

American Hegemony and Creative Destruction

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Books

Thomas K. McCraw, *Prophet of Innovation: Joseph Schumpeter and Creative Destruction*. Cambridge: MA, Harvard Belknap Press, 2007, 719 pages

Carroll Pursell, *Technology in Postwar America: A History*. New York: Columbia University Press, 2007, 280 pages

GORDON LIGHTFOOT'S "Canadian Railroad Trilogy" depicts how steel rails penetrated Canada's dark green forests from Gaspé to the Pacific. It ambiguously celebrates the land before it was industrialized, the labors of the navvies who laid down the rails, and the railroad itself. Joni Mitchell famously complained that mankind had paved paradise to build a parking lot. To use the phrase made famous by Joseph Schumpeter, both songs suggest the "creative destruction of capitalism." Both are also about the effects of machines on the natural world, a subject that did not concern Schumpeter's generation nearly so much as our own. The two books under review represent different ways to understand the creative destruction that unavoidably involves new technologies.

The author of *Prophet of Innovation*, Thomas K. McCraw, recently retired as Isidor Straus Professor at Harvard Business School, where he developed case studies of corporations as a central part of an MBA education. He won the 1985 Pulitzer Prize for *Prophets of Regulation* (Harvard University Press, 1984), and he has also published books on the Tennessee Valley Authority, entrepreneurship, and American business history. Carroll Pursell, author of *Technology in Postwar America*, recently retired as W. Adeline Barry Davee Distinguished Professor of the history of technology at Case – Western Reserve. He belongs to the pioneer generation of scholars who founded Science Technology and Society programs (the first at Case – Western in 1961), compiled many of its first anthologies, and tirelessly served the Society for the History of Technology (SHOT), which this year celebrates its first half century. He is that all – too – rare polymath whose interests span many sections of a library, including recently *A Hammer in Their Hands* (MIT 2006), a groundbreaking collection of documents on African Americans and

technology. His many works also include *The Machine in America* (Johns Hopkins, 1996), a social history of technology from the seventeenth century until the present. These distinguished scholars have each written books that cover a little less than seventy years. McCraw's story begins in the late nineteenth century and ends with Schumpeter's death in 1950, overlapping slightly with Pursell's reflections on technology in America since Pearl Harbor. Because they address technology from different starting points and emphasize different aspects of capitalism, examining these two works together poses fundamental issues.

What is the driving force of change in the contemporary world? The entrepreneur? The machine? Labor? Consumers? Politics? Or some combination of them all? Schumpeter extolled the entrepreneur and the constant turmoil caused by competition and new innovations. If Karl Marx said that under capitalism "all that is solid melts into air," Schumpeter celebrated "creative destruction." After ten years of the Great Depression, in 1939 he could still write, in *Business Cycles*: "Without innovations, no entrepreneurs; without entrepreneurial achievement, no capitalist returns and no capitalist propulsion. The atmosphere of industrial revolutions – of 'progress' – is the only one in which capitalism can survive." Historians of technology, in contrast, write little about business cycles, and are likely to focus on the social construction of technical systems. They treat entrepreneurs as but one of many actors, giving equal attention to inventors, legislators, retailers, consumers, and workers. They do not celebrate progress or write about "capitalist propulsion." Pursell does not even mention Schumpeter in his book, and he is hardly eccentric in this regard. Robert Friedel also ignored the Austrian economist in his massive recent work, *A Culture of Improvement: Technology and the Western Millennium* (MIT, 2007), as did the *doyen* of the field, Thomas P. Hughes in *American Genesis: A Century of Invention and Technological Enthusiasm* (Penguin, 1989). (However, Hughes informs me that he is greatly enjoying the book under review.) These two works represent radically opposed views of how the present world came into being. Schumpeter and many business historians put the entrepreneur at the center, which makes for appealing stories of struggle and achievement, triumph and loss. Historians of

technology seldom write of great figures bestriding history, but of complex interactions between networks of human beings and the machines they invent, manufacture, purchase, and use. Yet these are not diametrically opposed views. Despite their differences, these two approaches reject both Marxism and determinism, and both fields seek to verify their central claims by an appeal to history.

