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

exist among the people," there appeared to be only "1 person interested in science to about 10,000 inhabitants." Of the scientific periodicals, the *American Journal of Science* had a circulation of less than 800, *Science* less than 6000. For this the scientist, a specialist now, intent on laboratory research and neglectful of the public welfare, was in great part responsible.

Thus spake the citizen to the scientist and historian, and thus was Goode lodged between the horns of the Smithson bequest, between "increase and diffusion of knowledge among men," between the early Joseph Henry and Spencer Baird; between, as some reductively saw it, aristocracy and democracy. The publications on fish and fisheries tapered off in the early '80s to give way to historical essays, especially essays on museums.

As historian of museums Goode pioneered again. But it was as a lesser historian this time, neglectful of Agassiz's advice and, with it, of scholarly research. Observing that "the first chapter in the history of American museums is short," he gave it the same short treatment Fairchild had given the first chapter in the history of American science. That what the present calls presentism had crept in should come as no surprise. Given his position as administrator of America's premier natural history museum, it is understandable that Goode should have seen the institution of the museum as a hallmark of civilization in every age. That he lived his life in the Gilded Age must have served to set the seal upon its value as an instrument of public enlightenment, moral as well as intellectual. (How many institutions in that heyday of museum and library building were built by the perceived decline in public virtue?) In consequence Goode strove unremittingly to professionalize museum-keeping, much as his predecessors had striven to professionalize science, and to establish it as policy that museums were to strike a balance between scientific research and public enlightenment. Seeking to democratize the museum without making it a stationary roadshow, to nourish professional science without starving the multitude, Goode maintained separate collections for the two purposes. Seventy-five years earlier, Charles Willson Peale, who sought to direct his museum to the same ends, had called the democratic policy one of "rational amusement," but then, operating under severe financial constraint, he had been able to afford only one collection for all. Did the specter of the five-legged, six-footed, two-tailed cow giving milk to a two-headed calf, which necessity obliged Peale to display, ever haunt Goode?

Accompanied by an informative introductory essay and a gratifying collection of photographic portraits, the present volume presents two of Goode's essays on the early history of American science and three on scientific and educational institutions as they were first published in 1901 in the annual *Report of the United States National Museum*. Happily, the editor has retained Goode's footnotes, one of which reads, "1. This is asserted in a book written to support the present government in France. I forget the title." The index helpfully attaches first names (which Goode surely did not forget but rather could reasonably expect his audiences to provide) to the many naked surnames that appear in his essays.

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## Nobelists and Company

**Nationalism and Internationalism in Science, 1880–1939.** Four Studies of the Nobel Population. ELISABETH CRAWFORD. Cambridge University Press, New York, 1992. xii, 157 pp., illus. $44.95.

Ever since 1974 when restrictions governing documents related to Nobel Prize nominations and deliberations were relaxed, a small circle of Nobel devotees has debated what kinds of questions are worth asking of these coveted historical resources. To historical contextualists, statistical studies seemed too simplistic. To number crunchers and database compilers, generalizations uninformed by the "hard" data were inconclusive. Elisabeth Crawford has tried to navigate between these two extremes in her case studies of the Nobel population (which embraces not merely the laureates but all candidates and nominators). Working with data on the approximately 1000 physicists and chemists who constituted this population between 1901, when the prize was founded, and 1939, when the Second World War began, she explores a historical phenomenon shaped in part by the inauguration of the prize: nationalism and internationalism in science.

"Nationalism" and "internationalism" have not been easy terms to define in science studies; Crawford explains her usage of them in two introductory chapters on conceptual and historiographic issues. Viewing nationalism in terms of nation-state building in the final decades of the 19th century, she emphasizes science's role in strengthening the economic infrastructure and cultural character of several Western nations. Invoking Ernest Gellner's idiosyncratic description of nationalism as the imposition of high culture on society, she suggests several ways in which science was central to that cultural transformation, helping to create a national identity. Most of the secondary sources she draws upon to illustrate her points concern science in Germany. (Sources on science in Great Britain may not have worked as well because they would have posed a problem outside her analytical framework, that is, how science served imperialism and the empire in addition to the nation.) Internationalism in science embraces for Crawford such practices as international congresses, international scientific organizations, and efforts to establish international standards of measure. In addition to nationalism and internationalism in science, Crawford discusses some traditional concepts from the social history of science that she deploys throughout her book, such as disciplines, specialties, and research schools; elites; and Joseph Ben-David's notions of center and periphery in science.

For Crawford, the Nobel Prize is a locus for understanding tensions between nationalism and internationalism in science because prizewinners receive a significant number of nominations from scientists in nations other than their own. The implicit assumption of her argument is that the larger Nobel population of candidates and nominators can be used to understand tensions between nationalism and internationalism in science other than those that become manifest in the prize process itself. In her empirical chapters, she examines four problems: internationalism in science as a casualty of the First World War; the relation between Eastern Europe (the periphery) and Germany (the center); the Kaiser-Wilhelm Society and the Nobel institution; and Nobel laureates as an elite in American science. The first two cases in particular illustrate the interplay between statistical evidence and contextual reasoning in her argument.

It is Crawford's contention that, whereas the period from 1900 to 1914 was the "golden age of internationalism," there were thereafter disturbances in international scientific relations due to the First World War. Own-country nominations for the Nobel Prize increased during the war for Great Britain, the United States, and Germany; France had had high own-country nominations since 1901. During the war itself, Allied scientists rarely nominated Central Power scientists, and vice versa. Fewer than 2% of the nominations crossed enemy lines between 1916 and 1920. That, however, is the only really striking result of her bar-graph analysis of nominations from Central, Allied, and Neutral powers to Central Power physicists and chemists com-