

by Ronald Bush

Fictional characters, E. M. Forster famously said, are either round or flat. The round ones are complex, unpredictable, capable of development and change. The flat ones are one-dimensional. They can help fill out a novelist's grand scheme, and they are sometimes amusing (the obsessiveness of Johnny-once-notes is the very stuff of comedy), but they are not what we read novels for.

Forster's prejudices can be traced back to categories advanced by the poet and critic Samuel Taylor Coleridge in the early part of the 19th century. Coleridge, thinking of medieval masterpieces like Dante's *Divine Comedy* and more recent ones like Bunyan's *Pilgrim's Progress*, recognized that many great works of literature once portrayed human beings not in the round but allegorically—as organized reflections of a reality (Christian providence) that was to the author more real than everyday life. In Coleridge's opinion, though, allegory had lost its justification and allegorical characters had become unacceptable to modern readers. And, as one can see from Forster's *Aspects of the Novel* and hundreds of less intelligent counterparts, he persuaded almost everybody.

But not quite. In *The Literature of Labor and the Labors of Literature: Allegory in Nineteenth-Century American Fiction*, Cindy Weinstein, assistant professor of literature at Caltech, asks some interest-

ing questions about why the most famous of America's writers continued to populate their fictions with flat characters: why Nathaniel Hawthorne, whom Henry James called "the most valuable example of the American genius," dabbled in allegory for his entire career; why Herman Melville ruined his sales by writing books that people considered heavy-handed; why Mark Twain, who gave us Tom Sawyer and Huckleberry Finn, also created a character named #44; why Henry Adams, probably the most insightful commentator on American culture between de Tocqueville and Robert Lowell, styles himself at the beginning of his landmark autobiography, *The Education of Henry Adams*, a manikin with "the same value as any other geometrical figure."

Were the great 19th-century American writers behind the times? Hardly. They are now regarded as pioneers of 20th-century European sophistication. Why then, in an age when the fashion and conditions for religious allegory had passed, did they insist on presenting artificially simplified personifications of human life?

Weinstein's predecessors had given the beginnings of an explanation. Leo Marx, in a groundbreaking book entitled *The Machine in the Garden: Technology and the Pastoral Ideal in America* (1964), pointed out that the age of the American

Renaissance saw the rise of industry in a culture that still imagined itself, in Jeffersonian terms, an agrarian society and that still prided itself on the farmer's virtues of autonomy and closeness to nature. Our defining literature, therefore, was suffused with a horror that American life was becoming mechanical, and its anxieties increased with every innovation in technology. (And increased also, as Leo Marx's successors showed, with every new sign that America had changed from an agrarian to an industrial economy.)

One explanation, then, of the puzzling flatness of the fictional characters of the American Renaissance was that novelists were trying to show us what, if we were not careful, we might become: machine-made, less than human. So, in a story such as Twain's *A Connecticut Yankee in King Arthur's Court*, a school is called the Man-factory, and it molds medieval boys into 19th-century automats with all the verve and efficiency with which a few years later Henry Ford would produce Model T's. Twain clearly was writing social satire.

Or was he? Weinstein intelligently notices that *A Connecticut Yankee* delights in the success of the Man-factory at least as much as it disapproves. Nor was Twain alone in his ambivalence. In fact, as Weinstein shows in a fascinating piece of cultural history, the American writer's "weakness" for allegory had to do not simply with the rejection of machines and technology but with the way machines had provoked an ongoing and anxious redefinition of human life and work in which all the old categories had become unstuck. For example: work, Benjamin Franklin held, builds character and makes us better human beings, but

factory work was beginning to look like mechanically repetitive activity that corroded feeling and judgment. Many Americans believed the former, but instinctively hated factories anyway; just as (to take another of Weinstein's examples) scientific management theorists like Frederick Winslow Taylor tried to remake workers into perfectly efficient cogs in a factory system, yet continued to appeal to the worker's sense of individualism while they did it. Such contradictions were left for American writers to worry the way one worries a toothache with one's tongue: people who blindly held to both sides of the contradictions could feel there was something wrong but couldn't see it. Making them think through it became the novelist's job.