It was by no means an accident that the academic study of technology emerged when it did at the end of the 1950s. Not only was the pace of technical change quickening, but extensive government involvement in the newest developments in computing, aerospace, and automation stimulated curiosity, while competition with the Soviet Union made it seem crucial to understand the sources of innovation. Nevertheless, the field grew slowly in its early decades. Even today, if one puts “technology” in a course title at the university, students may avoid it. The same course may enroll twice as many people if titled not “Technology and Labor” but rather “Time, Work, and Leisure.” The subject also vexes bookstores, which seem never to know where to place histories of technology, which seldom have their own section. To take two seminal works in the field, should Ruth Schwartz Cowan’s classic *More Work for Mother: The Ironies of Household Technologies from the Open Hearth to the Microwave* (Basic Books, 1984) be located in women’s studies, history, or perhaps cultural studies? Is Judith Carney’s *Black Rice: The African Origins of Rice Cultivation in the Americas* (Harvard UP, 2001) found under Black Studies, history, or environment? Browsing for new works on technology and society requires a search through the history of science, transportation, engineering, computers, cultural studies, history, environment and nature, art and architecture, warfare, criticism, and more. Technology is potentially everywhere, yet often nowhere in the bibliophile’s universe. In part, this is a problem of demand. Few universities have departments of science and technology studies (or STS), and it is possible in most universities to get a history degree without taking any coursework in this area. Future generations may wonder why, in such a highly technical age, virtually all humanities students dealt with identity in some form or other, while so few systematically reflected on technology in society. By comparison, studies of entrepreneurship, business, and economics are easier to locate in the bookstore or library. Courses on entrepreneurship and the history of corporations are required in most business schools, many of which are celebrating their centennial. By comparison, programs dealing with the history of technology are only a few decades old, emerging well after Joseph Schumpeter’s death.

McCraw provides the best portrait we have of the brilliant Austrian economist, whose origins did not suggest world fame. Born in 1883, in a small, Czech town, where his grandfather had introduced the first steam engine and built the first textile mill, he might have become an entrepreneur rather than an economist, had his father not died when Schumpeter was only four. His mother possessed only modest means, but she had determination, charm and good looks. Moving to Graz, she managed to marry a retired general and member of the nobility. This match made it possible to send her son to the finest gymnasium in Vienna, where he excelled. He then entered the university in 1901, studying law and economics. He had a gift for languages, and became exceptionally fluent in French and English. One of Schumpeter’s hallmarks was his broad learning. To the end of his life he still read Greek and Latin literature for pleasure, and at times he wrote like a postmodern literary critic. For example, he declared once that any writer on any subject begins with “a preanalytic cognitive act that supplied the raw material for the analytic effort.” His writing and his lectures were studded with apt examples and memorable anecdotes that neatly underscored his arguments.

Drawing on diaries and correspondence, McCraw depicts the private Schumpeter, as well as the professor and the theories that he developed. In addition to being a charismatic lecturer and penetrating thinker, he was a passionate man who in 1909 fought a duel with a librarian who had refused his students access to important books. Although he wounded the librarian slightly, they later became good friends. While not modest, he was droll, declaring on one occasion that, while his ambition was to be the world’s greatest economist, lover, and horseman, it was not going too well with the horses. Schumpeter had many affairs and was married three times. He first married an English woman, but they drifted apart as World War I engulfed Europe and they found themselves living on opposite sides.

Astonishingly, while living in Britain and briefly working in Egypt, he wrote *The Nature and Content of Theoretical Economics* (1908), a work of 626 pages published when he was only 25. An even more impressive book appeared just three years later, *The Theory of Economic Development: an inquiry into profits, capital, credit, interest and the business cycle*. It turned Marx on his head, transforming capitalists from parasites to the driving force of business development. He praised captains of industry as creators of new wealth and as the enemies of tradition. They undermined the class structure and broke up society, propelling progress. His entrepreneurs did not accept the idea of a steady-state

economy, but assumed “the insatiability of wants.” Such ideas, novel when the book appeared, have become orthodoxy. One of McCraw's many strengths is his ability to distill competing economic theories into readable prose, illustrated with clear examples. Any reader can follow his summaries, and painlessly learn not only the key points in Schumpeter's thought but also how he differed from his rivals.

When Schumpeter became a full professor at Graz in 1911, he was only 28. A charismatic lecturer, in 1913 he was invited to Columbia University. During that academic year he also spoke at other major universities in the Northeast, forming associations that would last the rest of his career. Returning on the eve of World War I, he witnessed the collapse of the old order, as the Austrian empire disintegrated into many unstable democracies. Immediately after the war, he briefly served as Minister of Finance and then became a major stockholder in a bank. In 1908 he had been rather successful as a lawyer and investor in Cairo, but in the hyperinflationary economy of the 1920s he lost a lot of money. Close to bankruptcy and legally still married, he nevertheless took an Austrian much younger than himself to the altar. It was clearly a love match, as she had neither title nor wealth, but was the daughter of the concierge of his Vienna apartment building.

