Gutenberg Redux: A New Printing Revolution?
An Introduction, by Bruce L. Johnson

My love affair with books began at conception, or so it seems to me; I can't recall when I was not surrounded by books and other printed things, including stamps. I drove my mother to distraction with my "collections."

That's probably why I've never appreciated repeated efforts to "replace" the traditional book with digital varieties; I could never figure out the point. Why replace something that has worked very well for two millennia, thank you, with a cumbersome machine that evolves to a "new and improved" version the minute you bring home the latest model from the store, and depends upon an occasionally unreliable source of power to operate? What if the electricity fails?

Moreover, curling up with some electronic device on a dark and stormy night to read a digital book has never attracted me. There is something about the heft of a real book's binding, the feel of the paper, and the smell of the ink that intoxicates and cannot be "replaced" by an electronic version.

Apparently I'm in the minority, however, which is not the first time. In the 21st century, many people are more interested in the delivery of random information over the Internet, than in the organized knowledge presented in books. Books are viewed by many people as outdated and anachronistic.

The Graphics Philately Association exists to study postage stamps that commemorate myriad aspects of graphic communications, the history of printing, and the book as an artifact. Postage stamps, however, also commemorate computers and the increasingly im-

Germany Sc1425, issued on 21 August 1984, juxtaposes a medieval document with a personal computer. The stamp commemorates the 10th International Archives Conference in Bonn.

portant role they have played in society since the 1940s, particularly personal computers (PCs), which came onto the scene ca. 1980. Today, there is a growing and undeniable connection between computers, communications, books, and printing.

Because of that connection, a major sea-change is before us. It seems we are on the cusp of a technological revolution that rivals that of Gutenberg's several inventions in the 15th century. We know that Gutenberg did not invent "printing," per se, but he did design a new kind of press, perhaps based on wine presses, for his work. Of equal importance was the quickly hardening metal alloy (lead, tin, and antimony) he perfected; the mold for casting uniform type quickly and accurately; the oil-based ink he developed, which would stick to metal type; and a chase to "lock" type into place for multiple printings. Gutenberg's inventions have been modified and vastly improved, to be sure, but the essential techniques have remained largely the same.

Then came the computer. The technological revolution in printing and book production has been developing for decades. Except for books produced by so-called "small" or "fine presses," computers of all kinds run the huge machines that produce today's books, newspapers, magazines, and all other manner of printed material. On the personal level, some residents of the 21st century still resist computer technology and instead rely on typewriters, pens, and paper to communicate. If they have libraries, they may use catalog cards rather than databases, and I say, "Good for them!" Many philatelists, however, embrace the new technology and use computer programs to help

Germany Sc2068, issued on 17 February 2000, to commemorate the 600th birthday of Johannes Gutenberg. The stamp has as its background a specimen sheet of Gutenberg's printing type. The central portrait is based upon a copperplate engraving made by André Thevet for his two-volume work, *Vrais Portraits et Vies des Hommes Illustres, Grecs, Latins et Paiens* (Paris, 1584). Even though the original engraving states that the portrait represents "The true Effigies of Iohn Guttemberg Delineated from the Original Painting at Mentz in Germanie," the great man's portrayal in a fur cap with a flowing beard is probably based entirely on the artist's imagination, since no portrait from life is known to have survived.

organize their stamp collections. Others communicate using the Internet and email. EBay and other internet auction houses are major sources for their new stamp acquisitions. And I say, "Good for them, too!"

The most recent "shoe to drop" would take these developments to another level (or "depth," depending upon your point-of-view). The hugely popular search engine, Google, is only the latest organization or person to advocate "replacing" the codex book; the earlier Project Gutenberg, a library of 17,000 free e-books whose copyright has expired in the United States, also comes to mind. Google wants to digitize the world's books that are in public domain and make them available to

anyone with a need, and many major libraries have agreed to open their stacks in cooperation.

Jason Epstein has written a provocative essay, "Books@Google," about these efforts, and I think Epstein's essay (beginning on page 3) is important enough to devote part of this issue of *Philateli-Graphics* to present it to our members. Parts of this introduction and Epstein's story can be illustrated philatelically, and I have therefore added several appropriate stamps that illustrate both, including the new Digital Age.

