"In 1916 Ida A. Bengtson became the first woman to hold a professional position in the Hygienic Laboratory. She subsequently earned high regard for studies of bacterial toxins, trachoma, and rickettsial diseases. For the women who followed her, wrote a colleague, 'it was well . . . that the pioneer woman . . . was filling her position so ably.' " [From *Inventing the NIH*; courtesy National Library of Medicine]

care to merchant seamen. There Joseph Kinyoun applied the recent bacteriological discoveries of Koch and Pasteur to the specters of cholera and yellow fever raised by swelling immigration. In 1891, the laboratory was moved to Washington; 11 years later, during the Progressive expansion of the federal bureaucracy, the Service became the Public Health and Marine Hospital Service (the name contracted to "Public Health Service" in 1912). The laboratory ramified into divisions of pathology and bacteriology, chemistry, zoology, and pharmacology; it assumed responsibility for enforcing the provisions of the Biologics Control Act of 1902, defining standards of purity and inspecting and issuing licenses to manufacturing laboratories. Postwar efforts to create a national institute for drug research and parallel concerns over the creation of a national department of public health came to a legislative climax at the end of the '20s. In 1930, the Parker Act consolidated and confirmed the dominant position of the Public Health Service within the federal health-care establishment; the Ransdell Act transformed the Hygienic Laboratory into a National Institute of Health devoted to the comprehensive study of the diseases of man. The National Cancer Institute was founded in 1937, but NIH only became plural in 1948 when Congress established the National Heart Institute and the National Institute of Dental Research.

In an account relatively brief as institutional histories go, Harden succeeds in touching on a large number of researchers, bureaucrats, and politicians whose careers and achievements intersected the history of the Hygienic Laboratory and the Public Health Service. She concentrates, however, on health policy debates within and without the Public Health Service that shaped this early history, concluding with a fine and detailed accounting of the legislative struggles of 1926–1930 spearheaded by Senator Joseph Ransdell and Charles Holmes Herty, a veteran of the Chemical Warfare Service and onetime president of the American Chemical Society. What she makes clear is the difficulty of a victory that was achieved only after years of controversy that pitted against each other a series of powerful groups—among them the American Chemical Society, private research foundations, pharmaceutical firms, the American Medical Association, and not least the Public Health Service bureaucracy itself—each with vested interests in "public health" and its means of control.

In some respects, *Inventing the NIH* is an oddly balanced volume. Committed to celebrating the "invention" of the NIH in its first 50 years, Harden highlights how little (in contrast to its second half-century) was accomplished either in the commitment to public health or in biomedical research. Even after the passage of the landmark bills of 1930, she notes, the expansion of the NIH "into a large-scale, well-financed facility lay nearly twenty years ahead." From this point of view, the amount of space devoted to the legislative machinations of Ransdell, Herty, and others seems disproportionate. Harden's history nicely demonstrates just how many contenders fought over the "public health" and just how precarious was the fate of in-house research given its sensitive location and the inevitable linkage to these wider conflicts. For these reasons, it is disappointing that she hurries along in order to tell the story of Ransdell and Herty. An example: we are told that in 1922 the "maintenance appropriation" for the Laboratory peaked at $50,000; yet in 1918 Congress created within the Public Health Service a Division of Venereal Disease with an appropriation of $200,000, setting aside in addition (if I interpret the figures correctly) another $100,000 for external grant money and $300,000 for sociological and psychological research. Astounding largesse in an era of tight budgets, and reversed by 1926! Given what we have learned of the cultural environment in which Americans sought to confront venereal disease, this might have proved a revealing illustration of the sensitive linkage between budgetary fortunes and wider public notions of illness and its proper treatment. Harden notes the episode in several sentences, remarking of the budgetary contraction that venereal disease "was no longer the important political concern it had been in World War I."

In short, despite what seem to this reader to be problems of balance, Harden has produced a responsible survey of the early history of the NIH, sketching well though necessarily briefly the struggle waged by a variety of interest groups to promote biomedical research in government and to define the public health.