Responsible for his new wife and saddled with large debts that he doggedly paid off over the next decade, in 1925 Schumpeter returned to teaching as a professor at Bonn University. A riveting lecturer who always gave considerable time to his students, he swiftly made Bonn one of the most dynamic economic departments in Germany. He also lectured frequently to businesses and trade organizations, as well as to academic audiences. He did not seek acolytes or insist on orthodoxy from his students. Rather, he valued and knew quality when it saw it, and argued that ultimately there were only good and bad economists, while schools of thought were not interesting. McCraw notes, “he preferred to give briefs for all sides, not a polemic for only one.” He was a brilliant solo performer, not the sort to create a school of thought or to chair a department for decades of meetings, academic politics, and niggling administrative details.

In public, Schumpeter was a charming *bon vivant* and a seemingly tireless conversationalist. In private, he was a workaholic, who all his life relied on others to deal with household matters, and might be found writing at all hours. After the triple loss of his mother, second wife, and only child, all of whom died in the same traumatic summer of 1926, he was driven not only by curiosity and ambition but by guilt and sorrow. From that time on, however ebullient in his

lectures, he struggled with depression, and work was his solace. Schumpeter lived comfortably in a house overlooking the Rhine, but soon other universities tried to lure him away, most notably Harvard. First he came as a visitor, then held a split appointment, and finally, amid the rising tide of Nazism, he emigrated to the United States. From the autumn of 1932 until his death he was the highest paid member of the Harvard faculty. He visited Europe each summer for the first few years, but spent little time in Germany. Perhaps because of his distaste for the Nazis and long absence, “he badly underestimated the staying power of Hitler.”

His third wife was a Radcliffe-educated economic historian, and the first to share his intellectual interests. McCraw devotes an intriguing chapter to her studies of Japanese industrialization, and the suspicions her research aroused in the FBI. J. Edgar Hoover himself directed an investigation of the couple, who were interviewed several times between 1941 and 1944. The Bureau mistakenly suspected her of espionage and spreading Japanese propaganda, and described Schumpeter as a “former Austrian Finance Minister, reportedly escaped to the United States with considerable sum of money.”

Despite this nonsensical yet dangerous distraction and the frustration of seeing the world descend into another conflagration, during his last fifteen years Schumpeter wrote prodigiously, completing three long works and dozens of articles, while teaching a full load. Remarkably, he seldom showed drafts of his work to others, though he doubtless tried out ideas in conversations. This lack of feedback weakened *Business Cycles* (1939). Seeking to synthesize theory and history, it attempted “the rather hopeless task of fitting historical patterns of business booms and busts into predictable wave periods of standard lengths.” If uneven, the two volumes contain much fascinating material, particularly on the opposition to early entrepreneurs and how they overcame it. McCraw argues that the same materials might have been reorganized into three separate monographs. But Schumpeter was attempting to construct a grand design, and he was far more interesting in failure than most others are at their best. In contrast, his timely *Capitalism, Socialism, and Democracy* (1942) was far better integrated, and it became such a popular and critical success that it was reissued shortly after the war (1947), and long remained in paperback. In it he presented capitalism and socialism as irreconcilable systems, with little long-term chance for a hybrid system, either. Championing capitalism, he nevertheless admitted that its growth depended on destruction. “In capitalist reality as distinguished from its textbook picture,” what mattered was not

ordinary price competition, but rather, “the new technology, the new source of supply, the new type of organization (the largest – scale unit of control for instance) – competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives.” (*Capitalism, Socialism, and Democracy*, 85)

Throughout his career he contrasted the many hindrances to markets in central Europe, which grew slowly, with the dynamism of American corporations and the US economy. Many historical examples pointed to the superiority of large corporations in production and marketing, yet Schumpeter argued there was little danger of monopoly, for they remained vulnerable to competitors with innovations. However, the force of his early works did not reside in historical analysis. From his youth in Austria he attacked the older German, historical school centered in Berlin. Schumpeter championed mathematical economics, seeking to make the field more scientific. Even at age 60, when his work had taken a decidedly historical turn, his birthday was celebrated with a special issue of the 1943 *Review of Economic Statistics*.

