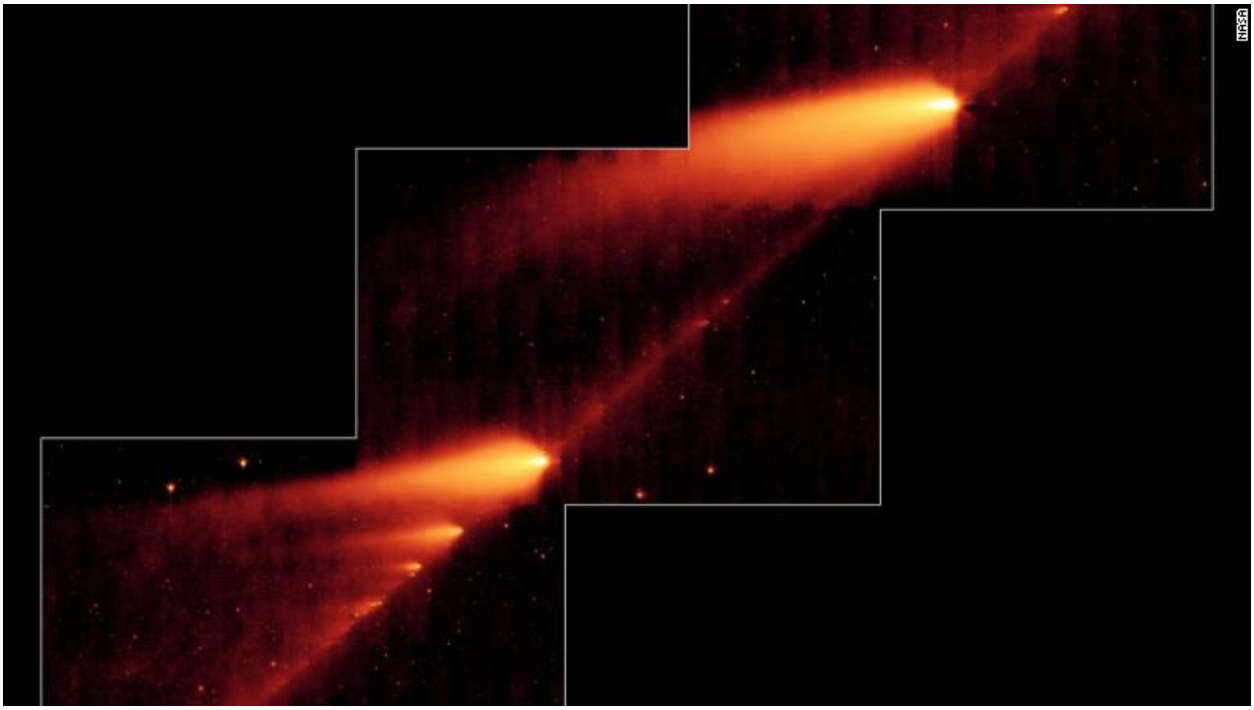
> "By the time SW3 passed Earth again in 2006, it was in nearly 70 pieces, and has continued to fragment further since then, the statement said. It was unclear whether the debris would strike Earth's atmosphere at a high enough velocity to cause a meteor shower."

This quote above is part of what was reported just after the event came and quickly vanished. Also in the source above is a NASA-provided Spitzer Space Telescope infrared image of the particulate disintegration a few years ago of comet SW3:



What We Saw, But Hardly Perceived

The viewing site I chose was also the site chosen by a dozen other people. There is a parking area close to Roanoke County's Explore Park, with no nearby hills or obstructions. What keeps this site from being generally ideal is the northwestern light dome from Roanoke City. Fortunately, this light pollution affecting a third of the sky did not diminish viewing of bright meteors and bolides, which mostly flashed from the South and Southwest, and even the North. Only the many very faint meteors were washed out everywhere, but that is not what most of us were looking for.

Typical meteor showers seem to radiate from one constellation. This one did not seem to radiate at all, and no faint meteors were visible. Perhaps others at truly dark sites got the "full show."

