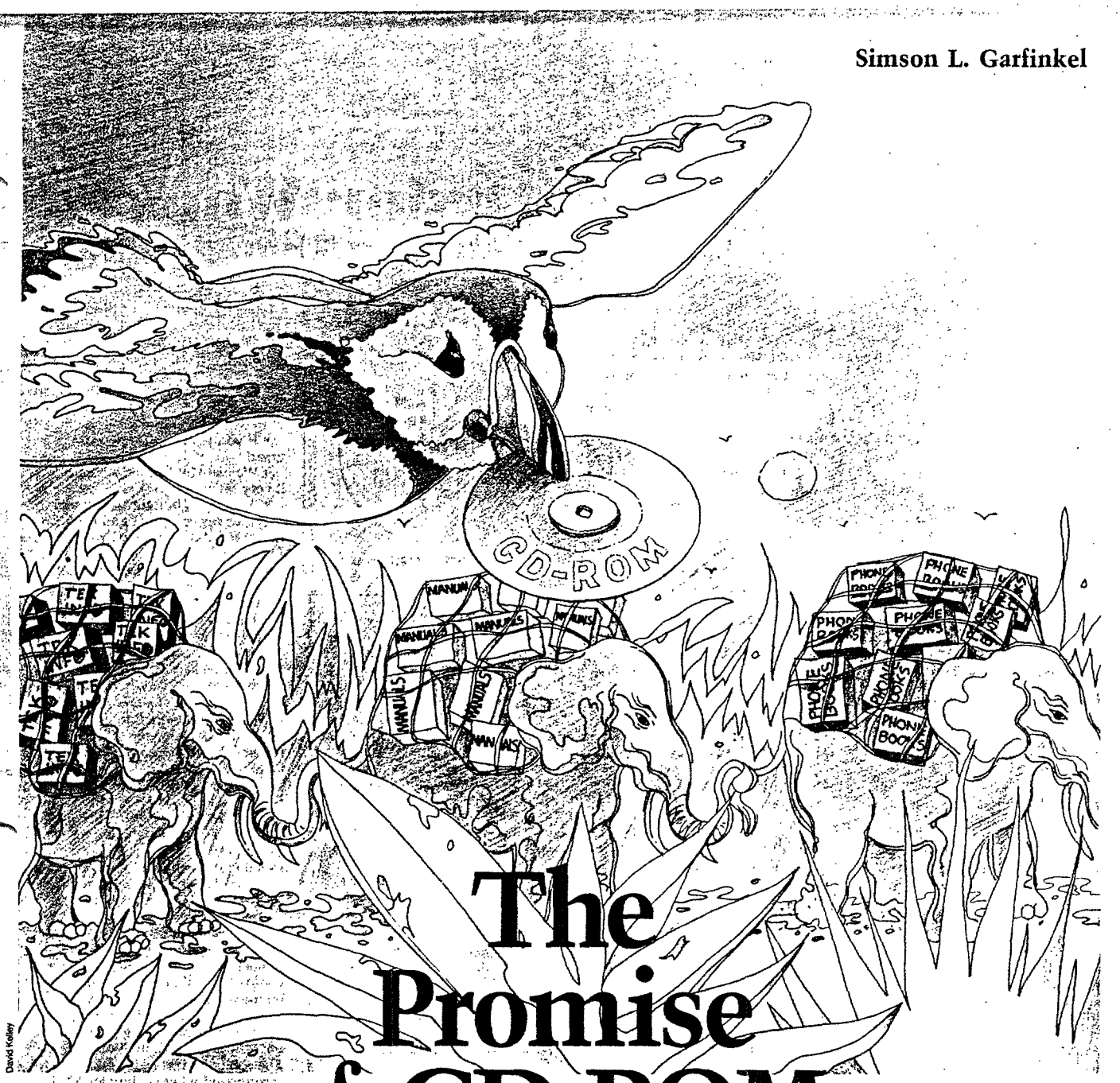
Simson L. Garfinkel




David Kelley

# The Promise of CD-ROMs

**CD-ROMs hold the promise of giving us information we can use to solve our own problems, even when those problems have nothing to do with computers.**

Doctor Robert Hogan had a problem: A man in his seventies had been feverish for nearly three weeks. Although the patient was thought to have a respiratory infection, he didn't respond to any of the medications he was placed on; in fact, he got worse.

