about detection probabilities, it is difficult to decide whether model-based inferences apply primarily to the sampling process or the ecological process. Nonetheless, time series data offer us the only description of the long-term dynamics that we are interested in; hence, we would be foolish to not use these data (with the proper method of analysis). We should, however, encourage monitoring programs that incorporate estimation of detection probabilities so that future analyses can disentangle sampling from ecology. I only wish the authors had included more on these issues. Their writings elsewhere indicate they are certainly capable of writing a good chapter on this important topic.

In spite of my somewhat critical remarks, I found the book to be very good. What it covers, it does so excellently. Now, someone has to write the supplement, the companion book on the analysis of time series data. None of the books available on that topic are of the caliber of *Analysis and Management of Animal Populations*.

BOOKS: ASTRONOMY

The Joy of Stargazing

Robin M. Catchpole

Opening *Seeing in the Dark* reminded me of one of the unanticipated pleasures of being a professional astronomer. During nights unsuitable for serious observation, one can revert to being an amateur and use the telescope to look at pretty things. On some occasions when very thin cirrus is present, the "seeing" (sharpness of the image) can be exceptionally good. Then one can seemingly cruise above the lunar surface, looking at the ancient craters, volcanic rilles, and the long, sharp black shadows cast by mountains catching the rising sun. One of my most memorable moments from such nights occurred as I looked at the "Trapezium" (the four bright stars at the heart of the Orion nebula) while an adjacent computer displayed an image taken by the Hubble Space Telescope of the same region. With its much greater resolution, the Hubble image showed the region's newly born stars surrounded by protoplanetary disks. Knowing about these details greatly enriched the experience of looking through the telescope. Seeing is indeed believing.

Seeing in the Dark
How Backyard Stargazers Are Probing Deep Space and Guarding Earth from Interplanetary Peril
by Timothy Ferris
Simon and Schuster, New York, 2002. 399 pp. $26, C$39.50. ISBN 0-684-86579-3.

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Sadly, such days are almost past. Fewer and fewer professional telescopes have an eyepiece. If the weather is clear, it is possible to spend the whole night observing from a well-lit control room and never see either the telescope or the sky. Indeed as a new generation of robotic telescopes comes into use, the time cannot be far off when there is no need even to visit the observatory.

Science writer Timothy Ferris's book is about the glory of the night sky, what it means, and some of the people past and present who love it. Ferris reminds us just how thought-provoking and moving the night sky can be. He takes us along on his journeys around the world, meeting amateurs and professionals who share his enthusiasm. On the high Texas plains, we find Barbara Wilson perched "atop a small ladder, peering through her 20-inch Newtonian—an instrument tweaked and collimated to within an inch of its life, with eyepieces that she scrubs with Q-tips before each observing session, using a mixture of Ivory soap, isopropyl alcohol, and distilled water." She is looking for the jet of electrons emerging at nearly the speed of light from the black hole at the center of the galaxy M87, 40 million light years away. When, finally, she sees it, she exclaims, "It's there! I mean, it's *so* there!" Along with vignettes of the many characters, Ferris gives us an introduction to astronomy and guides us through the night sky, from nearby planets to stars and distant clusters of galaxies.

Eyes on the skies. Star parties draw astronomy enthusiasts to dark sites where they can enjoy the celestial splendors.

CREDIT: ROGER RESSMEYER/CORBIS

When I became an astronomer 40 years ago, I was delighted to find that professional astronomy was all about the physics of stars, everything that amateur astronomy was not. This situation has changed somewhat since then. Ferris reminds us that amateurs make an increasingly important contribution to the science of astronomy. Not just in their traditional role of sweeping the dusk and dawn skies for comets, but in searching nearby galaxies for supernovae, following variable stars for signs of unusual activity, hunting for asteroids, and even monitoring changes on the surfaces of planets. In fact, they undertake many of the time-consuming activities for which it would be impossible to schedule large, professional telescopes. Some amateurs now use charge-coupled device (CCD) detectors, making their observations more accurate and their telescopes more efficient. Others, from around the world, collaborate with professionals in the continuous observation of variable stars. This requires careful standardization of procedures as well as rapid communication.

Ferris discusses an excellent example of how amateur astronomers have contributed to astrophysics: the case of supernova SN1987A, the brightest supernova to be seen since the invention of the telescope. The official first discovery of the supernova was made in Chile by an amateur turned professional, Ian Shelton, when he developed his photographs of the Tarantula region at the end of the night on 24 February 1987. A crucial detail in unraveling the physics of the explosion was measuring the time between the collapse of the stars core (signaled by the arrival of neutrinos, which were detected in Japan at 07:35:41 UT on 23 February) and the arrival of the shock front at the star's surface (which caused it to brighten). A then-untested "neutrino cooling" theory predicted the interval should be about two hours. But who could possibly have been watching the star before it exploded? Fortunately, Albert Jones, a well-known New Zealand amateur with more than a half million variable-star observations to his credit, happened to looked at Tarantula around 09:30 UT (near the beginning of the New Zealand night) and saw nothing unusual. An hour later, Robert McNaught, an amateur in Australia, took a photograph which showed that the star was already bright. This pair of observations confirmed that the shock had indeed taken between two and three hours to reach the star's surface. It was not until 31 hours later, that the first serious professional observations were made.

Ferris has an easy-to-follow but authoritative style. The book is well referenced and includes an excellent index and glossary. A series of short appendices provide an introduction to observing techniques, basic astronomical data (on meteor showers, representative bright stars, and the planets and their satellites), a list of Messier objects (to look at with binoculars and small telescopes), and rudimentary star maps.

Despite my living under the frequently damp, gray English skies, *Seeing in the Dark* would have inspired me to buy my own small telescope—had I not recently done so.