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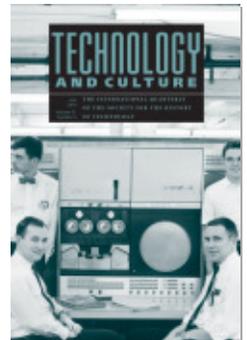
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The Scientific Life: A Moral History of a Late Modern Vocation

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reader to put together the pieces. Some passages feel repetitive, and there is one outright duplication (pp. 9 and 205). The early chapters, especially, are unforgiving to those unfamiliar with linguistics and computer science. Terms such as “Strong AI” and even acronyms like “CFG” (context-free grammar) appear without explanation. Though Chomsky is a key figure, his linguistic ideas are never laid out for the reader.

Columbia also makes several efforts to link computationalism to right-wing politics that come across as forced. For example, computationalism supposedly aligns with fundamentalist Christianity because they share “the belief in a quasi-platonic world out there that transcends the human social world” (p. 78). Though Columbia concedes in several places that computing is a flexible technology that can be bent to democratic as well as authoritarian ends, he never admits that rationalism or computationalism might be flexible ideologies. But by dividing the world starkly into rationalist authoritarians on one side and anti-rationalist democrats on the other, he fails to account effectively for the existence of the very targets of his exhortation: left-leaning advocates of democracy who believe firmly that computers will bring about their goals. The world is smooth, after all.

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The Scientific Life: A Moral History of a Late Modern Vocation.

By Steven Shapin. Chicago: University of Chicago Press, 2008.
Pp. xvii + 468. \$29.

This volume traces the evolution of science from calling to job to semi-entrepreneurial activity in our own time. The story is of course not this simple, and readers will find here Steven Shapin’s renowned virtues as a historian—rigorous evidential detail, sustained analytical complexity, and other gratifying signs of a historian *thinking*. The chapters on entrepreneurial science are less successful, however, and raise important questions about where science is now going and about how to study it.

After chapter 2’s retrospective, most of the book focuses on changes in the twentieth century. The main scientific types are familiar: the academic scientist, focused on fundamental research; the industrial scientist, oriented toward putting knowledge into use; and the entrepreneurial scientist, creating intellectual property for sale into a commercial development process, including faculty-based start-up companies. Many analysts have argued that these are misleading: the publication of Donald E. Stokes’s *Pasteur’s Quadrant* (1997) influentially displaced the binary contrast between basic (Bohr) and applied (Edison) research by showing that major discoveries occurred

where fundamental research and practical problem-solving interacted continuously. How does Shapin help clarify this “post-binary” picture?

First, Shapin’s book confirms the Stokes tradition by showing that familiar contrasts between basic and applied, high and low, intellectual and commercial science emerged from limited historical and institutional perspectives. His careful review of mid-century claims for “inherent strains” between science and industry (chapters 4 and 5) shows that the model appeared in academic sociology but not in industry accounts of research practices. Second, Shapin is not simply blurring the distinctions between basic and applied, high and low science, but showing that we may have high and low upside-down. He shows that when we pay attention to the self-descriptions of industrial science, we may find the large-scale corporate scientific operation *more* rather than less able to produce breakthrough discoveries. If you are trying to help stop global warming by engineering quantum dots at the nanoscale to produce large increases in photovoltaic efficiencies, you probably need what I would call “mass science”—brilliance orchestrated on a gigantic scale, which humans are just learning how to do. Chapters 5 and 6 are the heart of the book, and the detail in accounts of research managers like Kodak’s legendary Kenneth Mees suggests that real science *is* industrial science—if and only if it incorporates the traditional strengths of “pure” science into a collaborative architecture.

This is Shapin’s third contribution: he stitches together a picture of research in large corporations that rests on publication, open professional exchange, self-management, and significant freedom from cost accounting—in short, on the combination of autonomy and free collaboration that is normally associated with the research university. Those as aware as Mees of the uncertainty of ambitious research advocated research *dis*organization—which meant researcher self-organization—and regular, rigorous communication. Finding profitable commercial applications depended on applying Meesian aphorisms such as, “when I am asked how to plan, my answer is, ‘Don’t’” (pp. 198–99). The implication, not stated as such by Shapin, is that the productivity of U.S. science for most of the twentieth century depended on a much-misunderstood synthesis of “academic” freedom and porous, flexible, corporate organization, regardless of whether it appeared in industry, a government laboratory, or the university. This meant not entrepreneurial wildcatting but creativity within stable organizations.

The rest of the book is devoted to entrepreneurial science, and here the discussion is less compelling. Chapter 7’s interviews stage a debate between “discovery” and “use” that the previous analysis seemed to surpass. Chapter 8 and the epilogue fit oddly into the book: they change the subject from the “scientific life” to the life of venture-capital (VC) investors. The reason is ostensibly because the science-industry-university-inventor complex has come to *be* “late modern” science as such, but in fact research continues to

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be conducted by scientists and their grad students and post-docs, not by investors and their partners in academic administration. Shapin's official focus in this book is not "the scientist" wherever she may be found, but the "charismatic" truth-tellers, the "bearers of our most potent forms of knowledge" (p. 6), "our culture's most authoritative people," and he has determined that "late modernity's New Men and Women" are California's venture capitalists and their allied venture scientists (p. 306). It is at this point that one wonders whether Shapin is describing a charismatic effect or succumbing to it. In either case, the effects cannot be allowed to represent the scientific labor and innovation on which those effects depend.

Shapin does stress the extent to which VC investment decisions display an odd combination of "ruthless instrumentalism" and "clubbability" that generates "the moral texture of networking among familiar people" (pp. 302–3). The most interesting material is about the sheer exclusivity of VC networks, which, viewed outside the charismatic circle, raises the possibility of a compulsive oversampling from a small pool of ideas, of diversity failure, of inbreeding of a kind common to any extravagantly wealthy though volatile ancien régime. What if the geniuses of the 1990s internet economy, having denied their debt to stable organizations like the government ARPANET programs of the 1950s–80s and then overfocused on a lucrative but narrow digital version of futurity, are *therefore* no longer able to innovate at anything like earlier rates? What if the key to U.S. innovation was not entrepreneurship as such, but organization—a "cooperative advantage" that we are now busily giving up?

Shapin's book helps us formulate a range of vital questions for our current predicament, and it should be read by all interested in the fate of innovation in this transition from the "America century" to the one that still lies ahead.

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