

Moore's Law: The Life of Gordon Moore,  
Silicon Valley's Quiet Revolutionary by Arnold  
Thackray, David C. Brock, and Rachel Jones.

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 **Moore's Law: The Life of Gordon Moore, Silicon Valley's Quiet  
Revolutionary by Arnold Thackray, David C. Brock, and Rachel  
Jones (review)**

Paul E. Ceruzzi

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REVIEW

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**In lieu of** an abstract, here is a brief excerpt of the content:

Reviewed by:

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***Moore's Law: The Life of Gordon Moore, Silicon Valley's Quiet Revolutionary.* By Arnold Thackray, David C. Brock, and Rachel Jones. New York: Basic Books, 2015. Pp. xxvii+ 530. \$35.**

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The appearance of this book in 2015 was part of a celebration of the fiftieth anniversary of a brief note, published in the trade journal *Electronics*, by chemist Gordon Moore, who at the time was working at the modest Northern California electronics firm Fairchild Semiconductor Corporation. Moore's note contained a crude graph, based on four data points, which suggested that the number of "components per integrated function" was doubling every year into the foreseeable future. Moore was referring specifically to the kinds of products Fairchild was producing at the time. The company had developed a technique, the "planar process," for placing transistors, resistors, diodes, and other devices on a single chip of silicon. That process gave Fairchild an enormous advantage over the many competing methods of miniaturizing electronics then being explored.

That simple graph was the basis for "Moore's Law," now familiar to specialists and laypersons alike. It refers now to not only components on a chip, but also to semiconductor memory, disk storage, and the general metric of advances in digital microelectronics flooding modern society. The law is still holding as of this writing, if at a slightly slower pace.

Arnold Thackray, founder of the Chemical Heritage Foundation and a scholar whose works should be familiar to most readers of this journal, along with David C. Brock and Rachel Jones, have written a thorough narrative of the life and work of Gordon Moore. Born and raised in Northern California, he was a veteran of William Shockley's failed attempt to establish a viable semiconductor company in Palo Alto. It was Shockley's failure that laid the foundation for the transformation of that region from an agricultural valley to Silicon Valley. Moore went on to co-

found Fairchild, and then Intel, the latter still a dominant presence in the Valley.

There is no shortage of books, movies, television programs, and websites that tell the story of the origins and rise of Silicon Valley. What sets this apart from the others is, first of all, an emphasis on Moore's skills in chemistry, and how advances in semiconductors have depended as much, if not more, on chemistry as they have on electrical engineering or solid-state physics. This emphasis is not surprising given Hackray's background. Few others who have told this story noted the place of chemistry, even though Moore himself never hesitated to emphasize it. Perhaps it is because the kind of chemistry practiced in Silicon Valley is not what lay-people think the science is about; perhaps it is the long-standing impression that physics is the superior science. In any event, Hackray's appreciation of chemistry no doubt allowed him and his co-authors unusual access to Moore, his family, and his colleagues. The authors also had access to his papers, which they **[End Page 499]** have used well. The result is a thorough and comprehensive study, of both Moore's life and career and the trajectory of the Valley.

The book sometimes struggles with balancing the two stories: the remarkable life of Moore, and the rise of Silicon Valley. Most popular narratives about Silicon Valley stress the role of Moore's colleague Robert Noyce as the driver of the region; this book acknowledges Noyce's role but reminds readers that the quieter and self-effacing Moore was an equal if less-visible contributor. Likewise the story of the invention of the microprocessor at Intel, one of the critical inventions that transformed the world, could not be ignored. But the authors are less comfortable with that story, as it is more a story of electrical engineering than chemistry, and Moore had a smaller role in its creation.

I had the sense that the publishers were anxious to have the book appear in time for the fiftieth anniversary, and in their haste they skimmed on editing. For example, a quote from Moore about the profitability of one of Intel's products, the EPROM, is repeated twice, on...

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