Reviews

Raul Rojas, Editor
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This is the fascinating autobiography of Carly Fiorina, Hewlett-Packard’s CEO from 1999 to 2005. She was the first female CEO of a Fortune 20 company and here has written the first ideal personal memoir of any senior computer company executive. It has all the necessary qualities for a top memoir. First, and most importantly, it was written by the subject, not “as told to”. These are Fiorina’s own words. The writing is clear, direct, to the point, generally concise, always fluid, and often vicious. The book has an excellent index and includes a few personal photographs. Its length is appropriate to the subject.

The author tells the story of her life beginning with a few pages about her parents, going through her early days, her education, and her business career. Starting with a Stanford University arts degree, she climbed the corporate marketing ladder at AT&T Corp. to the top level of Lucent Technologies Inc. where, in 1998, Fortune identified her as the Most Powerful Woman of the Year.

The last half of the book is her detailed story of her career as the CEO of Hewlett-Packard (HP).

Fiorina pulls no punches. She tells it as she saw it, usually naming those who were with her or against her and only obscures the identities of a few players. In her view, she drove legendary but deeply troubled HP out of failure and onto the road to future success in the face of fierce internal opposition. At HP, as elsewhere, she faced—and challenged but never eliminated—obvious and hidden sexism, rudeness, and the powerful influence of the clubhouse of the men’s room.

She seems baffled as to why in 2005 she was rudely sacked, although it is clear from her own story that the HP family heirs and others on her board of directors—some of whom she labels “amateurish and immature”—saw her acquisition of Compaq Computer Corp., while HP was missing its stock price goals, as the last straw.

Unfortunately, Fiorina feels impelled to inject undistinguished business maxims and precepts into her otherwise gripping story.

Fiorina describes a part of the computing forest that is largely unknown to computer scientists. It is about money, sales, marketing, setting financial goals, and the leadership of a huge collection of people. I recommend this book as an insight into a strange but, unfortunately, important part of the world of computing that those of us in the Computer Society are generally shielded from.

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This is James W. Cortada’s second book in the Digital Hand trilogy. The Digital Hand, Volume 2 analyzes the changes that the American financial, telecommunications, media, and entertainment industries underwent because of computerization. Volume one, which I reviewed in IEEE Annals of the History of Computing, vol. 27, no. 2, 2005, dealt with the manufacturing, transportation, and retail industries. (In volume three, Cortada will analyze the public sector, including government and education.)
In this book, Cortada continues the approach begun in the first volume. Instead of solely telling the stories of individual products, the book presents an analysis of the behavioral patterns of decision makers, companies, and industries. Across the three books, Cortada is trying to accomplish his "long-term objective [...] to study enough industries to be able to generalize, with confidence, about the role of computing in 80 percent or more of the economy" (p. viii). Cortada's ambitious goal is to deduce patterns that might help current managers to understand and cope with today's problems.

Volume two consists of 13 chapters, a preface, two appendices, 92 pages of notes, 16 pages of a bibliographical essay, and an index—all in all, about a hundred pages longer than volume one. The book is basically divided into three main parts: Chapters 1 through 7 deal with the more traditional industries (such as banking, insurance, or brokerage), and Chapters 8 to 12 deal with the multimedia industries such as newspapers, TV, movies, or video games. Chapter 13 (the final discussion) together with the bibliographical essay and the appendices forms the third part. Similar to those in the first volume, the appendices provide additional methodological and technical insight. Appendix A discusses the "Role and Use of Industries, Sectors, and Economic Models as Concepts for Understanding Business and Economic Activities" and therefore is an expanded view on Appendix A of volume one (entitled "How to Study the Role of Computing by Industry"). Appendix B provides a short treatise on the basics of telecommunications and networking.

One of the most important milestones in the history of the digital (Cortada continues to use digital as a noun in describing the use of digital technologies) is the advent of the Internet. Chapters 6 and 7 describe how the telecommunications industry helped introduce the Internet to customers in a short period of time.

