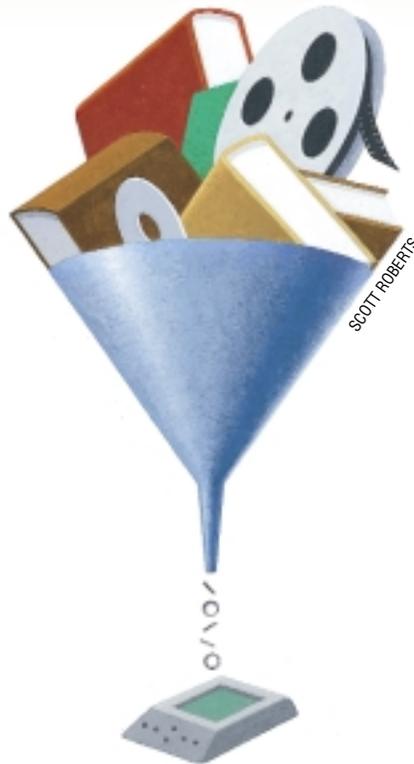


# Work

by Jeffreys Copeland and Haemer



*Don't sweat it—it's not real life. It's only ones and zeroes.*

— Gene Spafford

*It is also the story of a book ... never published on Earth, and ... never seen or even heard of by any Earthman.*

— “The Hitchhiker’s Guide to the Galaxy,”  
Douglas Adams

## Reading Revisited

Consider a bit stream. If it consisted of a million, eight-bit bytes, it might contain about seven seconds of music from a compact disk (CD), or a minute of MP3. Or it might contain a few seconds of a movie off a DVD. It might contain a picture from your last vacation at 300 dpi. Or it might contain five pages of fax. Or it might contain the platform from one of last summer’s political conventions as simple ASCII text. It could even be the genetic map for an example of *E. coli*. It could be any of those data streams, encrypted. It could be just plain noise.

In the November, 1998 issue of this magazine, we wrote “A Short History of Reading,” (<http://swexpert.com/C9/SE.C9.NOV.98.pdf>) which discussed how the book has evolved over the ages. We explored how the book—a technology that has been relatively unchanged for five millennia—has started to move forward into the electronic age. In the intervening two years, it’s become apparent that books aren’t the

only technology radically affected by this shift. We’d like to spend a few moments considering the implications of that.

We’ll warn you, though, we have no great marketing insight or inside information. We’re just two guys watching from the front porch of the Digital General Store out on Highway 0x17, enough of a backwater that Mr. Protocol rarely even makes it out here. Our opinions are colored by our wild political beliefs, and, in general, come down on the side of our shared preference for small, decentralized solutions (solutions that don’t have central mediating agents for transactions).

Meanwhile, a few more entries have appeared in the electronic reader product lines since our first discussion two years ago. Both SoftBook and NuvoMedia have been purchased by Gemstar. They have licensed the reader technology to Thomson Multimedia, which will begin selling the hardware under the RCA name. Microsoft has weighed in

with its heavily-advertised Reader software, available both for hand-held and desktop devices. (Indeed, no fewer than three ads for the MSReader appeared in a recent issue of *Brill’s Content*, a magazine of media criticism.) Franklin Computer Corp. will have released its stand-alone reading device by the time you see these words. And, as was the case two years ago, Everybook, Inc. plans to ship their product in six months.

We think we may be about at the point of critical mass for hardware. As with telephones a century ago, and fax machines 15 years ago, there may be enough devices capable of acting as electronic readers that it makes sense for publishers to provide electronic versions of books, which will cause folks to buy more devices, and which will generate more need for electronic content, and so on. Copeland’s wife recently became a convert to the Personal Digital Assistant (PDA) revolution, and now even carries her Palm into the washroom. This has given us some insight into the addition-

al uses of a hand-held device, and so we've set our mental product requirements a little higher: We not only want a device that we can use for an electronic book, but we want a device that can act as a reasonable PDA. We want to be able to track our calendars, address books and to-do lists in such a device as well. (This parallels our arguments, in the late 1970s when Wang, IBM, and other companies were attempting to sell stand-alone word processing hardware. Why would you want to buy a machine to do strictly word processing when you can buy a general purpose computer? At the time, we were talking about a single-user PDP-11/03, but it was the IBM PC that finally put both Wang and IBM's Displaywriter division out of business.)



The development of electronic book hardware is following the normal course of an invention. It was a dream, then two years ago became a curiosity, when the first examples appeared. It is on the verge of becoming a mass-produced commodity, like the Palm. Thus, it follows the development cycle of nearly every new manufactured artifact since the industrial revolution. Malcolm Gladwell, however, correctly points out that the velocity of change in the consumer marketplace is increasing. This affects the rate at which new products appear and disappear and the time it takes to cycle from esoteric curiosity to mundane commodity. (And we promise to throw up on the first person who tells us that this reflects the changes inherent in living on "Internet time.")