To contemplate the replacement of books with digital versions is anathema to me, and I don't believe that will happen. Tens of thousands of books are published annually in the United States, and millions world-wide. Books will continue to be published. What will change, I think, will be the access to books and the information they contain. Indexes to 19th-century books, for example, already abound on the market, made possible by software that allows one to scan the pages of an older book digitally, then extract key words (subjects) and organize those subjects to create a new index. Another example: type in "Gutenberg" for an electronic Google search, and you will get 2,250,000 "hits" on that subject, the most relevant listed first.

My guess is that most books available as digital versions will not be read on the screen, but will rather be printed on paper and read (with passages highlighted and page corners dog-eared) in the traditional way. We can always hope!

Greece Sc1193, issued on 8 December 1976 to commemorate the 500th anniversary of printing the first book wholly in Greek, the Greek Grammar of Constantine Lascaris (Milan: Diogini da Paravicino, 30 January 1476). The font is thought to have been designed by the Cretan, Demetrius Damilas. Is Lascaris grist for Google's digital mill?

Books@Google
by Jason Epstein

The expanding jumble of art, science, metaphysics, practical knowledge, merchandise, gossip, and other trivia stored electronically on the World Wide Web is directly descended from the unprocessed babble transmitted haphazardly by word of mouth and from place to place from which our ancestors forged the wisdom of our species. For millennia this babble had been held in tribal memory, in languages and cultures long forgotten, until the exigencies of burgeoning commerce some six thousand years ago—a recent event in the long career of *Homo sapiens*—compelled the invention of written language, the *sine qua non* of today's documented world including the Web itself.

Venda Sc62, a clay tablet from southern Mesopotamia (4th millennium B.C.E.) from The History of Writing series, showing a clay tablet with pictographs for trees, sacks of grain, and farming implements. The image is actually a mirror image of the original in the Louvre, Paris.

The invention during World War II of electronic memory and of the World Wide Web a mere seventeen years ago originally as a way for scientists to communicate with distant colleagues is a further—perhaps the ultimate—evolution of the momentous transition from collective memory dependent largely on mnemonic verse to prosaic inscription on clay, stone, and paper. With these primitive tools human beings were at last able to record, in language of great beauty and profound understanding, the lore and wisdom accumulated during our long prehistory. What further triumphs of the human spirit may be shaped from the World Wide Web, should our species survive its current follies, are beyond imagining.

In 1998 two Stanford graduate students, Larry Page and Sergey Brin, founded Google.com, a search engine that uses a better technology than had previously existed for indexing and retrieving information from the immense miscellany of the World Wide

Web and for ranking the Web sites that contain this information according to their relevance to particular queries based on the number of links from the rest of the Internet to a given item. This PageRank system transformed the Web from its original purpose as a scientists' grapevine, and from the random babble it soon became a searchable resource providing factual data of variable quality to millions of users. And once again it was the exigencies of commerce that transformed Google itself from an ingenious search technology without a business plan to a hugely profitable enterprise offering a variety of services including e-mail, news, video, maps, and its current, expensive, and utterly heroic, if not quixotic, effort to digitize the public domain contents of the books and other holdings of major libraries. This new program would provide users, wherever in the world Internet connections exist, access to millions of titles while enabling libraries themselves to serve millions of users without adding a foot of shelf space or incurring a penny of delivery expense.

Spurred by Google's initiative and by the lower costs, higher profits, and immense reach of unmediated digital distribution, book publishers and other copyright holders must at last overcome their historic inertia and agree to market their proprietary titles in digital form either to be read on line or, more likely, to be printed on demand at point of sale, in either case for a fee equal to the publishers' normal costs and profit and the authors' contractual royalty, thus for the first time in human history creating the theoretical possibility that every book ever printed in whatever language will be available to everyone on earth with access to the Internet.