"Someone had the presence of mind to order the appropriate lab work," says Dr. Hogan. Soon, the attending physicians suspected that the patient had a form of drug-induced lupus. But from which drug? Of the six drugs he was taking, which one might be working alone or with something else to bring about the condition?

Fortunately, Dr. Hogan had brought to the hospital a portable computer equipped with a new kind of peripheral: a CD-ROM drive. In the drive was a silver disk that contained the full text of the *Physician's Desk Reference*, the standard reference of prescription drugs. "In about 15 seconds, the *PDR* on CD-ROM produced a list for me of every drug mentioned in association with lupus in the entire *PDR*—about 25. It was as though I could read the entire *PDR* in 15 seconds and extract those references to the clinical question which was raised.

"We could make a very confident statement that the patient was not taking any drugs associated with development of drug-induced lupus," says Dr. Hogan, who practices in California and writes a column on computers for the *Journal*

*of the American Medical Association.* "Personally, I think that it's the kind of software that justifies the purchase of the hardware to operate it."

For aircraft mechanics, another CD-ROM is available, which contains the entire maintenance manual for the Boeing 757 aircraft—on paper, the

## One of the places where CD-ROM has made its biggest impact is in the library.

books come to a stack of seven feet, weighing 140 pounds. Type the words "autopilot" and "flaps," and the computer will tell you every section where the two words occur together. For programmers, Microsoft has produced the *Programmer's Library*, a collection of 19 manuals and reference books for PCs, all on one disk. Like the *PDR*, these disks can be searched in seconds for any paragraph or page that contains one or more key words. The Microsoft disk even has sample programs on it to show how tricky programs are done.

Each CD-ROM—short for compact disk read-only memory—gives a personal computer instant access to over 552 megabytes of information: the equivalent of more than 225,000 pages of single-spaced typewritten text, or 1,500 floppies. That's enough space to store the complete *Oxford English Dictionary*, 12 English-to-foreign-language dictionaries, or the 300 phone books listing everyone living in New York and New England. CD-ROMs containing those databases, and hundreds of others, are now available for purchase.

After three years of promise, CD-ROM has finally become a force of its own, making lives easier for hundreds of thousands of users across the country. Many of the people who have been touched by this new technology, which is essentially the same as audio compact disks sold in music stores, have had little other contact with computers. Indeed, the CD-ROM's promise is that it gives people information they can use to solve their own problems, even when those problems have nothing to do with computers.

One of the places where CD-ROM has made its biggest impact is in the library, where CD-ROM indexes of articles are available on subjects including art, business, law, medicine, psychology, science, and sociology, to name just a few.

In the Boston Public Library, and in many universities in the metropolitan Boston area, library patrons can walk up to the system and get a detailed printout of every article published on a particular subject almost instantly. That can be an overwhelming amount of information; luckily, most CD-ROM systems provide tools for dealing with information overload.

Typing "FIND AIDS" on the *PsycLIT* search system at Boston University returns 802 different journal articles about the deadly disease. "FIND CANCER" returns 1,027 articles. But if the patron wants only articles that mention both AIDS *and* cancer, she can type "FIND AIDS AND CANCER." The computer responds with the common references: just 14, to be precise.

CD-ROM-based systems are easier to use than the dial-up mainframe-based search systems, such as *Dialog* and *Dow Jones News Retrieval*, because they're screen-oriented and exploit specific features of personal computers, such as sound and color. CD-ROM systems are also faster. And, unlike a dial-up service, there's no hourly charge for using CD-ROM, just a one-time purchase or yearly subscription price.