Mind you, the danger of relying on high-technology for a device that allows you to read can be high. David Brin, in his second Uplift Trilogy, suggests a bizarre science-fictional circumstance under which old technology will save your life, but we prefer the more common reason: we live in constant fear of our batteries running out. Despite the advantages of the new solution, the book is an idea that's been around for so long for a reason. Pen and paper or clay and stylus are technologies that don't require a vast industrial combine to allow you to write down a phone message. It's also a little safer to take a newspaper into the sauna at the gym than an electronic reader; for the moment, we print things from the net and take them home to read, littering pages around the bed and couch like autumn leaves.

But what about the content? Just who is distributing electronic books? Not only the hardware manufacturers, as was the case two years ago, but some of the players you'd expect, such as Amazon and Barnesandnoble.com. Fatbrain is distrib-

uting electronic content under both its "eMatter" and "MightyWords" services. In addition, Boulder, CO-based netLibrary and Bloomington, IN-based 1stBooks Library are providing niche content, such as textbooks. There are a number of more or less samizdat ventures, too. We discovered that there are even online book distributors who specialize in adult material, confirming our suspicion that one of the compelling applications for any new technology is sex.

Of course, the Open eBook Forum is still working on standardization of electronic book formats. In the meantime, when you look for an electronic book online, you must find a distributor who has the book you want in a format compatible with your reader.

Please take as a given our usual plea for open standards and interchange formats. If a publisher can't serve all their potential customers with a single distribution binary, massive confusion results since you need to specify your device when buying a book or other binary. (Imagine having to specify the page size when ordering a paper book.) We argue that part of the reason the IBM PC and DOS took off as a computing platform was that it provided a single distribution target for binaries. We need the same common target for any form of electronic content. Music distribution appears to have coalesced around MP3; video seems to be transmitted in Apple QuickTime format; and for text we are left with ASCII and HTML, neither of which is sufficient for real book or technical publishing. (Yes, XML should solve the problem, but it hasn't yet made sufficient penetration in the real world.)

Also, all this applies to any service that does publishing-on-demand of either a book or a custom CD. These are services that have small installed bases now, and it would be wonderful if their very existence wasn't threatened by strictly electronic publishing, that is transmission of the naked bits themselves directly to the reader.

## Bit Streams

At some level, it doesn't matter what's contained in that megabyte stream we talked about a moment ago. It's just data. Any technique we use for transmitting movies is going to work for books, or music, or bacteria. In UNIX, we use the rule that a file is a file is a file. All files are treated identically—as just bits on a disk. We trust the programs we use that read the data to understand how to process it. For example, `ls` understands that it's looking at a directory file and interprets it correctly; `troff` turns a text stream into printed pages, and `Gimp` displays a picture. Unfortunately, the Digital Millennium Copyright Act (DMCA) prevents you from writing a DVD-watching tool for UNIX. And we don't yet know of an efficient *E. coli*-building utility—other than *E. coli*. (On other operating systems, the data stream has to be tagged with the type of file and the utility that's going to run it. This isn't as convenient, but for purposes of this discussion those details don't matter, much as we abhor the practice.)

On the other hand, it really does matter what's contained in the data stream. Metallica doesn't want their music freely transmitted as MP3s. Stephen King is willing to post his

books as shareware but wants three-quarters of his readers to pay a buck a chapter. (We note that Baen Books, <http://www.baen.com>, was selling fiction a chapter at a time over the Internet for a year before King did it. Of course, Charles Dickens and Herman Melville did it with ink-and-paper even earlier.) The major Hollywood studios will try to prevent you from publishing your software to read a DVD, even if you live in a foreign country. Intellectual property ownership is a real issue.

For quite some time, intellectual property of electronic content was not an issue anyone worried about. We can mark the end of that age with the open letter Bill Gates wrote in 1976, which read, in part, “As the majority of hobbyists must be aware, most of you steal your software ... Hardware must be paid for, but software is something to share. Who cares if the people who worked on it get paid?” That age of sharing is one to which the open-source movement wants to return. Or as Richard Stallman puts it in *The GNU Manifesto*, “In the long run, making programs free is a step toward the post-scarcity world, where nobody will have to work very hard just to make a living. People will be free to devote themselves to activities that are fun, such as programming ...” But in the meantime, before we get to a world of plenty, even Stallman is willing to recognize that programmers should be able to benefit from the fruits of their labors. Certainly, companies such as Red Hat and Cygnus have built entire, profitable, businesses on free software.