Not everyone welcomes the revolution
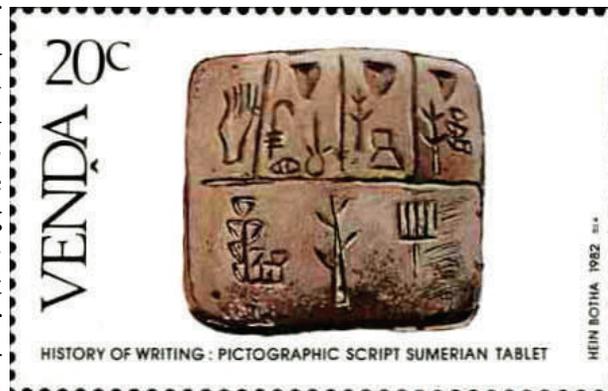
wrought by Google. Jean-Noël Jeanneney, director of the Bibliothèque Nationale, worries that national libraries, including his own, will suffer under Google's worldwide dominance, but nothing prevents the Bibliothèque Nationale and its counterparts from digitizing their own collections or permitting Google to do it for them as Oxford's Bodleian Library has done. Chris Anderson, the editor of *Wired*, writes that the vast "shelf space" of the Web permits virtually limitless digital content whose variety creates heretofore unexpected demand for relatively obscure or specialized items in a heterogeneous marketplace whose aggregate audience with its multiform interests far exceeds that for best sellers, whose current dominance reflects today's highly centralized retail structure dependent on quick turnover of largely undifferentiated items.

The radical decentralization of the digital marketplace has already been demonstrated in the music industry and preliminary evidence suggests that greater choice will, as Chris Anderson foresees, create greater demand for a wide range of books as well. An obvious example is books in Spanish to serve the 40 million Hispanics now living in the United States and poorly served by sparse retailers. According to Mark Sandler, an experiment by the University of Michigan Library involving the digitization of 10,000 "low use" monographs offered on the Web produced between 500,000 and one million hits per month. In the past, these works were accessible, Sandler writes, to a base population of 40,000 students, faculty, and staff. That's about four readers for each book included in the project. When electronic versions of these works were made accessible to the entire world, suddenly 40,000 potential readers became 4 billion, and the odds of consumer interest jumped from 4:1 to 400,000:1. Add to that the extent to which Web access overcomes the impediments of physical delivery—request a book (sight unseen) from storage, wait twenty-four hours for delivery, come physically to the library to pick it up, etc. Electronically, we're talking about instant gratification of a one in a million need. This is a service dream come true for libraries and library users, especially those without immediate access to a great research library collection. Fear of a worldwide Google monopoly may therefore be unfounded as rivals add specialized segments to Google's own long and lengthening tail.

Google was not the first search engine to filter the contents of the Web, but its PageRank innovation has become the most popular way to arrange Web sites on a given subject according to their possible relevance to specific queries. Google's inventors were also not the first to grasp the commercial implications of a technology that brings millions of searchers to specific topics and thus guides self-selected customers to a vast range of goods and services; but Google's unique technology provides the most efficient means for juxtaposing ads with appropriate search results. Hundreds of thousands of advertisers, most of them small businesses, bidding at auction for placement adjacent to Web sites of interest
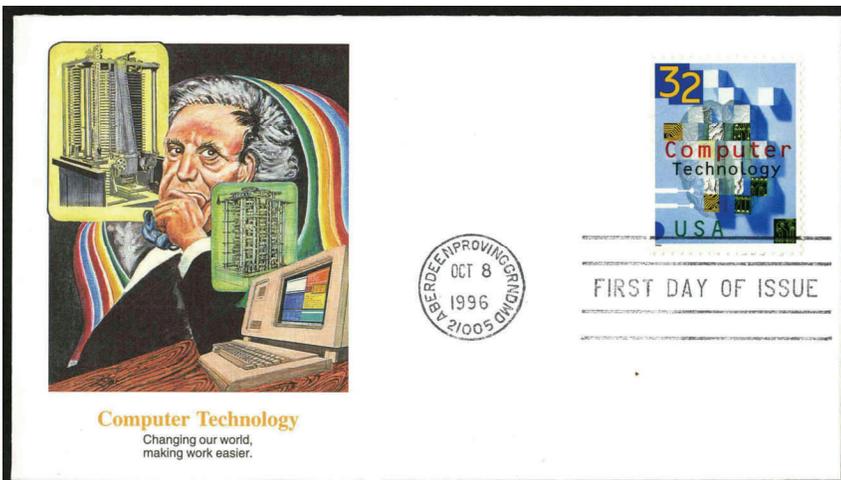
United States Sc3106, on a Fleetwood First Day Cover, issued on 8 October 1996 to honor Charles Babbage, the "father of the computer," who conceived the fundamental principles of the computer in 1822 with his steam-powered Difference Engine. The stamp commemorates the birth of the modern computer by honoring those individuals who created ENIAC at the University of Pennsylvania in 1946. The stamp is a composite design, consisting of many elements, produced entirely on computer, as most 21st century stamps are. David K. Stone painted the portrait of Babbage, and Nancy Skolos and Tom Wedell designed the composite image used on the stamp.