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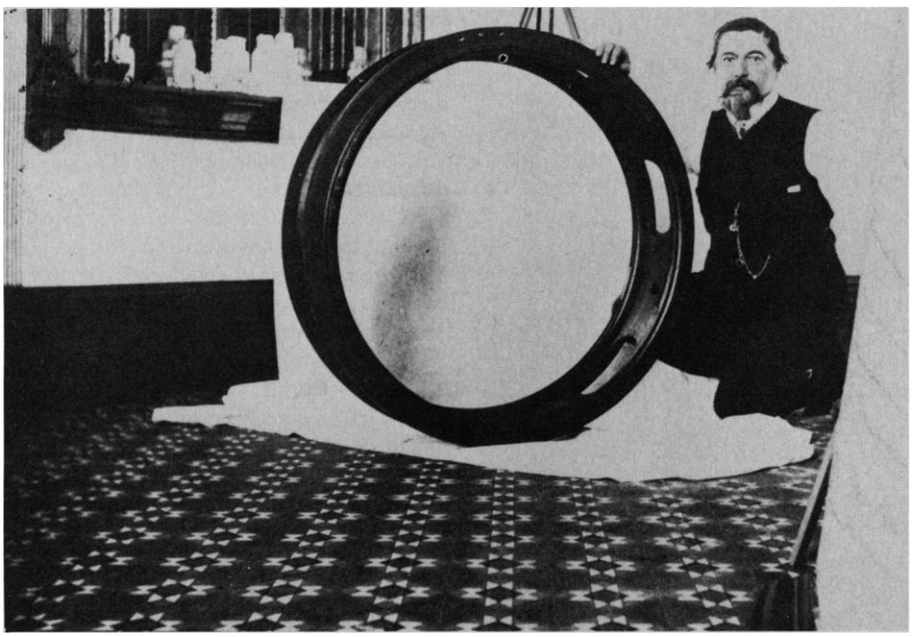
Building an Observatory

James Lick's Monument. The Saga of Captain Richard Floyd and the Building of the Lick Observatory. HELEN WRIGHT. Cambridge University Press, New York, 1987. xvi, 231 pp., illus. $32.50.

In documenting the labors of Captain Richard Floyd, president of the Lick Trust and overseer of the construction of the Lick Observatory, Helen Wright has focused on a member of a hitherto overlooked group of contributors to the success of the scientific enterprise. The stories of the financial supporters of science are well known, and historians relate the activities of the members of the scientific community as a matter of course. But the efforts of non-scientists who brought the dreams of the donors and the scientists to fruition—men and women who out of a sense of obligation to their community and at great personal cost carried out trusts, or the construction crews who worked in difficult and isolated conditions—are rarely acknowledged.

Wright subtitles this book a "saga," an apt choice. There is adventure in the story of a former Confederate naval officer without astronomical training struggling for 13 years to construct the first high-altitude astronomical observatory, complete with 36-inch refractor, the largest such telescope in the world at the time. Floyd had to overcome a hostile environment on a virgin mountaintop, vocal opposition to his efforts from members of the California Academy of Sciences and the Society of California Pioneers, and the limits of contemporary technology and human creativity. It took the combined efforts of the optical firm of Feil of Paris, who produced the glass for the lenses after years of failure, Alvan Clark and Sons, who ground the lenses, and Warner



"Richard S. Floyd with the 36-inch lens on Mount Hamilton, 1881." [From *James Lick's Monument*; courtesy of the Mary Lea Shane Archives of the Lick Observatory]

and Swasey, who with the assistance of ideas borrowed from Howard Grubb did the mechanical work, to produce a state-of-the-art observatory. All of this effort was overseen and coordinated by Floyd, who developed heart disease during this labor and died, only 47, but two years after the dedication of Lick Observatory. Perhaps more to the point, "saga" provides a categorization of a book that is neither monograph nor biography. There is too much detail of Floyd's life to call this a monograph on the history of Lick Observatory, but too little analysis of Floyd and too much about James Lick, the eccentric millionaire who selected an astronomical observatory as his monument, and the other characters who were involved in the building of Lick Observatory to view it as simply a biography.

