radio business overseas was low-cost labor. His solution is a tariff on technology clones: a U.S. company (though not a multinational) that puts a new product on the market gets 15 years of protection from foreign imitations.

The real strength of this book is not, however, its policy lessons. It is the detailed tracing of an idea from dream to realization to commonplace. The abundant illustrations go a long way toward justifying the book's coffee-table size. We can watch as radios shrink by fits and starts from suitcase to lunchbox to pocket size. As much as the well-written text, the pictures establish the small radio as even more a cultural than a technological artifact.

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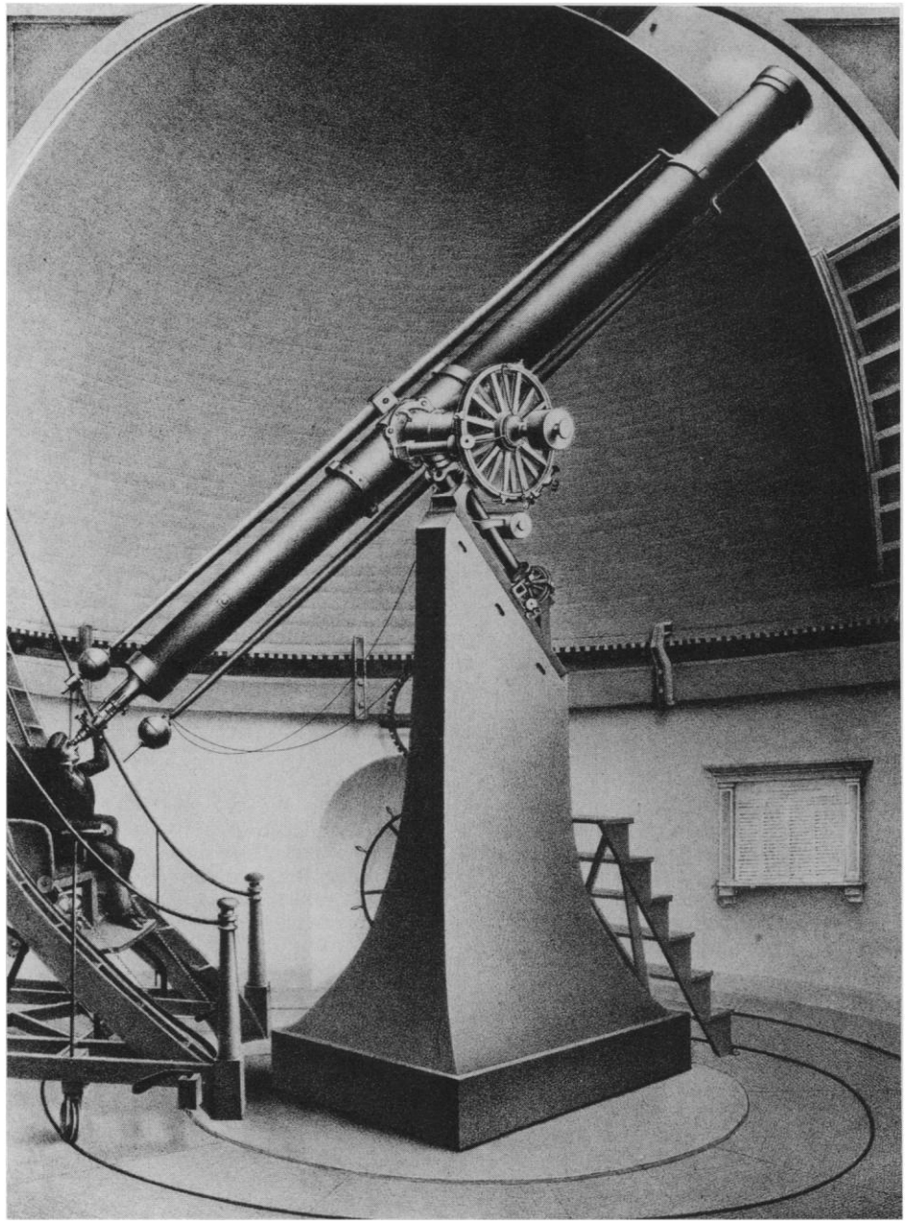
Genteel Enterprises

Science at Harvard University. Historical Perspectives. CLARK A. ELLIOTT and MARGARET W. ROSSITER, Eds. Lehigh University Press, Bethlehem, PA, 1992 (distributor, Associated University Presses, Cranbury, NJ). 380 pp., illus. $35.