In his final years Schumpeter labored on his *History of Economic Analysis*. After he died suddenly in 1950 of a cerebral hemorrhage, his wife pulled the notes together into the book that appeared in 1954. At 800,000 words, it was eight times the length of the usual academic book, and offered analysis of more than 1000 thinkers, from ancient times to the present, but concentrating on the eighteenth century and after. Despite its formidable length, leading economists wrote long reviews and praised it extravagantly in the major journals. Schumpeter died long before the first Nobel Prize in economics was given in 1969. However, three of his students, with quite varied views, did win it: Paul Samuelson, James Tobin, and E. F. Schumacher.

Despite its title, Pursell's *Technology in Postwar America* starts during World War II, emphasizing how the government increased investment in research and development to win the war. The new defense industry produced enormous quantities of weaponry, and advanced the development of radar, jet engines, electronics, and most dramatically, nuclear devices. All underwent further development after 1945, laying the basis for US hegemony. This chapter sets the pattern followed in book's early sections. Chapter two argues that if individual entrepreneurs developed methods to mass produce houses, the chief reason so many were built was federally sponsored mortgage programs, the GI Bill, and the construction of new highways. Government made suburbia boom. If builders like Edward J. DeBartolo built shopping

centers, the main reason he could build 200 of them, and that the US eventually had more than 28,000, was the federal government's passage of legislation in 1954 that made possible “accelerated depreciation” for new buildings. Repeatedly, the central actor is the US government, which creates the framework for innovation and change. For example, American technological mastery was inseparable from and maintained through well-funded public universities plus vigorous government investment in R & D, which resulted in a “brain-drain” from the rest of the world.

Pursell's argument is convincing when dealing with atomic power, the heavy military component in “foreign aid,” or the American occupation of Japan. As he points out, after 1946 Japan had to cut “prewar ties to German technology” as “occupation authorities supervised a shift to American technologies.” He does not depict this as simple economic colonization, however, as he notes that the transfer of the new transistor led to a stunningly successful Japanese electronics industry, and that the transfer of the assembly line led the Japanese to create the lean production system. Technology transfer was not always so successful, however. It was at the heart of the 1950 “Point Four Program,” aimed at “developing countries,” which provided visiting technical experts, equipment, demonstration projects, and training at US universities. However, unlike Japan, many countries did not rapidly assimilate new machines and production processes. By 1970, for many “the promise of an improved and modernized society remained merely a promise.”

Particularly in the 1960s the US government planned on a grand scale, at times with success – the Apollo Program did reach the moon, communications satellites did orbit the earth – but often with failure – atomic power was hardly “too cheap to meter” and the Plowshares Project that was to use atomic bombs to create harbors, blast a new canal through Central America, and open up underground gas deposits, fortunately never got very far. As these examples suggest, like most historians of technology Pursell is more concerned with the uses of technologies than with scientific theory. He succinctly summarizes efforts to automate blue-collar work and the development of robots, and he describes the industrialization of agriculture and the de-population of the farms. Between 1935 and 1995 poultry farmers increased the average weight of a chicken from 2.8 to 4.7 pounds, even as they reduced the time it took to hatch and rear it from 112 days to just 47. Through technologies of “continuous flow, nutrition, and growth promotion, and breeding and genetic improvement, the barnyard chicken was made over into a highly efficient machine” that could, in turn, be

slaughtered and processed at the rate of 15,000 an hour. Likewise, mechanical pickers could strip–mine hard green tomatoes, which were then “ripened” using a new gas called “ethereal.” Many such well–chosen examples demonstrate how corporations increased their efficiency.

