

viscoelastic properties displayed by most biomaterials.

The book ends on a rather tantalizing note regarding cell mechanics which is surely the next frontier of modern biomechanics. Coming from an established researcher in the area, this book will inspire uninitiated readers and students to invest a career in this area of work much as Steven Vogel's *Life in Moving Fluids* inspired a generation of biological fluid mechanists.

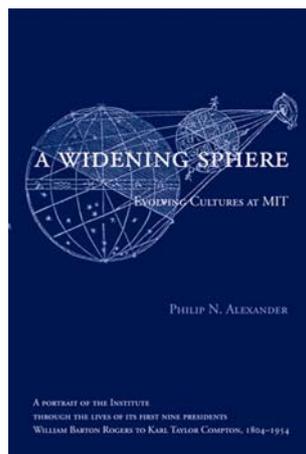
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**A Widening Sphere: Evolving Cultures at MIT.** Philip N. Alexander. The MIT Press, 55 Hayward Street, Cambridge, MA 02142. 2011. xi + 508 pp. Price: US\$ 29.95 (cloth).

In 1991, having just completed a book about the history of the California Institute of Technology (Caltech), I asked the school's four living presidents if they would write something from their perspective about how a modest Pasadena school, which in 1891 was devoted mainly to manual training, transformed itself into one of the world's great scientific centres. They had no trouble pinpointing the philosophy and the causes behind the school's success.

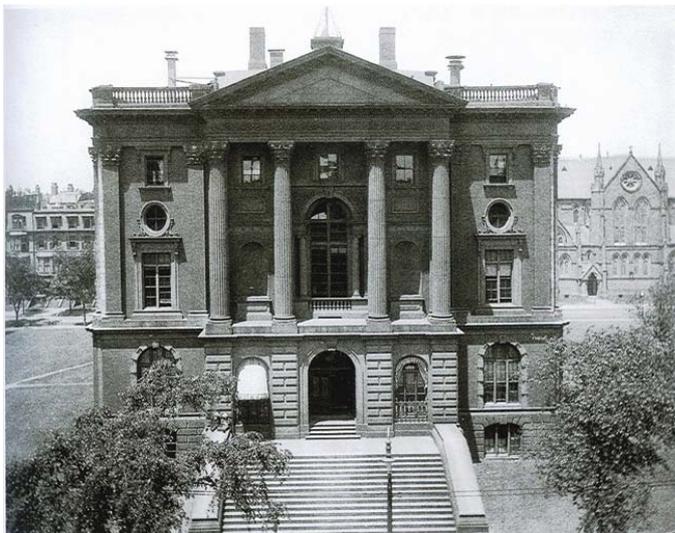
Lee DuBridg, the physicist who had the longest tenure of any Caltech president (1946–1969), took it as axiomatic that a small number of great scientists had made it possible for the school to grow and prosper. An institution is often said to be the shadow of a man, DuBridg added, pointing to Robert A. Millikan, the school's first chief administrative officer. In his opinion, Millikan, who refused the title of president while serving in that role from 1921 to 1945, had done more than any other single person to forge Caltech's character and secure its future.

Presidents Harold Brown (1969–1977) and Marvin Goldberger (1978–1987) emphasized the value of selecting the best people, concentrating on carefully selected fields of activity and knowing when to move into new areas of teaching and research. Thomas Everhart, who became Caltech's fifth president in 1987, added an additional ingredient: the ability to adapt to changing times in ways that do not compromise the mission or integrity of the institution.

Despite these lucid and well-informed prescriptions, my own research left me with the sense that a great mystery surrounds institutions of higher learning: Why do some schools succeed and flower whereas others go nowhere, stagnate and even wither away? Caltech originated as the brainchild of MIT graduate and astronomer George Ellery Hale, who had come to Caltech's home city of Pasadena as Director of the Solar Observatory on nearby Mount Wilson. Hale, who joined the board of Caltech's then-struggling forerunner, Throop University, believed that southern California needed a technical institution comparable to MIT. In pursuit of this vision he managed to lure both Arthur Amos Noyes, MIT's former president and the nation's leading physical chemist and Millikan, America's premier physicist and a Nobel laureate at the University of Chicago, to Pasadena, where they joined Hale in constituting Caltech's founding troika. Their singular abilities and synergy were certainly crucial to Caltech's success. But they do not tell the whole story either.

Now Philip N. Alexander, research associate in the program in writing and humanistic studies at MIT and longtime member of the MIT community, has taken up this question as it applies to what Caltech likes to call 'That Other Institute of Technology'. His new book, *A Widening Sphere: Evolving Cultures at MIT*, traces the university's history from its founding as a small technical institute in Boston's Back Bay in 1861 – and greatly overshadowed at the time by its venerable neighbor across the Charles River, Harvard University – to 1954. Like a number of other writers who have addressed the evolution of technical schools in recent books – notably Robert Seidel and Charles Vest – Alexander takes a historical approach to his subject, offering a detailed portrait of MIT through the lives of its first nine presidents, from William Barton Rogers, born in 1804, to Karl Taylor Compton, who died in 1954, six years after turning over the reins to James Killian.

Alexander casts a wide net, drawing on a host of source materials in MIT's Institute Archives, Special Collections and elsewhere, as well as on numerous oral histories and monographs. His portraits of MIT's presidents and their times are deft and illuminating. He recounts the political and entrepreneurial skills of MIT's first president, William Rogers,



The Bolyston Street building, ca. 1870 – named the Rogers Building, after MIT's founder and first president, in 1883.

and the endless quests of his successor, John Runkle, to publicise the new school amid rising tensions over the role of the humanities and the social sciences at a technical institution. Francis Walker raised MIT's technical profile by reorienting the curriculum to meet the growing national demand for specialized skills in engineering fields, whereas James Crafts vigorously promoted coursework leading to advanced degrees (first awarded in 1907). Henry Pritchett,

an astronomer with a PhD after his name, established three seminal research programs, including the Research Laboratory of Physical Chemistry under the direction of A. A. Noyes. He also mounted an ill-starred campaign to merge MIT with Harvard, but it was his successor, Richard Maclaurin, who moved MIT across the Charles River to become Harvard's neighbor in Cambridge. Ernest Nichols was a physicist whose colleagues snubbed Albert Ein-

stein during his 1921 visit to Boston, thus costing MIT 'a golden opportunity to trumpet itself as a mainstay of American science and technology', Alexander notes. As MIT entered the modern era, Samuel Stratton worked diligently to counter the perception that the school turned out graduates who excelled at industrial work but not at making fundamental discoveries and Karl Compton's vision of a science-based technological university, grounded in research, curriculum reform, and graduate education, guided MIT into the postwar world.

Tackling a university history that spans 150 years of American history is no small feat and carrying it off with originality, style and narrative skill says a good deal about Alexander's credentials as a scholar. There are few 'insider' institutional histories that can match *A Widening Sphere*. Alexander makes an important contribution to our understanding of the growth of America's scientific community in the last century and his book is likely to remain the definitive history of MIT for a long time.

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