Book Reviews

Faxed: The Rise and Fall of the Fax Machine. *By Jonathan Coopersmith*. Baltimore: Johns Hopkins University Press, 2015. xii + 308 pp. Photographs, illustrations, tables, notes, index. Cloth, $54.95. ISBN: 978-1-4214-1591-8.
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Reviewed by Paul Israel

Most of us think of the fax machine as an outmoded technology that emerged in the 1980s, on the cusp of the digital revolution, and has largely been displaced by computers and the Internet. But as Jonathan Coopersmith shows us in his long-awaited book *Faxed: The Rise and Fall of the Fax Machine*, the history of facsimile technology starts at the beginning of the age of telecommunications, in the mid-nineteenth century, and continues today as a vibrant form of communication in Japan, where the modern fax machine finally emerged in the 1970s and 1980s. Indeed, one of the great strengths of Coopersmith's book is the broad net he casts to capture the international dimensions of this history as well as the many iterations of facsimile technologies, business models, and markets that have been created over the last 170 years.

Fax technology first emerged in the 1840s in the form of facsimile telegraphs designed to obviate the transmission errors endemic to telegraphy, thus providing an accurate message that also could be authenticated by the handwriting or signature of the sender. In addition, facsimile made possible the transmission of images such as drawings and maps that could not be sent by other telegraph systems. However, persistent problems plagued these systems, including electromechanical synchronization that often worked poorly, the long time required to prepare messages for transmission, and the difficulty of producing high-quality, long lasting recorded messages. In addition, the complicated machinery was difficult to maintain and operate. As a result, facsimile telegraphy was never economically competitive with much cheaper telegraph systems. These issues would continue to plague facsimile technology for over a century.

To understand why this troublesome technology continued to find advocates, Coopersmith draws on "Michael Schiffer's concept of a cultural imperative, 'a product so fervently believed by a group . . . to be desirable and inevitable, merely awaiting technical means for its realization'" (p. 4). The fax certainly seems to epitomize this idea. It was the potential

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for facsimile reproduction of documents, photographs, maps, and other documents to revolutionize electrical communication that led so many inventors and companies to believe that this time would be different if the technical problems could finally be solved. The result was that, for most of its history, fax technology remained in a perpetual startup mode in which technology push rather than market pull and consumer uses dominated business models.

Facsimile technology finally had its first significant success when market pull for certain uses finally overcame the technical and economic drawbacks that made the technology too slow and too expensive for others. The first successful commercial fax systems were those designed to provide photographs to newspapers during the late 1920s and 1930s. The competitive daily newspapers of major cities, which increasingly employed photographs as the cost of reproduction declined, sought competitive advantages by publishing photographs of events that had taken place across the country or overseas. Photojournalism also provided a visual immediacy that helped newspapers compete with the new medium of radio, which could broadcast news as it happened. For these reasons, news publishers were willing to invest in the high cost of photo wire services.

The success of photo fax for newspapers helped to spur efforts to develop other markets. Most of these efforts, such as civilian and military weather maps, were unable to compete with less-expensive alternatives. However, the growing importance of paperwork in large corporate offices led Western Union to become the largest producer of fax machines through its Telefax service. Telefax was designed to deliver telegrams to large customers who could afford to invest in the machinery. Western Union charged normal telegraph fees for the service, which the company saw as a way of speeding delivery time while reducing labor and delivery costs. A major drawback to message facsimile proved to be the standard workflow of office paperwork, which required the ability to easily write on and duplicate messages, neither of which could be readily done with the existing technology. This proved even more problematic for the faxing of documents. Nonetheless, these early efforts suggested that fax technology could become a standard piece of office equipment if problems related to office procedures could be overcome.

These new commercial systems, as well as other efforts to improve facsimile technology during the 1930s, were aided by developments in electronics. Although Coopersmith does not draw a direct connection to this convergence, knowledgeable readers will recognize that the same firms that led the development of electronic media—especially RCA, AT&T, and General Electric—were also leaders in the effort to

develop facsimile technology and continued to play a crucial role in its development during and immediately after World War II. Another crucial partner during this period was the military, which sought facsimile transmission of photographs, drawings, and maps as part of its broader telecommunications strategy. In the decade following the war, the military would become the largest supporter of research in and market for facsimile technology.

The military's interest in fax was spurred by the needs of a far-flung organization, not unlike those of large multinational corporations in the postwar era. Increasingly, during the 1950s, facsimile was embraced as a means of improving the accuracy and speed with which information flowed through an organization. An especially important niche market emerged among banks, which needed to verify signatures on checks. Other businesses also experimented with facsimile transmission of documents within their own organizations. And while facsimile development was still dominated by technology push, by the 1960s there was increasing technology pull from corporate customers.

Several key developments would finally lead to the emergence of fax as a general-purpose rather than a niche technology in the 1970s and 1980s. Among these were the deregulation of telecommunications, the development of digital technology, the emergence of robust document-copying systems, and the shift in manufacturing from the United States to Japan. Coopersmith does an excellent job of analyzing the crucial role that the Japanese government, industry, and markets, especially for nonbusiness users, played in the emergence of the fax as a general-purpose technology. While his analysis could have benefited from a consideration of the much broader transference of the consumer electronics industry to Japan that occurred in this period, Coopersmith enables us to understand why successful fax technology emerged there and why it continues to have a robust place in Japanese culture even as it has been displaced by new digital technologies in the United States and Europe.

While readers would benefit from a chronology to help keep the multitude of fax technologies and companies straight, Coopersmith has done us all a service by tracing their very complex and convoluted history in a very readable and analytically sophisticated book.

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