Unfortunately, the experience of reading this book is not as pleasurable as it should be. Repetitions and extraneous details abound. The presentation sometimes becomes quite confusing. There is also the frustration of inaccurate citations. In one set of four footnotes citing correspondence from the Smithsonian Institution Archives (pp. 13–14), two of the footnotes cite the wrong dates for the letters and a third reverses the author and recipient (and is in the wrong place in the text). This pertains to the one collection of manuscripts Wright cites that I know well and may be an aberration, but I recommend care in using the citations.

Despite the book's problems, I recommend it to anyone interested in the history of American science and the history of astronomy. It provides a different perspective of the events and reminds us of the men and women behind the scientists.

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Explorations

New Lands, New Men. America and the Second Great Age of Discovery. WILLIAM H. GOETZMANN. Viking, New York, 1986. xiv, 528 pp., illus. $24.95.

Those who view internalist historiography of science as an affront to history will be cheered by this book, for its author seeks to regain the historical context of an era he persuasively labels "the Second Great Age of Discovery." The new age opened with Charles Marie de La Condamine's 1735–49 expedition to South America to test Newton's hypothesis that the earth is an oblate spheroid. Here was novelty for, impelled by thirst for knowledge, not plunder, the expedition summoned an astronomer, a mathematician, a botanist, a surveyor, and engineers and equipped them with the latest apparatus. Later in the century, James Cook's three great Pacific voyages confirmed the character of the new age by employing artists as well as scientists. Goetzmann throughout pays tribute, well deserved but rarely accorded, to the exploring artist. "Science and art came together to change the thought of Europe" (p. 39) and thenceforth to range the world together in harmony or discord, as might be, but forever indispensable to one another.

As befitted the offspring of Enlightenment thought, the new American republic entered the new age of discovery early with the Lewis and Clark Expedition, dispatching even before its return Stephen Long's and then an unbroken train of others, culminating three decades later in the United States Exploring Expedition, largest of all overseas scientific exploring expeditions under sail. The record of American achievement remains astonishing. Whereas 30 years before ships had entered American harbors only by charts published abroad, by 1860 Americans had mapped the nation, charted its coasts—and China's, Japan's, and many Pacific island groups' as well—discovered the Antarctic continent, and won for themselves world preeminence in geology and oceanography. Along the way, exploration nurtured specialization in the sciences, spawned distinguished careers in art as well as the sciences, and established the first great federal institutions of science. In the two decades just before, the Civil War Congress published 60 works on exploration of the American West alone. All this from a people committed (it was charged abroad) to an intellectually meager utilitarianism and (it was proclaimed at home) to the principles of equality and least government. Goetzmann notes the remarkable fact that, leaving aside the succession of geological surveys financed by the states, federal subsidy of the sciences and the arts at times represented a quarter to a third of the federal budget, a ratio never since approached or even glimpsed.

Having proceeded through the whole of the 19th century, Goetzmann pulls up sharply at the threshold of the Third Great Age of Discovery—averts the eye, one might almost say, from an age "highly organized, team-oriented, and ultimately the creature of impersonal systems analysis" (p. 453). He has detected the early signs of its approach among the first generation of "closet" (an epithet not consistently embellished with quotation marks) naturalists—the microscopist Jacob W. Bailey, the ornithologist John Cassin, Asa Gray at Harvard poring over plants arrived by post—all distilling for science the meaning of specimens gathered by explorers, the peace of their laboratories unbroken by the keenings of marauding Sioux. Goetzmann takes note of their signal contributions and, though sniffing elitism, well understands that it was they who clinched the achievement. But they never fill his horizon, for his sympathies clearly lie with those who had to deal with the whole rattlesnake and not just its skin and whose