In 1987, CD-ROM publishers pressed 164,700 disks under 750 different titles, says John Gale, president of Information Workstation Group, a consulting firm. The single biggest seller was Lotus *One Source*, a database of current financial information that's updated weekly and shipped to subscribers via Federal Express.

Prices for CD-ROMs break into three main categories: some applications, like *One Source*, cost $5,000 per year or more for subscriptions. (*One Source*, in fact, can cost up to $50,000 a year, depending on the particular databases subscribed to.)

Then there are many databases available in the $200 to $2,000 price range. Most of the bibliographic search systems fall into this category.

Last, there are the budget-priced CD-ROMS, from $200 down to $29. Many of these disks are simply collections of public-domain programs—the customer pays for the convenience of having all of the programs gathered in one place.

Information on a CD-ROM is recorded in one, long spiral track as a series of pits and flat spots that correspond roughly to the 1s and 0s of the data stream. CD-ROM stores so much information because the track is so narrow: There are 16,000 tracks per inch on a CD-ROM, compared with 96 tracks per inch on a floppy disk. If the CD-ROM track could be unwound, it would be more than 3.5 miles long.

The storage capacity of the disk is further increased by recording data on the disk at a constant linear velocity—which means that the disk spins more slowly when the head is reading from the outside tracks than when it's reading from the inside ones. The Apple Macintosh uses this same technique to increase storage space on its microfloppy disks, while at the same time improving reliability.

But the high storage comes at a price: CD-ROM drives are typically much slower than hard disks, principally because the disk must change the rate at which it spins as the laser moves from the inner tracks to the outer ones. Drives with seek times of 500 msec are typical; the fastest CD-ROM drive on the market has an average access time of 300 msec. Compare this with 12 to 17 msec of the fastest hard disks, and you'll understand why some CD-ROM applications copy parts of their database onto the PC's hard disk when they start up.

Other costs are associated with CD-ROM, in the form of dollars that need to be spent on the CD-ROM drive. Most CD-ROM players today cost between $800 and $1,200; the prices haven't dropped significantly in more than a year.

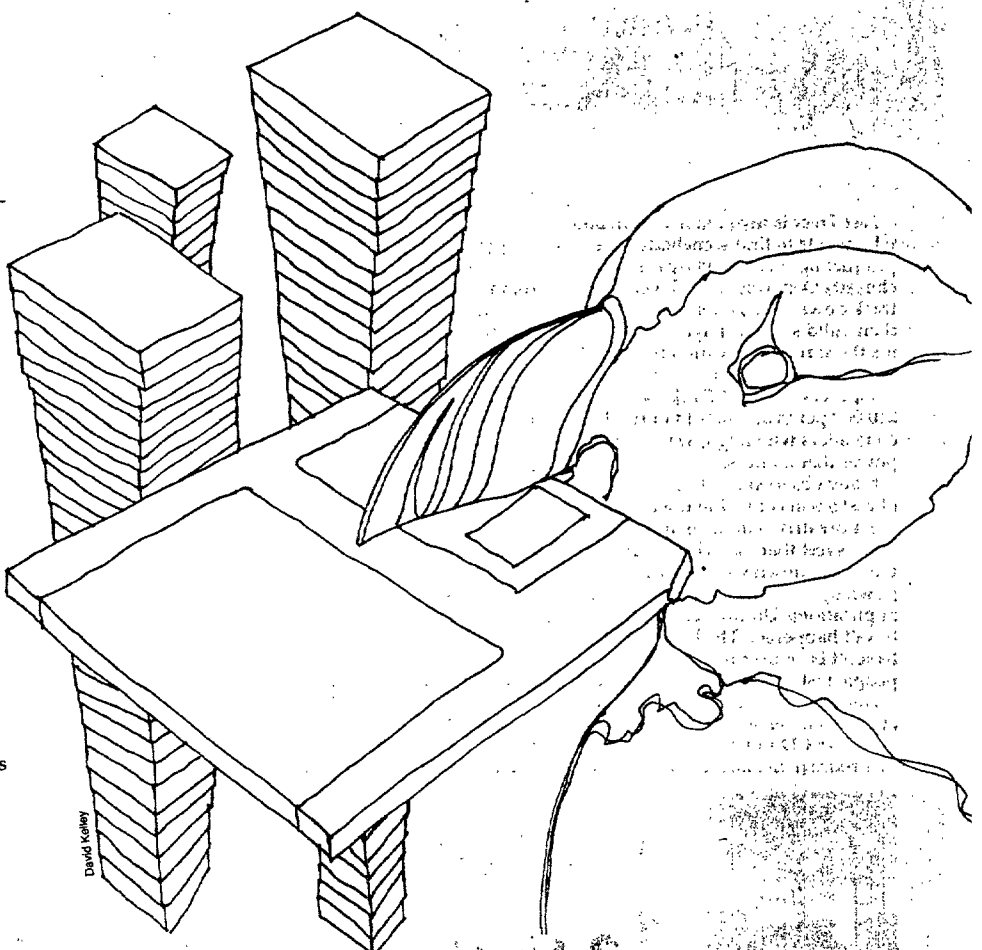
"A lot of the companies have decided that they want to stick with this price-skimming strategy," says Barry Cinnamon, president of the CD Bureau of Electronic Publishing, in Upper Montclair, NJ, which has been trying to make a business of selling CD-ROMs to consumers.