In the lithograph from the 1840s that appears at the right a state-of-the-art scientific instrument links an obscure bit of nature to a gentlemanly observer. The activity is protected and ennobled by the realistically rendered institutional building and artist-supplied neo-Renaissance spandrels. The dominant feature in the composition, however, is support—provided literally by the monolithic telescope pier, rooting science in Cambridge, and figuratively by the stone tablet at the right, reminding viewers that the enterprise exists thanks to voluntary benefactions of public spirited citizens.

This illustration neatly symbolizes the elements of science at Harvard during the period covered by this book, a collection of historical essays commemorating the 350th anniversary of the university. Although the book covers events from the founding of Harvard College in 1636 up to the end of World War II, its focus is on the century when modern university science developed—from the 1840s to the 1940s. Clark Elliott, associate curator of Harvard's archives, has gathered contributions from scholars who have used that important collection. The resulting volume is selective rather than comprehensive, analytical rather than celebratory, and focused on institutional activities rather than on scientific ideas. The 11 essays (accompanied by Margaret Rossiter's introduction and Elliott's bibliographical and chronological appendixes) can be divided into studies of individuals, programs, and relations between the university and the outside world.

Toby Appel's portrait of the obscure anatomist Jeffries Wyman and John Parascandola's sketch of the career of the biochemist and sociologist L. J. Henderson indicate both the diverse opportunities Harvard offered to scientists and the major change that took place in the institution's interest in individuality. Wyman, a caricature of the ascetic specialist, was able to prosper at Harvard in the mid-19th century owing to the support and protection of friends who admired his modest scientific character. Between 1910 and 1940 Henderson strove to reestablish intellectual community among increasingly disparate specialists, first by promoting systems concepts and then by establishing the elite Society of Fellows; interdisciplinary interchange required that the institution cultivate strong personalities.



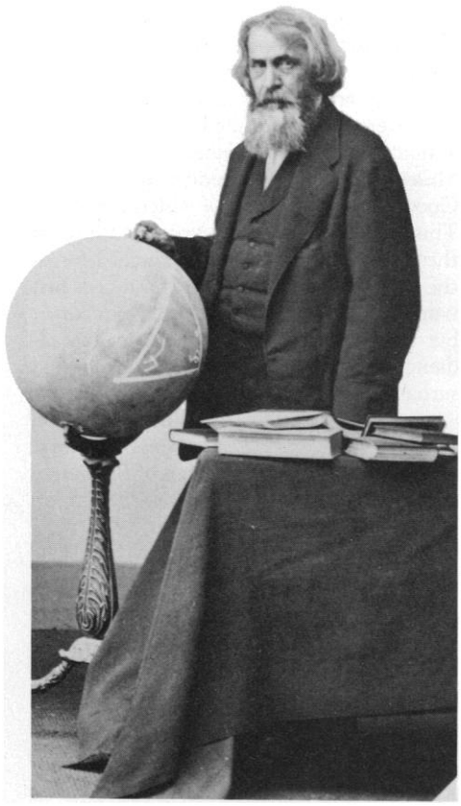
Harvard College's "Great Refractor," financed by "cometary enthusiasts" in 1843. [From *Science at Harvard University*; courtesy of the Adler Planetarium].

A trio of papers on programs in the social sciences indicates how local circumstances could produce tedious conservatism, bold innovation, or merely confusion. Curtis Hinsley shows how the anthropologist Frederic Putnam, intellectually insecure but financially well supported, generated an unadventurous, museum-oriented science that ultimately had little influence on the development of the discipline. Rodney Triplet emphasizes that the biochemist-turned-psychotherapist Henry Murray was able to maintain himself against the crabbed scientism of experimental psychologist E. G. Boring in the 1930s in large part because of his private wealth and status. According to Lawrence Nichols, university administrators waited three long decades before deciding that sociology had lost enough of its "ill repute" to be established as a department in 1931. Departmental self-sufficiency at Harvard, expressed in the local slogan "each tub on its own bottom," represented an extreme among American universities, but the vicissitudes of Harvard programs demonstrate the importance of the study of departments for understanding the development of academic disciplines.