When the first computers came into use in the 1950s, people living in rural areas still shared a telephone line—a so-called party line—with other inhabitants of their town. To make a call, a person had to pick up the phone and listen to find out whether there was already a conversation going on or not. "If so, good manners dictated the individual hang up the phone and wait until the line was free" (p. 229). Likewise, for a long-distance call, one had to make an appointment with the telephone operator for a time when a line would be available. An overseas call usually had to be prearranged half a day or even a full day before the call. Nowadays, it is hard for many people to recall a time without e-mail and cell phones. Cortada describes how telecommunication firms and their management teams, as well as millions of individual customers, underwent the process of incremental adoption of digital technologies.

Chapter by chapter, Cortada analyzes one industry after another and shows how companies studied different sources of information, such as publications or competitors, to determine how they should exploit the new possibilities offered by digital technology. At the end of the book, he generalizes over the different industries and discusses several patterns and questions that arise throughout the book. A common pattern of IT adoption, for example, is sheer enforcement either by competitors or contractors. This pattern results in the most radical changes of business practices. It is mainly observed in the interaction between different companies or contractors. Of course, when customers can choose, for instance, from different Web sites, nobody is able to force them to adopt a certain technology and then pay for it. One can easily imagine that these two patterns require different dissemination strategies.

A central question Cortada raises in The Digital Hand is whether the US economy is heading toward an entertainment economy. The question is relevant because most of the industries he discusses—movies, TV, video games, and publishing—involves the entertainment business. The way products are developed and marketed in these industries is directly affected by technological development. One major problem faced by these industries is how to make a profit: the cost of creating a copy is dropping close to zero yet the expenses of producing the content is steadily increasing. Cortada argues that these industries will undergo fundamental changes and that they will increasingly have to adapt business models and content in order for customers to be willing to pay for the goods and services.

Intrigued by the first volume, I was very curious to read the second and have not been disappointed. One of the hallmarks of volume two is the popularity of its content dealing with consumer industries, but it still retains scientific depth and seriousness. Although one can find many books on differ-
ent aspects of the history of the telecommunications, media, and entertainment industries, this is one of very few books in which a reader will find a scientifically profound discussion, for example, about the economic history of video games.

Like the first volume, this book is a painstakingly researched work. Each chapter is substantiated by about a hundred references. Too, in this volume Cortada’s research and discussions extend to 2005, whereas his first book stopped at 2001. Therefore, he is able to incorporate information about very recent developments, such as the Apple iPod and the Microsoft Xbox with which many readers will be readily familiar.

James Cortada already made clear in the first volume that he is able to create a work of exceptional profundity. The number of references alone is impressive. Reading the second is not only of scientific interest but is fun besides. Because of this combination, I find it is also suitable for use in a university-level seminar.

Unfortunately, time and paper is limited, therefore the book concentrates only on the US. Research topics I would like to see investigated include, for instance, why Americans still use checks whereas in most European countries wire transfers have already become the number-one method of bill-paying. And, although Cortada generally treats his subject matter in full detail, a few modern issues receive only brief comments, such as the role of women as a target group for computer games or the way in which massive multiplayer online games have made many individuals seemingly willing to pay a recurring monthly fee rather than just paying once to buy a game outright. Such treatment in these instances is not a disadvantage ultimately, however, because the book is attempting to draw general conclusions.

I fully recommend this book. It is a must-read for anyone wanting to get a feel for how technology adoption interacts with development and for how decision-making and company-interaction patterns have fostered or hindered the introduction of computers in a particular application and at a particular time. This book builds on the first volume; however, if you have not read the first, this book can be read independently without any loss of comprehensibility (although reading the first is recommended in its own right).

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Nobel Prize winners are often eccentric. The turbulent life of John Nash (Nobel Prize in economics, 1994) has been portrayed in Sylvia Nasar’s biography (later embellished in the Hollywood version); Daniel Carleton Gajdusek (physiology or medicine, 1976) was convicted of molesting children in 1997; Kary Mullis (chemistry, 1993) wrote about his encounters with extraterrestrials; and William Shockley (physics, 1956), as we find out in this book, had fixed ideas and personality problems, which eventually produced his downfall.

