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How to Find a Comet

By Carol Scott-Conner

Comets have always fascinated me. They are governed by the strict laws of orbital mechanics, yet in some ways are said to be as unpredictable as cats. Halley's Comet is a prime example. My grandmother had seen it in 1910 when its tail stretched all the way across the sky and people were afraid the cyanogen gas in that tail would poison the Earth's atmosphere. We both assumed that when it returned, it would be a truly spectacular sight.
By 1986, when Halley's Comet finally returned, I was a junior surgeon on the faculty of Marshall University College of Medicine in Huntington, West Virginia. It was my first job out of general surgery residency. We lived about seven miles out in the country, and the skies were darker. At its most visible, the comet was a fuzzy white patch. It didn't have a spectacular long tail. You could barely see it with your naked eye, and then only if you had already found it with binoculars. Truly as unpredictable as a cat — it had arrived right on time but did not deign to show its full glory.

The ancients believed that comets were omens. The long-anticipated return of Halley's Comet, even if it was visually a bust, coincided with a year of transition for me. I had just attained promotion to Associate Professor when my department went through a cataclysmic meltdown. I was actively looking for another job.

There were, in those days, perhaps five or ten legendary surgeons, all men, who had built departments of surgery of such prominence that they themselves were larger than life. To train under, or work for, such a luminary was to associate yourself with greatness. They were like stars, burning with their own raging internal nuclear fire, and they retained their brilliance for decades. Some, like a star gone nova, incinerated anyone who dared to get too close. But others benignly allowed a young surgeon to swing into their orbit, pass close, and then move back out into the greater darkness.

I was an anomaly; a young woman finding my way as an academic surgeon. My next job, wherever it might take me, had to bring me into the orbit of a benign surgical star. A star who could help shape my career and, by allowing me to slingshot around him, give that additional momentum I needed.

James D. Hardy MD, chair at the University of Mississippi, was such a star – one who measured his success by the number of academic surgeons he nurtured. He had a job opening for a surgeon like me. I sent him my resume and, in due course, flew down to Jackson for a job interview. I did not realize, until many years later, that Dr. Hardy had four children, all girls, each destined for an accomplished career. Those young women surely molded his receptiveness to a young female surgeon like myself.

Interviews for jobs such as these typically stretch over two days and are true tests of

endurance. After the first intensive day of meetings, Dr. Hardy drove me to his home so that we could pick up Mrs. Hardy and go to a local restaurant for dinner.

In a nervous attempt to make conversation, I said I had seen Halley's Comet – had he seen it? No, he had not. He was probably in his late sixties by then. Suddenly his voice sounded young. Had he also been waiting all his life for this legendary comet? I needed to show it to him.

At his home, we collected Mrs. Hardy and a large pair of binoculars. We stood in the street in front of his house so we could all see the comet. It was, by then, deep winter and even Jackson, Mississippi was chilly. I was totally disoriented. Several weeks had passed since I last glimpsed that fuzz ball, and from what I had heard, it had not become any more spectacular or easier to spot. Moreover, it would have moved against the background of the stars. I had no idea where it was but sincerely hoped it would be somewhere close to where I had seen it before.

I scanned the sky to get my bearings. It was a beautiful deep black, surprisingly full of stars for a suburban environment, and the moon wasn't up yet. Good conditions. But the skies seemed completely alien. It was as if I had dropped out of warp into a different quadrant of the galaxy. The pressure was on. I had to remind myself that the latitude was not different enough to affect the constellations. Calm down, calm down, I told myself. Same sky, no sweat.

I was determined not to ask which way was north. North Star, I kept telling myself, Polaris, North Star. Just find the North Star. What kind of stargazer can't find the North Star?

Yes, there was Ursa Minor and good old Polaris. I steadied myself and then the sky clicked into familiarity around me. I found Cassiopeia and the familiar constellations. Somewhere a dog barked. It was seriously cold and I was lightly dressed. Dr. Hardy acted like he had all the time in the world – was this a test? The long day of grueling interviews had convinced me – I wanted this job *so bad*. I *had* to get this job. If this was a test, I was going to ace it.

Pointing myself toward where I had last seen the comet, I leaned my body against the side of his car, laid my upper arms out in front of me along the roof and formed a tripod of my forearms to stabilize the heavy binoculars. The steel was cold against my light clothes, and I wondered if I would get my dress dirty. I systematically scanned the most likely region of the sky and tried not to shiver.

Scanning with binoculars can be hard; the field of view is so small that you must be disciplined and systematic, and scan with overlapping fields, or you will miss something. I tried to ignore Dr. Hardy, who was almost dancing with eagerness at my left shoulder. I refused to think about how desperately I wanted this job, about how much appeared to hang upon my astronomical skills. Suddenly a familiar fuzzy patch came into view.

"It's right here," I said happily. I held the binoculars fixed on the target and moved my head away so he could look. Even then, it took us a couple of tries. And then he helped Mrs. Hardy see it, and then we got into the car and went to dinner.

I got the job.

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After nine years at the University of Mississippi, I left for the University of Iowa, where I was busier than ever as Professor and Head of the Department of Surgery. I was, at that time, the second woman to attain such an academic position in the United States.