Barry's advertised prices have undercut almost every other seller of CD-ROMs in the marketplace—and have drawn complaints from several manufacturers. "They figure they can charge a lot of money for these drives," Barry says, and they want to do so for as long as possible.

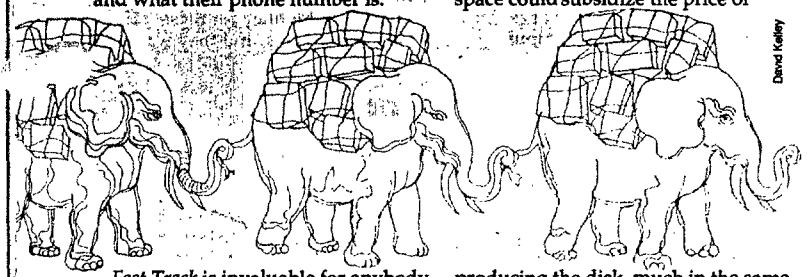
The high prices of the drives may explain why the CD-ROM industry has been so slow to take off. In 1986, Link Resources, a New York-based research and consulting firm, anticipated that 153,000 CD-ROM drives would be sold by the end of 1988; in actuality, the real numbers were closer to 50,000, according to more recent studies.

Another factor that has held off CD-ROM is the high cost of the disks themselves. In many cases, information providers have priced themselves into very small niche markets. The *Drug Information Center* is a database containing detailed information on virtually every single drug sold in the United States—an invaluable reference for physicians, hospitals, and even individuals. But the product's price—$1,950 per year for a subscription that's updated once every six months—places it out of reach of all but the wealthiest medical libraries.

An even better example is a product called *Fast Track*, produced by NYNEX Information Resources, which contains a compilation of the 300 phone books in New York and New England. With *Fast Track*, you



can simply type somebody's name, and the computer will tell you the street, city, and state he lives in. Or you can give *Fast Track* an address, and it will tell you who lives there and what their phone number is.




*Fast Track* is invaluable for anybody who wants to find somebody: The product has been used by the Massachusetts Department of Revenue to track down fathers delinquent on their child support payments. Indeed, it's the sort of application that would sell drives, the way *VisiCalc* sold computers. But *Fast Track* costs $10,000 per year—far out of reach of consumers who might want the power that it offers.

Many observers feel that the price of disks will come down when there are more drives in the marketplace. Others feel that the price of drives will come down when they are forced down by the availability of low-cost applications. Unfortunately, this hasn't happened: The low-cost disks haven't been useful enough to make people justify the purchase of a drive.

