BOOK REVIEWS

The Fortunes of an Ideal

Minds for the Making. The Role of Science in American Education, 1750–1990. SCOTT L. MONTGOMERY. Guilford, New York, 1994. xii, 316 pp. $39.95; paper, $18.95.

Scott Montgomery noticed the interesting fact that in the recent controversies over higher education the role of science has been almost totally ignored. The battles over canon and curriculum have been waged mainly among humanists. But how is the role of science in liberal education understood today? How is scientific education supposed to transform the mind and spirit? Such questions, we know, are no longer asked. And for most liberal arts students, science has been reduced to a meager residue of required courses, taken grudgingly, with no hint given of how a smattering of chemistry, geology, or whatever is supposed to contribute to the larger aims of liberal education.

Of course, it was not always so. For most of this century, a broad vision of science was the implicit integrating core of American higher education. The social studies, the humanities, the applied fields tried to model themselves on the "hard" sciences. The scholar became researcher. What was to be taught was a body of certified knowledge, the fruit of organized investigation. The stance of the trained intellect was one of detached objectivity. Political science taught the empirical analysis of government, not the arts of political judgment. Literature taught how to interpret a text, as object (as a geologist might "read" a landform), not how to write one.

How then do we now understand the role of science in education? How should we understand it? Montgomery takes us through a history of the diverse conceptions of science that have influenced American education since independence. These are the themes that have structured our ideas of where science fits and what science means in the educational enterprise, in the curriculum of the school and the university. This is the legacy we have to work with. And Montgomery would have us approach this legacy without illusions. He would have us understand that these conceptions of science are very much bound up with considerations of politics and national power, economic interest, and the self-promotional activities of scientists themselves, which, as we know, from Agassiz to NASA, can easily outdo those of snake-oil salesmen and conglomerate financiers in ballyhoo and hucksterism.

Montgomery organizes his story about three fundamental conceptions of the role of science in education that weave in and out of the history of the Republic. The first is "academism": Science is to be understood as part of the pure heritage of works of the mind, along with philosophy, great literature, and art, which it is the duty of the schools to preserve and pass along for the refinement of the mind. The second theme is "practicalism": Science is essential to economic and technological development, to prosperity and national power. The third tradition is "reformism": Science is the key to social transformation, to the preparation of citizens and the success of democracy.

In Montgomery's tale, the nation began with a broad and bold ideal of science education. The scientific frame of mind, as understood by Jefferson and Franklin, was both pure and practical. It was essential to the civic culture of the new Republic that citizens think "scientifically," science here implying something like Enlightenment rationalism.

Despite this grand vision, science had a hard time getting established in the schools and colleges of the new nation. Yet science was promoted by America's romanticization of nature, which led to interest in such subjects as botany and geology, and by the practical project of training farmers, mechanics, and military engineers. By midcentury, with the industrial revolution, the creation of the "agricultural and mechanical" colleges, and the demand to emulate German science and technology, the practical aspect of science became dominant.

The Progressive era was defined, philosophically, by Dewey's reformist idealism, but this was quickly subverted by the development of the idea of the school and university as factory, mass-producing specialists as efficiently as possible. In this period, too, education itself became a subject for scientific analysis. It was thought that one could study learning and teach scientifically.

The postwar period brought an enthusiasm for big science, science dedicated to defense and technology, a return to pure science, and, in the end, a scientific establishment ever more mysterious and remote from everyday life and the educational mainstream.

This book is rich and detailed in describing the distinctive epochs in the history of American science education. It is easy to read and the argument often perceptive. But to appreciate this book one must forgive its defects. Professional historians will hate it, for the research is shallow and derivative. There are a lot of sweeping assertions about complex matters (for example, that Dewey got his pragmatism "nearly whole" from James's *Principles of Psychology*) that make one shudder.

Montgomery writes in the style of the critical historian. The approach is what used to be called "debunking," more likely now "deconstructionist." (Probably these two amount to about the same thing in the end.) Montgomery's object is to strip away any illusions the reader may have about the scientific enterprise. Nothing is ever quite the way it seems. Every image of science is a contrivance to promote some interest. Every project of scientific education turns out to have feet of clay. Montgomery's stance is relentlessly critical. But one gets no sense of Montgomery's image of "authentic" or "adequate" science by virtue of which he finds all other ideas of science wanting. (Occasionally one suspects that he might hold a radical, romantic view that education should be about self-expression and personal exploration, but this is not really made clear.)

A relativizing exercise like this always raises the practical question: if all prevailing conceptions of science education are flawed, how should we now proceed? How should we define the purpose of science education? A book like this, somewhat brutally, can raise these questions for those who are epistemologically incurious or slumbering (and indeed there are many such in science education). But such a book does not help us answer such questions, and indeed it may, whether intentionally or not, intimate, nihilistically, that there are no better or worse answers, that all is charade and illusion.

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