On 22–23 May 2017, the Software Industry Special Interest Group (SIG) and the Center for Software History—both part of the Computer History Museum (CHM)—conducted a two-day Desktop Publishing Software Pioneer Meeting at the CHM in Mountain View, California. Many of those who had contributed to the technological developments that made the desktop publishing industry possible and the founders of almost all of the desktop publishing software companies participated. The goal of this meeting was to capture the recollections of those who had built the industry so as to provide a basis for future analysis by historians and use by researchers and those interested in these significant achievements. There were nine workshops during the meeting; each session was videotaped and recorded, and both the videos and the edited transcripts will be available through the CHM website (www.computerhistory.org). This was the 13th software pioneer meeting that the Software Industry SIG had conducted on a wide range of software industry topics. The workshop sessions were each about 1 to 1 1/2 hours long:

1. Purpose and Introductions of Participants
2. Technology in the 1960s
3. Technology in the 1970s
4. Technology in the 1980s
5. Seybold Newsletter and Seminars
6. Adobe
7. Ventura, Aldus and Apple
8. Atex and TeX

In addition to the workshops, some participants had oral history interviews recorded on the day following the pioneer meeting, and there are oral histories of some other industry pioneers who attended the meeting including Chuck Bigelow, Paul Brainerd, Liz (Bond) Crews, Steve Kirsch, Donald Knuth, Lee Lorenzen, John Scull, and Jonathan Seybold. You can access the workshop and oral history transcripts at www.computerhistory.org/collections/oralhistories and searching with the term: Desktop Publishing. These transcripts are edited and posted over time so some may not be available as of the publication date of this issue of the *Annals*. Other materials relevant to the Desktop Publishing special issues can also be accessed via history.computer.org/annals/dtp.

David Brock, the director of the Center for Software History, and Burton Grad, co-founder of the Software Industry SIG, were so impressed with the breadth and quality of the workshops and the oral history interviews that they decided to produce two special issues of the *Annals* covering...
both the technology and business discussions. David Hemmendinger joined Burt as co-guest editor of these two special issues, which are the 7th and 8th special issues of the Annals from the Software Industry SIG.

The first issue, subtitled Laying the Foundation, focuses on what took place during the 1960s and 1970s in automating and computerizing the printing and volume publishing industry (newspapers, magazines, and books) and the parallel development of the technologies (primarily at Xerox PARC) essential to making desktop publishing feasible and economically practical.

The first piece, an extended sidebar to this introduction, is a short summary by Jonathan Seybold of the key developments in typesetting that enabled the automation of volume printing and then made possible the use of computers to automate the process further. This is followed by Seybold’s description of the founding and growth of Rocappi, which designed and implemented some of the first printing computerization systems. This first set of articles on printing computerization is completed by two Anecdotes about Atex, which built the content entry systems (terminals and software) that were used by almost all magazines and newspapers to automate the entry of text and related material into the new automated printing systems.

The second portion of this issue focuses on the outstanding technological developments at the Xerox Palo Alto Research Center (PARC) in California that provided the key underpinnings for the desktop publishing industry. While Xerox PARC was targeted by Xerox to develop all of the elements needed for the “Office of the Future,” many of the projects concentrated on how to create and produce high-quality printed documents, which was of course the principal Xerox business at the time. Bob Sproull talks about the development of Press, a page description language for the Alto computer that could combine text and graphics. Larry Tesler describes the development of technologies that were vital to improved layout and printing, particularly modeless editing, which is now ubiquitous in word processing and desktop publishing systems, though Gypsy, the program that he helped to develop, is nearly unknown today. John Warnock then describes how he and his partner, Chuck Geschke, (and others) developed what later became PostScript, the initial product for Adobe, which many feel was the key software that made desktop publishing practical.

This issue concludes with two pieces closely related to the view that with the increasing capability, power, and availability of computers that could be placed on people’s desks and with laser printers, high-quality printing could become a part of every business and not just the publishing industry. Barbara Beeton, Karl Berry, and Dave Walden write about Donald Knuth’s development of TeX at Stanford University, which enabled scientists, mathematicians, and engineers to use computer systems to prepare papers with the complex formulas and notations needed in the different disciplines, and to do it with typography of excellent quality. Finally, the Interviews Department has portions of an interview that Dave Walden did with Chuck Bigelow at the desktop publishing meeting, talking about the development of computer-prepared fonts that matched or exceeded the graphic quality of the historic metal or photographic fonts.

The second desktop publishing issue, subtitled Building the Industry, will carry the story forward by describing how the technologies from the 1970s, both from the printing industry and from Xerox PARC, became the basis for the founding and growth of a number of companies, including Adobe, Aldus, Ventura, Frame Technology, and Quark, as well as Apple’s dramatic entry in the industry with the Macintosh, LaserWriter, and PostScript (from Adobe). This issue will also cover how the Seybold Newsletter and the conferences that Seybold ran became the face of the industry and promoted its integration and growth. The issue will conclude with follow-on articles on the use of TeX and on what were called the Font Wars between the principal desktop publishing competitors.
SIDEBAR: A VERY BRIEF ACCOUNT OF PRINTING AND TYPESETTING TECHNOLOGIES

by Jonathan Seybold

One essential element in the success of the desktop publishing industry was the prior work done in automating and computerizing the printing of newspapers, magazines, books, and other printed material. This work during the 1950s through the 1970s depended heavily on progress in moving from the historic forms of typesetting to technologies more amenable to computer control, along with the parallel development of high-speed printing presses that worked with these advanced typesetting systems. Below is a highly abbreviated history of some of the key typesetting developments, particularly those that used computers and terminals.

