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### Sky High

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SEEING IN THE DARK \*

How Backyard Stargazers Are Probing Deep Space and Guarding Earth from Interplanetary Peril

By Timothy Ferris

Simon & Schuster. 379 pp. \$ 26

At the age of 7, getting out of the family car with my dad at twilight, I happened to look up to see a pot hanging in the darkening sky. Straightaway my father took me to the backyard and introduced me that summer evening to the Big Dipper and its neighboring constellations. Reading *Seeing in the Dark*, a memoir of Timothy Ferris's adventures in amateur astronomy, transported me back to that joyous moment of revelation, the beginning of my own love affair with the heavens. Entrancing and beautifully written, this latest work by Ferris, the writer laureate of astronomy, will be treasured by generations of stargazers to come.

The purpose of the book, Ferris writes, is to experience "what happens in the moment when ancient starlight strikes the eye and incites the mind." For Ferris, it started when he was growing up in Key Biscayne, Fla., where during ink-black nights he drew pictures of Jupiter as seen through his fragile toy telescope. "The stars stood out so vividly," he recalls, "that they seemed to crackle, and we would watch, transfixed, as the Moon rose the color of a blood orange, then changed into costumes of ermine and silver." Soon young Timothy was sweeping storefronts to earn enough money to buy a larger scope and reading all the astronomy books in the local library, "along with dozens of science fiction novels that filled my head with notions of colonies on Mars and freighters plying routes to Ganymede and Titan." The space race added a special air of excitement as rockets launched from Cape Canaveral flew overhead and the blues played on the radio. Today Ferris looks upward from his own observatory perched atop a rocky hill in California's wine country, where he monitors supernovae -- "stars ending their careers in a fatal and titanic explosion" -- in far-off galaxies.

Astronomy is one of the few scientific fields where amateurs can still make important contributions. Some of the

greatest names in astronomical history started out while involved in other careers: Musician William Herschel discovered the planet Uranus, apothecary S. Heinrich Schwabe first noticed the ebb and flow of the sunspot cycle, and civil service clerk J. Norman Lockyer detected the element helium in the sun before it was ever known to exist on Earth. "Arthur Stanley Williams, a lawyer," writes Ferris, "charted the differential rotation of Jupiter's clouds and created the system of Jovian nomenclature used in Jupiter studies ever since."

New telescope designs and cheaper light-sensing devices to gather the precious bits of starlight are allowing amateurs to continue this tradition. The keen eyes of Stephen James O'Meara, for example, spied "spokes" on Saturn's rings. Professional astronomers were dismissive -- until the Voyager spacecraft, flying by, confirmed the find. More recently, the Internet is allowing amateurs and professionals to link up in fruitful collaborations. "Amateur superstars emerged," Ferris writes, "armed with the skills, tools, and dedication, to do what the eminent observational cosmologist Allan Sandage called 'absolutely serious astronomical work.'" They monitor variable stars for use in distance measurements to faraway star clusters, chronicle planetary weather, listen for signals from alien civilizations and help refind asteroids. "Asteroid 719 Albert, discovered in 1911," Ferris notes, "was lost for eighty-nine years before being reacquired by members of the Spacewatch team at Kitt Peak."

The author introduces us to a cast of characters that is by turns eccentric, engaging, amusing and obsessed, like Barbara Wilson of Texas, the "AIN'T NO Queen" (Association of Invisible Nebula and Things Nobody Observes), who seeks the impossible. She's trying hard to see footprints on the moon and an extrasolar planet through her telescope. "There are a lot of things I try for that I can't see," she admits. "I've been kicked in the butt many times. . . . The first time that you think you know something, the sky will knock you down to size. But it's all so beautiful." Yes, it is indeed.

There's an entire community -- seven miles south of Chiefland, Fla. -- dedicated to amateur astronomy, where a 16-inch telescope, aided by the latest technology, can rival the historic 100-inch telescope that discovered our universe of galaxies three-quarters of a century ago. And then there's the self-made millionaire businessman Edgar O. Smith, who ran off to Columbia University in his fifties to garner a PhD in astronomy and then set up a state-of-the-art private observatory on Kitt Peak, Ariz., a mecca of astronomy in America. There he specializes in exploring the centers of globular clusters.

As the subtitle of the book stresses, amateur astronomers these days are vital sentinels as well. The dramatic plunge of Comet Shoemaker-Levy into Jupiter in 1994 was a wakeup call regarding the dangers lurking in interplanetary space. Nightly, armies of amateurs are keeping watch on potential intruders, "transformed, like Superman changing clothes in a phone booth," Ferris writes, "from pedestrian pursuers of celestial vermin to heroic lookouts who might one day save the world from the peril of Death From Above." A 100-meter-wide NEO (Near Earth Object) could take out a city; a kilometer-size one would devastate a nation; a 10-kilometer NEO would deliver to us the same fate as the dinosaurs'.

But such doomful thoughts are few in this graceful ode to backyard stargazing. More prevalent are the delights to be found in the star-dappled heavens, such as the Orion nebula ("a glowing hive at the middle of the scabbard dangling from the hunter's belt"), open star clusters (which "adorn the Milky Way like spangles on a dove-gray scarf") and our next-door neighbor the Andromeda galaxy ("a vast array of glowing star-forming regions and clusters of massive young stars lining the spiral arms, interspersed with archipelagos of dark clouds that twist out, in turn after turn, from the center to the almost boundless outer reaches"). Along the way, Ferris sneaks in a few astronomy lessons -- on the origin of tides, the geology of Mars and Venus, the source of meteor showers, the universe's large-scale structure, to name a few -- but with such ease and grace that the narrative moves on seamlessly.

Ferris's descriptions are pitch-perfect in capturing the inner rhapsodic thrill of standing under a canopy of stars in the dark. "Stargazing can be as much an aesthetic as an intellectual pursuit," he writes, "its aim an informed attuning of our sense of beauty to the wider reality that surrounds us . . . you can see the phases of the Moon, solar and lunar eclipses, the ethereal dance of auroras, the colors and motions of the planets, the waxing and waning of bright variable stars, the faint glow of nebulae and nearby galaxies, and the stars -- about two thousand of them at a time."

By the book's end, you will yearn for the night to arrive quickly, so you can go outside, look upward to the cosmos, and behold these glittering wonders with your own eyes. \*

Marcia Bartusiak's latest book, "Einstein's Unfinished Symphony," won the 2001 American Institute of Physics Science Writing Award.

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