Yet by the middle of his book, it is clear that Pursell is not simply arguing that the US government has sponsored or indirectly abetted fundamental transformations in work, play, domestic life, travel, and security. He recognizes that “no system, however successfully hegemonic, is ever without pockets of resistance” such as organic farms and farmer’s markets, or the consumer revolt as embodied in such figures as Ralph Nader or, more recently, Naomi Klein. He recaps many of the arguments against technological society that emerged in the 1960s and 1970s from Ivan Illich, Paul Goodman, Herbert Marcuse, and the New Left. In Washington, Congress decided not to build the SST aircraft (the stillborn American equivalent of the Concorde) and in 1972 it set up an Office of Technology Assessment that would advise legislators. In 1971 a group of engineers formed The Committee for Social Responsibility in Engineering. During these years, the prestige of technology as the means of solving problems dropped sharply due to many other factors as well, including the growing awareness of chemical pollution (remember DDT?), the failure to win the war in Vietnam despite massive technical superiority, and the nuclear accident at Three Mile Island. The later chapters emphasize how citizens become aware of the environmental consequences of technological hubris. The creative destruction of capitalism can have long–term ecological consequences that Schumpeter never considered, and that take place not in the economist’s free market but in a contested public sphere shaped by politics and protest. In Pursell’s account, since 1945 consumers and voters have taken a more proactive role. Perhaps the most telling resistance to American technological hegemony, however, came from foreign competition, first from Japan and Europe, more recently from mainland Asia. Pursell recognizes that development has often come at such a high environmental and human cost, particularly in India and China, that it deserves Klein’s epithet, “disaster capitalism.”

A chapter on computing reprises Pursell’s argument. It reminds us that the federal government played the crucial early role in postwar technological development. Heavy military investments, particularly at MIT, Penn, Bell Labs, and Stanford made possible the first large computers, sped development of the transistor, stimulated the growth of aerospace programs, and led to the invention of what became the Internet. Yet the government

gradually bowed out. In Silicon Valley, Cambridge, and Seattle, entrepreneurs started new corporations and developed the technologies that the government had nurtured. Moreover, as products became commercial, consumer demand increasingly drove R & D. In a process Schumpeter would have recognized and approved, Google successfully challenged the apparent hegemony of Microsoft and a host of PC makers drove out once dominant IBM. Here, too foreign competition threatened the initial US advantage in electronics. Furthermore, European and Asian nations now emulate the pattern of government research–driven development in such emergent areas as biotechnology, pharmaceuticals, nanotechnologies, and robotics.

Overall, the American–dominated “corporate techno–utopia” was breaking down at the dawn of the twenty–first century. The far–sighted US leadership of 1945 was seldom visible. It surrendered automotive markets to Japanese and European firms. A decades–long failure to develop an effective energy policy, resulted in huge oil imports that severely unbalanced its trade. The US lost its leadership role as it boycotted the Kyoto Accords and refused to sign many international treaties. The creative destruction of American hegemony continued even as *Technology in Postwar America* went to press. The dollar declined sharply, yet it did not matter as much as it would have a generation ago, because the US has ceased to be the world’s essential economic motor. For the last decade, China’s and India’s economies have grown by 7 percent or more each year.

With sixty years’ hindsight, one can see that Schumpeter’s entrepreneurs remain important players, operating on a global scale, but often they do not initiate the process of technological development. Rather, governments, universities, and corporate R & D units provide seed money for research, which often leads to unexpected results that are not always immediately understood. In the early 1950s, British scientists wrongly assumed that the UK needed only a handful of mainframe computers to satisfy foreseeable needs. Similarly, in the 1970s AT&T turned down the chance to purchase the fledgling Internet from the Defense Department, because they saw too few commercial possibilities in it. Such examples are hardly limited to the postwar period. In the nineteenth century that Schumpeter focused so intently upon, some new technologies were misunderstood or overlooked. No entrepreneur would buy Alexander Graham Bell’s telephone patent, so he developed it himself. Samuel Morse had a similar experience with the telegraph. Invention and initial development, always fraught with uncertainties, have been extensively studied by historians of technology. Schumpeter, in contrast, focused less on the process

of invention than on the financing, commercialization and creative destruction that accompanied full-scale development. Integration of the two fields provides a fuller picture of the process from idea to product. Business schools train managers, consultants, and entrepreneurs; STS programs train historians, critics, curators, and government experts. A society needs both kinds of expertise.

Schumpeter remains iconic to MBAs, who embrace creative destruction as a welcome hallmark of a capitalism that forever opens up new opportunities. In contrast, the historian of technology takes equal interest in innovation and what has been destroyed and credits many actors aside from entrepreneurs. Technological history can easily incorporate Schumpeter, although not as a prophet but rather as a useful theorist of creative destruction. The combination further strengthens Pursell's implicit argument that US hegemony, however assiduously promoted during the Cold War, becomes unsustainable in an international free market. Integrating these two strands of analysis also suggests a sobering conclusion about how the United States may respond to its declining economic and political power. As McCraw put it, "Schumpeter emphasized that the destructive part of creative destruction has always been quite real, and he stressed that those whose interests are being destroyed will fight hard to preserve their culture and status."

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