

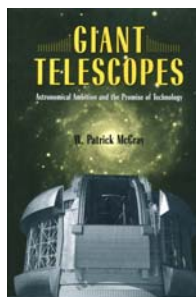
Giant Telescopes: Astronomical Ambition and the Promise of Technology

W. Patrick McCray
Harvard U. Press, Cambridge,
MA, 2004. \$45.00 (367 pp.).
ISBN 0-674-01147-3

As a child, my favorite book of all was David O. Woodbury's *The Glass Giant of Palomar* (Dodd, Mead, 1939). From its pages, George Ellery Hale sprang to life as a great scientific visionary who led astronomy into 20th-century modern times, a process culminating in the creation of the 200-inch telescope. I had worn my copy to tatters, memorizing most of it by that cold winter weekend in 1948 when Dad drove the family some 50 miles from our home in Oceanside, California, to the top of Palomar Mountain. As we rounded turn after turn, I peered through snow-covered pines and was nearly blinded by the stark contrast between sunlight and the shadows that they had cast. Suddenly, there before my disbelieving eyes, loomed the gigantic silver dome glistening vividly against a backdrop of deep blue, cloudless sky. As an awe struck 12-year-old, I decided on the spot, without a single doubt, that I would someday become an astronomer.

Similar emotions may have prompted Ronald Florence to write his definitive *The Perfect Machine: Building the Palomar Telescope* (HarperCollins, 1994), which describes the story in more historic completeness from an early 1990s perspective. W. Patrick McCray's *Giant Telescopes: Astronomical Ambition and the Promise of Technology* offers an important, unique, and timely sequel, which documents the huge strides taken since the Palomar Observatory in the quest to design and build ever larger, more sophisticated devices in pursuit of new astronomical discoveries.

Not being an astronomer but rather a science historian, McCray sets for himself the formidable task of uncovering and digesting enough factual details about recent and current telescope technology to enable him to write about that subject in clearly defined prose. His narrative is accessible to the attentive reader and entertaining as well. His approach combines traditional research of the literature with a refreshing hands-on style based upon visits to observatories and more than 60 personal interviews with sci-



entists and engineers who have been, and continue to be, primary players in the ongoing and dynamically active large-telescope arena.

After a mistake in the first paragraph, which should have been caught, McCray recovers convincingly by documenting his information sources carefully in disciplined academic fashion. The 200-inch mirror was never in the Mount Wilson optical shop; if Aden Meinel said that it was, he misspoke. But McCray correctly anticipated such a possibility by noting at the end of his "Sources" section that "personal memories are selective and people's recollections as well as the significance of their memories change over time." Those all-important points about memories and perspectives must be kept clearly in mind by readers as they are bathed in an ocean of well-crafted narrative about telescopes, as well as reported thoughts, motives, intentions, manipulations, conflicting viewpoints, and vignettes highlighting the personalities of many people whose past and present astronomical lives form the basis for McCray's portrayal.

I must admit to being impatient as I read through nearly half of the book before coming to anything about the National Optical Astronomy Observatory's 8-m Gemini North and South telescopes. However, I was amply rewarded with a clear understanding of why NOAO did not seek to pursue the largest among giant telescopes. I felt a bit put off by McCray's seemingly pejorative chapter titles, such as "Paper Telescopes" and "Smoke and Mirrors," until playful punch lines revealed his sense of humor. Let me assure any potential reader that the journey through McCray's epic work is well worth the effort.

Having lived my way through much of the subject matter, as the daily essence of my own long career in instrumental astronomy, I feel secure in saying that, by and large, the substance of McCray's *Giant Telescopes* seems quite solid. It is based on factual information that I remember vividly in many cases, less clearly in some, and on other interwoven details that I recalled only after reading about them. Some errors in fact and emphasis did appear along the way as I read the book. I would not presume to correct them here but a few closing remarks seem appropriate.

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It is true in spades that ongoing sociological issues, conflicts between individuals and institutions, bloated egos, and hidden personal agendas often dwarf the technical problems and challenges attendant to designing and building giant telescopes of the future and their instrumentation. McCray has captured the reality of such passion and emotion beautifully, although I hesitate to place too much literal validity on some of his comments about the nascence of Kitt Peak National Observatory and some reported issues between Leo Goldberg and Jesse Greenstein. Goldberg had passed away long before McCray began the research for his book; Greenstein, on the other hand, was well along in years and was not interviewed.

The development of segmented, thin-meniscus-shell, and spin-cast primary mirrors followed splintered, often bitterly contested pathways, but a happy outcome has materialized nonetheless because the world now enjoys a growing number of scientifically productive giant telescopes of all three styles, each possessing useful characteristics and capabilities. McCray provides a partial list, and the interested reader will also enjoy René Racine's 2004 article, "The Historical Growth of

Telescope Aperture," published in the *Publications of the Astronomical Society of the Pacific*, volume 116.

Some proposals for future giant telescopes and instruments seem impractical and farfetched, but there is good reason to believe that Jerry Nelson's segmented-mirror technology will serve as the foundation for a 30-m telescope, while Roger Angel's spin-cast borosilicate, honeycomb primary mirrors will themselves become the seven "segments" in a strongly competing 20-m telescope. Both projects are well into realistic planning stages, supported by adaptive optics and other marvels promised by 21st-century technology. Thus a bright future is sure to follow if funding goals can be achieved. Meanwhile, McCray is well poised to pen an exciting companion volume in the coming decades.

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