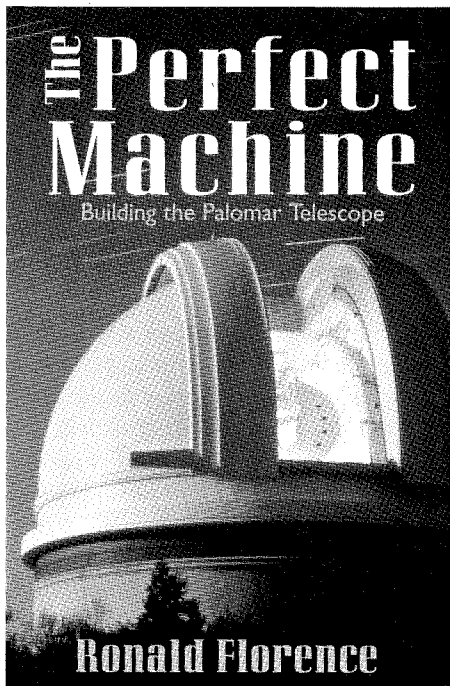
As Weinstein shows, writing stories with flat characters was one way to foreground these contradictions—to make readers uncomfortable and start them asking about what an individual really is. And the contradictions of identity and work were just as pertinent to the writers themselves. Post-Romanic literary creation, it was said, was a matter of genius, and writing was supposed to realize the largest self of the writer in an activity more like flowering than labor. Everybody knew, though, that writing demanded more perspiration than inspiration, and that writers were as conditioned by the marketplace as were factory hands. Were they, too, in danger of becoming human caricatures? Or was there something wrong with the commonplace wisdom about genius and creation? Making allegories, which stripped some of the magic from fiction and let the writer's work show, sometimes seemed more honest.

Weinstein's study adopts the method

Our defining literature, therefore, was suffused with a horror that American life was becoming mechanical, and its anxieties increased with every innovation in technology.

of so-called literary New Historicism, which in her introduction she defines as trying "to illustrate a discursive field rather than the force of historical evolution." That is to say, she wants to show not how historical reality generates literary style, but to look at the ways people tell stories and fashion images of themselves in and out of fiction, and then show how each affects the other as we produce the reality we live in. There is no question but that her work refines the method and (as the early praise on the jacket cover has it) "puts Weinstein at the forefront of a new generation of Americanists." To me, the study is especially valuable because of the tact with which it conducts such an interdisciplinary investigation without losing sight of the nuances of literary narrative. To the general reader, the interest of the book will be its presentation of the dark corners of ordinary American life, in which we suddenly realize that the images we have invented of ourselves to get through the day don't quite hang together. The elements she examines perplex us still (we are still carrying around some of the same contradictions).

Ron Bush is professor of literature at Caltech, where he has been a member of the faculty since 1982. He is currently a visiting fellow at Exeter College, Oxford.



HarperCollins Publishers, 1994
\$27.50
451 pages

by Ronald Brashear

It took a quarter-century to plan, design, construct, and implement the telescope. It was a state-of-the-art instrument, pushing technology to the limit. There was plenty of infighting within the project. The cooperation between science and industry rarely went smoothly. The entire project was fraught with difficulties, and there were a number of major setbacks that might have ended everything. Of course, I am referring to the Hubble Space Telescope. But the Hubble was not the first telescope to endure such birthing pains. This scenario is also applicable to the 200-inch (or 5-meter as it is known today) Hale Telescope on Palomar Mountain.

The building of the Hale Telescope is quite a story, and Ronald Florence tells it well. He does a good job in eliciting the drama, not of the Indiana Jones type, but of clashes in personality, the agonizing over the solution to engineering problems, and the intensity of the effort to produce a suitable mirror blank. You can even sense the anxiety during the long stretches while we wait for the mirror blank to cool and while it is being ground to the proper shape. Although this approach may not make for a scholarly history of the project, it does make for good reading.

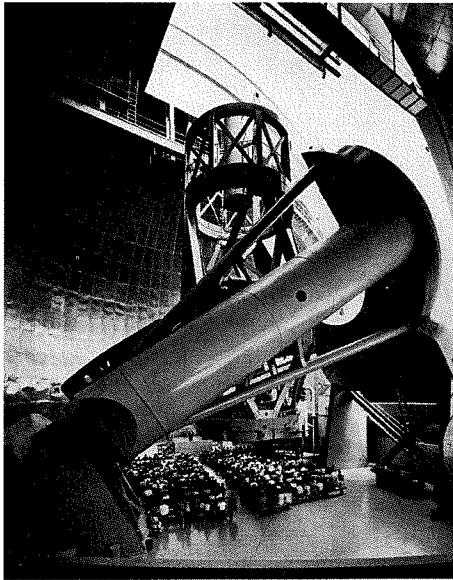
There have been many tellings of the building of the Palomar telescopes,

starting with David Woodbury's unfortunate 1939 attempt, *The Glass Giant of Palomar*. As Florence points out, Woodbury and his book are actually a part of the story, even helping to get a major figure on the project fired. There have been a number of recent articles on Palomar, but *The Perfect Machine* is the only full-length treatment of the Palomar story since Helen Wright's 1952 book, *Palomar, The World's Largest Telescope*.