Although the rise of Shockley is well known, his descent has been less well documented. Delving into the Shockley archives, Joel Shurkin has now filled that gap, producing a fascinating biography of one of the major figures of the electronic age—which, by the way, had no single creator as the subtitle could lead us to assume.

Ultracompetitive, William Shockley always tried to be first in any endeavor. He
strongly believed in his own genius and superiority. Perhaps as a consequence, his life was inevitably filled with permanent rivalry. Born of American parents in London in 1910, Shockley received a PhD in 1936 from the Massachusetts Institute of Technology with a doctoral thesis dealing with the then-emerging field of solid-state physics.

In the 1930s and 1940s, the workhorse of the emerging electronic age was the vacuum tube, which was also used to build the first electronic computers (most notably the ENIAC). Physicists in several countries (Germany and France, most prominently) were investigating the properties of crystal semiconductors and their possible use for signal amplification and as logic elements. It was Shockley’s good fortune to obtain a research position at Bell Laboratories, which in the following years would become involved in the race to build a solid-state replacement for the vacuum tube.

On leave from Bell Labs during World War II, Shockley’s vast knowledge and acumen was applied to several military projects involving radar, submarines, and optimal bombing patterns. Shockley made his mark in the emerging field of operations research and was awarded the Medal of Merit in 1946 for his contributions to the war effort.

Resuming his work at Bell Labs, Shockley was the team leader for a group including Walter Brattain and John Bardeen, who were later co-recipients in 1956 of the Physics Nobel Prize. Shockley provided the initial vision and research direction for the joint work of the group. After several false starts, Bardeen and Brattain started working with a design of their own for a contact point transistor and achieved a breakthrough in 1947, without the direct contribution of Shockley. A few weeks later, Bell Labs filed patents, without Shockley’s name, for the discovery of the new solid-state device, christened the “transistor.”

Many strategic patent issues were apparently involved in this decision by Bell Labs, which tried to make the patent application bulletproof. Shockley, however, managed to appear in all press releases and in the middle of pictures taken of the inventor group. At the same time, he worked furiously to upstage Bardeen and Brattain. He published his magnum opus *Electrons and Holes in Semiconductors* and worked out the theory and design of the junction transistor, precisely the kind which is most popular today. In a sense, Shockley justified his share of the Nobel Prize only after Bardeen and Brattain had provided the initial impulse. The group, however, never again collaborated in another project and disbanded shortly after the discovery.

After leaving Bell Labs in 1956, the same year he received the Nobel Prize, Shockley started the Shockley Semiconductor Laboratory of Beckmann Instruments, an established company, trying to commercialize his patents and inventions. Based in Mountain View, California, near Stanford University, Shockley was extremely successful in recruiting young talent. Electronic-age luminaries, such as Robert Noyce and Gordon Moore, worked for Shockley. However, his abrasive management style, as well as his decision not to concentrate on silicon devices, produced the famous revolt of the eight “traitors” who left to start Fairchild Semiconductors, and later on, other companies such as Intel. Sadly for Shockley, he never achieved the level of entrepreneurial success that his disciples did, and he eventually returned to the academic life.

The title words “Broken Genius” refer to Shockley’s late-life interest in eugenics and IQ differences. Antagonizing many of his academic peers, Shockley championed the idea that racial genetic differences account for differences in IQ. He became increasingly isolated, even from his few one-time close friends. He died in 1989, largely forgotten and ridiculed by the academic community to which he once contributed so much.

Although other reviewers have criticized a few details of Shurkin’s book (such as minor errors in the names of individuals and companies), I found this book to be compelling reading. It allows us to understand how obsession and almost pathologic pride can sometimes lead to great discoveries, but also to what we might call a type of social autism—that is, great researchers who become increasingly estranged from society and even from their own families. It also gives us a glimpse into the ruthless competition underlying much of corporate research. In this harsh world of discovery, Shockley was once its merciless king.

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