to their potential customers, now pay Google for each time a searcher clicks through to their site, making Google one of the richest corporations in the world: in effect an inter-active yellow pages of infinite variety serving a radically democratized world market.

The self-proclaimed goal of Google's ideal-istic founders is to practice virtue, which is reflected in the company's unofficial motto, "don't be evil." The confrontation of founders who wish to do only good with the complex reality of their astonishing commercial achievement is an issue of biblical scope which calls to mind the expulsion, naked and trembling, of our ancestral parents from prelapsarian Eden into a world where choice is obligatory and error inevitable, a blessing and a burden upon themselves and what Milton called, with mixed feelings, their hap-less seed.

Google's encounter with the complex laws of copyright is an interesting case involving a novel contradiction within the law created by the technology of digitization. Copyright law permits so-called "fair use," that is the right to copy short citations from protected works without payment, for instance in reviews and scholarly articles. Before digitization this was simply a matter of finding the desired cita-tion in a printed text and copying it with at-tribution into one's own work. But for Google to provide this opportunity to its users, it must first digitize the entire text, which vio-lates the provision of copyright law that for-bids copying more than a brief passage. Law-yers for Google and the publishers will con-tinue to exchange Talmudisms on this con-flict until book publishers decide to enter the digital world to everyone's advantage includ-ing their own and that of their authors. The issue will then be moot. Meanwhile the law-yers quibble and bill.

According to David Vise in *The Google Story*, the idea for Google Book Search oc-curred to Larry Page, Google's co-founder, when he was still a Ph.D. candidate at Stan-ford and recalled his difficulty as a high school student in finding the manuals he needed for assembling electronic gadgets. In graduate school he encountered a more se-vere version of the problem. "Right now," he

said, "it is really hard for scholars to work out-side their area of expertise because of the physical limitations of libraries." What he envi-sioned was an electronic library loan system in which libraries would lend one another titles digitally rather than ship physical copies. From this practical insight grew Google Book Search with its commitment to digitize as many as 20 million public domain titles from the collec-tions of major libraries and to challenge pub-lishers of protected works by copying their au-thors' property to permit allowable citations. How money is to be made from this vast project remains unclear and may have been a matter of indifference to the public-spirited Page when he conceived it, but sooner or later Google and its avatars will become not only the world's multilingual library of libraries but a universal bookstore offering millions of titles to readers worldwide and monetization will follow, raising the theoretical possibility that every book ever printed in whatever language may indeed be accessed wherever Internet connections exist.