Remember, of course, that “free” in this case is ambiguous: it refers to intellectual freedom—free speech—not monetary freedom—free beer. It’s why, semantic arguments between Stallman and Eric Raymond aside, we prefer the adjective “open.” It’s also worth remembering that even in the intellectual freedom promised by the GNU Public License (and its successors like the Artistic License) you aren’t given the absolute freedom to do what you want with the source code—you have to promise to treat it a certain way.

That’s great about the software, but what about the folks at Napster? What about the Grateful Dead? What about cross-stitching grandmothers? It’s really the same issue. Software is data, just like the books and the music and the movies. The real question is how to handle distribution to ensure that the developers’, writers’, filmmakers’, and composers’ rights are preserved.

It’s one thing to be in a position to give something away, as many of us do every day with our software, or as Stephen King and Michael Crichton have done with electronic versions of some of their work. But, there are at least two cases where you don’t want to give something away. The obvious one is that you want to profit from it. More subtle, though, is the case where you want to retain some control over your work. As a case-in-point, remember that all changes to the Perl source, even though it’s public, flow through Larry Wall’s hands. In other words, you want to be able to give away the right to use something without giving away the thing itself. The real issue is the one that consultant and writer Mike Gunderloy nails down: “If the world doesn’t find some way to compensate writers, writing will stop.”

## Distribution Methods

Napster is the poster child for ubiquitous peer-to-peer communications, both good and bad. Napster is based on the same technology used to factor large numbers over distributed networks and to search for signs of extraterrestrial communication by the wonderful SETI@home project at UC Berkeley. (See <http://setiathome.ssl.berkeley.edu> for details.)

But the technology to share MP3 files can also be the technology to prevent creative people from collecting royalties on their work. Worse, even without wholesale file-sharing going on in a peer-to-peer network, a digital work is quite easy to copy. We fully expect to hear lines at the dining room table like, “Hey, honey, when you have a moment, would you beam the ‘White Album’ to my PDA, please?”

For many artists—and for most software developers—the income from some of our work allows us to give some other parts of our work away, while still doing those annoying things like paying the rent and eating. Lost royalties means lost ability to provide more work.

Take the case of the needlepoint ladies. There is a small number of companies, with a small number of artists, who design needlepoint patterns, which then sell for about \$7 each. Like the music industry and Napster, the needlepoint companies have discovered that people have been trading patterns on the Net. Unlike the music industry, needlepoint company Pegasus Designs is willing to document their losses: 40% or about \$200,000 per year. If Pegasus can’t make enough money to keep publishing the work of designers like Marilyn Leavitt-Imblum and providing them with royalties, there won’t be a source for the patterns that little old ladies are now freely trading on the Internet.

The Grateful Dead recently reiterated their belief that their fans should be able to trade recordings of their music, as long as they aren’t profiting from them. The Dead’s attorney, Eric Doney, was quoted in September by the AP saying “If the majority of people can enjoy the music without incurring costs, then there will be no reason to pirate it.” But again, like Stephen King, the Grateful Dead can afford to give up more of their royalties than an unknown group like Portland, OR-based Duoglide or a lesser-known author like Rebecca Wells.

## Solutions

The solution is not the Draconian DMCA, which was used to prevent posting of the source for a Linux DVD driver. The DMCA can be used to stop sales of any device used for circumventing copy protection, even though it is also supposed to allow software developers to use reverse engineering to build interoperable software.

As we’ve said before, copyright law in the United States is shaped more by a desire to protect big corporate copyright holders than to protect individual artists. In a very real sense, copyright law is a Mickey Mouse business, as recent extensions to the life of copyright—protecting Walt Disney’s favorite rodent into the 21st century—make clear.

What we need is not a large, centralized bureaucracy to distribute data, but a way to connect content producers with content consumers.

Ravi Ganesan coined the term “Messyware” in an article in the November, 1999 Communications of the ACM, in which he describes the sort of useful middleman service that organizations such as Yahoo! and Amazon provide. It isn’t particularly efficient for us to search for Janet Evanovich’s Web site or Duoglide’s or Leavitt-Imblum’s to buy something. It makes more sense to find a distribution agent, like Amazon. Our anarchistic tendencies make us prefer that the agent weren’t a large monolithic company. We’d rather have a choice of mediating agents, and that all the money in this scheme weren’t flowing through one set of hands. (We’ll admit that perhaps we’d feel differently if the one set of hands was ours.)

