SKY & TELESCOPE

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On the Cover

Robert Q. Fugate stands next to the 3.5-meter telescope at the heart of the world's most advanced adaptive-optics system. Using laser-generated artificial stars high in the sky, Fugate and his team at the Starfire Optical Range in New Mexico will manipulate the scope's optics to create diffraction-limited images heretofore impossible from the ground. On page 24 Walter J. Wild and Fugate describe the promise of adaptive optics in the first of a two-part series. Contributing photographer Roger Ressmeyer, who took this portrait last year, offers a behind-the-scenes look at Fugate and his creation on page 20. Copyright 1994 Roger H. Ressmeyer–Starlight/MP©A.

FOCAL POINT

Through the Media, Darkly

IT SHOULD be called the "women-in" syndrome. You've read the stories: women in government, women in business, women in science.

Enough, already! To borrow a phrase from Supreme Court justice Ruth Bader Ginsburg, it is time for the news media to stop spotlighting women, especially scientists, as "one-at-a-time performers." In the end, such see-the-woman-at-work treatments preach only to the converted and fail to convince the lingering misogynist that women are making important contributions in a variety of fields.

We are, I hope, all well aware that women continue to face discrimination and sexist attitudes in the workplace. And, yes, girls need to see more role models, especially in books and articles about the sciences. But however well intentioned this exposure might be, I don't believe young women are helped if female researchers are depicted, like so many ornaments on a Christmas tree, as mere appendages to the scientific enterprise.

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Reporters and their editors must begin to ask different questions about the issues being covered, so that women's contributions can be fully integrated into regular news reports and no longer relegated to tacked-on sidebars or special annual features (implying that women are not newsworthy year round).

Let me suggest one way that such achievements can be brought into the mainstream. It became apparent while I was researching a certain facet of astronomical history for my book *Through a Universe Darkly.*

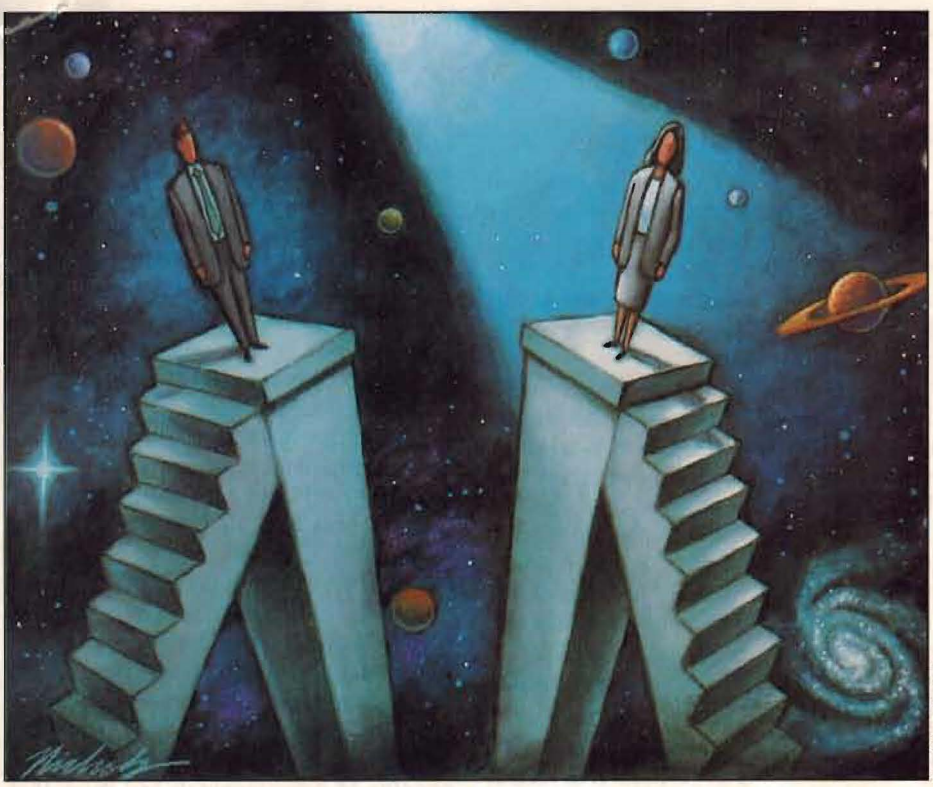
Histories of astronomy tend to be written from one overriding perspective; they show how advances in astronomy, its new instrumentation and its myriad discoveries over the centuries, have expanded the borders of the known universe — our sense of both space and time. And, for a number of historical reasons, the central characters in this story have been predominantly men.