One way of breaking this vicious cycle might be by placing advertisements on CD-ROMs. The programs that retrieve the information could also present the advertisements to the CD-ROM users. These ads could use computer graphics and music to get their points across, and the revenue gleaned from selling the advertising space could subsidize the price of producing the disk, much in the same way that advertisements are sold in newspapers and magazines to defray the costs in those publishing mediums.

Another possibility would be for CD-ROM publishers to offer lower-cost versions of their products for the mass market, with either restricted features or slower performance. Unfortunately, most CD-ROM publishers seem uninterested in making their products available at lower prices, even if it means expanding their markets.

**What CD-ROM isn't.** CD-ROM isn't a replacement for hard disks. But CD-ROMs also aren't merely a temporary step until write-once-optical or erasable-optical disks are widely available.

Roger Struckhoff, a long-time follower of the CD-ROM field, explains it this way: "When Gutenberg invented movable type, you didn't have people standing around and asking, 'So, Johann, when are you going to have erasable?'"

Simply put, CD-ROM is a *publishing* standard. CD-ROM gives companies that sell information a simple, cheap, and standardized way to distribute 552 megabytes on a single disk. A thousand CD-ROMs can be pressed for less than $1.50 per disk, and, ever since the adoption of the ISO 9660 CD-ROM data format, the same disks can be read on PC-compatible computers, Macintoshes, and any other machines with appropriate driver software.

Selling that information on a read-only device eliminates the possibility that the information might be changed at a later time. This is one of the reasons that schools are so excited about putting educational software on CD-ROM, says Martha Steffen, a self-described "CD-ROM evangelist" who works at Apple Computer—students can't corrupt programs used by courses, either by accident or maliciously.

Another advantage, Steffen says, is that a single CD-ROM could hold an entire year's worth of courseware for an entire school, kindergarten through 12th grade: Tied to a network, any computer in the school could access the data.

Microsoft recently announced that it will be providing updates to its programming languages on CD-ROM as an option. That will change the task of doing an update from loading 15 to 20 floppy disks into a computer to simply inserting one CD-ROM and running a program, says Susan Lammers, director of the CD-ROM group at Microsoft.

Inside the BCS, the CD-ROM Group has recently merged with the Hypermedia group, says Larry Gussin, who edits the *Hypermedia/Optical Disk Publishing Newsletter*. "There's a lot of overlap," Gussin says, because CD-ROM naturally lends itself to interactive, multimedia databases.

Although the group is currently engaged in two hypermedia projects, Gussin says, its most important goal right now is building its membership base. This April, it will be having a state of the optical publishing industry meeting, followed by a panel discussion on optical publishing strategies in May.

The BCS Macintosh Group has a CD-ROM player for interested users to see. To see a CD-ROM drive on a PC, try stopping by Abt Books in Harvard Square, Cambridge, the world's only store-front CD-ROM bookstore.

The Hypermedia/Optical Group hasn't made any effort to secure CD-ROM drives at reduced cost to members, Gussin says, because there hasn't been enough interest. Indeed, it doesn't make sense to purchase a CD-ROM drive unless there's a particular CD-ROM application you want to use. But once you have that drive—and a few disks to play in it—a whole new world of information will open, one that promises to grow by leaps and bounds within the next few years. ◘

---

*Simson L. Garfinkel is a freelance journalist and computer consultant living in Somerville, Mass. Copyright 1989 by Simson L. Garfinkel.*

MicroPRINT
the professional difference

PostScript at its Best

2 Linotronics (2540 & 1270 dpi)
Mac & Laser Rentals
QMS Color Printing
400 dpi Scanning
Conversions

MicroFLASH
In XPress 2, you can create
11" x 48" pages
on the Linotronic, without tiling.
(Check next month's ad for another tip)

Daily, Weekly & Monthly
RENTALS
Great Prices

Call (617) 890-7500