From Airline Reservations to Sonic the Hedgehog: A History of the Software Industry. *By Martin Campbell-Kelly*. Cambridge: MIT Press, 2003. xiv + 372 pp. Illustrations, tables, bibliography, notes, index. Cloth, $29.95. ISBN: 0-262-03303-8.

Reviewed by Leslie Berlin

Software—the infinite variations of coded zeroes and ones that help control key elements of our daily life, from traffic lights, cell phones, and automatic teller machines to medical equipment and grocery-store scanners—is intangible, ubiquitous, invisible, and indisputably important. Bill Gates, founder and chief technology officer of software giant Microsoft, regularly speaks of "software magic" in his speeches. And one prominent scientist quoted in Martin Campbell-Kelly's exceptionally informative history of the software industry, *From Airline Reservations to Sonic the Hedgehog*, describes software as "only slightly removed from pure thought-stuff" (p. 3).

Campbell-Kelly's book goes a long way toward giving readers a grasp of how this elusive thing called software became the fourth largest industrial sector of the American economy. His is a major contribution. Most histories of the software industry are written by journalists and focus on a single firm (Microsoft, more often than not) or a single entrepreneur (Bill Gates, for the most part). Campbell-Kelly offers something different: a comprehensive history, based largely on studies undertaken by governments, professional analysts, academics, and the occasional reputable business journalist. Campbell-Kelly begins with the industry's origins in the mid-1950s and follows its growth through to its Microsoft-Oracle-IBM-SAP incarnation some forty years later. And he does it in just over three hundred pages.

Campbell-Kelly is quite open about how he made this exceedingly daunting project somewhat less so, declaring up front that "the book has a strong US focus" and that it "cuts off" at 1995. He offers reasonable justifications for these limits—American firms have long dominated the world's software industry, and the rise of the Internet in the mid-1990s meant that the industry entered a new phase (of online software delivery and increasingly blurry lines between corporate and consumer sectors of the industry) too youthful for a historian's lens to address profitably. As for the most gaping question left

open by the “limits and exclusions” Campbell-Kelly set for himself—what about India, with its hundreds of thousands of software engineers and rising indigenous industry?—Campbell-Kelly quite responsibly points readers to other sources of information.

Campbell-Kelly adopts what he calls “three main vectors” to explain the industry’s history: time; “sectorization” of companies into software contractors, corporate software producers, and mass-market software firms; and segmentation of the products themselves by the markets into which they are sold. The vector approach works well, in no small measure because the industry “sectorization” maps easily onto a chronological history of the development of the software business. The mid-1950s to mid-1960s was the era of software contracting, in which corporate or government customers paid as much as $1 million to companies like the Computer Usage Company and Computer Applications, Inc., for custom programs tailored to run on room-sized mainframe computers. IBM’s introduction of the System/360 computer family in 1964 created a market for software programs that could be used by several different corporate customers to meet a common business need: speeding up payroll functions or automating small manufacturing operations, for example. This age of corporate software producers was dominated by Informatics, whose Mark IV file-management system was the first software product in the world to be a runaway best seller. As the personal computer began to reach an ever-widening market in the mid-1970s, a wave of software firms appeared with plans to serve the mass market: Microsoft, Lotus, Digital Research, Personal Software (the company behind VisiCalc), MicroPro. Chapters begin with entertaining images or illustrations taken from the era under discussion and usually end with a summary, stretching to several paragraphs, of innovations that would be helpful to students reading the book. “Not Only Microsoft,” Campbell-Kelly’s chapter on the maturing of the personal computer software industry in the late 1980s and early 1990s, which appeared in this journal in a slightly different format in the spring of 2001, is particularly strong.

Campbell-Kelly’s careful work makes it clear that many elements of the modern software industry have been present since its birth. There have never been enough programmers. The users themselves have always been key contributors to new programs, particularly through user groups. For every successful company, there are dozens of failures, many of which Campbell-Kelly discusses. IBM—which Campbell-Kelly points

out had a 75 percent share of the computer industry (hardware, software, and services) in the 1960s and whose software sales exceeded Microsoft's until 1998—has long written the rules for the software industry. Campbell-Kelly avers, "If this book serves no other purpose, I hope it will at least provide a corrective to the common misconception that Microsoft is the center of the software universe around which all else revolves" (p. 9). He estimates that Microsoft dominates 10 percent of his book, "just as it dominates 10 percent of the software industry" (p. 9).

The subject matter and sweeping scope of *From Airline Reservations to Sonic the Hedgehog* create a few probably unavoidable difficulties. The acronyms can get a bit out of hand—twenty-nine appear on page 46 alone—but Campbell-Kelly avoids them when he can. Readers learn almost nothing about the people who worked for early software companies, and only slightly more about the people who founded the more current crop of firms. The societal implications of an ever more software-intensive world and the technology behind the business likewise receive little attention. These unaddressed areas present an opportunity for future researchers, especially if software firms open their archives.

If one measure of a successful book is that it leaves a reader simultaneously satisfied and hungering to know more, then by this measure, as by many others, *From Airline Reservations to Sonic the Hedgehog* is a success indeed.

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