Until the second half of this century, male astronomers (with a few exceptions) generally assumed that their female colleagues were better at tedious data inspection than at creative thinking. For that matter, the doors to the best observatories were essentially closed to women, as it was thought improper for men and women to spend the night together on a dark, isolated mountaintop. (The lack of proper toilet facilities was another popular excuse.)

With female astronomers denied access to the largest telescopes at the time of some of astronomy's greatest discoveries (and all the fame that ensued), their accomplishments, done with pen and paper back at observatory headquarters, have not been conspicuously noted in the standard textbooks, even to this day. Instead, the spotlight is routinely focused on the men who extended our cosmic horizons — observers such as Harlow Shapley, who in 1917 moved our solar system from the center of the Milky Way galaxy to its outer fringes, and Edwin P. Hubble, who later made us see that the Milky Way itself was but one of billions of other galaxies roaming the voids of space.

But besides looking at astronomy as the evolution of our spatial awareness, we can also study it as a search for the cosmic formula. Some 2,600 years ago, the very first question asked by the world's first philosopher, the ancient Greek Thales, was simply this: What is the universe composed of? Astronomy continues to be driven by this rudimentary question. When we view the history of astronomy through this alternate lens, a whole new cast of characters emerges. And, lo and behold, many of the principal figures are female.

We come to meet the 19th-century English astronomer Margaret Murray Huggins, who worked tirelessly by the side of her husband, William, to help prove that the Earth and the stars were composed of the very same elements. This finding overturned the belief, held since the time of Aristotle, that the heavens were a hallowed province, a realm filled with some unearthly substance.



GARRY NICHOLS

By the turn of the century, at the Harvard College Observatory, Annie Jump Cannon was setting records for classifying stars recorded on photographic plates (she categorized nearly 400,000 over her professional lifetime). The stellar classes she established — *O B A F G K M*, remembered by that infamous refrain, "Oh, Be A Fine Girl, Kiss Me" — are still used today throughout the world.

By the 1920s, a determined Harvard Observatory graduate student named Cecilia Payne (later Payne-Gaposchkin) carefully analyzed many of Cannon's cherished plates and uncovered the very first hint that the simplest element, hydrogen, was the most abundant substance in the universe. The reverberations that have resounded from this single, plain fact still echo long and hard through the corridors of astronomy. Here at last was the fuel for a star's persistent burning; here was the gaseous tracer that enabled radio astronomers to reveal a universe once hidden; here was the remnant debris from the first few minutes of the universe's creation.

Payne-Gaposchkin's discovery did no less than change the entire face of the material cosmos. How disappointing it is, then, that Hubble garners 55 lines in the *International Encyclopedia of Astronomy*, while Payne-Gaposchkin manages a mere seven — and with no mention of her work on hydrogen.

More recently it has been a woman, Vera Rubin of the Carnegie Institution of Washington, who largely convinced the astronomical community that something truly massive resides unseen in the universe, an unknown substance that has come to be called dark matter. Her painstaking measurements of a host of galaxies suggest that these luminous collections of stars could be mere whitecaps, whose gleaming presence diverts our eyes from a hidden ocean of matter right below. A veritable army of observers is attempting to certify the existence of this extra stuff and learn its true nature. If found, it may change only certain details in the story of the universe; on the other hand, this dark matter — this "missing" mass — has the potential to alter the entire tale.

What a delight it is to see these and other female scientists attain a stature on par with their equally distinguished male colleagues — without a fix, without a whiff of tokenism. In this particular instance, the spotlight was shifted onto these women simply by changing the emphasis of the story, providing an angle often overlooked or undervalued. What had formerly been invisible became visible with a shift of the journalistic lens. Like the universe's dark matter, women have been lurking around astronomy's more notable stars all along.

MARCIA BARTUSIAK

Marcia Bartusiak is a contributing editor of Discover *magazine. A review of her latest book,* Through a Universe Darkly: A Cosmic Tale of Ancient Ethers, Dark Matter, and the Fate of the Universe, *appears in the February issue.*

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