Comets came and went, but none were potentially visible in the Midwest until early 2013, when comet Pan-STARRS swung in its inexorable orbit closer and closer to the sun. It was still visible only through a powerful telescope, when the radiologists found a fuzzy white patch on my routine mammogram. I remember watching the screen as the radiologist, a close colleague, performed a focused ultrasound examination. The lump had a strange kind of beauty – irregular, dense and almost sparkling with internal calcifications. It also had all of the characteristics of cancer. I could feel the ultrasound transducer sliding over a lump. I should have been able to feel it. When was the last time I had examined my own breasts?

A biopsy led to my own diagnosis of early-stage breast cancer. Ironically, after a lifetime as an academic general surgeon, my own surgical practice had narrowed to almost exclusively breast patients.

Early-stage breast cancer, like mine, can be appropriately treated by lumpectomy and radiation (which saves the breast) or mastectomy (which involves its complete removal). Like most female surgeons, I had faced the personal 'what if' of breast cancer and knew that, given a choice between lumpectomy and mastectomy, I would choose the latter. Sometimes patients would ask me what I, myself, would choose, and I always deflected the question. It was not about me; it was about them. Until, suddenly, it was just that. It was about me.

My team fast-tracked me to my favorite junior surgeon, who concurred with my desire for a mastectomy. The anesthesiologist, a former thoracic surgeon who did primarily pediatric anesthesia, sang softly, "Go to sleep, little patient…" as he pushed the propofol.

After surgery, there were several weeks of uncertainty while I awaited the results of tests. I flew to Amelia Island, Florida, for a surgical meeting, and waited for the results of the specialized studies that would determine if I needed chemotherapy or not. Comet Pan-STARRS was now said to be just barely visible to the naked eye, near the crescent moon immediately after sunset.

By then, I was cynical enough about comets not to consider a successful sighting a good omen. But one clear evening, while the other surgeons gathered for drinks at the pre-banquet reception, I went out on the adjoining patio and watched the waning light of the western sky fade into a gorgeous pale luminous yellow. It became darker and darker, but the sky remained suffused with the delicate color of a seashell.

The closer a comet gets to the sun, the brighter and easier it is to see, but the sun's light washes out any hope of casual observation. Your best chance to see a comet is when it is still

in the night sky. Comet Pan-STARRS was so faint that it could only be seen in those liminal moments right after the sun set but before the comet followed it below the horizon.

The crescent moon hung low in the tree branches. The comet would be even lower, where the trees were thicker, and the sky retained its glow. I heard the gentle voices of staff coming and going from a service entrance below me. The moon sank closer to the horizon.

I lingered after all hope was gone, perhaps self-conscious about my flat left chest where my surgeon had taken the cancer, perhaps simply loathe to leave the quiet balmy night. After an hour, I gave up and returned to the glittering chatter of the banquet.

Comet Pan-STARRS is a nonperiodic comet and will probably never return to our solar system. I never did see it during this transit, but the news about my cancer, when it came, was good news. And like Pan-STARRS, my cancer has not returned.

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In early 2015, Comet Lovejoy, a long-period comet, made its once in 8000 years visit and became visible at our latitude. By that time, I had stepped down as Department Head and remained a Professor, contentedly moving into late-career obscurity. One clear evening in mid-January, the skies were dark and starry. The half-moon was not due to rise for several hours yet. Viewing conditions were, in short, perfect. I went out on the back deck with binoculars. I was lucky – Comet Lovejoy was near Orion's belt, and that constellation together with the Pleiades and Aldebaran were familiar landmarks. Would I be able to see it? My eyesight was not as keen as it once was. Ah, but it was a gorgeous January night, and the stars were reassuringly clear and bright pinpoints of undistorted light even to my aging eyes.

Just as I had all those years ago, I found the general area of interest and scanned the sky carefully with our binoculars. And then, there it was, a faint fuzzy patch. Much like Halley's had been about thirty years earlier.

I went into work the next morning and asked all my coworkers, whenever the pace of clinic slowed and allowed idle conversation, if they had seen comet Lovejoy. No one had. Most had never heard of it. No one cared.

But then, toward the end of the day, I ran into a young surgeon whom I had recruited back when I was Department Head. He was about the same age that I had been when I showed Halley's Comet to Dr. Hardy. I told him I'd seen the comet and he immediately perked up. A comet! His oldest daughter was just getting interested in astronomy. Neither he nor his daughter had ever seen a comet.

He lived just a couple of houses up the hill from us. I invited him to come by after dark. Two days later, when I'd forgotten the encounter, he knocked on our door and we went out on the back deck together. I showed him the landmarks, the constellations which, luckily, were ones that almost everyone knows and, if not, can be taught to find – Orion, for example – the striding hunter of the night sky.

I mentally visualized the sky chart showing the projected course of the comet against the stars. It would not have moved very far. I scanned that area of the sky myself with the binoculars and there it was! A very faint smudge, slightly ovoid, and clearly different from anything else in the sky. It had, of course, moved against the fixed stars in the intervening nights, but it was close to its previous location. Fortuitously that night it was contained within a triangle of three relatively bright stars. Taken together with the landmark constellations, that made it very easy to find.

First, I showed him the comet. Just as with Dr. Hardy, this took several tries. Finally, he saw it. Then I showed him the constellations, the triangle of stars, and how to find and then methodically scan that small region of sky. We practiced a couple of times.

I offered to walk up the hill with him and help him show his daughter but there was no need. He had seen his comet, and he was not afraid that he would lose it.

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