Moveable Type, Hot Metal Typesetting, and Letterpress Printing

Johannes Gutenberg’s use of moveable type and the printing press to print books in mid-15th century Europe is well-known. This technology had evolved in China and then spread from there to Europe, but it was Gutenberg’s innovations that made this technology transformative.

Printing presses improved dramatically over the course of the 19th century, but the process of setting type remained unchanged. In 1886 and 1887, two companies developed new machines. They used the same basic technique: rather than use and reuse an inventory of raised metal type characters, they each made a typesetting machine that would inject molten lead alloy into molds and cast the type characters as needed. After the job was printed, the cast type would be melted down and the metal reused for another job. Although the concept was the same, the two machines were quite different.

A Linotype machine is a “linecaster.” It casts an entire line of type at one time. The input keyboard and the line casting unit were part of a single integrated machine. The Monotype machine cast each letter individually. It had a stand-alone casting machine, driven by 31-channel paper tape. Separate input keyboard machines produced the paper tape.

Starting in the mid-1930s, newspapers began installing Linotype machines fitted with paper tape readers so that wire service news copy did not have to be retyped. A human operator still had to justify the line and hyphenate words when necessary.

Photo-Offset Lithographic Printing

In the 1950s, photo-offset lithographic printing began to replace letterpress printing. In place of the raised metal surface used in a letterpress printing press, a lithographic press uses a photosensitive sheet of aluminum that is exposed to a photographic negative of a page to be printed in a bright light. The light that passes through the negative hardens the coating and the unexposed remainder is washed off.

The printing press applies a mixture of ink and water to the plate. The lithographic process uses ink that adheres only to the coated portions of the plate. The coating is too fragile to be used directly to transfer the inked image to the paper, and so the inked image is transferred to a rubberized “blanket”—which, in turn, transfers that image to the paper; the transfer of ink onto paper is thus “offset” from the printing plate.

Because lithography is a photographic process, offset presses were more efficient and better suited than letterpress to print graphic images with high quality. For the same reason, it also made sense to start with text that has been typeset photographically—especially since a phototypesetting machine could be considerably faster and more versatile than a hot metal machine.
Phototypesetters

Shortly after WWII, Louis Moyroud and René Higonnet began work in France on a new approach to setting type photographically. Negative images of type characters were arranged around a glass disk that spun in front of a lamp. The lamp flashed when the character desired passed in front of it, producing an image of the character, which passed through a lens system that scaled the character image to the desired type size and exposed it onto photographic film or paper.

They emigrated to the US in 1949, where a company was formed to commercialize their invention. The first Photon 200 machine went into service in 1954. Although other companies developed competing machines, Photon remained the leading supplier of phototypesetting machines through the 1960s.

Linotype took a different approach. Its Linofilm (1958) used character images held on stationary glass grids rather than a spinning disk or drum. The Linotype type font department aggressively built its font library. By the 1970s, Linotype had become the standard setter for high-quality phototypesetting, and the Linotype font library represented the core set of typefaces that everyone (in the US at least) wanted to use.

Compugraphic (CG), started in 1968, introduced reliable, low-cost phototypesetters that enabled many organizations that had not previously set type to do so. The early machines were driven from paper tape input. In 1971, CG introduced the CompuWriter, a compact self-contained keyboard-operated desktop phototypesetter that was sold as an office machine. Many thousands of such machines were sold over the next 15 years.

Improving cathode ray tube (CRT) and computing technology made the prospect of digital computer-output typesetting enticing. The first high-speed digital CRT typesetters came onto the market in 1967 and 1968. These were much faster and much more reliable than conventional phototypesetters. The introduction of the Autologic APS-4 in 1971 brought the same functionality for 1/3 the price. Autologic dominated the market for high-speed digital typesetters until the advent of PostScript in 1985.

In 1976, Monotype introduced the Lasercomp, a laser output imagesetter. This used presized bit-mapped fonts, with a different font master for every size of every typeface. Like some of the CRT typesetters, it could output scanned graphics and screened black and white halftone pictures along with the text. The Linotype Linotronic 101 laser imagesetter, introduced in 1983, used typefont masters stored as vector outlines.

Phototypesetters, digital CRT, and laser typesetters all coexisted for a time, as linecasters fell out of use. With the advent of the microcomputer, they were basically computer output devices. The market for phototypesetters did not survive the introduction of PostScript, and all of these machines were eventually supplanted by high-resolution laser printers. More on the introduction of computers is at fhistory.computer.org/annals/dtp.

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