In the most important essay in the collection, Bruce Sinclair goes beyond particular disciplines to probe Harvard leaders' beliefs about the relations among science, technology, education, and the future. He does this brilliantly through a narrative of the university's repeatedly unsuccessful efforts to develop applied science and, more particularly, to cooperate with M.I.T. New England manufacturers, from Abbott Lawrence in the 1840s to Gordon McKay in the 1910s, sought to fund engineering at Harvard. Long-time president Charles W. Eliot, and other Harvard men, believed firmly that applied science was part of their mission. Plans to incorporate M.I.T. into the university were repeatedly put forward. Yet a workable solution was never found. Sinclair locates the barrier in the visceral distinction that Harvard men made between amateur "gentlemen" and merely professional "players"; engineering training was incompatible with a college culture that was thought to foster the open-ended learning necessary for true leaders.

Sinclair's essay, and others in the volume, confirm the view that while Harvard science could be empirical or theoretical, creative or routine, it was nearly always genteelly academic. As B. F. Skinner recalled, at the first meeting of the Society of Fellows in 1933 Harvard president James B. Conant "talked mostly about the necessity of a classical education in science." Two papers address the challenges that World War II and the Cold War posed for this perspective.

I. Bernard Cohen delicately assesses computer designer Howard Aiken's problems in reconciling academic assumptions about scientific creativity with benefactor-collaborator IBM's expectations regarding public relations credit. Peggy Kidwell then reviews the effects of World War II and its aftermath on the astronomy program; this paper, together with Sara Genuth's initial essay on the rise of Harvard astronomy, provides an ironic frame for the volume. Many average Americans considered the great comet that appeared in early 1843 a confirmation of the well-known evangelist William Miller's prophecy that the world would end that year. Responsible citizens funded the Great Refractor in large part to combat such ignorant apocalyptic beliefs. In succeeding decades, Harvard astronomy prospered as part of international science. In the late 1940s, however, observatory director Harlow Shapley was pushed aside because his internationalism was too visible. At the same time, the federal government became the observatory's major patron; this new support derived from the military's belief that astronomy could help to ward off the nuclear apocalypse.



The mathematician Benjamin Peirce (1809–1880) at Harvard. "Even in an antebellum world of striking beards and stately public styles, Peirce was described by his contemporaries as a man of immense presence." [From *Science at Harvard University*; courtesy of Harvard University Archives]

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Hallmarks of Civilization

The Origins of Natural Science in America. The Essays of George Brown Goode. SALLY GREGORY KOHLSTEDT, Ed. Smithsonian Institution Press, Washington, DC, 1991. xii, 411 pp. + plates. $45.

The generation of George Brown Goode's immediate predecessors labored to raise their nation's science in world esteem while simultaneously pursuing scientific careers in the opportunities opened by the state and federal explorations and surveys and the scientific institutions those enterprises spawned. Determined to live *by* as well as *in* science, they rarely paused to look back.

Goode (1851–1896), securely established at the National Museum his predecessors had created, could afford to take stock. Prosperous and indulgent parents, private tutors, and training at Wesleyan University and Louis Agassiz's Museum of Comparative Zoology had set him on a career in ichthyology when Spencer F. Baird brought him to the United States National Museum as curator in 1878, then made him assistant secretary of the Smithsonian in charge of the Museum. Slight of stature, impatient, chain-smoking, he poured forth research papers by the score, scientific bibliographies, and a volume of genealogy, the while administering the museum. But perhaps his most enduring accomplishment is his pioneering essays on the history of science in America.

Goode reported the results of his inventory of American scientific achievement in a series of addresses delivered in the late 1880s and 1890s before the Biological Society of Washington, the AAAS, and one of the earliest meetings of the American Historical Association (a seeming anomaly here, but Goode had helped to get the Association incorporated). Writing history with an eye to Agassiz's admonition to the historian of zoology that "the value of each successive contribution should be estimated in the light of the knowledge of the period, not of that of the present time," Goode replied with some indignation to Herman L. Fairchild's negligent observation that American science had been in "a state of general lethargy" for the first four decades of the 19th century, a lethargy Fairchild incredibly laid to "the absence of everything like an effective national pride in science."

Nonetheless, Goode himself discerned a dismaying lack of pride of another sort among scientists of his own day: civic pride. He found that in the United States, where "more than in any other country, it is necessary that sound, accurate knowledge and a scientific manner of thought should