

Making Silicon Valley: Innovation and the Growth of High Tech, 1930–1970. By *Christophe Lécuyer*. Cambridge: MIT Press, 2006. x + 393 pp. Index, notes, bibliography, figures, photographs. Cloth, \$40.00. ISBN: 0-262-12281-2.

By Leslie Berlin

Christophe Lécuyer's *Making Silicon Valley: Innovation and the Growth of High Tech, 1930–1970* could be considered a prehistory of Silicon Valley. The period he surveys ends before the catchy regional moniker was coined in 1971, but one of Lécuyer's points is that a distinctive work culture had appeared in the area earlier than one might have suspected. Consider, for example, this description of a group of technologists on the San Francisco Peninsula:

[The culture] gave little heed to traditional distinctions of class and educational attainment . . . and greatly valued technical innovation and resourcefulness. [The culture] was characterized by its mix of competitiveness and information sharing. (p. 17)

Lécuyer is not describing Internet jockeys in the 1990s, or even semiconductor engineers in the 1960s, but rather Peninsula-based ham-radio operators, circa 1925. Thus traces of “Silicon Valley culture” became visible on the scene three decades before silicon made its first appearance in the region. To name one example, in an excellent depiction of vacuum-tube pioneer Charles Litton, Lécuyer offers a model of the charismatic high-tech Peninsula-based entrepreneur hard at work twenty years before Steve Jobs was born.

Lécuyer's main ambition in this book is to turn back the clock in order to reveal the precursors of the full-blown Silicon Valley phenomenon. Whereas most histories of Silicon Valley begin roughly at the onset of World War II, Lécuyer opens his chronicle a decade earlier. The San Francisco Peninsula in 1930 may have appeared to be, as Lécuyer puts it, an “industrial backwater,” but that backwater was, in its own way, a primordial soup in which elements of the latter-day Silicon Valley were quietly fermenting.

The main ingredient in the regional mix, in Lécuyer's opinion, was manufacturing expertise. With this claim, Lécuyer builds on, and distinguishes himself from, the two main schools of thought on the evolution of Silicon Valley. One school, following the work of Stuart Leslie, claims that the region's origins can be found in World War II-era ties to the military and to Stanford University. A second cluster of academics, led by Annalee Saxenian, holds that Silicon Valley is the product of a dense network of specialized firms that formed tight horizontal

relationships with each other. Lécuyer does not dismiss these ideas, but, in scrupulous, scholarly prose, he suggests a different theory. With a nod to the work of economist Alfred Marshall, Lécuyer argues that Silicon Valley's "emergence and rapid expansion" can be traced to the specialized technological skills and manufacturing expertise of firms operating in the region in the early and middle decades of the twentieth century. Such expertise attracted skilled workers to the area, and in turn gave it an advantage over rivals in other locales.

Lécuyer examines "three technological and entrepreneurial groups": electronics hobbyists, microwave engineers, and semiconductor technologists. His particular interest is the last group, to which he devotes four of the book's seven chapters. Each of the first three chapters covers a different firm in order to "develop a theme relating to how Silicon Valley evolved" (p. 9), such as the role of the military, the part played by Stanford University, and the transition from defense-based to commercial markets. Thus, in the first chapter, he discusses power-tube manufacturer Eitel-McCullough; in the second, Litton's microwave-tube manufacturing operation, Litton Industries; and in the third, klystron producer Varian Associates. Fairchild Semiconductor and several of its spinoffs—Signetics, Amelco, Intel, Intersil, and National Semiconductor—receive careful attention, and historians of technology will enjoy Lécuyer's detailed description of how the integrated circuit made the transition from lab notebook to product at Fairchild Semiconductor.

The chapters have a similar structure. Most open with a one-paragraph description of an event, such as a 1953 British military report ranking Litton tubes best in the world, followed by a series of questions, such as these: How did Litton establish himself? What portion of his success did he owe to Stanford? The balance of each chapter, roughly twenty-five pages, answers the questions before concluding with a two- to three-paragraph summary. The virtue of this approach is that each chapter can stand alone. Its shortcoming is that the various threads of the discussions are not pulled together until the last ten pages of the book, leaving a good deal up to the reader. Although Lécuyer describes the rise of distinct manufacturing capabilities in several technical areas, he does not show how each one relates to the other. Nor is it clear how the earlier culture created by the ham-radio operators, combining as it did elements of competition and collaboration, influenced the men who came along later to run the semiconductor companies that churned out planar integrated circuits? Or did it actually have an influence? Why did these different groups independently end up adopting the same general approaches to their work? Since the book's primary subject is the continuity of certain cultures and expertise within a given geographic region, such questions deserve more attention.

Despite these drawbacks, Lécuyer has succeeded in shedding considerable light on the forces that shaped Silicon Valley. Previous research has demonstrated that universities, defense contractors, venture capitalists, engineers, entrepreneurs, suppliers, researchers, and customers participated in the region's growth. To this list, thanks to Lécuyer's meticulous research, we must add the previously unsung manufacturing and production experts.

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