Part of the reason we favor a little inefficiency and anarchy in our Messyware agent is that it prevents complete homogenization of the results. If your only source of book recommendations is Amazon, you’ll tend to read what everyone else is reading. In turn, this will drive publishers to produce a very narrow range of bland blockbuster best sellers—just like what happens with movies from major studios. Interestingly enough, what we want already exists for the rare book world in the form of <http://www.abebooks.com>, a Web site that consolidates the catalogs of independent booksellers.

Ganesan, by the way, was actually attempting to backfill theory like Keynesian economists did after the New Deal: He’s the chief technical officer for CheckFree, a service that electronically transmits payments generated with desktop bill-paying software. However, he may have a point.

We’re less likely to download an article from the Web if we have to subscribe to the service provided by that Web site. How much better to be able to pay only a small fee for the item we want to download, say 10 cents for a copy of William Safire’s column from last Sunday’s New York Times. We downloaded this year’s Hugo-nominated short fiction from the Web for free, but would have much rather paid for it—expecting that the writers would get some royalties—by downloading it from Alexandria Digital Literature at <http://www.alexlit.com>. Unfortunately Alexandria would only let us download some of the short fiction in a reader-specific format for a device we don’t have.

Meanwhile, the Wall Street Journal ran a set of articles on August 18 from Tokyo and Estonia explaining how people overseas have been using their cellular phones to surf the Web and make small micropayments for services, from the daily newspaper to the fee in a parking lot. Those are not services we necessarily want on a cell phone—indeed, we’re opposed to cell phones on the principle that there are times we don’t want to be found—but the idea is a sound one. Small transactions are the bane of credit card companies. It costs more in paperwork than anyone’s profit if we pull out our American Express card to pay for something that costs less than \$5. If we had a simple way to transfer a dime to the Times for Safire’s column, 50 cents to Fantasy and Science Fiction for Harry Turtledove’s Hugo-nominated story, and a buck to the Grateful Dead for an MP3 of “Sugar Magnolia” from their European tour, we’d be more likely to pay for those items.

## Finishing Up

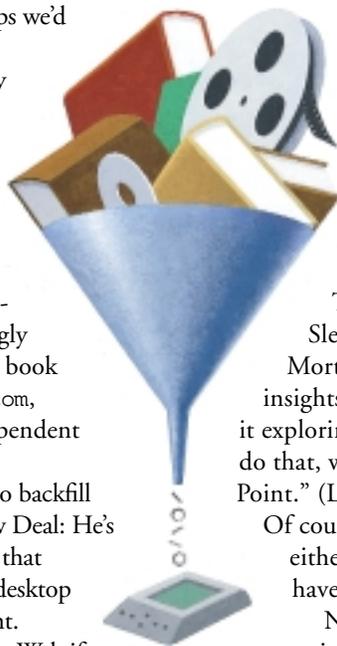
We’ve probably raised more questions than we have answered in the preceding three kilowords. We really don’t know the answers to the distribution problem. We do know that Draconian laws will stifle competition and interchange of both data and information. We do know that without an incentive of some sort—often economic—some creative endeavors just don’t happen. We do know that we’d be interested in seeing experiments in micropayments and subscription services for distribution of digital content, and would likely be willing participants in such experiments.

We need to thank T.K.F. Weisskopf, executive editor at Baen Books, who read “A Short History of Reading” and kept asking questions, as well as providing us with some interesting tidbits about what a book editor really does. We also found that some of Malcolm Gladwell’s pieces from *The New Yorker*, such as “The Science of the Sleeper” (October 4, 1999) and “Clicks and Mortar” (December 6, 1999), provided helpful insights. If we had more space, we would have spent it exploring Gladwell’s ideas in detail. Since we can’t do that, we’ll just recommend his book “The Tipping Point.” (Little Brown, 2000, ISBN 0-316-31696-2.)

Of course, none of the opinions expressed here are either Gladwell’s or Weisskopf’s: as usual, you have to blame us, personally.

Next time, we’ll see if we can come up with an appropriate calendar program for the new year, the real start of the new millennium, and our 101st column for this magazine and its predecessors. Until then, happy trails.

Quick final note: On the day the proofs of this column arrived on our desks, Napster and German publishing giant Bertelsmann AG reached an agreement. Bertelsmann will drop its participation in the copyright infringement suit mounted by the major record labels against Napster and make an investment in the company. In exchange, Napster will switch to a membership-and-subscription-based service and pay royalties to artists and their recording labels. We’d have preferred to see a pay-per-play micropayment scheme as a solution instead, but this is probably both simpler to administer and less of an experimental challenge for an already fraught business relationship. ✍



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Note: The software from this and past Work columns is available at <http://alumni.caltech.edu/~copeland/work> or alternatively at <ftp://ftp.cpg.com/pub/Work>.