BOOKS & ARTS

Research funding in the twenty-first century

Are universities and market forces compatible?

Science for Sale: The Perils, Rewards and Delusions of Campus Capitalism

by Daniel S. Greenberg

University of Chicago Press: 2007.

288 pp. \$25

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Daniel Greenberg is widely considered the premier journalist of science policy, having written extensively on the subject over the course of its 60-year evolution in the United States. *Science for Sale* is his latest offering. It provides an intriguing, if idealistic, review of the issues surrounding the funding of science in the twenty-first century. Greenberg posits that science was once, and should be again, driven by the pure curiosity of scientists and not by motives influenced by the stress of external funding and the negative forces of capitalism. Unfortunately, science past did not really exist in the way he spends so much time describing in the book.

Greenberg's idyllic views — in particular that the academic scientist and the university are best motivated by curiosity alone — are interesting. But they run counter to history, to how organizations operate and, perhaps most importantly, to the understanding that 'the university' itself is an idea, not an ideal or an ideology.

In fine journalistic style, the author makes his case that the modern university, with its quest for resources, has drifted far from its purely scientific origins. He presents substantial and meaningful information and anecdotes about the academic arms race, the drive for comprehensive funding and the complexities and perils of corporate funding of research. He guides us through the negative effects that can result throughout the academic system for a large-scale, high-impact enterprise that is highly competitive at individual and institutional levels.

Academics would admit that Greenberg's concerns about conflicts of interest and the challenges of funding are legitimate and that these need to be managed consciously and meaningfully. But his assumptions and arguments about the corruption of academic purpose and of its independence from

corporate and government funding are oversimplified. He presents scenarios in which the actors involved, be they academic scientists, university administrators or corporate technologists, do not seem to live up to his ideals in terms of their scientific comportment; his analyses aren't so much incorrect as lacking in detail and historical context.

From its beginnings, US academic science has focused on practical outcomes and has been linked heavily to industry. Take the Silliman family of Connecticut. Benjamin Silliman, a Yale alumnus and son of the revolutionary war hero General Gold Selleck Silliman, switched professions from law to medicine and in 1804 taught the first academic science class in the United States. He was a hybrid chemist, geologist and science-society organizer who, between 1804 and 1857, spent much of his time on practical mineralogy and consulting for industry and the government. Silliman's son, also Benjamin, became a Yale chemist and one of the most influential academic scientists in US history. He wrote a US\$526 report for industry on how to distil fractionated oil, which ultimately led to the emergence of the oil industry in Pennsylvania and provided the chemical source for the Standard Oil Company. These path-breaking academics helped shape the structure of America's first school of science (Sheffield Scientific School at Yale) and furthered the US tradition of practical science.

This account and numerous others demonstrate the emergence of US universities through donation, state constitution, church, land-grant or powerful local business and commercial forces. *Science for Sale's* portrayal of academic science as previously unencumbered by market forces, greed or evil is not the whole story.

The theory Greenberg presents is desirable. In reality, science and its environment represent a much more complicated force. Academic scientists work to advance humanity, sometimes coming up with innovations that have the potential for good and bad outcomes. One of Greenberg's case studies of corporate influence on the development trajectory of the chemotherapy drug Taxol seems like child's

play when compared with government influence on the production of new technologies with a high potential for social and economic disruption. Even science at its most pure can be affected by a variety of factors, sometimes with unintended consequences. The point is, all influences are at least equal, all outcomes can cut both ways and all resources carry with them a *quid pro quo*.

Greenberg outlines the myriad pitfalls and patfalls faced by academic science, but does not analyse how to address them. US research universities exist inside one of the bastions of capitalism and are organized to compete with each other for students, faculty, resources and recognition in this complex sociocultural system. Unlike much of the rest of the world, they are not managed by a central ministry. This setting has led institutions to take on many of the characteristics that concern Greenberg — size, scope, wealth, reliance on external resources, and so on. It is not a set of corporate or capitalistic forces that are driving US academia on the path of increased complexity and stress. It is the universities, through their creativity, connectivity, influence and power, that are driving other institutions or nation states to action with science-based competition. ■

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