What we did see were a few very brief bolides, and only two seemed to leave a visible trail. Perhaps viewers from very dark sites saw more trails. A classic bolide is a very bright meteor that typically persists at altitude for several seconds, leaving a faint contrail. Occasionally a bolide also produces sound we can hear.

There are also rare events, such as the rocky fireball that flew at a glancing angle over the city of Chelyabinsk in Russia. (It was well photographed, because drivers have constantly running video cameras in their vehicles to discourage slick criminals from fake collisions.) This random rock had sufficient mass to flash brighter than the sun when it hit our atmosphere at a low angle. It also produced a mighty shock wave that smashed many windows below. I have examined a fragment of a fragment that made it to ground, and it is dark rock. In contrast, some meteors are more metallic and cohesive. Large objects sometimes impact our blue planet's surface, most often plunging into the oceans.

I have been outside doing astronomy many times over several decades. Even on "ordinary" nights without a scheduled shower a few random meteors may flash overhead. Most of these arrive at

high velocity, and rarely have a faint streak for a second or two. These random meteors behave as if they were in a common meteor shower. Using Newton's classic formula of **F=ma** (Force equals mass times acceleration), a fast moving anything hits the atmosphere with much more kinetic force than something arriving at "just" ten miles per second. The tau Herculids intersected Earth's orbital space to where particles (if any) would arrive possibly slow enough to hit our atmosphere, and not even flash.

We did see some flashes during the two hours I was there. However, the flashes we saw were SURPRISING in that they did not appear to radiate and leave faint trails, with two exceptions. They were all brief and very bright: I estimate flashes were at least two magnitudes brighter than Venus. We heard no bangs.

Another surprising element is that most of what we saw appeared just a few degrees above the horizon, mostly below twenty degrees. That is in part because one looks through a greater area of dense sky, versus looking nearly overhead at Hercules and Boötes. Of course, a few flashes occurred at higher angles. Our distribution experience was thereby a combination of clear skies with distant seeing, and denser air closer to Earth's surface. Toss in relatively slower rocky fragments, and the physics formula for our show was complete.

In other words, the main reason for nearly all seeming to flash briefly and virtually horizontally just above our local horizon was simple: Meteors can burn when they push against atmospheric molecules, similar to what happens at the bases of returning astronaut capsules. Meteors from most showers arrive with much higher velocities and force per given mass. High velocity and force can offset lower atmospheric density at altitude. Molecular pushback can, through pressure, not just friction, ignite tiny rocks with different speeds at different levels of our atmosphere.

What is going on for any observer involves 3D perspective: When a typical meteor shower seemingly arrives from a radiant constellation reference area its individual flashes appear to

radiate like spokes on a bicycle. The tau Herculids were different: They were arriving so slowly, as if we were more inside the flow all around us, than looking out at rapid incoming. This all is explained by very simple physics of 4D relative perception.

Regarding individual flashes, most of them appeared singular, but a very few had two linear flashes a second or two apart. That duality was likely not two parallel and juxtaposed meteors. It was more likely the partial, then total, flashing of sections of irregular mass shapes. To our eyes this was quite surprising, because "regular" meteors arriving at high speed appear quite different, be they scheduled or random.

Another perspective clue was how these very bright flashes (mostly yellow) appeared from multiple directions. This odd distribution for our eyes could be a scattering – but it could also be partly from the effect of Earth's "push/shadow gravity well" bending the path of slow pieces with less kinetic energy.

The Bottom Line:

Random flashing meteors arrive all the time, and we miss nearly all that arrive. Chelyabinsk's one large rock arrived by chance at day and flashed as a strong fireball brighter than the sun. Micro meteor showers are random, as I have observed them on just a few occasions over decades of skygazing. Named meteor showers can be fun, varying in quality each year.

You will never see any "fireflies from space" if you don't go out yourself. No fancy equipment is needed, just your eyes and good seeing, plus a reclining lawn chair. The next impressive meteor shower this year will be the reliable Perseids in August; however a full moon will interfere. Here is one annual guide.

An ironic footnote: While we were watching these few space fireflies, real flying insect fireflies were busy looking for love just a few feet above the grassy part of our viewing area.