The 200-inch telescope is the last in a line of world's-largest-telescopes that were the product of George Ellery Hale's activities. Hale, a solar astrophysicist with a talent for separating large sums of money from wealthy men, saw the value of large telescopes in solving the riddles of stellar evolution and cosmology. After constructing the 40-inch Yerkes refractor, the 60-inch reflector, and the 100-inch Hooker Telescope (the latter two on Mount Wilson), Hale and his engineer/astronomer colleague Francis Pease felt confident by 1923 that an even larger telescope could be built—provided they had the money, of course, which they estimated would have to be on the order of 5 million dollars. What proved valuable for Hale was the “old-boy” network of which he was part. He impressed Wickliffe Rose, head of the Rockefeller Foundation, with the telescope idea and by 1928 the funding for the construction of the 200-inch telescope was in hand.

Florence also does a good job in placing the 200-inch telescope project in the context of its time. He notes the key items that impinged on the lives of both the project staff and the public at large. Florence begins his book with an overview of the Shapley-Curtis “Great Debate,” a defining moment in the controversy over whether nebulae were within our galaxy or were galaxies of their own. He then discusses the status of cosmology, the importance of a large telescope to the field, and the background of George Ellery Hale, the father of the 200-inch. Fortunately, he spends some time in discussing the impact of the two most significant events that affected the progress of the telescope: the Great Depression and World War II. The 200-inch project provided jobs during

His management style got the telescope built, but he won few friends with his concept that building the telescope was no different from building a huge battleship gun turret.



The 200-inch Hale Telescope was dedicated on June 3, 1948.

the Depression and allowed a number of companies to concentrate more manpower and effort onto special research for the project than they might have during a period when business was better. On the other hand, the war slowed the telescope's construction to a halt by siphoning off manpower and resources.

The most intriguing parts of the book are the depictions of the individuals involved in the making of the telescope. Of note are, first, George Ellery Hale whose frenetic pace led to his undoing. His efforts as a scientific entrepreneur, combined with his strenuous research style and direction of Mount Wilson Observatory, were the equivalent of burning the candle at both ends and led to his complete breakdown in 1910. After that Hale would alternate bouts of intense work with periods of intense exhaustion. The 200-inch telescope proved to be his final project and the one for which he would be best remembered.

Then there were the former military figures like Captain Clyde "Sandy" McDowell, the Leslie Groves of the 200-inch. McDowell retired from the Navy and gave up a chance at admiral in order to manage the construction of the telescope. His management style got the telescope built, but he won few friends with his concept that building the telescope was no different from building a huge battleship gun turret. McDowell

hired retired Army Colonel M. L. Brett to run the construction camp on Palomar. Brett ran the camp like a military operation, even serving one deliberately horrible meal a week to make the workers look forward to the others.

Florence depicts the scientists and engineers as by far the most heroic figures in the drama. It is easy to sympathize with men like George McCauley of Corning and his heroic efforts to fashion a suitable piece of Pyrex for the telescope mirror. Everything seemed to go wrong for McCauley, from a superior taking credit for his work to a flood that threatened to destroy the second attempt at a 200-inch mirror blank. Florence has also done a service by bringing to light a figure who has received very little credit: Rein Kroon, a young Dutch engineer who had been hired for the project by Westinghouse, the builders of the telescope mounting. Kroon solved most of the difficult problems involved in the telescope mounting: how to use oil-film bearings for the mounting, the internal design for the north "horseshoe" bearing, and the design of the declination bearings. The efforts of these men and many others discussed in the book resulted in the completed 200-inch Hale Telescope which entered service in 1949.

Florence spent a good deal of time researching the story (his endnotes show that he has spent much time in archives looking at primary sources), and for this he is to be commended. He has not, however, grappled with some of the significant historical issues regarding the 200-inch and so I still await a scholarly treatment of the Palomar Observatory by a historian of science and technology. A true scholarly history was probably not Florence's intent (there is no preface and, alas, no bibliography other than the works mentioned in the endnotes), but fortunately we are left with a well-researched and well-written story.

Ron Brashear is curator of the history of science and technology at the Huntington Library in San Marino, California.