Page's original conception for Google Book Search seems to have been that books, like the manuals he needed in high school, are data mines which users can search as they search the Web. But most books, unlike manuals, dic-tionaries, almanacs, cookbooks, scholarly jour-nals, student trots, and so on, cannot be ade-quately represented by Googling such subjects as Achilles/wrath or Othello/jealousy or Ahab/ whales. The *Iliad*, the plays of Shakespeare, *Moby-Dick* are themselves information to be read and pondered in their entirety. As digitiza-tion and its long tail adjust to the norms of hu-man nature this misconception will cure itself as will the related error that books transmitted electronically will necessarily be read on elec-tronic devices. Only those who have not read the *Iliad* or *Moby-Dick*, or *Bleak House* or *Swann's Way* or *The Origin of Species*, will en-tertain this improbability. Until human beings themselves evolve as electronic receivers, read-ers will select such books as these—the em-bodiment of civilizations—as files from the World Wide Web, whence they will be transmit-ted either to a personal computer and printed out—a cumbersome procedure resulting in a stack of unbound sheets—or, much more sat-isfactorily, to a nearby machine not much big-
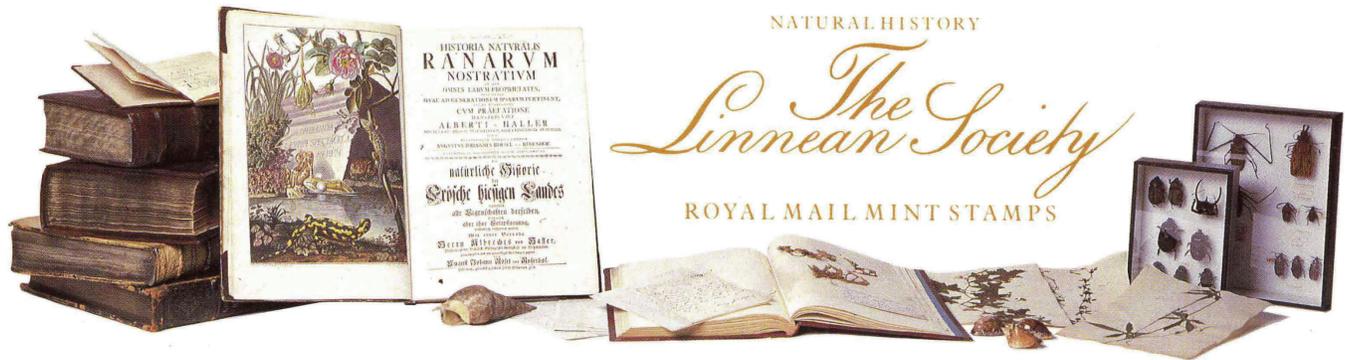
Great Britain Sc1201-1204, issued on 19 January 1988, to commemorate the 200th anniversary of the Linnean Society of London. In his publications, Carl Linnaeus (Carl von Linné, 1707-1778) provided a concise, usable survey of the world's plants and animals as then known, about 7,700 species of plants and 4,400 species of animals. These works helped to establish and standardize the consistent binomial nomenclature for species which he introduced on a world scale for plants in 1753, and for animals in 1758, and which is used today. His *Systema Naturae* 10th edition, volume 1 (1758), has accordingly been accepted by international agreement as the official starting point for zoological nomenclature. Books by Linnaeus that are held by the Bodleian Library are among those that will be digitized by the Google Library Project. Since its founding in 1602 by Sir Thomas Bodley, the Bodleian Library's mission has been to serve the worldwide "Republic of Letters," by making the Library's collections open to all who have a need to use them. More than 60% of readers who use and work in the Bodleian Library have no direct affiliation with the University of Oxford. Ronald Milne, Bodley's Librarian, states that "the Google Library Project . . . testifies to our ongoing commitment to enable and facilitate access to our content for the scholarly community and beyond. The initiative will carry forward Sir Thomas Bodley's vision and the ethos of the Bodleian Library into the digital age, allowing readers from around the world to access the Library's collections over the World Wide Web."

ger than an ATM which will automatically print, bind, and trim requested titles on demand that are indistinguishable from factory-made books, to be read as books have been read for centuries.

Meanwhile Google, together with the Gutenberg Project and the Open Content Alliance, and similar programs, has turned a new page in the history of civilizations leaving to us the privilege and the burden of carrying the story further. As part of this effort, On Demand Books has installed in the World Bank bookstore in Washington, D.C., an experimental version of a machine such as I have just described, one that receives a digi-

tal file and automatically prints and binds on demand a library-quality paperback at low cost, within minutes and with minimal human intervention—an ATM for books. A second experimental machine has been sent to the Alexandrina Library in Egypt and will soon be printing books in Arabic. A newer version will be installed later this year [2006] or early next year in the New York Public Library.